CITY OF ALAMEDA

SPECIFICATIONS AND PLANS

FOR

CYCLIC SEWER REPLACEMENT PROJECT, PHASE 16

NO. P.W. 05-19-26

MANDATORY PREBID MEETING:	August 19, 2019, 11:00 a.m.
LOCATION:	City Hall West 950 W. Mall Square, Conference Room 156 Alameda, CA 94501
BID DUE DATE:	August 26, 2019 by 2:00 p.m.
LOCATION:	Public Works Department 950 W. Mall Square, Room 110 Alameda, CA 94501

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

		Page No.
Section I.	Proposal and Contract Requirements	1
Section II.	Legal Relations and Responsibilities	5
Section III.	Scope of Work	21
Section IV.	Control	24
Section V.	Control of Materials	28
Section VI.	Prosecution and Progress	29
Section VII.	Measurements and Payments	32
Section VIII.	Special Provisions	35
Section IX.	Quantities	36
Section X.	Materials	38
Section XI.	Description and Location of Work	39
Section XII.	Construction Details	41
Section XIII.	Mandatory Pre-Construction Meeting Submittals	64
Exhibit A	Bidder's Proposal	
Exhibit B	Contractor's Certified Payroll Forms	
Exhibit C	List of Processors	
Exhibit D	Contractor Agreement	
Exhibit E	Emergency Form	
Exhibit F	Performance Bond Form	
Exhibit G	Payment Bond Form	
Exhibit H	Bidder's Bond	
Exhibit I	List of Submittals	
Exhibit J	City's Integrated Pest Management Plan	
Exhibit K	Project Stabilization Agreement	
Attachment A	Trench Excavation Construction Standards	
Attachment B	Geotechnical Evaluations by Miller Pacific Engineering Group and Ninyo & Moore	
Attachment C	Applicable City of Alameda Standard Plans and Details	
Attachment D	East Bay Regional Parks Sample Encroachment Permit Application and Insurance Requirements	
Attachment E	East Bay Communities Regional Standards For Sanitary Sewer System Installation, Rehabilitation And Repair; June 30, 2016	
Attachment F	Technical Provisions for Construction	

CITY ENGINEER'S APPROVAL

THE PROJECT SPECIFICATIONS CONTAINED HEREIN, FOR THE CYCLIC SEWER REPLACEMENT PROJECT, PHASE 16, NO. P.W. 05-19-26, HAVE BEEN APPROVED BY THE CITY ENGINEER IN ACCORDANCE WITH CITY OF ALAMEDA ORDINANCE NO. 3154 AND CALIFORNIA GOVERNMENT CODE 830.6.

Scott Wikstrom, P.E. C56266
City Engineer
City of Alameda, CA

7/30/2019
Date

CITY OF ALAMEDA, CALIFORNIA

SPECIFICATIONS, SPECIAL PROVISIONS AND PLANS
FOR
PUBLIC WORK

SECTION I. PROPOSAL AND CONTRACT REQUIREMENTS

A. GENERAL INFORMATION. The City of Alameda will receive sealed bid at the time and place specified in the advertisement calling for bids for:

CYCLIC SEWER REPLACEMENT PROJECT, PHASE 16
NO. P.W. 05-19-26

Electronic specifications and bidder's forms for bidding this project can only be obtained at the City of Alameda website, http://alamedaca.gov/business/bids-rfps, www.cityofalamedaca.gov/Business/Bids-RFPs, or by calling (510) 747-7900. There is no cost for the specifications. **It is the responsibility of each prospective bidder to check the website periodically for updates, such as Addenda.**

B. EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK. The bidder is required to examine carefully the site and the proposal, plans, specifications and contract forms for the work contemplated, and it will be assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, the special provisions and the contract.

C. DESIGNATIONS. As used herein "City" shall mean the City of Alameda; "Council" or "City Council" shall mean the Council of the City; "City Manager" shall mean the City Manager of the City; "Engineer" or "City Engineer" shall mean the City Engineer or City Engineer's designee of the City; "Director" shall mean the Public Works Director of the City; and "Contractor" shall mean the bidder who is awarded the contract for the work.

D. PROPOSAL FORM. All bids must be made upon blank forms which are included in these specifications. (Exhibit A)

All bids must give the prices proposed **in figures.** Bids must be signed by the Bidder. If the proposal is signed by an individual, that individual's name and business address must be shown. If made by a firm or partnership, the name and the post office address of each member of the firm or partnership must be shown. If made by a corporation, the proposal must show the name of the state under the laws of which the corporation was chartered and the names, titles, and business addresses of the president, secretary and treasurer.

E. PRESENTING AND MARKING OF BIDS. Bids must be presented to the Public Works Department, 950 W. Mall Square, Room 110, Alameda, California, under sealed cover, plainly marked on the outside, "**CYCLIC SEWER REPLACEMENT PROJECT, PHASE 16, NO. P.W. 05-19-26**" no later than **2:00 p.m.** on the date set forth in the following paragraph.

A **mandatory** pre-bid meeting will be held at City Hall West, 950 W. Mall Square, Conference Room 156, Alameda, California, 94501 on August 19, 2019. City reserves the right to hold additional prebid meetings as necessary for contractors to visit the site.

Bids will be opened in the Public Works Department, 950 W. Mall Square, Room 110, Alameda, California, **at 2:01 p.m. on August 26, 2019.**

F. BIDDER'S GUARANTY. All bids shall be accompanied by one of the following forms of bidder's guaranty: cash, a cashier's check, a certified check, or a bidder's bond executed by an admitted surety insurer, made payable to the City of Alameda. The security shall be in an amount equal to at least ten percent (10%) of the amount bid. A bid shall not be considered unless one of the forms of bidder's security is enclosed with it. If, in lieu of depositing cash, a cashier's check, or a certified check, the bidder submits a bidder's bond, the said bond shall, in form, be satisfactory to the City Attorney of the City of Alameda. A Bid Bond form is provided in Exhibit H.

Said bidder's guaranty which is submitted according to the above paragraph shall, in the event of the failure, for any reason, of the successful bidder or bidders to execute the contract as awarded, be deemed to be liquidated damages to be retained in full by the City of Alameda, but shall not be construed as a penalty for failure to execute said contract. The full amount of the said bidder's guaranty shall also be retained in full by the City of Alameda as consideration payable to the City of Alameda for engineering, accounting and clerical services in formulating specifications for such bid or bids, for advertising costs to the City of Alameda in connection with such bid or bids, and further, as consideration for the award of such contract to such bidder or bidders.

Any bid bond submitted under this Section shall incorporate therein by reference, or otherwise, all of the provisions of Section I, Item F, of these specifications.

G. RETURN OF BIDDER'S GUARANTIES. Within ten (10) days after the award of the contract, the Public Works staff will return the proposal guaranties accompanying the bids which are not to be considered in making the award. All other proposal guaranties will be held until the contract has been finally executed, after which they will be returned to the respective bidders whose bids they accompanied.

H. TAXES. Bids must include all state and federal taxes applicable to the transaction.

I. SUBCONTRACTORS. All contractors shall comply with the State Subletting and Subcontracting Fair Practices Act, located in Sections 4100 through 4112 of the California Public Contract Code. A copy of said Act is available in the office of the City Engineer. Said Act is hereby made a part of the specifications on the above-mentioned job and all contractors submitting bids shall accompany the bid with information regarding subcontractors as therein provided. All Subcontractors shall have a current City of Alameda business license.

J. REJECTION OR RETURN OF BIDS. Bids may be rejected if they show any alterations of form, additions not called for, conditional or alternative bids, incomplete bids, erasures or irregularities of any kind. The right is reserved to reject any and all bids. The City reserves the right to return bids unopened.

K. BID PROTEST. Any bid protest must be submitted in writing to the Public Works Director, City of Alameda Public Works Department, City Hall West, 950 West Mall Square, Room 110, Alameda, CA 94501 before 5:00 p.m. of the 5th business day following the posting date of the Notice of Intent to Award.

1. The initial protest document shall contain a complete statement of: the legal grounds for the protest; all the facts relevant to the protest; and the form of relief requested and the legal basis for such relief.
2. The protest shall refer to all the specific portions of the document which forms the legal grounds for the protest.
3. The protest shall include the name, address, and telephone number of the person representing the protesting party.
4. The party filing the protest shall concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
5. The Public Works Director will issue a decision on the protest. If the Public Works Director determines that a protest is frivolous, the party originating the protest may be determined to be irresponsible and that party may be determined to be ineligible for future contract awards.
6. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest and failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

L. AWARD OF CONTRACT. The award of contract, if it be awarded, will be to the responsible bidder who submits the lowest and best bid and whose proposal complies with all requirements described herein. The award, if made, will be made within ninety (90) days after the opening of the bids. All bids will be compared on the basis of the Engineer's estimate of quantities of work to be done. Once awarded, this contract may be mutually extended on a year-by-year basis, for up to four (4) additional years, based on satisfactory performance of all aspects of this contract. The Public Works Director shall, on or before April 1, submit written notice that the contract is to be extended upon the same terms and costs (plus an annual increase to consumer price index for the San Francisco Bay Area appropriate to the trades associated with the work for the previous calendar year) as the existing contract. In the event of a delay the City reserves the right to hold the Bidder to its bid for 90 days from the date the contract is awarded.

Bid protests, contracts, bonds, insurance, and other documents identified in these specifications and these special provisions are to be delivered to the following City address: City of Alameda, City Hall West, Public Works Department, 950 West Mall Square, Room 110, Alameda, CA 94501.

M. EXECUTION OF CONTRACT. The contract, in form and content satisfactory to the City, will be awarded at a regular City Council meeting (first and third Tuesdays of each month, except August). At least five (5) business days prior to the anticipated award date, the Contractor will be notified of apparent award status and requested to provide the documents necessary to complete the contract process. Required documentation shall include two (2) copies of the contract executed by the Contractor, proof of insurance and Payment and Performance bonds. The Contractor will be given five (5) business days from the date the City Council awards the contract to obtain the relevant bonds and insurance along with any other documents required for submission.

No proposal shall be considered binding upon the City until the execution of the contract. Failure to execute a contract and file acceptable bonds and insurance as provided herein within the time frame outlined above shall be just cause for the annulment of the award and the forfeiture of the bidder's guaranty.

N. CONTRACT BONDS. The Contractor shall furnish two good and sufficient bonds. One of the bonds shall be executed in a sum equal to at least one hundred percent (100%) of the contract price, which shall be furnished as required by the Terms of Section 3247 to 3252 of the Civil Code of the State of California (see Exhibit G). The other bond shall guaranty faithful performance of the said contract by the Contractor and shall be executed in a sum equal to at least one hundred percent (100%) of the contract price (see Exhibit F). Bonds shall be furnished by a surety company satisfactory to the City of Alameda.

Whenever any surety or sureties on any such bonds, or any bonds required by law for the protection of the claims of laborers and materials, become insufficient or the City Engineer has cause to believe that such surety or sureties have become insufficient, a demand in writing may be made of the Contractor for further bond or bonds or additional surety not exceeding that originally required, as is considered necessary, taking into account the extent of the work remaining to be done. Thereafter no payment shall be made upon such contract to the Contractor, or any assignee of the Contractor, until such further bond or bonds or additional surety has been furnished. Faithful performance bonds, whether by individual or corporate surety, shall in addition to other terms and conditions, contain the conditions that (1) death of the named principal shall not operate as a release of the obligation hereunder of the surety, and (2) extensions of time, if any, granted by the City to Contractor for performance of the work covered by said bond shall extend for a like time the period of limitations during which surety shall remain bound by the said undertaking.

SECTION II. LEGAL RELATIONS AND RESPONSIBILITIES

A. LAWS TO BE OBSERVED. The Contractor shall keep himself fully informed of all existing and future state and federal laws and all municipal ordinances and regulations of the City of Alameda which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

B. PROJECT STABILIZATION AGREEMENT. This project is subject to and shall be performed under the Project Stabilization Agreement ("PSA") between the City of Alameda and the Building and Construction Trades Council of Alameda County and its affiliated local unions. Contractors submitting bids must provide evidence of acceptance of the terms and conditions of the PSA at the time of bid. Specifically, contractor must submit the completed and signed "Agreement to be Bound to PSA" (included in Exhibit A, Bidder's Proposal). Additionally, all contractors and subcontractors of any tier on this project will be required to execute the Agreement to be Bound to PSA and be subject to the PSA prior to contract award.

C. DEPARTMENT OF INDUSTRIAL RELATIONS COMPLIANCE AND PREVAILING WAGE REQUIREMENTS ON PUBLIC WORKS PROJECTS.

1. Effective January 1, 2015, no Contractor or Subcontractor may be listed on a bid proposal for a public works project (submitted after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 (with the limited exceptions from this requirement for bid purposed only under Labor code Section 1771.1(a)). Register at https://www.dir.ca.gov/Public-Works/Contractor-Registration.html

2. No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

3. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

4. The Prime Contractor is required to post job site notices prescribed by regulations. See 8 Calif. Code Regulation §16451(d).

5. Effective April 1, 2015, All Contractors and Subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner at: https://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html

D. PREVAILING WAGES:

1. The Contractor is aware of the requirements of California Labor Code sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" projects. Since this Project involves a "public work" project, as defined by the Prevailing Wage Laws, Contractor shall fully

comply with such Prevailing Wage Laws. Contractor's failure to comply with the Prevailing Wage Law may constitute a default under the contract for performance of the work which would entitle the City to rescind the contract or exercise other remedies as provided by law or the contract.

2. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this contract from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. In the alternative, the Contractor may view a copy of the prevailing rates of per diem wages at the City's Public Works Department, Building 1, 950 W. Mall Square, Room 110, Alameda. The Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. The Contractor shall defend, indemnify, and hold the City, its elected officials, officers, employees, volunteers, and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws and/or the City's Labor Compliance Program (hereinafter referred to as "LCP"), if any.

3. If this project is funded in whole or in part with Federal monies and subject to the provisions of the Davis-Bacon Act, the successful bidder shall pay not less than the wage rates determined by the Secretary of Labor. The Federal wage rates shall apply unless the State wage rates are higher. The Federal Wage Rates applicable to the contract are those current within ten (10) days of the bid due date.

4. The Contractor and all subcontractors shall pay and shall cause to be paid each worker engaged in work on the Project not less than the general prevailing rate of *per diem* wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

5. The Contractor and all subcontractors shall pay and shall cause to be paid to each worker needed to execute the work on the Project travel and subsistence payments, as such travel and subsistence payments are defined in the applicable collective bargaining Contracts filed with the Department of Industrial Relations in accordance with Labor Code § 1773.8.

6. If during the period any bid for work on this Project remains open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of *per diem* wages in the locality in which this public work is to be performed, such change shall not alter the wage rates in the Notice calling for Bids or the contract subsequently awarded.

7. Pursuant to Labor Code §1775, the Contractor shall as a penalty to the City, forfeit Fifty Dollars ($50.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of *per diem* wages, determined by the Director, for such craft or classification in which such worker is employed for any public work done under the Contract by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commission. In addition, the difference between such prevailing rate of *per diem* wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of *per diem* wage shall be paid to each work by the Contractor.

8. Any worker employed to perform work on the Project, which work is not covered by any craft or classification listed in the general prevailing rate of *per diem* wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to the work on the Project to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such

person in such craft or classification.

9. For those crafts or job classifications requiring special prevailing wage determinations, please contact the Division of Labor Statistics and Research, Prevailing Wage Unit, P.O. Box 420603, San Francisco, CA 94142-0603, (415) 703-4774 or check out the web site at www.dir.ca.gov.

E. HOURS OF LABOR.

1. As provided in Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work provided that the employees' compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

2. The Contractor shall pay to the City a penalty of Twenty-five Dollars ($25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

3. Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of *per diem* wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Contract applicable to each particular craft, classification, or type of worker employed.

F. CERTIFIED PAYROLL.

1. Contractor's attention is directed to California Labor Code Section 1776, which requires Contractor and any subcontractors to keep an accurate payroll record and which imposes inspection requirements and penalties for non-compliance. Contractor is responsible for the submission of copies of payrolls by all subcontractors. Each payroll submitted shall be accompanied by a "Statement of Compliance", signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract, and shall certify the following:

a. That the payroll for each payroll period contains the name, social security number, and address of each employee, his or her correct classification, including applicable area and group code, hourly rates of wages paid, daily and weekly number of hours worked, deductions made and actual wages paid, and that such information is correct and complete;

b. That such laborer or mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions

have been made either directly or indirectly from the full wages earned, other than permissible deductions; and

c. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

2. If the Contractor or a subcontractor does not work during the payroll period, a Statement of Non-Working Days must be submitted for each day not worked.

3. In the event of noncompliance with the requirements of such section after 10 Days written notice specifying in what respects compliance is required, the CONTRACTOR shall forfeit as a penalty to the CITY, $25.00 for each calendar Day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.

G. APPRENTICES.

1. Attention is directed to the provisions in sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him on contracts greater than $30,000 or 20 working days. The Contractor and any subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices.

2. Section 1777.5 requires the Contractor or subcontractor employing workers in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of the public works project, and which administers the apprenticeship program in that trade, for a certificate of approval, if they have not previously applied and are covered by the local apprenticeship standards.

3. The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if: (1) the Contractor employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions; or (2) if the Contractor is not a signatory to an apprenticeship fund and if the funds administrator is unable to accept Contractor' required contribution. The Contractor or subcontractor shall pay a like amount to the California Apprenticeship Council.

4. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex-officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

H. LABOR DISCRIMINATION. No discrimination shall be made in the employment of persons upon public works because of the race, color, sex, religion, age, national origin, sexual orientation, or physical disability of such persons and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of the provisions of the Labor Code, and, in particular, Section 1735.

I. REGISTRATION OF CONTRACTORS. Before submitting bids, contractors shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and

Professional Code of the State of California. All Contractors must have an "A" license or a "C" license that allows them to complete the work specified herein, in a professional manner consistent with these specifications.

J. PERMITS AND LICENSES. The Contractor shall procure all permits and licenses, including City of Alameda business licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work. However, the contractor will be reimbursed for construction permit fees. The estimated cost shown as an allowance in the bid proposal is only for bidding purposes. Payment shall be made for the actual cost of the permit. The cost for a City of Alameda business license is not reimbursable. Each Subcontractor shall have a current City of Alameda business license.

The following permit(s) and/or license(s) are required for this project:

1. **A City of Alameda Business License from the City of Alameda, 2263 Santa Clara Avenue, Finance Department, Room 220, Alameda.**
2. **"No Parking, Tow Away" signs and Excavation Permit from City Hall, 2263 Santa Clara Avenue, Planning and Building Services, Room 190, Alameda.**
3. **An Encroachment Permit from the East Bay Regional Parks from 2950 Peralta Oaks Court, Oakland, CA 94605.**
4. **Wastewater Discharge Permit from the East Bay Municipal Utility District (EBMUD) if the Contractor plans to discharge dewatering disposal water to the City's sewer system. Reference Section XII.K.**
5. **Caltrans Encroachment Permit (Contractor Double Permit) from Caltrans, Office of Encroachment Permits (6th Floor), District 4, Caltrans, 111 Grand Ave., Mail Stop: 5E (Permits), Oakland, CA 94612 ($492.00).**

K. PATENTS. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes used on or incorporated in the work, and agrees to indemnify and hold harmless the City of Alameda, its officers, employees and agents from all suits at law or actions of any nature, damages, royalties and costs on account of the use of any patented materials, equipment, devices or processes.

L. RESPONSIBILITY FOR DAMAGES. The City of Alameda, its officers, employees and agents shall not be answerable or accountable in any manner for any loss or damage to the work or any part thereof, nor to any material or equipment used in performing the work, nor for injury or damage to any person or persons, either workers or the public, nor for damage to adjoining property from any cause whatsoever during the progress of the work nor at any time before final acceptance.

M. CONTRACTOR'S RESPONSIBILITY FOR THE WORK. Except as provided above, until formal acceptance of the work by the City, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and

shall bear the expense thereof, except such injuries or damages occasioned by acts of the Federal Government or the public enemy. The Contractor will not be responsible for the cost of repairing or restoring damage to the work, which damage is determined to have been proximately caused by an act of God, in excess of 5% of the contracted amount.

N. SAFETY PROVISIONS. The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department (CAL-OSHA).

O. NO PERSONAL LIABILITY. Neither the City Council, City Manager, the City Engineer, nor any other City officer, authorized assistant or agent shall be personally responsible for any liability arising under this contract.

P. RESPONSIBILITY OF CITY. The City of Alameda shall not be held responsible for the care or protection of any material or parts of the work prior to final acceptance, except as expressly provided in these specifications.

Q. PUBLIC CONVENIENCE AND SAFETY. The Contractor shall so conduct operations as to cause the least possible obstruction and inconvenience to public traffic. The Contractor shall furnish, erect and maintain such fences, barriers, lights and signs as are necessary or as required by the Engineer to give adequate warning to the public at all times that the work is in progress and of any dangerous conditions to be encountered as a result of the work or of the presence of the Contractor's equipment or machinery.

The use of Flex-o-Lite Model No. 501, or approved equal, will be permitted only in specifically approved locations and only to the extent of 50 percent of the total amount of necessary lighting. Other models of lesser candle power may be permitted in some approved locations at a lesser percentage.

If the work involves the construction of a street or highway, the following additional provisions shall apply:

All traffic shall be permitted to pass through the work, unless other existing streets are stipulated as detours in the special provisions. Residents and businesses along the affected street or highway shall be provided passage as far as practicable; convenient access to driveways, houses and public buildings along the street or highway shall be maintained and temporary crossings shall be provided and maintained in good condition. No more than one cross or intersecting street or highway shall be closed at any time without the approval of the Engineer.

Contractor shall submit to the Engineer at the pre-construction meeting a Traffic Control Plan for any work that will impact vehicular traffic in the area. The Contractor must have an approved plan prior to commencing of work. All Traffic Control Plans must be in conformance with Caltrans regulations and guidelines.

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic.

The Traffic Control Plan shall cover, at minimum, all phases of work scheduled to occur in the first twenty (20) working days that will impact vehicular, pedestrian and bicycle traffic in the area. The Traffic Control Plan shall allow residents on the streets impacted ample "on street" parking within one (1) block of their homes. The Contractor shall have an approved Traffic Control Plan prior to commencing of work in the field. Contractor shall submit subsequent additions to the Traffic Control Plan in a timely manner to allow for the Engineer's review and shall be in conformance with Caltrans regulations and guidelines.

At least 72 hours prior to beginning work on a section of street, curb or sidewalk that will affect use of the parking lane, the Contractor shall notify, by approved "No Parking - Tow Away" signs on barricades, all affected property owners, residents, businesses and agencies adjacent to that section of street. The "No-Parking" signs shall state the days, dates, and hours of parking lane closure, and shall be placed along the street on each side at no more than 50 feet spacing. The Contractor shall notify the Engineer at least one (1) working day in advance of the intent to post No-Parking signs, so that the timely posting can be verified by the Inspector. The Contractor is permitted to list up to one (1) working day before and one (1) working day after the scheduled days of work, as shown in the latest approved schedule on signs, in order to bracket the approved scheduled date of work. The Contractor shall remove the "No Parking" signs as soon as the parking lane is re-opened to parking.

If the Contractor is unable to meet the scheduled and noticed time for the work, the Contractor shall immediately notify the Engineer and remove the posted "No-Parking" signs. The Contractor shall submit a new scheduling request in writing to the Engineer. Upon written approval of the Engineer, the Contractor shall post signs at least 72 hours prior to beginning work per the revised schedule.

Work hours are limited between 8:00 A.M. and 5:00 P.M., except for vicinity of schools where the work hours are limited between 9:00 A.M. and 3:00 P.M.

Contractors must coordinate with the Alameda Unified School District and any private school on the streets that are in the vicinity of schools.

R. NOTICES TO CONTRACTOR. Any notice required to be given to the Contractor by the City of Alameda or by the City Engineer or by any officer of said City may be given to said Contractor at the address shown in the Contractor's proposal. Such notice may be given by mailing a copy of said notice to the Contractor to such address by United States certified mail. Evidence of such mailing shall be deemed the equivalent of personal services of said notice.

S. UTILITIES. The location of railroad tracks, utility facilities and other structures shall be the responsibility of the Contractor. The Contractor shall contact the owners of those tracks, facilities and structures for any information that may be required. The Contractor shall contact Underground Services Alert (USA) at 800-642-2444 forty-eight (48) hours prior to

commencement of work.

Where existing sewers and storm drains cross or interfere in any way with construction under this contract, they shall be left in place and the Contractor shall work around them, or where feasible and practical, the Contractor may, with the permission of the City Engineer, remove and replace them at his/her own expense. Precautions shall be exercised to provide bearing under existing sewer lines so encountered to preclude settlement during or after the term of the contract. In the event that some of these sewers are abandoned, they may, with the permission of the City Engineer, be removed and not replaced. The Contractor shall provide submittals for the Engineer's review and approval for supporting utilities.

The owners of pipes, wires, conduits, vaults and other utilities (other than sewers) located in the City streets which could conflict with the proposed work will be notified by the City Engineer to remove or adjust the same, without cost to the Contractor, to such extent as will allow the prosecution of the work described herein according to the necessities thereof and in accordance with these specifications. Wherever and whenever the Contractor anticipates working in an area from which utilities must be removed at the expense of others, he/she shall notify the City Engineer sufficiently in advance (a minimum of ten (10) working days) to permit the owners thereof to rearrange or abandon such utilities, and he/she shall cooperate with the owners thereof in the performance of the work under this contract.

The work will be so prosecuted that a minimum of damage will result to utility services. In the event that utility services are damaged or interrupted, the Contractor shall immediately, at his/her own expense, restore such services in a manner satisfactory to the City Engineer. In the event that an interruption of utility services is sustained for a period of longer than one-half hour, it shall be the responsibility of the Contractor to notify the occupants of the premises to which said services are connected, so that no damage will accrue on or to said premises.

The Contractor shall perform all work in such manner as to prevent damage to utilities lying outside of or below a required excavation of trench area.

T. SOUND CONTROL REQUIREMENTS. Sound control shall conform to Section 4-10 of the Alameda Municipal Code, which prohibits weekday construction activities between 7:00 pm and 7:00 am.

U. CONSTRUCTION SITE CONTROLS. Within five (5) business days of the date the work is to commence pursuant to the NTP the Contractor shall submit an Erosion/Stormwater Pollution Prevention Plan (SWPPP) to the City Engineer for review. The SWPPP shall include appropriate erosion and sediment control measures to effectively prevent the entry of soil, dirt, debris and other pollutants to storm water runoff, the storm drain system, lagoons and the bay/estuary during construction. No work in the field under this Contract may begin until the City Engineer has approved the Contractor's SWPPP.

Erosion and sediment control plans/sheets shall indicate the specifications and maintenance schedules for the installation and upkeep of the erosion control mechanisms. Specifications shall be provided for the erosion control practices, perimeter protection(s), any silt

fencing and fiber rolls to be used, storm drain inlet protections, stabilized construction entrance(s) and exits, site and excavation dewatering activities, vehicle tire wash area(s), vehicle and equipment servicing area(s), and the materials handling and storage area(s). These specifications should meet the same level of erosion and sediment control effectiveness established by practices identified in the San Francisco Bay Regional Water Quality Control Board's Erosion and Sediment Control Field Manual (510-622-2465), the Association of Bay Area Government's Manual of Standards for Erosion and Sediment Control (510-464-7900) and/or the California Stormwater Quality Association's Stormwater Best Management Practice Handbook – Construction (2003) (www.cabmphandbooks.com). Contact City Public Works Department Clean Water Program Specialist Jim Barse (510-747-7930) for additional assistance in obtaining copies of these reference documents.

The Contractor is responsible for ensuring that all of his/her workers and subcontractors are aware of and implement the specific stormwater quality control measures under the approved SWPPP. The Contractor(s) shall avoid creating excess dust when breaking asphalt/concrete and during excavation and grading. If water is to be used as a measure for dust control, use as little as possible. All wash water shall be kept out of streets, gutters and storm drains. Controls shall be implemented before construction begins and maintained until the end of construction at which time they shall be removed.

Failure to comply with the following approved construction Best Management Practices ("BMPs") shall result in the issuance of correction notices, citations and/or a project stop order:

1. Gather all construction debris on a regular basis and place it in a dumpster or other container which is emptied or removed on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution. After breaking old pavement, remove all pieces to avoid contact with rainfall or runoff.
2. Remove on-site piles from the site on a regular basis. Only temporary storage is allowed. All temporary soil or other stockpiles on site shall be securely covered with a tarp, plastic sheeting or similar material.
3. Remove all dirt/mud, gravel, rubbish, refuse and green waste from the sidewalk, street pavement, and storm drain system adjoining the project site daily and prior to rain. Clean up leaks, drips and spills immediately. Avoid unnecessary driving on unpaved areas during wet weather.
4. Install and maintain stabilized construction entrances to minimize the tracking of dirt, mud, dust and debris onto the public right-of-way.
5. Broom-sweep the sidewalk and public street pavement adjoining the project site daily and prior to rain. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the completion of work the street shall be washed and the wash water collected and disposed offsite.
6. Install filter materials (such as block and gravel bags, sandbags, filter fabric) at the storm drain inlets surrounding the project site. Such inlet protections shall be installed before: the start of the rainy season (October 1st), site de-watering activities, saw-cutting activities, or any other activity that may result in the discharge of material to the storm drain. Filter materials shall be maintained and/or replaced as necessary to minimize short-cutting and to remove sediment deposits and buildup. Accumulated sediment/debris shall be disposed of properly.

7. Vacuum saw-cutting slurry and remove from site. Do not allow saw-cut slurry to enter the storm water conveyance system.

8. Create a contained and covered area on the site for the storage of cement bags, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the storm drain system by wind, exposure to rainfall or in the event of a material spill.

9. Never clean machinery, tools, brushes, etc. or rinse containers into a street, gutter, storm drain or stream. See the *Building Maintenance and Remodeling* BMP flyer and ACCWP BMP brochures for more information. Contact the Public Works Department at 747-7930 for assistance with obtaining these documents.

10. Ensure that concrete/gunite supply trucks or concrete/plaster finishing operations do not discharge wash water into street gutters or drains. Concrete trucks shall have a self-contained washout system or discharge to a dedicated, secure site washout in order to avoid the possibility of debris on city streets or discharge of wash water to the storm water conveyance system.

11. Minimize removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Re-plant the area, and stabilize all cut and fill slopes as soon as possible after grading is completed. At a minimum, 4,000 pounds/acre of straw with tackifier should be placed on all exposed soils including those within active work areas and flat lots. **No site grading shall occur between October 1 and May 31 unless approved erosion and sedimentation control measures are in place.**

12. Provide erosion "prevention" and perimeter protection measures (soil stabilization) such as fiber rolls, silt fence, and/or sediment traps or basins. Ensure control measures are adequately maintained and in operable condition. Sediment controls, including inlet protection, are necessary but should be a secondary defense behind good erosion control and site perimeter measures.

13. Design site de-watering operations to prevent the discharge of any sediment, debris or other pollutants to the municipal storm water conveyance system.

14. Maintain and if necessary, repair, all erosion prevention and sediment control measures throughout the contract term. Replacement supplies should be kept on site. Site inspections shall be conducted before and after each storm event, and every 24 hours for extended storm events, to identify areas that contribute to erosion and sediment problems or any other pollutant discharges. If additional measures are needed, inform the City Engineer immediately and document all inspection findings and actions taken.

15. Conduct visual observations before, during, and after storm events. Any breach, malfunction, leakage, or spill observed that could result in the discharge of pollutants to surface waters that might not be visually detectable in stormwater shall trigger the collection of a sample of discharge. The following procedures shall be followed during sampling:

<u>Sampling Procedures</u>:

- For all construction activity, identify a sampling and analysis strategy and sampling schedule for potential discharges discovered through visual monitoring.
- Any breach, malfunction, leakage, or spill observed during visual monitoring which could result in the discharge of pollutants to surface waters that would not be visually detectable in stormwater shall trigger the collection of a sample of discharge.
- Samples shall be collected at all discharge locations which drain the areas identified by

the visual observations and which can be safely accessed.

- Personnel trained in water quality sampling procedures shall collect stormwater samples.
- An uncontaminated sample shall be collected for comparison with the discharge sample.
- Sampling shall be conducted during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.
- The uncontaminated sample shall be compared to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and TDS
- All field and/or analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times.

16. Contact the City of Alameda Public Works Department at 510-747-7930 in the event of any slope failure, sediment pond overflow, or any other malfunction resulting in sediment-laden runoff. The City shall, in turn, report such incidents to the Regional Water Quality Control Board.

17. Clearly mark with the words, "No Dumping! Drains to Bay" or the equivalent, using methods approved by the City of Alameda, onto the on-site storm drain inlets. All on-site storm drains must be inspected and, if necessary, cleaned, at least once a year immediately prior to the rainy season. Additional cleaning may be required by the City of Alameda.

18. Require all concrete trucks used in the performance of the work to have a self-contained washout system, rather than do washout on the site. The idea is to avoid:

a. An undesirable pile of concrete on the jobsite, and
b. The possibility of debris on city streets.

The objective of these Standard Conditions is to ensure that the City's municipal storm water Permit, the National Pollutant Discharge Elimination System (NPDES) Permit provisions and additional Regional Water Quality Control Board requirements are adequately enforced.

These recommendations are intended to be used in conjunction with the State's Best Management Practices Municipal and Construction Handbooks, local program guidance materials from municipalities, Section 7.1.01, of the Standard Specifications and any other appropriate documents on storm water quality controls for construction. If you need assistance in checking these documents, contact Clean Water Program Specialist at 510-747-7930.

Failure to comply with the above program will result in issuance of noncompliance notices, citations, project stop orders or fines. The fine for noncompliance of the above program is two hundred and fifty dollars ($250.00) per occurrence per day. The State under the Federal Clean Water Act can also impose a fine on the Contractor.

V. RECYCLING OF CONCRETE AND ASPHALT MATERIALS. Concrete and Asphalt are highly recyclable, and must be source separated as much as possible on the project site and delivered to a processor as separate materials to ensure a very high recycling rate, above 80%. Additionally, the Contractor shall prepare and submit to Alameda.WasteTracking.com a Waste Management Plan to recycle at least 80% of these two types of materials to an approved materials recycling location other than a landfill. The 80% shall be determined by weight of

materials of the entire project.

The Contractor shall also submit to alameda.wastetracking.com a Summary Report, containing proof of actual recycling results of construction and/or demolition debris hauled from the project (ex. processing facility tonnage receipts verifying at least 80% recycling rate).

Proof of an approved Waste Management Plan must be provided to the City Engineer before construction starts and proof of an approved Summary Report must be provided before project acceptance. The Contractor shall submit a request, along with proof in writing, to the City Engineer of the Contractor's inability to comply with this requirement.

W. CLEAN AIR ACT OF 1970, ET SEQ. AND FEDERAL WATER POLLUTION CONTROL ACT AS AMENDED BY THE CLEAN WATER ACT OF 1977. The Contractor agrees to comply with federal clean air and water standards during the performance of this contract and specifically agrees to the following:

- The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location or site of operations owned, leased, or supervised by the Contractor and the subcontractors for the construction, supply and service contracts entered into by the Contractor;

- Any facility to be utilized in the accomplishment of this contract is not listed on the Environmental Protection Agency's List of Violating Facilities pursuant to 40 CFR, Part 15.20;

- In the event a facility utilized in the accomplishment of this contract becomes listed on the EPA list, this contract may be canceled, terminated, or suspended in whole or in part;

- It will comply with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Water Pollution Control Act relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308, respectively, and all regulations and guidelines issued thereunder;

- It will promptly notify the Government of the receipt of any notice from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that any facility utilized or to be utilized in the accomplishment of this contract is under consideration for listing on the EPA List of Violating Facilities;

- It will include the provisions of Paragraph a. through g. in every subcontract or purchase order entered into for the purpose of accomplishing this contract, unless otherwise exempted pursuant to the EPA regulations implementing the Air or Water Acts above (40 CFR, Part 15.5), so that such provisions will be binding on each subcontractor or vendor;

In the event that the Contractor or the subcontractor for the construction, supply and service contracts entered into for the purpose of accomplishing this contract were exempted from complying with the above requirements under the provisions of 40 CFR, Part 15.5 (a), the

exemption shall be nullified should the facility give rise to a criminal conviction (see 40 CFR 15.20) during the accomplishment of this contract. Furthermore, with the nullification of the exemption, the above requirements shall be effective. The Contractor shall notify the Government, as soon as the Contractor's or the subcontractors' facility is listed for having given rise to a criminal conviction noted in 40 CFR, Part 15.20.

X. SUBMITTALS AND REQUEST FOR INFORMATION (RFI'S). The Contractor shall submit an RFI within five (5) business days of an event or question of fact arising under the Contract. The Engineer in charge of the project shall have ten (10) business days to respond to an RFI or any Submittal required to be made under the Contract.

Y. COMPLIANCE WITH THE CITY'S INTEGRATED PEST MANAGEMENT POLICY:

The Contractor shall follow the requirements of the City's Integrated Pest Management (IPM) Policy to ensure the City is in compliance with its Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, issued by the California Regional Water Quality Control Board. Contractor shall follow the City's IPM Policy and utilize generally accepted IPM Best Management Practices (BMPs) to the maximum extent practicable for the control or management of pests in and around City buildings and facilities, parks and golf courses, urban landscape areas, rights-of-way, and other City properties.

Contractor will ensure that applicators will use the most current IPM technologies available to ensure the long-term prevention or suppression of pest problems and to minimize negative impacts on the environment, non-target organisms, and human health. Contractor will consider the options or alternatives listed below in the following order, before recommending the use of or applying any pesticide on City property:

1. No controls (e.g., tolerating the pest infestation, use of resistant plant varieties or allowing normal life cycle of weeds)
2. Physical or mechanical controls (e.g., hand labor, mowing, exclusion)
3. Cultural controls (e.g., mulching, disking, alternative vegetation), good housekeeping (e.g. cleaning desk area)
4. Biological controls (e.g., natural enemies or predators)
5. Reduced-risk chemical controls (e.g., soaps or oils)
6. Other chemical controls

Contractor shall ensure that only appropriate licensed applicators who are authorized and trained in pesticide application and who shall implement the City department's IPM standard operating procedures may apply pesticides to or within City property.

Restricted Chemicals

The term pesticide applies to herbicides, insecticides, fungicides, rodenticides and other substances used to control pests. Antimicrobial agents are not included in this definition of pesticides.

Contractor shall avoid the use of pesticides that threaten water quality, human health and the environment. Thus, the Contractor shall not use or promote the use of the following

chemicals:

1. Acute Toxicity Category I chemicals as identified by the Environmental Protection Agency (EPA),
2. Organophosphate pesticides (e.g., those containing Diazinon, chlorpyrifos or malathion)
3. Pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin),
4. Carbamates (e.g., carbaryl),
5. Fipronil,
6. Copper-based pesticides unless:
    a) Their use is judicious,
    b) Other approaches and techniques have been considered, and;
    c) Threat of impact to water-quality is prevented.

General Pesticide Usage Practices

Contractor shall ensure implementation of the following practices:

1. All pesticide applications shall be performed according to the manufacturer's instructions as detailed on the product label, and in accordance with all applicable state and local laws and regulations set forth to protect the environment, the public, and the applicator; and properly dispose of unused pesticides and their containers.

2. Pesticides that are not approved for aquatic use will not be applied to areas immediately adjacent to water bodies where through drift, drainage, or erosion, there is a reasonable possibility of a pesticide being transported into surface water.

3. Applicators will always avoid applications of pesticides that directly contact water, unless the pesticide is registered under Federal and California law for aquatic use.

4. Obtain coverage under the Statewide General NPDES Permit prior to discharging pollutants from the use of aquatic pesticides directly to the waters of the United States, or onto aquatic plants growing in waters of the United States (as required by the State Water Quality Resources Control Board).

Posting of Warning Notices Prior to Pesticide Application

1. If a pesticide with a "Warning" or "Danger" label indicator must be applied, the Contractor shall post sufficient copies of warning notices (Notice of Scheduled Chemical Application for Pest Management) and MSDS to effectively alert the public (i.e., at all entrances to a building) no less than 48 hours in advance of the pesticide application. The warning notice must be completely filled out, including name of the pesticide (both chemical and brand name), time and date of application, and with a fully legible re-entry time.

Annual Pesticide Use Summary Report

Contractor shall track pesticide use on City properties and provide an annual pesticide use summary report of pesticide application on City properties. The annual pesticide use

summary report shall be submitted to the City's Public Works Department Clean Water Program staff by a date to be determined in the scope of work and shall include the following information:

1. Product name and manufacturer
2. Active ingredient
3. The total quantity of each pesticide used during the prior fiscal year (from July 1 to June 30)
4. Target pest(s) for pesticide application(s).
5. Reasons for increases in use of pesticides that threaten water quality, specifically organophosphorous pesticides, pyrethroids, carbamatesl, fipronil, and copper-based pesticides.

Best Management Practices (BMPs)

To protect water quality, the Contractor shall implement the BMPs and control measures described below:

1. Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of pesticides and training of pest control advisors and applicators.
2. Use the most effective, least toxic pesticides that will do the job, provided there is a choice. The agency will take into consideration the LD50, overall risk to the applicator, and impact to the environment (chronic and acute effects).
3. Apply pesticides at the appropriate time to maximize their effectiveness and minimize the likelihood of discharging pesticides in stormwater runoff. Avoid application of pesticides if rain is expected (this does not apply to the use of pre- emergent herbicide applications when required by the label for optimal results.)
4. Employ techniques to minimize off-target application (i.e. spray drift) of pesticides, including consideration of alternative application techniques. For example, when spraying is required, increase drop size, lower application pressure, use surfactants and adjuvants, use wick application, etc.
5. Apply pesticides only when wind speeds are low.
6. Mix and apply only as much material as is necessary for treatment. Calibrate application equipment prior to and during use to ensure desired application rate.
7. Do not mix or load pesticides in application equipment adjacent to a storm drain inlet, culvert, or watercourse.
8. Properly inspect applicator equipment to prevent accidental pesticide leaks, spills and hazards to applicators and the environment.
9. Meet local fire department and Alameda County Agricultural Commissioner storage requirements for pesticide products. Provide secondary containment for liquids if required.
10. Prepare spill kits, store the kits near pesticides, and train employees to use them.
11. Store pesticides and other chemicals indoors in a locked and posted storage unit, as per California Code of Regulations.
12. Store pesticides in labeled containers, as per California Code of Regulations.
13. Rinse empty pesticide/herbicide containers, and empty in the spray, as per California Code of Regulations.
14. Dispose of triple-rinsed empty pesticide containers according to recommendations of the Alameda County Agricultural Commissioner and the manufacturer.

15. Try to find a qualified user for any unwanted pesticides, or return to the manufacturer if unopened. If disposal is required, contact Alameda County's Household Hazard Waste Collection Program at (510) 670-6460 between 8:30 AM and 5:00 PM., Monday through Friday, to make appropriate disposal arrangements, or to recycle the material.
16. If changing pesticides or cleaning spray tanks, use tank rinse water as the product, over a targeted area within the application site.
17. Irrigate slowly to prevent runoff, and do not over-water.

SECTION III. SCOPE OF WORK

A. WORK TO BE DONE. The work to be done consists of furnishing all labor, tools, equipment, materials, except as herein specified, and doing all work associated with removing and installing sanitary sewer mains, sewer laterals, manholes, cleanouts, curb, gutter, sidewalk, driveway, street patch, SWPPP, traffic controls and all other associated work to complete the project at the locations designated in the plans.

The Notice to Proceed (NTP) for this project is tentatively scheduled to be issued October 22, 2019.

The Initial Project Submittal Package shall address the entire project, and shall include the Traffic Control Plan (first 20 working days at minimum), SWPPP, Waste Reduction and Recycling Plan, and the full project schedule. Contractor shall not commence work in the field until Engineer has approved the Initial Project Submittal Package.

The Contractor shall have two hundred eighty (280) consecutive working days from the date the work is to commence pursuant to the Notice to Proceed to complete the work.

Contractor is advised to remove all equipment from the streets identified as route, detour, and/or staging areas for the 4th of July Parade, during the period of Wednesday, July 1, 2 p.m. through 8 a.m. Monday, July 6. No removal of concrete, asphalt or pavement markings shall be allowed on these streets unless they are restored in full at least 24 hours prior to July 2.

Contractor shall not work during City holidays, 2019 and 2020 holidays include:

Veteran's Day	Monday, November 11, 2019
Thanksgiving Day	Thursday, November 28, 2019
Day after Thanksgiving Day	Friday, November 29, 2019
Christmas Day	Wednesday, December 25, 2019
New Year's Day	Wednesday, January 1, 2020
Martin Luther King, JR.	Monday, January 20, 2020
Presidents Day	Monday, February 17, 2020
Memorial Day	Monday, May 25, 2020
Day before Independence Day	Friday, July 3, 2020
Labor Day	Monday, September 7, 2020

The following City events are planned for Calendar Year 2019 and 2020:

Event	**Date**
Farmer's Market (Webster Street at Haight Avenue) held every Tuesday and Saturday (year-round) from 9 a.m. to 1 p.m.	
Classic Car Show (Park Street)	October 12, 2019
Trick or Treat at Webster Street	TBD

Santa on Webster Street	TBD
Spring Festival (Park Street)	TBD
Alameda Island Jam (Webster Street)	TBD
July 4th Parade	July 4, 2020
Art and Wine Faire (Park Street)	TBD
Concerts at the Cove	TBD

B. ALTERATIONS. The City of Alameda reserves the right to increase or decrease the quantity of any item or portion of work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer; also to make such alterations or deviations, increases or decreases, additions or omissions in the plans and specifications, as may be determined during the progress of the work to be necessary and advisable.

C. EXTRA AND FORCE ACCOUNT WORK. New and unforeseen work will be classed as extra work when such work cannot be covered by any of the various items or combination of items for which there is a bid price.

The Contractor shall do no extra work except upon written order from the Engineer. Extra work as herein before defined under Section 4-1.05, Extra Work, when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made as agreed upon in writing pursuant to an extra work order signed by both parties, or by force account.

Work performed on force account shall be paid on a time and materials basis plus ten percent (10%). For work done by a subcontractor, an additional five percent (5%) markup is allowed to reimburse the contractor for additional administration cost and no other additional payment will be made; provided, however, that the City reserves the right to furnish such materials required as it deems expedient, and the Contractor shall have no claim for profit on the cost of such materials. Payment for work performed on force account pursuant to this subsection shall include full compensation to the Contractor for contributions made to the State as required by the provisions of the Unemployment Reserve Act, Chapter 352, Statutes of 1935, as amended; for taxes paid to the Federal Government as required by the Social Securities Act, approved August 14, 1935, as amended; for premiums paid on any other insurance of any nature which the Contractor may be required to carry or which he may elect to carry, and for additional premiums paid on faithful performance and labor and materials bonds required by reason of increase in the amount of work to be performed over and above that called for in the original contract. The price paid for labor shall include any compensation insurance paid by the Contractor.

All force account work shall be recorded and tracked daily upon Time and Material Tentative Extra Work Order report sheets furnished by the Contractor to the Engineer and signed by both parties, which daily reports shall thereafter be considered the true record of force account work done. Verification of time and materials shall be made on a daily basis by the Inspector or by his/her designee.

D. REMOVAL OF OBSTRUCTIONS. The Contractor shall remove and dispose of all structures, debris, or other obstruction of any character to the construction of the project if and as required by the Engineer.

E. CLEAN UP. Contractor shall leave the work site in an acceptable clean manner at the end of each work day. Upon completion and before making application for acceptance of the work, the Contractor shall clean the street or road, borrow pits, and all ground occupied by the Contractor in connection with the work, of all rubbish, excess materials, temporary structures, and equipment; and all parts of the work shall be left in a neat and presentable condition.

SECTION IV. CONTROL

A. AUTHORITY OF THE ENGINEER. The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed; the manner of performance and rate of progress of the work; the interpretation of the plans and specifications; the acceptable fulfillment of the contract on the part of Contractor; and all questions as to claims and compensation.

The Engineer's decision shall be final and he/she shall have executive authority to enforce and make effective such decisions and orders that the Contractor fails to carry out promptly.

B. PLANS. All authorized alterations affecting the requirements and information given on the approved plans shall be in writing. No changes shall be made to any plans or drawings after the same have been approved by the Engineer, except by direction of the Engineer.

Working drawings of plans for any structure not included in the plans furnished by the Engineer shall be approved by the Engineer before any work involving these plans shall be performed, unless approval is waived in writing by the Engineer.

Notwithstanding the foregoing, the Contractor agrees that approval by the Engineer of the Contractor's working plans does not relieve the Contractor of any responsibility for the accuracy of the dimensions and details thereof, and that the Contractor shall be responsible for agreement and conformity of his/her working plans with the approved plans and specifications.

The Contractor shall provide as-built drawings at the completion of the work. As-built drawings shall be prepared by a licensed engineer or surveyor and approved by the City Engineer.

As-built drawings must be in digital format. Any difficulty in providing the digital as-built drawings must be documented and presented to the City Engineer, who may permit manual as-built drawings on 24"x36" vellum. Release of retention is subject to the approval of the as-built drawings by the Engineer.

Full compensation for furnishing all working drawings and digital **as-built drawings** shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made therefor.

C. CONFORMITY WITH PLANS AND ALLOWABLE DEVIATION. Finish surfaces in all cases shall conform with the lines, grades, cross sections, and dimensions shown on the approved plans. Deviations from the approved plans, as may be required by the exigencies of construction will be determined in all cases by the Engineer and authorized in writing.

D. COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS. These specifications, the plans, special provisions and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative, to describe, and to provide for a complete work. Plans shall govern over specifications; special provisions shall govern over both specifications and plans.

E. INTERPRETATION OF PLANS AND SPECIFICATIONS AND ADDENDA THERETO. Should it appear that the work to be done, or any matter relative thereto, is not sufficiently detailed or explained in these specifications, plans, and the special provisions, the Contractor shall apply to the Engineer for such further explanation as may be necessary to carry out the work. Upon such application by the Contractor or prospective bidder, or in the event that it appears expedient to the Engineer to further explain, clarify, or amend these specifications, special provisions and plans, the Engineer shall issue addenda thereto and such addenda shall constitute a part hereof, and shall be binding on the Contractor. It is up to the Contractor to check before the bid date that Contractor has all paperwork to complete the bid.

It is the responsibility of each prospective bidder to check the website listed on page 1 of these specifications periodically for Addenda updates. If the addendum is issued after the mandatory pre-bid meeting is held, the addendum will be forwarded by email, to all attendees who have furnished contact information. Do not rely upon third party providers of the original plans and specs to issue all addenda. Contractor shall acknowledge receipt of all addenda on the Bid and those Bids that do not have acknowledgment of all addenda will be considered non-responsive.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

F. SUPERINTENDENCE. Whenever the Contractor is not present on any part of the work where it may be desired to give directions, orders will be given by the Engineer in writing and shall be received and obeyed by the superintendent or foreman in charge of the particular work in reference to which orders are given.

G. CONSTRUCTION STAKING & LAYOUT. Construction staking and layout shall be at the contractor's expense and performed by the contractor's surveyor or engineer qualified to do surveying work.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the Engineer. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor.

AND/OR

G. LINES AND GRADES. All distances and measurements are given and will be made in a horizontal plane. Grades are given from the top of stakes or nails, unless otherwise noted on the plans.

Three consecutive points shown on the same rate of slope must be used in common, in order to detect any variation from a straight grade, and in case any discrepancy exists, it must be reported to the Engineer. If such discrepancy is not reported to the Engineer, the Contractor shall be responsible for any error in the finished work.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the Engineer. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor.

H. INSPECTION. The Engineer shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials used and employed in the work.

The Contractor shall give at least 48 hours notice in writing when he will require inspection on subgrade, formwork, concrete paving, etc. Inspection will routinely be carried out at pre-scheduled time established at the pre-construction meeting. Inspection will only be carried out for substantial quantities of work ready for inspection.

The Contractor shall contact the City's representative by 11:00 a.m. the day prior to any special inspections so the City can schedule the inspections. If the contractor does not perform work that requires the special inspection as previously communicated to City's representative then the contractor will be responsible for all costs associated with special inspection regardless of the fact that the special inspector did not perform any services.

Whenever the Contractor varies the period during which work is carried on each day, he shall give due notice to the Engineer, so that proper inspection may be provided. Any work done in the absence of the Engineer is subject to rejection.

The inspection of the work shall not relieve the Contractor of any of his/her obligations to fulfill the contract as prescribed. Defective work shall be made good and unsuitable materials may be rejected, notwithstanding the fact that such defective work and unsuitable materials have been previously overlooked by the Engineer and accepted or estimated for payment.

Working hours in the field are restricted to 8 AM through 5 PM, Monday through Friday, excluding City Holidays, and shall constitute "normal working hours." The Public Works Department Inspectors work on Friday's and can be reached at 510-747-7900. In some locations, as noted on the Plans, normal working hours may be further restricted to avoid traffic and/or school-related conflicts. Any work in the field performed outside of these hours, including but not limited to construction, clean up, placement of traffic control devices, and mobilization/demobilization, shall be subject to removal and the Contractor fined $5,000 per incident, unless such work has been previously authorized by the Engineer in writing.

Inspection hours for construction shall be from 8 AM through 5 PM, Monday through Friday, excluding City Holidays, and shall constitute "normal inspection hours." The Public

Works Department Inspectors work on Friday's and can be reached at 510-747-7900. Unless prior written authorization has been received from the Engineer, the Contractor shall not perform any work outside of these hours except for general clean up, demobilization, and placement of no-parking signs. The Contractor shall pay the salary and benefits, including overtime, of the City employee(s) for inspection of any work performed outside of the normal inspection hours. Projects financed in whole or in part with state funds shall be subject to inspection at all times by the Director of Public Works of the State of California, or his agents.

I. REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK. All work which is defective in its construction or deficient in any of the requirements of these specifications shall be remedied, or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed for such correction.

Any work done beyond the lines and grades shown on the plans or established by the Engineer, or any extra work done without written authority, shall be considered as unauthorized and will not be paid for.

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to cause defective work to be remedied, or removed and replaced, and unauthorized work to be removed, and to deduct the cost thereof from any monies due or to become due the Contractor.

The fact that the work and materials have been inspected from time to time, and payments on account have been made, does not relieve the Contractor from the responsibility of replacing and making good any defective work or materials that may be discovered within one year from the date of the completion of the work by the Contractor and its acceptance by the City.

J. FINAL INSPECTION. Whenever the work provided and contemplated by the contract shall have been satisfactorily completed, the Engineer will make the final inspection.

K. FINAL GUARANTEE. It is understood that the Contractor is skilled in the trade or calling necessary to perform the work set forth within the plans and specifications, and that the City of Alameda, not being skilled in such matters, relies upon the Contractor to do and perform all work, acts, and things necessary to carry out the contract in the most skilled and desirable manner, and the Contractor guarantees the workmanship and materials to be the best of their kind. The acceptance of any part or of the whole of the work by the City does not operate to release the Contractor or the Contractor's surety from said guarantee.

The Contractor shall be held responsible for and must make good any defects through faulty, improper or inferior workmanship or materials arising from or discovered in any part of the contract work within one year of the completion and acceptance of the same. The bond for faithful performance, furnished by the Contractor, shall cover such defects and protect the City of Alameda against any and all such defects.

Nothing in this section supersedes contractor obligations for repair and replacement of work pursuant to the Public Contract Code.

SECTION V. CONTROL OF MATERIAL

A. SAMPLES AND TESTS. At the option of the Engineer, the source of supply of each of the materials shall be approved by the Engineer before delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Engineer.

All tests of materials furnished by the Contractor shall be made in accordance with commonly recognized standards of national organizations and such special methods and tests as are prescribed in these specifications.

The Contractor shall furnish such samples of materials as are requested by the Engineer without charge. No material shall be used until it has been approved by the Engineer. Samples will be secured and tested whenever necessary to determine the quality of material.

B. DEFECTIVE MATERIALS. All materials not conforming to the requirements of these specifications shall be considered as defective, and all such materials, whether in place or not, shall be rejected. They shall be removed immediately from the site of the work unless otherwise permitted by the Engineer.

Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

SECTION VI. PROSECUTION AND PROGRESS

A. PROGRESS OF THE WORK AND TIME FOR COMPLETION. The Contractor shall submit the Initial Project Submittal Package to the City Engineer for review. The Initial Project Submittal Package shall address the entire project, and shall include the Traffic Control Plan (first 20 working days at minimum), SWPPP, Waste Reduction and Recycling Plan, and the full project schedule. Contractor shall not commence work in the field until Engineer has approved the Initial Project Submittal Package.

The Contractor shall not commence construction on any section of the work until such time that he/she shall have on the ground, or can furnish definite assurance to the Engineer that there will be available when required, all the materials necessary to complete the section of the work upon which construction is to begin.

The Contractor shall submit a three week look-ahead work schedule every Monday and upon the issuance of any change order that alters the contract's schedule. Engineer shall have ten (10) working days to respond to the updated work schedule, and Contractor shall abide by most recently approved schedule until a new one has been approved in writing by the Engineer.

The Contractor shall submit additions to the Traffic Control Plan ten (10) working days in advance of any work that was not covered by the Traffic Control Plan submitted in the Initial Project Submittal Package.

In order to minimize disturbances to residents and public the Contractor shall:

1. Backfill and resurface failed area locations the same working day as the start of break out.
2. Resurface planed AC areas within three (3) working days from the day the areas were planed. The streets shall be swept, repeatedly if necessary, to minimize loose material.
3. Schedule removal and reconstruction of curb, gutter, and culverts so that only one side of the street is under construction on any one day, and parking and unimpeded pedestrian passage remains available on the opposite side of the street.
4. Not apply the slurry seal on streets the same day that trash and recycling pickup is scheduled.

B. SUBLETTING AND ASSIGNMENT. The Contractor shall give his/her personal attention to the fulfillment of the contract and shall keep the work under his/her control.

Subcontractors will not be recognized as such, and all persons engaged in the work of construction will be considered as employees of the Contractor, and their work shall be subject to the provisions of the contract and specifications.

Where a portion of the work sublet by the Contractor is not being prosecuted in a manner satisfactory to the Public Works Director, the subcontractor shall be removed immediately on the requisition of the Engineer and shall not again be employed on the work.

This contract may be assigned only on written consent of the City Council.

C. CHARACTER OF WORKER. If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Engineer or shall appear to the Engineer to be incompetent or to act in a disorderly manner, said worker shall be discharged immediately on the requisition of the Engineer and such person shall not again be employed on the work.

D. TEMPORARY SUSPENSION OF WORK. The Engineer shall have the authority to suspend the work wholly or in part for such period as he/she may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he/she may deem necessary, due to the failure on the part of the Contractor to carry out orders given or to perform any of the provisions of the work. The Contractor shall immediately obey such orders of the Engineer and shall not resume suspended work until ordered in writing by the Engineer.

E. TIME OF COMPLETION AND LIQUIDATED DAMAGES. It is agreed by the parties to the contract that in case all the work called for under the contract is not completed before or upon the expiration of the contract's term as set forth in these specifications, damage will be sustained by the City of Alameda, and that it is and will be impracticable to determine the actual damage which the City will sustain in the event of and by reason of such delay; and it is therefore agreed that the Contractor will pay to the City of Alameda the sum of one thousand dollars ($1000.00) per day for each and every day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Alameda may deduct the amount thereof from any money due or that may become due the Contractor under the contract.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the time specified, the City Council shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City; and if it decides to extend the time limit for the completion of the contract, it shall further have the right to charge the Contractor, his heirs, assigns, or sureties, and to deduct from the final payment for the work, all or any part, as it may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of such extensions, except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

The Contractor shall not be assessed with liquidated damages nor the cost of engineering and inspection during any delay in the completion of the work caused by acts of God or of the public enemy, acts of the City, fire, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather or delays of subcontractors due to such causes; provided that the Contractor shall within ten (10) days from the beginning of such delay notify the Engineer in writing of the causes of delay. The Engineer shall ascertain the facts and the extent of the delay and his findings of the facts thereon shall be final and conclusive.

F. SUSPENSION OF CONTRACT. If, at any time, in the opinion of the City Council, the Contractor has failed to supply an adequate working force, or material of proper quality, or has failed in any other respect to prosecute the work with the diligence and force specified and intended in and by the terms of the contract, notice thereof in writing will be served upon him; and shall he neglect or refuse to provide means for a satisfactory compliance with the contract, as directed by the Engineer, within the time specified in such notice, the City Council in any such case shall have the power to suspend the operation of the contract. Upon receiving notice of such suspension, the Contractor shall discontinue said work, or such parts of it as the City Council may designate. Upon such suspension, the Contractor's control shall terminate, and thereupon the City Council or its duly authorized representative may take possession of all or any part of the Contractor's materials, tools, equipment and appliances upon the premises, and use the same for the purpose of completing said contract, and hire such force and buy or rent such additional machinery, tools, appliances, and equipment, and buy such additional materials and supplies at the Contractor's expense as may be necessary for the proper conduct of the work and for the completion thereof; or may employ other parties to substitute other machinery or materials, and purchase the materials contracted for, in such manner as the City Council may deem proper; or the City Council may annul and cancel the contract and relet the work or any part thereof. Any excess of cost arising therefrom over and above the contract price will be charged against the Contractor and his sureties, who will be liable therefor. In the event of such suspension, all monies due the Contractor or retained under the terms of this contract shall be forfeited to the City; but such forfeiture shall not release the Contractor or his sureties from liability for failure to fulfill the contract. The Contractor and his sureties will be credited with the amount of money so forfeited toward any excess of cost over and above the contract price, arising from the suspension of the operations of the contract and the completion of the work by the City as above provided; the Contractor will be so credited with any surplus remaining after all just claims for such completion have been paid.

In the determination of the question whether there has been any such noncompliance with the contract as to warrant the suspension or annulment thereof, the decision of the City Council shall be binding on all parties to the contract.

G. RIGHT-OF-WAY. The right-of-way sufficient for the work to be constructed will be provided by the City. The Contractor shall make his own arrangements, and pay all expenses for additional area required by him outside of the limits of right-of-way, unless otherwise provided in the special provisions. Contractor's staging area must be approved by the Engineer.

SECTION VII. MEASUREMENTS AND PAYMENT

A. MEASUREMENTS AND PAYMENT. Payment for work done under the contract shall be made on the basis of the sums as calculated from the finally measured quantities of work done and the agreed unit and lump sum prices. Payment shall be full compensation for furnishing all labor, materials, tools and equipment and doing all the work necessary to construct the items for which payment is being made, complete in place as shown on the plans and described in the specifications.

B. EXTRA AND FORCE ACCOUNT WORK. Extra work as hereinbefore defined (Section III, Paragraph C) when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made as agreed upon in writing pursuant to an extra work order signed by both parties, or by force account.

Work performed on force account shall be paid on a time and materials basis plus ten percent (10%). For work done by a subcontractor, an additional five percent (5%) markup is allowed to reimburse the contractor for additional administration cost and no other additional payment will be made; provided, however, that the City reserves the right to furnish such materials required as it deems expedient, and the Contractor shall have no claim for profit on the cost of such materials. Such payment shall include full compensation to the Contractor for contributions made to the State as required by the provisions of the Unemployment Reserve Act, Chapter 352, Statutes of 1935, as amended; for taxes paid to the Federal Government as required by the Social Securities Act, approved August 14, 1935, as amended; for premiums paid on any other insurance of any nature which the Contractor may be required to carry or which he may elect to carry, and for additional premiums paid on faithful performance and labor and materials bonds required by reason of increase in the amount of work to be performed over and above that called for in the original contract. The price paid for labor shall include any compensation insurance paid by the Contractor.

C. PROGRESS PAYMENTS. The City shall, once each month, cause an estimate in writing to be made by the City Engineer of the total amount of work done and the acceptable materials furnished and delivered by the Contractor on the ground and not used at the time of such estimate, and the value thereof. The City of Alameda shall retain five percent (5%) of such estimated value of the work done and fifty percent (50%) of the value of the materials so estimated to have been furnished and delivered and unused, as aforesaid, as part security for the fulfillment of the contract by the Contractor, and shall monthly pay to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No such estimate or payment shall be required to be made, when, in the judgment of the City Engineer, the work is not proceeding in accordance with the provisions of the contract, or when in his judgment, the total value of the work done since the last estimate amounts to less than Three Hundred Dollars ($300.00). No such estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

Partial Payments

Progress payments shall be in accordance with Section 9-1.16 of the Standard Specifications "Progress Payments", as currently amended, and these special provisions. The City, once in each month, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished, provided the acceptable materials are listed as eligible for partial payment as materials in the special provisions and are furnished and delivered by the Contractor on the ground and not used or are furnished and stored for use on the Contract, if the storage is within the City and the Contractor furnishes evidence satisfactory to the Engineer that the materials are stored subject to or under the control of the City, to the time of the estimate, and the value thereof. The estimate shall also include any amounts payable for mobilization.

The amount of any material to be considered in making an estimate will in no case exceed the amount thereof which has been reported by the Contractor to the Engineer. Only materials to be incorporated in the work will be considered. The estimated value of the material established by the Engineer will in no case exceed the Contract price for the item of work for which the material is furnished.

Contractor warrants that upon signature of pay estimate, all work has been performed in strict compliance with the Contract Documents, and all work for which progress payments have been previously issued and payment has been received from City, shall be free and clear of all third-party claims, stop notices, security interests, and encumbrances.

Payment of all, or any part, of an estimate in writing may be withheld on account of any of the following:

1. Defective work not remedied;
2. Third-party claims against Contractor or City arising from the acts or omissions of Contractor or subcontractors;
3. Stop Notices;
4. Failure of Contractor to make timely payments due to subcontractors for material or labor;
5. Damage to the City or others for which Contractor is responsible;
6. Failure of Contractor to maintain, update, and submit record documents;
7. Failure of Contractor to submit schedules or their updates as required by the Contract Documents;
8. Performance of the work by Contractor without properly processed shop drawings;
9. Liquidated damages assessed;
10. Any other failure of Contractor to perform its obligations under the Contract Documents.

SUBSTITUTION OF SECURITIES FOR WITHHELD ACCOUNTS. Pursuant to Chapter 13 (commending with Section 4590), Division 5, Title 1 of the Government Code of the State of California, securities may be substituted for any monies withheld by a public agency to ensure performance under a contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the public agency, or with a state or

federally chartered bank as the escrow agent, who shall pay such monies to the Contractor upon satisfactory completion of the contract.

Securities eligible for substitution under this section shall include those listed in Section 22300 of the Public Contract Code of the State of California or bank or savings and loan certificates of deposit.

Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

Any escrow agreement entered into pursuant to this section shall contain, as a minimum, the following provisions:

1. The amount of securities to be deposited.
2. The terms and conditions of conversion to cash in case of the default of the Contractor.
3. The termination of the escrow upon completion of the contract.

D. NOTICE OF COMPLETION. Whenever the work provided and contemplated by the contract shall have been satisfactorily completed, the Engineer will make the final inspection.

When such final inspection shows that the work has been completed in conformance with the plans, specifications and special provisions, the Engineer will recommend the formal acceptance of the work by the City Council; and upon such acceptance, Notice of Completion will be recorded. The said work shall not be deemed completed until the same is accepted by the City.

E. PAYMENT OF THE RETENTION. The City Engineer shall, after the completion of the contract, total all amounts retained under the provisions of the contract. Final payment of retention shall be in conformance with Public Contract Code Section 7107.

It is mutually agreed between the parties to the contract that no certificate given or payments made under the contract, except the final certificate of final payment, shall be conclusive evidence of the performance of the contract, either wholly or in part, against any claim of the Contractor; and no payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor further agrees that the payment of the final amount due under the contract, and the adjustment and payment for any work done in accordance with any alterations of the same, shall release the City of Alameda, its officers, employees and agents from any and all claims or liability on account of work performed under the contract or any alteration thereof.

SECTION VIII. SPECIAL PROVISIONS

STANDARD SPECIFICATIONS ADOPTION. The work embraced herein shall be done in accordance with the appropriate provisions of construction detail of the specifications entitled "State of California, Department of Transportation, Standard Specifications", latest revision, insofar as the same apply, which specifications are hereinafter referred to as the Standard Specifications, and in accordance with the following Special Provisions.

Whenever in the Standard Specifications the following terms are used, they shall be understood to mean and refer to the following:

Department of Public Works or Department of Transportation	To the Engineering Division
Director of Public Works	To the Public Works Director
Engineer	To the City Engineer, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.
Laboratory	To the designated Laboratory authorized by the City of Alameda to test materials and Work involved in the contract.
State	To the City of Alameda

Other terms appearing in the Standard Specifications, and these specifications, shall have the intent and meaning specified in Section I, Definition of Terms, of the Standard Specifications.

In case of conflict between the Standard Specifications and these Special Provisions, the Special Provisions shall take precedence over and be used in lieu of such conflicting portions.

In case of conflict between the Standard Specifications or Special Provisions and the "East Bay Communities Regional Standards For Sanitary Sewer System Installation, Rehabilitation and Repair", the "East Bay Communities Regional Standards For Sanitary Sewer System Installation, Rehabilitation And Repair" shall take precedence over and be used in lieu of such conflicting portions.

SECTION IX. QUANTITIES

The following preliminary estimate of the quantities of work to be done and materials to be furnished is approximate only, and the City of Alameda does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work that may be deemed necessary or expedient to the Engineer.

Quantities shall be determined by the Contractor from plans and specifications. Any discrepancy or conflict shall be reported to the Project Manager. Contractor shall be held responsible for any discrepancies or conflicts not reported to the Project Manager seventy-two (72) hours prior to the bid opening.

The basis of award of contract shall be by the City of Alameda for the lowest and best bid that will best serve the City's need. The contract shall be awarded with the entire project based bid.

The City reserves the right to reject any, any portion, or all bids.

The base bid consists of thirty seven (37) bid items, as outlined below and detailed in Section XII, M, Extent of Contract. The project also includes ZERO add alternates.

TABULATION OF PRELIMINARY ESTIMATE OF QUANTITIES

	Description	Est. Qty.	Unit	Unit Price	Total Price
1	MOBILIZATION, DEMOBILIZATION AND SWPPP	1	LS		
2	MAINTAINING TRAFFIC	1	LS		
3	8.63" HDPE SEWER MAIN - PIPEBURST	1460	LF		
4	8" PVC SEWER MAIN - OPEN CUT	12,187	LF		
5	10" PVC SEWER MAIN – OPEN CUT	7	LF		
6	8" CIPP LINER	61	LF		
7	10" CIPP LINER	526	LF		
8	15" CIPP LINER	976	LF		
9	ABANDON EXISTING SEWER AND FILL WITH GROUT	1,385	LF		
10	FIELD LOCATE BURIED MANHOLES AND RODHOLES	5	EA		
11	REMOVE EXISTING RODHOLE	10	EA		
12	REMOVE EXISTING MANHOLE	37	EA		
13	ABANDON EXISTING MANHOLE	1	EA		
14	CONNECT TO EXISTING MANHOLES AND REBUILD CHANNELS	35	EA		
15	2 FT DIAMETER MANHOLE	1	EA		
16	4 FT DIAMETER MANHOLE	45	EA		
17	REHABILITATE EXISTING MANHOLE	373	VF		
18	REPLACE MANHOLE LID AND CASTING	34	EA		

	Description	Est. Qty.	Unit	Unit Price	Total Price
19	8" INTERNAL DROP CONNECTION	1	EA		
20	FIELD LOCATE AND POTHOLE EXISTING LATERALS	376	EA		
21	4" LOWER LATERAL, FITTINGS & CONNECTIONS - PIPEBURST	9,402	LF		
22	4" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT	373	LF		
23	4" LATERAL CLEANOUT, CAP AND CLEANOUT BOX	368	EA		
24	4" LATERAL RECONNECTION TO SEWER MAIN	10	EA		
25	6" LOWER LATERAL, FITTINGS & CONNECTIONS – PIPEBURST	200	LF		
26	6" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT	150	LF		
27	6" LATERAL CLEANOUT, CAP AND CLEANOUT BOX	18	EA		
28	RECONSTRUCT SIDEWALK	6,016	SF		
29	RECONSTRUCT CURB AND GUTTER	800	LF		
30	ASPHALT CONCRETE PATCH	947	TON		
31	ASPHALT CONCRETE BRIDGE	893	TON		
32	MECHANICAL SHEETING AND SHORING OF SEWER TRENCH	1	LS		
33	PAVEMENT STRIPING AND MARKING	1	LS		
34	PERMITS AND LICENSES	1	TBD	ALLOWANCE	5000
35	STOCKPILING OF CONTAMINATED SOIL	20	TON		
36	IMPORT BORROW	20	TON		
37	CONTAMINATED GROUND WATER	1,000	GAL		
				Total Bid	

SECTION X. MATERIALS

The Contractor shall furnish for use under these special provisions all materials required to complete the contract, except as described under Section VII of the specifications.

SECTION XI. DESCRIPTION AND LOCATION OF WORK

A. DESCRIPTION OF WORK The work to be done consists of doing all work associated with the installation of sanitary sewer mains, sewer laterals, manholes, cleanouts, street patch, SWPPP, traffic control, removal and disposal of manholes, sewer lines, and all other associated work to complete the project at the locations shown on the plans.

All work is to be in conformance with the plans and specifications as required by the Engineer. The contract shall include all work necessary to make the job complete as herein specified or as shown on the plans. The contract will be awarded with Base Bid only.

B. PLANS The following drawings dated are incorporated into these Specifications:

TITLE	DRAWING NO.	CASE
Cyclic Sewer Replacement Project, Phase 16	9423	35
CITY OF ALAMEDA STANDARD PLANS:		
Standard Plan Curb, Gutter, Sidewalk and Driveway	6297	34
Standard Pre-Cast Concrete Manhole Type A (Modified)	See Contract Plans	
Standard Manholes Type B and C Shallow Depth (Modified)	See Contract Plans	
Inside Drop Manhole Detail (Modified)	See Contract Plans	
Standard Manhole Cover (Modified)	See Contract Plans	
Standard Section for Repaving Trenches	2930	22
4" Sewer Lateral Two-Way Cleanout	See Contract Plans	
6" or 8" Sewer Lateral Two-Way Cleanout (Modified)	See Contract Plans	

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORATATION STANDARD PLANS 2018 EDITION AND CALIFORNIA MUTCD 2014 EDITION:

Traffic Control System for Lane Closure on Multilane Conventional Highways	T11
Traffic Control System for Half Road Closure on Multilane Conventional Highways and Expressway	T12

TITLE	DRAWING NO. CASE
Traffic Control System for Lane Closure on Two Lane Conventional Highways	T13
Work in Center of Road with Low Traffic Volumes	TA-15
Closure in the Center of an Intersection	TA-26
Closure at the Side of an Intersection	TA-27
Sidewalk Detour or Diversion	TA-28
Crosswalk Closures and Pedestrian Detours	TA-29

SECTION XII. CONSTRUCTION DETAILS

The construction details covered under this Section XII shall be Special Provisions as set forth in Section VIII.

A. MAINTAINING TRAFFIC. Attention is directed to Section 7-1.03, "Public Convenience", 7-1.04, "Public Safety", of the State of California Standard Specifications, and to Section II, Article Q of these specifications.

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic.

The Contractor will not be permitted to detour traffic from the work area at any time. The Contractor will be required to maintain two-way traffic at all times. Any lane closure shall be subject to the prior approval of the City Engineer.

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress on working days.

Prior to commencement of work, the Contractor shall provide the Engineer with sketches for approval, indicating the method of signing and necessary delineators for proposed lane closures.

The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangement relative to keeping the work area clear of parked vehicles.

The provisions of Section 7-1.04 of the Standard Specifications, regarding State-furnished signs, are hereby revised to provide that all signs and other warning devices shall be provided by the Contractor and shall become his/her property after the completion of the contract. The Contractor shall refer to the current "Manual of Warning Signs, Lights and Devices for Use in the Performance of Work Upon Highways" and the "Uniform Sign Chart" issued by the Department of Transportation, Division of Operations.

Flagmen, if necessary, shall be properly equipped and trained in accordance with "Instructions to Flagmen", published by the California Department of Transportation. Section 12-1.04 is revised to provide that all flagmen shall be furnished by the Contractor at his/her expense.

The provisions in this section may be modified or altered if, in the opinion of the Engineer, public traffic will be better served and work expedited. Said modifications or alterations shall not be adopted until approved in writing by the Engineer.

No additional compensation will be allowed the Contractor for providing for the free

passage of traffic through the work. Construction work hours are restricted between 8:00 AM to 5:00 PM, Monday through Friday.

Whenever vehicle or equipment is parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with florescent traffic cones or portable delineators placed on a taper in advance of the parked vehicle or equipment and along the edge of the pavement at 25-foot intervals to a point no less that 25 feet past the last vehicle or piece of equipment. A minimum of nine (9) cones or portable delineators shall be used for the taper. A W20-1 (Road Work Ahead) or C24 (CA) (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the Engineer.

Contractor shall be responsible for posting "No Parking-Tow Away" Signs for the seventy-two (72) hours prior to construction. Contractor must obtain these signs at his/her own expense from the City's Planning and Building Office or at the Department of Public Works. No parking signs shall be posted only when work is being performed by the Contractor at the posted locations. No Parking signs shall display a date range no longer than 2 weeks at any given time. A revision in date range requires re-posting.

All vehicular, bicycle, and pedestrian traffic shall be permitted to pass through the work, unless other existing streets stipulated in the special provisions. **Contractor must comply with ADA requirements, by providing pedestrian access on the sidewalk and crosswalk during construction.**

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic. A traffic control plan identifying the size and location of such facilities shall be submitted to the Engineer for approval a minimum of two weeks prior to beginning construction. Any work being performed without proper signing in place shall be stopped until the unsatisfactorily condition is corrected. **Contractor shall submit to the Engineer a traffic control plan signed and stamped by a Traffic Engineer registered in the state of California for any work that will impact vehicular, bicycle, and pedestrian traffic in the area and shall be developed to show the actual field conditions and not a typical plan. The contractor must have an approved plan prior to commencing of work. All Traffic Control Plans must be in conformance with the California Manual on Uniform Traffic Control Devices (CA MUTCD) regulations and guidelines. Contractor shall submit Traffic Control Plan for approval to the Engineer at the pre-construction. Any work being performed without proper signing in place shall be stopped until the unsatisfactory condition is corrected.**

The Contractor shall place barriers at each end of all excavations and at such places along excavations as may be necessary to warn all pedestrian and vehicular traffic of excavations. Lights shall also be placed along excavations (from sunset each day to sunrise of the next day) until excavation is entirely restored. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and stored in containers so as to cause the least possible interference with public travel. Free access must be maintained to all fire hydrants, water valves and meters, and private driveways.

Storage of construction material and equipment on City streets will not be permitted.

No trench or excavation shall be left open at the end of any day's work. Daily traffic control measures shall continue until cleanup activities have been satisfactorily completed and all of the Contractor's equipment has been removed from the traveled way area.

The provision of this section will not relieve the Contractor from his/her responsibility to provide such additional devices or take such measures as may be necessary to comply with the provision in Section 7-1.04, "Public Safety," of the Standard Specifications.

Contractor shall not work on multiple streets at a time unless approved by the engineer.

See Section II, Q. for traffic control guidelines. This section also outlines times construction is allowed on certain streets in the City. (Night work, if requested by the Contractor, must be approved by the City Engineer.)

B. ORDER OF WORK. Order of work shall conform to provisions of Section 10-1.02, "Work Sequencing", of the Standard Specifications and these Special Provisions.

The Contractor shall coordinate his work with all other contractors or utility companies working in the construction area.

At least three (3) working days prior to the placement of any new traffic striping and pavement markings, the Contractor shall layout cat-tracks for the traffic striping and pavement marking and contact the City inspector for inspection and approval of the cat-tracking. The City shall review, modify as necessary, and approve the cat-tracking prior to the Contractor proceeding with the striping/marking. The Contractor may not proceed with the striping/marking work until the cat-tracks have been approved by the Engineer or approved designee. The Contractor shall post temporary "No Parking" signs in accordance with the provisions of Sections 7-1.03 and 7-1.04, "PUBLIC CONVENIENCE AND PUBLIC SAFETY" of these Specifications.

Any work done without proper inspection and approval will be subject to rejection. In the case of rejection, the Contractor shall remove the rejected work, and the striping/marking work shall be reinstalled in accordance with these requirements and based on the direction of the Engineer. The City will not compensate the Contractor for any work associated with replacing striping/marking to the satisfaction of the Engineer, including but not limited to: the full removal of the rejected traffic striping and pavement marking work; the installation of new striping/marking, including blacking out any of the removed and rejected striping/marking; and the re-posting of temporary "No Parking" signs in accordance with the provisions of Sections 7-1.03 and 7-1.04, "PUBLIC CONVENIENCE AND PUBLIC SAFETY" of these Specifications. All of these costs shall be borne by the Contractor.

C. PORTLAND CEMENT CONCRETE. All concrete shall be Class "A" unless otherwise specified and shall meet the requirements of the Standard Specifications, Section 90. If it is found necessary to increase the slump of concrete at the site of the work it shall be done only by the addition of 16 pounds of cement (1/6 sack) per gallon of water. Such addition shall be made only at the direction of the Engineer and in his presence.

All edges of concrete shall be edged with a cement edger of the size 2-3/4" in width with a 3/16" radius. All joints or grooves that are indicated on the plans or required by the Engineer shall be marked with cement grooves or jointers 4" in width and having a groove 3/8" wide at the top and a depth of l/4" to l/2".

A power driven pavement saw shall be used to cut existing Portland cement concrete sidewalk, curb and gutter where it is necessary to remove the concrete. The depth of the cut shall be a minimum of 1-1/2" and straight; and, if two cuts are made, they shall be parallel. The cut shall be deep enough to permit complete breakage of the concrete without ragged edges. Sawcut debris is not permitted to enter the storm drain system and shall be vacuumed up by the contractor.

All concrete with exposed surfaces, such as sidewalk, curb, gutter, local depressions, driveway and catch basins tops shall be colored by adding to the mix a proportionate amount of the best quality lampblack, such proportion to be determined by the Engineer.

All new or previously existing concrete surfaces shall be left neat, clean and free from concrete droppings. The Contractor shall be responsible for preventing vandals or others from disfiguring or defacing the finished surfaces. Any new concrete surfaces disfigured due to pouring late in the day, or due to the failure on the part of the Contractor to provide adequate protection or covering to the new surfaces, shall be replaced at the Contractor's expense. The work shall conform to Section I.U. Construction Site Control and Section III. E. Clean Up.

The name of the Contractor and the year the work is performed shall be stamped upon both ends of each single piece of any concrete work, as called for by Section No. 22-5.3 of the Municipal Code. Contractor shall obtain a load slip from each delivery and give one copy of said slip to the Engineer at the point of deliver of the material.

All exposed surfaces shall be cured by the impervious membrane method to the satisfaction of the Engineer.

D. EQUAL AND/OR APPROVED EQUAL

Wherever the term "or equal" and/or "approved equal" are used following a trade name or the mention of any patented product in the specifications, they shall be deemed to read "or their equals in quality and utility" where two or more such trade names or patented products are mentioned. If any trade name or patented product or process is mentioned in these specifications and is not followed by any such term as "or equal", such trade name or patented product or process shall be deemed to be followed by the words "or its equal in quality and utility" or "or their equals in quality and utility" if more than one is mentioned. Trade names, proprietary products and methods are used merely as standards of quality and utility and to designate the

type of material and processes desired. Materials and processes of equal quality and utility may be furnished or used so long as such substitution causes no delay to product delivery and/or installation and the Contractor has received written approval therefor by the Engineer. The Contractor shall allow 30 days for the Engineer's review of the proposed substitution.

E. DISPOSAL OF EXCAVATED MATERIALS. Salvable materials will be disposed of as directed by the Engineer. The Contractor shall dispose of at least 80% of the removed concrete, rock, brick, asphalt or other similar materials to an approved materials recycling location other than a landfill. The 80% shall be determined by weight of materials. All disposal and recycling weight/receipt tags shall be submitted to the Engineer. In Exhibit C is a suggested list of facilities that will accept construction and demolition waste materials. The Contractor shall submit a request and proof in writing if unable to achieve this 80% goal. Other waste materials shall be disposed of in localities outside of the City of Alameda at the discretion of the Contractor.

F. EXISTING IMPROVEMENTS. Existing fence, lawn, or other improvements within the area of the work shall be carefully removed without damage and replaced in their present location and condition upon completion of the work, in a manner satisfactory to the Engineer and the owner.

Existing lawn shall be removed only where necessary and shall be replaced if considered by the Engineer to be in good condition. Otherwise, the Contractor shall furnish four inches (4") of new loam and plant new lawn, all as approved by the Engineer. All ground surface and replaced lawn shall be left smoothly graded to the original grade.

All existing irrigation system including electric wire, pipelines, sprinkler heads, damaged as a direct or indirect result of construction activity, shall be replaced by the Contractor at his/her expense at appropriate locations in a manner satisfactory to the Engineer and the owner. Any existing improvements that are damaged or disturbed due to carelessness by the Contractor shall be replaced or adjusted to the satisfaction of the Engineer.

Existing fence or other improvements within the area of the work shall be carefully removed without damage and replaced in their present location and condition upon completion of the work, in a manner satisfactory to the Engineer and the owner.

The Contractor shall not disturb or destroy any permanent survey points and/or monuments without the written consent of the City of Alameda. Any permanent survey points and/or monuments disturbed or destroyed, as a direct or indirect result of construction activity shall be replaced to the satisfaction of the Engineer by a licensed surveyor at the Contractor's expense.

All decorative landscaping (shrubs, plants, trees, lawn, etc.) and/or hardscaped ground surfaces (exposed aggregate, bricks and mortar, painted concrete, etc.) that are removed, damaged, or destroyed as a direct or indirect result of any work done for this project shall be replaced by the contractor at his expense and in the manner that is satisfactory to the engineer and the owner.

Unless specified separately by bid items, payment for existing improvements should be included in various bid items and no additional payment will be made.

G. TREE ROOTS. Where tree roots conflict with the grade for the placement or replacement of concrete work, the Contractor shall inform the City Maintenance Division immediately. When directed by the City Maintenance Division, the Contractor shall perform the necessary root removal and trimming to a minimum depth of ten inches (10") below the proposed concrete, to prepare the site for the concrete work. All cut roots shall be properly painted with an approved root-sealing compound. The Contractor shall then proceed with the work to completion. The cost of the Contractor cutting the tree roots involved shall be included in the cost of the work.

Prior to any lateral extension excavation, the area must be reviewed by the Engineer or his representative, and if required, the City Arborist shall supervise the excavation and any root cutting or shaving where tree conflicts exist.

If root trimming is not allowed by the City Maintenance Division, all trees that could be damaged from equipment will require protection from physical injury. Tree trunks are to be wrapped with orange plastic construction fencing from the base up to the first branch. The plastic fencing must be wrapped to a minimum thickness of 2 inches to protect from possible injury. Additional protection from larger equipment can be provided by strapping 2x4 boards over the orange fencing on the side of the tree where there is a potential for injury. When trenching is undertaken, the size of the equipment may require that upper scaffold stems are also wrapped and protected. Hand digging is the only acceptable method for excavating the soil within five feet of the base of trees.

H. UTILITY RELOCATION. The known existing utilities and pipelines except building connections (laterals) are shown on the Drawings in their approximate location. The Contractor shall exercise care in avoiding damage to all utilities, as he/she will be held responsible for their repair if damaged. There is no guarantee that all utilities or obstructions are shown, or that locations indicated are accurate. Utilities are piping, conduits, wire, cable, poles, ducts, manholes, pull boxes and the like, located at the project site.

The Contractor shall be responsible for locating all utilities, and must protect and support all utilities, which are to remain whether shown or not shown on the plans. Full compensation for this work shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made.

The Contractor shall contact all affected utility owners and request them to locate their respective utilities prior to the start of "potholing" procedures. The utility owner shall be given seven days written notice prior to commencing potholing. If a utility owner is not equipped to locate its utility, the Contractor shall locate it.

The location of all affected utility underground pipes; conduits and other utilities shall be clearly marked on the pavement or with suitable markers if not on pavement. In addition to the location of metallic pipes and conduits, non-metallic pipe, ducts and conduits shall also be similarly located using surface indicators and shall then be similarly marked.

After the utility survey is completed, potholing shall commence to determine the actual location of the utilities. Prior to excavating for any new pipelines or structures, the Contractor shall locate and uncover all existing utilities to a point one foot below the utility. Pothole for all utilities where crossings, interferences, or connections to the new pipelines are shown on the Drawings, marked by the utility companies, or indicated by surface signs. The Contractor shall submit a report identifying each underground utility and its depth and station. Any variation in the actual elevations and the indicated elevations shall be brought to the Engineer's attention.

Any necessary relocations of utilities, whether shown on the Drawings or not, shall be coordinated with the affected utility. The Contractor shall perform the relocation only if instructed to do so in writing from the utility and the Engineer. Payment for work not shown on the Drawings shall be in accordance with Section VII, Article B, of these specifications or for a price previously agreed upon in writing, by the Contractor and the Engineer. If the Contractor does not expose all required utilities, he shall not be entitled to additional compensation for work necessary to avoid interferences, nor for repair to damaged utilities.

Excavations around underground electrical ducts and conduits shall be performed using extreme caution to prevent injury to workmen or damage to electrical ducts or conduits. Similar precautions shall be exercised around gas lines, telephone and television cables.

Backfill and pave with one inch of cutback after completing potholing.

If interferences occur at locations other than shown on the Drawings, the Contractor shall notify the Engineer, and a method for correcting said interferences shall be supplied by the Engineer. Payment for interferences that are not shown on the plans, nor for which there are surface indications, shall be in accordance with the provisions of the General Conditions.

Planned utility service shutdowns shall be accomplished during periods of minimum use. In some cases this may require night or weekend work, at no additional cost to the City. The Contractor shall program his work so that service will be restored in the minimum possible time, and shall cooperate with the utility companies in reducing shutdowns of utility systems to a minimum.

No utility shall be disconnected without prior written approval from the utility owner. When it is necessary to disconnect a utility, the Contractor shall give the utility owner not less than 72 hours notice when requesting written approval. The Contractor shall program his work so that service will be restored in the minimum possible time.

There are existing overhead electric and telephone transmission lines along the pipeline routes. These overhead utilities are not shown on the Drawings. Extreme caution shall be used when working in the vicinity of overhead utilities so as to prevent injury to workmen or damage to the utilities. The Contractor shall be required to comply with the applicable provisions of the California Construction Safety Orders when working anywhere on this project.

Existing gas, water, sewer and telephone house laterals are not specifically shown on the

Drawings but do exist along the pipeline routes. Protect all service laterals from damage due to construction operations. If any laterals are damaged, notify the Engineer and the affected utility immediately. The cost of repair shall be borne by the Contractor.

I. EXCAVATION AND BACKFILL Method of excavation, trench shoring and dewatering, if applicable, shall be the responsibility of the Contractor, subject to the approval of the Engineer. It should be presumed that the presence of high groundwater will require dewatering operations.

Contractor shall submit to the Engineer a submittal for the trenching plan, material data sheets of any shoring equipment to be used, and calculations signed, stamped and approved by a registered California Engineer. The Contractor must have an approved plan prior to commencing of any excavation and trenching work.

Refer to the attached Geotechnical report(s) for the trenching guidelines.

The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department.

Any excavation shall be supported so that it will be safe and the ground alongside the excavation will not slide or settle, and all existing improvements, either on public or private property, will be fully protected from damage.

Any damage or collapse of pavement or improvements beyond the trench shoring or excavation limits, due to sliding, caving, or settling of ground during excavation, construction, or backfilling, or from construction equipment, shall be repaired to the satisfaction of the Engineer at the Contractor's expense. All supports shall be removed after construction is completed, unless otherwise directed by the Engineer, and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

Approved local or imported material shall be used for backfill. When the material from the excavation is unsuitable for backfill; it shall be disposed of and a suitable material (free from large stones) and approved by the Engineer, shall be furnished by the Contractor for the backfill. Backfilling shall be accomplished by tapping or ramming with proper tools for the full depth to sub-grade elevation in six inch (6") layers or less. Relative compaction shall be ninety-five percent (95%) or more as determined by the Impact or Field Method Compaction Test. Flooding or jetting of backfill shall not be allowed.

Backfilling of trenches in pipe areas shall be accomplished by backfilling on both sides of the pipe simultaneously so that injurious side pressures do not occur. Backfilling around the pipe by bulldozer or other mechanical equipment will not be allowed.

Guidelines for site preparation, suitable backfill material, material requirements, fill placement and compaction are outlined in the Geotechnical Report.

Payment for excavation and backfill shall be included in the various bid items of these specifications. The contractor shall provide the engineer daily load tags for backfill material used.

J. SEWAGE PUMPING The Contractor shall furnish, install, and operate pumps, conduits, and other equipment to divert the flow of sewage during the project construction.

The pumping system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum. Standby pumps shall be provided as required. Pumping shall be done by the Contractor in such a manner that it will not damage public or private property or create a nuisance or health menace. The pumped sewage shall be in an enclosed hose or pipe and shall be reinserted into the sanitary sewer system. Sewage shall not be allowed to free flow in gutters, streets, or over sidewalks, etc. Nor shall any sewage be allowed to flow into the storm inlets, the lagoon or conduits. Pumping and all related work shall be included in various items and shall not be considered for additional payment. Contractor shall submit a pump set up diagram showing the intake point and outfall point, including the pump size, pipe size for the sewage conveyance from the existing system.

Payment for sewage pumping whether on public right-of-way and private property shall be included in the various contract items of work.

K. CONTROL OF WATER All excavations shall be kept free from water and all construction shall be in the dry. The presence of high groundwater will require dewatering operations. The contractor shall furnish, install, maintain and operate all necessary pumping and other equipment for dewatering all excavations. The contractor shall at all times have on the project sufficient pumping equipment for immediate use, including standby pumps for use in case other pumps become inoperable. A sufficient number of pumps shall be provided as to hold the groundwater level at an elevation not less than two feet below the lowest elevation of the concrete or other material to be placed. Water shall be disposed of in such a manner as to cause no injury or nuisance to public or private property, or be menace to the public health.

The Contractor may obtain a wastewater discharge permit from the East Bay Municipal Utility District (EBMUD) to discharge dewatering disposal water to the City's sewer system. The Contractor is responsible for applying for and meeting all of the EBMUD permit requirements.

The Contractor shall remove sediment from the disposal water prior to disposing into the sewer system. The sediment removal method shall meet the requirements of the EBMUD permit (filtered with Whatman 934 AH Glass Microfiber filter, or equivalent).

The dewatering operation shall be continuous, so that the excavated areas shall be kept free from water during construction, while concrete is setting and achieves full strength, and until backfill has been placed to a sufficient height to anchor the work against possible floatation.

Dewatering shall be continued during, backfilling operations such that the groundwater is at least one foot below the level of the compaction effort at all times. No compaction of saturated

clay materials shall be allowed.

Dewatering devices must be adequately filtered to prevent the removal of fines from the soil.

The Contactor shall be responsible for any damage to foundations or any other parts of existing structures or the new work caused by failure of any part of the Contractor's protective works. After temporary protective works are no longer needed for dewatering purposes, they shall be removed by the Contractor.

If pumping is required on a 24- hour basis, requiring engine drives, then engines shall be equipped in a manner to keep noise to a minimum. Refer to Section II, Article T, of these specifications for noise control requirements.

The contractor shall be responsible for furnishing temporary drainage facilities to convey and dispose of surface water falling or passing over site.

No sediment shall be pumped from the excavation. Refer to Section II, Article U, of these specifications for construction site controls.

Payment for dewatering whether on public right-of-way and private property shall be included in the various contract items of work.

L. EXCAVATION OF TRENCH The ground shall be excavated in open trenches, the sides of which shall be parallel to and at equal distances on each side of the sanitary sewer centerline. **Trench shall be saw cut along straight lines with no jagged edges.** At no time shall there be more than 200 lineal feet of the trench opened along any single sanitary sewer force main route, including the section opened ahead of the pipe laying and the section behind the pipe laying which has not been completely backfilled. Open trenches will be plated during non-working hours. This is to include asphalt concrete fillets around the perimeter of plates.

The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and health of the Industrial Relations Department. **See Attachment A, "TRENCH EXCAVATION CONSTRUCTION STANDARDS".**

Except where otherwise shown on the plans or otherwise approved by the Engineer, maximum trench width shall be as follows:

For pipe size 4" use maximum trench width 28"
For pipe size 8" use maximum trench width 36"
For pipe size 10" use maximum trench width 36"

In addition, all excavation shall conform to Section XII. I., "Excavation and Backfill."

Due to nature of soil along alignment excavation should be shored using recommended methods in Section XII, I., "Excavation & Backfill", Subsection "Excavation Stabilization &

Temporary Slopes." Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department.

Contractor shall submit proposal for review and approval to the Engineer for method of sheeting and shoring.

All storm drains, water pipes, gas pipes, EBMUD sewer pipes, and conduits or other structures must be properly supported where crossing or lying along the trench.

Contractor should expect to encounter 8" concrete patch over utility crossings. The 8" patch shall be saw cut, as necessary, when trenching for the new line.

a. Trench Backfill shall be in conformance with Section XII.I. of these specifications and this Section.

b. Location wires for non-trace-able pipes. All PVC, HPDE pipe and conduits for electrical wires shall be marked with a locatable wire prior to back filling the trenches during construction so as to be easily located from the ground surface by the typical Underground alert service.

c. Service shall be maintained at all times. No temporary connections shall be made which are health hazard. All connections shall be made in such a manner that no rock, soil, piece of pipe, or other debris is allowed to enter the sewerage system.

When trenching, the Contractor will not be permitted to tunnel under curb and/or gutter and or sidewalk for lower lateral installation. The curb, and/or gutter, and/or sidewalk will be saw cut at the nearest score marks and then removed and disposed of off-site. Upon completion of lateral replacement work, the curb and/or gutter, and/or sidewalk will be replaced per Standard Drawing No. 6297, Case 24.

Excavation shall be supported so that it will be safe and the ground alongside the excavation will not slide or settle. All existing improvements including structures, fences, walls, and foundations will be fully protected from damage.

Any damage to the existing improvements beyond the trench shoring or excavation limits due sliding, caving, or settling of ground or backfill, or from construction equipment shall be repaired to the satisfaction of the property owner and the City Engineer.

All existing improvements including irrigation system, brick walkways, brick walls, fences, electrical wires, driveways, pipelines, sprinkler heads, and landscaping damaged as a direct or indirect result of construction activity shall be replaced by the contractor at his expense at appropriate locations in a manner satisfactory to the property owner and the City Engineer. Continuous dewatering may be required due to high groundwater. Dewatering shall be in conformance with Section XII, K "Control of Water."

Contractor shall take extra care where trees are in conflict or in close proximity to

laterals. See Section XII G. TREE ROOTS.

Payment shall be shall be included in the various bid items of these specifications.

M. EXTENT OF CONTRACT. The Contractor shall furnish all labor, material has herein specified, tools and equipment necessary and shall do all the work necessary to construct and put in complete order for use the construction project contemplated by these specifications, the various items, and in the approximate quantities tabulated in the Proposal, Section XIV.

1. MOBILIZATION, DEMOBILIZATION, STORMWATER AND POLLUTION PREVENTION PLAN (SWPPP) **(Bid Item #1).**

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications and the following items.

a. Installing temporary construction water supply, power, wiring, and lighting facilities as required.
b. Providing field office trailers if needed by the Contractor.
c. Providing all on-site communication facilities, including telephones, and radio pagers.
d. Preparation of Waste Reduction and Recycling Plan
e. Preparation and submittal of SWPPP.
f. Having all OSHA required notices and establishment of safety programs.
g. Beginning work on the project or at the subject site as applicable.
h. Obtaining approved traffic control plan from the City.
i. Construction scheduling of the sewer replacement at the St. Joseph's Basilica property shall be coordinated with the St. Joseph school based upon their school schedule.

Demobilization shall include the following items.

1) Moving off from the site of all Contractors equipment that was required for operations.
2) Removal of all temporary facilities and equipment.
3) Final cleanup and site restoration.

Payment for MOBILIZATION, DEMOBILIZATION AND SWPPP shall be at the contract lump sum (LS) price and shall be considered full compensation for labor, materials, tool, equipment, and incidentals.

2. MAINTAINING TRAFFIC **(Bid Item #2).** Maintaining traffic shall be in conformance with Section XII, A, MAINTAINING TRAFFIC of these specifications.

Payment for MAINTAINING TRAFFIC including temporary traffic control, plan, signs, flagman, and traffic control satisfactory implementation shall be at the contract lump sum (LS) price and shall be considered full compensation for labor, materials, tool, equipment, and incidentals required for maintaining traffic during construction.

3. 8.63" HDPE SEWER MAIN - PIPEBURST **(Bid Item #3).** Shall include potholing

of utility mains, services, and storm drains that may be in conflict with the work, pre- and post-construction CCTV inspection in accordance with Section 02659, sawcutting up to 12" deep, excavation (hand excavation if necessary) of entry, exit, boring, and receiving pits, excavation by hand in tight areas, disposal of excavated materials including removal of portions of existing sewer pipe and rodholes to facilitate pipebursting, dewatering, control of sewage flow, pipebursting existing sewer pipes, furnishing and insertion of 8.63" OD HDPE (DR=17) pipe, including imported backfill material, pipe bedding, reconnection of live laterals, compaction, temporary resurfacing, testing, restoration of landscape improvements, and all other work necessary to pipeburst and install the replacement new sewer main, complete, in place.

Payment for 8.63" HDPE SEWER MAIN - PIPEBURST in linear foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

4. 8" PVC SEWER MAIN – OPEN CUT (**Bid Item #4**). Shall include all sawcutting up to 12" deep, potholing utility mains, services, and storm drains in advance of trenching, pre and post-construction CCTV inspection in accordance with Section 02659, excavation including hand excavation in tight areas, accurately locating the existing sewer by potholing in areas where it is necessary to determine its alignment, removal and disposal of the existing sewer where it is encountered in the alignment of the new sewer, disposal of all asphalt, concrete and excavated materials, dewatering, control of sewage flow, furnishing and installation of 8" PVC (SDR=26) pipe sewer pipe, fittings, pipe bedding, connection of live laterals, imported backfill material, Caltrans backfill requirements at specified locations, compaction, temporary resurfacing, repair of storm drains, restoration of all landscape improvements, testing and all other work necessary to install the new sewer main, complete, in-place.

Payment for the 8" PVC SEWER MAIN – OPEN CUT will be in liner foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

5. 10" PVC SEWER MAIN – OPEN CUT (**Bid Item #5**). Shall include all sawcutting up to 12" deep, potholing utility mains, services, and storm drains in advance of trenching, pre and post-construction CCTV inspection in accordance with Section 02659, excavation including hand excavation in tight areas, accurately locating the existing sewer by potholing in areas where it is necessary to determine its alignment, removal and disposal of the existing sewer where it is encountered in the alignment of the new sewer, disposal of all asphalt, concrete and excavated materials, dewatering, control of sewage flow, furnishing and installation of 10" PVC (SDR=26) pipe sewer pipe, fittings, pipe bedding, connection of live laterals, imported backfill material, compaction, temporary resurfacing, repair of storm drains, restoration of all landscape improvements, testing and all other work necessary to install the new sewer main, complete, in-place.

Payment for the 10" PVC SEWER MAIN – OPEN CUT will be in liner foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

6. 8" CIPP LINER **(Bid Item #6).** Shall include pre and post-construction CCTV inspection and cleaning in accordance with Section 02659, installation and curing of thermosetting resin impregnated material cast-in-place sewer pipe inside of existing 8" sewer mains including curing with hot water or steam, all testing and removal of all waste materials and process water by truck, and disposal at a legal disposal site, or discharge of process water into the existing sewer system, provided all the requirements of the East Bay Municipal Utility District are met, including finishing and trimming of sewer liner, dewatering, control of sewage flow and/or bypass pumping, and all other work necessary to install the new 8" CIPP sewer main, complete, in place.

Payment for the 8" CIPP LINER will be in liner foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

7. 10" CIPP LINER **(Bid Item #7).** Shall include pre and post-construction CCTV inspection and cleaning in accordance with Section 02659, installation and curing of thermosetting resin impregnated material cast-in-place sewer pipe inside of existing 10" sewer mains including curing with hot water or steam, all testing and removal of all waste materials and process water by truck, and disposal at a legal disposal site, or discharge of process water into the existing sewer system, provided all the requirements of the East Bay Municipal Utility District are met, including finishing and trimming of sewer liner, dewatering, control of sewage flow and/or bypass pumping, and all other work necessary to install the new 8" CIPP sewer main, complete, in place.

Payment for the 10" CIPP LINER will be in liner foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

8. 15" CIPP LINER **(Bid Item #8).** Shall include pre and post-construction CCTV inspection and cleaning in accordance with Section 02659, installation and curing of thermosetting resin impregnated material cast-in-place sewer pipe inside of existing 8" sewer mains including curing with hot water or steam, all testing and removal of all waste materials and process water by truck, and disposal at a legal disposal site, or discharge of process water into the existing sewer system, provided all the requirements of the East Bay Municipal Utility District are met, including finishing and trimming of sewer liner, dewatering, control of sewage flow and/or bypass pumping, and all other work necessary to install the new 15" CIPP sewer main, complete, in place.

Payment for the 15" CIPP LINER will be in liner foot (LF) of sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

9. ABANDON EXISTING SEWER AND FILL WITH GROUT **(Bid Item #9).** Shall include clearing and flushing sewer lines to be abandoned of all internal obstructions, televising of lines to be abandoned and identification of existing defects, plugging the ends of the line with 3' long concrete plug and filling the abandoned sewer lines with grout as specified including all

necessary, materials, equipment and labor, complete in place.

Payment for ABANDON EXISTING SEWER AND FILL WITH GROUT shall be by linear foot (LF) and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

10. FIELD LOCATE BURIED MANHOLES AND LAMPHOLES/RODHOLES **(Bid Item #10).** Shall include all necessary work to field locate, expose and open for inspection buried manholes and lampholes/rodholes.

Payment for FIELD LOCATE BURIED MANHOLES AND LAMPHOLES/ RODHOLES shall be for each (EA) buried manhole or lamphole/rodhole field located and exposed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

11. REMOVE EXISTING RODHOLE **(Bid Item #11).** Shall include removing existing rodholes, careful excavation around existing utilities as necessary, disposal of excavated and removed materials, dewatering, control of sewage flow, and all other work necessary to remove the manhole, complete, in place.

Payment for REMOVE EXISTING RODHOLE shall be for (EA) manhole removed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

12. REMOVE EXISTING MANHOLE **(Bid Item #12).** Shall include removing existing manholes, careful excavation around existing utilities as necessary, disposal of excavated and removed materials, dewatering, control of sewage flow, and all other work necessary to remove the manhole, complete, in place.

Payment for REMOVE EXISTING MANHOLE shall be for (EA) manhole removed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

13. ABANDON EXISTING MANHOLE **(Bid Item #13).** Shall include sealing the inlets and outlets (if necessary) with a three (3) foot long concrete plug and excavation and removal and disposal of the manhole ring and cover, and cone, barrel, or square vault sections to a point three (3) feet below the ground surface and backfilling the excavation with intermediate backfill material, compaction, temporary resurfacing in streets and/or restoration of surfacing above the excavation to match existing surrounding area.

Payment for ABANDON EXISTING MANHOLE shall be for (EA) manhole removed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

14. CONNECT TO EXISTING MANHOLE AND REBUILD CHANNELS **(Bid Item #14.** Shall include connection to the existing manholes using Standard or Alternate Manhole

Connection Detail, control of sewage flow, waterstop gaskets on new sewer pipe, as shown on the plans, chipping out and reshaping of the manhole channels as necessary to accommodate the new sewer main, patching the manhole interior with waterplug including all work necessary to comply with the confined space entry requirements.

Payment for CONNECT TO EXISTING MANHOLE AND REBUILD CHANNELS will be for each (EA) existing manhole with reconnected pipes and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

15. 2 FT DIAMETER MANHOLE **(Bid Item #15).** Shall include potholing of utility mains, services, and storm drains that may be in conflict with the work, sawcutting, careful excavation by hand around existing utilities as necessary, disposal of excavated materials, dewatering, construction of new two (2) foot diameter manholes with new cast iron frame and cover as shown in the plans, concrete manhole base with an antimicrobial crystalline waterproofing additive in accordance with Specification Section 03330, control of sewage flow, connections to new and existing pipelines as shown on the plans including pipe stubs and fittings, imported backfill material, compaction, temporary resurfacing, and all other work necessary to install the manholes, complete, in place.

Payment for 2 FT DIAMETER MANHOLE will be for each (EA) manhole and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

16. 4 FT DIAMETER MANHOLE **(Bid Item #16).** Shall include potholing of utility mains, services, and storm drains that may be in conflict with the work, sawcutting, careful excavation by and around existing utilities as necessary, disposal of excavated materials, dewatering, construction of new four (4) foot diameter manholes using concrete manholes sections manholes bases cast with an antimicrobial crystalline waterproofing additive in accordance with Specification Section 03330 and new cast iron frame and cover as shown in the plans, control of sewage flow, connections to new and existing pipelines as shown on the plans including pipe stubs and fittings, imported backfill material, compaction, temporary resurfacing, and all other work necessary to install the manholes, complete, in place.

Payment for 4 FT DIAMETER MANHOLE will be for each (EA) manhole and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

17. REHABILITATE EXISTING MANHOLE **(Bid Item #17).** The Contractor shall manage, control, divert or bypass pump the sewage flow as needed for the manhole rehabilitation described below and shall clean, degrease, hydro blast, abrasive blast, chip, bush hammer and scrape off all loose, deteriorated and corroded concrete on the inside of the manhole to expose sound concrete, dispose of all spoils at a legal dump site, cut off and remove all manhole steps and stairs and burn back the steel to ½ inch below the surface, seal and plug any infiltration leaks into the manhole with high early non-shrink cement mortar and chemical grout if necessary to stop a leak, fill all bug holes, voids, pits and cracks to smooth the inside concrete surface, coat the entire internal surface of the manhole with a high performance mortar with antimicrobial and

crystalline waterproofing enhancements in accordance with Specification Section 03340 at least 1 inch thick, and coat the entire internal surface of the manhole from the spring line of the sewer to the underside of the metal manhole frame with an approved corrosion protection coating system following the manufacturer's approved installation methods, including complete coating of the manhole channel and coating of the underside surface of the cast iron frame and cover with a bituminous coating if the manhole frame and cover is to be retained, complete.

Payment for REHABILITATE EXISTING MANHOLE will be a price per vertical foot (VF) of four (4) foot diameter manholes as measured from the bottom of the manhole frame casting to the bottom of the sewer channel and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

18. REPLACE MANHOLE LID AND CASTING **(Bid Item #18).** Shall include all work and equipment and materials for the replacement and resetting manhole frame and cover, as shown on the plans including all sawcutting, excavation and disposal of excavated material at a legal disposal site, installation of new grade rings, reinforced concrete collar, restoration of all disturbed and damaged surfaces, to pre-project conditions or better.

Payment for REPLACE MANHOLE LID AND CASTING will be for each (EA) lid and casting replacement and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

19. 8" INTERNAL DROP CONNECTION **(Bid Item #19).** Shall include installation of an 8" PVC internal drop connection as shown on the plans, and all other work necessary to install the internal drop connection into the manhole, complete, in place.

Payment for 8" INTERNAL DROP CONNECTION will be for each (EA) 8" internal drop connection and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

20. FIELD LOCATE AND POTHOLE EXISTING LATERALS **(Bid Item #20).** Shall include electronically and physically locating sewer laterals in advance of the sewer main construction, excavation of the sewer lateral by hand at the sewer main and at the tie-in point to the existing building lateral to determine if it is live, temporary covering of the excavations with steel plates or with plywood in non-traffic areas and removal and disposal of excavated material.

Payment for FIELD LOCATE AND POTHOLE EXISTING LATERALS will be for each (EA) lateral potholed and located and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

21. 4" LOWER LATERAL, FITTINGS & CONNECTIONS - PIPEBURST **(Bid Item #21).** Shall include excavation, sawcut up to 16" deep, control of sewage flow, furnishing and installing 4.5" OD HDPE sewer pipe by pipe burst, connectors and fittings, connection to the new PVC/HDPE sewer main with a PVC wye or electrofusion coupling and connection to existing lateral, existing cleanout or new cleanout, potholing of utility mains and services, backfill, compaction, temporary resurfacing, and all other work necessary to install the sewer laterals, complete in place.

Payment for 4" LOWER LATERAL, FITTINGS & CONNECTIONS – PIPEBURST will be by lineal foot (LF) of lateral installed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

22. 4" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT **(Bid Item #22).** Shall include excavation, sawcut up to 16" deep, control of sewage flow, potholing of utility services and mains, furnishing and installing 4" PVC (SDR=26) sewer pipe, connectors and fittings, backfill, compaction, temporary resurfacing, replacement of all existing landscaping and improvements that are damaged as a result of the work, and all other work necessary to install the sewer laterals, complete in place.

Payment for 4" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT will be by lineal foot (LF) of lateral installed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

23. 4" LATERAL CLEANOUT, CAP AND CLEANOUT BOX **(Bid Item #23).** Shall include excavation, control of sewage flow, sawcutting, furnishing and installing new cast iron double wye and standpipe with cap, fittings and precast cleanout boxes with lids including all necessary materials, equipment and labor, complete, in place.

Payment for 4" LATERAL CLEANOUT, CAP AND CLEANOUT BOX will be for each (EA) lateral cleanout, cap and cleanout box and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

24. 4" LATERAL RECONNECTION TO SEWER MAIN **(Bid Item #24).** Shall include reconnection of an existing 4" sewer lateral in compliance with the City of Alameda lateral requirements including connection to new HDPE/PVC sewer main with an electrofusion saddle/PVC wye, 4.5" OD HDPE or 4" PVC sewer pipe, all connectors and fittings, and all other work necessary to reconnect the existing sewer lateral, complete in place.

Payment for 4" LATERAL RECONNECTION TO SEWER MAIN will be for each (EA) lateral reconnected to the new sewer main and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

25. 6" LOWER LATERAL, FITTINGS & CONNECTIONS - PIPEBURST **(Bid Item #25).** Shall include excavation, sawcut up to 16" deep, control of sewage flow, furnishing and installing 6.63" OD HDPE sewer pipe by pipe burst, connectors and fittings, connection to the new PVC/HDPE sewer main with a PVC wye or electrofusion coupling and connection to existing lateral, existing cleanout or new cleanout, potholing of utility mains and services, backfill, compaction, temporary resurfacing, and all other work necessary to install the sewer laterals, complete in place.

Payment for 6" LOWER LATERAL, FITTINGS & CONNECTIONS – PIPEBURST will be by lineal foot (LF) of lateral installed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

26. 6" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT **(Bid Item #26).** Shall include excavation, sawcut up to 16" deep, control of sewage flow, potholing of utility services and mains, furnishing and installing 6" PVC (SDR=26) sewer pipe, connectors and fittings, backfill, compaction, temporary resurfacing, replacement of all existing landscaping and improvements that are damaged as a result of the work, and all other work necessary to install the sewer laterals, complete in place.

Payment for 6" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT will be by lineal foot (LF) of lateral installed and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

27. 6" LATERAL CLEANOUT, CAP AND CLEANOUT BOX **(Bid Item #27).** Shall include excavation, control of sewage flow, sawcutting, furnishing and installing new 6" PVC double wye and standpipe with cap, fittings and precast cleanout boxes with lids including all necessary materials, equipment and labor, complete, in place.

Payment for 6" LATERAL CLEANOUT, CAP AND CLEANOUT BOX will be for each (EA) lateral cleanout, cap and cleanout box and shall be considered full compensation for labor, materials, tools, equipment, and doing all the work herein specified.

28. RECONSTRUCT SIDEWALK **(BID ITEM #28)** AND RECONSTRUCT CURB AND GUTTER **(BID ITEM #29).** Concrete curb, gutter, sidewalk, residential and/or commercial driveways and approaches removed for installation of laterals, cleanouts, mains, and/or manholes, shall be reconstructed in accordance with Drawing 6297, Case 24, and in conformance with the applicable requirements of Section 73 of the Standard Specifications and these Special Provisions. Sidewalks shall be Portland cement concrete three inches (3") thick. Residential driveways and their approaches shall be of Portland cement concrete four inches (4") thick. Commercial driveways and their approaches shall be of Portland cement concrete six inches (6") thick. Concrete shall be saw cut and reconstructed to the limits shown on plan and established in the field by the Engineer. Concrete and saw cutting shall conform to Section XII. C.

Gutter shall be 8 inches (8") in thickness and 30 inches (30") in width, or as shown on plans, or as needed to conform with existing gutter.

All sidewalk constructed shall be given the same surface finish as the surrounding sidewalk, and the surface shall be colored by adding to the mix a proportionate amount of the best quality lampblack, such proportion to be determined by the Engineer (**add 1.5 pounds of Lump Black per cubic yard of Concrete**). Concrete, Curb, Gutter and Sidewalk replacements shall extend to the nearest score-mark or as directed by the engineer or his representative.

Damage to existing sidewalk, curb, gutter, or driveways beyond the limits shown on the plans, or reconstruction required by the Engineer, caused by carelessness or inefficiency of the Contractor, shall be repaired or replaced at the Contractor's expense.

Payment shall be at the contract unit price per square foot (SF) of concrete replacement for sidewalk which includes driveways, and approaches and at the contract unit price per linear foot (LF) of curb and gutter, including full compensation for all labor, tools, equipment, and materials, and doing all work involved in saw cutting, removal, and replacing concrete curb, gutter, sidewalk, driveways and approaches.

29. ASPHALT CONCRETE PATCH **(BID ITEM #30).** Trenches opened for the installation of sewer mains, laterals, and manholes in pavement areas, shall be paved with four inches (4") minimum asphalt concrete on eighteen (18") inches of aggregate base over compacted backfill. If depth of existing asphalt concrete in the roadway is greater than four inches (4"), then the depth of the new asphalt concrete section shall equal existing. The work shall conform to Drawing No. 2930, Case 22 and as shown on the plans. Asphalt concrete shall be Type A, ½" maximum aggregate with medium gradation, and shall conform to applicable requirements of Section 39 of the Standard Specifications. Paving asphalt of the Viscosity Grade AR 4000 shall be used unless otherwise permitted by the Engineer. The AC shall be placed in 4" lifts. Aggregate base shall be provided and compacted in accordance with Drawing 2930, Case 22.

Aggregate base must be Class 2 in accordance with Section 26 of the Standard Specifications with maximum aggregate size of ¾".

At least 72 hours prior to beginning work on a section of sewer scheduled for shutdown, the Contractor shall notify all affected property owners, residents, business and agencies adjacent to that section of street, by flyer and by approved "No Parking - Tow Away" signs on barricades of the work to be done, dates and hours of work, and lack of access to and from driveways for brief periods. The "No-Parking" signs shall state the days, dates, and hours of lane closure, and shall be placed along the street on each side at no more than 50 feet spacing, including no-parking zones. The Contractor shall notify the Engineer at least one (1) working day in advance of the intent to post "No-Parking" signs and to distribute flyers, so that the timely posting can be verified by the Inspector. The Contractor is permitted to list up to one (1) working day before and one (1) working day after the scheduled days of work, as shown in the latest approved schedule, on signs and flyers, in order to bracket the approved scheduled date of work. The Contractor shall remove the "No Parking" signs as soon as the street is re-opened to traffic.

If the Contractor is unable to meet the scheduled and noticed time for the work, the Contractor shall immediately notify the Engineer and remove the posted "No-Parking" signs. The Contractor shall submit a new scheduling request in writing to the Engineer. Upon written approval of the Engineer, the Contractor shall post signs and notify residents with new flyers at least 72 hours prior to beginning work per the revised schedule.

Payment for ASPHALT CONCRETE PATCH shall be at the contract price per ton (TON) of asphalt. Said contract unit price shall include full compensation for labor, material tools, equipment, and incidental associated with the work.

30. ASPHALT CONCRETE BRIDGE **(BID ITEM #31).** An asphalt bridge for street patch, having a width of one foot, shall be constructed on either side of the pipe trench according to Drawing No. 2930, Case 22. Asphalt concrete shall be Type A, ½" maximum aggregate with

medium gradation, and shall conform to applicable requirements of Section 39 of the Standard Specifications. Paving asphalt of the Viscosity Grade AR 4000 shall be used unless otherwise permitted by the Engineer. The four-inch (4") section shall be placed in two-inch lifts.

Payment for ASPHALT CONCRETE BRIDGE for street patch shall be at the contract price per ton (TON). Said contract unit price shall include full compensation for labor, material tools, equipment, and incidental associated with the work.

31. MECHANICAL SHEETING AND SHORING OF SEWER TRENCH **(BID ITEM #32).** Due to the nature of soils along the sewer trench alignment, excavation should be shored using recommended shoring techniques where required. See Section XII.I. Excavation and Backfill. Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department. Contractor shall submit sheeting and shoring proposal prepared, signed and stamped by a Civil or Structural Engineer, registered in the state of California for review and approval to the Engineer.

Sheeting and Shoring in this bid item shall be defined as mechanical trench stabilizing devices.

Payment shall be at the contract lump sum (LS) price and shall be considered full compensation for labor, materials, tool, equipment, and incidentals associated with the work.

32. PAVEMENT STRIPING AND MARKING **(BID ITEM #33).** Traffic stripes and marking removed shall be installed in accordance to the Standard Specifications Section 84. New striping must match the preexisting striping. Thermoplastic pavement striping and marking shall conform to Section 84 of the Standard Specifications. Painted striping and marking shall conform to Section 84 of the Standard Specifications. Pavement marking damage or destroyed as a result of the work shall be replaced in kind in conformance with Section 84 of the Standard Specifications. **Pavement markings shall be replaced in full, partial replacement of words, symbols, limit lines and crosswalk lines will not be allowed.** Whenever the Contractor's operations obliterate pavement delineation (striping - either painted or pavement markers or both, stop bars and crosswalks), pavement delineation shall be temporarily replaced before opening the traveled way to public traffic. For lane or center lines temporary delineation shall consist of reflective traffic line tape applied in pieces not less than 4" long nor less than 4" wide, spaced no more than 12' apart on curve, nor more than 24' apart on tangents, or as required by the Engineer.

Pavement Striping

Reflective traffic line tape shall be applied in accordance with the manufacturer's instructions. Temporary delineation shall be the same color as permanent delineation. Full compensation for temporary delineation shall be considered as included in the prices paid for the contract items of work that obliterated the existing delineation and no separate payment will be made therefore. Traffic tape shall be removed when required and disposed of as specified under Section XII, E., Disposal of Excavated Materials. Striping for all other locations within the project boundaries shall be replaced in kind across full width of roadway, as directed by the

Engineer.

Layout of traffic striping and pavement markings shall be subject to approval by the Engineer prior to placement of striping/marking, in accordance with Section 10-1.02 "WORK SEQUENCING" of the Standard Specifications.

Payment for restoring existing PAVEMENT STRIPING AND MARKING, temporary striping and marking, and new striping and marking shall be at the contract lump sum (LS) price and shall be considered to be included and this shall be considered full compensation for labor, materials, tools, equipment, and incidentals to furnish and install striping and marking.

33. PERMITS AND LICENSES **(BID ITEM #34).** The Contractor will be compensated for the actual cost of all PERMITS AND LICENSES required for the project as described in Section II.J. For bidding purposes the City is assigning a fixed amount to this item and the cost of permits shall be charged against the allowance shown in the bid schedule. At the completion of work and prior to final acceptance, any monies remaining unexpended in the allowance shall be deducted from the total contract Price by change order.

34. STOCKPILING OF CONTAMINATED SOIL, IMPORT BORROW, CONTAMINATED GROUND WATER. The Contractor hazardous waste handlers for both water and soil handling shall have 40 hour Hazwhopper training, with yearly eight (8) hour Hazwhopper update. The Contractor shall submit a site Safety Plan. The Contractor shall retain a certified Industrial Hygienist. Attention is directed to the following specifications in the event contaminated soil is encountered during excavation.

A. STOCKPILING OF CONTAMINATED SOIL **(BID ITEM #35)**. In the event excavated soils are stockpiled onsite for the purpose of proper disposal at an accepting landfill, stockpiled soil shall be placed on and under 10-mil polyethylene sheeting and secured with a 6-foot high perimeter chain-link fence and lock. See quantities for estimated weight of contaminated excavated soil (based on soil weight at 130pcf). The Contractor shall be responsible for maintaining the integrity of the plastic sheeting during its use. If the sheeting is damaged during stockpiling and removal operations, the Contractor shall be responsible for replacing the sheeting with equivalent or greater thickness than that specified and shall be responsible for the cost of inspecting, sampling, and/or removing and disposal of soil affected by pollutants due to the damage sheeting.

Weighmaster Certificates. Weighmaster certificates will be required for this work.

Payment shall be at the contract unit price per ton (TON) of soil stockpiled, including off-hauling and disposal at an accepting landfill and shall include full compensation for furnishing all labor, material, fencing, tools, equipment and incidentals, and for doing all work.

B. IMPORT BORROW **(BID ITEM #36)**. In the event the Engineer has determined that contaminated soil shall be removed and disposed off-site, the Contractor shall back fill the affected excavation with on-site select material. Should import borrow be required, import borrow shall be of a quantity suitable for roadway construction and shall be free of organic or

deleterious materials. It shall be granular with sand equivalent of 20 or higher, a maximum particle size of one inch (1") and no more than 15% passing the No. 200 sieve.

Payment of imported borrow shall be at the contract unit price per ton (TON) of import borrow and shall include full compensation for furnishing all labor, material, tools, equipment and incidentals and for doing all work in placing import borrow.

C. CONTAMINATED GROUND WATER **(BID ITEM #37)**. Should contaminated ground water be encountered, contaminated ground water shall be stored, treated and disposed at a City approved discharge point either storm or sewer. The City will test water for constituents. The treated water will be discharged to either sanitary sewer or storm drain. The City will obtain necessary permits for discharging treated water to these facilities. The ground water shall be pumped into baker tanks and treated through a carbon treatment absorption system. Water samples will be collected from sample ports located up gradient and down gradient of the carbon system. All influent and efficient samples will be analyzed for TPH, BTEX, and heavy metal by the City.

Payment shall be at the contract unit price per gallon (GAL) of contaminated water and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and doing all work, including storage, pumping, treatment and disposal

SECTION XIII. MANDATORY PRE-CONSTRUCTION MEETING SUBMITTALS

A. REQUIRED REPORTS. Contractor shall submit the following mandatory reports to the City Engineer at the pre-construction meeting:

- Construction Schedule
- Traffic Control Plan for each site
- Pothole Plan and Schedule

The Contractor shall not proceed with construction until these reports have been approved by the City Engineer and the Contractor has received such approval in writing (included in your Notice to Proceed letter). The potholing plan and schedule must be approved by the City Engineer at least two (2) weeks before construction may proceed.

Exhibit 'A'

BIDDER'S PROPOSAL FORM

Bidder's Proposal

Subcontractors to be used in the Performance of this Contract (Form)

Executed Agreement to be Bound to PSA

Security For Compensation Certificate

Important Instructions

EXHIBIT "A"

SECTION XIV. BIDDER'S PROPOSAL

Specifications and Special Provisions

No. P.W. 05-19-26

Filed:

Cyclic Sewer Replacement Project, Phase 16
Alameda, California

Proposal to the COUNCIL of the CITY OF ALAMEDA:

The undersigned declares that he has carefully examined the location of the proposed work and the Plans, Specifications, and Special Provisions therefore, referred to herein, and hereby proposes to furnish all labor, materials, machinery, tools and equipment required to perform the work, and to do all the said work, in accordance with said Plans, Specifications and Special Provisions for the unit prices set forth in the following schedule:

	Description	Est. Qty.	Unit	Unit Price	Total Price
1	MOBILIZATION, DEMOBILIZATION AND SWPPP	1	LS		
2	MAINTAINING TRAFFIC	1	LS		
3	8.63" HDPE SEWER MAIN - PIPEBURST	1460	LF		
4	8" PVC SEWER MAIN - OPEN CUT	12,187	LF		
5	10" PVC SEWER MAIN – OPEN CUT	7	LF		
6	8" CIPP LINER	61	LF		
7	10" CIPP LINER	526	LF		
8	15" CIPP LINER	976	LF		
9	ABANDON EXISTING SEWER AND FILL WITH GROUT	1,385	LF		
10	FIELD LOCATE BURIED MANHOLES AND RODHOLES	5	EA		
11	REMOVE EXISTING RODHOLE	10	EA		
12	REMOVE EXISTING MANHOLE	37	EA		
13	ABANDON EXISTING MANHOLE	1	EA		
14	CONNECT TO EXISTING MANHOLES AND REBUILD CHANNELS	35	EA		
15	2 FT DIAMETER MANHOLE	1	EA		
16	4 FT DIAMETER MANHOLE	45	EA		
17	REHABILITATE EXISTING MANHOLE	373	VF		
18	REPLACE MANHOLE LID AND CASTING	34	EA		
19	8" INTERNAL DROP CONNECTION	1	EA		
20	FIELD LOCATE AND POTHOLE EXISTING LATERALS	376	EA		
21	4" LOWER LATERAL, FITTINGS & CONNECTIONS - PIPEBURST	9,402	LF		
22	4" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT	373	LF		
23	4" LATERAL CLEANOUT, CAP AND CLEANOUT BOX	368	EA		
24	4" LATERAL RECONNECTION TO SEWER MAIN	10	EA		
25	6" LOWER LATERAL, FITTINGS & CONNECTIONS – PIPEBURST	200	LF		
26	6" LOWER LATERAL, FITTINGS & CONNECTIONS – OPEN CUT	150	LF		
27	6" LATERAL CLEANOUT, CAP AND CLEANOUT BOX	18	EA		
28	RECONSTRUCT SIDEWALK	6,016	SF		
29	RECONSTRUCT CURB AND GUTTER	800	LF		
30	ASPHALT CONCRETE PATCH	947	TON		
31	ASPHALT CONCRETE BRIDGE	893	TON		
32	MECHANICAL SHEETING AND SHORING OF SEWER TRENCH	1	LS		
33	PAVEMENT STRIPING AND MARKING	1	LS		
34	PERMITS AND LICENSES	1	TBD	ALLOWANCE	5000
35	STOCKPILING OF CONTAMINATED SOIL	20	TON		
36	IMPORT BORROW	20	TON		
37	CONTAMINATED GROUND WATER	1,000	GAL		
				Total Bid	

Amount of Time Required to Commence
Work After Receipt of Work Order: **10** **Days**

The undersigned agrees to execute the contract required in said Specifications, to the satisfaction of the Council of the City of Alameda, with the necessary bonds, if any be required, within ten days, not including Sundays or legal holidays, after receiving notice that the contract has been awarded and is ready for signature; and further agrees that, in case of his default in any of the foregoing provisions, the proceeds of any check which may accompany his bid in lieu of a bid bond shall become the property of the City of Alameda as agreed and liquidated damages.

Firm Name (Please Print) _____

Signature of Person on Behalf of Firm _____

Business Address _____

_____

Dated: _____ Zip Code _____

Name Title Address

(Of Officers or Partners)

_____

_____

_____

_____

_____

_____

_____

_____

Incorporated under the laws of the State of _____

Contractor's License No. _____ Expiration Date: _____

Department of Industrial Relations (DIR) No.: _____

The signature above certifies that the foregoing information given on this document is true and correct under penalty of perjury. (Section 7028.15 California Business and Professionals Code.)

PROPOSED SUBCONTRACTOR FORM

The Bidder shall list the name, address, license number and Department of Industrial Relations number of each subcontractor to whom the Bidder proposes to subcontract portions of the work, as required by the provisions in Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications and Section 2-1.01, "General," for the special provisions.

COMPANY NAME	CA LICENSE NO.	BUSINESS ADDRESS	DESCRIPTION OF WORK	DIR NO.

(This form may be duplicated if necessary to list additional subcontractors)

The bidder's execution on the signature portion of this proposal shall also constitute an endorsement and execution of those certifications which are a part of this proposal)

EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

The bidder _____, proposed subcontractor , hereby certified that he has ___, has not ___, participated in a previous contract or subcontract subject to the equal opportunity clauses, as required by Executive Orders 10925, 11114, or 11246, and that, where required, he has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all report due under the applicable filling requirements.

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

AGREEMENT TO BE BOUND TO PSA

PROJECT STABILIZATION AGREEMENT FOR THE CITY OF ALAMEDA AGREEMENT TO BE BOUND

The undersigned party confirms that it agrees and assents to comply with and to be bound by the City of Alameda

Project Stabilization Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms.

By executing this Agreement To Be Bound, the undersigned party subscribes to, adopts and agrees to be bound by the written terms of the legally established trust agreements, as set forth in section 17, specifying the detailed basis upon which contributions are to be made into, and benefits made out of, such Trust Fund(s) and ratifies and accepts the trustees appointed by the parties to such Trust Fund(s) and agrees to execute a separate Subscription Agreement(s) for Trust Funds when such Trust Fund(s) require(s) such document(s).

Such assent and obligation to comply with and to be bound by this Agreement shall extend to all work covered by said Agreement undertaken by the undersigned party. The undersigned party shall require all of its subcontractors, of whatever tier, to become similarly bound for all their work within the scope of this Agreement by signing an identical Agreement To Be Bound.

This letter shall constitute a subscription agreement, to the extent of the terms of the letter.

Dated: _____ Project: _____

_____ _____

Signature of Authorized Officer Authorized Officer & Title

_____ _____

Name of Contractor/Employer(s) Contractor/Employer(s) Address

_____ _____

CSLB # Area Code Phone

_____ _____

E-mail and/or Fax Motor Carrier (CA) Permit Number

_____

DIR Prevailing Wage Registration #

SECURITY FOR COMPENSATION CERTIFICATE

(Required by Paragraph 1861, California Labor Code)

To: _____

_____

I am aware of the provisions of Section 3700 of the Labor Code of the State of California which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this contract.

_____

_____

_____

(Signature of Bidder)

_____

_____

Business Address

IMPORTANT INSTRUCTIONS

1. Any erasure or interlineation may invalidate bid.

2. If corporation is bidder, affix seal of corporation.

3. If bidder is:

   (a) An individual doing business under his own name, sign his own name only.

   (b) An individual using a firm name, sign: Example, "John Doe, an individual doing business as Blank Company."

   (c) A co-partnership, sign: Example, "Blank Company, by John Doe, President" (or other title).

4. If a firm or co-partnership, give the names of all individual co-partners composing the firm. If a corporation, state legal name of corporation; also name of president, secretary and treasurer thereof.

5. If a bid is sent by mail, write the word "Proposal" plainly on the envelope.

Exhibit 'B'

CERTIFIED PAYROLL AND PREVAILING WAGES FORMS

Contractor's Certification Concerning Labor Standards and Prevailing Wage Requirements

Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements

Certification of Bidder Regarding Section 3 and Segregated Facilities

Certification of Proposed Subcontractor Regarding Section 3 and Segregated Facilities

Certification of Understanding and Authorization

Certification For Applicable Fringe Benefit Payments

Authorization For Deductions

Employee Questionnaire

EXHIBIT B: Certified Payroll Forms

CITY OF ALAMEDA
PUBLIC WORKS DEPARTMENT
CONTRACTOR'S CERTIFICATION
CONCERNING LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS

(Appropriate Recipient):	DATE
c/o	PROJECT NUMBER (if any)
	PROJECT NAME

1. The undersigned, having executed a contract with _____

_____ for the construction of the above-identified project acknowledges that:

(a) The Labor Standards provisions are included in the aforesaid contract;

(b) Correction of any infractions of the aforesaid conditions, including infractions any of his subcontractors and Any lower tier subcontractor, is his responsibility.

2. He certifies that:

(a) Neither he nor any firm, partnership or association in which he has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary Labor, part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act as amended (40 U.S.C. 276u-2(a)).

(b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

He agrees to obtain and forward to the aforementioned recipient within ten days after the execution of any subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certification Concerning Labor Standards at Prevailing Wage Requirements executed by the subcontractors.

He certified that:

(a) The legal name and the business address of the undersigned are:

(b) The undersigned is:

(1) A SINGLE PROPRIETORSHIP (3) A CORPORATION ORGANIZED IN THE STATE OF

(2) A PARTNERSHIP (4) OTHER ORGANIZATION (Describe)

(c) The name, title and address of the owner, partners or officers of the undersigned are:

NAME	TITLE	ADDRESS

EXHIBIT B: Certified Payroll Forms

(d) The names and address of all other persons, both natural and corporate, having a substantial interest in the undersigned, and the nature of the interest are (if none, so state):

NAME	TITLE	ADDRESS

(e) The names, address and trade classification of all other building construction contractors in which the undersigned, has a substantial interest are (if none, so state):

NAME	TITLE	ADDRESS

3. He certifies:

(a) The company's Federal Tax Identification Number is: _____

(b) The ethnicity of the company's owner(s) is/are:_____

(c) Is the company a female owned business: _____ Yes _____ No

Date _____ _____
(Contractor)

By _____
(Signature)

WARNING

U.S. Criminal Code, Section 1010, Title 18, U.S. C. Provides in part "Whoever .....makes, passes, utters, or publishes any statement, knowing the same to be false .....shall be fined not more than $5,000 or imprisoned not more than two years or both."

EXHIBIT B: Certified Payroll Forms

CITY OF ALAMEDA
PUBLIC WORKS DEPARTMENT
SUBCONTRACTOR'S CERTIFICATION
CONCERNING LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS

(Appropriate Recipient):	DATE
c/o	PROJECT NUMBER (if any)
	PROJECT NAME

1. The undersigned, having executed a contract with _____

_____ for _____

in the amount of $_____ In the construction of the above-identified project, certifies that:

(a) The Labor Standards provisions of the contract for construction are included in the aforesaid contract;

(b) Neither he nor any firm, partnership or association in which he has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary Labor, part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act as amended (40 U.S.C.. 276u-2(a)).

(b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

2. He agrees to obtain and forward to the aforementioned recipient within ten days after the execution of any subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certification Concerning Labor Standards at Prevailing Wage Requirements executed by the subcontractors.

(a) The workmen will report for duty on or about _____(date).

3. He certifies that:

(a) The legal name and the business address of the undersigned are:

(b) The undersigned is:

(1) A SINGLE PROPRIETORSHIP (3) A CORPORATION ORGANIZED IN THE STATE OF

(2) A PARTNERSHIP (4) OTHER ORGANIZATION (Describe)

(c) The name, title and address of the owner, partners or officers of the undersigned are:

NAME		ADDRESS

EXHIBIT B: Certified Payroll Forms

(d) The names and address of all other persons, both natural and corporate, having a substantial interest in the undersigned, and the nature of the interest are (if none, so state):		
NAME	TITLE	ADDRESS
(e) The names, address and trade classification of all other building construction contractors in which the undersigned, has a substantial interest are (if none, so state):		
NAME	TITLE	ADDRESS

3. He certifies:

(a) The company's Federal Tax Identification Number is: _____

(b) The ethnicity of the company's owner(s) is/are:_____

(c) Is the company a female owned business: _____ Yes _____ No

Date: _____ _____

(Contractor)

By _____

(Signature)

WARNING

U.S. Criminal Code, Section 1010, Title 18, U.S. C. Provides in part "Whoever .....makes, passes, utters, or publishes any statement, knowing the same to be false .....shall be fined not more than $5,000 or imprisoned not more than two years or both."

EXHIBIT B: Certified Payroll Forms

CERTIFICATION OF BIDDER REGARDING SECTION 3
AND SEGREGATED FACILITIES

Name of Prime Contractor | Project Name and Number

The undersigned hereby certified that:

(a) Section 3 provisions are included in the Contract.

(b) A written Section 3 plan was prepared and submitted as part of the bid proceedings (if bid equals or exceeds $10,000).

(c) No segregated facilities will be maintained.

Name
Name and Title of Signer (Print or Type)

Signature | Date

EXHIBIT B: Certified Payroll Forms

CERTIFICATION OF PROPOSED SUBCONTRACTOR REGARDING
SECTION 3 AND SEGREGATED FACILITIES

Name of Subcontractor	Project Name and Number

The undersigned hereby certified that:

(a) Section 3 provisions are included in the Contract.

(b) A written Section 3 plan was prepared and submitted as part of the bid proceedings (if bid equals or exceeds $10,000).

(c) No segregated facilities will be maintained, as required by Title VI of the Civil Right Act of 1964.

Name
Name and Title of Signer (Print or Type)

Signature	Date

EXHIBIT B: Certified Payroll Forms

CERTIFICATION OF UNDERSTANDING AND AUTHORIZATION

Project Name: _____

Project Number: _____

This is to certify that the principals, and the authorized payroll officer, below, have read and understand the Minutes of the Preconstruction Conference and the labor standards clauses pertaining to the subject project.

The following person(s) is designated as the payroll officer for the undersigned and is authorized to sign the Statement of Compliance which will accompany our weekly certified payroll reports for this project:

_____
Designated Payroll Officer (Name)

_____
Designated Payroll Officer (Signature)

_____
Authorized by (Contractor/Subcontractor)

_____
(Signature)

_____
(Title)

_____
(IRS) Employer Identification Number

_____
(Date)

EXHIBIT B: Certified Payroll Forms
CERTIFICATION FOR APPLICABLE FRINGE BENEFIT PAYMENTS

Project Name: _____
Project Number: _____

Classification/ Fringe Benefits Provided	Name, Address and Telephone Number of Plan/Fund/Program
1. _____ Health and Welfare	_____
_____ Pension	_____
_____ Vacation	_____
_____ Apprenticeship/Training	_____
2. _____ Health and Welfare	_____
_____ Pension	_____
_____ Vacation	_____
_____ Apprenticeship/Training	_____
3. _____ Health and Welfare	_____
_____ Pension	_____
_____ Vacation	_____
_____ Apprenticeship/Training	_____

OR: (Check if applicable)
_____ I certify that I do not make payments to approved fringe benefit plans, funds or programs.

_____ By _____
Contractor/Subcontractor Signature

_____ _____
Date Title

EXHIBIT B: Certified Payroll Forms

AUTHORIZATION FOR DEDUCTIONS

The undersigned authorized deductions, as noted, to be made from their wages. It is understood that these deductions: (a) are in the interest of the employee; (b) is not a condition of employment; (c) there is no direct or indirect financial benefit accruing to the employee; and; (d) it is not otherwise forbidden by law.

Employee's Name	Employee's Signature	Date	Deduction

_____

Signature of Authorized Representative of Employee

_____

Authorized Representative's Name and Title

_____

Date

EXHIBIT C

LIST OF PROCESSORS BY MATERIAL

List of Processors by Material

EXHIBIT "C"

LIST OF PROCESSORS BY MATERIAL

This guide is a listing of facilities/processors that accept construction and demolition waste materials. This is not a complete and comprehensive list; it is intended to be a quick reference guide to assist contractors and the general public recycle their construction and demolition debris.

Please call each facility for accepted materials, hours of operation, and the terms and conditions prior to delivering your materials.

ASPHALT & CONCRETE

AMAN ENVIRONMENTAL CONSTRUCTION (510) 553-0110
8300 Baldwin Street, Oakland
- Clean asphalt
- Clean concrete

CALMAT (925) 485-1279
501 El Charo Road, Pleasanton
- Clean asphalt
- Clean concrete

COUNTY QUARRY PRODUCTS, INC. (510) 682-0707
5501 Imhoff Drive, Martinez
- Clean asphalt
- Clean concrete
- Concrete with rebar
- Concrete roofing
- Tiles, gravel, porcelain

CURTNER QUARRY (510) 793-8861
2000 Scott Creek Road, Milpitas
- Clean concrete
- Clean asphalt (broken or grindings)
- Concrete roofing
- Tiles, gravel, porcelain

DAVIS STREET TRANSFER STATION (510) 638-2303
2615 Davis Street, San Leandro

DORN RECYCLERS (925) 449-9328
Livermore
(May pickup: large quantities)

DUTRA MATERIALS (510) 887-8070
4001 West Winton Avenue, Hayward
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

LA VISTA QUARRY (510) 538-5085
28814 Mission Boulevard, Hayward
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

RAISCH PRODUCTS (408) 227-9222
2122 Old Calaveras Road, Milpitas
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

RAISCH PRODUCTS (408) 734-4245
1444 Borregas Avenue
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

RAISCH PRODUCTS (510) 623-5870
7010 Auto Mall Parkway, Fremont
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

RAISCH PRODUCTS (408) 227-9222
55 Hillsdale Avenue, San Jose
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

RECYCLED BUILDING MATERIALS- WHOLE HOUSE SALVAGE (650) 856-0634
. Cinder blocks
. Roofing tiles

SPECIALTY CRUSHING (510) 986-0964
Oakland
. Clean asphalt
. Clean concrete
. Cinder blocks

SRDC, Inc. (415) 367-7324
195 Seaport Boulevard, Redwood City
. Clean asphalt
. Clean concrete

SYAR INDUSTRIES, INC. (510) 215-1114
Foot of Parr Boulevard, Richmond
. Clean asphalt
. Clean concrete

THE REUSE PEOPLE (510) 567-8525
2615 Davis Street, San Leandro
. Reuse/free drop-off;
. Useable, whole cinder blocks
. Roofing tile

VASCO ROAD LANDFILL & RECYCLING DROPOFF (925) 447-0491
4001 North Vasco Road, Livermore
. Clean asphalt
. Clean concrete

WRT WASTE MANAGEMENT (415) 822-2175
895 Egbert Avenue, San Francisco
. May pickup; asphalt, concrete

ZANKER RESOURCE MANAGEMENT (408) 263-2383
705 Los Esteros Way, San Jose
. Clean asphalt
. Clean concrete
. Concrete with rebar
. Concrete roofing
. Tiles, gravel, porcelain

Recycled materials, if deemed acceptable, by the Engineer, for the requirements of these specifications will be considered for building materials. Contractor shall submit a request in writing for the Engineer's use. The written request shall include all specification information required by the Engineer that provides him/her assurance that the proposed materials are an equal or better to those specified herein.

For further information regarding materials and vendors, Contractor may call Waste Management at (510) 747-7960.

Exhibit 'D'

SAMPLE CONTRACT AGREEMENT/ ADDITIONAL INSURED CERTIFICATE

Sample of Contract Agreement

Additional Insured Certificates

CONTRACTOR AGREEMENT

THIS AGREEMENT ("**Agreement**") is entered into this _____ day of _____ 2019, by and between the CITY OF ALAMEDA, a municipal corporation (the "**City**"), and COMPANY, a (California corporation, partnership, sole proprietor, individual) whose address is Address, ("**Contractor**"), in reference to the following:

RECITALS:

A. The City of Alameda is a municipal corporation duly organized and validly existing under the laws of the State of California with the power to carry on its business as it is now being conducted under the statutes of the State of California and the Charter of the City.

B. The City is in need of the following services: Cyclic Sewer Replacement Project, Phase 16. City staff issued Specifications and Plans on August 1, 2019, after a submittal period of twenty five days received _____ of timely submitted bids, and the bids were opened on August 26, 2019. Staff reviewed the bids and selected the lowest responsive and responsible bidder.

C. Contractor possesses the skill, experience, ability, background, certification and knowledge to provide the services described in this Agreement on the terms and conditions described herein.

D. City and Contractor desire to enter into an agreement for Cyclic Sewer Replacement Project, Phase 16, upon the terms and conditions herein.

NOW, THEREFORE, it is mutually agreed by and between the undersigned parties as follows:

1. TERM:

The Contractor shall have two hundred eighty (280) consecutive working days from the date the work is to commence pursuant to the Notice to Proceed to complete the work.

This Agreement may be mutually extended on a year-by-year basis, for up to four (4) additional years, at the sole discretion of the Public Works Director, based, at a minimum, upon satisfactory performance of all aspects of this Agreement. The Public Works Director may submit written notice that the Agreement is to be extended at the same terms and compensation as the existing Agreement and the compensation adjusted by the Construction Cost Index for the San Francisco Bay Area as reported in the Engineering News Record for the previous calendar year for the trade(s) associated with the services or tasks.

2. SERVICES TO BE PERFORMED:

Contractor agrees, at its own cost and expense, to furnish all labor, tools, equipment, materials, except as otherwise specified, and to do all work strictly in accordance with Specifications, Special Provisions and Plans, which Specifications, Special Provisions and Plans are hereby referred to and expressly made a part hereof with the same force and effect as if the

same were fully incorporated herein. The Contractor acknowledges that the work plan included in Exhibit "A" is tentative and does not commit the City to request Contractor to perform all tasks included therein.

3. COMPENSATION TO CONTRACTOR:

Contractor shall be compensated for services performed pursuant to this Agreement in the amount and manner set forth in Contractor's bid, which is attached hereto as Exhibit "A" and incorporated herein by this reference. Payment will be made in the same manner that claims of a like character are paid by the City, with checks drawn on the treasury of said City, with checks drawn on the treasury of said City, to be taken from CIP _____.

Payment will be made by the City in the following manner: On the first day of each month, Contractor shall submit a written estimate of the total amount of work done the previous month. However, the City reserves the right to adjust budget within and between tasks. Pricing and accounting of charges are to be according to the bid packet pricing, unless mutually agreed to in writing.

Payment shall be made for 95% of the value of the work completed as determined by the City. The City shall retain 5% of the value of the work as partial security for the completion of the work by Contractor. Retained amounts shall be paid to Contractor within sixty days of acceptance by the City of the project. Payment shall not be construed as acceptance of defective work. No interest will be paid to Contractor on retained funds.

Total compensation for work is $_____, with a _____ percent contingency in the amount of $_____ for a total not to exceed of $_____. Use of contingency shall be for items of work outside the original scope and requires prior written authorization by the City.

Prompt Payment Of Withheld Funds To Subcontractors: The City shall hold retainage from the prime contractor and shall make prompt and regular incremental acceptances of portions, as determined by the City of the contract work and pay retainage to the prime contractor based on these acceptances. The prime contractor or subcontractor shall return all monies withheld in retention from all subcontractors within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the City. Any delay or postponement of payment may take place only for good cause and with the City's prior written approval. Any violation of these provisions shall subject the violating prime contractor to the penalties, sanctions, and other remedies specified in Section 7108.5 of the California Business Professions Code. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise, available to the prime contractor or subcontractor in the event of a dispute involving late payment, or nonpayment by the contractor, or deficient subcontractor's performance, or noncompliance by a subcontractor, including but not limited to remedies under California Public Contract Code Section 9204. This clause applies to both DBE and non-DBE subcontractors.

4. TIME IS OF THE ESSENCE:

Contractor and the City agree that time is of the essence regarding the performance of this Agreement.

It is agreed by the parties to the Agreement that in case all the work called for under the Agreement is not completed before or upon the expiration of the time limit as set forth in paragraph 1 above, damage will be sustained by the City, and that it is and will be impracticable to determine the actual damage which the City will sustain in the event of and by reason of such delay. It is therefore agreed that the Contractor will pay to the City the sum of one thousand dollars ($1,000) per day for each and every day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City may deduct the amount thereof from any money due or that may become due the Contractor under the Agreement.

It is further agreed that in case the work called for under the Agreement is not finished and completed in all parts and requirements within the time specified, the City shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City; and if the City decides to extend the time limit for the completion of the Agreement, it shall further have the right to charge the Contractor, his or her heirs, assigns, or sureties, and to deduct from the final payment for the work, all or any part, as it may deem proper, of the actual costs and overhead expenses which are directly chargeable to the Agreement, and which accrue during the period of such extensions.

The Contractor shall not be assessed with liquidated damages during any delay in the completion of the work caused by an act of God or of the public enemy, acts of the City, fire, flood, epidemic, quarantine restriction, strikes, freight embargoes, and unusually severe weather or delays of subcontractors due to such causes; provided that the Contractor shall, within one (1) day from the beginning of such delay, notify the City in writing of the causes of delay. The City shall ascertain the facts in good faith and the extent of the delay, and its findings of the facts thereon shall be final and conclusive.

5. STANDARD OF CARE:

Contractor agrees to perform all services hereunder in a manner commensurate with the prevailing standards of like professionals in the San Francisco Bay Area and agrees that all services shall be performed by qualified and experienced personnel who are not employed by the City nor have any contractual relationship with City.

6. INDEPENDENT PARTIES:

Contractor hereby declares that it is engaged as an independent business and it agrees to perform its services as an independent contractor. The manner and means of conducting the work are under the control of Contractor, except to the extent they are limited by statute, rule or regulation and the express terms of this Agreement. No civil service status or other right of employment will be acquired by virtue of Contractor's services. None of the benefits provided by City to its employees, including but not limited to unemployment insurance, workers' compensation plans, vacation and sick leave are available from City to Contractor, its employees

or agents. Deductions shall not be made for any state or federal taxes, FICA payments, PERS payments, or other purposes normally associated with an employer-employee relationship from any fees due Contractor. Payments of the above items, if required, are the responsibility of Contractor.

7. IMMIGRATION REFORM AND CONTROL ACT (IRCA):

Contractor assumes any and all responsibility for verifying the identity and employment authorization of all of its employees performing work hereunder, pursuant to all applicable IRCA or other federal, or state rules and regulations. Contractor shall indemnify, defend, and hold City harmless from and against any loss, damage, liability, costs or expenses arising from any noncompliance of this provision by Contractor.

8. NON-DISCRIMINATION:

Consistent with City's policy that harassment and discrimination are unacceptable employer/employee conduct, Contractor agrees that harassment or discrimination directed toward a job applicant, a City employee, or a citizen by Contractor or Contractor's employee on the basis of race, religious creed, color, national origin, ancestry, handicap, disability, marital status, pregnancy, sex, age, or sexual orientation will not be tolerated. Contractor agrees that any and all violations of this provision shall constitute a material breach of this Agreement.

9. HOLD HARMLESS:

Contractor shall indemnify, defend, and hold harmless the City, its City Council, boards, commissions, officials, employees, and volunteers ("Indemnitees") from and against any and all loss, damages, liability, claims, suits, costs and expenses whatsoever, including reasonable attorneys' fees ("Claims"), arising from or in any manner connected to Contractor's negligent act or omission, whether alleged or actual, regarding performance of services or work conducted or performed pursuant to this Agreement. If Claims are filed against Indemnitees which allege negligence on behalf of the Contractor, Contractor shall have no right of reimbursement against Indemnitees for the costs of defense even if negligence is not found on the part of Contractor. However, Contractor shall not be obligated to indemnify Indemnitees from Claims arising from the sole negligence or willful misconduct of Indemnitees.

10. INSURANCE:

On or before the commencement of the terms of this Agreement, Contractor shall furnish the City's Risk Manager with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of insurance coverage in compliance with paragraphs 10A, B, C and D. Such certificates, which do not limit Contractor's indemnification, shall also contain substantially the following statement: "Should any of the above insurance covered by this certificate be canceled or coverage reduced before the expiration date thereof, the insurer affording coverage shall provide fourteen (14) days' advance written notice to the City of Alameda, "Attention: Risk Manager."

It is agreed that Contractor shall maintain in force at all times during the performance of this Agreement all appropriate coverage of insurance required by this Agreement with an

insurance company that is acceptable to the City Risk Manager and licensed to do insurance business in the State of California. Endorsements naming the City, its City Council, boards, commissions, officials, employees, and volunteers as additional insured shall be submitted with the insurance certificates.

A. COVERAGE:

Contractor shall maintain the following insurance coverage:

(1) Workers' Compensation:
Statutory coverage as required by the State of California.

(2) Liability:
Commercial general liability coverage in the following minimum limits:

Bodily Injury:	$1,000,000 each occurrence $2,000,000 aggregate - all other
Property Damage:	$1,000,000 each occurrence $2,000,000 aggregate

If submitted, combined single limit policy with aggregate limits in the amounts of $2,000,000 will be considered equivalent to the required minimum limits shown above.

(3) Automotive:
Comprehensive automobile liability coverage (any auto) in the following minimum limits:

Bodily injury:	$1,000,000 each occurrence
Property Damage:	$1,000,000 each occurrence
or	
Combined Single Limit:	$2,000,000 each occurrence

(4) Pollution Prevention:
Legal liability required for hazardous materials excavation in the amount of $2,000,000 each occurrence.

(5) Builders Risk: $2,000,000.

B. SUBROGATION WAIVER:

Contractor agrees that in the event of loss due to any of the perils for which it has agreed to provide comprehensive general and automotive liability insurance, Contractor shall look solely to its insurance for recovery. Contractor hereby grants to the City, on behalf of any insurer providing comprehensive general and automotive liability insurance to either Contractor or City with respect to the services of Contractor herein, a waiver of any right to subrogation which any such insurer of said Contractor may acquire against City by virtue of the payment of any loss under such insurance.

C. FAILURE TO SECURE:

If Contractor at any time during the term hereof should fail to secure or maintain the foregoing insurance, the City shall be permitted to obtain such insurance in the Contractor's name or as an agent of the Contractor and shall be compensated by the Contractor for the costs of the insurance premiums at the maximum rate permitted by law and computed from the date written notice is received that the premiums have not been paid.

D. ADDITIONAL INSURED:

City, its City Council, boards, commissions, officials, employees, and volunteers shall be named as an additional insured under all insurance coverages, except worker's compensation insurance. The naming of an additional insured shall not affect any recovery to which such additional insured would be entitled under this policy if not named as such additional insured. An additional insured named herein shall not be held liable for any premium, deductible portion of any loss, or expense of any nature on this policy or any extension thereof. Any other insurance held by an additional insured shall not be required to contribute anything toward any loss or expense covered by the insurance provided by this policy.

E. SUFFICIENCY OF INSURANCE:

Contractor shall furnish the following bonds from a bonding company acceptable to the City Risk Manager. Faithful Performance Bond and Labor and Material Bond are only required for work over $25,000. Therefore, those estimates that are under $25,000 will not need to budget for the bond premiums and those estimates over $25,000 will need to be sure to budget for the bond premiums.

The insurance limits required by City are not represented as being sufficient to protect Contractor. Contractor is advised to consult Contractor's insurance broker to determine adequate coverage for Contractor.

11. BONDS:

Contractor shall furnish the following bonds from a bonding company acceptable to the City Risk Manager:

A. Faithful Performance:

A bond in the amount of 100% of the total contract price guaranteeing the faithful performance of this contract, and

B. Labor and Materials:

A bond for labor and materials in the amount of 100% of the total contract price.

12. PROHIBITION AGAINST TRANSFERS:

Contractor shall not assign, sublease, hypothecate, or transfer this Agreement, or any interest therein, directly or indirectly, by operation of law or otherwise, without prior written consent of the City Manager. Any attempt to do so without said consent shall be null and void, and any assignee, sublessee, hypothecate or transferee shall acquire no right or interest by reason

of such attempted assignment, hypothecation or transfer. However, Contractor's claims for money from the City under this Agreement may be assigned to a bank, trust company or other financial institution without prior written consent. Written notice of such assignment shall be promptly furnished to the City by Contractor.

The sale, assignment, transfer or other disposition of any of the issued and outstanding capital stock of Contractor, or of the interest of any general partner or joint venturer or syndicate member or cotenant, if Contractor is a partnership or joint venture or syndicate or cotenancy, which shall result in changing the control of Contractor, shall be construed as an assignment of this Agreement. Control means fifty percent (50%) or more of the voting power of the corporation.

13. SUBCONTRACTOR APPROVAL:

Unless prior written consent from the City is obtained, only those people and subcontractors whose names are listed in Contractor's bid shall be used in the performance of this Agreement.

Requests for additional subcontracting shall be submitted in writing, describing the scope of work to be subcontracted and the name of the proposed subcontractor. Such request shall set forth the total price or hourly rates used in preparing estimated costs for the subcontractor's services. Approval of the subcontractor may, at the option of the City, be issued in the form of a Work Order.

In the event that Contractor employs subcontractors, such subcontractors shall be required to furnish proof of workers' compensation insurance and shall also be required to carry general and automobile liability insurance in reasonable conformity to the insurance carried by Contractor. In addition, any work or services subcontracted hereunder shall be subject to each provision of this Agreement.

14. PERMITS AND LICENSES:

Contractor, at its sole expense, shall obtain and maintain during the term of this Agreement, all appropriate permits, certificates and licenses, including a City Business License that may be required in connection with the performance of services hereunder.

15. REPORTS:

Each and every report, draft, work product, map, record and other document reproduced, prepared or caused to be prepared by Contractor pursuant to or in connection with this Agreement shall be the exclusive property of the City.

No report, information nor other data given to or prepared or assembled by Contractor pursuant to this Agreement shall be made available to any individual or organization by Contractor without prior approval by the City.

Contractor shall, at such time and in such form as the City may require, furnish reports concerning the status of services required under this Agreement.

16. RECORDS:

Contractor shall maintain complete and accurate records with respect to sales, costs, expenses, receipts and other such information required by the City that relate to the performance of services under this Agreement.

Contractor shall maintain adequate records of services provided in sufficient detail to permit an evaluation of services. All such records shall be maintained in accordance with generally accepted accounting principles and shall be clearly identified and readily accessible. Contractor shall provide free access to such books and records to the representatives of the City or its designees at all proper times, and gives the City the right to examine and audit same, and to make transcripts therefrom as necessary, and to allow inspection of all work, data, documents, proceedings and activities related to this Agreement. Such records, together with supporting documents, shall be kept separate from other documents and records and shall be maintained for a period of three (3) years after receipt of final payment.

If supplemental examination or audit of the records is necessary due to concerns raised by the City's preliminary examination or audit of records, and the City's supplemental examination or audit of the records discloses a failure to adhere to appropriate internal financial controls, or other breach of contract or failure to act in good faith, then Contractor shall reimburse the City for all reasonable costs and expenses associated with the supplemental examination or audit.

17. NOTICES:

All notices, demands, requests or approvals to be given under this Agreement shall be given in writing and conclusively shall be deemed served when delivered personally or on the second business day after the deposit thereof in the United States Mail, postage prepaid, registered or certified, addressed as hereinafter provided.

All notices, demands, requests, or approvals from Contractor to the City shall be addressed to the City at:

City of Alameda
Public Works Department
950 West Mall Square, Room 110
Alameda, CA 94501
ATTENTION: Shilpa Patel, Assistant Engineer
Ph: (510) 747-7930 / Fax: (510) 769-6030
Email: spatel@alamedaca.gov

All notices, demands, requests, or approvals from the City to Contractor shall be addressed to Contractor at:

[Contractor Name]
[Department]
[Address]
Alameda, CA 94501

ATTENTION; [Title]
Ph: (510) xxx-xxxx / Fax: (510) xxx-xxxx
Email:

18. **SAFETY:**

The Contractor will be solely and completely responsible for conditions of all vehicles owned or operated by Contractor, including the safety of all persons and property during performance of the services and tasks under this Agreement. This requirement will apply continuously and not be limited to normal working hours. In addition, Contractor will comply with all safety provisions in conformance with U.S. Department of Labor Occupational Safety and Health Act, any equivalent state law, and all other applicable federal, state, county and local laws, ordinances, codes, and any regulations that may be detailed in other parts of the Agreement. Where any of these are in conflict, the more stringent requirements will be followed. The Contractor's failure to thoroughly familiarize itself with the aforementioned safety provisions will not relieve it from compliance with the obligations and penalties set forth herein.

The Contractor will immediately notify the City's Risk Manager within 24 hours of any incident of death, serious personal injury or substantial property damage that occurs in connection with the performance of this Agreement. The Contractor will promptly submit to the City a written report of all incidents that occur in connection with this Agreement. This report must include the following information: (i) name and address of injured or deceased person(s); (ii) name and address of Contractor's employee(s) involved in the incident; (iii) name and address of Contractor's liability insurance carrier; (iv) a detailed description of the incident; and (v) a police report.

19. **LAWS TO BE OBSERVED:**

Contractor shall comply with all applicable laws, state, federal, and all ordinances, rules and regulations enacted or issued by City. In addition, the Contractor shall keep himself fully informed of all existing and future state and federal laws and all municipal ordinances and regulations of the City of Alameda which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

20. **DEPARTMENT OF INDUSTRIAL RELATIONS COMPLIANCE AND PREVAILING WAGE REQUIREMENTS ON PUBLIC WORKS PROJECTS:**

Effective January 1, 2015, no Contractor or Subcontractor may be listed on a bid proposal for a public works project (submitted after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 (with the limited exceptions from this requirement for bid purposed only under Labor code Section 1771.1(a)). Register at https://efiling.dir.ca.gov/PWCR

No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

The Prime Contractor is required to post job site notices prescribed by regulations. See 8 Calif. Code Regulation §16451(d).

Effective April 1, 2015, All Contractors and Subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner at: https://apps.dir.ca.gov/ecpr/das/altlogin

21. HOURS OF LABOR:

As provided in Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work provided that the employees' compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

The Contractor shall pay to the City a penalty of Twenty-five Dollars ($25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of *per diem* wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Contract applicable to each particular craft, classification, or type of worker employed.

22. APPRENTICES:

Attention is directed to the provisions in sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him on contracts greater than $30,000 or 20 working days. The Contractor and any subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices.

Section 1777.5 requires the Contractor or subcontractor employing workers in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of the

public works project, and which administers the apprenticeship program in that trade, for a certificate of approval, if they have not previously applied and are covered by the local apprenticeship standards.

The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if: (1) the Contractor employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions; or (2) if the Contractor is not a signatory to an apprenticeship fund and if the funds administrator is unable to accept Contractor' required contribution. The Contractor or subcontractor shall pay a like amount to the California Apprenticeship Council.

Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex-officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

23. LABOR DISCRIMINATION:

No discrimination shall be made in the employment of persons upon public works because of the race, color, sex, religion, age, national origin, sexual orientation, or physical disability of such persons and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of the provisions of the Labor Code, and, in particular, Section 1735.

24. REGISTRATION OF CONTRACTORS:

Before submitting bids, contractors shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and Professional Code of the State of California.

25. URBAN RUNOFF MANAGEMENT:

The Contractor shall avoid creating excess dust when breaking asphalt or concrete and during excavation and grading. If water is used for dust control, contractor shall use as little as necessary. Contractor shall take all steps necessary to keep wash water out of the streets, gutters and storm drains.

The Contractor shall develop and implement erosion and sediment control to prevent pollution of storm drains. Such control includes but is not limited to:

a. Use storm drain inlet protection devices such as sand bag barriers, filter fabric fences, block and gravel filters. (Block storm drain inlets prior to the start of the rainy season (October 15), on site de-watering activities and saw-cutting activities; shovel or vacuum saw-cut slurry and remove from the site).

b. Cover exposed piles of soil or construction material with plastic sheeting. All construction materials must be stored in containers.

c. Sweep and remove all materials from paved surfaces that drain to streets, gutters and storm drains prior to rain as well as at the end of the each work day. At the completion of the project, the street shall be washed and the wash water shall be collected and disposed of offsite in an appropriate location.

d. After breaking old pavement, Contractor shall remove all debris to avoid contact with rainfall or runoff.

e. Contractor shall maintain a clean work area by removing trash, litter, and debris at the end of each workday. Contractor shall also clean up any leaks, drips, and other spills as they occur.

The objective is to ensure that the City and County of Alameda County-Wide Clean Water Program is adequately enforced. These controls should be implemented prior to the start of construction, up-graded as required, maintained during construction phases to provide adequate protection, and removed at the end of construction.

These recommendations are intended to be used in conjunction with the State's Best Management Practices Municipal and Construction Handbooks, local program guidance materials from municipalities, Section 7.1.01 of the Standard Specifications and any other appropriate documents on storm water quality controls for construction.

Failure to comply with this program will result in the issuance of noncompliance notices, citations, project stop orders or fines. The fine for noncompliance of the above program is two hundred and fifty dollars ($250.00) per occurrence per day. The State under the Federal Clean Water Act can also impose a fine on the contractor, pursuant to Cal. Water Code §13385.

26. COMPLIANCE WITH MARSH CRUST ORDINANCE:

Contractor shall perform all excavation work in compliance with the City's Marsh Crust Ordinance as set forth at Section 13-56 of the Municipal Code. Prior to performing any excavation work, Contractor shall verify with the Building Official whether the excavation work is subject to the Marsh Crust Ordinance. Contractor shall apply for and obtain permits from Building Services on projects deemed to be subject to the Marsh Crust Ordinance.

27. COMPLIANCE WITH THE CITY'S INTEGRATED PEST MANAGEMENT POLICY:

The Contractor shall follow the requirements of the City's Integrated Pest Management (IPM) Policy to ensure the City is in compliance with its Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, issued by the San Francisco Bay Regional Water Quality Control Board.

- ☐ Contractor shall use the most current IPM technologies available to ensure the long-term prevention or suppression of pest problems and to minimize negative impacts on the environment, non-target organisms, and human health for the control or management of

pests in and around City buildings and facilities, parks and golf courses, urban landscape areas, rights-of-way, and other City properties.

- ❑ Contractor will consider the City IPM Policy's hierarchy of options or alternatives listed below, in the following order before recommending the use of or applying any pesticide on City property: (1)

    a. No controls (e.g. tolerating the pest infestation, use of resistant plant varieties or allowing normal life cycle of weeds);

    b. Physical or mechanical controls (e.g. hand labor, mowing, exclusion);

    c. Cultural controls (e.g. mulching, disking, alternative vegetation) and good housekeeping (e.g. cleaning desk area);

    d. Biological controls (e.g., natural enemies or predators);

    e. Reduced-risk chemical controls (e.g., soaps or oils);

    f. Other chemical controls.

- ❑ Prior to applying chemical controls the contractor shall complete a checklist for the City's pre-approval that explains why a chemical control is necessary. For annual contracts that require regular application of chemical controls the contractor shall submit one checklist prior to the initiation of the project demonstrating that the hierarchy has been reviewed and no other options exist. (Attached as Exhibit C). Additionally, the Contractor shall provide documentation to the City's project manager of the implementation of the IPM techniques hierarchy described in the City's IPM Policy.

- ❑ Contractor shall avoid the use of the following pesticides that threaten water quality, human health and the environment:

    a. Acute Toxicity Category I chemicals as identified by the Environmental Protection Agency (EPA)

    b. Organophosphate pesticides (e.g., those containing Diazinon, chlorpyrifos or malathion)

    c. Pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin), carbamates (e.g., carbaryl), and fipronil

    d. Copper-based pesticides unless their use is judicious, other approaches and techniques have been considered, and the threat of impact to water quality is prevented.

- ❑ Contractor shall sign the Contractor Verification Form (attached as Exhibit B) indicating the intent to implement the City's IPM Policy, and return a signed copy to the City's project manager.

- ☐ Contractor shall provide to the City's project manager an annual Report of all pesticide usage in support of City operations including pesticide name, active ingredient(s), target pest(s), the total amounts used and the reasons for any increase in use of any pesticide.

- ☐ Contractor shall provide a copy of any current IPM certifications(s) to the City's project manager prior to initiation of the service work.

A copy of the City's IPM Policy may be obtained from the City's project manager and is also on file with the City Clerk.

If this agreement pertains to the use of any items listed above, the Contractor will need to fill out and send in the Contractor Verification Form and Contractor Check List. ADD EXHIBIT B IF PEST CONTROL.

28. PURCHASES OF MINED MATERIALS REQUIREMENT:

Contractor shall ensure that all purchases of mined materials such as construction aggregate, sand and gravel, crushed stone, road base, fill materials, and any other mineral materials must originate from a surface mining operation identified on the AB3098 List per the Surface Mining and Reclamation Act of 1975 (SMARA).

Within five days of award of contract, Contractor shall submit a report to City which lists the intended suppliers for the above materials and demonstrates that the suppliers are in compliance with the SMARA requirements. The AB3098 List is maintained by the Department of Conservation's Office of Mine Reclamation (OMR) and can be viewed at: www.conservation.ca.gov/OMR/ab_3098_list/index.htm. Note that the list changes periodically and should be reviewed accordingly.

29. TERMINATION:

In the event Contractor fails or refuses to perform any of the provisions hereof at the time and in the manner required hereunder, Contractor shall be deemed in default in the performance of this Agreement. If such default is not cured within a period of two (2) business days after receipt by Contractor from the City of written notice of default, specifying the nature of such default and the steps necessary to cure such default, the City may terminate the Agreement forthwith by giving to the Contractor written notice thereof.

The City shall have the option, at its sole discretion and without cause, of terminating this Agreement by giving seven (7) days' prior written notice to Contractor as provided herein. Upon termination of this Agreement, each party shall pay to the other party that portion of compensation specified in this Agreement that is earned and unpaid prior to the effective date of termination.

30. ATTORNEY'S FEES:

In the event of the bringing of any action or suit by a party hereto against the other party by reason of any breach of any covenants, conditions, obligation or provision arising out of this Agreement, the prevailing party shall be entitled to recover from the non-prevailing party all of

its costs and expenses of the action or suit, including reasonable attorneys' fees, experts' fees, all court costs and other costs of action incurred by the prevailing party in connection with the prosecution or defense of such action and enforcing or establishing its rights hereunder (whether or not such action is prosecuted to a judgment). For the purposes of this Agreement, reasonable fees of attorneys of the Alameda City Attorney shall be based on the fees regularly charged by private attorneys with the equivalent number of years of experience in the subject matter area of the law for which the Alameda City Attorney's services were rendered who practice in Alameda County in law firms with approximately the same number of attorneys as employed by the Alameda City Attorney's Office.

31. PCC SECTION 9204 SUMMARY - CLAIMS SUBMITTED BETWEEN 01-01-2017 AND 01-01-2020.:

Notwithstanding anything else to the contrary stated in the Information For Bidders (IFB) or the Contract Documents, all claims, regardless of dollar amount, submitted between January 1, 2017 and January 1, 2020 shall be governed by PCC Section 9204 and this section.

The following provisions and procedures shall apply:

A. For the purposes of this section, the term "Claim", "Contractor", "mediation", "Public Entity" "Public works project" and "Subcontractor" shall have the meaning provided for in PCC Section 9204.

B. Contractor shall submit each Claim (whether for a time extension, payment for money or damages) in writing and in compliance with PCC Section 9204. Contractor must include reasonable documentation to support each claim.

C. Upon receipt of a Claim, the City shall conduct a reasonable review and respond in writing within 45 days of receipt and shall identify in a written statement what portions of the claim are disputed and undisputed. Undisputed portions of the Claim shall be process and paid within 60 days of the written statement. Undisputed amounts not paid in a timely manner shall bear interest at 7% per annum. The City and Contractor may mutually agree to extend the 45 day response time.

D. If the City needs approval from the City Council to provide a written statement, the 45 days may be extended to 3 days following the next duly noticed public meeting pursuant to PCC Section 9204(d)(1)(C).

E. If the City fails to timely respond to a Claim or if Contractor disputes the City's response, Contractor may submit a written demand for an informal meet and confer conference with the City to settle the issues in dispute. The demand must be sent via registered or certified mail, return receipt requested. Upon receipt, the City shall schedule the conference within 30 days.

F. Within 10 business days following the informal meet and confer conference, the City shall submit to Contractor a written statement describing any issues remaining in dispute and that portion which is undisputed. Undisputed portions of the Claim shall be process and paid within 60 days of the written statement. Undisputed amounts not paid in a timely manner shall bear

interest at 7% per annum. The issues remaining in dispute shall be submitted to non-binding mediation. If the City and Contractor mutually agree on a mediator, each party shall pay equal portions of all associated costs. If within 10 business days, the City and Contractor cannot agree on a mediator, each party shall select a mediator (paying all costs associated with their selected mediator), and those mediators shall select a qualified neutral third party to mediate the disputed issues. The City and Contractor shall pay equal portions of all associated costs of such third party mediator.

G. Unless otherwise agreed by the City and Contractor, any mediation conducted hereunder shall excuse any further obligation under Public Contract Code Section 20104.4 to mediate after litigation has commenced.

H. The City reserves all rights and remedies that it has pursuant to the Construction Contract, plans and specification, at law or in equity which are not in conflict with PCC 9204.

I. This Section shall be automatically extended if legislation is lawfully passed which extends the terms of Public Contract Code Section 9204 beyond January 1, 2020.

32. CONFLICT OF LAW:

This Agreement shall be interpreted under, and enforced by the laws of the State of California excepting any choice of law rules which may direct the application of laws of another jurisdiction. The Agreement and obligations of the parties are subject to all valid laws, orders, rules, and regulations of the authorities having jurisdiction over this Agreement (or the successors of those authorities.) Any suits brought pursuant to this Agreement shall be filed with the courts of the County of Alameda, State of California.

33. ADVERTISEMENT:

Contractor shall not post, exhibit, display or allow to be posted, exhibited, displayed any signs, advertising, show bills, lithographs, posters or cards of any kind pertaining to the services performed under this Agreement unless prior written approval has been secured from the City to do otherwise.

34. WAIVER:

A waiver by City of any breach of any term, covenant, or condition contained herein, shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant, or condition contained herein, whether of the same or a different character.

35. INTEGRATED CONTRACT:

This Agreement represents the full and complete understanding of every kind or nature whatsoever between the parties hereto, and all preliminary negotiations and agreements of whatsoever kind or nature are merged herein. No verbal agreement or implied covenant shall be held to vary the provisions hereof. Any modification of this Agreement will be effective only by written execution signed by both the City and Contractor.

36. INSERTED PROVISIONS:

Each provision and clause required by law to be inserted into the Agreement shall be deemed to be enacted herein, and the Agreement shall be read and enforced as though each were included herein. If through mistake or otherwise, any such provision is not inserted or is not correctly inserted, the Agreement shall be amended to make such insertion on application by either party.

37. CAPTIONS:

The captions in this Agreement are for convenience only, are not a part of the Agreement and in no way affect, limit or amplify the terms or provisions of this Agreement.

Signatures on next page

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

COMPANY NAME
(A California Corporation, partnership, sole proprietor, individual)

_____
(Name)
(Title)

_____
(Name)
(Title)

CITY OF ALAMEDA,
a Municipal Corporation

_____
Eric J. Levitt
City Manager

RECOMMENDED FOR APPROVAL

_____
Liam Garland
Public Works Director

APPROVED AS TO FORM:
City Attorney

_____
Yibin Shen
City Attorney

Exhibit 'E'

EMERGENCY FORM

EXHIBIT "E"

EMERGENCY FORM

During the course of the work and/or while the contractor has responsibility for the project, emergencies may arise where it is necessary to repair or replace safety devices, or install additional safety devices, or take preventative measures necessary for public safety. Such corrections as may be necessary are the contractor's responsibility and he, or his representative, will be called upon in such emergencies.

Please fill in the following information and submit it to the Deputy Public Works Director/City Engineer.

CONTRACTOR'S NAME_____

CONTRACTOR'S PHONE NUMBER_____

PROJECT SUPERINTENDENT_____

CONTACT IN THE EVENT OF EMERGENCY:

Name:_____

Phone Number:_____

In cases where the contractor, or his representative, cannot be contacted or will not take the necessary actions, the City Public Works Department will be notified and the necessary repairs, corrections, or changes will be made. The contractor will be billed for such remedial action. Charges will include the cost of labor at applicable rates, the City's normal overhead factor, the rental of any equipment or safety devices placed during the emergency that are damaged or stolen, or otherwise not returned to the City, will be billed to the contractor.

Scheduled starting date_____

Scheduled completion date_____

Job Name_____

EMERGENCY CONTACT INFORMATION – CITY OF ALAMEDA:

PROJECT MANAGER (NAME & PHONE NO.)_____

PROJECT INSPECTOR (NAME & PHONE NO.)_____

OTHER STAFF (NAME & PHONE NO.)_____

EXHIBIT "F"

PERFORMANCE BOND FORM

EXHIBIT "F"

Performance Bond Form

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

_____
(Name of Owner)

_____
(Address of Owner)

hereinafter called OWNER, in the penal sum of _____
_____ Dollars. ($ _____)

in lawful money of the United States, f or the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 2019, a copy of which is hereto attached and made a part hereof for the construction of:

_____

_____

_____

_____

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

EXHIBIT 'F'

PERFORMANCE BOND FORM

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed on _____ counterparts, each one
(Number)

of which shall be deemed an original, this the _____ day of _____, 2019.

ATTEST: _____
Principal

_____ By: _____
Principal Secretary

(SEAL)

_____
(Witness as to Principal) (Address)

_____
(Address)

_____
(Surety)

ATTEST:

_____
Surety Secretary

(SEAL)

_____ By: _____
(Witness as to Surety) Attorney-in-fact

_____
(Address) (Address)

_____

NOTE: Date of BOND must not be prior to date of Contract.
If the CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

Exhibit 'G'

PAYMENT BOND FORM

EXHIBIT 'G'

PAYMENT BOND FORM

KNOW ALL MEN BY THESE PRESENTS: that

_____

_____

a _____, hereinafter called Principal, and

_____

hereinafter called Surety, are held and firmly bound unto _____

_____

_____

hereinafter called OWNER, in the penal sum of _____ Dollars. ($ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 2019, a copy of which is hereto attached and made a part hereof for the construction of:

_____

_____

_____

_____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

EXHIBIT 'G'

PAYMENT BOND FORM

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed on _____ counterparts, each one
(Number)
of which shall be deemed an original, this the _____ day of _____, 2019.

ATTEST: _____
Principal

_____ By: _____
Principal Secretary

(SEAL)

_____
(Witness as to Principal) (Address)

_____
(Address)

_____
(Surety)

ATTEST:

_____
Surety Secretary

(SEAL)

_____ By: _____
(Witness as to Surety) Attorney-in-fact

_____
(Address) (Address)

_____

NOTE: Date of BOND must not be prior to date of Contract.
If the CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

Exhibit 'H'

BIDDER'S BOND FORM

EXHIBIT 'H'

Bidder's Proposal Form Contractor Name: _____

BIDDER'S BOND

We, _____
as Principal, and as Surety are bound unto the _____,
hereafter referred to as "oblige", in the penal sum of ten percent (10%) of the total amount of the bid of the Principal submitted to the Obligee for the work described below, for the payment of which sum we bind ourselves, jointly, and severally,

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:

WHEREAS, the Principal is submitted to the Obligee, for _____
(Copy here the exact description of

_____
work, including locations as it appears on the proposal)

_____

_____

for which bids are to be opened per Section 1 Proposal and Contract Requirements, Paragraph E, Presenting and Marking of Bid.

NOW, THEREFORE, if the Principal is awarded the contract and, within the time and manner required under the specifications, after the prescribed forms are presented to Contractor for signature, enters into a written contract, in the prescribed form, in accordance with the bid, and files two bonds with Obligee, one to guarantee faithful performance of the contract an the other to guarantee payment for labor and materials as provided by law, then this obligation shall be null and void; otherwise, it shall remain in full force.

In the event suit is brought upon this bond by the Obligee and judgement is recovered, the Surety shall pay all cost incurred by the Obligee in such suite, including a reasonable attorney's fee to be fixed by the court.

The surety; for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

Dated: _____, 2019. _____

_____
Principal

_____
Surety

By: _____

EXHIBIT "H"

CERTIFICATE OF ACKNOWLEDGMENT

State of California
County of Alameda

On this _____ day of _____ in the year 2019 before me _____, a Notary Public, personally appeared _____
Attorney-in-fact

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____(Seal)
Notary Public

EXHIBIT "I"

LIST OF SUBMITTALS

EXHIBIT "I"

List of Submittals

CYCLIC SEWER REPLACEMENT PROJECT
PHASE 16
No. P.W. 05-19-26

Shall include but not limited to the following:

Item	Section Reference	Due Date/Frequency
1. Contract Bonds	Section I, Paragraph N	Within 5 days of award
2. Certified Payroll	Section II, Paragraph F	Submitted weekly
3. Emergency Form	Exhibit E	Preconstruction meeting
4. Insurance	Contract, Exhibit D	Within 5 days of award
5. Licenses/Permits	Section II, Paragraph J	Preconstruction meeting
6. Traffic Control Plan	Section XII, Paragraph A	Preconstruction meeting
7. Technical Submittals	Relevant Technical Specifications	Preconstruction meeting and updated at weekly meetings
8. Stormwater PPP	Section II, Paragraph U	Preconstruction meeting
9. Work Schedule	Section VI, Paragraph A	Preconstruction meeting and updated at weekly meetings

The above list is not exhaustive and the Contractor shall follow the requirements in the documents for submittals.

EXHIBIT "J"

INTEGRATED PEST MANAGEMENT POLICY WITH CONTRACTOR VERIFICATION FORM AND CONTRACTOR CHECK LIST

City of Alameda Contractor Verification Form
Implementation of City of Alameda Integrated Pest Management Policy

The City of Alameda (City) is mandated to:

(a) Minimize its reliance on pesticides that threaten water quality, and
(b) Require the effective use of Integrated Pest Management (IPM) in all municipal operations and on all municipal property.

To ensure compliance with this mandate, all City operations need to verifiably implement the practices and policies described in the City's IPM Policy adopted June 15, 2010. A copy of this IPM Policy is included with this form. The implementation of the IPM Policy is applicable to all municipal contractors that provide landscaping, structural pest control, or other pest management services in support of City operations and/or on municipal property.

The undersigning parties acknowledge that all elements of the City's IPM Policy will be implemented throughout the period of contractual services provided to City operations and on municipal property. Specific actions to document this performance shall include:

- ☐ Pest Management Contractor shall provide to City project manager for pre-approval the Pest Management Considerations Checklist.
- ☐ Pest Management Contractor shall avoid the use of the following pesticides that threaten water quality, human health and the environment:
  - Acute Toxicity Category I chemicals as identified by the Environmental Protection Agency (EPA)
  - Organophosphate pesticides (e.g., those containing Diazinon, chlorpyrifos or malathion)
  - Pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin), carbamates (e.g., carbaryl), and fipronil
  - Copper-based pesticides unless their use is judicious, other approaches and techniques have been considered and the threat of impact to water quality is prevented.
- ☐ Pest Management Contractor shall provide to the City's project manager an annual Report of all pesticide usage in support of City operations including product name and manufacturer, active ingredient(s), target pest(s), the total amounts used and reasons for any increase in use of any pesticide.
- ☐ If the Contractor's on-site personnel are currently IPM certified through either the EcoWise or GreenPro programs, or through another program, the contractor shall provide written evidence of any certifications to the City's project manager.

_____	_____
City Departmental Representative	Contractor Representative
_____	_____
Print Name	Print Name
_____	_____
Date	Date
_____	_____
City Department	City Contractor

City of Alameda Pest Management Contractor Checklist:
Pest Management Options Considerations

Contractor will consider the City IPM Policy's hierarchy of options or alternatives listed below, in the following order before recommending the use of or applying any pesticide on City property. Please provide a written explanation in each section below of why the specific pest management option is not appropriate:

(1) No controls (e.g. tolerating the pest infestation, use of resistant plant varieties or allowing normal life cycle of weeds)

Comment: _____

_____

_____

(2) Physical or mechanical controls (e.g. hand labor, mowing, exclusion)

Comment: _____

_____

_____

(3) Cultural controls (e.g. mulching, disking, alternative vegetation), good housekeeping (e.g. cleaning desk area)

Comment: _____

_____

_____

(4) Biological controls (e.g., natural enemies or predators)

Comment: _____

_____

_____

(5) Reduced-risk chemical controls (e.g., soaps or oils)

Comment: _____

_____

_____

(6) Other chemical controls

Comment: _____

_____

_____

Contractor Representative

_____
Print Name

_____
Date

_____
City Contractor

EXHIBIT "K"

PROJECT STABILIZATION AGREEMENT FOR THE CITY OF ALAMEDA

PROJECT STABILIZATION AGREEMENT

FOR THE

CITY OF ALAMEDA

PREAMBLE

This Agreement is made and entered into on this date, January 19, 2017, by and between the city of Alameda ("City" or "Owner") together with contractors and/or subcontractors who shall become signatory to this Agreement by signing the "Agreement To Be Bound" (Addendum "A"), ("Contractor/Employer(s)"), and the Building and Construction Trades Council of Alameda County, AFL-CIO ("Council") and its affiliated Local Unions signatory hereto ("Union(s)").

The purpose of this Agreement is to promote efficiency of construction operations during construction of the Project (as defined in Section 1.11 below) by providing for the orderly and peaceful settlement of labor disputes and grievances without strikes, work stoppages or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project.

RECITALS

WHEREAS, the timely and successful completion of the Project is of the utmost importance to the city of Alameda; and

WHEREAS, large numbers of workers of various skills will be required in the performance of the construction work, including those to be represented by the Union(s) signatory to this Agreement employed by Contractor/Employer(s) and subcontractors who are also signatories to this Agreement; and

WHEREAS, it is recognized that on a project of this magnitude with multiple contractors and bargaining units on the job site at the same time over an extended period of time, the potential for work disruption is substantial without an overriding commitment to maintain continuity of work; and

WHEREAS, the interests of the general public, the city of Alameda, the Union(s) and Contractor/Employer(s) would be best served if the construction work proceeded in an orderly manner without disruption because of strikes, sympathy strikes, work stoppages, picketing, lockouts, slowdowns or other interferences with work; and

WHEREAS, the Contractor/Employer(s) and the Union(s) desire to mutually establish and stabilize wages, hours and working conditions for the workers employed on the Project by the Contractor/Employer(s), and further, to encourage close cooperation among the

Contractor/Employer(s) and the Union(s) so that a satisfactory, continuous and harmonious relationship will exist among the parties to this Agreement; and

WHEREAS, the parties agree that one of the primary purposes of this Agreement is to avoid the tensions that might arise on the Project if union and non-union workers of different employers were to work side by side on the Project thereby leading to labor disputes that could delay completion of the Project; and

WHEREAS, this Agreement is not intended to replace, interfere with, abrogate, diminish or modify existing local or national collective bargaining agreements in effect during the duration of the Project, insofar as a legally binding agreement exists between the Contractor/Employer(s) and the affected Union(s), except to the extent that the provisions of this Agreement are inconsistent with said collective bargaining agreements, in which event, the provisions of this Agreement shall prevail; and

WHEREAS, the contract(s) for construction work on the Project will be awarded in accordance with the applicable provisions of the California Public Contract Code; and

WHEREAS, the city of Alameda desires to provide construction training and employment opportunities for residents of the city of Alameda and Alameda County through apprentice and pre-apprentice programs; and

WHEREAS, the parties to this Agreement pledge their full good faith and trust to work towards a mutually satisfactory completion of the Project;

NOW, THEREFORE, IT IS AGREED BETWEEN AND AMONG THE PARTIES HERETO, AS FOLLOWS:

ARTICLE 1

DEFINITIONS

1.1 "City" means the city of Alameda.

1.2 "Agreement" means this Project Stabilization Agreement and all attached hereto Addenda.

1.3 "Agreement To Be Bound" means the document, as set forth in Addendum A hereto, that formally binds the Contractor/Employer(s) to comply with all the terms and conditions of this Agreement and that operates as a pre-condition to performing work on the Project.

1.4 "Apprentice" means an individual registered and participating as an apprentice in a Joint Labor/Management Apprenticeship Program approved by the State of California, Department of Industrial Relations, Division of Apprenticeship Standards.

1.5 "Completion" shall mean the date upon which the written notice of completion has been issued for a specific building, phase or project constructed under this Agreement.

1.6 "Construction Contract" means the public works or improvement contract(s) which will be awarded by the City and which are necessary to complete the Project, including subcontracts at any tier.

1.7 "Contractor/Employer(s)" means any individual, firm, partnership or corporation, or combination thereof, including joint ventures, and their successors and assigns that is an independent business enterprise and enters into a contract with the City or its Project Manager or any of its contractors or subcontractors at any tier, with respect to the construction of any part of the Project under contract terms and conditions approved by the City and which incorporate this Agreement.

1.8 "Coordinator" means that individual or entity designated and authorized by the City to provide those administrative services required by this Agreement.

1.9 "Council" means the Building and Construction Trades Council of Alameda County, AFL-CIO.

1.10 "Master Labor Agreement" ("MLA" or "Schedule A") means the Master Collective Bargaining Agreement of each craft Union(s) signatory to this Agreement listed in Exhibit A to this Agreement and incorporated herein by reference, a copy of which shall be made available to the City upon request.

1.11 "Project" means those Construction Contracts for individual public works, within the City of Alameda with a total value (as estimated by the City) of one million dollars ($1,000,000.00) or more. Specifically excluded from this definition of Project and, therefore, the scope of this Agreement are multi-year contracts that have already been let by the City. The City and the Council may mutually agree in writing to add additional components to the Project Scope of Work to be covered under this Agreement.

1.12 "Project Manager" means the person or persons or business entity designated by City or private developer having control over a public works project to oversee all phases of construction on the Project.

1.13 "Trust Fund(s)" means an agreement for an established vacation, pension or other form of deferred compensation plan, apprenticeship and health benefit funds established by an applicable Master Labor Agreement as set forth in Section 17.1.

1.14 "Union(s)" means the Building and Construction Trades Council of Alameda County, AFL-CIO and any affiliated Labor Organization signatory to this Agreement, acting on their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed this Agreement.

ARTICLE 2

SCOPE OF AGREEMENT

2.1 The City will apply this Agreement as a contract specification to the award of all public works construction contracts on the Project for Covered Work as specifically defined under Article 2 of this Agreement. This Agreement does not apply to any private development projects. In the event that the City is made aware that this Agreement or portions thereof are inconsistent with the terms and conditions of any grant, loan, or contract with any Federal or State agency or with the instructions or directions of an authorized representative of a Federal or State agency regarding the requirements of any such grant, loan, or contract, the City shall notify the Council. Within seven (7) days of notification, the parties shall meet and confer to attempt to modify the Agreement to avoid forfeiture of any funding or otherwise resolve the issue. Should the parties be unable to come to agreement, the Agreement or any inconsistent provision shall be subject to resolution by the grievance arbitration procedures set forth in Article 11. The foregoing notwithstanding, if the granting agency determines that the resolution of such grievance procedure will result in the forfeiture of material grant funds (meaning an amount that would threaten viability of the project), then the Agreement may be modified or terminated in order to avoid the forfeiture.

2.2 Parties: The Agreement shall apply and is limited to all Contractor/Employer(s) performing work for the Project (including subcontractors at any tier), the City, the Council and the Union(s) signatory to this Agreement, acting on their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed this Agreement.

2.3 Covered Work: This Agreement covers, without limitation, all site preparation, surveying, construction, alteration, demolition, installation, improvement painting or repair of buildings, structures and other works, and related activities for the Project, including geotechnical and exploratory drilling, temporary HVAC, and landscaping and temporary fencing that is within the craft jurisdiction of one of the Union(s) and which is directly or indirectly part of the Project, including, without limitation to the following examples, pipelines (including those in linear corridors built to serve the project), pumps, pump stations, start-up, and modular furniture installation. On-site work includes work done for the Project in temporary yards or areas adjacent to the Project, and at any on-site or off-site batch plant constructed solely to supply materials to the Project. This scope of work includes all on-site soils and materials testing and inspection where such testing and inspection is a classification in which a prevailing wage determination has been published.

2.4.1 This Agreement shall apply to any start-up, calibration, commissioning, performance testing, repair, operational revisions to systems and/or subsystems performed after Completion if it is within the scope of the contract for public work unless it is performed by City employees.

2.4.2 This Agreement covers all on-site fabrication work over which the City, Contractor/Employer(s) or subcontractor(s) possess the right of control (including work done for the Project in any temporary yard or area established for the Project). Additionally, it is agreed hereby that this Agreement covers any off-site work, including fabrication work necessary for the Project defined herein, that is covered by a current MLA or local addenda to a National Agreement of the applicable Union(s) that is in effect as of the execution date of this Agreement.

2.4.3 The furnishing of supplies, equipment or materials which are stockpiled for later use shall not be covered by this Agreement. However, construction trucking work, such as the delivery of ready-mix, asphalt, aggregate, sand or other fill material which are incorporated into the construction process as well as the off-hauling of debris and excess fill, material and/or mud, shall be covered by the terms and conditions of this Agreement, to the fullest extent provided by law and by prevailing wage determinations of the California Department of Industrial Relations. Contractor/Employer(s), including brokers, of persons providing construction trucking work shall provide certified payroll records to the City within ten (10) days of written request or as required by bid specifications.

2.4.4 It is agreed that the Contractor shall require all contractors of whatever tier who have been awarded contracts for work covered by this Agreement, to accept and be bound by the terms and conditions of this Project Agreement by executing the Agreement to be Bound (Attachment A) prior to commencing work. The Project Manager and/or Coordinator shall assure compliance with this Agreement by the Contractors. It is further agreed that, where there is a conflict, the terms and conditions of this Project Agreement shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements, except work covered by the Agreement within the following craft jurisdictions shall be performed under the terms of their National Agreements as follows: National Agreement of Elevator Constructors, National Transient Lodge (NTL) Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, and all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, except that Articles 5, 6, and 11 of this Agreement shall prevail and be applied to such work. It is understood that this is a self-contained, stand alone, Agreement and that by virtue of having become bound to this Project Agreement, neither the Project Contractor/Manager nor the Contractors will be obligated to sign any other local, area, or national agreement.

2.5 The on-site installation or application of all items shall be performed by the craft having jurisdiction over such work as set forth under the provisions of this Agreement; provided, however, it is recognized that installation of specialty items which may be furnished by the owner of the Project or a contractor shall be performed by construction persons employed under this Agreement who may be directed by other personnel in a supervisory role.

2.6 After installation by the Contractor/Employer(s) and upon Completion, it is understood, the City reserves the right to perform start-up, operation, repair, maintenance or revision of equipment or systems with employees of the City. If required, the service representative may make a final check and may direct workmen on site to make any necessary repairs to protect the terms of a manufacturer's guarantee or warranty prior to start-up of a piece of equipment.

2.7 It is expressly agreed and understood by the parties hereto that the City shall have the right to purchase material and equipment from any source, except where limited by this Agreement, and the craftspersons will handle and install such material and equipment.

2.8 Exclusions. The following shall be excluded from the scope of this Agreement:

2.8.1 The Agreement is not intended to, and shall not affect or govern the award of public works contracts by the City which are not included in the Project.

2.8.2 The Agreement shall not apply to a Contractor/Employer(s)' non-construction craft employees, including, but not limited to, executives, managerial employees, engineering employees and supervisors above the level of General Foreman or Senior General Foreman (except those covered by existing MLAs), staff engineers or other professional engineers, administrative and management.

2.8.3 This Agreement shall not apply to any work performed on or near or leading to the site of work covered by this Agreement that is undertaken by state, county, city or other governmental bodies or their contractors; or by public or private utilities or their contractors.

2.8.4 Off-site maintenance of leased equipment and on-site supervision of such work;

2.8.5 The City shall not be required to comply with this Agreement for any work performed with its own forces as permitted by the City Charter, City Codes or Ordinances, the California Uniform Construction Cost Accounting Act, Public Contract Code and Education Code, as applicable.

2.9 Award of Contracts: It is understood and agreed that the City shall, for the award of contracts for public works, have the absolute right to select the bidder with the lowest responsive, responsible bid for the award of contracts under this Agreement. The bidder need only be willing, ready and able to execute and comply with this Agreement.

ARTICLE 3

EFFECT OF AGREEMENT

3.1 By executing the Agreement, the Union(s) and the City agree to be bound by each and all of the provisions of the Agreement.

3.2 By accepting the award of a construction contract for the Project, whether as contractor or subcontractor, the Contractor/Employer(s) agrees to be bound by each and every provision of the Agreement and agrees that it will evidence its acceptance prior to the commencement of work by executing the Agreement To Be Bound in the form attached hereto as Addendum A.

3.3 At the time that any Contractor/Employer(s) enters into a subcontract with any subcontractor providing for the performance of a construction contract, the Contractor/Employer(s) shall provide a copy of this Agreement to said subcontractor and shall require the subcontractor as a part of accepting an award of a construction subcontract to agree in writing to be bound by each and every provision of this Agreement prior to the commencement of work. The obligations of a Contractor/Employer(s) may not be evaded by subcontracting.

3.4 Each Contractor/Employer(s) shall give written notice to the Union(s) of any subcontract involving the performance of work covered by this Agreement within either seven (7) days of entering such subcontract or before such Contractor/Employer(s) commences work on the Project, whichever occurs first. Such notice shall specify the name, address, phone number, and the California Contractor State License Board (CSLB) license number and motor carrier permit number, and DIR registration number, of the Contractor/Employer(s). Written notice at a Pre-Job Conference shall be deemed written notice under this provision for those Contractor/Employer(s) listed at the Pre-Job only.

3.5 This Agreement shall only be binding on the signatory parties hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party. Each Contractor/Employer(s) shall alone be liable and responsible for its own individual acts and conduct and for any breach or alleged breach of this Agreement. Any dispute between the Union(s) and the Contractor/Employer(s) respecting compliance with the terms of the Agreement shall not affect the rights, liabilities, obligations and duties between the signatory Union(s) and other Contractor/Employer(s) party to this Agreement.

3.6 The provisions of this Agreement, including MLA's, shall apply to the work covered by this Agreement, notwithstanding the provisions of any other local, area and/or national agreements which may conflict with or differ from the terms of this Agreement. Where a subject covered by the provisions of this Agreement is also covered by a MLA, the provisions of this Agreement shall prevail. Where a subject is covered by the provisions of a MLA and is not covered by this Agreement, the provisions of the MLA shall prevail.

3.7 (a) With regard to any Contractor/Employer(s) that is independently signed to any MLA, this Project Stabilization Agreement shall in no way supersede or prevent the enforcement of any subcontracting clause contained in such MLA, except as specifically set forth in subsection (b) of this Section 3.7. Any such subcontracting clause in an MLA shall remain and be fully enforceable between each craft union and its signatory employers, and no provision of this Project Stabilization Agreement shall be interpreted and/or applied in any

manner that would give this Project Stabilization Agreement precedence over subcontracting obligations and restrictions that exist between craft unions and their respective signatory employers under an MLA, except as specifically set forth in subsection (b) of this Section 3.7.

(b) If a craft union (hereafter "Aggrieved Union") believes that an assignment of work on this Project has been made improperly by a contractor or subcontractor, even if that assignment was as a result of another craft union's successful enforcement of the subcontracting clause in its MLA, as permitted by subsection (a) of this Section 3.7, the Aggrieved Union may submit a claim under the jurisdictional resolution process contained in Article 6 of this PLA, and the decision rendered as part of that process shall be enforceable to require the contractor or subcontractor that made the work assignment to assign that work prospectively to the Aggrieved Union. An award made to a craft union under the subcontracting clause of its MLA, as permitted pursuant to Section 3.7 (a) of this Article, shall be valid and fully enforceable by that craft union unless it conflicts with a jurisdictional award made pursuant to this Agreement. If the award made under the MLA conflicts with the jurisdictional award, the award of any damages under the former shall be null and void ab initio.

ARTICLE 4

RELATIONSHIP BETWEEN PARTIES

4.1 This Agreement shall only be binding on the signatory parties hereto, and shall not apply to parents, affiliates, subsidiaries, or other ventures of any such party.

4.2 Each Contractor/Employer(s) shall alone be liable and responsible for its own individual acts and conduct and for any breach or alleged breach of this Agreement. Any alleged breach of this Agreement by a Contractor/Employer(s) or any dispute between the Union(s) and the Contractor/Employer(s) respecting compliance with the terms of this Agreement, shall not affect the rights, liabilities, obligations and duties between the signatory Union(s) and each of the other Contractor/Employer(s), party to this Agreement.

4.3 It is mutually agreed by the parties that any liability of a Union(s) shall be several and not joint. Any alleged breach of this Agreement by a signatory Union(s) shall not affect the rights, liabilities, obligations and duties between the Contractor/Employer(s) and the other Union(s) party to this Agreement.

4.4 It is recognized by the parties to this Agreement that the Contractor/Employer(s) are acting only on behalf of said Contractor/Employer(s), and said Contractor/Employer(s) have no authority, either expressed, implied, actual, apparent or ostensible, to speak for or bind the City.

ARTICLE 5

NO STRIKES - NO LOCKOUTS

5.1 The Union(s), the City and Contractor/Employer(s) covered by the Agreement agree that for the duration of the Project:

5.1.1 There shall be no strikes, sympathy strikes, work stoppages, picketing, hand billing or otherwise advising the public that a labor dispute exists, or slowdowns of any kind, for any reason, by the Union(s) or employees employed on the Project, at the job site of the Project or at any other facility of the City because of a dispute on the Project. Disputes arising between the Union(s) and Contractor/Employer(s) on other City projects are not governed by the terms of the Agreement or this Article.

5.1.2 As to employees employed on the Project, there shall be no lockout of any kind by a Contractor/Employer(s) covered by the Agreement.

5.1.3 If a master collective bargaining agreement expires before the Contractor/Employer(s) completes the performance of the Construction Contract and the Union(s) or Contractor/Employer(s) gives notice of demands for a new or modified master collective bargaining agreement, the Union(s) agrees that it will not strike on work covered under this Agreement and the Union(s) and the Contractor/Employer(s) agree that the expired master collective bargaining agreement shall continue in full force and effect for work covered under this Agreement until a new or modified master collective bargaining agreement is reached. If the new or modified master collective bargaining agreement provides that any terms of the master collective bargaining agreement shall be retroactive, the Contractor/Employer(s) agrees to comply with any retroactive terms of the new or modified master collective bargaining agreement which are applicable to employees who were employed on the projects during the interim with retroactive payment due within seven (7) days of the effective date of the modified Master Agreement.

5.1.4 Withholding employees for failure of a Contractor/Employer(s) to tender timely Trust Fund(s) contributions as required in accordance with Article 16 and/or for failure to timely meet its weekly payroll is not a violation of this Article 5; however, the Union(s) shall give the affected Contractor/Employer(s), the Coordinator and the City written notice seventy-two (72) hours prior to the withholding of employees when failure to tender Trust Fund(s) contributions has occurred. There shall be twenty-four (24) hours notice when failure to meet weekly payroll has occurred or when paychecks are determined to be nonnegotiable by a financial institution normally recognized to honor such paychecks.

Should a Contractor/Employer(s) performing work on this Project be delinquent in the payment of Trust Fund(s) contributions required under this Agreement, the

Union(s) may request that the general Contractor/Employer(s) issue joint checks payable to the Contractor/Employer(s) and the appropriate employee benefit Trust Fund(s), on behalf of the employee(s) until such delinquencies are satisfied. Any Trust Fund(s) claiming that a Contractor/Employer(s) is delinquent in its fringe benefit contributions to the Trust Fund(s) will provide written notice of the alleged delinquency to the affected Contractor/Employer(s), with copies to the General Contractor/Employer(s), the Coordinator and the City. The notice will indicate the amount of delinquency asserted and the period that the delinquency covers. It is agreed, however, with respect to Contractor/Employer(s) delinquent in trust or benefit contribution payments, that nothing in this Agreement shall affect normal contract remedies available under the MLAs. If the General Contractor/Employer(s) is delinquent in the payment of Trust Fund(s) contributions for covered work performed on this project, the General Contractor/Employer(s) agrees that the affected Trust Fund(s) may place the City on notice of such delinquencies and the General Contractor/Employer(s) further agrees that the City may issue joint checks to the General Contractor/Employer(s) and the Trust Fund(s), on behalf of the employee(s) until the delinquency is satisfied.

5.2 Expedited Arbitration: Any party to this Agreement shall institute the following procedure, prior to initiating any other action at law or equity, when a breach of this Article is alleged to have occurred:

5.2.1 A party invoking this procedure shall notify Bob Hirsch, as the permanent Arbitrator, or, Barry Winograd, as the alternate Arbitrator under this procedure. In the event that the permanent Arbitrator is unavailable at any time, the alternate will be contacted. If neither is available, then a selection shall be made from the list of Arbitrators in Article 11.2.2, Step 5. Should either the permanent or the alternate arbitrator listed above no longer work as a labor arbitrator, the City and the Council shall mutually agree to a replacement. Notice to the Arbitrator shall be by the most expeditious means available, with notices by facsimile, email or telephone to the Coordinator, the City and the party alleged to be in violation, and to the Council and involved local Union(s) if a Union(s) is alleged to be in violation.

5.2.2 Upon receipt of said notice, the Coordinator will contact the designated Arbitrator named above or his alternate who will attempt to convene a hearing within twenty-four (24) hours if it is contended that the violation still exists.

5.2.3 The Arbitrator shall notify the parties by facsimile, email or telephone of the place and time for the hearing. Said hearing shall be completed in one session, which, with appropriate recesses at the Arbitrator's discretion, shall not exceed twenty-four (24) hours unless otherwise agreed upon by all parties. A failure of any party to attend said hearings shall not delay the hearing of evidence or the issuance of an award by the Arbitrator.

5.2.4 The sole issue at the hearing shall be whether or not a violation of Article 5, Section 5.1.1 of the Agreement has occurred. The Arbitrator shall have no authority to consider any matter of justification, explanation or mitigation of such violation or to award damages, which issue is reserved for court proceedings, if any. The award shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with or enforcement of the award. The Arbitrator may order cessation of the violation of this Article and other appropriate relief and such award shall be served on all parties by hand or certified mail upon issuance.

5.2.5 Such award may be enforced by any Court of competent jurisdiction upon the filing of this Agreement and all other relevant documents referred to above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the other party. In the proceeding to obtain a temporary order enforcing the Arbitrator's award as issued under Section 5.2.4 of this Article, all parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order or enforcement. The Court's order or orders enforcing the Arbitrator's award shall be served on all parties by hand or delivered by certified mail.

5.2.6 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure, or which interfere with compliance, are waived by the parties.

5.2.7 The fees and expenses of the Arbitrator shall be divided equally between the party instituting the arbitration proceedings provided in this article and the party alleged to be in breach of its obligation under this article.

ARTICLE 6

WORK ASSIGNMENTS AND JURISDICTIONAL DISPUTES

6.1 The assignment of Covered Work will be solely the responsibility of the Contractor/Employer(s) performing the work involved and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

6.2 All jurisdictional disputes on this Project between or among the Union(s) and the Contractor/Employer(s), parties to this Agreement, shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department, or any other plan or method of procedure that may be adopted in the future by the Building

and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Contractor/Employer(s) and Union(s) parties to this Agreement.

6.2.1 If a dispute arising under this Article involves the Northern California Carpenters Regional Council or any of its subordinate bodies, an Arbitrator shall be chosen by the procedures specified in Article V, Section 5, of the Plan from a list composed of John Kagel, Thomas Angelo, Robert Hirsch and Thomas Pagan and the Arbitrator's hearing on the dispute shall be held at the offices of the California State Building and Construction Trades Council in Sacramento, California, within fourteen (14) days of the selection of the Arbitrator. All other procedures shall be as specified in the Plan.

6.3 All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor/Employer(s)' assignment shall be adhered to until the dispute is resolved. Individuals violating this Section shall be subject to immediate discharge.

6.4 Each Contractor/Employer(s) shall conduct a Pre-Job Conference with the Council prior to commencing Covered Work. The Primary Employer, the Coordinator and the City will be advised in advance of all such conferences and may participate if they wish. Pre-job conferences for different Contractor/Employer(s) may be held together.

ARTICLE 7

COORDINATOR

7.1 The City will designate a Coordinator, who will be responsible for the administration and application of this Agreement.

7.2 The Coordinator shall endeavor to facilitate harmonious relations between the Contractors and Unions signatory hereto and will represent the City at the Pre-Job Conference(s) called for in Article 8 and the A Joint Administrative Committee called for in Article 20. The Coordinator shall not be responsible for the acts of the Contractor/Employer(s) or Unions signatory hereto, and will not be a party to any arbitration or litigation arising out of this Agreement.

ARTICLE 8

PRE-JOB CONFERENCES

8.1 Pre-Job Conference Timing and Attendees:

8.1.1 The Contractor shall hold and conduct a mandatory pre-job conference with representatives of all involved sub-contractors and the Unions at a location mutually agreeable to the Council at least twenty-one (21) calendar days prior to:

(a) The commencement of any Covered Work, as defined in section 2.3 above; and

(b) The commencement of Covered Work on each subsequently awarded Construction Contract.

8.1.2 The conference shall be attended by a representative of each participating Contractor, each affected Union, and the Council. The Owner may attend at its discretion.

8.2 Pre-Job Conference Information.

8.2.1 The information to be presented at the pre-job conference will consist of:

(a) A listing of each Contractor's scope of work;

(b) The Contractor's craft assignments;

(c) The estimated number of craft workers required to perform the work;

(d) Transportation and parking arrangements, if any;

(e) The estimated start and completion dates of the work;

(f) Identification of any pre-fabricated materials;

(g) All workforce projection information required under Article 14 of this Agreement; and

(h) A listing of all specialty work to be performed by the employees of an equipment vendor or manufacturer to protect the warranty on such equipment, and a demonstration by enumeration of specific tasks why such work cannot be performed by Covered Employees.

8.3 Work will not commence for any Contractor until an **Agreement to be Bound** has been signed and submitted by a duly authorized representative of the Contractor to the applicable Union(s) and the Council.

ARTICLE 9

MANAGEMENT RIGHTS

9.1 Consistent with the Schedule A Agreements, the Contractor/Employer(s) shall retain full and exclusive authority for the management of their operations, including the right to direct their work force in their sole discretion. No rules, customs or practices shall be permitted or observed which limit or restrict production, or limit or restrict the working efforts of employees except that lawful manning provisions in the MLA shall be recognized.

ARTICLE 10

WORK RULES

10.1 Work rules shall apply as set forth in the applicable MLA.

ARTICLE 11

GRIEVANCE PROCEDURE

11.1 All disputes concerning the interpretation and/or application of this Agreement which do not fall within the Article 5, No Strikes-No Lockouts procedure or Article 6, Work Assignments and Jurisdictional Disputes, shall be governed by the following grievance and arbitration procedure.

Employee Grievances: All disputes involving discipline and/or discharge of employees working on the Project shall be resolved through the grievance and arbitration provision contained in the MLA for the craft of the affected employee. No employee working on the Project shall be disciplined or dismissed without just cause.

11.2 Grievances between one or more Union(s) and one or more Contractor/Employer(s); or between the City and one or more Contractor/Employer(s) regarding interpretation and/or application of this Agreement shall be pursued according to the following provisions:

11.2.1 A grievance shall be considered null and void if not brought to the attention of the Contractor/Employer(s) or the Union(s) within fourteen (14) calendar days after the grievance is alleged to have occurred but in no event more than thirty (30) calendar days after the charging party became aware of the event giving rise to the dispute. The Coordinator shall be delivered a copy of all grievances.

11.2.2 Grievances between one or more Union(s) and one or more Contractor/Employer(s), or between the City and one or more Contractor/Employer(s) regarding provisions of this Agreement shall be settled or otherwise resolved according to the following Steps and provisions:

Step 1: A representative of the grievant and the party against whom the grievance is filed shall meet and attempt to resolve the grievance.

Step 2: In the event the matter remains unresolved in Step 1 above, within seven (7) calendar days, the grievance shall be reduced to writing and may then be referred by the Union(s), the City, or the Contractor/Employer(s) to the other party for discussion and resolution.

Step 3: In the event that the representatives are unable to resolve the dispute within the seven (7) calendar days after its referral to Step 2, either involved party may submit the dispute within seven (7) calendar days to the Joint Administrative Subcommittee established in Section 20.2. The Joint Administrative Subcommittee shall meet within seven (7) calendar days after such referral (or such longer time as is mutually agreed upon by the representatives on the Joint Administrative Subcommittee) to confer in an attempt to resolve the grievance. If a Union(s) is party to the grievance, regardless of which party has initiated the grievance proceeding, prior to the

meeting of the Joint Administrative Subcommittee, the Union(s) shall notify its International Union Representative(s), which shall advise both parties if it intends on participating in the meeting. The participation by the International Union Representative in this Step 3 meeting shall not delay the time set herein for the meeting, unless otherwise mutually agreed by the parties. If the dispute is not resolved by the Joint Administrative Subcommittee, it may be referred within seven (7) calendar days by either party to Step 4.

At the time a grievance is submitted under this Agreement or any MLA, the Union(s) may request that the City withhold and retain an amount from what is due and owing to the Contractor/Employer(s) against whom the grievance is filed, sufficient to cover the damages alleged in the grievance, should the Union(s) prevail.

The amount shall be retained by the City until such time as the underlying grievance giving rise to the retention is withdrawn, settled, or otherwise resolved, and the retained amount shall be paid to whomever the parties to the grievance shall decide, or to whomever an Arbitrator shall so order.

Step 4: In the event the matter remains unresolved in Step 3, either Party may request, within seven (7) calendar days, that the dispute be submitted to arbitration. The time limits set out in this procedure may, upon mutual agreement, be extended. Any request for arbitration, request for extension of time limits, and agreement to extend such time limits shall be in writing with a copy delivered to the Coordinator.

Step 5: The Parties agree that the Arbitrator who will hear the grievance shall be selected from the following: Barry Winograd, William Riker, and Robert Hirsch. The parties shall flip a coin to determine who shall strike the first name and shall then alternately strike names from the list and the last remaining name shall be the neutral third party Arbitrator who shall have the power to resolve the dispute in a final and binding manner. Should a Party to the procedure fail or refuse to participate in the hearing, if the Arbitrator determines that proper notice of the hearing has been given, said hearing shall proceed to a default award. The Arbitrator's award shall be final and binding on all Parties to the arbitration. The costs of the arbitration, excluding attorney fees, including the Arbitrator's fee and expenses, shall be borne by the losing party. The Arbitrator's decision shall be confined to the question(s) posed by the grievance and the Arbitrator shall not have authority to modify amend, alter, add to, or subtract from, any provisions of this Agreement.

11.3 Grievances raised by the City against one or more Union(s) and/or the Council, or against the City by one or more Union(s) and/or the Council, regarding provisions of this Agreement shall be settled or otherwise resolved according to the following Steps and provisions:

Step 1: The Joint Administrative Subcommittee shall attempt to resolve the grievance. The Joint Administrative Subcommittee shall meet within five (5) working days after receipt of the grievance (or such longer time as is mutually agreed upon by the representatives on this Joint Administrative Subcommittee) to confer with regard to the grievance. If the dispute is not resolved by the Joint Administrative Subcommittee, it may be referred within five (5) working days by either party to the Joint Administrative Committee.

Step 2: The Joint Administrative Committee shall attempt to resolve the grievance. The Joint Administrative Committee shall meet within five (5) working days after receipt of the grievance (or such longer time as is mutually agreed upon by the representatives on the Joint Administrative Committee) to confer with regard to the grievance. In the event that the Joint Administrative Committee is unable to resolve the dispute within the five (5) working days after receipt of the grievance, either involved party may proceed to Step 3.

Step 3: In the event the matter remains unresolved pursuant to Step 2, either Party may request that the dispute be submitted to arbitration in accordance with the process set forth in Paragraph 11.2.2. Step 5.

Step 4: Should a Party to the procedure fail or refuse to participate in the hearing, if the Arbitrator determines that proper notice of the hearing has been given, said hearing shall proceed to a default award. The Arbitrator's award shall be final and binding on all Parties to the arbitration. The costs of the arbitration, including the Arbitrator's fee and expenses, shall be borne by the losing Party. The Arbitrator's decision shall be confined to the question(s) posed by the grievance and the Arbitrator shall not have authority to modify amend, alter, add to, or subtract from, any provisions of this Agreement.

11.4 Grievances between a Union(s) and a Union(s)' signatory Contractor/Employer(s) involving interpretation or application of the MLA shall be governed by the grievance procedures contained in the MLA.

ARTICLE 12

UNION RECOGNITION AND REPRESENTATION

12.1 The Contractor/Employer(s) recognize the Union(s) signatory hereto as the sole and exclusive collective bargaining representatives for all craft employees on the Project.

12.2 The Contractor/Employer(s) shall require all employees who work on a Construction Contract on or before eight (8) days of consecutive or cumulative employment on the Project to comply with the applicable Union(s)' security provisions, and to maintain compliance for the period of time they are performing work on the Project, which requirement shall be satisfied by the tendering of periodic dues and fees uniformly required to the extent allowed by law. Further, there is nothing in this Agreement that would prevent non-union employees from joining the Union(s).

12.3 Authorized representatives of the Union(s) shall have access to the site at all times. Such representatives shall comply with reasonable visitor safety and security rules established for the Project at the pre-job meeting. Access for Union(s) representatives will not be unduly restricted.

ARTICLE 13

REFERRAL

13.1 Contractor/Employer(s) performing construction work on the Project described in the Agreement shall, in filling craft job requirements, utilize and be bound by the registration facilities and referral systems established or authorized by the Union(s) signatory hereto when such procedures are not in violation of Federal law. The Contractor/Employer(s) shall have the right to reject any applicant referred by the Union(s), in accordance with the applicable Master Agreement.

13.2 The Contractor/Employer(s) shall have the unqualified right to select and hire directly all supervisors above the level of general foreman or senior general foreman it considers necessary and desirable, without such persons being referred by the Union(s).

13.3 In the event that referral facilities maintained by the Union(s) are unable to fill the requisition of a Contractor/Employer(s) for employees within a forty-eight (48) hour period (Saturdays, Sundays and Holidays excluded) after such requisition is made by the Contractor/Employer(s), the Contractor/Employer(s) shall be free to obtain workers from any source. A Contractor/Employer(s) who hires any personnel to perform covered work on the Project pursuant to this Section shall immediately provide the appropriate Union(s) with the name and address of such employee(s) and shall immediately refer such employee(s) to the appropriate Union(s) to satisfy the requirements of Article 12 of this Agreement.

ARTICLE 14

LOCAL WORKFORCE DEVELOPMENT

14.1 The parties agree to a goal that residents of the city of Alameda, and Alameda County ("Local Residents"), in order of priority as here listed, will perform up to twenty-five

percent (25%) percent of all hours worked on the Project, on a craft-by-craft basis, if such workers are available, capable and willing to work. Contractors will first be required to request residents from the City of Alameda, and if those are not available, will then request residents from Alameda County. If the Local Resident is also a high school graduate of a high school located in Alameda or has received a General Educational Development diploma ("GED") while living in Alameda, those hours will count double. In addition, the parties agree that participants in the Alameda Point Collaborative Program will be referred to the apprentice programs of the Union(s) and establish a goal that such participants will perform fifteen percent (15%) of all apprentice hours worked on the Project. All participants that will be referred to the contractors to meet this requirement will have gone through a pre-apprenticeship program that meets the Multi-Craft Core Curriculum as established by the National Building Trades, or other union pre-apprenticeship programs.

14.2 The Contractor/Employer(s) shall make good faith efforts to reach these goals working through the hiring hall procedures of the applicable Schedule A Agreement and, when applicable, utilize their "rehire" and "name call" rights to employ such Local Residents. The Union(s) shall utilize their utmost efforts to recruit sufficient numbers of apprentice and journeymen craftspersons who are Local Residents to fulfill the requirements of the Contractor/Employer(s). The parties to this Agreement support the development and placement of increased numbers of skilled construction workers from Local Residents to meet the needs of the Project and the requirements of the industry generally.

14.3 To evaluate the performance of the Contractor/Employer(s) and Union(s) in achieving the employment of Local Residents goal on this Project, the Contractor/Employer(s) shall submit copies of their monthly certified payroll reporting forms to the Coordinator. The Contractor shall also submit a monthly report tabulating the ratio of Local Residents to total employees for each craft Union to the Coordinator. The performance of the Contractor/Employer(s) and Union(s) will be reviewed at the periodic Joint Administrative Committee meetings called for in Section 20 of this Agreement.

ARTICLE 15

NON-DISCRIMINATION

15.1 The Contractor/Employer(s) and Union(s) agree to comply with all anti-discrimination provisions of federal, state and local law, to protect employees and applicants for employment on the Project.

ARTICLE 16

APPRENTICES

16.1 Recognizing the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry, the Contractor/Employer(s) will employ apprentices in the respective Union(s) to perform such work as is within their capabilities and which is customarily performed by the Union(s) in which they are indentured. The apprentice ratios will be in compliance with the applicable provisions of the California Labor Code and Prevailing Wage Rate Determinations.

16.2 The parties only recognize the State-approved Apprenticeship training programs administered by Joint Labor/Management Apprenticeship Training Committees for the purposes of meeting the goals of this Article 16.

ARTICLE 17

WAGE SCALES AND FRINGE BENEFITS

17.1 All Contractor/Employer(s) agree to pay contributions to the established vacation, pension and other form of deferred compensation plan, apprenticeship, health benefit funds, and all other contributions established by the applicable MLA for each hour worked on the Project in the amounts designated in the MLAs of the appropriate Union(s) that are recognized by a prevailing wage determination and paid in accordance with the MLA. The Contractor/Employer(s) shall not be required to pay contributions to any other trust funds or other contributions that are not contained in the published prevailing wage determination to satisfy their obligation under this Article, except that those Contractor/Employer(s) who are signatory to the MLAs with the respective trades shall continue to pay all trust fund or other contributions as outlined in such MLAs.

17.2 By signing this Agreement, the Contractors/Employers adopt and agree to be bound by the written terms of the legally established Trust Agreements, as described in Section 17.1, which may from time to time be amended, specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractors/Employers authorize the parties to such local trust agreements to appoint trustees and successor trustees to administer the Trust Funds and hereby ratify and accept the trustees so appointed as if made by the Contractors/Employers. The Contractors/Employers agree to execute a separate Subscription Agreement(s) for Trust Funds when such Trust Fund(s) requires such document(s).

17.3 Wages, Hours, Terms and Conditions of Employment: The wages, hours and other terms and conditions of employment on the Project shall be governed by the MLAs of the respective Union(s), copies of which shall be made available to the City upon request, to the extent such MLA is not inconsistent with this Agreement.

17.4 Holidays: Holidays shall be established as set forth in the applicable MLA.

ARTICLE 18

HEALTH AND SAFETY

18.1 The employees covered by the terms of this Agreement shall at all times, while in the employ of the Contractor/Employer(s), be bound by the reasonable safety rules and regulations as established by the City and Contractor/Employer(s) and in accordance with OSHA/Cal-OSHA. These rules and regulations will be published and posted at conspicuous places throughout the Project.

18.2 In accordance with the requirements of OSHA/Cal-OSHA, it shall be the exclusive responsibility of each Contractor/Employer(s) on the Project to assure safe working conditions for its employees and compliance by them with any safety rules contained herein or established by the Contractor/Employer(s).

18.3 A convenient supply of cold and potable drinking water shall be provided by the Contractor/Employer(s).

18.4 The Contractor/Employer(s) and Union(s) agree that the work site shall be a drug free workplace. Parties agree to recognize and use the Substance Abuse Prevention Program contained in each applicable Union(s)' MLA.

ARTICLE 19

HELMETS TO HARDHATS

19.1 The parties recognize a desire to facilitate the entry into the Building and Construction Trade Union(s) of veterans who are interested in careers in the building and construction industry. The parties agree to utilize the services of the Center for Military Recruitment, Assessment and Veteran's Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

19.2 The Union(s) and Contractor/Employer(s) agree to coordinate with the Center to assist in the creation and maintenance an integrated database of Veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Union(s) will give credit to such Veterans for bona fide, provable past experience.

19.3 To evaluate the performance of the Contractor/Employer(s) and Union(s) in achieving the employment of veterans on this Project, the Contractor/Employer(s) shall submit to the Coordinator information regarding veterans it has employed on a Project. The Contractor/Employer(s) shall submit a monthly report tabulating the number of veterans employed to the Coordinator. The performance of the Contractor/Employer(s) and Union(s) will be reviewed at the periodic Joint Administrative Committee meetings called for in Section 20 of this Agreement.

ARTICLE 20

JOINT ADMINISTRATIVE COMMITTEE

20.1 The Council and the City to this Agreement shall establish a six (6) person Joint Administrative Committee. This Committee shall be comprised of three (3) representatives selected by the City and three (3) representatives selected by the Council. The City and the Council shall designate alternates who shall serve in the absence of designated representatives for any purpose contemplated by this Agreement. The Joint Administrative Committee shall meet as required to review the implementation of the Agreement, the progress of the Projects and the employment of Local Residents and veterans on Projects covered by this Agreement.

20.2 The Joint Administrative Committee shall appoint a Joint Administrative Subcommittee consisting of one City representative and one Union(s) representative for the purpose of convening to confer in an attempt to resolve a grievance that has been filed consistent with Article 11. Any question regarding the meaning, interpretation, or application of the provisions of this Agreement shall be referred directly to the Joint Administrative Subcommittee for resolution. The Joint Administrative Subcommittee shall meet as required to resolve grievances by majority vote with such resolutions to be final and binding on all signatories of the Agreement. A failure of any party or parties to attend said hearing shall not delay the hearing of evidence or issuance of an award by the Joint Administrative Subcommittee, if such award is made by a majority vote, and the hearing shall proceed ex parte. If the subcommittee is unable to resolve the grievance, the grievance may be referred in accordance with Step 3 of Article 11.

ARTICLE 21

MISCELLANEOUS PROVISIONS

21.1 Counterparts. This Agreement may be executed in counterparts, such that original signatures may appear on separate pages, and when bound together all necessary signatures shall constitute an original. Faxed or e-mailed pdf signature pages transmitted separately to other parties to this Agreement shall be deemed equivalent to original signatures.

21.2 Warranty of Authority. Each of the persons signing this Agreement represents and warrants that such person has been duly authorized to sign this Agreement on behalf of the party indicated, and each of the parties by signing this Agreement warrants and represents that such party is legally authorized and entitled to enter into this Agreement.

ARTICLE 22

GENERAL SAVINGS CLAUSE

22.1 It is not the intention of either the City, Contractor/Employer(s) or the Union(s) parties to violate any laws governing the subject matter of this Agreement. If any Article or provision of this Agreement shall be declared invalid, inoperative, or unenforceable by any competent authority of the executive, legislative, judicial or administrative branch of the federal, state or local government, the parties shall suspend the operation of each such Article or provision during the period of invalidity. Such suspension shall not affect the operation of any other provision covered in this Agreement to which the law or regulation is not applicable. Further, the Contractor/Employer(s) and Union(s) agree that if and when any or all provisions of this Agreement are finally held or determined to be illegal or void by a Court of competent jurisdiction, the City and the Council will promptly enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the requirements of an applicable law and the intent of the parties hereto.

ARTICLE 23

DURATION OF AGREEMENT

23.1 This Agreement shall become effective on the day the city of Alameda ratifies this Agreement and shall continue in full force and effect for a period of three (3) years, at which time this Agreement will be reviewed and considered for extension or renewal with modifications if appropriate. Individual projects within the scope of this Agreement may be completed in phases and this Agreement shall be applied to such individual projects until Completion of such phase. After the expiration of this Agreement, the provisions of the Agreement shall continue to apply to those Projects subject to this Agreement until construction is completed. The parties may mutually agree in writing to amend, extend or terminate this Agreement at any time.

[THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

ADDENDUM "A"

PROJECT STABILIZATION AGREEMENT FOR THE CITY OF ALAMEDA

AGREEMENT TO BE BOUND

The undersigned party confirms that it agrees and assents to comply with and to be bound by the City of Alameda Project Stabilization Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms.

By executing this Agreement To Be Bound, the undersigned party subscribes to, adopts and agrees to be bound by the written terms of the legally established trust agreements, as set forth in section 17, specifying the detailed basis upon which contributions are to be made into, and benefits made out of, such Trust Fund(s) and ratifies and accepts the trustees appointed by the parties to such Trust Fund(s) and agrees to execute a separate Subscription Agreement(s) for Trust Funds when such Trust Fund(s) require(s) such document(s).

Such assent and obligation to comply with and to be bound by this Agreement shall extend to all work covered by said Agreement undertaken by the undersigned party. The undersigned party shall require all of its subcontractors, of whatever tier, to become similarly bound for all their work within the scope of this Agreement by signing an identical Agreement To Be Bound.

This letter shall constitute a subscription agreement, to the extent of the terms of the letter.

Dated: _____ Project: _____

_____ _____

Signature of Authorized Officer | Authorized Officer & Title

_____ _____

Name of Contractor/Employer(s) | Contractor/Employer(s) Address

_____ _____

CSLB # | Area Code Phone

_____ _____

E-mail and/or Fax | Motor Carrier (CA) Permit Number

_____

DIR Prevailing Wage Registration #

EXHIBIT A
MASTER LABOR AGREEMENTS OF SIGNATORY AFFILIATED LOCAL UNIONS:

SIGNATURES

City of Alameda

Jill Keimach, City Manager

Approved as to Form:
Janet Kern, City Attorney

Building and Construction Trades Council
Of Alameda County, AFL-CIO

Andreas Cluver, Secretary-Treasurer

SIGNATORY UNION(S)

Asbestos Workers, Local 16 By:

Boilermakers, Local 549 By:

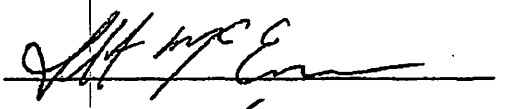
Bricklayers & Allied Craftsmen, Local 3 By:

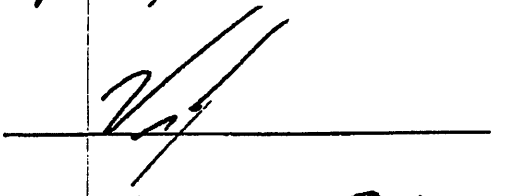
Cement Masons, Local 300 By:

Electrical Workers, Local 595 By:

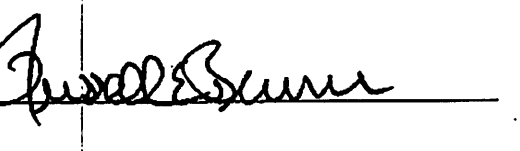
Elevator Constructors, Local 8 By:

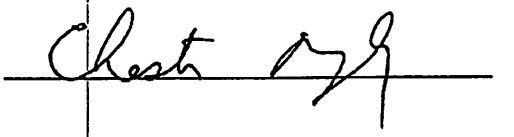
Laborers, Local 886 By:

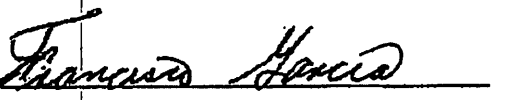
Iron Workers, Local 378 By: 

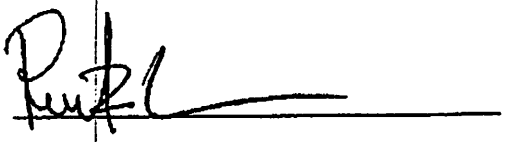
Laborers, Local 67 By: 

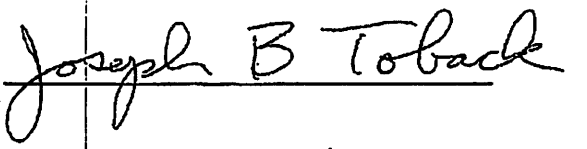
Laborers, Local 304 By: 

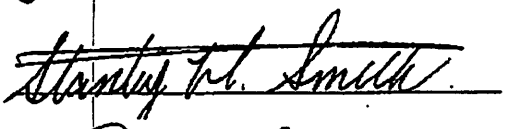
Operating Engineers, Local 3 By: 

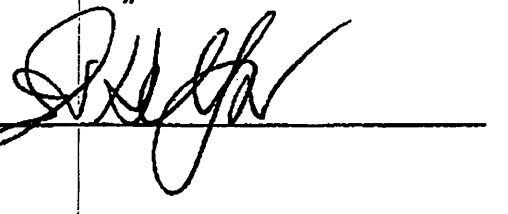
Plasterers, Local 66 By: 

Roofers, Local 81 By: 

Sheet Metal Workers, Local 104 By: 

Sign Display, Local 510 By: 

Sprinkler Fitters, Local 483 By: 

Teamsters, Local 853 By: 

United Association of Journeymen and Apprentices Fitting Industry, Underground Utility & Landscape, Local 355

By: _____

United Association of Steamfitters, Pipefitters, Plumbers, & Gas Fitters, Local 342

By: _____

Northern California Carpenters Regional Council (on behalf of Carpenters, Local 713, Carpenters, Local 2236, Lathers, Local 68L, Millwrights, Local 102, Pile Drivers, Local 34)

By: _____

District Council No. 16 Northern California International Union of Painters & Allied Trades (on behalf of Auto & Marine Painters, Local 1176, Carpet & Linoleum Layers, Local 12, Glaziers, Architectural Metal & Glassworkers, Local 169, Painters & Tapers, Local 3)

By: _____

District Council of Iron Workers of the State of California & Vicinity Trades

By: _____

ATTACHMENT "A"

TRENCH EXCAVATION AND CONSTRUCTION STANDARDS

SECTION CS-2.

TRENCH EXCAVATION CONSTRUCTION STANDARDS

CS-2-01. GENERAL: Trench excavation shall conform with the City Standard Specifications. In general a trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation. Additionally, for the purpose of the City Standard Specifications, a trench shall include excavation for appurtenant structures including but not limited to, manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits. The Contractor's attention is directed to the rules, orders, and regulations of the California Division of Occupational Safety and Health (CAL/OSHA) for a more specific definition.

A. The requirements specified in this section of the City Standard Specifications apply to all trench excavations. Nothing in these City Standard Specifications shall relieve the Contractor from conforming to the requirements of CAL/OSHA. If there is a conflict between the two aforementioned standards, the more stringent requirement shall apply.

B. Trench excavation shall include the removal of all water and materials of any nature which interfere with the construction work.

D. The method for installation of pipe or conduit (open trench, tunnel, or bore and jack) shall be shown on the Project Plans.

E. Open trenching shall be prohibited on paved streets for a period of not less than five (5) years from the date the asphalt concrete pavement was placed or one (1) year from the date any slurry seal was placed unless the Contractor receives written approval from the Director of Public Works.

F. Where pipe is to be installed in new embankment, the embankment shall be first constructed to the following dimensions and compacted prior to any excavation for placement of pipe:

1. a height of 12 inches above the top of pipe.

2. a width of not less than 5 times the diameter of the pipe on each side of the pipe, after which the trench shall be excavated.

G. Excavated material from trenches located within paved areas shall be immediately loaded into trucks and hauled off and disposed of outside the public right of way. No excavated material shall be placed or stored within the public right of way unless otherwise allowed by the Director of Public Works.

CS-2-02. EXISTING UNDERGROUND UTILITIES:

A. The Contractor shall contact Underground Services Alert (U.S.A.), at least 48 hours in advance of any excavation.

1. The Contractor shall not commence excavation in a location prior to U.S.A. members marking the location of their utilities or indicating that none exist within the excavation limits outlined by the Contractor.

2. The Contractor shall notify the Inspector of any conflict discovered as a result of the USA marking prior to commencing excavation at that location.

B. It is the Contractor's responsibility to verify the location and elevation of all existing utilities within the limits of excavation.

C. All existing pipes within the trench zone and any other facilities adjacent to the trench shall be carefully supported and protected from damage as a result of the Contractor's operations.

CS-2-03. EXCAVATION METHOD: Methods used in excavation shall be such as not to cause damage to surrounding property or to unnecessarily damage pavement. Street pads for backhoe outriggers and other equipment shall be utilized to prevent unnecessary damage.

CS-2-04. MINIMUM AND MAXIMUM TRENCH WIDTH: All trench widths shall be in compliance with the Standard Drawings. In the event that unsuitable materials or unstable trench walls are encountered, the trench width shall be modified in accordance with the applicable ASTM standard.

A. The pipe or conduit shall be positioned in the center of the trench.

B. The trench width for utility company owned facilities shall conform to the utility company standards.

C. The minimum trench width for City owned facilities shall conform to the requirements of Table CS-2-1, with the exception of Rock Wheel trench excavation specified elsewhere in the City Standard Specifications:

Table CS-2-1

Pipe Material	*Pipe Size (nominal diameter)*	*Minimum Trench Width*
All Pipes	6-Inches and less	O.D.[a] + 12-inches
Ductile Iron Pipe	Greater than 6-inches	O.D + 24-inches
Polyvinyl Chloride and High Density Polyethylene Pipes[b]	Greater than 6-inches	O.D. + 16 inches [c]
Cast-in-Place Concrete Pipe	Greater than 36-inches	O.D.
Reinforced Concrete and Vitrified Clay Pipes	Greater than 6-inches	O.D. + 16-inches

a. -O.D. – Outside Diameter

b. -High Density Polyethylene Pipe shall be used only when approved.

c. -Where trench walls can not sustain a vertical cut, trench width shall be three times O.D.

D. If the maximum trench width specified on the Project Plans is exceeded, the Contractor shall be required to provide a higher strength bedding class or a higher strength pipe as approved by the Director of Public Works.

E. The minimum trench width for installation of water service, street light, or traffic signal conduit of two inches in diameter or less, shall be in accordance with the manufacturer's recommendation for the conduit.

F. Rock Wheel trench excavation for trench depths up to twenty-four (24) inches for street light, traffic signal, or utility company conduit installations shall only be permitted when approved by the Director of Public Works. Where allowed, rock wheel excavation shall be performed in accordance with Section 86 of the Caltrans Standard Specifications. The minimum trench width shall be two (2) inches wider than the conduit being placed in the trench. The maximum rock wheel trench width shall be six (6) inches.

CS-2-05. SHORING, SHEETING, AND BRACING: The Contractor shall furnish and install sufficient shoring, sheeting, and bracing to insure the safety of workmen and the public, protect the work, and protect existing facilities.

A. Shoring, sheeting, and bracing shall comply with the rules, orders and regulations of CAL/OSHA.

B. Each Contractor shall submit to the Inspector a copy of its current Annual Excavation Permit issued by CAL/OSHA along with the Contractor's own Trench Safety Plan prior to the start of construction.

C. The Contractor shall be required to provide drawings and/or calculations by a registered engineer to the Director of Public Works a minimum of five (5) working days prior to beginning excavation for specially designed bracing and shoring of an excavation where required by CAL/OSHA or the Contractor's Trench Safety Plan.

D. Failure to comply with any of the rules, orders or regulations mentioned herein shall be sufficient cause for the Inspector to immediately suspend the work. The Contractor shall be responsible for the adequacy of all shoring and bracing and compliance with the law. Failure of the Inspector to suspend the work or notify the Contractor of any inadequacy of shoring and bracing or noncompliance with the law shall not relieve the Contractor of this responsibility.

E. The Contractor shall furnish and maintain shoring, sheeting and bracing until after the pipeline has been installed and sufficiently backfilled and the Inspector has approved the placement of backfill. The Contractor shall provide adequate safety measures to allow for access by the Inspector or testing personnel to perform compaction testing and inspection of the lifts of backfill placed.

CS-2-06. CONTROL OF WATER: When either ground water or surface run-off is encountered, the Contractor shall furnish, install, maintain, and operate all necessary pumps, materials and equipment to keep excavation reasonably free from water until the laying and jointing of the pipe, pouring of concrete and placing of bedding material has been completed, inspected and approved, and all danger of flotation and other damage is removed. Water pumped from the trench excavation shall be disposed of in a manner subject to the approval of the Director of Public Works.

CS-2-07. FOUNDATION:

A. All loose material shall be removed from the new trench bottom before placing the bedding material.

B. Special Foundation Treatment:

1. Whenever the bottom of the trench is soft or rocky, or, otherwise unsuitable as a foundation for the pipe in the opinion of the Director of the Public Works, the unsuitable material shall be removed as directed by the Director of Public Works to provide a stable and satisfactory foundation.

CS-2-08. MAXIMUM LENGTH OF OPEN TRENCH:

A. The maximum length of open trench where prefabricated pipe is to be laid shall be the distance necessary to accommodate that amount of pipe which can be installed and backfilled in that same day, but in no case shall exceed 400 feet except as allowed for with storm drain installation under Section CS-10B, CAST-IN-PLACE CONCRETE PIPE (CIPCP) of the Construction Standards.

B. At the end of each working day, there shall be no open trench in paved or improved areas unless it is plated in accordance with these City Standard Specifications. Improved areas are defined as any areas within 300' of any existing housing or commercial structure or paved area whether paved with asphalt concrete or Portland cement concrete.

The maximum length of trench in unimproved areas that may be left open for CIPCP is defined in Section CS-10B. A maximum of 300 feet of trench may be left open in unimproved areas if barricaded for all other piping material installations.

CS-2-09. TRENCH PLATES: Trench plates shall be used for temporary cover of trenches and other excavations.

A. When the backfilling of trenches and excavations can not be completed in the same day within a paved street section or within the concrete curb and gutter and sidewalk area, trench plates shall be required and the following conditions shall apply:

1. The plates shall be of steel construction capable of supporting H20 loading
2. The plates shall have a skid resistant surface.
3. The plates must extend beyond the edge of the trench wall to adequately support the traffic loads on it. In no case shall the plates extend less than twelve (12) inches beyond the trench wall.
4. Each plate must be fully supported around the perimeter to prevent wobbling or rocking.
5. The plates shall be secured to prevent any movement.
6. Trenches and excavations shall be adequately shored and braced to withstand highway traffic loads.
7. Temporary paving or cold-mix asphalt concrete (cutback) shall be placed and continuously maintained around all outside edges of the trench plates until removal of the plates.

ATTACHMENT "B"

GEOTECHNICAL EVALUATIONS

MILLER PACIFIC ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
CITY OF ALAMEDA
CYCLIC 16 SEWER REHABILITATION PROJECT
ALAMEDA, CALIFORNIA

May 1, 2019

Job No. 949.122

Prepared For:
Mr. David Stier
Nute Engineering
907 Mission Avenue
San Rafael, California 94901

CERTIFICATION

This document is an instrument of service, prepared by or under the direction of the undersigned professionals, in accordance with the current ordinary standard of care. The service specifically excludes the investigation of polychlorinated byphenols, radon, asbestos or any other hazardous materials. The document is for the sole use of the client and consultants on this project. No other use is authorized. If the project changes, or more than two years have passed since issuance of this report, the findings and recommendations must be updated.

MILLER PACIFIC ENGINEERING GROUP
(a California corporation)

REVIEWED BY





Rusty Arend
Geotechnical Engineer No. 3031
(Expires 6/30/19)

Scott Stephens
Geotechnical Engineer No. 2398
(Expires 6/30/19)

504 Redwood Blvd., Suite 220 ■ Novato, California 94947 ■ T (415) 382-3444 F (415) 382-3450

MILLER PACIFIC
ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
CITY OF ALAMEDA
CYCLIC 16 SEWER REHABILITATION PROJECT
ALAMEDA, CALIFORNIA

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 PROJECT DESCRIPTION 1
3.0 SITE CONDITIONS 3
3.1 Regional Geology 3
3.2 Seismicity 4
3.3 Surface Conditions 4
3.4 Field Exploration and Laboratory Testing 5
3.5 Previous Geotechnical Investigations 5
3.6 Subsurface Conditions 6
4.0 GEOLOGIC HAZARDS 7
4.1 Seismic Shaking 7
4.2 Liquefaction and Related Effects 8
4.3 Seismically-Induced Settlement 8
4.4 Corrosion Potential 8
5.0 CONCLUSIONS AND RECOMMENDATIONS 9
5.1 Seismic Design 9
5.2 Earthwork 9
5.2.1 Excavations 10
5.2.2 Trench Bottom Stabilization 10
5.2.3 Fill Materials 10
5.2.4 Fill Placement and Compaction 10
5.3 Temporary Support of Excavations 11
5.4 Temporary Dewatering 11
5.5 New Pavements 11
5.6 Trenchless Construction 12
6.0 SUPPLEMENTAL GEOTECHNICAL SERVICES 13
7.0 LIST OF REFERENCES 14

FIGURE 1: SITE LOCATION MAP
FIGURE 2: SITE PLANS FOR VARIOUS SITES
FIGURE 3: REGIONAL GEOLOGIC MAP
FIGURE 4: ACTIVE FAULT MAP
FIGURE 5: LIQUEFACTION SUSCEPTIBILITY MAP
FIGURE 6: TUNNELMAN'S GROUND CLASSIFICATION FOR SOILS

TABLE 1: EXISTING PAVEMENT SECTIONS
TABLE 2: 2016 CALIFORNIA BUILDING CODE SEISMIC DESIGN CRITERIA
TABLE 3: SHORING DESIGN CRITERIA
TABLE 4: PRELIMINARY ASPHALT-CONCRETE PAVEMENT SECTIONS

APPENDIX A: SUBSURFACE EXPLORATION AND LABORATORY TESTING
APPENDIX B: SUBSURFACE DATA FROM PREVIOUS INVESTIGATIONS

MILLER PACIFIC ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
CITY OF ALAMEDA
CYCLIC 16 SEWER REHABILITATION PROJECT
ALAMEDA, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our Geotechnical Investigation for the City of Alameda's Cyclic 16 Sewer Rehabilitation Project in Alameda, California. The project involves rehabilitation of multiple sewer mains, manholes, and lower sewer laterals on various streets and easements throughout the City, as shown on the Site Location Map, Figure 1.

Our work was performed in accordance with our Agreement for Professional Services authorized October 17, 2018. The purpose of our Geotechnical Investigation was to explore subsurface conditions and to develop geotechnical criteria for design and construction of the project. The scope of our services includes:

- Exploration of subsurface conditions with 18 test borings located within the general vicinity of the planned sewer alignment.
- Laboratory testing to estimate pertinent engineering properties of the soils encountered during our exploration.
- General evaluation and discussion of relevant geologic hazards including seismic shaking, liquefaction, and other hazards.
- Preparing geotechnical recommendations and design criteria related to temporary support of excavations, temporary dewatering, earthwork, trench backfill, new pavement sections, seismic design, and other geotechnical-related items.
- Preparation of this report which summarizes our subsurface exploration and laboratory testing programs, evaluation of relevant geologic hazards, and geotechnical recommendations and design criteria.

This report completes our Phase 1 services for the project. Subsequent phases of work should include supplemental consultation, geotechnical plan review and observation and testing of geotechnical-related work items during construction

2.0 PROJECT DESCRIPTION

The project includes rehabilitation of approximately 2.8 miles of sanitary sewer main, associated manholes, and sewer laterals on various streets and easements throughout the City. A summary of the site locations is presented on Figure 1 whereas preliminary Site Plans for each location are presented on Figures 2-1 to 2-11. Descriptions of the planned improvements at each site are summarized below.

Site 1. *Lincoln Avenue between Webster Street and Constitution Way*

Replacement of approximately 650 feet of six-inch-pipe sewer with invert depths ranging from about five to six feet below ground surface.

Site 2. *Lincoln Avenue between Constitution Way and St. Charles Street*

Replacement of approximately 2,000 feet of six-inch-diameter sewer pipeline with inverts ranging from about five to ten feet below ground surface.

Site 2A. *Lincoln Avenue between Constitution Way and 9th Street*

Replacement of approximately 300 feet of six-inch-pipe with inverts ranging from about five to ten feet below ground surface.

Site 2B. *9th Street between Pacific Avenue and Buena Vista Avenue*

Replacement of approximately 350 feet of six-inch-diameter sewer pipeline with invert depths ranging from about six to eight feet below ground surface.

Site 3. *Bay Street between Eagle Avenue and Pacific Avenue*

Replacement of approximately 1,000 feet of eight-inch-diameter pipe with invert depths ranging from about six to eight feet below ground surface. A portion of the replacement will occur within an apparent easement on the west side of Bay Street.

Site 4. *Santa Clara Avenue between Benton Street and Morton Street*

Replacement of approximately 300 feet of six-inch-diameter pipe with invert depths ranging from about eight to ten feet below ground surface.

Site 5. *Santa Clara Avenue between Paru Street and Lafayette Street*

Replacement of approximately 1,700 feet of six-inch pipe with inverts ranging from about eight to ten feet below ground surface.

Site 6. *Lafayette Street between Clinton Avenue and Alameda Avenue*

Replacement of approximately 1,500 feet of six-inch-diameter sewer pipeline with depths ranging from about three to five feet below ground surface.

Site 7. *San Antonio Avenue between Chestnut Street and Morton Street*

Replacement of approximately 2,600 feet of six-inch pipe with depths ranging from about five to ten feet below ground surface.

Site 8. *San Antonio Avenue between 9th Street and St. Charles Street*

Replacement of approximately 1,600 feet of six-inch-diameter sewer pipeline with invert depths ranging from about six to ten feet below ground surface.

Site 9. Centennial Avenue

Replacement of approximately 450 feet of six-inch-diameter sewer with inverts ranging from about six to ten feet below ground surface.

Site 10. Easement near Alameda Dog Park

Replacement of approximately 1,100 feet of 15-inch-diameter pipeline with invert depths ranging from about 10 to 12 feet below ground surface.

Site 11. Sand Beach Place between Sand Beach Road and Harbor Light Road

Replacement of approximately 300 feet of eight-inch-diameter sewer with inverts ranging from about five to ten feet.

Site 12. Grand Street, North of Fort Mann Way

Replacement of approximately 350 feet of eight-inch-diameter pipe with invert depths ranging from about six to eight feet.

Site 13. Clement Avenue between Schiller Street and Lafayette Street

Replacement of approximately 300 feet of six-inch-diameter pipeline with invert depths ranging from about five to seven feet below ground surface.

Site 14. Marina Village Parkway between Webster Street and Mariner Square Drive

Replacement of approximately 400 feet of eight-inch-diameter pipeline with invert depths ranging from about five to seven feet below ground surface. This portion of the sewer replacement will likely be constructed by pipe bursting.

3.0 SITE CONDITIONS

3.1 Regional Geology

The site is located within the Coast Range Geomorphic Province of California. The regional bedrock geology consists of complexly folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock of the Franciscan Complex. Bedrock is characterized by a diverse assemblage of greenstone, sandstone, shale, chert, and melange, with lesser amounts of conglomerate, calc-silicate rock, schist and other metamorphic rocks.

The regional topography is characterized by northwest-southeast trending mountain ridges and intervening valleys that were formed by movement between the North American and the Pacific Plates. Continued deformation and erosion during the late Tertiary and Quaternary Age (the last several million years) formed the prominent coastal ridges and the inland depression that is now the San Francisco Bay. The more recent seismic activity within the Coast Range Geomorphic Province is concentrated along the San Andreas Fault zone, a complex group of generally north to northwest trending faults.

Regional geologic mapping (USGS, 2000) generally indicates Sites 1 through 9 and Site 13 are located toward the interior of Alameda Island are underlain by dune sands of Holocene and Pleistocene age. The dune sands are described as fine-grained, very well sorted, well-drained aeolian (wind) deposits. The mapping also indicates that Sites 10, 11, 12 and 14 are generally located toward the perimeter of the island and are underlain by artificial fill. A Regional Geologic Map and descriptions of the mapped geologic units are shown on Figure 3.

3.2 Seismicity

The project site is located within the seismically active San Francisco Bay Area and will therefore experience the effects of future earthquakes. Earthquakes are the product of the build-up and sudden release of strain along a "fault" or zone of weakness in the earth's crust. Stored energy may be released as soon as it is generated or it may be accumulated and stored for long periods of time. Individual releases may be so small that they are detected only by sensitive instruments, or they may be violent enough to cause destruction over vast areas.

Faults are seldom single cracks in the earth's crust but are typically comprised of localized shear zones which link together to form larger fault zones. Within the Bay Area, faults are concentrated along the San Andreas Fault zone. The movement between rock formations along either side of a fault may be horizontal, vertical, or a combination and is radiated outward in the form of energy waves. The amplitude and frequency of earthquake ground motions partially depends on the material through which it is moving. The earthquake force is transmitted through hard rock in short, rapid vibrations, while this energy becomes a long, high-amplitude motion when moving through soft ground materials, such as Bay Mud.

The California Geological Survey (previously known as the California Division of Mines and Geology), defines a "Holocene-active fault" as one that has had surface displacement within Holocene time (the last 11,700 years). CGS has mapped various faults in the region as part of their Fault Activity Map of California (CGS, 2010). Many of these faults are shown in relation to the project site on the attached Active Fault Map, Figure 4. The nearest known active faults to the site are the San Andreas and Hayward Faults which are located approximately 22.1 kilometers (13.7 miles) to the southwest and 5.7 kilometers (3.5 miles) to the northeast[1], respectively.

3.3 Surface Conditions

Within the project areas, surface conditions generally consist of asphalt-paved roadways with the exception of Site 10 which appears to be located within an easement near the east side of the Alameda Dog Park. The sites are located within relatively densely-populated urban areas with neighboring properties generally consisting of residential and/or commercial developments. The width of the roadways varies from a single lane in each direction (in residential areas) to as many as two lanes in each direction (along Lincoln Avenue, Santa Clara Avenue and Otis Drive). There are overhead power lines along the shoulder of most streets and numerous underground utilities exist and are often located within several feet of the proposed alignments. Surface conditions for specific sites are shown in the respective Site Plan included under Figures 2-1 to 2-11.

[1] Distances to faults estimated using Caltrans ARS Online (v2.3.09), accessed April 29, 2019.

3.4 Field Exploration and Laboratory Testing

We explored subsurface conditions near the proposed sewer alignments on January 9, 10 and 11, 2019 with 18 borings at the approximate locations shown on Figures 2-1 to 2-11. The borings were excavated using truck-mounted drilling equipment to approximate depths ranging from 13.5 to 16.5 feet below ground surface. The borings were logged by our Field Geologist and samples were obtained for classification and laboratory testing. We prepared boring logs based on soil descriptions in the field, as well as visual examination and testing of the soil samples in our laboratory. The boring logs from our field exploration are presented in Appendix A.

Laboratory testing of soil samples from the exploratory borings included determination of moisture content, dry density, sieve analysis, and the amount of material passing a No. 200 sieve. The results of our laboratory tests are presented on the boring logs with the exception of the sieve analyses which are presented on Figures A-20 and A-21. Our laboratory testing program is discussed in greater detail in Appendix A.

3.5 Previous Geotechnical Investigations

Several subsurface explorations have been conducted by Miller Pacific and other Consultants as part of previous phases of the City's ongoing Cyclic Sewer Rehabilitation Project or other nearby projects. Prior to completing our subsurface exploration, we reviewed the following reports which were provided by the City or obtained from our files:

Langan Treadwell Rollo, *Geotechnical Investigation for Cyclic Sewer Replacement Project, Alameda, California,* dated June 16, 2015.

Miller Pacific Engineering Group, *Geotechnical Investigation, City of Alameda, Cyclic Sewer Rehabilitation Project, Alameda, California,* dated May 17, 2016.

Miller Pacific Engineering Group, *Geotechnical Investigation, City of Alameda, Cyclic 14 Sewer Rehabilitation Project, Alameda, California,* dated February 3, 2017.

Ninyo & Moore, *Geotechnical Evaluation, Cyclic Sewer Replacement, Phase 8, Buena Vista Avenue, Pacific Avenue, and Lincoln Avenue, Alameda, California*, dated July 9, 2010.

Treadwell & Rollo, *Geotechnical Evaluation, Mariner Square Loop Improvements, Alameda Landing, Alameda, California,* dated July 5, 2012.

URS, *City of Alameda Cyclic Sewer Replacement, Phase 9, Lincoln, Central, and Encinal Avenues and Elm Street,* dated June 1, 2011.

URS, *City of Alameda Cyclic Sewer Replacement, Phase 11, Otis Drive, Pacific Avenue, Harbor Bay Parkway, Lincoln avenue, Hawthorne Street, St. Charles Street, bay Street, Sherman Street, Paru Street,* dated October 10, 2013.

The approximate locations of the nearby borings and cone penetration tests (CPTs) from these previous investigations are shown on the Site Plans, Figures 2-1 to 2-11. The CPT, boring logs, and laboratory testing from the previous investigations are included under Appendix B.

3.6 Subsurface Conditions

Based on our field exploration, subsurface conditions are generally consistent with previous investigations and regional geologic mapping and consist of predominantly noncohesive, sandy soils to the depths explored. The sandy soils are generally loose to very dense and are classified under the Unified Soil Classification System as silty and clayey sand (SM and SC), poorly graded sand, poorly graded sand with silt and poorly graded sand with clay (SP, SP-SM and SP-SC). Boring 16 is located along the northern margins of Alameda Island and encountered about five feet of medium dense sandy fill over Bay Mud. The Bay Mud generally consists of very soft silty clay of high plasticity (USCS Classification of CH).

Although some of the soils encountered in our borings appear to be fill, it is difficult to definitively distinguish between the fill and dune sand as the materials are very similar in composition. While the fill encountered in our borings consists of predominantly sand, the fill may vary over short distances and may contain variable soil types, cobbles, boulders, wood, organic material, and other debris which could not be retrieved within the samples or detected by the relatively small diameter borings.

Pavements were encountered at all of the borings in our field investigation and generally consist of asphalt over aggregate base. The thicknesses of the asphalt and aggregate base sections at each boring location are summarized below in Table 1. We note that concrete pavement was encountered at Boring 1 which was completed at Site 1 along Lincoln Avenue. Concrete pavements were also observed at several locations in previous investigations and may be encountered during construction of the new sewer lines.

Table 1 – Existing Pavement Sections

Boring Location	Asphalt Pavement Thickness (inches)	Aggregate Base Thickness (inches)	Boring Location	Asphalt Pavement Thickness (inches)	Aggregate Base Thickness (inches)
B-1	4.0	10.0(1)	B-10	2.5	4.0
B-2	4.0	6.0	B-11	4.0	14.0
B-3	3.5	6.0	B-12	2.5	4.5
B-4	4.0	5.0	B-13	8.0	10.0
B-5	8.0	4.0	B-14	4.0	5.0
B-6	8.0	10.0	B-15	4.0	4.0
B-7	6.0	2.0	B-16	6.0	16.0
B-8	3.0	4.0	B-17	5.0	8.0
B-9	2.0	6.0	B-18	4.0	4.0

(1) Two inches of concrete was encountered beneath the aggregate base at Boring 1

With the exception of Borings 5, 11, 12 and 13, groundwater was encountered at the boring locations at depths ranging from about 4 to 14.5 feet below ground surface. Because the borings were not left open for an extended period of time, a stabilized depth to groundwater may not have been observed. Groundwater elevations fluctuate seasonally and with changes in tidal elevations and higher groundwater levels may be present during periods of intense rainfall and/or high tide.

4.0 GEOLOGIC HAZARDS

This section summarizes our review of commonly considered geologic hazards and discusses their potential impacts on the planned improvements. The primary geologic hazards which could affect the proposed development include strong seismic ground shaking, liquefaction, and potentially corrosive soil and groundwater conditions. Other geologic hazards are judged less than significant with regard to the proposed project. Each significant geologic hazard considered is discussed in further detail in the following paragraph

4.1 Seismic Shaking

The project site will likely experience seismic ground shaking similar to other areas in the seismically active Bay Area. The intensity of ground shaking will depend on the characteristics of the causative fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions.

While a detailed seismic hazard analysis is beyond the scope of our work for this project, it should be noted that the potential for strong seismic shaking at the project site is high. Due to their proximity and historic rates of activity, the San Andreas and Hayward Faults present the highest potential for severe ground shaking. The significant adverse impact associated with strong

seismic shaking is potential damage to the pipelines and related improvements. Measures to mitigate the effects of ground shaking should, as a minimum, include using flexible connections and designing any new structures to resist seismic loads as discussed in Section 5.1.

4.2 Liquefaction and Related Effects

Liquefaction refers to the sudden, temporary loss of soil strength during strong ground shaking. This phenomenon can occur in saturated, loose, granular deposits subjected to seismic shaking. Recent advances in liquefaction studies indicate that liquefaction can occur in granular materials with relatively high fines content provided the fines exhibit a plasticity index less than 7. Liquefaction can result in flow failure, lateral spreading, ground movement, settlement, and other related effects. Buried pipelines and manholes embedded within liquefied soils may also experience uplift due to buoyancy.

As shown on Figure 5, regional liquefaction hazard maps indicate the site is mapped within a zone of moderate to very high susceptibility to liquefaction (Association of Bay Area Governments, 2019). The results of our subsurface exploration indicate many of the sites are underlain by loose to medium dense sands which may be susceptible to loss of soil strength during a seismic event. While a quantitative analysis of liquefaction susceptibility is beyond the scope of work for this project, the potential for liquefaction to occur is generally moderate to very high depending upon location. Therefore, the improvements should de designed to account for potential movements resulting from liquefaction and related effects. Minimum mitigation measures should include the use of flexible connections and designing buried structures to account for uplift and buoyancy effects associated with liquefaction. Flexible pipes (e.g. PVC or HDPE) should be considered as they generally perform better in areas where ground movements are expected.

4.3 Seismically-Induced Settlement

Seismic ground shaking can induce settlement of unsaturated, loose, granular soils. Settlement occurs as the loose soil particles rearrange into a denser configuration when subjected to seismic ground shaking. Varying degrees of settlement can occur throughout a deposit, resulting in differential settlement of structures founded on or within such deposits. Loose granular soils located above the groundwater table were encountered at several boring locations. Therefore, the design of the new improvements should account for potential movements and settlement resulting from seismically-induced settlement.

4.4 Corrosion Potential

Corrosive soil and groundwater can damage buried metallic structures, cause concrete spalling, and deteriorate rebar reinforcement. While corrosion testing was not included as part of our scope of work, such testing was performed as part of previous investigations (Langan Treadwell Rollo, 2015) and the test results are included under Appendix B. The new improvements should be designed to account for potential corrosion. Minimum mitigation measures should include designing concrete structures in accordance with applicable durability requirements outlined in ACI 318. Metallic components should incorporate protective coatings or other measures aimed at improving corrosion resistance.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface exploration, we judge that construction of the proposed improvements is feasible from a geotechnical standpoint. Primary geotechnical considerations for the project include providing appropriate temporary support for excavations which will encounter predominantly loose to dense sands and shallow groundwater, providing appropriate groundwater control measures in areas where excavations extend below the water table, appropriate seismic and structural design for any new structures, and providing for proper bedding and trench backfill. Additional discussion and recommendations addressing these and other considerations are presented in the following sections.

5.1 Seismic Design

Minimum mitigation of ground shaking includes seismic design of new structures in conformance with the provisions of the most recent edition (2016) of the California Building Code. The magnitude and character of these ground motions will depend on the particular earthquake and the site response characteristics. Based on the interpreted subsurface conditions and close proximity of the San Andreas and Hayward Faults, we recommend the CBC coefficients and site values shown in Table 2 be used to calculate the design base shear of new improvements as applicable.

Table 2 – 2016 California Building Code Seismic Design Criteria

Parameter	Design Value
Site Class	F
"Representative" Site Latitude	37.7732°N
"Representative" Site Longitude	-122.2669°W
Spectral Response (short), S_S	1.528 g
Spectral Response (1-sec), S_1	0.604 g
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Spectral Response (Short), S_{MS}	1.528 g
Spectral Response (1 sec), S_{M1}	0.906 g
Design Spectral Response (short), S_{DS}	1.019 g
Design Spectral Response (1 sec), S_{D1}	0.604 g
MCE_G PGA Adjusted, PGA_M	0.588 g

Reference: ATC Hazard by Location, accessed on April 29, 2019.

5.2 Earthwork

Earthwork is expected to consist of excavation and backfilling with excavations of up to about 12 feet anticipated for the new sewers. Earthwork should be performed in accordance with the recommendations and criteria outlined in the following sections.

5.2.1 Excavations

Excavations for the pipeline and related improvements will encounter predominantly loose to dense sandy soils and shallow groundwater. Soft Bay Mud will also likely be encountered in excavations at Site 12 along Grand Street and at Site 14 along Marina Village Parkway. In unsupported excavations, the sandy soils will be susceptible to flowing below groundwater and running to fast raveling above groundwater, while the soft Bay Mud will be susceptible to squeezing. Definitions of the various ground behaviors are presented in the Tunnelman's Ground Classification for Soils, Figure 6. The on-site soils are considered "Type C" soils in accordance with OSHA soil type designations. Temporary support for excavations should be installed prior to or immediately following excavation to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring and temporary support of excavations is discussed in further detail in Section 5.3.

5.2.2 Trench Bottom Stabilization

Based on planned pipeline invert depths, we anticipate the bottom of pipeline excavations will extend below the groundwater table in many locations. In areas where trench bottoms are soft, loose, or otherwise unstable, we recommend the trench bottoms be over-excavated a minimum of 12 inches below the planned pipe invert and backfilled with drain rock. The drain rock should be completely wrapped with a geotextile filter fabric consisting of Mirafi FW300 or an approved equivalent.

5.2.3 Fill Materials

Unless otherwise recommended by the City or the pipe manufacturer, pipe bedding and embedment materials should consist of well-graded sand with 90 to 100 percent of particles passing the No. 4 sieve and no more than five percent finer than the No. 200 sieve. Provide the minimum bedding thickness beneath the pipe in accordance with the manufacturer's recommendations (typically three to six inches).

Fill materials used for pipe backfill should consist of non-expansive and non-corrosive materials that are free of organic matter, have a Liquid Limit of less than 40 (ASTM D 4318), a Plasticity Index of less than 20 (ASTM D 4318), and have a minimum R-value of 20 (California Test 301). The fill material should contain no more than 50 percent of particles passing a No. 200 sieve and should have a maximum particle size of four inches. Some of the onsite fill soils may be suitable for re-use as trench backfill provided that it meets the requirements above.

5.2.4 Fill Placement and Compaction

Fill materials should be moisture conditioned to near the optimum moisture content prior to compaction. Properly moisture conditioned fill materials should subsequently be placed in loose, horizontal lifts of eight-inches-thick or less and uniformly compacted to at least 90 percent relative compaction. In pavement areas, the upper 12 inches of backfill should be compacted to at least 95 percent relative compaction. The maximum dry density and optimum moisture content of fill materials should be determined in accordance with ASTM D1557.

5.3 Temporary Support of Excavations

Temporary support of excavations will be required to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring types may include trench boxes or shields, driven sheet piles, vertical hydraulic shores, or other systems. While a variety of systems are available, shoring that applies positive pressure and immediate support to the side walls of the excavation will be more effective in controlling ground movements and reducing the risk of damage to nearby utilities and structures. For excavations that extend below the groundwater table, sheet piles may be used to reduce groundwater seepage thereby reducing the amount of dewatering, pumping, and groundwater disposal that would be required.

The selected support system should be designed to resist lateral pressures from earth and construction surcharge loads. Watertight shoring systems (e.g. interlocking sheet piles) which do not allow for drainage should also be designed to resist hydrostatic pressures. As a minimum, shoring systems should be designed based on the criteria provided in Table 3.

Table 3 – Shoring Design Criteria

Parameter	Design Value
Active Earth Pressure, Unrestrained[1]	45 pcf
Active Earth Pressure, Restrained[2]	35 x H psf
Lateral Passive Resistance[1]	250 pcf
Minimum Surcharge Pressure[3,4]	125 psf

(1) Equivalent fluid pressure.
(2) Rectangular distribution, H is wall height in feet
(3) Apply surcharge load to upper 5 feet of shoring.
(4) Surcharge load to be adjusted at the discretion of the Contractor's shoring designer.

5.4 Temporary Dewatering

Temporary dewatering will be required where excavations extend below the groundwater table. While various systems are available, dewatering would most likely consist of wells spaced as needed to keep the groundwater level below the excavation bottom. The selection, design, installation, monitoring, and removal of temporary dewatering should be the responsibility of the Contractor in accordance with their means and methods. The Contractor should be required to submit dewatering plans for review by the City prior to implementation. Considering the granular soils are relatively permeable, dewatering will likely generate a large volume of water and temporary dewatering and groundwater disposal can add significant costs to the project.

5.5 New Pavements

New pavements will be required for trenches that extend into traffic areas. We have provided preliminary pavement design in accordance with Caltrans procedures for flexible pavement (Caltrans, 2015). We assumed Traffic Index values ranging from four to seven depending on the expected traffic loads for a twenty-year design life. For our preliminary design, we assumed an R-value of 20 and 50 which are generally consistent with R-values for select fill and Class 2

aggregate subbase, respectively. During construction, we should test the backfill materials to confirm the R-value of the backfill material is consistent with our assumed values. The preliminary recommended pavement sections are presented in Table 4.

Table 4 – Preliminary Asphalt-Concrete Pavement Sections

Traffic Index[1]	Select Fill Backfill (R-Value = 20)		Class 2 Aggregate Subbase (R-Value = 50)	
	Asphalt Thickness (inches)	Class 2 Aggregate Base Thickness (inches)	Asphalt Thickness (inches)	Class 2 Aggregate Base Thickness (inches)
4	3.0	5.0	2.5	4.0
5	3.5	7.0	3.0	5.0
6	4.0	9.0	3.5	6.0
7	5.0	10.0	4.0	7.0

(1) Traffic Index to be determined by the project Civil Engineer

The Class 2 aggregate base should conform to the most recent version of Caltrans Standard Specifications and should be compacted to at least 95 percent relative compaction. Additionally, the aggregate base should be firm and unyielding under heavy, rubber-tired construction equipment. If heavier truck traffic or "superior" performance is desired, the thickness of the aggregate base and asphalt thickness may be increased.

5.6 Trenchless Construction

We understand pipe bursting may be used to install the new sewers in areas where easements cross through private property and/or beneath existing structures. Pipe bursting is a trenchless replacement method in which an existing pipe is broken, either by brittle fracture or by splitting, using an internal mechanically applied force applied by a bursting tool (IPBA, 2012). At the same time, a new pipe of the same or larger diameter is pulled in replacing the existing pipe. In general, the new pipe and bursting head are launched from the insertion pit and the cable or pulling rod is pulled from the receiving pit.

Pipe bursting should be performed by a Contractor experienced in projects with similar pipe materials, diameters, and bursting lengths. Survey reference points should be installed on nearby existing structures (e.g. pavements, utilities, foundations, etc.) to allow for monitoring of potential movement that may occur during pipe bursting. A preconstruction survey should be performed to serve as a baseline for comparison with the monitoring data collected during construction. Shoring for the insertion and launching pits should be designed in accordance with the recommendations outlined in Section 5.3.

6.0 SUPPLEMENTAL GEOTECHNICAL SERVICES

We must review the plans and specifications when they are nearing completion to confirm that the intent of our recommendations has been incorporated and to provide supplemental recommendations as needed. During construction, we must inspect geotechnical items relating to earthwork and new pavement construction. We should observe trench excavations, proper moisture conditioning of soils, fill placement and compaction, compaction of asphalt pavement, and other geotechnical-related work items.

7.0 LIST OF REFERENCES

American Society of Civil Engineers (ASCE) (2010), "Minimum Design Loads for Buildings and Other Structures" (2010 ASCE-7), Structural Engineering Institute of the American Society of Civil Engineers.

American Concrete Institute, "318-14: Building Code Requirements for Structural Concrete and Commentary".

American Society for Testing and Materials, (2009) "2009 Annual Book of ASTM Standards, Section 4, Construction, Volume 4.08, Soil and Rock; Dimension Stone; Geosynthetics," ASTM, Philadelphia.

California Building Code, 2013 Edition, California Building Standards Commission/International Conference of Building Officials, Whittier, California.

California Department of Transportation (Caltrans) (2015), 2015 Standard Specifications.

California Department of Transportation (Caltrans) (2015), Highway Design Manual

International Pipe Bursting Association, "Guideline for Pipe Bursting", dated January 12, 2012.

Langan Treadwell Rollo, Geotechnical Investigation for Cyclic Sewer Replacement Project, Alameda, California, dated June 16, 2015.

Miller Pacific Engineering Group, Geotechnical Investigation, Alameda Unified School District, Otis Elementary School Modular Classroom, 3010 Fillmore Street, Alameda, California, dated September 10, 2015.

Miller Pacific Engineering Group, Geotechnical Investigation, City of Alameda, Cyclic Sewer Rehabilitation Project, Alameda, California, dated May 17, 2016.

Ninyo & Moore, Geotechnical Evaluation, Central Avenue Improvements, Pacific Avenue to 3rd Street, Alameda, California, dated March 6, 2009.

Ninyo & Moore, Geotechnical Evaluation, Cyclic Sewer Replacement, Phase 8, Buena Vista Avenue, Pacific Avenue, and Lincoln Avenue, Alameda, California, dated July 9, 2010.

Nute Engineering, Preliminary Drawings for Cyclic 14 Sewer Rehabilitation Project, Job No. 8592, dated August 1, 2016.

Occupational Safety and Health Administration (OSHA)(2005), Title 29 Code of Federal Regulations, Part 1926 (www.OSHA.gov).

Treadwell & Rollo, Geotechnical Evaluation, Mariner Square Loop Improvements, Alameda Landing, Alameda, California, dated July 5, 2012.

United States Geological Survey, "Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California", R.W. Gramer, 2000.

URS, City of Alameda Cyclic Sewer Replacement, Phase 9, Lincoln, Central, and Encinal Avenues and Elm Street, dated June 1, 2011.

URS, City of Alameda Cyclic Sewer Replacement, Phase 11, Otis Drive, Pacific Avenue, Harbor Bay Parkway, Lincoln avenue, Hawthorne Street, St. Charles Street, bay Street, Sherman Street Paru Street, dated October 10, 2013.



NORTH

SITE LOCATION

N.T.S.

LEGEND:

Approximate location of sewer project alignments

REFERENCE: Google Earth, 2019

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION. © 2016, ALL RIGHTS RESERVED.

FILE: 949.122 STD Figures 2019.dwg

SITE LOCATION MAP

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 8/3/2016

Designed ABC
Drawn EIC
Checked ABC

1
FIGURE



SITE PLAN FOR SITE 1

(APPROX SCALE: 1" = 100'-0")

NORTH

APPROX. SCALE

0 50 100 200 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Approximate location of reference CPT from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION. © 2019. ALL RIGHTS RESERVED.

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITE 1

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-1
FIGURE



SITE PLAN FOR SITES 2, 2A AND 2B

(APPROX SCALE: 1" = 200'-0")

NORTH

APPROX. SCALE

0 100 200 400 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Approximate location of reference boring from previous study
- Approximate location of reference CPT from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION. © 2019. ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

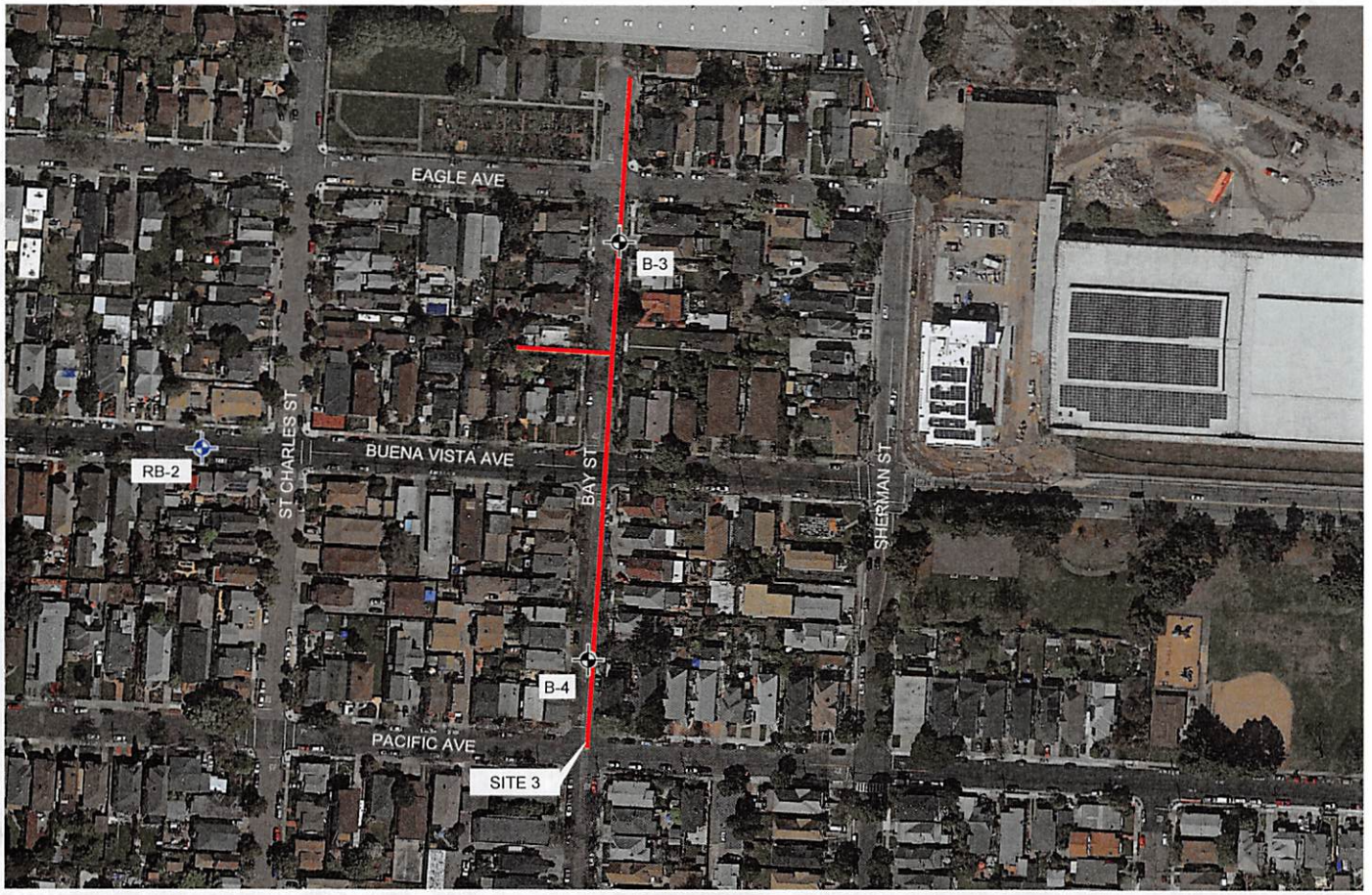
SITE PLAN FOR SITES 2, 2A AND 2B

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-2
FIGURE



SITE PLAN FOR SITE 3

(APPROX SCALE: 1" = 150'-0")

NORTH

APPROX. SCALE

0 75 150 300 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Approximate location of reference boring from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
A CALIFORNIA CORPORATION. © 2019, ALL RIGHTS RESERVED
FILE: 949.122 Site Plans 2019.dwg
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

SITE PLAN FOR SITE 3

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-3
FIGURE



SITE PLAN FOR SITE 4

(APPROX SCALE: 1" = 100'-0")

NORTH

APPROX. SCALE

0 50 100 200 FEET

LEGEND:

Approximate location of sewer project alignments

Approximate location of boring by Miller Pacific for this study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITE 4

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-4
FIGURE



SITE PLAN FOR SITE 5

(APPROX SCALE: 1" = 150'-0")

NORTH

APPROX. SCALE

0 75 150 300 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Approximate location of reference boring from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

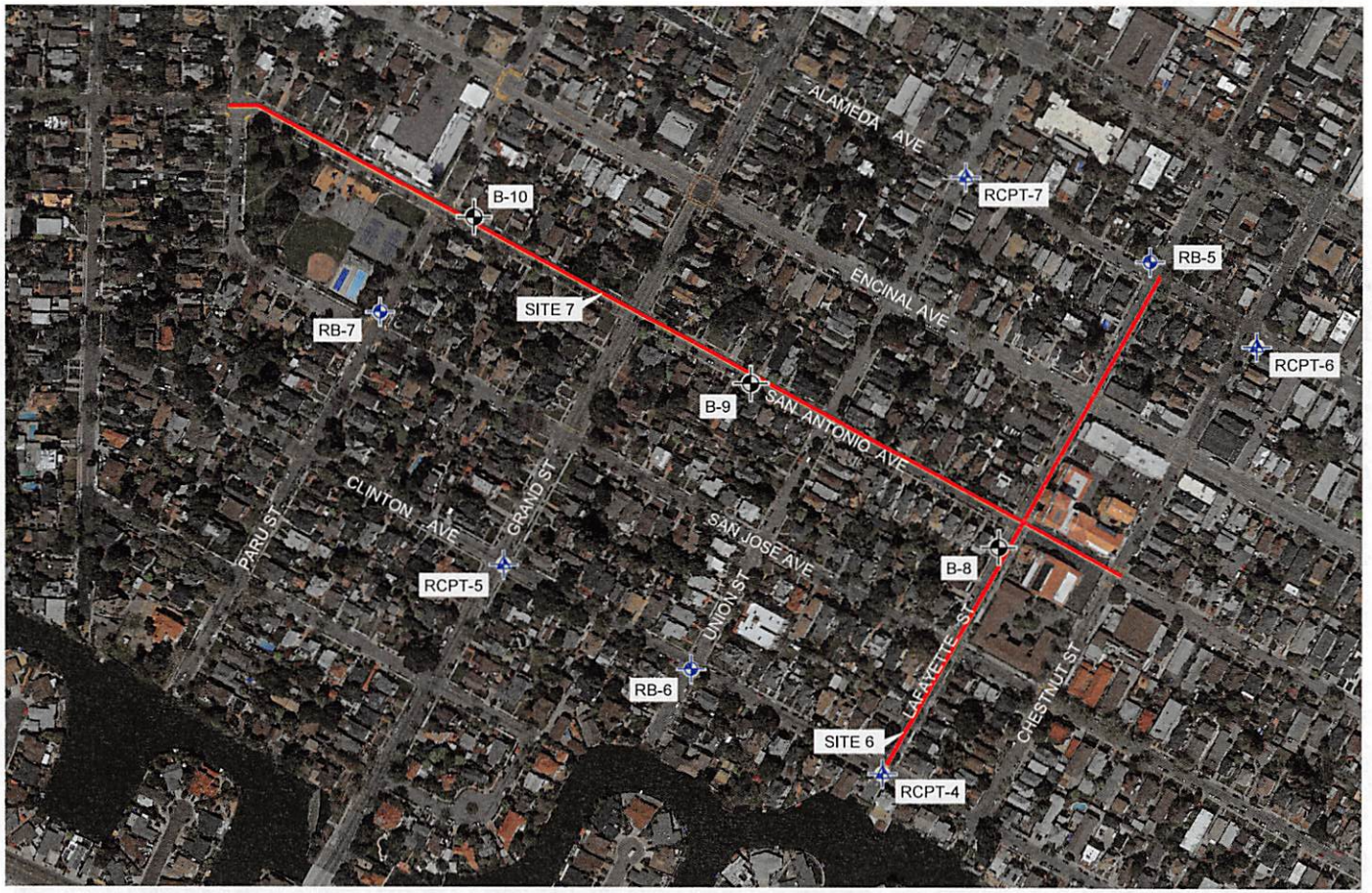
SITE PLAN FOR SITE 5

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-5
FIGURE



SITE PLAN FOR SITES 6 AND 7

(APPROX SCALE: 1" = 300'-0")

NORTH

APPROX. SCALE

0 150 300 600 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Approximate location of reference boring from previous study
- Approximate location of reference CPT from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITES 6 AND 7

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-6
FIGURE



SITE PLAN FOR SITES 8 AND 9

(APPROX SCALE: 1" = 150'-0")

NORTH

APPROX. SCALE

0 75 150 300 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Reference boring by others from previous studies

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
A CALIFORNIA CORPORATION. © 2019. ALL RIGHTS RESERVED
FILE: 949.122 Site Plans 2019.dwg

504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

SITE PLAN FOR SITES 8 AND 9

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-7
FIGURE



SITE PLAN FOR SITE 10

(APPROX SCALE: 1" = 150'-0")

NORTH

APPROX. SCALE

0 75 150 300 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITE 10

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-8
FIGURE



SITE PLAN FOR SITE 11

(APPROX SCALE: 1" = 100'-0")

NORTH

APPROX. SCALE

0 50 100 200 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITE 11

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-9
FIGURE



LEGEND:

- Approximate location of sewer project alignments
- Approximate location of boring by Miller Pacific for this study
- Reference boring from previous studies

SITE PLAN FOR SITES 12 AND 13

(APPROX SCALE: 1" = 200'-0")

NORTH

APPROX. SCALE

0 100 200 400 FEET

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

SITE PLAN FOR SITES 12 AND 13

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-10
FIGURE



SITE PLAN FOR SITE 14

(APPROX SCALE: 1" = 150'-0")

NORTH

APPROX. SCALE

0 75 150 300 FEET

LEGEND:

- Approximate location of sewer project alignments
- Approximate location of reference boring from previous study
- Approximate location of reference CPT from previous study

REFERENCE: Google Earth aerial imagery (map data: Google) of the project area accessed on February 7, 2019.

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION. © 2019. ALL RIGHTS RESERVED

FILE: 949.122 Site Plans 2019.dwg

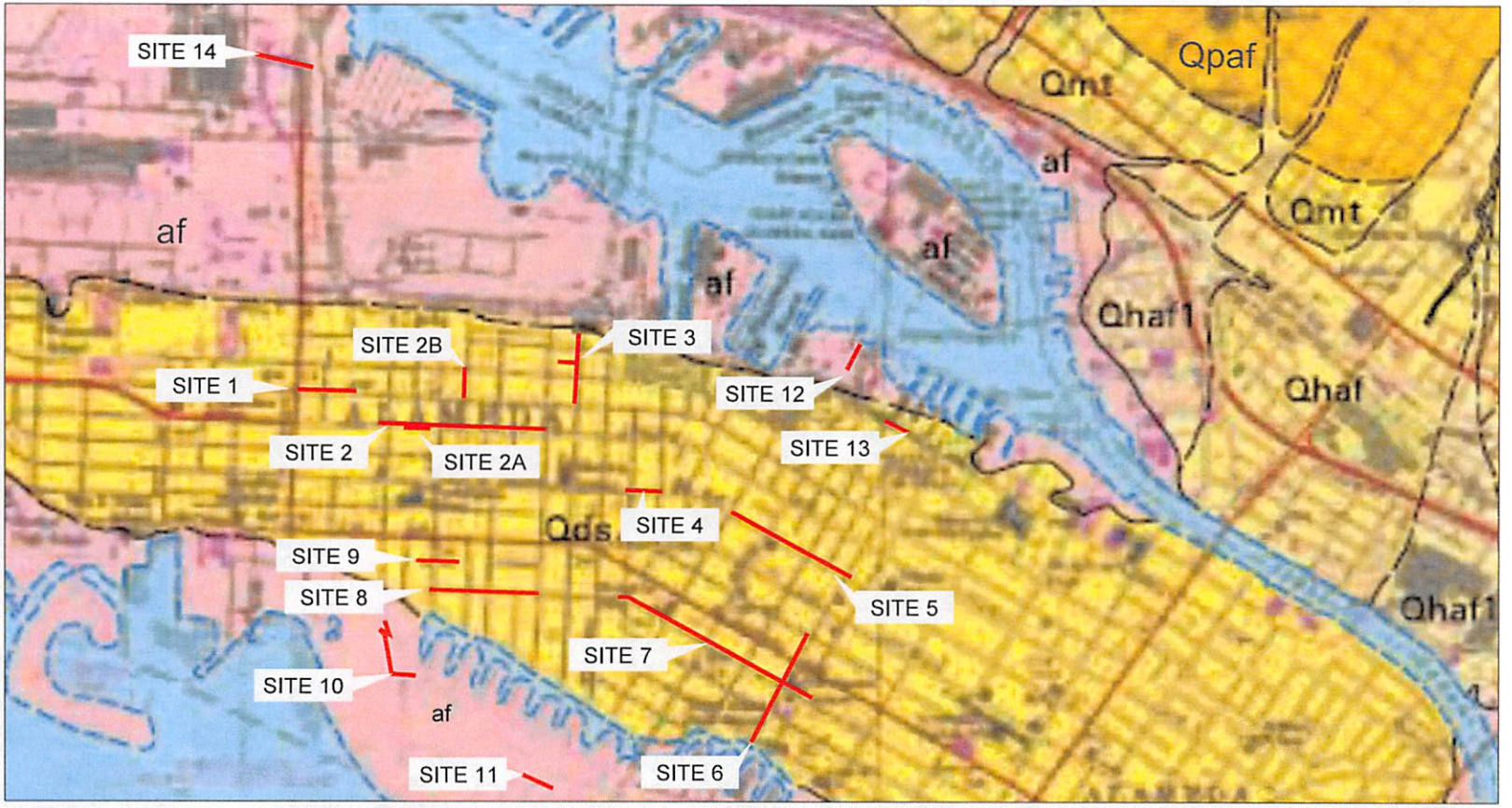
SITE PLAN FOR SITE 14

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/16/2019

Designed ABC
Drawn EIC
Checked ABC

2-11
FIGURE



LEGEND:

———	Approximate location of sewer project alignments
af	Artificial Fill (Historic)
Qds	Dune Sand (Holocene and Pleistocene)
Qhaf1	Younger Alluvial Fan Deposits (Holocene)
Qhaf	Alluvial Fan and Fluvial Deposits (Holocene)
Qmt	Marine Terrace Deposits (Pleistocene)
Qpaf	Alluvial Fan and Fluvial Deposits (Pleistocene)

NORTH

GEOLOGIC MAP

(NO SCALE)

REFERENCE:
"Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California" by R.W. Graymer, 2000.

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION. © 2016. ALL RIGHTS RESERVED.

FILE: 949.122 STD Figures 2019.dwg

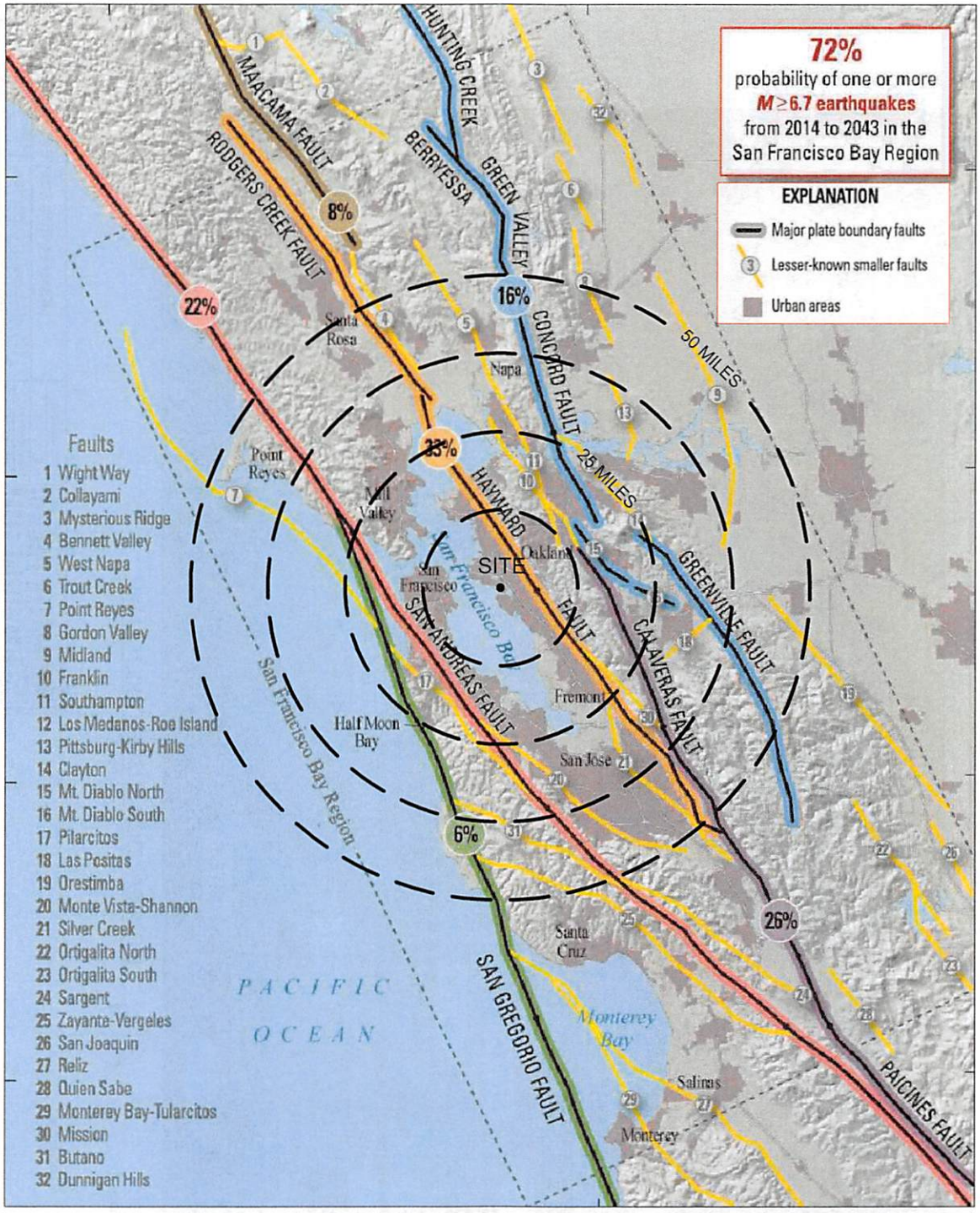
GEOLOGIC MAP

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 8/3/2016

Designed ABC
Drawn EIC
Checked ABC

3
FIGURE



SITE COORDINATES
LAT. 37.7726°
LON. -122.2664°

SCALE
0 12.5 25 50 MILES

NORTH

DATA SOURCE:
1) U.S. Geological Survey, U.S. Department of the Interior, "Earthquake Outlook for the San Francisco Bay Region 2014-2043", Map of Known Active Faults in the San Francisco Bay Region, Fact Sheet 2016-3020, Revised August 2016 (ver. 1.1).

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

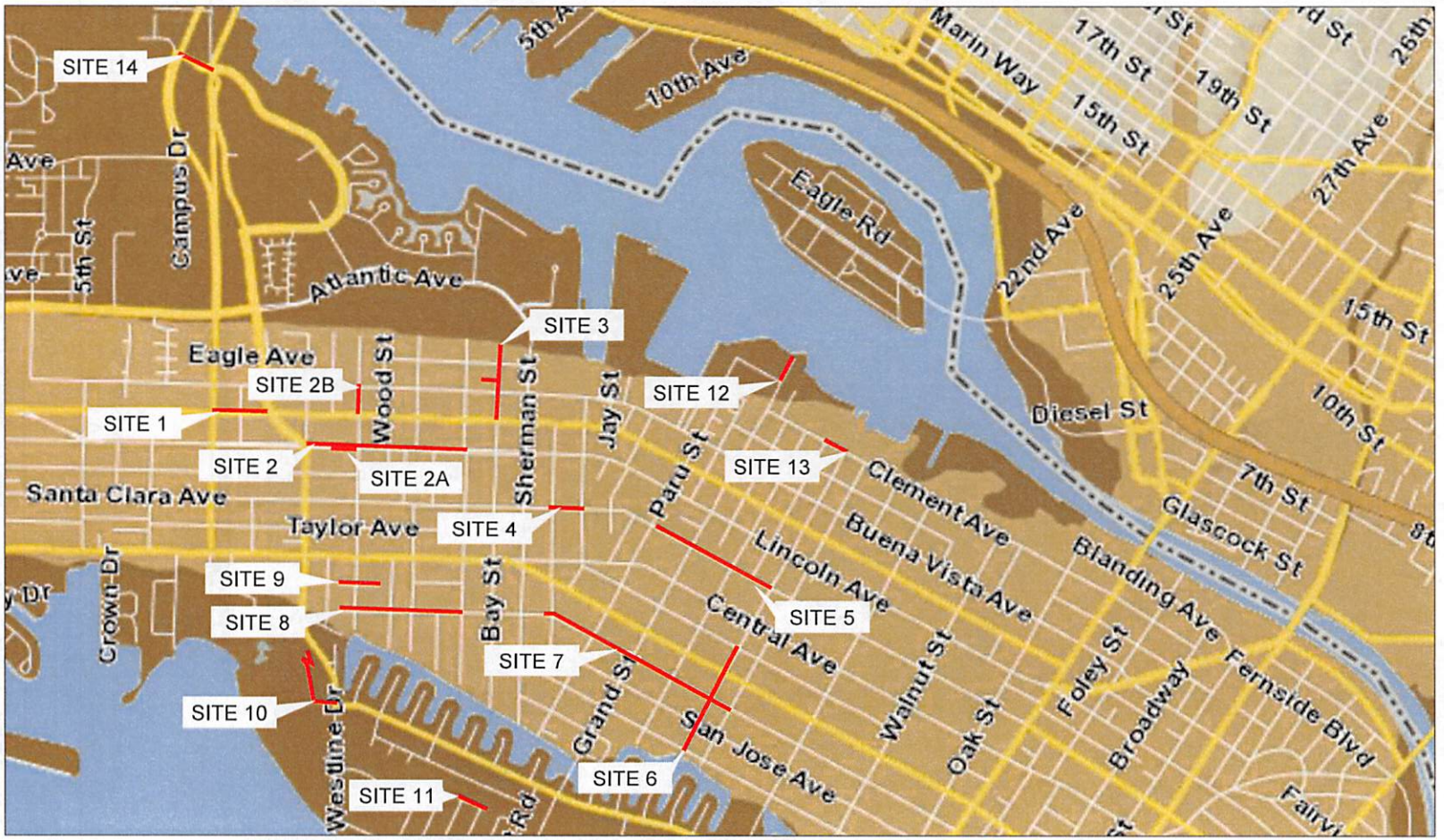
A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 STD Figures 2019.dwg

ACTIVE FAULT MAP

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

4
FIGURE



LEGEND:

Approximate location of sewer project alignments

Susceptibility Level:

Very High
High
Moderate
Low
Very Low
Local Road
Major Road

NORTH

LIQUEFACTION SUSCEPTIBILITY MAP

N.T.S.

REFERENCE: ABAG Geographic Information System.

MPEG MILLER PACIFIC ENGINEERING GROUP
A CALIFORNIA CORPORATION. © 2016. ALL RIGHTS RESERVED
FILE: 949.122 STD Figures 2019.dwg

504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

LIQUEFACTION SUSCEPTIBILITY MAP

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 8/3/2016

Designed ABC
Drawn EIC
Checked ABC

5
FIGURE

Tunnelman's Ground Classification for Soils[1]

Classification		Behavior	Typical Soil Types
Firm		Heading can be advanced without initial support, and final lining can be constructed before ground starts to move.	Loess above water table; hard clay, marl, cemented sand and gravel when not highly overstressed.
Raveling	Slow raveling ----- Fast raveling	Chunks or flakes of material begin to drop out of the arch or walls sometime after the ground has been exposed, due to loosening or to over-stress and "brittle" fracture (ground separates or breaks along distinct surfaces, opposed to squeezing ground). In fast raveling ground, the process starts within a few minutes, otherwise the ground is slow raveling.	Residual soils or sand with small amounts of binder may be fast raveling below the water tale, slow raveling above. Stiff fissured clays may be slow or fast raveling depending upon degree of overstress.
Squeezing		Ground squeezes or extrudes plastically into tunnel, without visible fracturing or loss of continuity, and without perceptible increase in water content. Ductile, plastic yield and flow due to overstress.	Ground with low frictional strength. Rate of squeeze depends on degree of overstress. Occurs at shallow to medium depth in clay of very soft to medium consistency. Stiff to hard clay under high cover may move in combination of raveling at excavation surface and squeezing at depth behind surface.
Running	Cohesive-running ----- Running	Granular materials without cohesion are unstable at a slope greater than their angle of repose (+/- 30° – 35°). When exposed at steeper slopes they run like granulated sugar or dune sand until the slope flattens to the angle of repose.	Clean, dry granular materials. Apparent cohesion in moist sand, or weak cementation in any granular soil, may allow the material to stand for a brief period of raveling before it breaks down and runs. Such behavior is cohesive-running.
Flowing		A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances, completely filling the tunnel in some cases.	Below the water table in silt, sand, or gravel without enough clay content to give significant cohesion and plasticity. May also occur in highly sensitive clay when such material is disturbed.
Swelling		Ground absorbs water, increases in volume, and expands slowly into the tunnel.	Highly preconsolidated clay with plasticity index in excess of about 30, generally containing significant percentages of montmorillonite.

1 Modified by Heuer (1974) from Terzaghi (1950)

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com
A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 STD Figures 2019.dwg

TUNNELMAN'S GROUND CLASSIFICATION FOR SOILS

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn RCA
Checked

6
FIGURE

MILLER PACIFIC
ENGINEERING GROUP

APPENDIX A
SUBSURFACE EXPLORATION AND LABORATORY TESTING

A. SUBSURFACE EXPLORATION

We explored subsurface conditions with 18 exploratory borings drilled with truck-mounted equipment on January 9, 10 and 11, 2019 at the approximate locations shown on the Site Plans on Figures 2-1 to 2-11. The exploration was conducted under the technical supervision of our Field Geologist who examined and logged the soil materials encountered and obtained samples. The subsurface conditions encountered in the test borings are summarized and presented on the Boring Logs, Figures A-1 through A-19.

Disturbed samples were obtained using a 3-inch diameter, split-barrel Modified California Sampler with 2.5 by 6-inch tube liners or a Standard Penetration Test (SPT) Sampler. The samplers were driven by a 140-pound hammer at a 30-inch drop. The number of blows required to drive the samplers 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory

B. LABORATORY TESTING

We conducted laboratory tests on selected intact samples to classify soils and to estimate engineering properties. The following laboratory tests were conducted in general accordance with the ASTM standard test method cited:

- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D 2937
- Particle Size Distribution (Gradation) of Soils Using Sieve Analysis, ASTM D 6913
- Amount of Material in Soils Finer than No. 200 (75-µm) Sieve, ASTM D 1140

The moisture content, dry density and amount of materials in soils finer than No. 200 sieve test results are shown on the exploratory boring logs, whereas the sieve analysis test results are shown on Figures A-20 and A-21.

The exploratory boring logs, description of soils encountered and the laboratory test data reflect conditions only at the location of the boring at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate and changes in surface and subsurface drainage.

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT	Peat, muck, and other highly organic soils
ROCK			Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

PI	PLASTICITY INDEX
LL	LIQUID LIMIT
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

STRENGTH TESTS

TV	FIELD TORVANE (UNDRAINED SHEAR)
UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress

SAMPLER TYPE

- MODIFIED CALIFORNIA
- STANDARD PENETRATION TEST
- THIN-WALLED / FIXED PISTON
- HAND SAMPLER
- ROCK CORE
- X DISTURBED OR BULK SAMPLE

SAMPLER DRIVING RESISTANCE

Modified California and Standard Penetration Test samplers are driven 18 inches with a 140-pound hammer falling 30 inches per blow. Blows for the initial 6-inch drive seat the sampler. Blows for the final 12-inch drive are recorded onto the logs. Sampler refusal is defined as 50 blows during a 6-inch drive. Examples of blow records are as follows:

- 25 sampler driven 12 inches with 25 blows after initial 6-inch drive
- 85/7" sampler driven 7 inches with 85 blows after initial 6-inch drive
- 50/3" sampler driven 3 inches with 50 blows during initial 6-inch drive or beginning of final 12-inch drive

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the excavation location during the time of exploration. Subsurface rock, soil or water conditions may vary in different locations within the project site and with the passage of time. Boundaries between differing soil or rock descriptions are approximate and may indicate a gradual transition.

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILENAME: 949.122 BoringLogs2019.dwg

SOIL CLASSIFICATION CHART

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

A-1
FIGURE

BORING 1

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/11/2019
ELEVATION: 12 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				10 inches of Aggregate Base						
				2 inches of Concrete						
				Silty SAND (SM) light to medium brown, moist, medium dense, fine-grained	22	106	5.7		P200 14.1	
1	5			grades mottled orange, tan, and brown, very dense						
					92/11"	117	16.1			
3	10			SAND (SP) mottled orange, tan, brown, wet, medium dense, fine-grained						
4					38		20.2			
				Bottom of boring at 13.5 feet Groundwater measured at 9 feet after drilling						
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-2
FIGURE

BORING 2

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/11/2019
ELEVATION: 12 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				6 inches of Aggregate Base						
				SAND (SP) brown, moist, loose, fine-grained	14	108	5.9			
1				Clayey SAND (SC) mottled orange, gray, brown, moist, dense, fine-grained						
	5				74	116	15.3		P200 18.0	
2										
3	10				40		19.2			
4										
	15				38		18.5			
5				Bottom of boring at 16.5 feet Groundwater measured at 11.5 feet after drilling						
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-3
FIGURE

BORING 3

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/11/2019
ELEVATION: 5 - feet*
*REFERENCE: Google Earth, 2019

meters / feet DEPTH	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0 - 0			3.5 inches of Asphalt Concrete						
			6 inches of Aggregate Base						
			SAND (SP) brown, moist, loose to medium dense, fine-grained	15	116	14.0			
1			grades mottled orange, tan and light brown, saturated						
5				15	109	20.6			
2									
3 10			Silty SAND (SM) brown, moist, medium dense, fine-grained	18		20.2		P200 24.8	
4									
15				16		19.6			
5			Bottom of boring at 16.5 feet Groundwater measured at 5 feet after drilling						
6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-4
FIGURE

BORING 4

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/11/2019
ELEVATION: 11 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				5 inches of Aggregate Base						
				SAND (SP) brown, moist, loose, fine-grained						
					8	105	10.2			
1										
	5									
				Silty SAND (SM) mottled orange, tan, and light brown, moist, dense, fine-grained						
2										
					54	110	19.5		SA P200 20. 2	
3	10									
				grades medium dense						
4					18		15.8			
				Bottom of boring at 13.5 feet Groundwater measured at 10.5 feet after drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-5
FIGURE

BORING 5

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/10/2019
ELEVATION: 22 - feet*
*REFERENCE: Google Earth, 2019

meters / feet DEPTH	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0 - 0			8 inches of Asphalt Concrete						
			4 inches of Aggregate Base						
			Silty SAND (SM) brown, dry to sightly moist, loose to medium dense, fine-grained	16	105	7.9		P200 15.3	
1									
5									
			grades very dense						
2				86		18.4			
3 10									
				47		21.2			
4			Bottom of boring at 13.5 feet No groundwater encountered during drilling						
15									
5									
6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-6
FIGURE

BORING 6

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/10/2019
ELEVATION: 24 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			8 inches of Asphalt Concrete						
				10 inches of Aggregate Base						
				SAND (SP) brown, moist, medium dense, fine-grained	27	103	5.8			
1	5				29	112	14.6			
2										
3	10			SAND with Silt (SP-SM) brown, wet, very dense, fine-grained	82	110	19.7			
4		▼								
	15				47		21.3		SA P200 9.7	
5				Bottom of boring at 16.5 feet Groundwater measured at 13 feet after drilling						
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-7
FIGURE

BORING 7

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/10/2019
ELEVATION: 26 - feet*
*REFERENCE: Google Earth, 2019

meters / feet DEPTH	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0 - 0			6 inches of Asphalt Concrete						
			2 inches of Aggregate Base						
			Silty SAND (SM) brown, moist, loose to medium dense, fine-grained	14	107	10.0			
1									
5									
2 ▼			grades wet, dense	61	99	20.2		P200 14.9	
3 10									
4				41		20.9			
			Bottom of boring at 13.5 feet Groundwater measured at 7 feet after drilling						
15									
5									
6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-8
FIGURE

BORING 8

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/2019
ELEVATION: 20 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			3 inches of Asphalt Concrete						
				4 inches of Aggregate Base						
				Silty SAND (SM) brown, moist to wet, medium dense, fine- to medium-grained	16	112	19.5		P200 14.2	
	1									
	5									
	2			grades wet, dense	54	106	20.3			
	3 10									
	4				43		19.1			
	15			Bottom of boring at 13.5 feet Groundwater measured at 5 feet after drilling (borehole caved to 9 feet after augers were removed)						
	5									
	6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-9
FIGURE

BORING 9

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/2019
ELEVATION: 25 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters / feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0 - 0			2 inches of Asphalt Concrete						
			6 inches of Aggregate Base						
			Silty SAND (SM) brown, slightly moist, medium dense, fine-grained	19	105	6.3			
1									
5			grades moist to wet, dense	54	112	17.5		P200 15.9	
2									
3 10				59	114	19.4			
4									
▼ 15			grades very dense	71		18.1			
5			Bottom of boring at 16.5 feet Groundwater measured at 14.5 feet after drilling						
6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-10
FIGURE

BORING 10

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/2019
ELEVATION: 26 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			2.5 inches of Asphalt Concrete						
				4 inches of Aggregate Base						
				SAND with Silt (SP-SM) brown, moist to wet, loose to medium dense, fine-grained	17	107	18.2			
1	5									
2				grades dense	64	111	18.9			
3	10									
					41		21.8		SA P200 10.6	
4				Bottom of boring at 13.5 feet Groundwater measured at 12 feet after drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-11
FIGURE

BORING 11

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/2019
ELEVATION: 21 - feet*
*REFERENCE: Google Earth, 2019

meters / feet DEPTH	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0 - 0			4 inches of Asphalt Concrete 14 inches of Aggregate Base						
			SAND (SP) brown, moist, medium dense, fine-grained	39	110	5.7			
1									
5				27	106	8.2			
2									
3 10			grades wet, dense	61		16.3			
4									
15			Silty SAND (SM) brown, wet, dense, fine-grained	34		21.7		P200 15.2	
5			Bottom of boring at 16.5 feet No groundwater encountered during drilling						
6 20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-12
FIGURE

BORING 12

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/2019
ELEVATION: 22 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			2.5 inches of Asphalt Concrete						
				4.5 inches of Aggregate Base						
				Clayey SAND (SC) brown, moist, loose, fine- to medium-grained						
					7	102	5.9		P200 14.0	
1	5									
				grades dense						
2					54	115	13.0			
3	10									
				grades medium dense						
4					33		18.9			
				Bottom of boring at 13.5 feet No groundwater encountered during drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-13
FIGURE

BORING 13

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/19
ELEVATION: 11 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			8 inches of Asphalt Concrete						
				10 inches of Aggregate Base						
				SAND (SP) brown, moist, dense, fine- to medium-grained, occassional shell fragment	72	107	3.9		P200 2.6	
1	5									
2				SAND with Clay (SP-SC) brown, wet, medium dense, fine-grained	27		21.0		P200 9.5	
3	10									
4					39		18.7			
				Bottom of boring at 13.5 feet No groundwater encountered during drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

A-14
FIGURE

BORING 14

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/19
ELEVATION: 10 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				5 inches of Aggregate Base						
				SAND with Silt (SP-SM)						
				brown, moist, medium dense	48		8.4			
	5			grades wet	19		21.3		P200 11.5	
	10			shell fragments noted in sample	34		20.3			
	15				37		23.0			
				Bottom of boring at 16.5 feet						
				Groundwater measured at 8 feet after drilling						

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

A-15
FIGURE

BORING 15

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/9/19
ELEVATION: 10 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				4 inches of Aggregate Base						
				SAND with Silt (SP-SM) brown, moist, medium dense, fine-grained						
					27	96	16.0		SA P200 10.1	
1										
	5									
2				grades wet						
					9		23.4			
3	10									
4					11		21.7			
				Bottom of boring at 13.5 feet Groundwater measured at 4 feet after drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

A-16
FIGURE

BORING 16

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/11/2019
ELEVATION: 5 feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			6 inches of Asphalt Concrete						
				16 inches of Aggregate Base						
				Silty SAND with Gravel (SM) dark gray, moist, medium dense, fine- to medium-grained	37	99	14.9		SA P200 17.8	
1	5			Silty CLAY (CH) dark gray, wet, very soft, high plasticity, sulfur odor						
2 ▼					3	33	151.0	227		
3	10			trace organics noted in sample	2		112.2			
4				Bottom of boring at 13.5 feet Groundwater measured at 7 feet after drilling						
	15									
5										
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-17
FIGURE

BORING 17

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 11/11/2019
ELEVATION: 5 feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			5 inches of Asphalt Concrete						
				8 inches of Aggregate Base						
				SAND (SP) gray, moist, medium dense to dense, fine-grained	48	124	10.1			
1										
	5			Silty SAND (SM) mottled orange, gray and brown, wet, loose to medium dense, fine-grained	32					
2					10		20.5			
3	10				11		18.8		P200 42.2	
4				SAND (SP) mottled orange, gray and brown, wet, dense, fine-grained						
	15				35		19.8			
5				Bottom of boring at 16.5 feet Groundwater measured at 9 feet after drilling						
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn TWM
Checked

A-18
FIGURE

BORING 18

EQUIPMENT: Truck Mounted Drill Rig with 4-inch Solid Flight Auger
DATE: 1/15/19
ELEVATION: 22 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt Concrete						
				4 inches of Aggregate Base						
				SAND (SP) brown, moist, loose to medium dense, fine-grained	17	109	7.4			
1										
	5			Silty SAND (SM) mottled brown and gray, wet, dense, fine-grained	34/9"	105	21.2		P200 24.8	
2										
3	10 ▼				55		17.6			
4										
	15			grades medium dense	24		17.4			
5				Bottom of boring at 16.5 feet Groundwater measured at 10 feet after drilling						
6	20									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

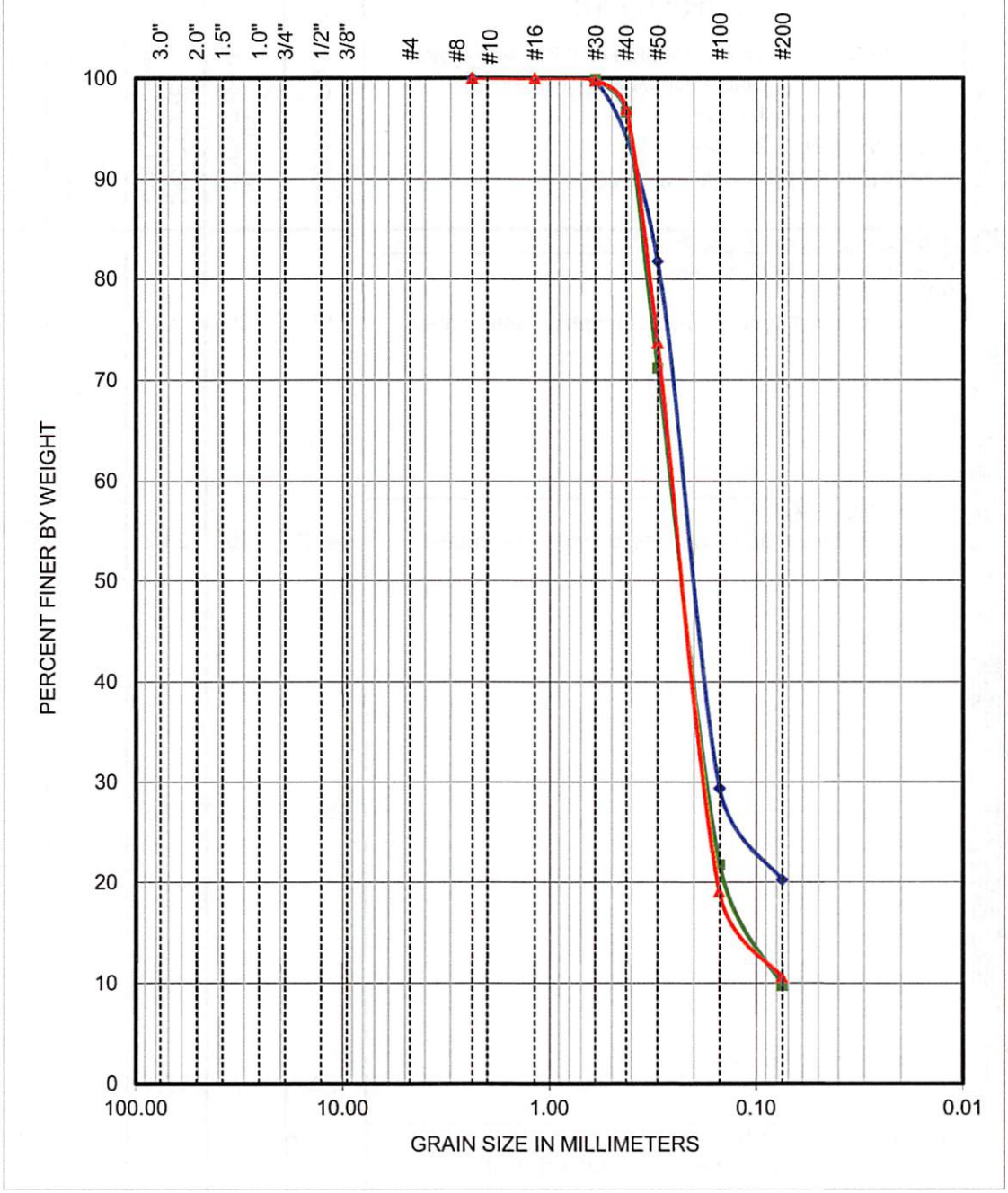
A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED
FILENAME: 949.122 BoringLogs2019.dwg

BORING LOG

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 4/29/2019

Drawn EIC
Checked

A-19
FIGURE



SYMBOL	SAMPLE SOURCE	CLASSIFICATION
◆	Boring 4 at 7 feet	Silty SAND (SM)
■	Boring 6 at 15 feet	SAND with Silt (SP-SM)
▲	Boring 10 at 12 feet	SAND with Silt (SP-SM)

MPEG MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILENAME: 949.122 STD Figures 2019.dwg

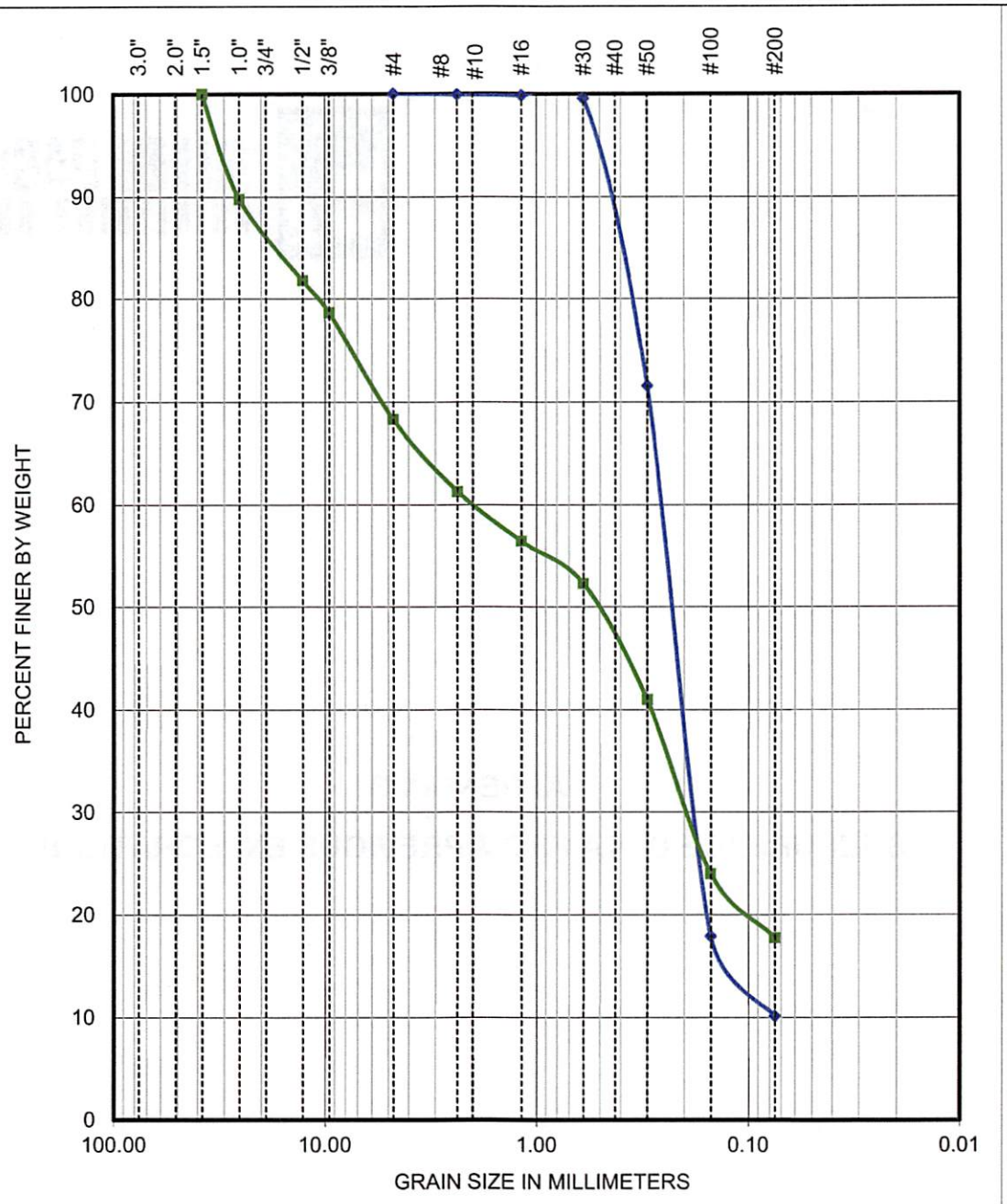
SIEVE ANALYSES TEST RESULTS

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/29/2019

Drawn RCA
Checked

A-20
FIGURE



SYMBOL	SAMPLE SOURCE	CLASSIFICATION
	Boring 15 at 3 feet	SAND with Silt (SP-SM)
	Boring 16 at 3 feet	Silty SAND with Gravel (SM)

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2019, ALL RIGHTS RESERVED

FILENAME: 949.122 STD Figures 2019.dwg

SIEVE ANALYSES TEST RESULTS

City of Alameda, Cyclic 16
Sewer Rehabilitation Project
Alameda, California

Project No. 949.122 Date: 4/29/2019

Drawn RCA
Checked

A-21
FIGURE

MILLER PACIFIC ENGINEERING GROUP

APPENDIX B

SUBSURFACE DATA FROM PREVIOUS EXPLORATIONS

REFERENCE BORING 1

Project: Cyclic Sewer Replacement, Phase 11 **Project Location: Alameda, CA** **Project Number: 26818686**	**Log of Boring B-2** Sheet 1 of 1

Date(s) Drilled	7/17/2013	Logged By	P. Maat	Checked By	S. Janowski
Drilling Method	Hand auger 0 to 5 Ft, HSA thereafter	Drill Bit Size/Type	8-in OD HSA	Total Depth of Borehole	16.5 feet
Drill Rig Type	Mobil B-40 Truck	Drilling Contractor	Exploration Geoservices	Surface Elevation	Approx. 6 Feet (NAVD 88)
Groundwater Level(s)	10.0' measured while drilling	Sampling Method(s)	Bulk, SPT	Hammer Data	Safety hammer; 140 lbs, 30-inch drop
Borehole Backfill	Neat cement grout tremmied to surface, asphalt patch	Location	In center of street, in front of 1041 Lincoln Ave. at 37.77491, -122.26612.		

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Plasticity Index (PI)	Percent Passing #200 Sieve	REMARKS AND OTHER TESTS
	0						6-inch thick ASPHALT with fabric --PAVEMENT-- 12-inch thick Silty Sand with Gravel --BASE COURSE--				
		⊠	1				Silty Sand (SM), dark brown (10YR 3/3), dry; approx. 85% fine to medium-grained sand, approx. 15% no plasticity fines				Hand Auger 1.5 to 5 Feet
	5		2	12	56		becomes medium dense, dark yellowish brown (10YR 4/6), moist; 82% fine to medium-grained sand, 18% fines, iron oxide staining	12		18	Begin HSA drilling
	10		3	23	72		becomes dark yellowish brown (10YR 4/4), wet ▽				
	15		4	17	94		Poorly Graded Sand with Silt (SP-SM), medium dense, brown (10YR 4/3), wet; 88% fine to medium grained sand, 12% no plasticity fines	24		12	
							TOTAL DEPTH = 16.5 feet				Grouted with 2 bags (47 lb) cement in approx. 6 gallons water
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: ALAMEDA CYCLIC 11.GPJ; 10/8/2013 B-2

Figure A-2

REFERENCE BORING 2

DATE DRILLED 6/16/10 BORING NO. B-2

GROUND ELEVATION 14' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow Stem Auger; Mobile B-56 (Exploration Geoservices)

DRIVE WEIGHT 140 LB. (WIRE-LINE) DROP 30"

SAMPLED BY MHL LOGGED BY MHL REVIEWED BY PKB

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 8 inches thick.
							AGGREGATE BASE: Approximately 8 inches thick.
						SM	MERRITT SAND: Brown to yellowish brown, damp, medium dense, silty SAND; fine to medium sand; little silt.
		31					
		16					Yellowish brown, moist; trace clay.
5		38	14.7	112.3			Mottled yellowish brown to reddish brown.
			▼				Saturated.
		20					
10							
		16					Loose.
15							Total depth = 15 feet.
							Groundwater was measured at a depth of approximately 7 feet in borehole at about 15 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							Backfilled with Portland cement grout on 6/16/10.
20							

Ninyo & Moore

BORING LOG

CYCLIC SEWER REPLACEMENT - PHASE 8
ALAMEDA, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401641001	7/10	A-2

REFERENCE BORING 3

Project: Cyclic Sewer Replacement, Phase 9 **Project Location: Alameda, CA** **Project Number: 26818068**	**Log of Boring B-2** Sheet 1 of 1

Date(s) Drilled	5/6/2011	Logged By	S. Janowski	Checked By	P. Humphrey
Drilling Method	Hand auger 0 to 5 Ft, HSA thereafter	Drill Bit Size/Type	5 3/4-in OD HSA	Total Depth of Borehole	16.5 feet
Drill Rig Type	MARL M5T Track	Drilling Contractor	Gregg Drilling	Surface Elevation	Approx. 25 Feet (NAVD 88)
Groundwater Level(s)	5' measured while drilling	Sampling Method(s)	Bulk, SPT	Hammer Data	Automatic hammer; 140 lbs, 30-inch drop
Borehole Backfill	Neat cement grout tremmied to surface, asphalt patch	Location	In center of street, in front of 1716 Central Ave. N37.77001, W122.25624 NAD 83		

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Plasticity Index (PI)	Percent Passing #200 Sieve	REMARKS AND OTHER TESTS
25	0						3-inch thick Asphalt over 3-inch thick Concrete --PAVEMENT--				Begin 10:00
							6-inch thick Silty Sand with gravel --BASE COURSE--				
							Silty Sand (SM), moist, brown, approx. 80% fine to medium-grained sand, approx. 20% no plasticity fines				Hand Auger 1 to 5 Feet
			1								
20	5		2	17	100		becomes medium dense, wet, approx. 70% fine to medium sand, approx. 30% low plasticity fines	18			
							becomes moist				
15	10		3	22	100		becomes wet, 84% fine to medium sand, 16% no plasticity fines			16	
							becomes gray				
							Poorly-graded Sand with Silt (SP-SM), medium dense, wet, brown and gray, approx. 90% fine to medium-grained sand, approx. 10% no plasticity fines				
10	15		4	31	100						
							TOTAL DEPTH = 16.5 feet				
5	20										
0	25										
-5	30										

Report: GEO_10B1_OAK; File: ALAMEDA CYCLIC 9.GPJ; 5/24/2011 B-2

Figure A-3

REFERENCE BORING 4

BORING 5

EQUIPMENT: Truck-Mounted B24 with 4.0-inch Solid Flight Auger
DATE: 1/5/17
ELEVATION: 30 - feet*
*REFERENCE: Google Earth, 2017

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			4 inches of Asphalt over 7 inches of Aggregate Base						
				Clayey SAND (SC) brown, moist, medium dense						
	1				14		15.0			P200 21.3%
	5									
2				grades wet, dense						
					56	113	18.6			
3	10									
4					46		19.9			
	15			Bottom of boring at 14.5 feet Groundwater encountered at 6 feet during drilling						
5										
6	20									

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2017, ALL RIGHTS RESERVED

FILE: 949.122BL.dwg

BORING LOG

City of Alameda, Cyclic 14 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 1/11/2017

Drawn ZMS
Checked

A-6
FIGURE

REFERENCE BORING 5

PROJECT: **CYCLIC SEWER REPLACEMENT PROJECT**
Alameda, California

Log of Boring B5-1

Boring location: See Site Plan, Figure 2 | Logged by: S. Wolfe
Date started: 5/11/15 | Date finished: 5/11/15
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30 inches | Hammer type: Downhole Safety
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	Sample	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Ground Surface Elevation: 26.5 feet[2])	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0						4 inches asphalt concrete						
						6 inches aggregate base						
1						SAND (SP) yellow-brown, loose, moist, fine-grained, trace fines						
2												
3	SPT		3 4 4	8	SP							
4												
5						CLAYEY SAND (SC) yellow-brown, dense, moist, fine-grained Corrosion Test, see Figure D-2						
6	S&H		13 27 44	43	SC					16.3	17.6	113
7												
8	SPT		9 13 17	30	SP-SC	SAND with CLAY (SP-SC) yellow-brown with gray-brown mottling, medium dense to dense, moist, fine-grained						
9						▽ (05/11/15, 2:25 p.m.)						
10						SAND (SP) gray-brown to yellow-brown, dense, wet, fine-grained						
11	S&H		12 17 50	40	SP							
12												
13												
14	SPT		12 16 19	35	SP-SC	SAND with CLAY (SP-SC) yellow-brown, dense, wet, fine-grained						
15												
16												
17												
18												
19												
20												

Boring terminated at a depth of 15 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at 9 feet below ground surface during drilling.

[1] S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.6 and 1.0, respectively to account for sampler type and hammer energy.
[2] Elevations based on City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15..

LANGAN TREADWELL ROLLO

Project No.: 750513315 | Figure: A-5

TEST GEOTECH LOG 750513315.GPJ TR.GDT 6/16/15

REFERENCE BORING 6

PROJECT: **CYCLIC SEWER REPLACEMENT PROJECT**
Alameda, California

Log of Boring B3-1

Boring location: See Site Plan, Figure 2
Logged by: S. Wolfe
Date started: 5/11/15 Date finished: 5/11/15
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30 inches Hammer type: Downhole Safety
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
						Ground Surface Elevation: 16.5 feet[2]						
						4 inches asphalt concrete						
						4 inches aggregate base						
1					SP	SAND (SP) dark brown to brown, loose, moist, fine-grained, trace fines						
2												
3	SPT		2 1 2	3								
4						grades to yellow-brown						
5					SC	CLAYEY SAND (SC) orange-brown with gray-brown mottling, medium dense, moist, fine-grained						
6	S&H		8 11 15	16		Corrosion Test, see Figure D-2				18.2	17.3	112
7												
8	SPT		7 9 13	22	SP-SC	SAND with CLAY (SP-SC) yellow-brown and gray-brown, medium dense, moist, trace organics, fine-grained						
9						▽ (05/11/15, 11:35 a.m.)						
10												
11	S&H		17 19 22	25		SAND (SP) yellow-brown with orange-brown seams, medium dense, wet, fine-grained, trace fines						
12					SP							
13												
14	SPT		16 18 23	41								
15						dense, increased fines content						
16												
17												
18												
19												
20												

Boring terminated at a depth of 15 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at 9.5 feet below ground surface during drilling.

[1] S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.6 and 1.0, respectively to account for sampler type and hammer energy.
[2] Elevations based on City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15..

LANGAN TREADWELL ROLLO

Project No.: 750513315
Figure: A-3

TEST GEOTECH LOG 750513315.GPJ TR.GDT 6/16/15

REFERENCE BORING 7

Project: Cyclic Sewer Replacement, Phase 11 **Project Location: Alameda, CA** **Project Number: 26818686**	**Log of Boring B-3** Sheet 1 of 1

Date(s) Drilled	7/17/2013	Logged By	P. Maat	Checked By	S. Janowski
Drilling Method	Hand auger 0 to 5 Ft, HSA thereafter	Drill Bit Size/Type	8-in OD HSA	Total Depth of Borehole	16.5 feet
Drill Rig Type	Mobil B-40 Truck	Drilling Contractor	Exploration Geoservices	Surface Elevation	Approx. 6 Feet (NAVD 88)
Groundwater Level(s)	10.0' measured while drilling	Sampling Method(s)	Bulk, SPT, Modcal	Hammer Data	Safety hammer; 140 lbs, 30-inch drop
Borehole Backfill	Neat cement grout tremmied to surface, asphalt patch	Location	In center of street, in front of 1004 Paru St. at 37.76793, -122.26087.		

Elevation feet / Depth, feet	SAMPLES: Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Plasticity Index (PI)	Percent Passing #200 Sieve	REMARKS AND OTHER TESTS
0						4-inch thick ASPHALT, no fabric --PAVEMENT-- 6-inch thick Silty Sand with Gravel --BASE COURSE--				
						Silty Sand (SM), dark yellowish brown (10YR 4/4), moist; 78% medium grained sand, 22% no plasticity fines				Hand Auger 0.8 to 5 Feet
		1								
5						becomes medium dense, yellowish brown (10YR 5/6)	14		22	Begin HSA drilling
		2	15	22						
10						Poorly Graded Sand with Silt (SP-SM), medium dense, yellowish brown (10YR 5/6), moist; 86% fine to medium grained sand, 14% no plasticity fines.	20		14	
		3	25	56		becomes wet				
15										
		4	30	61						
						TOTAL DEPTH = 16.5 feet				Grouted with 2 bags (47 lb) cement in approx. 6 gallons water
20										
25										
30										

Report: GEO_10B1_OAK; File: ALAMEDA CYCLIC 11.GPJ; 10/8/2013 B-3

Figure A-2

REFERENCE BORING 8

BORING 2

EQUIPMENT: B24 Truck-Mounted Rig with 4-inch Solid Flight Auger
DATE: 4/14/2016
ELEVATION: 28 - feet*
*REFERENCE: Google Earth, 2016

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			2 inches of Asphalt over 6 inches of Aggregate Base						
				Silty SAND (SM) brown, moist, loose						
					10	99	8.1		13.0 P200	
1	5			grades wet, medium dense						
					29	106	16.5			
2										
3	10			grades dense						
					64	106	21.6			
				Bottom of boring at 11.5 feet No groundwater encountered during drilling						
4										
	15									
5										
6	20									

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2015, ALL RIGHTS RESERVED

FILE:949.122 BL.dwg

BORING LOG

Alameda Sewer Rehabilitation
Alameda, California

Drawn RCA
Checked

Project No. 949.122 Date: 5/5/2016

A-3
FIGURE

REFERENCE BORING 9

BORING 2

EQUIPMENT: Truck-Mounted B24 with 4.0-inch Solid Flight Auger
DATE: 1/5/17
ELEVATION: 14 - feet*
*REFERENCE: Google Earth, 2017

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			3 inches of Asphalt over 8 inches of Aggregate Base						
				SAND (SP) light brown, moist to wet, medium dense						
	5				20	115	17.7			
2				Clayey SAND (SC) tan and gray mottled, wet, medium dense	17		20.1			P200 31.8%
3	10									
4					39	117	17.2			
				Bottom of boring at 13.5 feet Groundwater encountered at 3 feet during drilling						
	15									
5										
6	20									

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

MILLER PACIFIC ENGINEERING GROUP
504 Redwood Blvd.
Suite 220
Novato, CA 94947
T 415 / 382-3444
F 415 / 382-3450
www.millerpac.com

A CALIFORNIA CORPORATION, © 2017, ALL RIGHTS RESERVED
FILE: 949.122BL.dwg

BORING LOG

City of Alameda, Cyclic 14 Sewer Rehabilitation Project
Alameda, California
Project No. 949.122 Date: 1/11/2017

Drawn ZMS
Checked

A-3
FIGURE

REFERENCE BORING 10

PROJECT:	ALAMEDA LANDING RETAIL ANCHOR BUILDING Alameda, California	**Log of Boring TR-R8** PAGE 1 OF 1
Boring location:	See Site Plan, Figure 2	Logged by: P. Wildvine
Date started:	2/3/12	Date finished: 2/3/12
Drilling method:	Hollow Stem Auger	
Hammer weight/drop:	140 lbs./30 inches	Hammer type: Automatic
Sampler:	Standard Penetration Test (SPT)	

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
						Top of Slab Elevation: 2.8 feet[2]						
0						2-Inches Asphaltic Concrete (AC)						
1	SPT		8 10 21	31	GM	SILTY GRAVEL with SAND (GM) orange-brown, dense, dry to moist, some clay						
2												
3												
4												
5	SPT		3 1 1	2	CH	CLAY (CH) gray, soft, moist						
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Boring terminated at a depth of 5.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

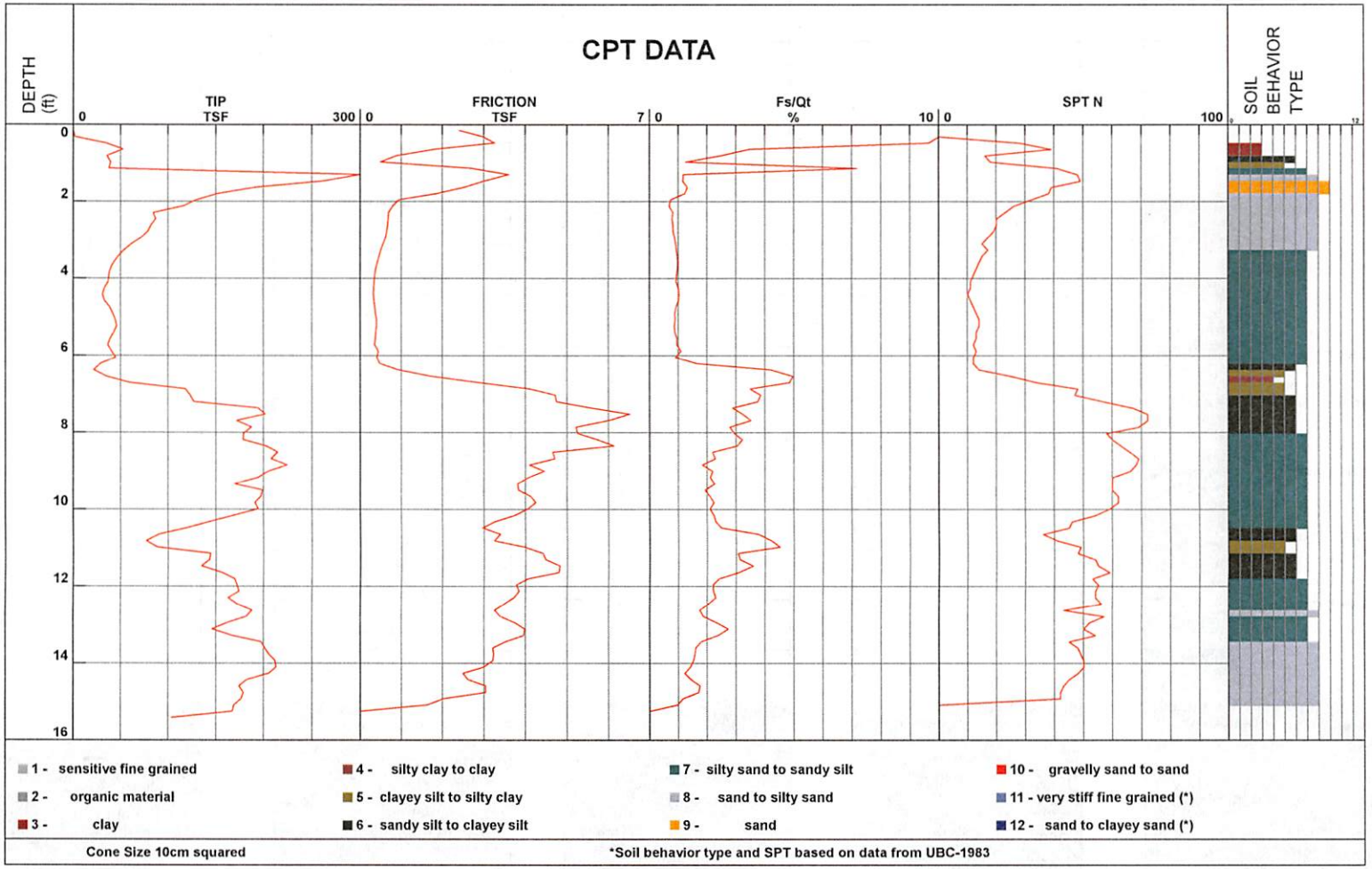
[1] S&H blow counts for the last two increments were converted to SPT N-Values using a factor of 1.0 to account for sampler type and hammer energy.
[2] Elevations based on City of Alameda Datum.

Treadwell&Rollo
A LANDAU COMPANY

Project No.: 731584101
Figure: B-8

TOP OF CONCRETE SLAB 731584101.GPJ TR.GDT 6/28/12

REFERENCE CPT 1



Terminated at 15.4 feet.

Date performed 05/11/15.

Ground surface elevation: 12 feet, City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15.

CYCLIC SEWER REPLACEMENT PROJECT
Alameda, California

CONE PENETRATION TEST RESULTS
C2-1

Date 06/05/15	Project No. 750513315	Figure B-2

LANGAN TREADWELL ROLLO

REFERENCE CPT 2

GREGG

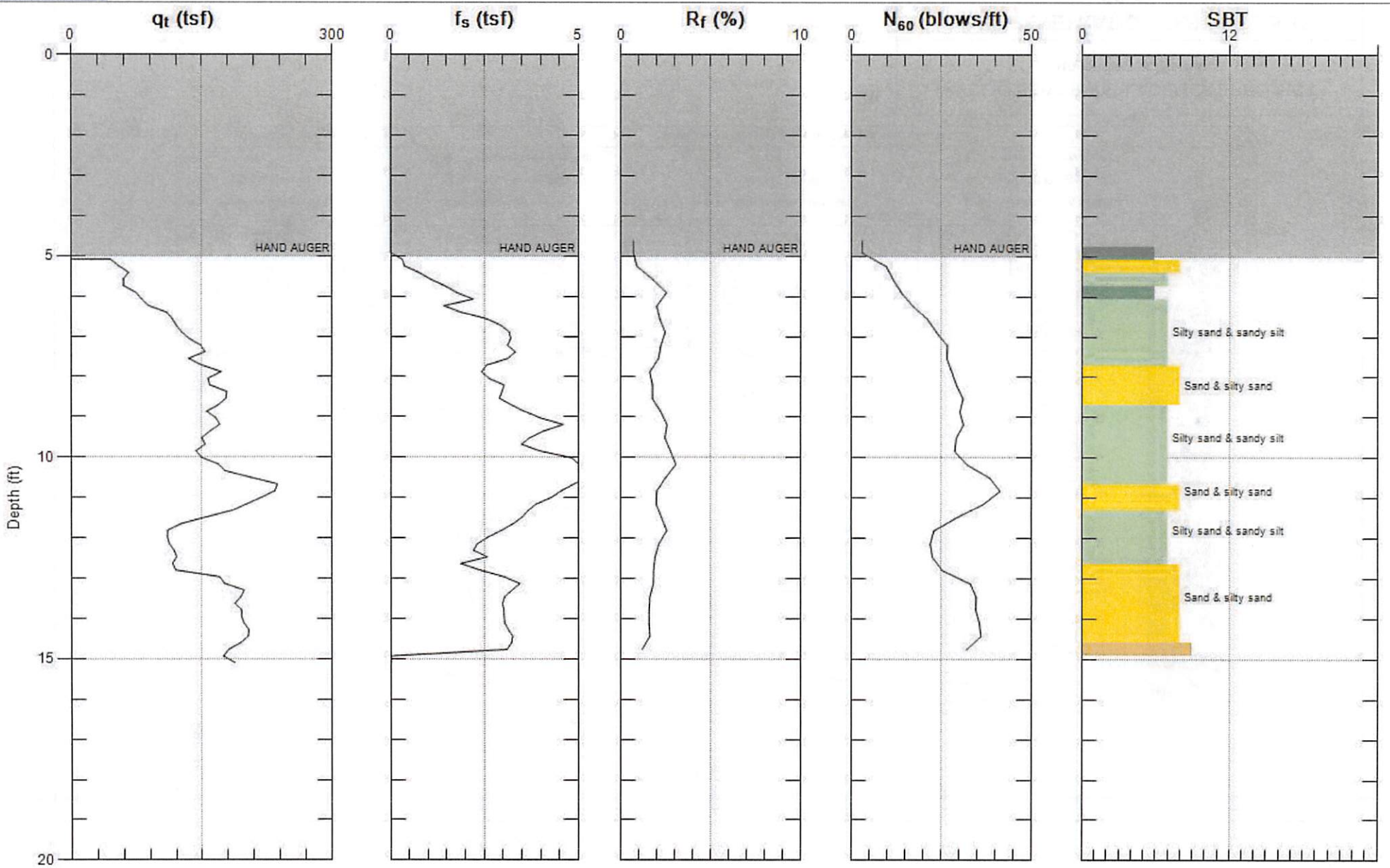
URS

Site: CITY OF ALAMEDA

Sounding: CPT-02

Engineer: P.MAAT

Date: 7/2/2013 09:11



Max. Depth: 15.092 (ft)

Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

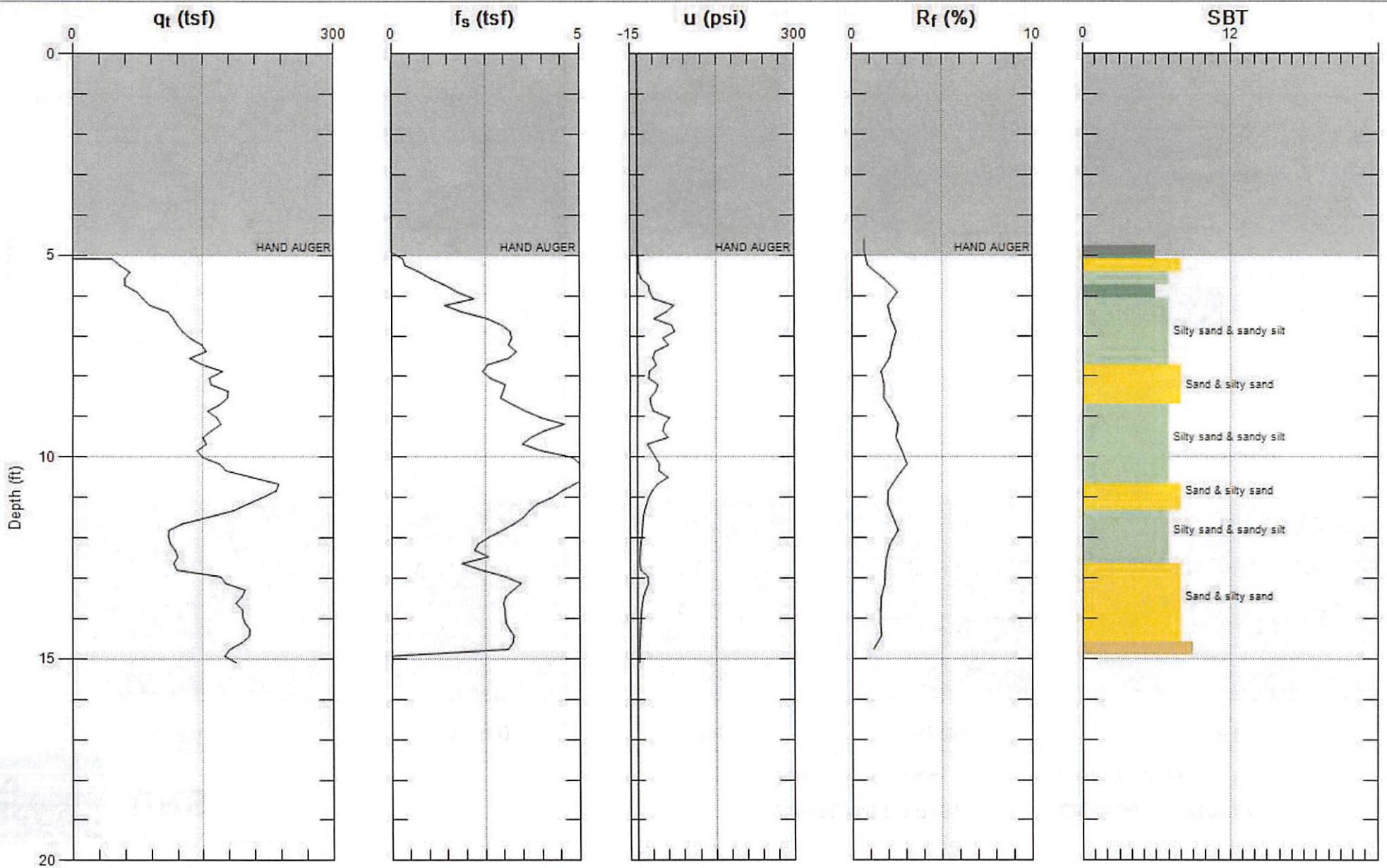
REFERENCE CPT 2 (CONTINUED)

GREGG

URS

Site: CITY OF ALAMEDA
Sounding: CPT-02

Engineer: P.MAAT
Date: 7/2/2013 09:11



Max. Depth: 15.092 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

REFERENCE CPT 3

GREGG

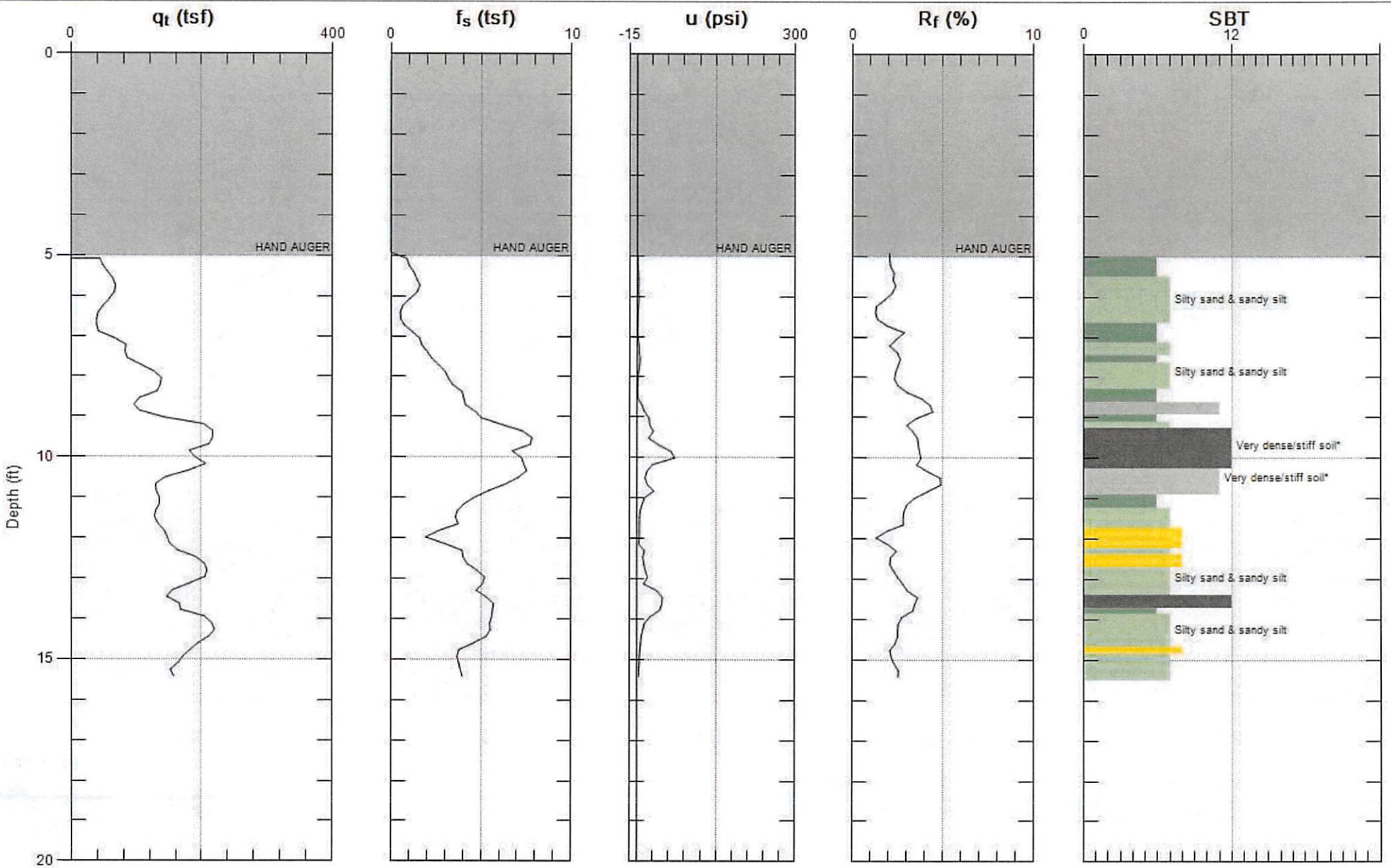
URS

Site: ALAMEDA P+PW

Sounding: CPT-04

Engineer: S.GAMBINO

Date: 5/6/2011 11:41

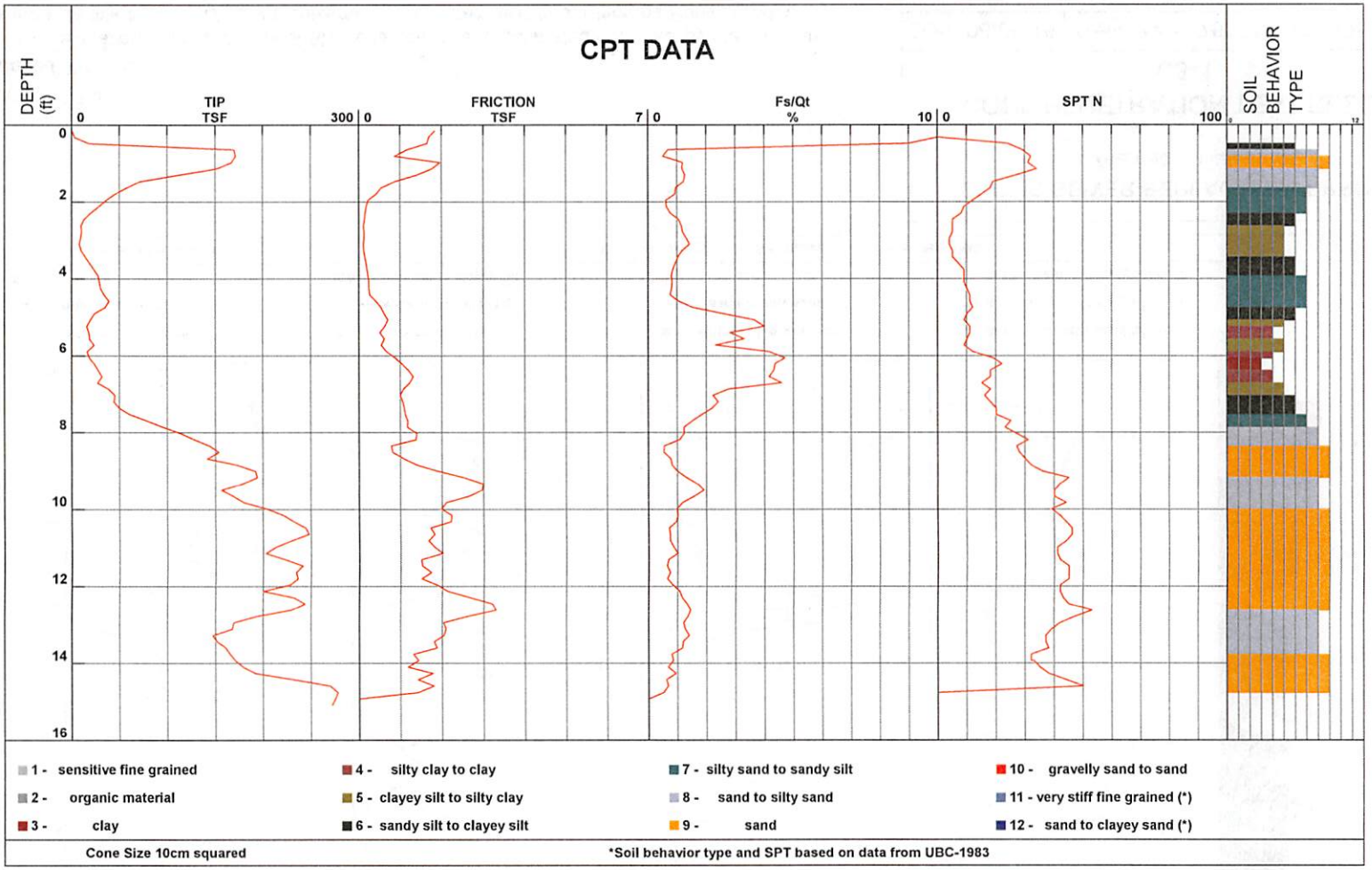


Max. Depth: 15.420 (ft)

Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

REFERENCE CPT 4



Terminated at 15.1 feet.
Groundwater estimated at 7 feet (see Figure B-19, Pore Pressure Dissipation Test).
Date performed 05/11/15.
Ground surface elevation: 11 feet, City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15.

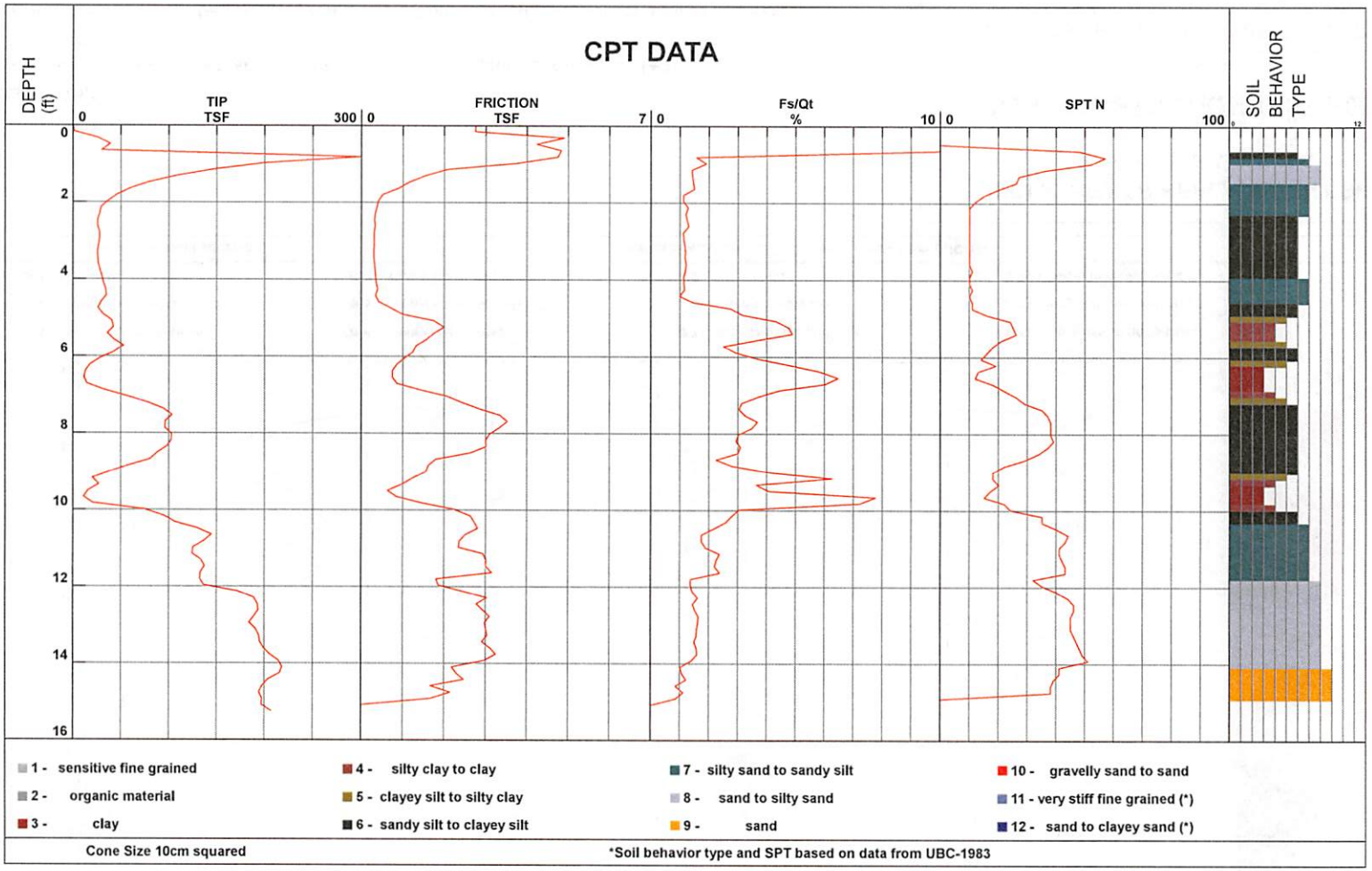
CYCLIC SEWER REPLACEMENT PROJECT
Alameda, California

CONE PENETRATION TEST RESULTS
C3-2

Date 06/05/15	Project No. 750513315	Figure B-5

LANGAN TREADWELL ROLLO

REFERENCE CPT 5



Terminated at 15.3 feet.

Date performed 05/11/15.

Ground surface elevation: 16.5 feet, City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15.

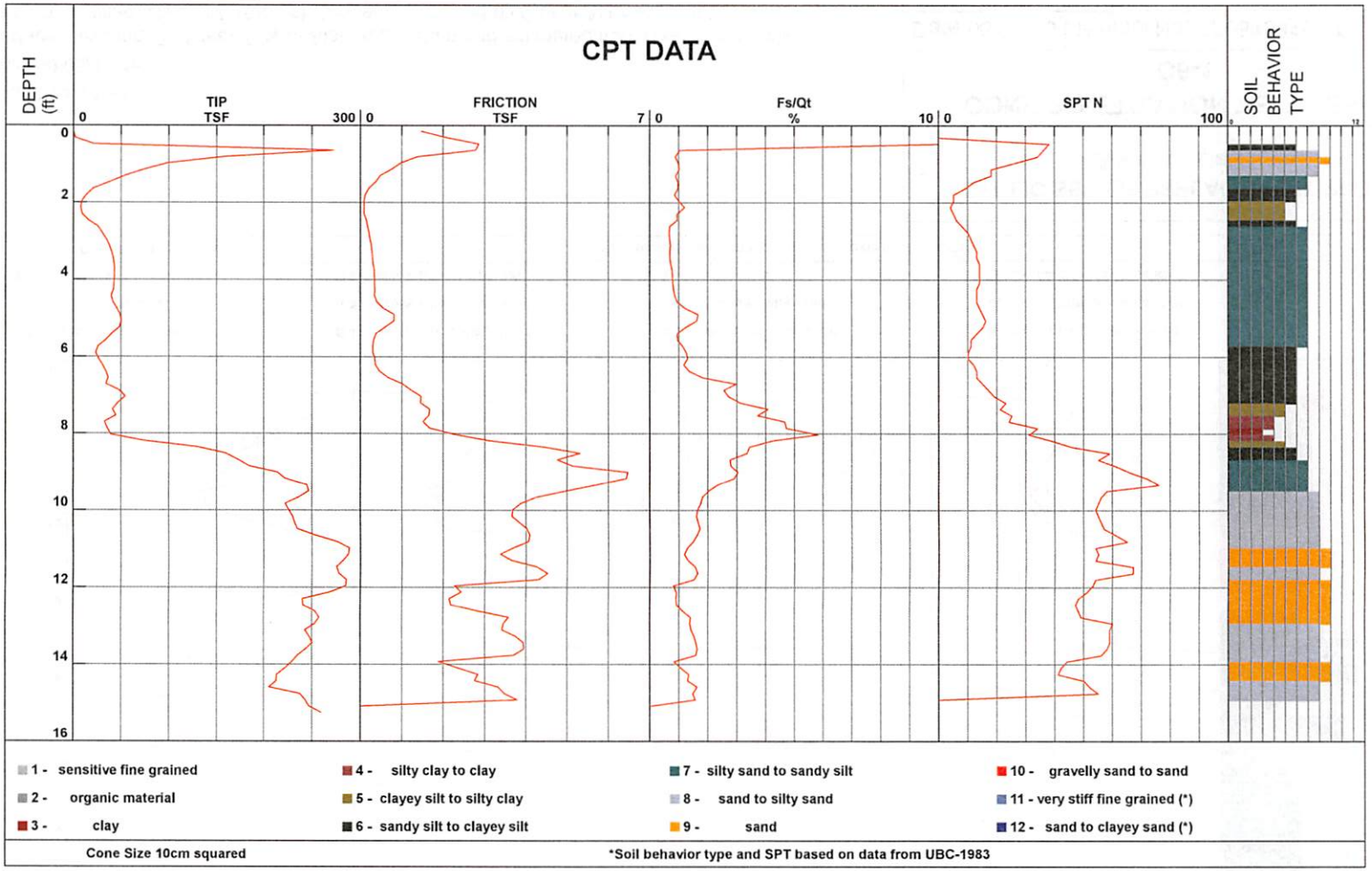
CYCLIC SEWER REPLACEMENT PROJECT
Alameda, California

CONE PENETRATION TEST RESULTS
C3-1

Date 06/05/15	Project No. 750513315	Figure B-4

LANGAN TREADWELL ROLLO

REFERENCE CPT 6



Terminated at 15.3 feet.

Date performed 05/11/15.

Ground surface elevation: 27 feet, City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15.

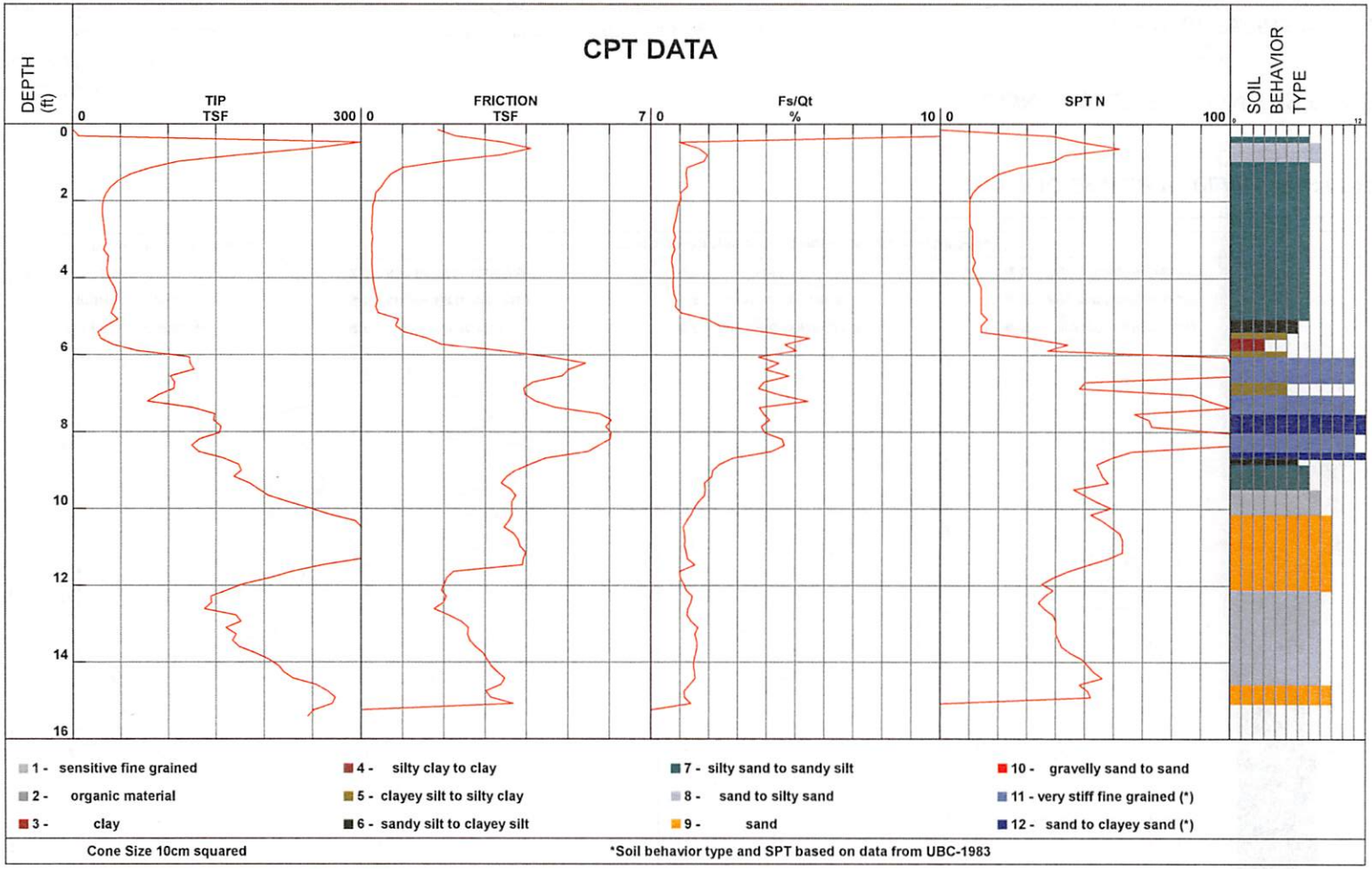
CYCLIC SEWER REPLACEMENT PROJECT
Alameda, California

CONE PENETRATION TEST RESULTS
C5-2

Date 06/05/15	Project No. 750513315	Figure B-8

LANGAN TREADWELL ROLLO

REFERENCE CPT 7



Terminated at 15.4 feet.

Date performed 05/11/15.

Ground surface elevation: 27.5 feet, City of Alameda Datum and estimated from nearby manhole rim elevations from file titled "Cyclic12_GeotechRequest," provided by City of Alameda Public Works Department via email on 04/06/15.

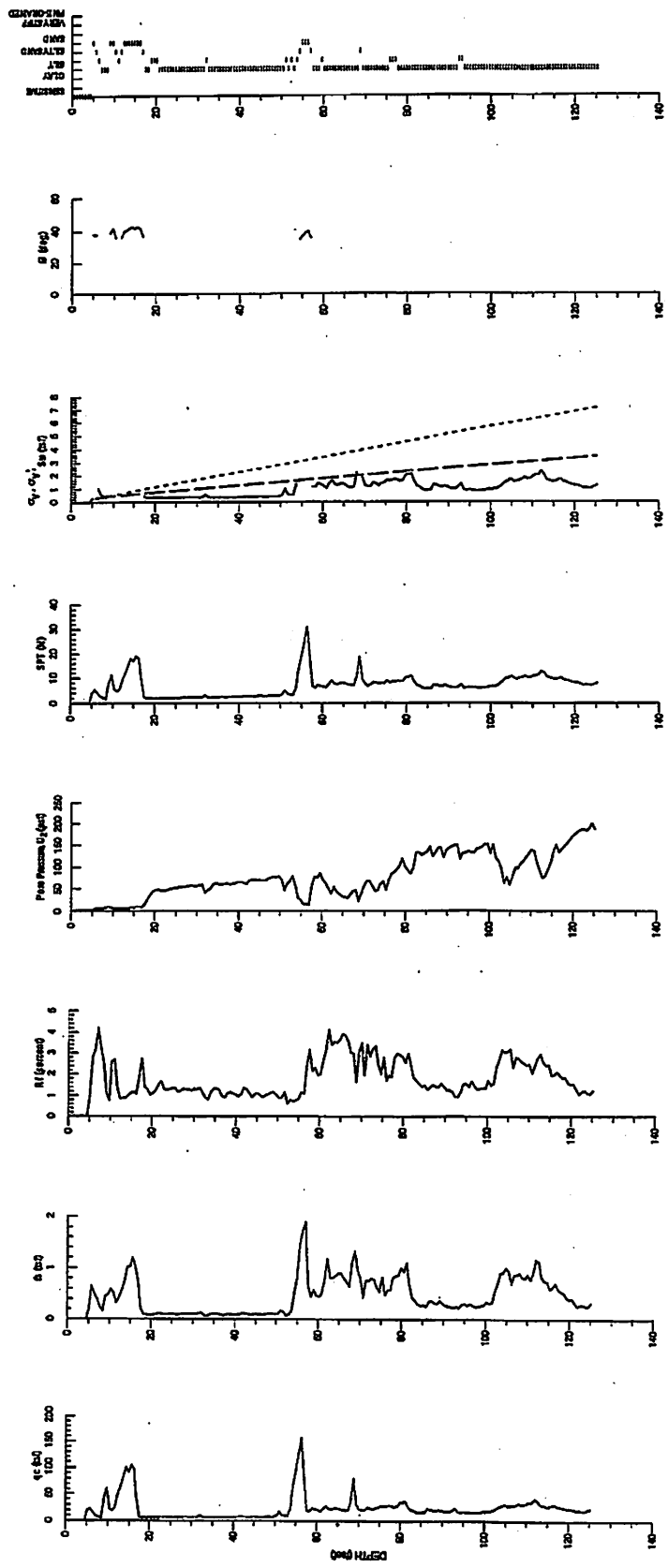
CYCLIC SEWER REPLACEMENT PROJECT
Alameda, California

CONE PENETRATION TEST RESULTS
C5-1

Date 06/05/15	Project No. 750513315	Figure B-7

LANGAN TREADWELL ROLLO

REFERENCE CPT-8



ALAMEDA LANDING
RETAIL ANCHOR BUILDING
Alameda, California

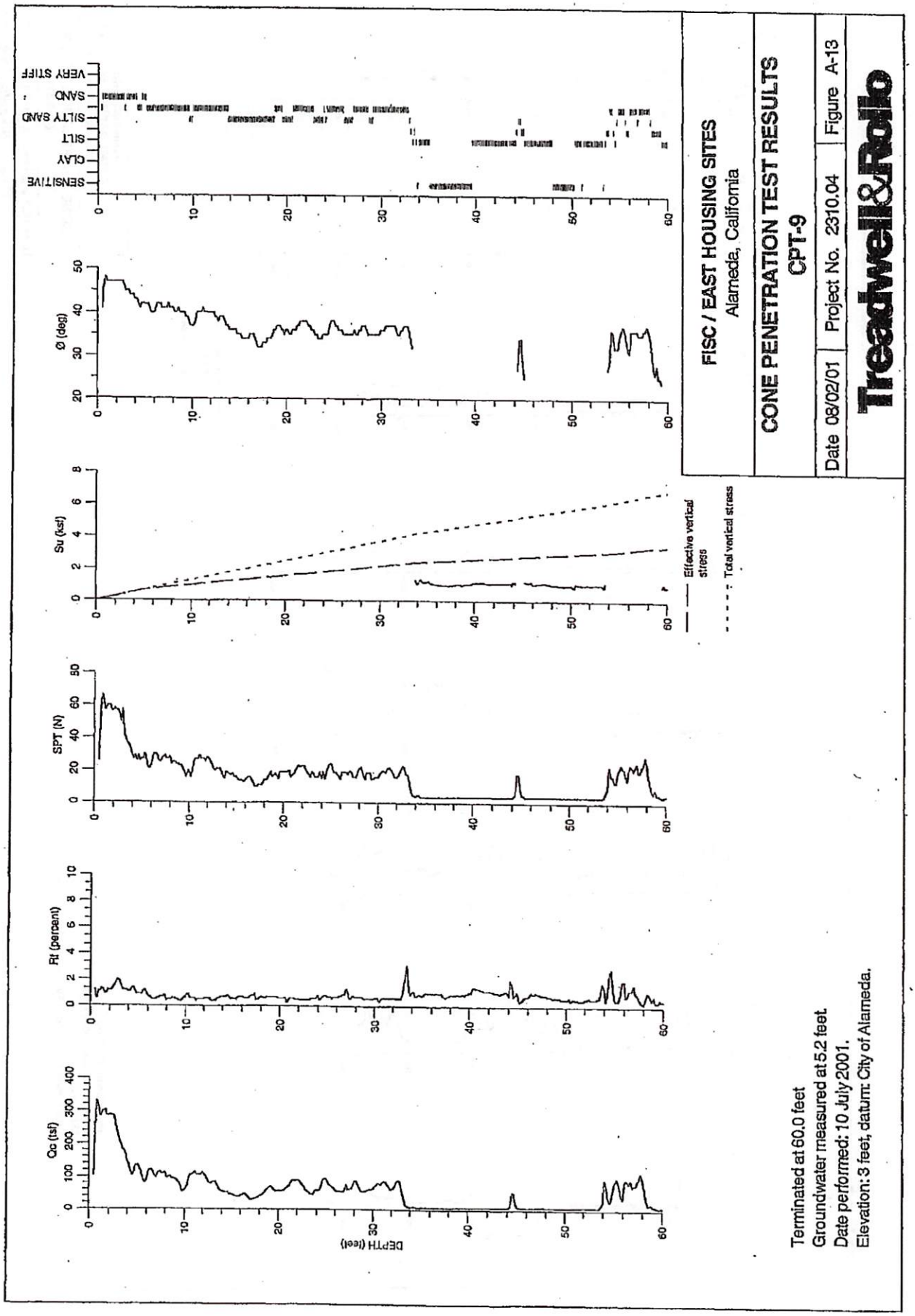
CONE PENETRATION TEST RESULTS
CPT-R4

Date 02/14/12 | Project No. 731584101 | Figure B-16

Treadwell&Rollo
A LANGAN COMPANY

Terminated at 125.2 feet
Groundwater assumed at 8 feet.
Data performed: 02/01/12.
Ground surface elevation: 6.6 feet, City of Alameda datum.

REFERENCE CPT-9



Geotechnical Evaluation

Cyclic Sewer Replacement, Phase 15
Alameda, California

City of Alameda

950 W Mall Square, Room 110 | Alameda, California 94501

December 8, 2017 | Project No. 403144001



Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

December 8, 2017
Project No. 403144001

Mr. Philip Lee
City of Alameda
950 W. Mall Square, Room 110
Alameda, California 94501

Subject: Geotechnical Evaluation
Cyclic Sewer Replacement Phase 15
Alameda, California

Dear Mr. Lee:

In accordance with your authorization, we have performed a geotechnical evaluation for Phase 15 of Cyclic Sewer Replacement Project on various streets in Alameda, California. This report presents the findings from our subsurface exploration, and our conclusions and geotechnical recommendations regarding the proposed project.

As an integral part of our role as the geotechnical engineer-of-record, we request the opportunity to review the construction plans before they go to bid and to provide follow-up construction observation and testing services.

Ninyo & Moore appreciates the opportunity to be of service to you on this project.

Sincerely,
NINYO & MOORE

Su Pyae Sone Soe, EIT
Senior Staff Engineer

Peter C. Connolly, PE, GE
Principal Engineer



SPS/PCC/vmn

Distribution: (1) Addressee (via e-mail)

CONTENTS

1	INTRODUCTION	1
2	SCOPE OF SERVICES	1
3	PROJECT AND SITE DESCRIPTION	3
4	SUBSURFACE EVALUATION AND LABORATORY TESTING	3
5	GEOLOGIC AND SUBSURFACE CONDITIONS	4
5.1	Regional Geologic Setting	4
5.2	Site Geology	4
5.3	Subsurface Conditions	5
5.3.1	Pavement Section	5
5.3.2	Fill	6
5.3.3	Merritt Sand	7
5.3.4	Bay Deposits	7
5.4	Groundwater	7
6	GEOLOGIC HAZARDS AND GEOTECHNICAL ISSUES	7
6.1	Seismic Hazards	8
6.2	Static Settlement	8
6.3	Expansive Soils	8
6.4	Material Suitability	9
6.5	Excavatability	9
6.6	Excavation Wall Stability	9
6.7	Excavation Bottom Stability	10
6.8	Uplift Considerations	10
7	CONCLUSIONS	11
8	RECOMMENDATIONS	11
8.1	Earthwork	11
8.1.1	Abandonment of Existing Utilities	11
8.1.2	Observation and Removals	12
8.1.3	Excavation Stabilization and Temporary Slopes	12
8.1.4	Construction Dewatering	14
8.1.5	Drainage	15

8.1.6 Material Requirements 15
8.1.7 Subgrade Preparation 16
8.1.8 Fill Placement and Compaction 16
8.1.9 Rainy Weather Considerations 18
8.2 Thermoplastic Pipe 18
8.3 Uplift Resistance 19
8.4 Pavement Resurfacing 19
8.5 Review of Construction Plans 20
8.6 Pre-Construction Conference 20
8.7 Construction Observation and Testing 20
9 LIMITATIONS 20
10 REFERENCES 22

TABLES

1 – Segments Under Consideration 2
2 – Thickness of Asphalt Concrete and Aggregate Base 6
3 – Recommended OSHA Material Classifications and Allowable Slopes 13
4 – Recommended Material Requirements 16
5 – Subgrade Preparation Recommendations 16
6 – Recommended Compaction Requirements 17

FIGURES

1 – Site Location
2A to 2D – Boring Locations
3 – Lateral Earth Pressures for Cantilevered Shoring
4 – Lateral Earth Pressures for Braced Excavation

APPENDICES

A – Boring Logs
B – Laboratory Testing

1 INTRODUCTION

In accordance with your request, Ninyo & Moore has performed a geotechnical evaluation for Phase 15 of the sanitary sewer replacement project in Alameda, California. The segments under consideration for this phase of the project are listed in Table 1 and highlighted on Figure 1. The purpose of our study was to evaluate the near-surface soil conditions within the proposed sanitary sewer corridors and provide recommendations for the design and construction of the proposed sewer replacement. This report presents the findings from our subsurface exploration, the results of our geotechnical laboratory testing, our conclusions regarding the geotechnical conditions at the subject site, and our geotechnical recommendations for the project.

2 SCOPE OF SERVICES

Ninyo & Moore's scope of services for this phase of the project included review of pertinent background data, performance of a geotechnical reconnaissance, subsurface evaluation, laboratory testing, and engineering analysis with regard to the proposed construction. Specifically, we performed following tasks:

- Review of readily available background materials, including topographic maps, geologic data and maps, and fault and seismic hazard maps.
- Geotechnical Site reconnaissance to observe the surficial geologic conditions and to select and mark the boring locations for utility mark-out services.
- Coordination with Underground Service Alert (USA) to locate the underground utilities in the vicinity of the proposed borings. A private utility survey was also conducted to further evaluate subsurface conflicts.
- Preparation of a traffic control plan for data collection activities. Providing an arrow board, signs, cones, and a flagman, as-needed, to divert traffic around the work area while data is being collected.
- A subsurface drilling permit was obtained from Alameda County Public Works Agency (ACPWA), and exploratory borings were backfilled in conformance with the ACPWA drilling permit.
- Subsurface exploration consisting of 19 solid-stem auger borings using truck-mounted drilling equipment and 4 hand auger borings. A representative of Ninyo & Moore logged the subsurface conditions exposed and collected soil samples for laboratory testing.
- Coring the pavement at the boring locations to check for petromat within the asphalt concrete.
- Soil cuttings from the subsurface exploration were collected in buckets and disposed in a landfill accepting non-hazardous waste.
- Laboratory testing of selected soil samples was performed to evaluate geotechnical characteristics.

- Data compilation and geotechnical analysis of field and laboratory data.
- Preparation of this report presenting the findings and conclusions from our field exploration laboratory testing, and engineering analyses, as well as our geotechnical recommendations for the design and construction of the proposed sanitary sewer improvements.

Table 1 – Segments Under Consideration

Segment No.	Streets	Segment Length	Street Segment	
			From	To
1	Brush Street	393 feet	2nd Street	3rd Street
2	Cypress Street	421 feet	3rd Street	End
3	Haight Avenue	743 feet	Pacific Avenue	3rd Street
4	Taylor Avenue	659 feet	3rd Street	5th Street
5	Road (203' east of 6th Street)	173 feet	Pacific Avenue	End
6	8th Street	620 feet	Stewart Court	Buena Vista Avenue
7	Buena Vista Avenue	654 feet	9th Street	Chapin Street
8	Pacific Avenue	1332 feet	Chapin Street	Sherman Street
9	Eagle Avenue	1367 feet	Chapin Street	Sherman Street
10	Sherman Street	372 feet	200' North of Eagle Avenue	200' South of Eagle Avenue
11	Buena Vista Avenue	11 feet	Jay Street	Jay Street
12	Minturn Street	398 feet	Lincoln Avenue	End
13	Schiller Street	360 feet	Buena Vista Avenue	Pacific Avenue
14	Lafayette Street	305 feet	Santa Clara Avenue	Lincoln Avenue
15	Union Street	876 feet	San Antonio Avenue	End
16	Noble Avenue	621 feet	Everett Street	Broadway
17	Foley Street	436 feet	Buena Vista Avenue	Tilden Way
18	Briggs Avenue	1271 feet	High Street	Fernside Boulevard
19	Jackson Street	416 feet	Mound Street	Grove Street
20	Chester Street	467 feet	Regent Street	Broadway
21	Washington Street	566 feet	Doris Court	Versailles Avenue
22	Clay Street	437 feet	Versailles Avenue	Mound Street
23	Post Street	1220 feet	San Jose Avenue	End
24	Toyon Terrace	141 feet	Post Street	End
25	Adams Street	166 feet	Post Street	Peach Street
26	Oyster Pond Road	514 feet	Basinside Way	Robert Davey Jr. Drive

3 PROJECT AND SITE DESCRIPTION

The proposed project consists of sanitary sewer replacement at 26 alignments in the City of Alameda (Figure 1). The sewer replacement work involves the removal and replacement of the sanitary sewer main and laterals within the public right-of-way on the streets provided in Table 1. We understand that sewer mains will be replaced with Polyvinyl Chloride (PVC) pipes, and that the laterals will be replaced with High Density Polyethylene (HDPE) pipes. We also understand that the alignment depth will range between approximately 2 and 20 feet below the existing grade.

The proposed alignments for the project are under asphalt-paved streets that are partially tree-lined. Drainage is controlled by gutters and storm drains. Except for Cypress Street, Sherman Street, Minturn Street, Foley Street, Toyon Terrace, and Oyster Pond Road, the street segments along the proposed alignments are two-way streets, approximately 30 to 40 feet wide, with one lane for travel in each direction and a parking lane on both sides of the street. Ground elevations range from approximately 8 to 32 feet above mean sea level (Google Earth, 2017). The portions of Minturn Street and Sherman Street along the proposed alignments are two-way streets, approximately 20 to 40 feet wide, with one lane for travel in each direction and a parking lane on one side of the street. Ground elevations range between approximately 10 to 11 feet above mean sea level (MSL) along Sherman Street and 27 to 30 feet above MSL along Minturn Street (Google Earth, 2017). The portions of Cypress Street, Toyon Terrace, and Oyster Pond Road along the proposed alignments are two-way streets, approximately 20 to 35 feet wide, with one lane for travel in each direction but no parking lane. Ground elevations range from approximately 9 to 13 feet above MSL (Google Earth, 2017). Foley Street near the proposed alignment is a one-way street, approximately 20 feet wide, with one lane for travel and a parking lane. Ground elevations along Foley Street near the alignment range between approximately 22 and 25 feet above MSL (Google Earth, 2017).

4 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our field exploration included a site reconnaissance and a subsurface exploration conducted between October 23 and 27, 2017. The subsurface exploration consisted of drilling, logging, and sampling nineteen (19) solid-stem auger exploratory borings and four (4) hand auger exploratory borings. The solid-stem auger borings were advanced to depths of approximately 11½ to 26½ feet below ground surface using a truck-mounted drill rig. The hang auger borings were advanced to depths of approximately 5 to 7½ feet below ground surface. The locations of the borings are presented on Figures 2A through 2D. A representative of Ninyo & Moore logged

the subsurface conditions exposed in the borings and collected representative soil samples for laboratory testing. Descriptions of the subsurface materials encountered are presented in the following sections. Detailed boring logs are presented in Appendix A.

The laboratory testing for this study included tests to evaluate in-situ moisture content and dry density, percentage of particles finer than the No. 200 sieve, direct shear strength, unconfined compressive strength, and sand equivalent index. The results of the in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. The results of the other laboratory tests performed are presented in Appendix B.

5 GEOLOGIC AND SUBSURFACE CONDITIONS

5.1 Regional Geologic Setting

The site is located on the eastern side of San Francisco Bay in the Coast Ranges Province of California. The Coast Ranges are comprised of several mountain ranges and structural valleys stretching approximately 600 miles from the Oregon border to the Santa Ynez River. They are formed by tectonic processes commonly found around the Circum-Pacific belt. Basement rocks have been sheared, faulted, metamorphosed, and uplifted, and are separated by thick blankets of Cretaceous and Cenozoic sediments that fill structural valleys and line continental margins. The San Francisco Bay Area has several ranges that trend northwest-southeast, parallel to major strike-slip faults such as the San Andreas, Hayward, and Calaveras. Major tectonic activity associated with these and other faults consists primarily of right-lateral strike-slip movement.

5.2 Site Geology

Radbruch (1959) indicates that, based on unpublished data from 1856, project alignments on Clay Street, Toyon Terrace, Oyster Pond Road, the southern portion of Post Street, the eastern portion of Briggs Avenue, and the eastern portion of Adams Street are located on reclaimed land which extended from former shoreline to the present bay margin. The project alignments on the other streets and the remaining portions of Post Street, Briggs Avenue, and Adams Avenue are within the limits of the former shoreline of the San Francisco Bay, and therefore are located within the boundaries of the original Alameda peninsula.

Published geologic maps indicate that the alignments not located on reclaimed land are underlain by Holocene to Pleistocene dune sand (Graymer, 2000; Witter et al, 2006; Knudsen et al, 2000), designated as Merritt Sand by Helley & Graymer (1997), Radbruch & Case (1967),

and Radbruch (1957). Project alignments on reclaimed land are underlain by artificial fill (Graymer, 2000; Helley & Graymer, 1997; Radbruch & Case, 1967; Radbruch, 1957). Knudsen et al (2000), and Witter et al (2006) indicate that the artificial fill is underlain by bay mud.

Helley & Graymer (1997) described the Merritt Sand as fine-grained, very well sorted, well-drained eolian deposits, while Radbruch (1957) described the Merritt Sand as fine-grained, silty, clayey, with lenses of sandy clay and clay, wind- and water- deposited beach and near-shore deposits. Graymer (2000) described the dune sand as fine-grained, very well sorted, well-drained, eolian deposits, and indicates that it is probably time-correlative with the Merritt Sand. Radbruch (1959) indicates that most artificial fill along the east shore of San Francisco Bay consists of Merritt Sand that has been dredged or pumped from offshore underwater borrow areas, but in some places it may consist of bay mud, materials from the Temescal formation, broken rock, or miscellaneous refuse. Graymer (2000) described the bay mud as water-saturated estuarine mud of Holocene age that contains a few lenses of well-sorted, fine sand and silt with shelly layers and peat.

5.3 Subsurface Conditions

The exploratory borings were advanced through pavement and fill. Other materials encountered during our subsurface evaluation included Merritt Sand, and Bay Deposits. Generalized descriptions of the units encountered are provided in the subsequent sections. More detailed descriptions are presented on the boring logs in Appendix A.

5.3.1 Pavement Section

The pavement sections encountered in our borings consisted of asphalt concrete over an aggregate base section. The thicknesses of the asphalt concrete and aggregate base for each street are listed in Table 2. Petromat was encountered within the asphalt concrete section in Borings B-1, B-5, B-6, B-8, B-9, B-10, B-13, B-15, and B-16.

Variations in the thickness of asphalt concrete, and aggregate base layers within and beyond the range observed may be encountered due to past maintenance, utility work or other factors.

Table 2 – Thickness of Asphalt Concrete and Aggregate Base				
Boring	Streets	Asphalt Concrete (inches)	Depth to Petromat (inches)	Aggregate Base (inches)
B-1	Brush Street	4	2	5
B-2	Cypress Street	5		11
B-3	Haight Avenue	3½		4
B-4	Taylor Avenue	4½		4
B-5	Road (203' east of 6th Street)	8	3½	4
B-6	8th Street	2½	2½	16
B-7	Buena Vista Avenue	2½		10½
B-8	Pacific Avenue	4	2	5
B-9	Eagle Avenue	5½	2½	5
B-10	Buena Vista Avenue	4	3	5
B-11	Minturn Street	4¼		5
B-12	Schiller Street	1½		5½
B-13	Lafayette Street	3	1½	4½
B-14	Union Street	2½		5½
B-15	Noble Avenue	6	2	3½
B-16	Briggs Avenue	5	1½	5
B-17	Jackson Street	1½		6
B-18	Chester Street	1½		7½
B-19	Washington Street	1½		6
B-20	Clay Street	4		5½
B-21	Toyon Terrace	3¼		7
B-22	Adams Street	2½		6½
B-23	Oyster Pond Road	3		4

5.3.2 Fill

Fill was encountered below the pavement section in Borings B-1, B-3, B-4, B-5, B-7, B-9, B-12, B-13, B-14, B-20, B-21, B-22, and B-23. The depth to the bottom of the fill ranges from approximately 2¼ feet to 12 feet. The fill, as encountered, generally consisted of moist to wet, loose to medium dense silty sand with lenses of clay.

5.3.3 Merritt Sand

Merritt Sand was encountered from below the pavement section to the depths explored in Boring B-2, B-6, B-8, B-10, B-11, B-15, B-16, B-17, B-18, and B-19 or below the fill in the other borings with the exception of Borings B-22 and B-23. The Merritt Sand, as encountered, generally consisted of moist to wet, loose to very dense, silty sand, poorly graded sand with silt, and clayey sand.

5.3.4 Bay Deposits

Bay deposits were encountered from below the fill to the depths explored in Boring B-23. The Bay Deposits generally consisted of wet, stiff, fat clay.

5.4 Groundwater

Groundwater was generally encountered during the subsurface exploration for this study except in Borings B-7, B-21, and B-22. The groundwater was encountered at depths ranging from approximately 4 to 10 feet below the ground surface. The Seismic Hazard Zone Reports for the Oakland East Quadrangle (CGS, 2003a), Oakland West Quadrangle (CGS, 2003b), and San Leandro Quadrangle (CGS, 2003c) indicate that the historic high groundwater level is generally between 5 and 10 feet below the ground surface except for the alignment on Chester Street where the historic high groundwater level is around 10 feet deep, and the alignments on Oyster Pond Road, Toyon Terrace, Taylor Avenue, Clay Street, and Union Street where the depth to historic high groundwater is around 5 feet or less.

The depth to groundwater within the limits of the study area is subject to spatial variations in topography and subsurface hydrogeologic conditions. Groundwater may rise to a higher elevation than was encountered in our exploratory borings due to the short time available for seepage of water into the borings. Furthermore, groundwater levels may fluctuate in response to seasonal variations in precipitation, tidal influences, groundwater pumping/dewatering nearby, changes in irrigation practices adjacent to or within the study area, or other factors.

6 GEOLOGIC HAZARDS AND GEOTECHNICAL ISSUES

This study addressed a number of potential issues relevant to the proposed construction, including seismic hazards, static settlement, expansive soils, material suitability, excavation characteristics, and uplift considerations. These issues are discussed in the following subsections.

6.1 Seismic Hazards

The project alignments are within a seismically active region and may experience a relatively high degree of ground shaking following a significant seismic event on a nearby fault. The alignments are not located within an Alquist-Priolo Fault Rupture Hazard Zone established by the state of geologist to delineate regions of potential ground surface rupture adjacent to active faults (CGS, 1982a; 1982b; 1982c). The closest fault to the sites known to be active is the Hayward fault to the east. The lateral distance between the Hayward fault and the various project alignments ranges between approximately 3¼ and 5½ miles.

Strong ground shaking may induce liquefaction and related hazards such as sand-boils and dynamic settlement in susceptible soils. The study alignment is within a liquefaction seismic hazard zone as mapped by the CGS (2003d; 2003e; 2003f), and is generally mapped as having moderately susceptibility to liquefaction (Kundsen, et al., 2000; Witter et al., 2006) except for the alignments on reclaimed land (Clay Street, Toyon Terrace, Oyster Pond Road, the southern portion of Post Street, the eastern portion of Briggs Avenue, and the eastern portion of Adams Street) that are in a mapped area of very high susceptibility to liquefaction.

Consequently, differential settlement of the sewer from liquefaction, sand-boils, and dynamic settlement should be anticipated following a significant seismic event. A rigorous evaluation of liquefaction and related phenomena was not part of our scope of work for this project. Based upon previous experience in the City of Alameda, the replacement sewer may undergo a few inches of differential dynamic settlement. Flexible couplings and increased pipeline gradients can mitigate some of the consequence of the differential dynamic settlement. In general, remedial grading and paving is the economically preferred alternative to mitigating liquefaction and related hazards for city streets and should be anticipated for the project improvements.

6.2 Static Settlement

We anticipate that the loads associated with the new pipelines and related manholes or vaults will be balanced by the weight of the displaced soil such that the net load will be negligible. As such, we do not regard post-construction settlement due to static loads as a design consideration.

6.3 Expansive Soils

Some clay minerals undergo volume changes upon wetting or drying. Unsaturated soils containing those minerals will shrink/swell with the removal/addition of water. The heaving pressures associated with this expansion can damage structures and flatwork. We do not

regard expansive soils as a design consideration given the predominantly granular nature of the subsurface materials encountered in the study area.

6.4 Material Suitability

In general, based on the findings from our subsurface exploration, we anticipate that the soil materials excavated for the new sewer alignments, with the exception of the bay deposits, will be suitable, from a geotechnical perspective, for re-use in some capacity as trench backfill, provided that the materials are not too wet to inhibit compaction or get mixed with deleterious or otherwise unsuitable material. Trench spoils, particularly from below the groundwater table, may be too wet to compact when excavated. The spoils may need to be spread out to dry before being reused as backfill.

The material encountered in our subsurface exploration, with the exception of the bay deposits, generally consisted of silty sand. This material may be classified as Class III backfill as per American Society for Testing and Materials (ASTM) Standard D 2321 and may be suitable in a dry or dewatered trench, for use as pipe bedding, initial backfill, and general trench backfill. At locations where the trench is above the groundwater table, this material may be suitable for use as foundation material and for replacing overexcavated trench bottom. The allowable thickness of the foundation section is 12 inches for Class III material. Class III material should not be used as foundation material or for replacing overexcavated trench bottom at locations where the trench bottom is below the groundwater table. The bay deposits encountered during our subsurface exploration at Boring B-23, consisted of fat clay, which may be classified as Class IVB material that is unsuitable for use as bedding or pipe zone fill. The bay deposits that do not contain organic material may be used to trench backfill above the pipe zone fill provided that the material is moisture conditioned to near the optimum moisture content.

6.5 Excavatability

We anticipate that the proposed project will involve excavations of up to about 20 feet for installation of new pipelines. The geologic units encountered during our subsurface evaluation within this interval consisted primarily of loose to dense silty sand. We anticipate that backhoes, excavators, or other trenching equipment in good working condition should be able to make the proposed excavations.

6.6 Excavation Wall Stability

The geologic units encountered during our subsurface evaluation generally consisted of loose to dense silty sand. Our subsurface evaluation encountered a relatively shallow groundwater table. Cuts in these deposits or excavations below the groundwater table may not remain stable

without appropriate inclination of side slopes or shoring. Precipitation on the trench sidewalls or surface runoff over the trench sidewalls may further adversely impact the stability of the excavation walls. Dewatering measures may be needed to provide a dry excavation in which to work. Temporary surface drainage improvements may also be advisable. Recommendations for dewatering and drainage improvements are presented in Sections 8.1.4 and 8.1.5.

Techniques for trench shoring may consist of movable trench boxes or shields, sheeting and hydraulic or mechanical jacks, or driven sheet piling. Appropriately-sized trench boxes or shields should protect workers but may allow movement of the excavation wall which will result in subsidence at the ground surface. Tight sheeting (without gaps) with appropriately-sized hydraulic or mechanical jacks to provide positive pressure against the face of the excavation should reduce the horizontal deflection of the sidewall and resulting subsidence at the ground surface. Driven sheet piles may be needed to support the excavation sidewall if the unsupported wall cannot remain stable long enough to install trench shields or sheeting. Recommendations for excavation stabilization are presented in Section 8.1.3.

6.7 Excavation Bottom Stability

In general, we anticipate that the bottom of the pipeline trenches will remain stable and provide suitable support for compaction of backfill. However, excavations that extend near or below the water table may experience "quick" conditions or bottom instability. Unstable bottom conditions may warrant overexcavation and replacement with crushed, angular rock. Recommendations for stabilizing excavation bottoms should be based on evaluation in the field by the geotechnical consultant at the time of construction.

6.8 Uplift Considerations

The groundwater table is relatively shallow with respect to the proposed depth for some of the new alignments. We anticipate that the overburden pressures at the proposed depths of the new pipeline alignments will balance the buoyancy-related uplift forces due to submergence. Manholes and access vaults below the groundwater table; however, might be impacted by uplift forces. Recommendations for design parameters to resist buoyancy-related uplift forces are presented in Section 8.3.

7 CONCLUSIONS

Based on our review of the referenced documents, field reconnaissance, subsurface evaluation, and laboratory testing, it is our opinion that the proposed improvements are feasible from a geotechnical standpoint. Geotechnical considerations of note on this project include the following:

- The site could experience a relatively large degree of ground shaking due to a significant earthquake event resulting in liquefaction and dynamic settlement. The replacement sewer may be designed with flexible couplings and an increased gradient to accommodate a few inches of differential dynamic settlement.

- On-site material, with the exception of the bay deposits encountered near Oyster Pond Road, generally conforms to the requirements for Class III backfill and may be re-used as bedding, initial backfill, general backfill, and foundation material. Some of the on-site material may be too wet after excavation and will need to be dried out before placement as fill. The bay deposits encountered may be considered a Class IVB material and are unsuitable for use as bedding or pipe zone fill. Bay deposits that do not contain organic material may be used to trench backfill above the pipe zone fill provided that the material is moisture conditioned to near the optimum moisture content.

- Our subsurface exploration encountered a relatively shallow groundwater table. We anticipate that the proposed excavations will encounter groundwater and some of the pipes and manholes will be partially or wholly submerged. Recommendations for dewatering of excavations and parameters for modeling the uplift resistance of submerged manholes or vaults are presented in Sections 8.1.4 and 8.3, respectively.

- We anticipate that excavations may need to be shored or sloped appropriately to remain stable. Recommendations for excavation stabilization are presented in Section 8.1.3. Trench bottoms may be unstable due to the shallow groundwater table.

8 RECOMMENDATIONS

The following guidelines should be used in the preparation of the construction plans. The geotechnical consultant should review the proposed plans prior to construction.

8.1 Earthwork

The earthwork should be conducted in accordance with the relevant grading ordinances having jurisdiction and the following recommendations. The geotechnical engineer should observe earthwork operations. Evaluations performed by the geotechnical engineer during the course of operations may result in new recommendations, which could supersede the recommendations in this section.

8.1.1 Abandonment of Existing Utilities

We anticipate that the existing main sewer lines will largely be removed and disposed of during the sewer replacement work. If sewer mains and laterals are to be abandoned in

place, the pipes should be crushed, or plugged with pumpable grout or concrete mix. If plugged in place, the grout or concrete should be pumped from the high end of the pipe, with the low end plugged, until concrete completely fills the pipe. Excavations made to remove existing utilities should be backfilled in accordance with our recommendations in Section 8.1.8. Pavement and aggregate base debris generated during the abandonment should be removed from the project site and disposed of at a legal dumpsite. Excavated soil materials may be re-used as engineered fill provided that the materials comply with, or are processed to comply with, the recommendations in Section 8.1.6.

8.1.2 Observation and Removals

Prior to placement of bedding material, the client should request an evaluation of the exposed subgrade by the geotechnical consultant. Materials that are considered unsuitable shall be excavated under the observation of the geotechnical consultant in accordance with the recommendations in this section or the field recommendations of the geotechnical consultant.

Unsuitable materials include, but may not be limited to dry, loose, soft, wet, expansive, organic, or compressible natural soils; fractured, weathered, or soft bedrock; and undocumented or otherwise deleterious fill materials.

Unsuitable materials should be removed from the bottom of the trench to the depth of suitable material as evaluated by the geotechnical consultant in the field. Foundation material should be placed and compacted to get back to the design grade. The allowable thickness of ASTM D 2321 Class III foundation material is 12 inches. If thicker sections of foundation material are needed, Class IA foundation material with a filter fabric cover or Class IB foundation material should be used.

The subgrade of trenches excavated near or below the groundwater table may become unstable. Recommendations for stabilizing excavation bottoms should be based on an evaluation by the geotechnical consultant during construction. Stabilization recommendations might include installing additional sumps or well points, or overexcavating to install a drainage blanket or place suitable Class IA/IB foundation material.

8.1.3 Excavation Stabilization and Temporary Slopes

Excavations, including trench excavations, shall be stabilized in accordance with the Excavation Rules and Regulations (29 Code of Federal Regulations, Part 1926) stipulated by the Occupational Safety and Health Administration (OSHA, 1989). Stabilization shall

consist of shoring sidewalls or laying slopes back. Table 3 lists the OSHA material type classifications and corresponding allowable temporary slope layback inclinations for soil deposits that may be encountered on site. Alternatively, a shoring system may be used to stabilize excavation sidewalls during construction. Potential shoring systems include trench boxes/shields, sheeting with hydraulic or mechanical jacks, cantilever sheet piles, or sheet piles with internal braces. Trench boxes/shields and sheeting may be used to stabilized excavations above groundwater. The lateral earth pressures listed in Table 3 may be used to design or select the trench box/shield or sheeting system in accordance with the criteria listed in the OSHA Excavation Rules and Regulations (29 CFR Part 1926).

The recommendations presented in this table are based on the limited subsurface data provided by our exploratory borings and reflect the influence of the environmental conditions that existed at the time of our exploration. Excavation stability, material classifications, allowable slopes, and shoring pressures should be re-evaluated and revised, as-needed, during construction. Excavations, shoring systems and the surrounding areas should be evaluated daily by a competent person for indications of possible instability or collapse.

Table 3 – Recommended OSHA Material Classifications and Allowable Slopes

Formation	OSHA Classification	Allowable Temporary Slope[1,2,3]	Lateral Earth Pressure on Shoring[4] (psf)
Cohesive Bay Deposits (above groundwater)	Type B	1 h:1 v (45°)	45×D + 72
Fill and Merritt Sand (above groundwater)	Type C	1 ½ h:1 v (34°)	80×D + 72

1 Allowable slope for excavations less than 20 feet deep. Excavation sidewalls in cohesive soil may be benched to meet the allowable slope criteria (measured from the bottom edge of the excavation). The allowable bench height is 4 feet. The bench at the bottom of the excavation may protrude above the allowable slope criteria.
2 In layered soil, layers shall not be sloped steeper than the layer below.
3 Temporary excavations less than 5 feet deep may be made with vertical side slopes and remain unshored if judged to be stable by a competent person (29 CFR, Part 1926.650).
4 'D' is depth of excavation for excavations up to 20 feet deep. Includes a surface surcharge equivalent to two feet of soil.

Sheet piles that extend below the mudline may be needed for excavations below the groundwater table to reduce the potential for "quick" conditions or bottom instability. We anticipate that an embedment depth equivalent to 125 percent of the head differential after dewatering may be needed to provide a suitable factor of safety against piping. The earth pressure diagrams presented in Figure 3 may be used to design a cantilever sheet pile shoring system. The earth pressures listed in Figure 3 do not include a factor of safety. Once the depth of embedment and point of rotation are selected to meet shear and

moment equilibrium at the tip of the sheet pile, the depth of embedment should be increased by 20 to 40 percent for an approximate factor of safety of 1.5 to 2.0 and checked against the embedment depth needed to resist piping. Alternatively, the sheet pile shoring may be supported by internal braces. The earth pressure diagrams presented in Figure 4 may be used to design an internally-braced, sheet pile shoring system. The designer should select an appropriate factor of safety to use with the earth pressure diagrams presented in Figure 4.

The shoring system should be designed or selected by a suitably qualified individual or specialty subcontractor with consideration for the tolerable settlement of ground adjacent to the excavation. Potential causes of settlement that should be addressed include loss of lateral support following excavation, vibration during the installation of sheet piles, other construction induced vibrations, dewatering, and removal of the support system. Shoring should be sufficiently tight to reduce washout from behind the shoring. The shoring parameters presented in this report are preliminary design criteria, and the designer should evaluate the adequacy of these parameters and make appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect workers. OSHA requirements pertaining to worker safety should be observed.

We understand that the proposed excavations will not be in close proximity to existing structures. Excavations made in close proximity to existing structures may undermine the foundation of those structures and/or cause soil movement related distress to the existing structures. Stabilization techniques for excavations in close proximity to existing structures will need to account for the additional loads imposed on the shoring system and appropriate setback distances for temporary slopes. The geotechnical engineer should be consulted for additional recommendations if the proposed excavations cross below a plane extending down and away from the foundation bearing surfaces of adjacent structures at an angle of 1:1 (horizontal to vertical).

8.1.4 Construction Dewatering

Groundwater was encountered in our exploratory borings at depths ranging from approximately 4 to 10 feet below the ground surface. However, significant fluctuations in the groundwater level may occur as a result of variations in seasonal precipitation and other factors. Water intrusion into the excavations may occur as a result of groundwater intrusion or surface runoff. The contractor should be prepared to take appropriate dewatering measures in the event that water intrudes into the excavations. Considerations for construction dewatering should include anticipated drawdown, volume of pumping,

potential for settlement, and groundwater discharge. Disposal of groundwater should be performed in accordance with the guidelines of the Regional Water Quality Control Board.

When excavating near or below the groundwater table, the dewatering system should depress the water level below the bottom of the cut to reduce the potential for subgrade instability and washout from behind sheeting or sloughing of exposed trench walls. The dewatering system should maintain the water level about 2 feet below the pipe bedding and foundation material to provide a stable trench bottom. Sump pumps, well points, deep wells, geotextile-geonet composites, perforated underdrains, or stone blankets should be used, as appropriate, to drain water from below the bedding and foundation material. Perforated underdrains and open-graded stone blankets should be wrapped in a suitable geotextile filter to reduce the potential for the removal of fines and subsequent creation of voids in the overlying and adjacent materials. The operation of the dewatering system should continue during and after the installation of the pipe and embedment until sufficient backfill has been placed to balance the uplift forces.

8.1.5 Drainage

Temporary swales or cutoff barriers should be provided to divert surface water away from the excavation. Dams, cutoffs, or other barriers should be constructed on the bottom of the trench to reduce the velocity of subdrain discharge or runoff along the trench bottom thereby reducing the potential for erosion or undermining of trench walls, subgrade, bedding, or foundation materials.

8.1.6 Material Requirements

Materials used during earthwork, grading, and paving operations should comply with the requirements listed in Table 4. Materials should be evaluated by the geotechnical consultant for suitability prior to use. The contractor should notify the geotechnical consultant 72 hours prior to import of materials or use of on-site materials to permit time for sampling, testing, and evaluation of the proposed materials. On-site materials may need to be dried out before re-use as fill.

Table 4 – Recommended Material Requirements		
Material and Use	**Source**	**Requirements[1,2]**
Foundation below bedding material and pipe zone fill	Import	1½ inch open-graded crushed rock meeting ASTM D2321 Class IA with filter fabric (Mirafi 140 N); 1½ inch angular, dense graded, fine & coarse aggregate mixture meeting ASTM D2321 Class IB
	On-site borrow	No additional requirements[1]
Pipe Bedding Material and Pipe Zone Fill	Import	As per manufacturer's recommendations; or well-graded sand or sand gravel mixture with 5 percent fines or less and nominal size 3/4" or less
	On-site borrow	No additional requirements[1]
Trench Backfill above pipe zone fill	Import	Expansion Index less than 50; Free from rocks/lumps in excess of 2" diameter
	On-site borrow	No additional requirements[1]

[1] In general, fill should not consist of pea-gravel and should be free of rocks or lumps in excess of 6-inches diameter, trash, debris, roots, vegetation or other deleterious material.
[2] In general, import fill should be tested or documented to be non-corrosive[3] and free from hazardous materials in concentrations above levels of concern.
[3] Non-corrosive as defined by the Corrosion Guidelines (Caltrans, 2012).

8.1.7 Subgrade Preparation

Subgrade should be prepared as per the recommendations in Table 5. Prepared subgrade should be maintained in a moist (but not saturated) condition by the periodic sprinkling of water prior to placement of additional overlying fill or construction of pavements. Subgrade that has been permitted to dry out and loosen or develop desiccation cracking, should be scarified, moisture conditioned, and recompacted.

Table 5 – Subgrade Preparation Recommendations	
Subgrade Location	**Preparation Recommendations**
Sewer Trenches	• Check for and remove unsuitable materials as per Section 8.1.2. • Do not scarify. Compact as per Section 8.1.8 if disturbed. Remove or compact loose/soft material.

8.1.8 Fill Placement and Compaction

Fill and backfill should be compacted in horizontal lifts to meet the criteria listed in Table 6. The allowable uncompacted thickness of each lift of fill depends on the type of compaction equipment utilized, but generally should not exceed 8 inches in loose thickness. The allowable compacted thickness of Class III foundation material is 12 inches. The thickness of the bedding material placed below the pipe should be 4 inches or more. Where rock or other

unyielding materials are exposed in the trench bottom, or the pipe crosses other utilities or buried structures, the thickness of the bedding material should be increased to 6 inches. The pipe barrel should rest on the bedding material. Small holes should be excavated in the bedding material to provide room for bells. The bedding and initial backfill should be carefully placed by hand under the pipe haunches and in the bell holes to avoid creating voids below the pipe. Trenches should be wide enough to provide room to operate compaction equipment and wide enough to provide lateral clearance between the pipe and trench wall equivalent to half the pipe diameter. If the native soils cannot sustain a vertical cut or if the trench walls are sloped back for stability, the lateral clearance should be increased to a distance equivalent to the pipe diameter.

Bedding and pipe zone fill should be shoveled under pipe haunches and compacted by manual or mechanical, hand-held tampers. Trench backfill should be compacted by mechanical means. Densification of trench backfill, bedding and pipe zone fill by flooding or jetting is not recommended. Loose material that has sloughed off of trench sidewalls during pipeline installation, backfill placement, or compaction should be removed before placing and compacting additional fill. Special care should be exercised to avoid damaging the pipe during compaction of the backfill. Before allowing vehicles or typical construction equipment to cross over pipe, 36 inches of embedment cover should be placed and compacted over the pipe. Hydro-hammers should not be used for compaction.

Table 6 – Recommended Compaction Requirements

Fill Type	Location	Compacted Density[1]	Moisture Content[2]
Aggregate Base	Pavement sections	95 percent	At or near optimum
Trench Backfill	Within 3 feet from top of pavement	95 percent	At or near optimum
	In locations not already specified	90 percent	At or near optimum
Pipe Zone Fill	Material above bedding to 12 inches above pipe	90 percent	At or near optimum
Bedding	Material below conduit invert	90 percent	At or near optimum

[1] Expressed as percent relative compaction or ratio of field density to reference density (typically on a dry density basis for soil). The reference density of soil should be evaluated by the latest version of ASTM D 1557.

[2] Optimum moisture should be evaluated by latest version of ASTM D 1557.

Compacted fill should be maintained in a moist (but not saturated) condition by the periodic sprinkling of water prior to placement of additional overlying fill or construction of the pavement section. Fill that has been permitted to dry out and loosen or develop desiccation

cracking, should be scarified, moisture conditioned, and recompacted as per the requirements above.

8.1.9 Rainy Weather Considerations

We recommend that construction be performed during the period between approximately April 15 and October 15, to avoid the rainy season. In the event that grading is performed through the rainy season, the plans for the project should be supplemented to include a stormwater management plan prepared in accordance with the requirements of the relevant agency having jurisdiction. The plan should include details of measures to protect the subject property and adjoining off-site properties from damage by erosion, flooding or the deposition of mud, debris, or construction-related pollutants, which may originate from the site or result from the grading operation. The protective measures should be installed by the commencement of grading, or prior to the start of the rainy season. The protective measures should be maintained in good working order unless the drainage system is installed by that date and approval has been granted by the building official to remove the temporary devices.

In addition, construction activities performed during rainy weather may impact the stability of excavation subgrade and exposed ground. The geotechnical engineer should be consulted for recommendations to stabilize the site as-needed.

8.2 Thermoplastic Pipe

Thermoplastic pipe, consisting of either PVC or HDPE, is considered to be a flexible conduit. Flexible conduits should be designed or specified with particular consideration of (1) the load on the pipe including traffic and soil overburden, (2) soil stiffness in the pipe zone, and (3) stiffness of the pipe material. The thermoplastic pipes on this project should be designed or specified with due consideration for these factors.

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed at the sides of buried flexible pipelines for the purpose of evaluating lateral deflection caused by the weight of the backfill above the pipe. We recommend that a modulus of soil reaction of 1000 pounds per square inch be used for design, provided that the pipe embedment material (including bedding and pipe zone backfill) and general trench backfill conform to and are compacted in accordance with the recommendations provided in this report.

As discussed in Section 6.1, the proposed alignments traverse areas that may liquefy and undergo dynamic settlement on the order of a few inches. The civil engineer should consider

specifying flexible connections where possible and increasing the hydraulic gradient of the alignment to allow for some differential dynamic settlement.

8.3 Uplift Resistance

Underground structures, including manholes or pipelines, that extend below the groundwater table will experience buoyancy-related uplift forces that might lead to upward movement. Groundwater was encountered in our exploratory borings at depths ranging from approximately 4 to 10 feet below the ground surface. However, groundwater levels may fluctuate with seasonal precipitation, tidal effects, or other factors. Underground structures below the groundwater table should be designed to resist uplift forces related to the buoyancy effect. Uplift forces may be resisted by the weight of the manhole or vault plus contents, the weight of soil above the vault, and friction along the sides of the manhole or vault. The unit weight of the soil may be considered to be 120 pounds per cubic foot (pcf) above the groundwater table and 62 pcf below the groundwater table. Frictional uplift resistance is the product of the friction coefficient and the effective contact pressure. A friction coefficient of 0.30 may be assumed for uplift resistance for mass or formed concrete against silty sand or clayey sand. The effective contact pressure may be calculated using an equivalent fluid pressure of 60 pcf above the groundwater table and 32 pcf below the groundwater table. We do not anticipate that static uplift will be a design consideration for pipelines with embedment equivalent to twice the pipe diameter due to the magnitude of the overburden pressures.

Uplift resistance may be reduced during a seismic event if the material around the pipe, manhole, or underground vault liquefies. Frictional uplift resistance should be neglected below the groundwater table to model the reduction in uplift resistance due to liquefaction. Pipelines installed by trenchless methods may be impacted by liquefaction and associated uplift. Liquefaction related uplift should not be a design consideration for pipelines installed in open trenches and backfilled with appropriately compacted material due to the relative density of the backfill material. Similarly, liquefaction related uplift should not be a design consideration for underground vaults or manholes installed in an oversize excavation backfilled with appropriately compacted material.

8.4 Pavement Resurfacing

We understand that the pavement will be repaired along the proposed sewer alignments to conform to the existing pavement structural sections. An independent evaluation of the traffic index and pavement design was not undertaken for the subject project. Existing pavement that has been undermined by excavation activities should be removed and replaced.

8.5 Review of Construction Plans

The recommendations provided in this report are based on preliminary design information for the proposed construction. We recommend that the geotechnical consultant review project plans. It should be noted that, upon review of these documents, some recommendations presented in this report might be revised or modified to meet the project requirements.

8.6 Pre-Construction Conference

We recommend that a pre-construction conference be held. City representatives, the civil engineer, the geotechnical consultant, and the contractor should be in attendance to discuss the plans, the project, and the proposed construction schedule.

8.7 Construction Observation and Testing

The recommendations provided in this report are based on subsurface conditions disclosed by discrete exploratory borings. The geotechnical consultant in the field during construction should check the interpolated subsurface conditions. During construction, the geotechnical consultant should:

- Observe trench subgrade for stability and removal of unsuitable materials.
- Observe excavation shoring.
- Check and test imported materials prior to their use as fill.
- Observe trench backfill and compaction.
- Perform field density tests to evaluate trench backfill and aggregate base compaction.

The recommendations provided in this report assume that Ninyo & Moore will be retained as the geotechnical consultant during the construction phase of the project. If another geotechnical consultant is selected, we request that the selected consultant provide a letter to the architect and the owner (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the recommendations contained in this report.

9 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every

subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

10 REFERENCES

American Society for Testing and Materials (ASTM), 2017, Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.

California Department of Transportation (Caltrans), 2012, Corrosion Guidelines, Version 2.0, Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Technology Branch: dated November.

California Geological Survey (CGS), 1982a, Oakland East Quadrangle and Part of Las Trampas Ridge Quadrangle, Earthquake Fault Zones, Revised Official Map, Scale 1:24,000, Released January 1.

California Geological Survey (CGS), 1982b, Oakland West Quadrangle, Earthquake Fault Zones, Revised Official Map, Scale 1:24,000, Released January 1.

California Geological Survey (CGS), 1982c, San Leandro Quadrangle, Earthquake Fault Zones, Revised Official Map, Scale 1:24,000, Released January 1.

California Geological Survey (CGS), 2003a, Seismic Hazard Zone Report for the Oakland East 7.5-Minute Quadrangle, Alameda County, California, Seismic Hazard Zone Report 080.

California Geological Survey (CGS), 2003b, Seismic Hazard Zone Report for the Oakland West 7.5-Minute Quadrangle, Alameda County, California, Seismic Hazard Zone Report 081.

California Geological Survey (CGS), 2003c, Seismic Hazard Zone Report for the San Leandro 7.5-Minute Quadrangle, Alameda County, California, Seismic Hazard Zone Report 078.

California Geological Survey (CGS), 2003d, Seismic Hazard Zone Map for the Oakland East Quadrangle and Part of the Las Trampas Ridge Quadrangle, Alameda County, California, Scale: 1:24,000, dated February 14.

California Geological Survey (CGS), 2003e, Seismic Hazard Zone Map for the Oakland West Quadrangle, Alameda County, California, Scale: 1:24,000, dated February 14.

California Geological Survey (CGS), 2003f, Seismic Hazard Zone Map for the San Leandro Quadrangle, Alameda County, California, Scale: 1:24,000, dated February 14.

Dibblee, T.W., Jr., 2005, Geologic Map of the Oakland East Quadrangle, Contra Costa and Alameda Counties, California: Dibblee Foundation, DF-160, Scale 1:24,000.

Google Earth, 2017, Google Earth 6.2, http://earth.google.com/.

Graymer, R.W., 2000, Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa and San Francisco Counties, California, U.S. Geological Survey, MF-2342, Scale 1:50,000.

Helley, E.J., and Graymer, D.L., 1997, Quaternary Geology of Alameda County and Surrounding Areas, California: Derived from the Digital Database, United States Geological Survey, Open-File Report 97-97, Scale 1:100,000, Contour Interval: 10 meters.

Helley, E.J., Lajoie, K.R., Spangle, W.E., and Blair, M.L., 1979, Flatland Deposits of the San Francisco Bay Region, California – their Geology and Engineering Properties, and their Importance to Comprehensive Planning, U.S. Geological Survey Professional Paper 943, Scale 1:125,000.

Knudsen, K.L., J.M. Sowers, R.C. Witter, C.M. Wentworth, E.J. Helley, Nicholson, R.S., Wright, H.M., and Brown, K.H., 2000, Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California: A Digital Database: U.S. Geological Survey Open-File Report 00-444.

Occupational Safety and Health Administration (OSHA), 1989, Occupational Safety and Health Standards – Excavations, Department of Labor, Title 29 Code of Federal Regulations (CFR) part 1926, dated October 31.

Radbruch, D., 1957, Areal and Engineering Geology of the Oakland West Quadrangle, California: United States Geological Survey, Misc. Geologic Investigations Map I-239, Scale 1:24,000.

Radbruch, D., 1959, Former Shoreline Features Along the East Side of San Francisco Bay, California: United States Geological Survey, Misc. Geologic Investigations Map I-298, Scale 1:48,000.

Radbruch, D., and Case, J.E., 1967, Preliminary Geologic Map and Engineering Geologic Information, Oakland and Vicinity, California: Scale 1:24,000.

Witter, R.C., Knudsen, K.L, Sowers, J.M., Wentworth, C.M., Koehler, R.D., and Randolph, C. E., 2006, Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California: U.S. Geological Survey Open-File Report 2006-1037, scale 1:24,000.

FIGURES



LEGEND

SEWER MAIN REHABILITATION

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2017.

N

FEET

0 2,500 5,000

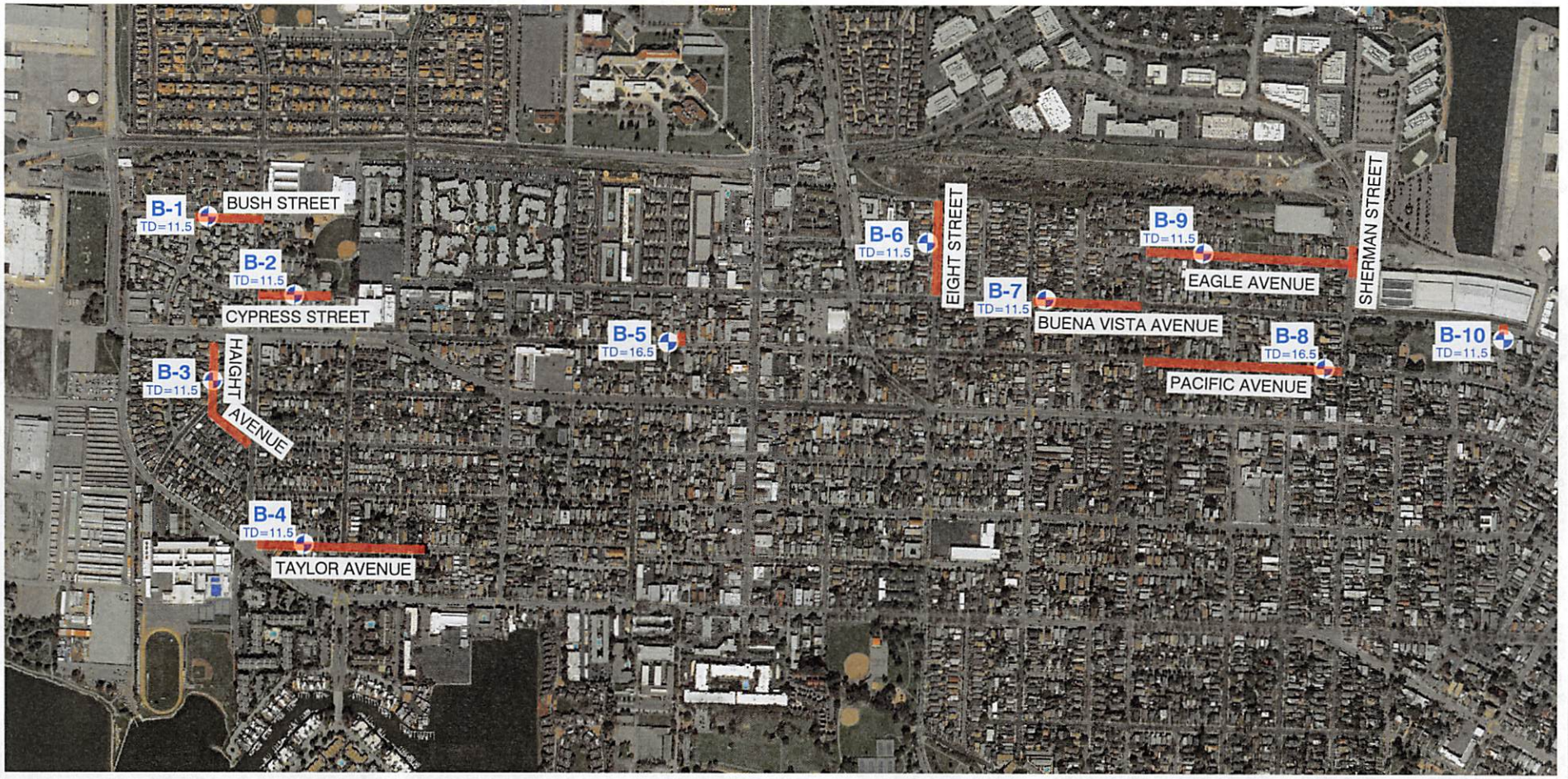
403144001_SL.dwg 11/21/2017 JP

FIGURE 1

SITE LOCATION

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 I 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

SEWER MAIN REHABILITATION

B-10 TD=11.5 BORING;
TD=TOTAL DEPTH IN FEET

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2017.

N

FEET
0 1,000 2,000

403144001_BL1.dwg 11/21/2017 JP

FIGURE 2A

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

BORING LOCATIONS

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 I 12/17



LEGEND

SEWER MAIN REHABILITATION

B-15 TD=21.5 BORING;
TD=TOTAL DEPTH IN FEET

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2017

N

FEET
0 1,000 2,000

403144001_BL2.dwg 11/21/2017 JP

FIGURE 2B

BORING LOCATIONS

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 I 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

SEWER MAIN REHABILITATION

B-19 TD=16.5 BORING;
TD=TOTAL DEPTH IN FEET

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2017.

N

FEET
0 1,000 2,000

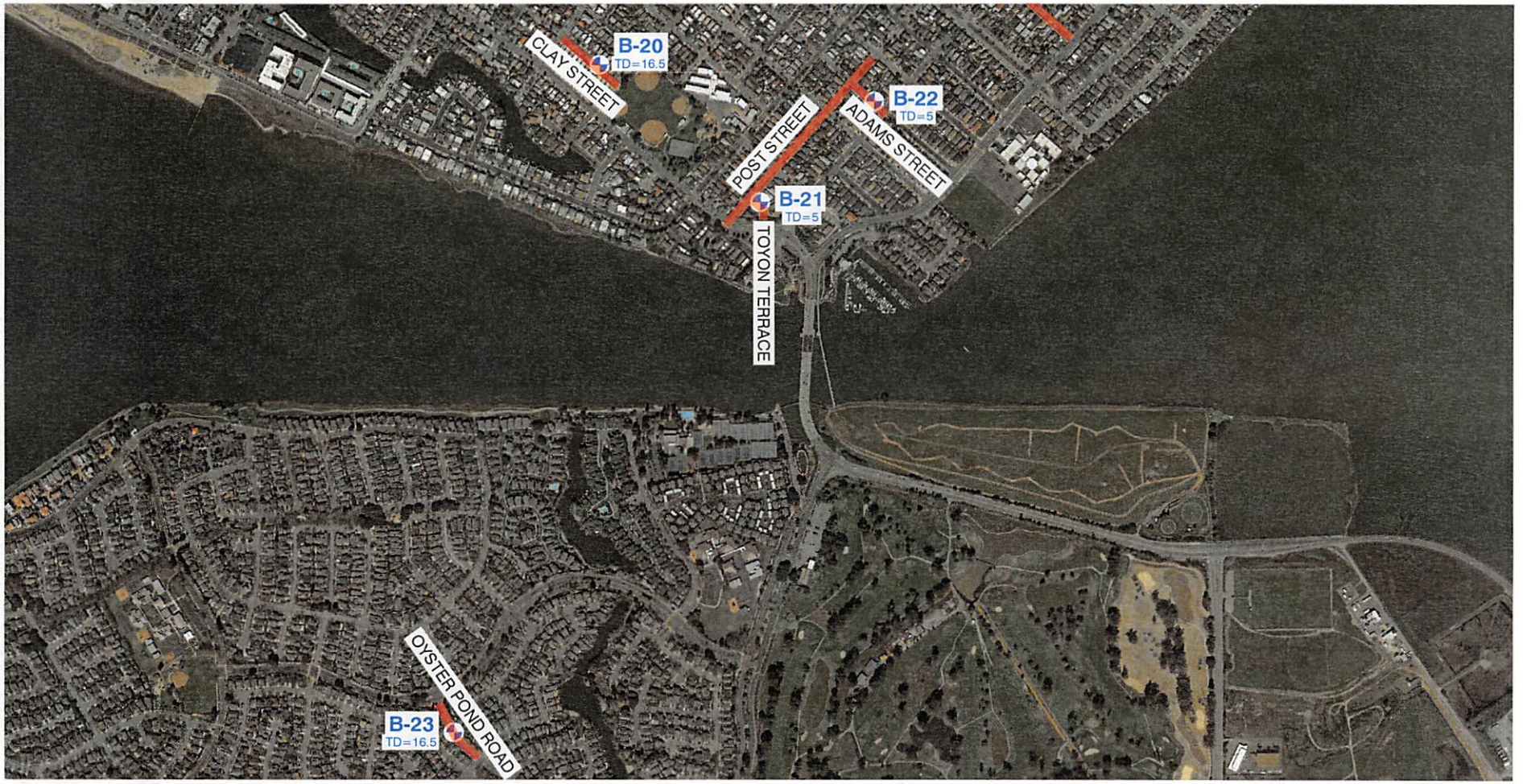
403144001_BL3.dwg 11/21/2017 JP

FIGURE 2C

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

BORING LOCATIONS

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 I 12/17



LEGEND

SEWER MAIN REHABILITATION

B-23 TD=16.5 BORING;
TD=TOTAL DEPTH IN FEET

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2017.

N

FEET
0 1,000 2,000

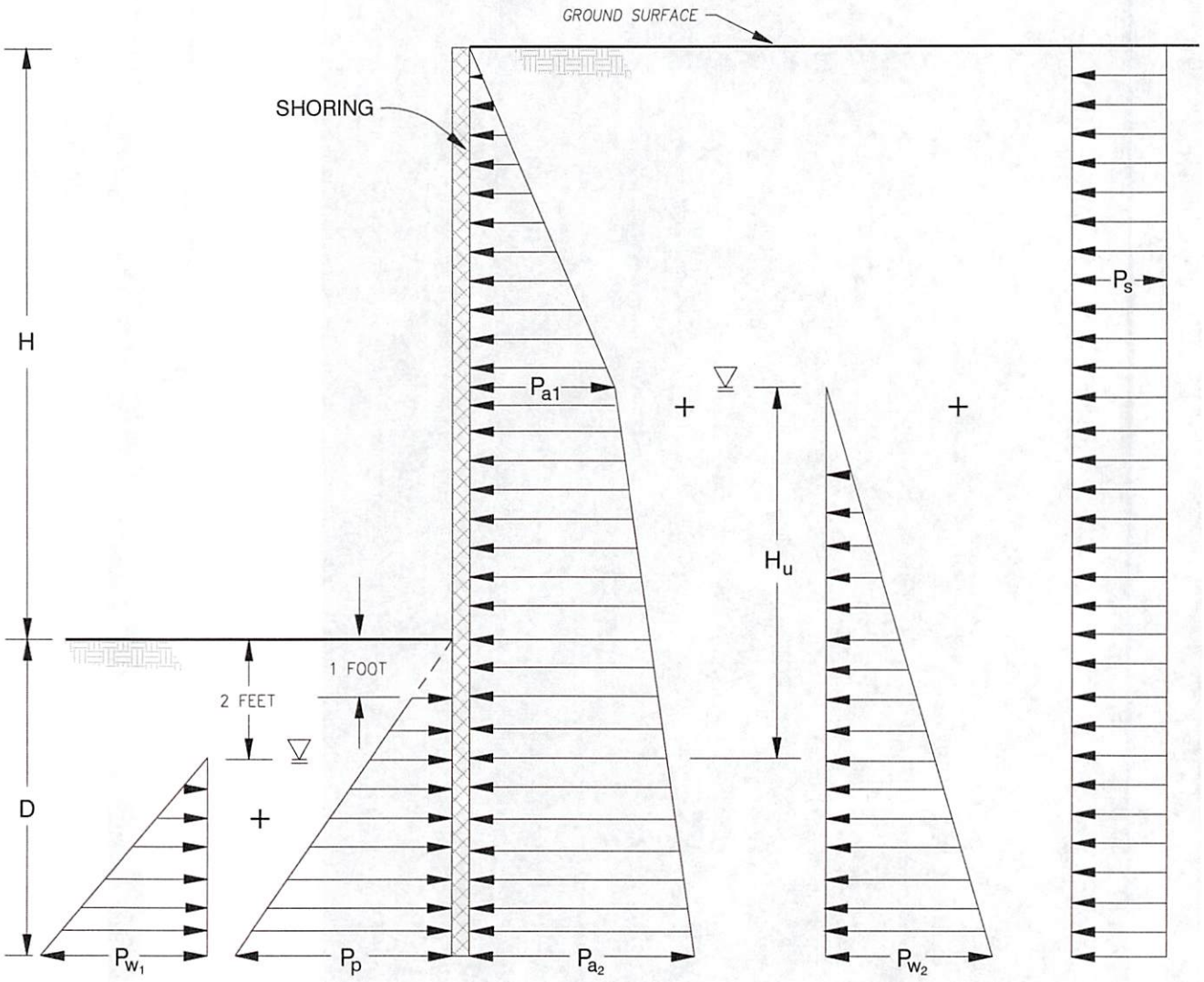
403144001_BL4.dwg 11/21/2017 JP

FIGURE 2D

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

BORING LOCATIONS

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 I 12/17



NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, P_a
   $P_{a_1} = 40\ (H - H_u + 2)$ psf; $P_{a_2} = 0.33\ [125\ (H_u - 2 + D) - P_{w_2}\ ] + P_{a_1}$ psf
2. PASSIVE LATERAL EARTH PRESSURE, P_p
   $P_p = 3\ [240 + 125\ (D - 2) - P_{w_1}\ ]$ psf
3. NEGLECT PASSIVE LATERAL EARTH PRESSURE FOR 1 FOOT BELOW MUDLINE
4. HYDROSTATIC PRESSURE WITH SEEPAGE
   $P_{w_1} = P_{w_2} = 124.8\ (H_u + D - 2)(D - 2)/(2D + H_u - 4)$ psf
5. LATERAL EARTH PRESSURE DUE TO CONSTRUCTION OR LIVE LOAD SURCHARGE, $P_s = 72$ psf
6. NEGLECT DYNAMIC EARTH PRESSURES FOR TEMPORARY CONDITION
7. H, H_u, AND D IN FEET

NOT TO SCALE

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

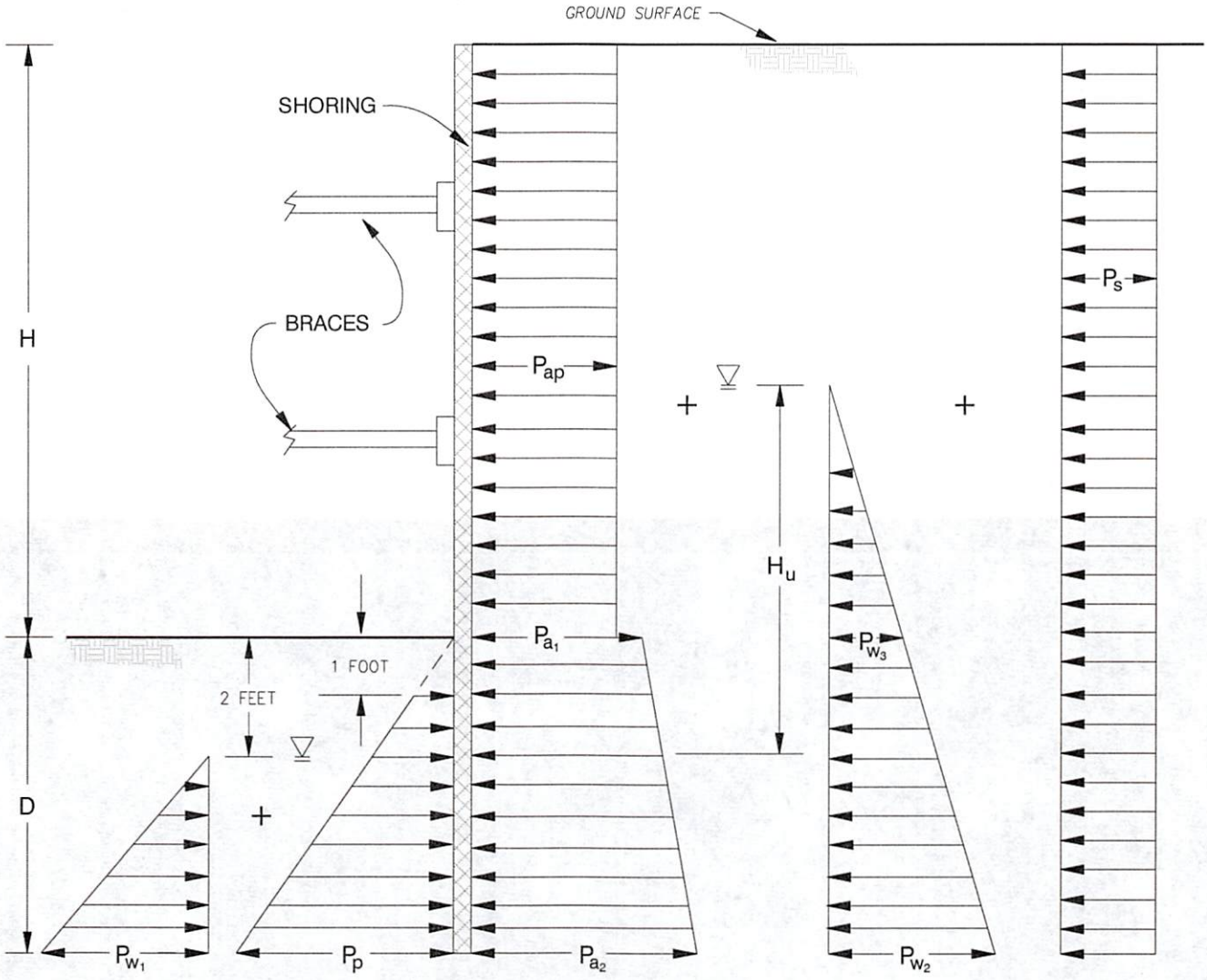
403144001_LEP-CS.dwg 14:04:27 11/21/2017 JP

FIGURE 3

LATERAL EARTH PRESSURES FOR CANTILEVERED SHORING

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17



NOTES:

1. APPARENT LATERAL EARTH PRESSURE, P_{ap}
   $P_{ap} = 26H$ psf
2. ACTIVE LATERAL EARTH PRESSURE, P_a
   $P_{a_1} = 0.33\ [120\ (H - H_u + 2) + 125\ (H_u - 2) - P_{w_3}]$ psf; $P_{a_2} = 0.33\ [120\ (H - H_u + 2) + 125\ (H_u - 2 + D) - P_{w_2}]$ psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   $P_p = 3\ [240 + 125\ (D - 2) - P_{w_1}]$ psf
4. NEGLECT PASSIVE LATERAL EARTH PRESSURE FOR 1 FOOT BELOW MUDLINE
5. HYDROSTATIC PRESSURE WITH SEEPAGE
   $P_{w_1} = P_{w_2} = 124.8\ (H_u + D - 2)(D - 2)/(2D + H_u - 4)$ psf; $P_{w_3} = P_{w_2}\ (H_u - 2)/(H_u - 2 + D)$ psf
6. LATERAL EARTH PRESSURE DUE TO CONSTRUCTION OR LIVE LOAD SURCHARGE, $P_s = 72$ psf
7. NEGLECT DYNAMIC EARTH PRESSURES FOR TEMPORARY CONDITION
8. H, H_u, AND D IN FEET

NOT TO SCALE

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

403144001_LEP-BE.dwg 14:04:27 11/21/2017 JP

FIGURE 4

LATERAL EARTH PRESSURES FOR BRACED EXCAVATION

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT
PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler
Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

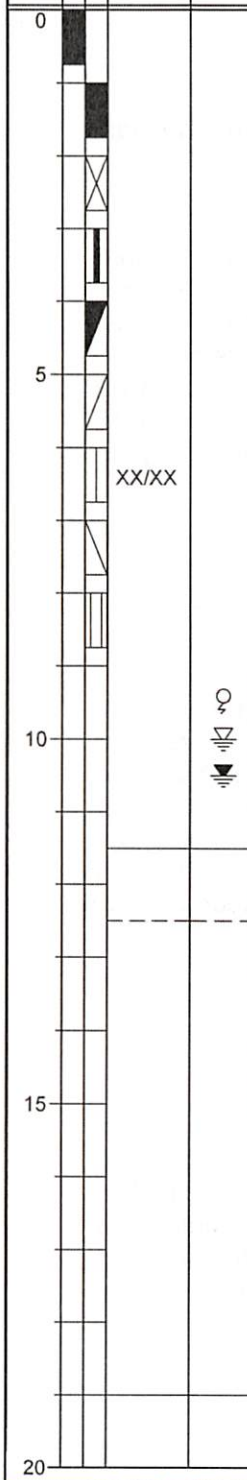
Field Procedure for the Collection of Relatively Undisturbed Samples
Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler
The sampler, with an external diameter of 3 inches, was lined with 6-inch-long, thin brass liners with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550-01. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass liners, sealed, and transported to the laboratory for testing.

Field Testing
The following tests were performed in the field to evaluate soil properties.

Static Cone Penetrometer
A penetrometer with a conical tip having an apex angle of 60 degrees and a cone base area of 1.5 square centimeters was manually pushed 6 inches into the soil. The penetrometer was instrumented to measure the Cone Penetration Index (Qc) computed as the peak force on the cone divided by the cone base area. The Cone Penetration Index is reported in kilograms per square centimeter (ksc) on the boring log at the depth of the test as a measure of the relative density or consistency of the soil encountered.

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

No recovery with modified split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

SM

MAJOR MATERIAL TYPE (SOIL):

Solid line denotes unit change.

CL

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

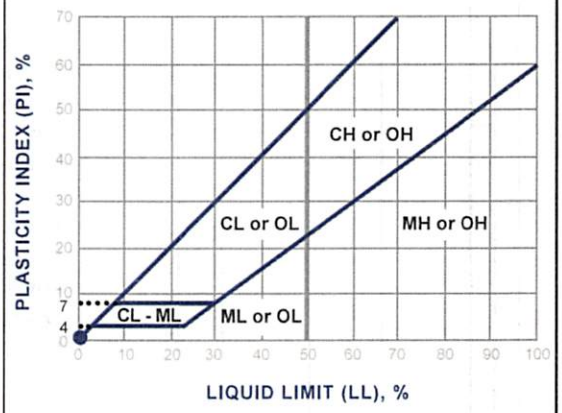
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions	
			Group Symbol	Group Name
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consis-tency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

USCS METHOD OF SOIL CLASSIFICATION

DATE DRILLED 10/23/17 BORING NO. B-1

GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 4 inches thick. Petromat located approximately 2 inches from top of pavement.
						SM	AGGREGATE BASE: Approximately 5 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		Q_S=37					
			▼			SM	FILL: Dark gray, moist, loose, silty SAND; little silt.
		8					MERRITT SAND: Brown, moist, loose, silty SAND; little silt. Light brown, wet. Medium dense.
10		26	20				
20							Total Depth = 11.5 feet. Backfilled with Portland cement grout on 10/23/17. Notes: Groundwater was measured at a depth of approximately 4 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

DATE DRILLED 10/23/17 BORING NO. B-2

GROUND ELEVATION 12' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 5 inches thick.
						SP	AGGREGATE BASE: Approximately 11 inches thick.
		Q_S=50				SM	Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							MERRITT SAND:
							Brown, moist, medium dense, silty SAND; little silt.
						SC	Brown, moist, medium dense, clayey SAND; little clay.
		30	▼ 18.4				Wet.
10		25					
							Total Depth = 11.5 feet.
							Backfilled with Portland cement grout on 10/23/17.
							Notes: Groundwater was measured at a depth of approximately 5.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
20							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 2

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DATE DRILLED 10/23/17 BORING NO. B-3

GROUND ELEVATION 13' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 3.5 inches thick.
						SM	AGGREGATE BASE: Approximately 4 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		Q_S=12					FILL: Dark gray, moist, very loose, silty SAND; little silt.
		37				SM	MERRITT SAND: Brown, moist, medium dense, silty SAND; little silt.
			▼			SC	Brown, moist, dense, clayey SAND; little clay. Wet.
10		35	19.4				
20							Total Depth = 11.5 feet. Backfilled with Portland cement grout on 10/23/17. Notes: Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 3

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/23/17 BORING NO. B-4

GROUND ELEVATION 14' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 4.5 inches thick.
						SM	AGGREGATE BASE: Approximately 4 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		Q_S=35	8.1			SM	FILL: Dark brown, moist, loose, silty SAND; little silt.
		34				CL	MERRITT SAND: Light brown, moist, loose to medium dense, silty SAND; little silt. Light brown, moist, hard, sandy CLAY.
10		51					Wet.
20							Total Depth = 11.5 feet. Backfilled with Portland cement grout on 10/23/17. Notes: Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 4

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DATE DRILLED 10/23/17 BORING NO. B-5

GROUND ELEVATION 17' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 8 inches thick.
						SP	Petromat located approximately 3.5 inches from top of pavement.
						SM	AGGREGATE BASE: Approximately 4 inches thick.
						SM	Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							FILL:
		14					Dark brown, moist, loose, silty SAND; little silt.
							MERRITT SAND:
							Brown, moist, loose, silty SAND; little silt.
							Medium dense.
			▼			SP-SC	Brown, moist, medium dense, poorly graded SAND; few clay.
10							Wet.
		36	20.5				Dense.
		28					Medium dense.
20							Total Depth = 16.5 feet.
							Backfilled with Portland cement grout on 10/23/17.
							Notes: Groundwater was measured at a depth of approximately 8 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 5

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/24/17 BORING NO. B-6

GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 2.5 inches thick. Petromat located at the bottom of the concrete.
						SM	AGGREGATE BASE: Approximately 16 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		30	17.7				MERRITT SAND: Brown, moist, loose, silty SAND; little silt. Medium dense.
10		33				SC	Brown, wet, dense, clayey SAND.
20							Total Depth = 11.5 feet.
							Backfilled with Portland cement grout on 10/24/17.
							Notes: Groundwater was measured at a depth of approximately 8 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
30							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

DATE DRILLED 10/24/17 BORING NO. B-7

GROUND ELEVATION 14' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 2.5 inches thick.
						SM	AGGREGATE BASE: Approximately 10.5 inches thick.
		Q_S=35					Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
						SM	FILL:
							Dark brown, moist, loose, silty SAND; little silt.
		39	13				MERRITT SAND:
							Brown, moist, medium dense, silty SAND; little silt.
							Dense.
10						SC	Brown, moist, medium dense, clayey SAND; trace clay.
		23					
20							Total Depth = 11.5 feet.
							Backfilled with Portland cement grout on 10/24/17.
							Notes: Groundwater, though not encountered at the time of drilling, may rise to a to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 7

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/24/17 BORING NO. B-8

GROUND ELEVATION 18' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 4 inches thick.
						SM	Petromat located approximately 2 inches from top of pavement.
							AGGREGATE BASE: Approximately 5 inches thick.
		Q_S=35					Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							MERRITT SAND:
						SC	Brown, moist, loose, silty SAND; little silt.
		42					Brown, moist, dense, clayey SAND; little clay.
10		39					Wet.
						SP-SC	Brown, wet, dense, poorly graded SAND; few clay.
		36	19.4				
20							Total Depth = 16.5 feet.
							Backfilled with Portland cement grout on 10/24/17.
							Notes: Groundwater was measured at a depth of approximately 9.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
30							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

FIGURE A- 8

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/24/17 BORING NO. B-9

GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 5.5 inches thick. Petromat located approximately 2.5 inches from top of pavement.
						SM	AGGREGATE BASE: Approximately 5 inches thick.
		Q_S=35				SM	Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							FILL: Dark gray, moist, loose, silty SAND; little silt.
		14				SC	MERRITT SAND: Brown, moist, loose, silty SAND; little silt.
			▼				Brown, moist, medium dense, clayey SAND. Wet.
10		15	20.3			SM	Brown, wet, medium dense, silty SAND.
20							Total Depth = 11.5 feet.
							Backfilled with Portland cement grout on 10/24/17.
							Notes: Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 9

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/24/17 BORING NO. B-10

GROUND ELEVATION 12' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 4 inches thick.
						SM	Petromat located approximately 3 inches from top of pavement.
		Q_S=35					AGGREGATE BASE: Approximately 5 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
						SC	MERRITT SAND: Brown, moist, loose, silty SAND; little silt.
		24					Brown, moist, medium dense, clayey SAND; little clay.
			▼			SM	Brown, wet, medium dense, silty SAND; little silt.
10		19	20.2				

Total Depth = 11.5 feet.

Backfilled with Portland cement grout on 10/24/17.

Notes:
Groundwater was measured at a depth of approximately 7 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 10/27/17 BORING NO. B-11

GROUND ELEVATION 28' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 3" hand auger

DRIVE WEIGHT N/A DROP N/A

SAMPLED BY PCC LOGGED BY PCC REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 4.25 inches thick.
						SP	AGGREGATE BASE: Approximately 5 inches thick.
						SM	Dark brown, dry to moist, medium dense, poorly graded SAND; little fine to coarse (1 inch) gravel; trace silt.
		Q_S=33					MERRITT SAND:
		Q_S=20					Brown, moist, very loose to loose, silty SAND.
		Q_S=28				CL	Brown and gray, moist, stiff, lean CLAY; some sand.
			▼			SC	Brown, wet, loose, clayey SAND.
10							
20							
30							
40							

Total Depth = 7.8 feet.

Backfilled with Portland cement grout on 10/27/17.

Notes:
Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 10/25/17 BORING NO. B-12

GROUND ELEVATION 24' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 1.5 inches thick.
						SM	AGGREGATE BASE: Approximately 5.5 inches thick.
		Q_S=37					Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel;
						SM	trace silt.
							FILL:
							Dark brown, moist, loose, silty SAND; little silt.
							MERRITT SAND:
		28	16.1	111.1			Brown, moist, medium dense, silty SAND; little silt.
							Low plasticity.
			▼				Wet.
10		50					
		30					
						SP-SM	Brown, wet, dense, poorly graded SAND; few silt.
20		40	21.5				

Total Depth = 21.5 feet.

Backfilled with Portland cement grout on 10/25/17.

Notes:

Groundwater was measured at a depth of approximately 8.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

30

40

FIGURE A- 12

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/25/17 BORING NO. B-13

GROUND ELEVATION 30' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 3 inches thick. Petromat located approximately 1.5 inches from top of pavement.
						SM	AGGREGATE BASE: Approximately 4.5 inches thick.
		Q_S=29				SM	Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							FILL: Dark brown, moist, loose, silty SAND; little silt.
		12	9.3	100.4			MERRITT SAND: Brown, moist, loose to medium dense, silty SAND; little silt.
10		48	▼				Wet, medium dense.
		52/5"	17.5			SP-SM	Brown, wet, dense to very dense, poorly graded SAND; few silt.
20		91/11"	23.7	104.6			
		70					
30							Total Depth = 26.5 feet.
							Backfilled with Portland cement grout on 10/25/17.
							Notes: Groundwater was measured at a depth of approximately 10 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

FIGURE A- 13

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/25/17 BORING NO. B-14

GROUND ELEVATION 20' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 2.5 inches thick.
						SM	AGGREGATE BASE: Approximately 5.5 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		Q_S=28				SM	FILL: Dark brown, moist, loose, silty SAND; little silt.
		32	16.9	112.1			MERRITT SAND: Brown, moist, medium dense, silty SAND; little silt. Low plasticity.
10		56	18.9	110.3			Wet.
		89					Dense.
20		35	17.4				
30							Total Depth = 21.5 feet.
							Backfilled with Portland cement grout on 10/25/17.
							Notes: Groundwater was measured at a depth of approximately 8.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

DATE DRILLED 10/26/17 BORING NO. B-15

GROUND ELEVATION 24' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 6 inches thick.
						SP	Petromat located approximately 2 inches from top of pavement.
						SM	AGGREGATE BASE: Approximately 3.5 inches thick.
							Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
		Q_S=18					MERRITT SAND:
							Brown, moist, very loose, silty SAND; little silt.
							Low plasticity.
		44	17.3	108.4			Medium dense.
			▼				Wet.
10							
		77					Dense.
		31					
20							
		56				SC	Brown, wet, very dense, clayey SAND.
							Total Depth = 21.5 feet.
							Backfilled with Portland cement grout on 10/26/17.
							Notes:
							Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
30							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

DATE DRILLED 10/27/17 BORING NO. B-16

GROUND ELEVATION 14' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 3" hand auger

DRIVE WEIGHT N/A DROP N/A

SAMPLED BY PCC LOGGED BY PCC REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 5 inches thick. Petromat located approximately 1.5 inches from top of pavement.
		Q_S=34				SM	AGGREGATE BASE: Approximately 5 inches thick. Dark brown, dry to moist, medium dense, poorly graded SAND; little fine to coarse (2 inches) gravel; trace silt.
		Q_S=47					MERRITT SAND: Brown, dry to moist, loose to medium dense, silty SAND.
			▼ 24.4			SC	Brown to gray, wet, loose, clayey SAND; little clay.
10							Total Depth = 7.5 feet.
							Backfilled with Portland cement grout on 10/27/17.
							Notes: Groundwater was measured at a depth of approximately 6 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
20							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 16

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DATE DRILLED 10/26/17 BORING NO. B-17

GROUND ELEVATION 23' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 1.5 inches thick.
						SM	AGGREGATE BASE: Approximately 6 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							MERRITT SAND: Dark brown, moist, loose, silty SAND; little silt.
		7	▼			SC	Dark gray, moist, loose, clayey SAND; little clay.
							Brown.
10							Wet.
		34				SP-SM	Brown, wet, dense, poorly graded SAND; few silt.
		44	18.3				
20		95/11"					Very dense.
							Total Depth = 21.5 feet.
							Backfilled with Portland cement grout on 10/26/17.
							Notes: Groundwater was measured at a depth of approximately 7.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
30							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

FIGURE A- 17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/26/17 BORING NO. B-18

GROUND ELEVATION 30' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 1.5 inches thick.
		Q_S=38				SM	AGGREGATE BASE: Approximately 7.5 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							MERRITT SAND: Dark brown, moist, loose to medium dense, silty SAND; little silt.
		30	15.1	106.5		SC	Brown, moist, medium dense, clayey SAND.
						SM	Brown, wet, dense, silty SAND; little silt.
10		65					
		53					Very dense.
20		85					
		48					Dense.
30							Total Depth = 26.5 feet.
							Backfilled with Portland cement grout on 10/26/17.
							Notes: Groundwater was measured at a depth of approximately 9 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

FIGURE A- 18

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DATE DRILLED 10/26/17 BORING NO. B-19

GROUND ELEVATION 18' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 1.5 inches thick.
						SM	AGGREGATE BASE: Approximately 6 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							MERRITT SAND: Brown, moist, loose, silty SAND; little silt.
		17	16				Medium dense.
			▼				Wet.
10		34					Dense.
		67					Dark gray, very dense.
							Total Depth = 16.5 feet.
							Backfilled with Portland cement grout on 10/26/17.
20							Notes: Groundwater was measured at a depth of approximately 8 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 19

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

DATE DRILLED 10/26/17 BORING NO. B-20

GROUND ELEVATION 8' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 4 inches thick.
						CL	AGGREGATE BASE: Approximately 5.5 inches thick.
		Q_S=52					Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
							FILL:
							Dark gray, moist, soft, lean CLAY; organic; little gravel; trace glass.
						SM	Organic odor.
		9	25.6 ▼				Dark gray, moist, loose to medium dense, silty SAND; little silt.
							Wet.
10		14					Medium dense.
		30				SM	MERRITT SAND:
							Brown, wet, medium dense, silty SAND; little silt.
							Total Depth = 16.5 feet.
20							Backfilled with Portland cement grout on 10/26/17.
							Notes:
							Groundwater was measured at a depth of approximately 6.5 feet in borehole about 5 minutes after completion of drilling. Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

DATE DRILLED 10/26/17 BORING NO. B-21

GROUND ELEVATION 9' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 3" hand auger

DRIVE WEIGHT N/A DROP N/A

SAMPLED BY PCC LOGGED BY PCC REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						GP	ASPHALT CONCRETE: Approximately 3.25 inches thick.
						SC	AGGREGATE BASE: Approximately 7 inches thick.
						CL	Brown, dry to moist, medium dense, poorly graded GRAVEL; little sand; trace silt.
						SC	FILL:
			29.2			SC	Brown, moist, medium dense, clayey SAND.
							Dark brown to gray, moist, firm, lean CLAY.
							Dark brown, moist, medium dense, clayey SAND.
							MERRITT SAND:
							Dark brown, moist, medium dense, clayey SAND; some clay.
							Wet; organic odor; scattered rootlets.
10							
20							
30							
40							

Total Depth = 5 feet.

Backfilled with Portland cement grout on 10/26/17.

Notes:
Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 10/26/17 BORING NO. B-22

GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 3" hand auger

DRIVE WEIGHT N/A DROP N/A

SAMPLED BY PCC LOGGED BY PCC REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP-SM	ASPHALT CONCRETE: Approximately 2.5 inches thick.
						SC	AGGREGATE BASE: Approximately 6.5 inches thick.
			12.9			SM	Dark brown, dry to moist, medium dense, poorly graded SAND with silt; some gravel.
							FILL:
							Dark gray, dry to moist, medium dense, clayey SAND; few gravel.
							Dark gray to dark brown, moist, loose, silty SAND; little silt; trace gravel. Wet.
10							
20							
30							
40							

Total Depth = 5 feet.

Backfilled with Portland cement grout on 10/26/17.

Notes:
Groundwater, though not encountered at the time of drilling, may rise to a to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 10/25/17 BORING NO. B-23

GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 4" Solid Stem, Mobile B-24 (Cal Geotech), 3" hand auger top 5'

DRIVE WEIGHT 140 LBS (safety & cathead) DROP 30 inches

SAMPLED BY SPS LOGGED BY SPS REVIEWED BY PCC

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SP	ASPHALT CONCRETE: Approximately 3 inches thick.
						SM	AGGREGATE BASE: Approximately 4 inches thick. Brown, dry to moist, medium dense, poorly graded SAND; little to some gravel; trace silt.
						SP-SM	FILL: Dark brown, moist, loose, silty SAND; little silt; trace gravel.
		3	21.5				Dark gray, moist, very loose, poorly graded SAND; few silt; trace gravel.
			▽				Wet.
10		3					
			64.8			CH	BAY DEPOSITS: Dark gray, wet, stiff, fat CLAY. Hole obstructed to a depth of 10 feet by caving soil or squeezing soil on removal of auger.
20							Total Depth = 16.5 feet. Backfilled with Portland cement grout on 10/25/17. Notes: Groundwater was encountered at a depth of approximately 8 to 10 feet in borehole during drilling. Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30							
40							

FIGURE A- 23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA
403144001 | 12/17

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488-00. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

Moisture Content
The moisture content of samples obtained from the exploratory borings was evaluated in accordance with ASTM D 2216. The test results are presented on the boring logs in Appendix A.

In-Place Density Tests
The in-place dry density of relatively undisturbed samples obtained from the exploratory borings was evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis
Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-13. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

200 Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-14.

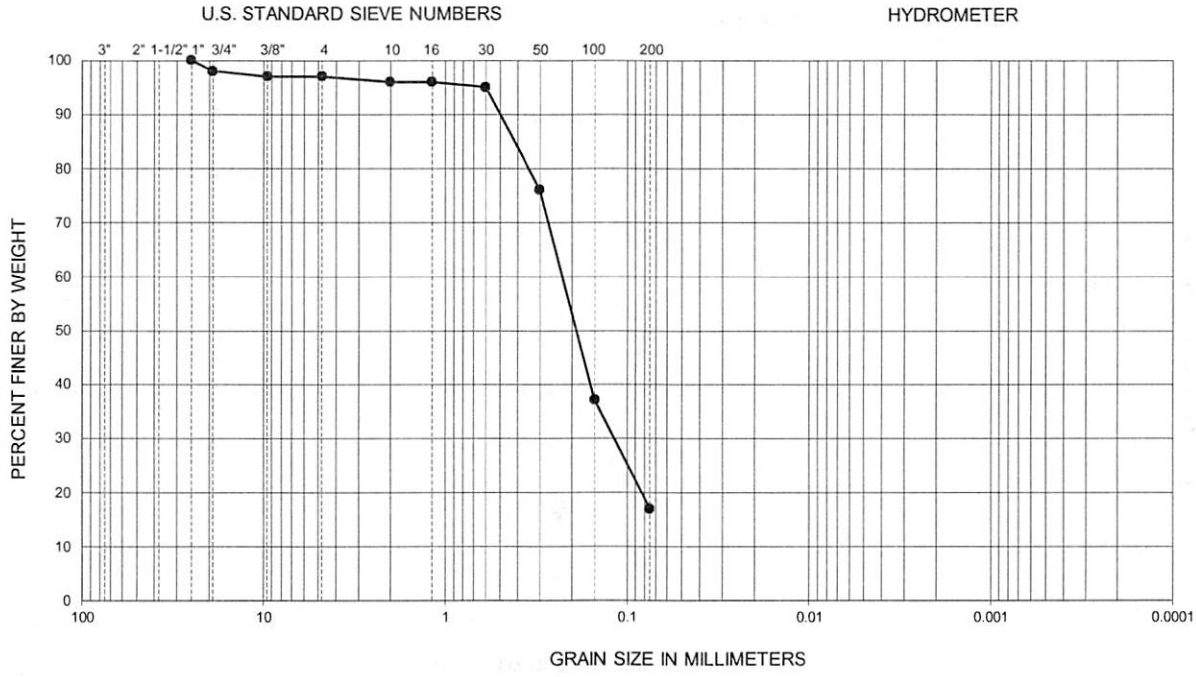
Atterberg Limits
Tests were performed on selected representative soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System (USCS). The test results and classifications are shown on Figure B-15.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures B-16 through B-19.

Sand Equivalent
Sand equivalent (SE) tests were performed on selected representative samples in general accordance with California Test (CT) 217. The SE value reported on Figure B-20 is the ratio of the coarse- to fine-grained particles in the selected samples.

Unconfined Compression Tests
Unconfined compression tests were performed on relatively undisturbed samples in general accordance with ASTM D 2166. The test results are shown on Figure B-21.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-4	1.0-4.0	--	--	--	--	0.13	0.22	--	--	17	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-1

GRADATION TEST RESULTS

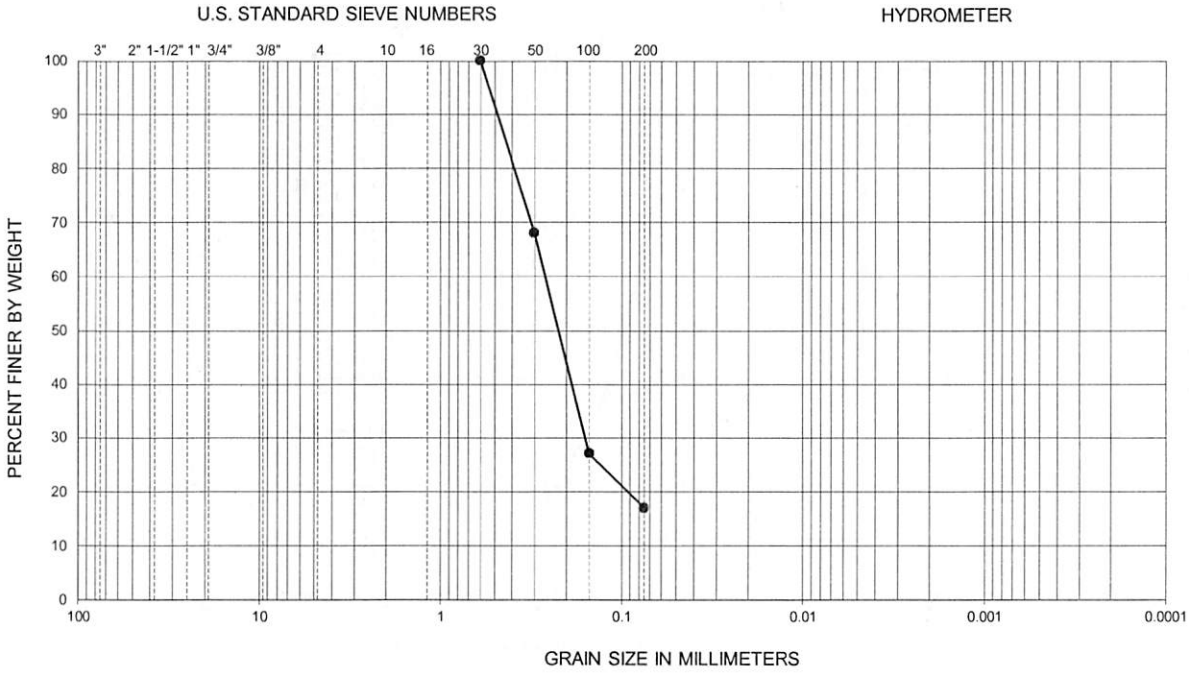
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-4 0-4'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-7	5.0-6.5	--	--	--	--	0.17	0.26	--	--	17	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-2

GRADATION TEST RESULTS

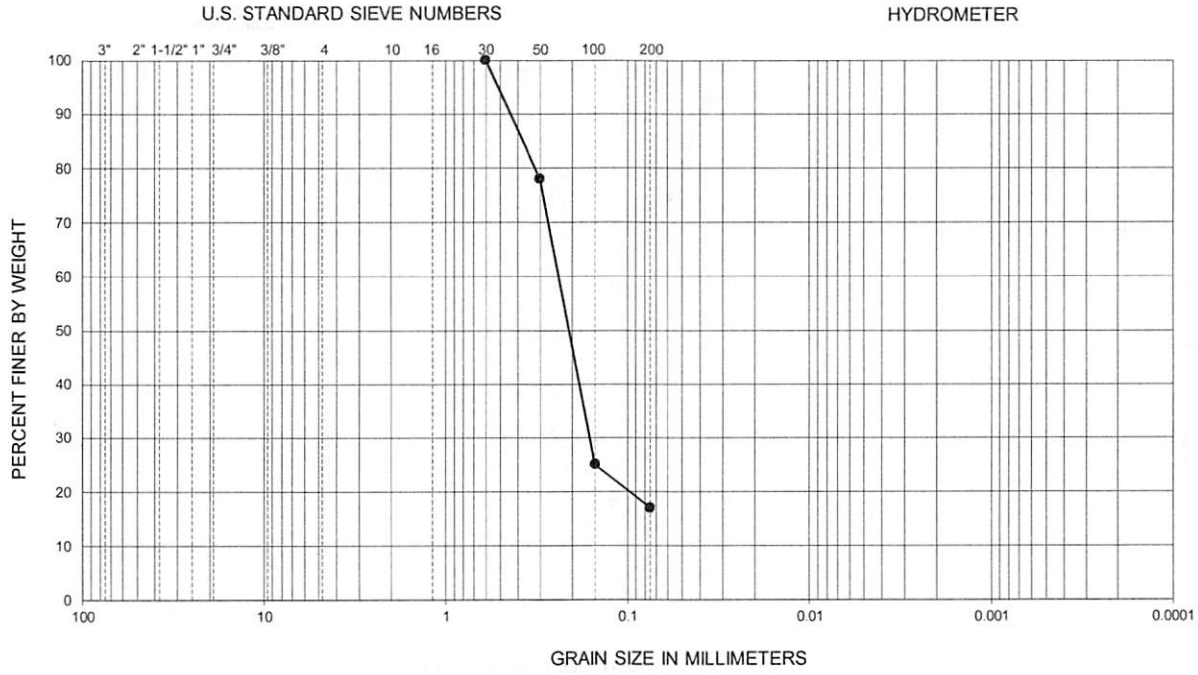
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-7 5-6.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-10	10.0-11.5	--	--	--	--	0.17	0.24	--	--	17	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-3

GRADATION TEST RESULTS

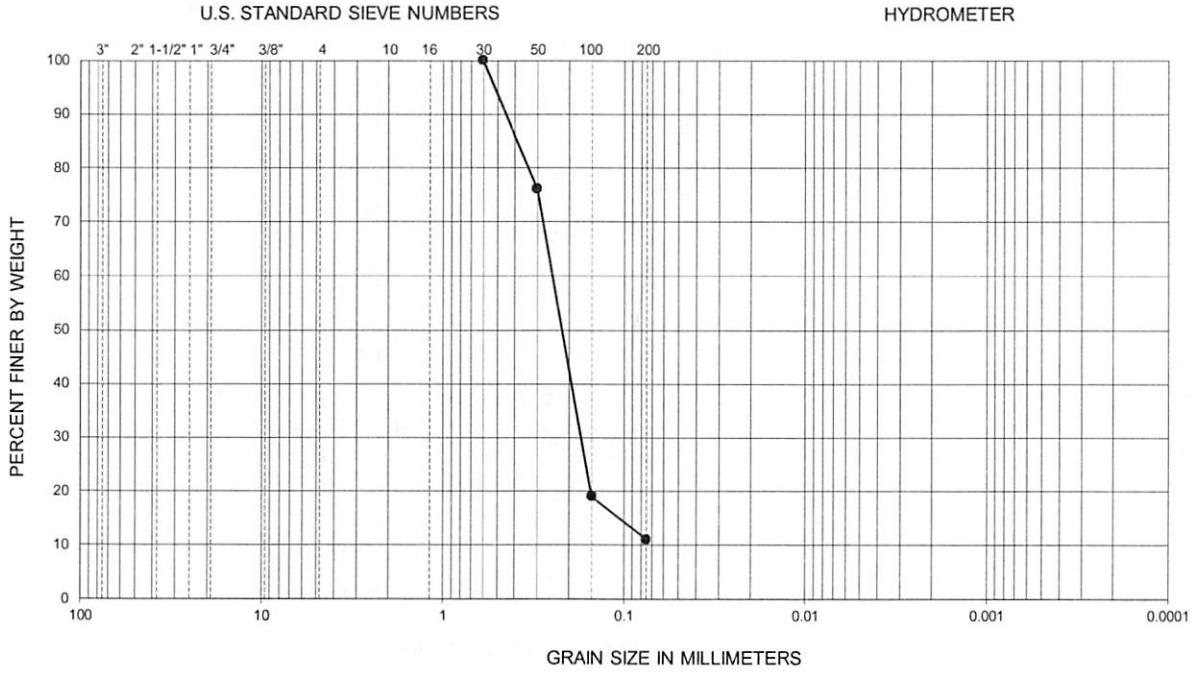
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-10 10-11.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-12	20.0-21.5	--	--	--	--	0.18	0.25	--	--	11	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-4

GRADATION TEST RESULTS

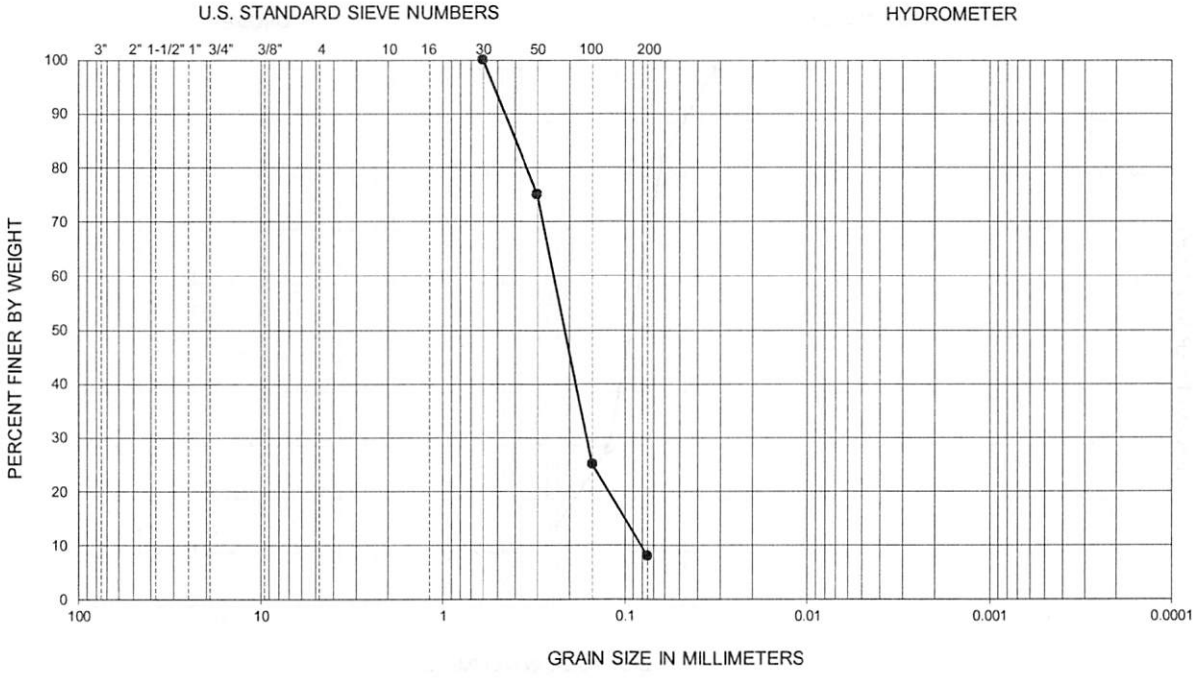
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-12 20-21.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-13	15.5-16.0	--	--	--	0.08	0.17	0.24	3.0	1.5	8	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

NP - INDICATES NON-PLASTIC

FIGURE B-5

GRADATION TEST RESULTS

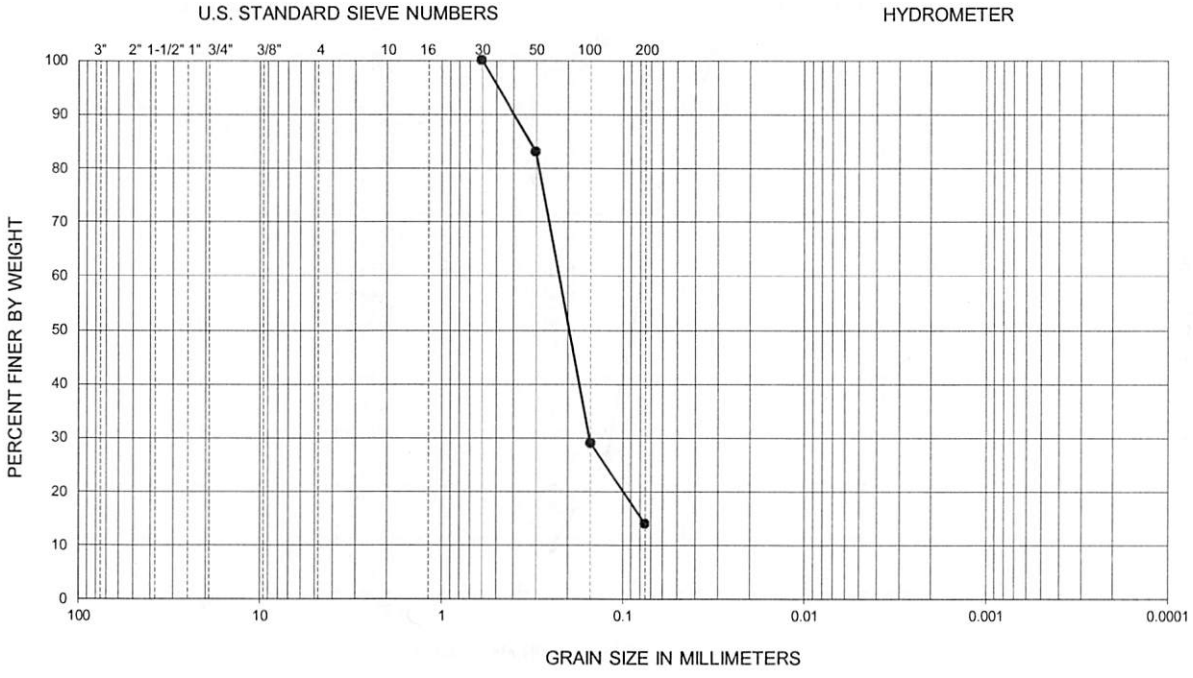
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-13 15.5-16'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-14	20.0-21.5	--	--	--	--	0.16	0.23	--	--	14	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-6

GRADATION TEST RESULTS

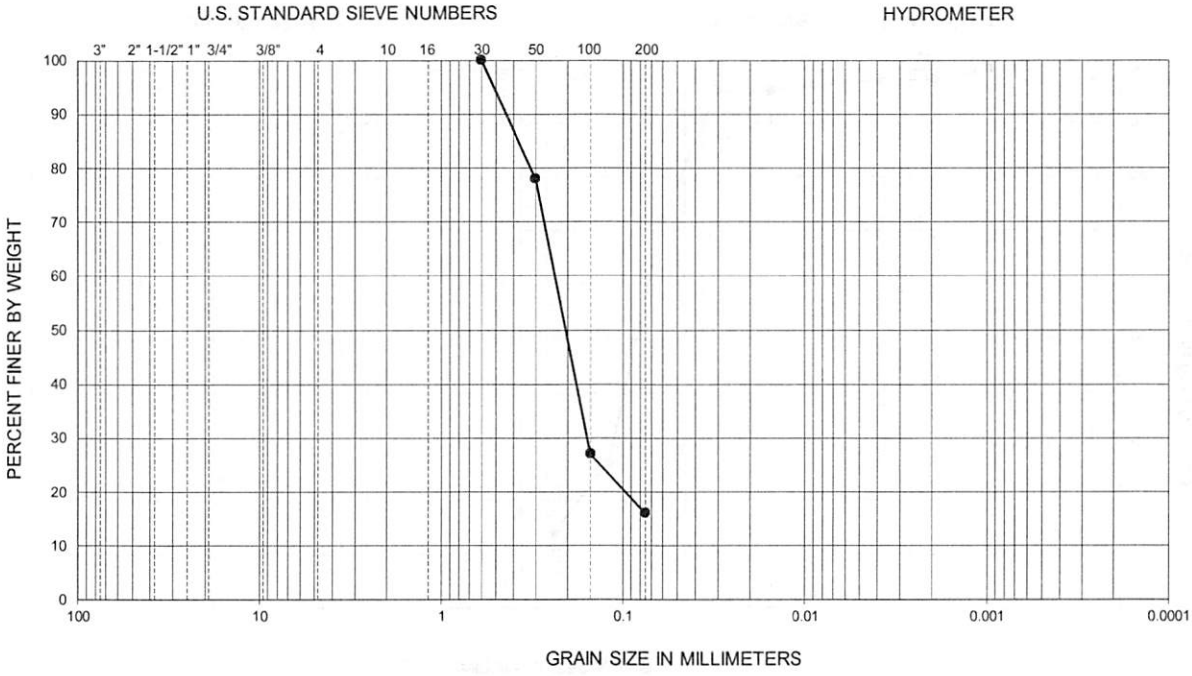
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-14 20-21.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-15	5.75-6.0	--	--	--	--	0.17	0.24	--	--	16	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-7

GRADATION TEST RESULTS

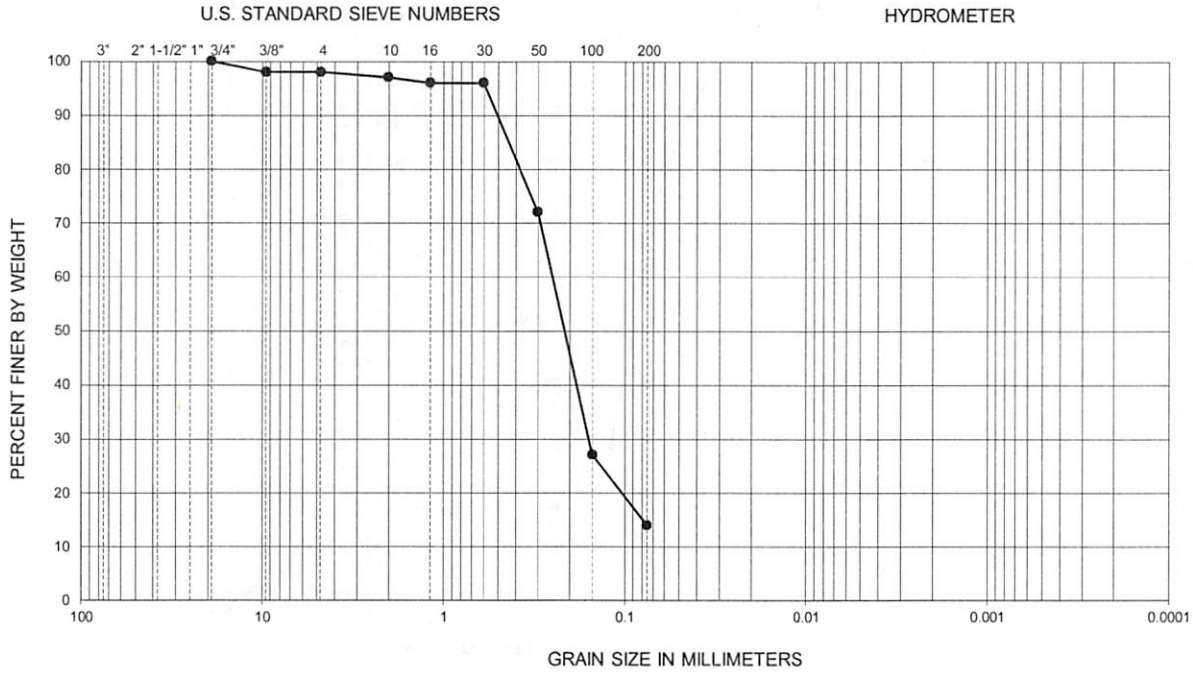
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-15 5.75-6'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-16	1.8-2.6	--	--	--	--	0.16	0.26	--	--	14	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-8

GRADATION TEST RESULTS

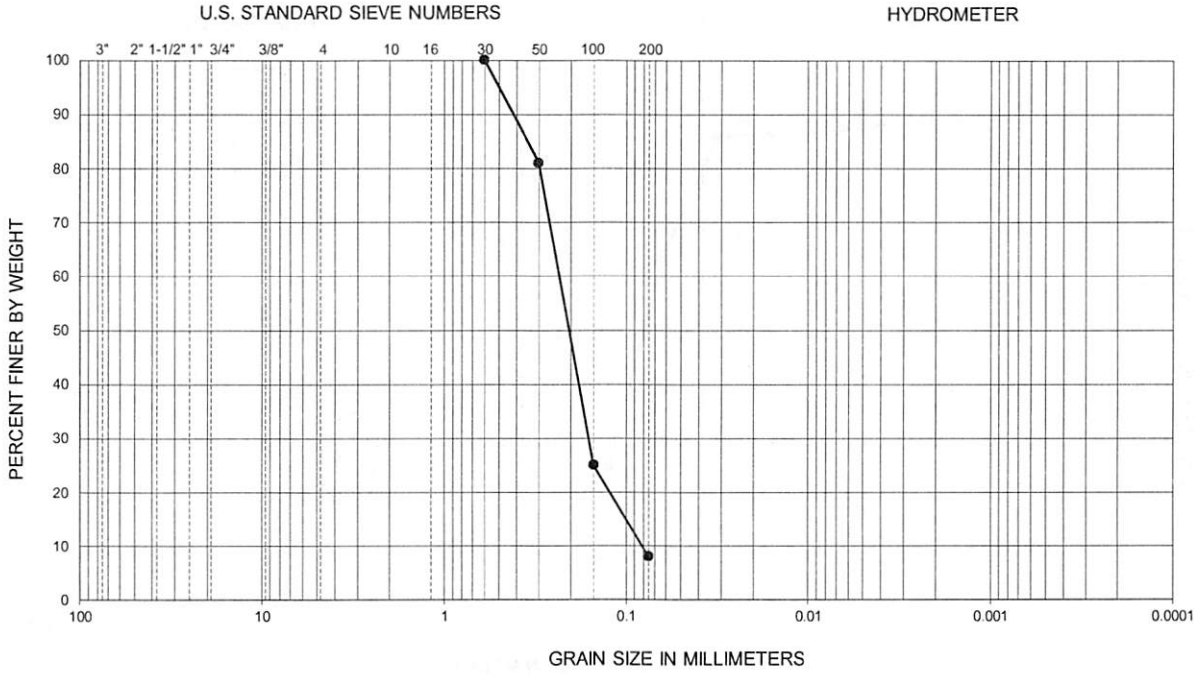
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-16 1.8-2.6'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-17	15.0-16.5	--	--	--	0.08	0.17	0.24	3.0	1.5	8	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-9

GRADATION TEST RESULTS

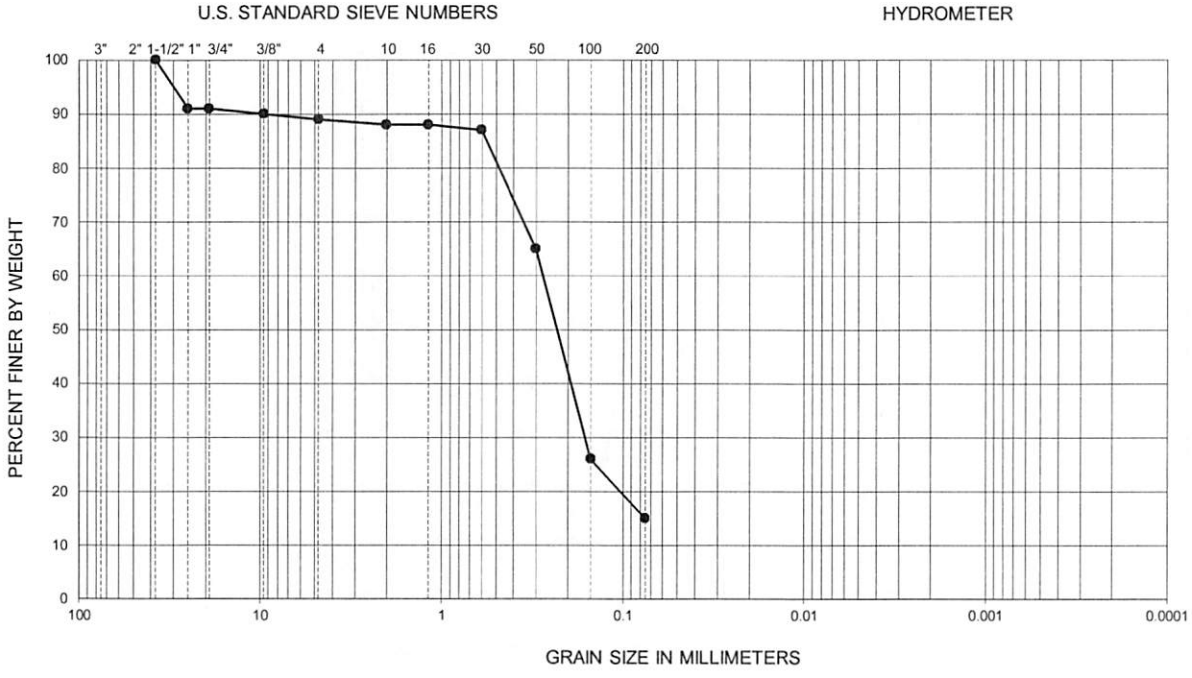
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-17 15-16.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-18	1.0-5.0	--	--	--	--	0.17	0.28	--	--	15	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-10

GRADATION TEST RESULTS

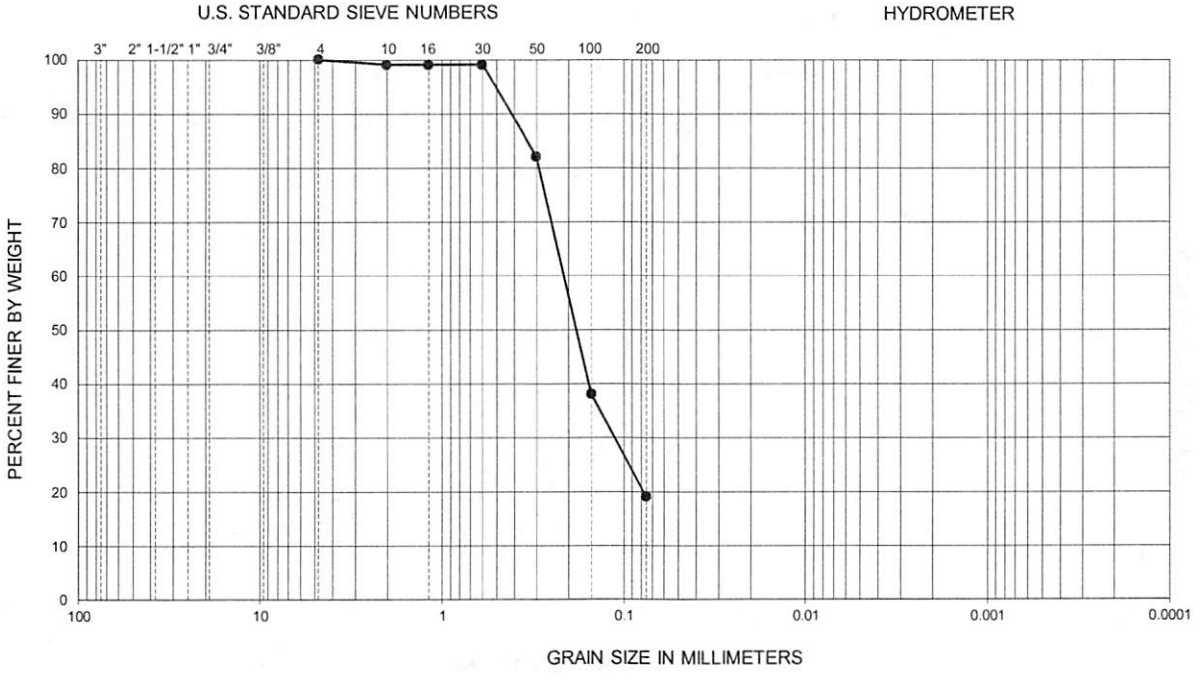
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-18 0-5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-19	5.0-6.5	--	--	--	--	0.13	0.22	--	--	19	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-11

GRADATION TEST RESULTS

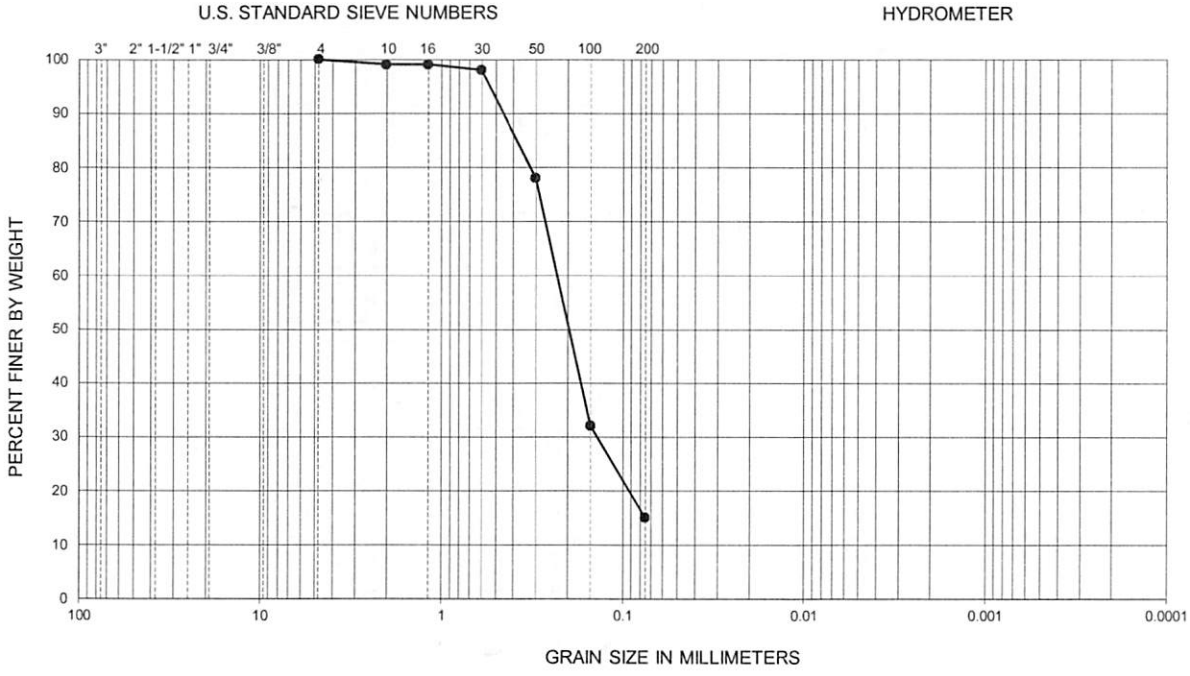
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-19 5-6.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-20	5.0-6.5	--	--	--	--	0.14	0.23	--	--	15	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-12

GRADATION TEST RESULTS

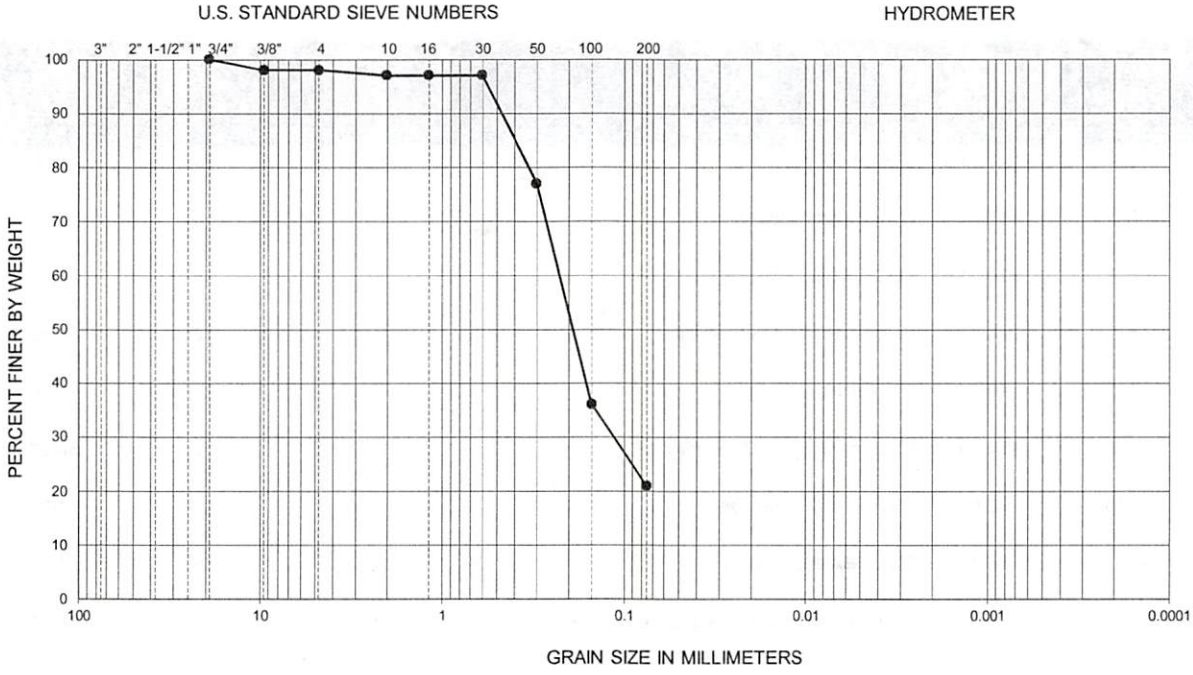
CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-20 5-6.5'

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-22	2.3-3.0	--	--	--	--	0.13	0.22	--	--	21	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-13

GRADATION TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SIEVE (NEW) B-22 2.3-3'

SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-1	10.0-11.5	Silty SAND; little silt	100	16	SM
B-2	5.0-6.5	Clayey SAND; little clay	100	16	SC
B-3	10.0-11.5	Clayey SAND; little clay	100	14	SC
B-5	10.0-11.5	Poorly graded SAND; few clay	100	12	SP-SC
B-6	5.0-6.5	Silty SAND; little silt	100	15	SM
B-8	15.0-16.5	Poorly graded SAND; few clay	100	12	SP-SC
B-16	5.5-6.0	Clayey SAND; little clay	100	22	SC
B-21	3.5-4.0	Clayey SAND; some clay	100	36	SC
B-23	5.0-6.5	Poorly graded SAND; few silt; trace gravel	95	8	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE B-14

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

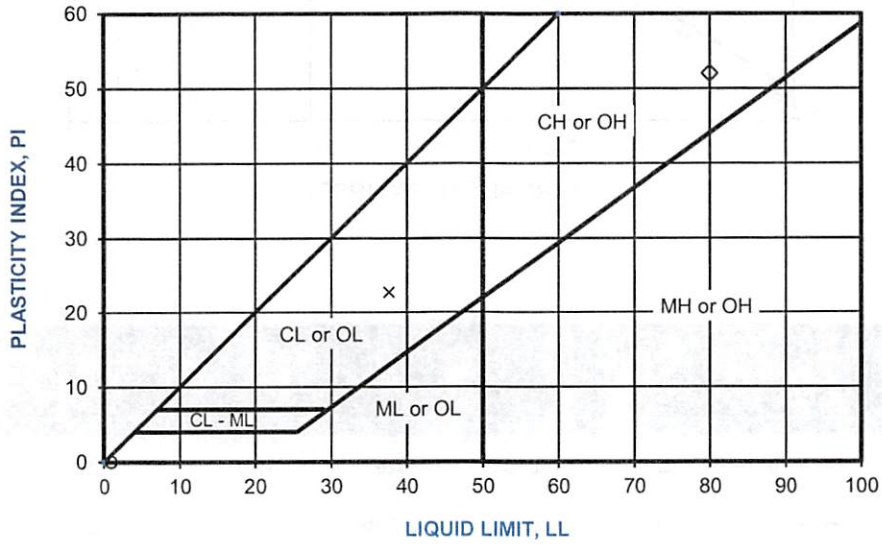
NO. 200 SIEVE ANALYSIS TEST RESULTS

CYCLIC SEWER REPLAEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-1	10.0-11.5	NP	NP	NP	NP	SM
■	B-6	5.0-6.5	NP	NP	NP	NP	SM
◆	B-9	10.0-11.5	NP	NP	NP	NP	SM
○	B-12	6.0-6.5	NP	NP	NP	NP	SM
□	B-14	6.0-6.5	NP	NP	NP	NP	SM
Δ	B-15	5.5-6.0	NP	NP	NP	NP	SM
X	B-21	3.5-4.0	38	15	23	CL	SC
+	B-23	5.0-6.5	NP	NP	NP	NP	SP-SM
◇	B-23	12.0-15.0	80	28	52	CH	CH

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

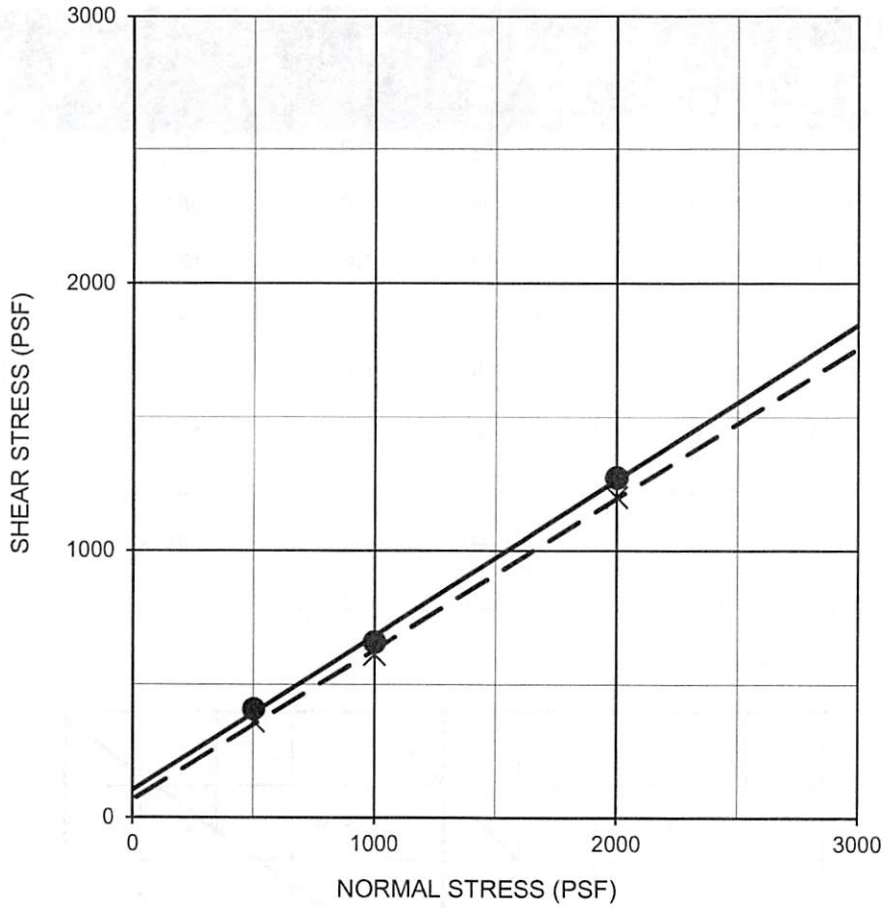
FIGURE B-15

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

ATTERBERG LIMITS TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
Silty SAND	—●—	B-13	6.0-6.5	Peak	100	30	SM
Silty SAND	– – X – –	B-13	6.0-6.5	Ultimate	70	29	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

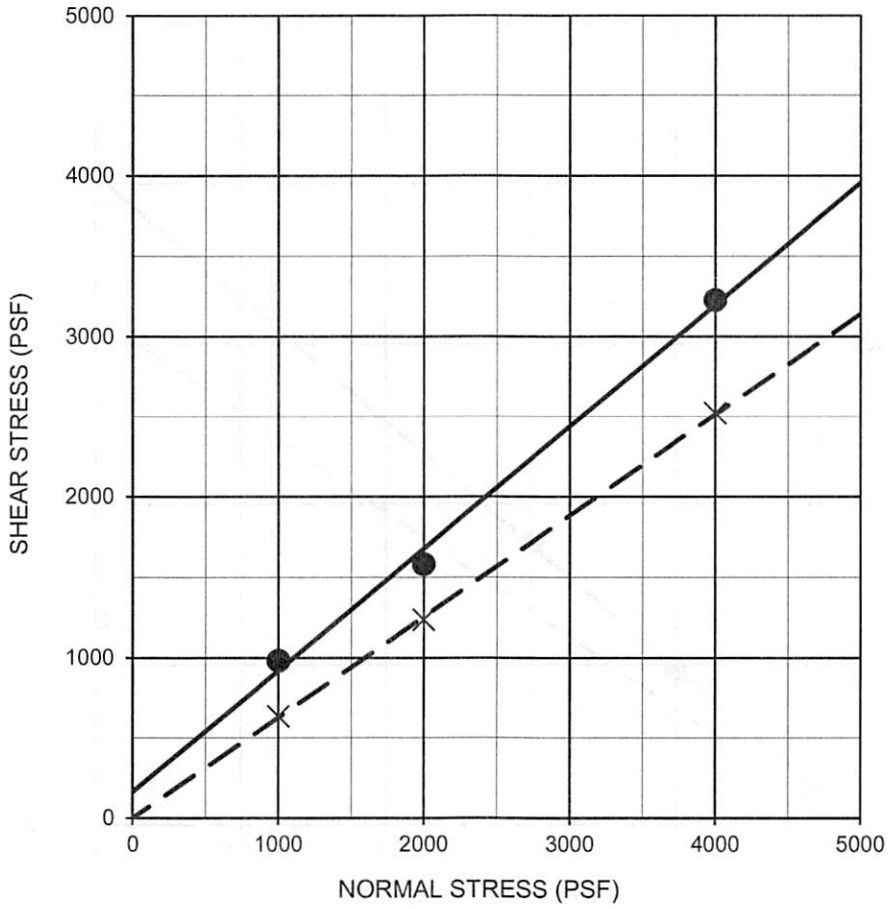
FIGURE B-16

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

DIRECT SHEAR TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
SAND; few silt	—●—	B-13	21.0-21.5	Peak	160	37	SP-SM
SAND; few silt	– – X – –	B-13	21.0-21.5	Ultimate	0	32	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-17

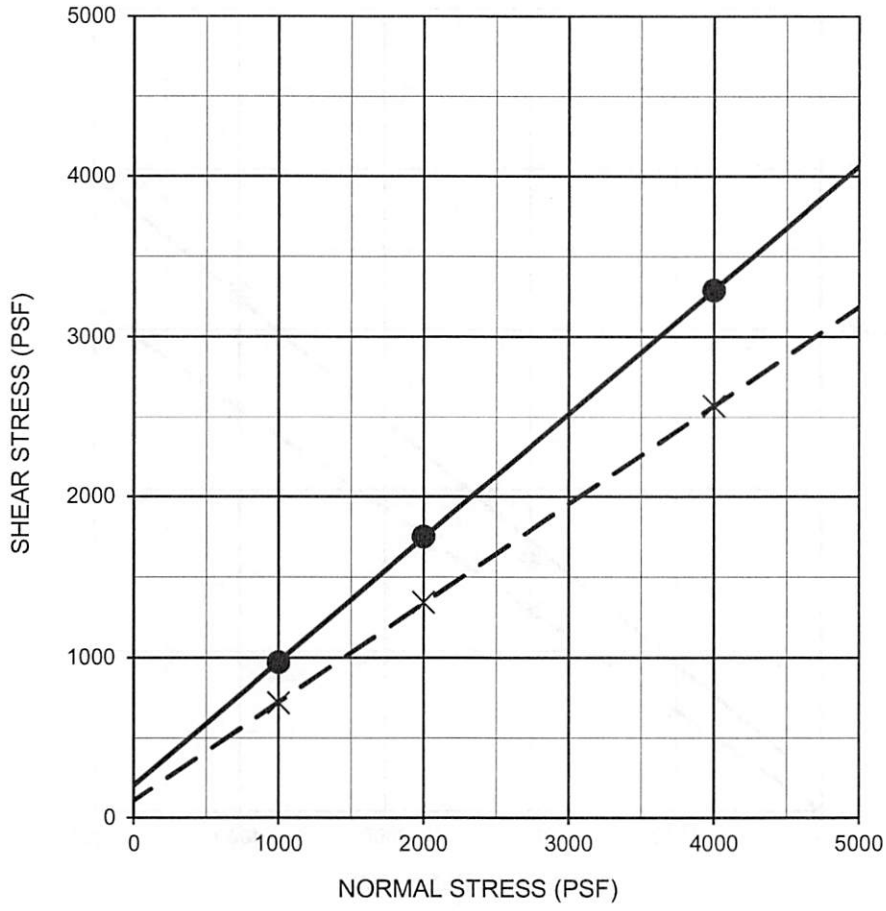
DIRECT SHEAR TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

DIRECT SHEAR B-13 @ 21.0-21.5



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
Silty SAND	—●—	B-14	11.0-11.5	Peak	200	38	SM
Silty SAND	– – X – –	B-14	11.0-11.5	Ultimate	110	32	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-18

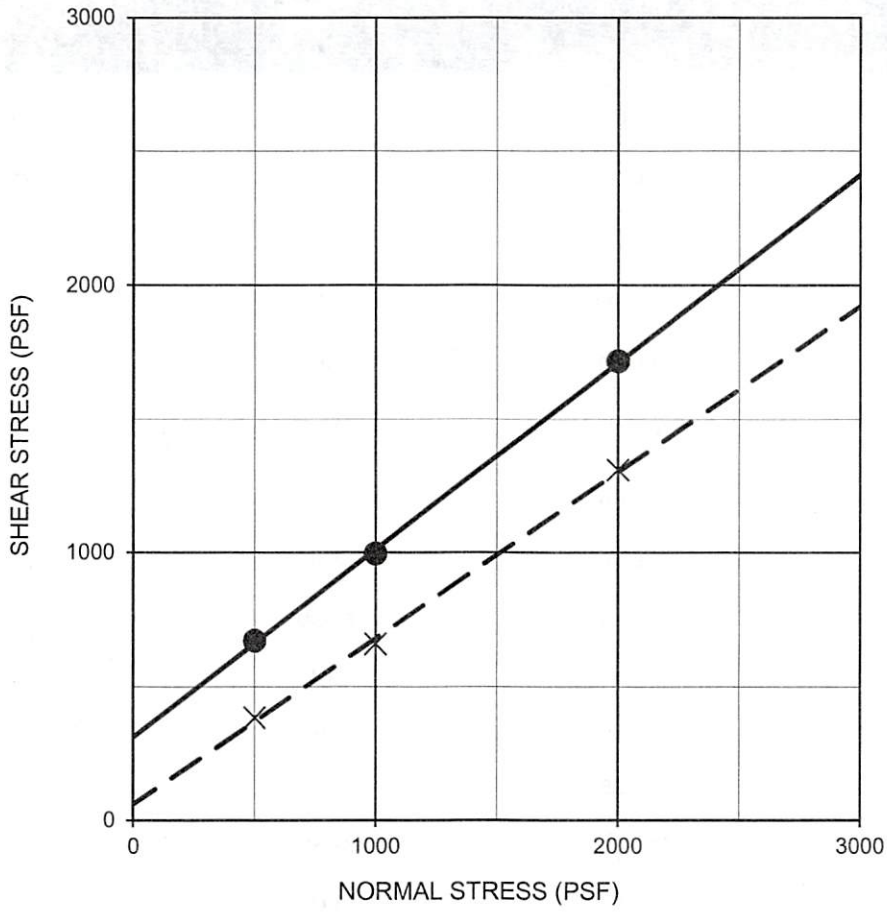
Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

DIRECT SHEAR TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DIRECT SHEAR B-14 @ 11.0-11.5



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
Silty SAND	—●—	B-15	6.0-6.5	Peak	310	35	SM
Silty SAND	– – X – –	B-15	6.0-6.5	Ultimate	60	32	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-19

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

DIRECT SHEAR TEST RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

DIRECT SHEAR B-15 @ 6.0-6.5

SAMPLE LOCATION	SAMPLE DEPTH (ft)	SOIL TYPE	SAND EQUIVALENT
B-1	5.0-6.5	SM	19
B-2	10.0-11.5	SC	21
B-3	1.0-3.5	SM	24
B-4	10.0-11.5	CL	15
B-6	1.5-4.0	SM	27
B-8	10.0-11.5	SC	22
B-9	1.0-4.0	SM	23
B-12	1.5-4.0	SM	25
B-13	15.0-15.5	SP-SM	40
B-14	15.5-16.0	SM	38
B-15	1.0-5.0	SM	19
B-16	1.8-2.6	SM	25
B-17	20.0-21.5	SP-SM	30
B-18	1.0-5.0	SM	26
B-19	10.0-11.5	SM	34
B-20	10.0-11.5	SM	24
B-22	2.3-3.0	SM	21

PERFORMED IN GENERAL ACCORDANCE WITH AASHTO T176/CT 217

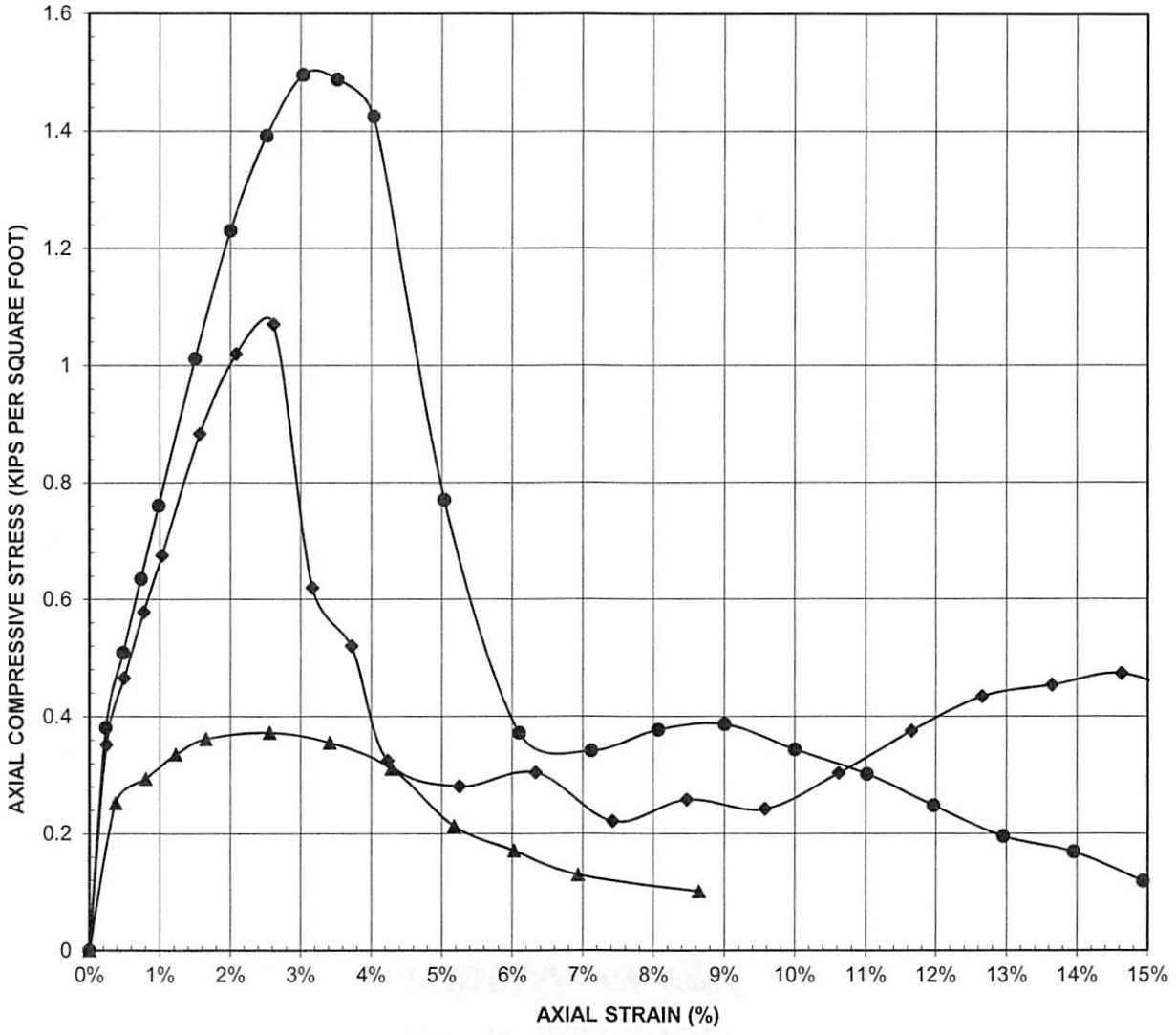
FIGURE B-20

SAND EQUIVALENT VALUE

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



SYMBOL	DESCRIPTION	SOIL TYPE	SAMPLE LOCATION	SAMPLE DEPTH (ft.)	MOISTURE CONTENT w, (%)	DRY DENSITY γ_d, (pcf)	STRAIN RATE (%/min.)	UNDRAINED SHEAR STR s_u, (ksf)
◆	Silty SAND; little silt	SM	B-12	6.0-6.5	16.1	111.1	1.04	0.53
●	Silty SAND; little silt	SM	B-14	6.0-6.5	16.9	112.1	1.00	0.75
▲	Clayey SAND	SC	B-18	6.0-6.5	15.1	106.4	1.73	0.19

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2166

FIGURE B-21

UNCONFINED COMPRESSION RESULTS

CYCLIC SEWER REPLACEMENT PHASE 15
ALAMEDA, CALIFORNIA

403144001 | 12/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

1956 Webster Street, Suite 400 | Oakland, California 94612 | p. 510.343.3000

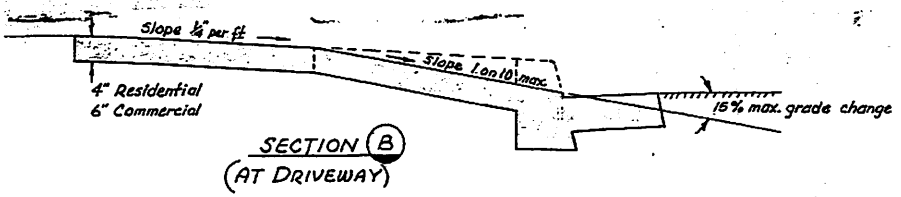
SAN DIEGO | IRVINE | LOS ANGELES | FONTANA | OAKLAND | SAN FRANCISCO | SACRAMENTO

SAN JOSE | PHOENIX | TUCSON | PRESCOTT | LAS VEGAS | DENVER | BROOMFIELD | HOUSTON

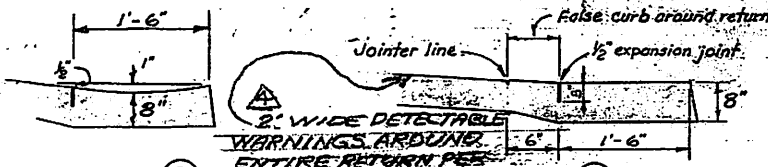
www.ninyoandmoore.com

ATTACHMENT "C"

APPLICABLE CITY OF ALAMEDA STANDARD PLANS AND DETAILS

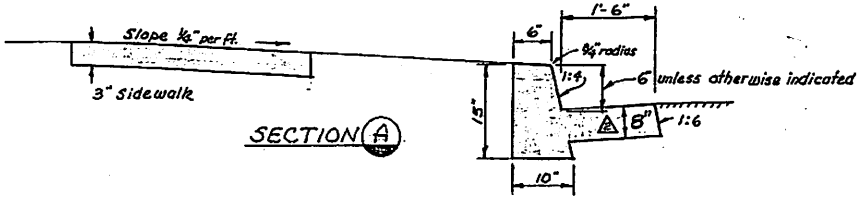


SECTION (B)
(AT DRIVEWAY)



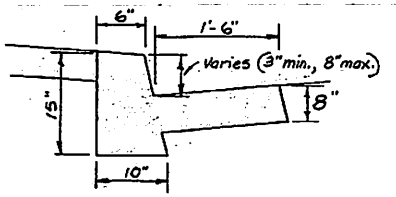
SECTION (D)
AT FLUSH RETURN

SECTION (C)
AT FLUSH RETURN

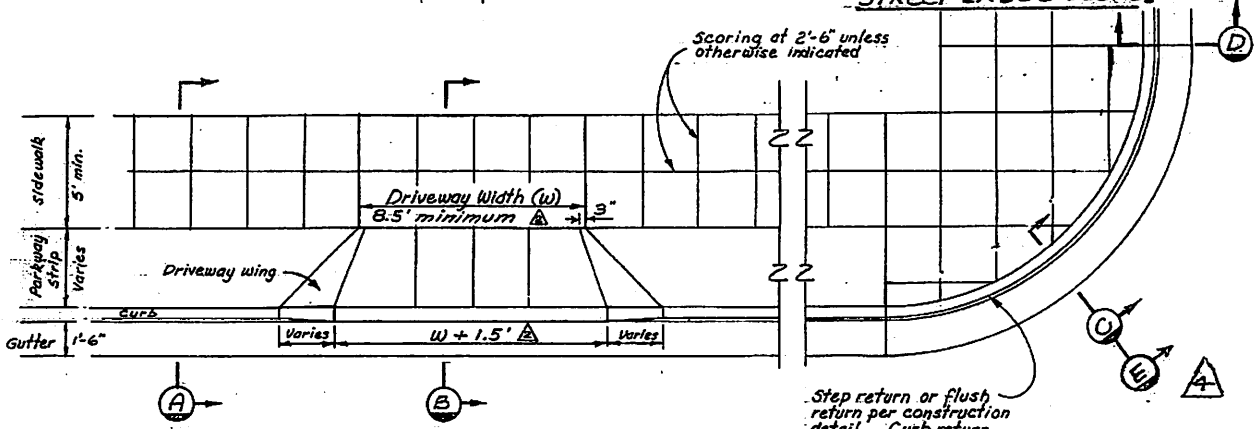


SECTION (A)

SECTION (E) AT STEP RETURNS - REFER TO CALTRANS STND PLAN A88A&B FOR HC LOCATIONS & DETAILS AND STREET CROSS SLOPE.



SECTIONS (B)
AT STEP RETURN



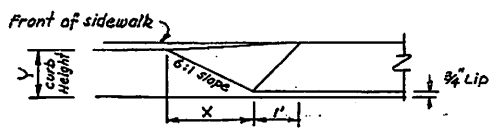
NOTES:

A Required mix design is 5 sack, ¾" aggregate, 2500psi with 1½ lb. lampblack per cu.yd.

CURB AND GUTTER
½" Expansion joints at 15'.
Jointer line at 5'.
Finish as specified.
Transition to existing wider gutter shall be 5' long.

SIDEWALK AND DRIVEWAY
½" expansion joints at 15'.
Finish as specified.

See dwg. 6270-22 where driveway slopes exceed limits shown.



FRONT VIEW AT DRIVEWAY WING

Y	4"	5"	6"	8"
X	19½"	25½"	31½"	43½"

DRIVEWAY WING LENGTHS FOR VARIOUS CURB HEIGHTS

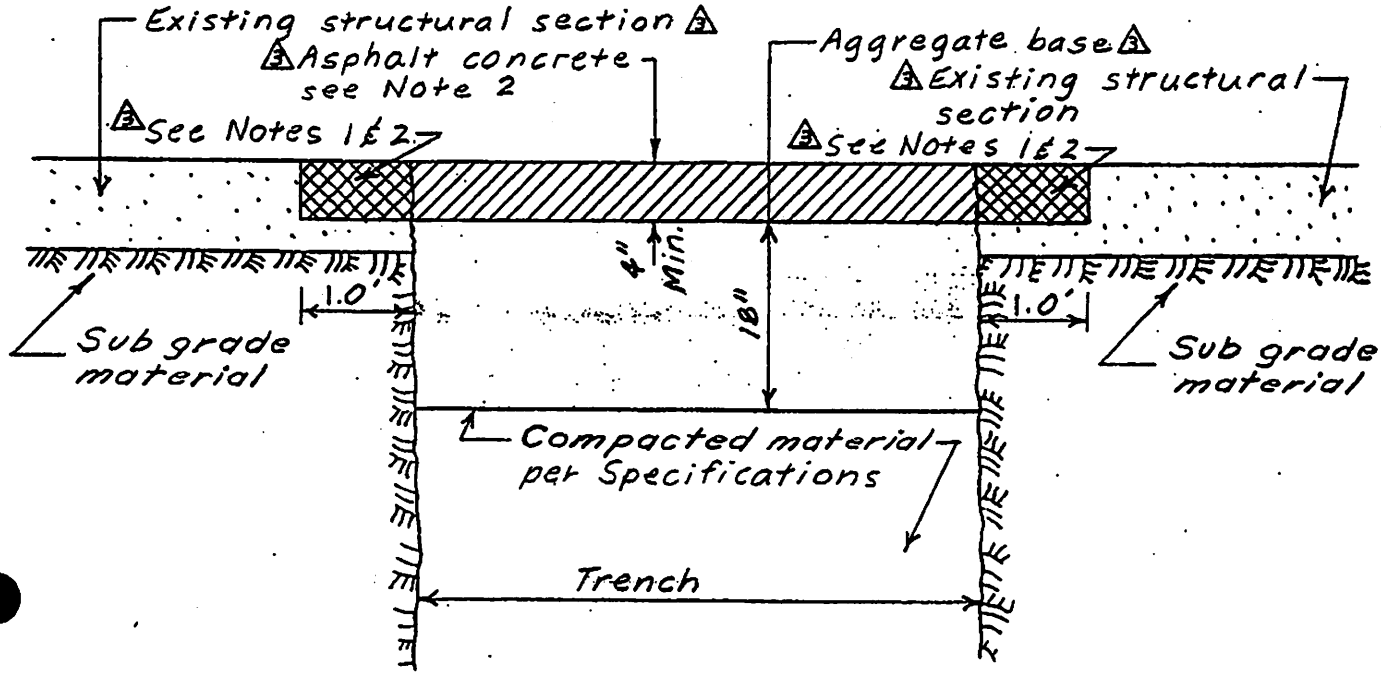
NO.	REVISED	BY	APP.
A	FEB 2010	ES	
A	April 1998	JF	
A	Jan. 1974	Terry	MH
A	Jan. 1972	Terry	MH

COMPILED LONG & WONG
DRAWN H.J. WONG
CHECKED J. PAU
DATE OCT. 1968
SCALE NONE

CITY OF ALAMEDA
CALIFORNIA
ENGINEERING DEPARTMENT

STANDARD PLAN CURB GUTTER SIDEWALK AND DRIVEWAY

SHEET 1 OF 1
APPROVED BY
M J Hanna
CITY ENGINEER
REG. C. E. NO. 7041
DATE 10-28-68
DWG. 6297
CASE 24



2 NOTES

2 1. For trenches wider than 6", cut & remove additional one foot (1.0') width of asphalt concrete on both sides of the trench after placement of aggregate base & prior to paving.

2. Pave entire opening with 4" min. of AC or equal to original depth of AC (whichever is greater).

NO.	REVISED	BY	APVD.
4	APRIL 1998	CRS	[illegible]
3	MAY 1996	FDB	[illegible]
2	FEB. 1975	Terry	NH
1	Nov. 1961	Terry	NH

FILED

DRAWN W. Terry

CHECKED

DATE Nov. 1961 | SCALE None

578-10-48-250

CITY OF ALAMEDA
CALIFORNIA
ENGINEERING DEPARTMENT

STANDARD SECTION FOR REPAVING TRENCHES

SHEET 1 OF 1

APPROVED BY

M. J. Hanna

CITY ENGINEER
REG. C. E. NO. 7061

DATE 12-5-'61

DWG. 2930 | CASE 22

ATTACHMENT "D"

East Bay Regional Parks Sample Encroachment Permit Application and Insurance Requirements

East Bay Regional Park District
Encroachment Permit

PERMIT NUMBER:

PERMIT FEE:

EBRPD FACILITY AFFECTED:	
PERMITEE NAME: (Company)	
ADDRESS:	
CONTACT PERSON:	
PHONE:	
EMAIL:	

SAMPLE

CONDITIONS:

1. No project work shall commence until all necessary permits and environmental clearances have been obtained. It shall be the sole responsibility of the Permittee to obtain all necessary permits.
2. This permit is valid through _____.
3. The Permittee shall contact:
   Park Supervisor _____ at _____to coordinate access.
   Work during wet, storm or elevated fire hazard conditions shall be at the discretion of the Park Supervisor.
4. Prior to the commencement of work the Permittee and Permittee's Contractor shall provide and maintain:
   a. Commercial General Liability Insurance, occurrence form, with a limit of not less than **$2,000,000 for each occurrence**. If such insurance contains a general aggregate limit, either it shall apply separately to this Encroachment Permit or be no less than **two (2) times the occurrence limit**.
   b. Automobile Liability Insurance, occurrence form, with a limit of not less than **$1,000,000 for each occurrence**. Such occurrence shall include coverage for owned, hired and non-owned automobiles.
   c. Builder's Risk, Special Hazards, or other coverage may be required, as provided in the Supplementary Conditions or other written communication from the East Bay Regional Park District ("Park District").
   d. General Provisions for all insurance:
      i. All insurance shall include the Park District, its elected and appointed officers, employees, and volunteers as additional insureds with respect to this Encroachment Permit and the performance of the Description of Project/Activity on the Encroachment Permit and Permit Application. The coverage shall contain no special limitations on the scope of its protection to the above-designated insureds.
      ii. General liability insurance shall be primary and non-contributory with respect to any insurance or self-insurance programs of the Park District, its boards, commissions, officers, agents, employees, and volunteers.

iii. All insurance shall be evidenced, prior to commencement of services, by properly executed policy endorsements in addition to a certificate of insurance.

iv. In addition to requiring that the Permitee and Permitee's Contractor provide an insurance certificate showing the levels and types of coverage required for the project or contract, the Park District also requires the Permitee and Permitee's Contractor to provide the Park District with a copy of the actual endorsements (a document that modifies the terms of the underlying policy and is issued by the insurance company itself, rather than a broker) to the commercial, general, automobile, and excess liability insurance policies that show the Park District, its boards, commissions, officers, agents, and employees have been named as additional insureds by the insurers.

e. No changes in insurance may be made without the approval of the Park District.

f. Notice of Cancellation. The Park District requires thirty (30) days written notice of cancellation of any insurance required by this Permit. Additionally, the notice statement on the certificate should not include the wording "endeavor to" or "but failure to mail such notice shall impose no obligation or liability upon the company, its agents or representatives" (or similar wording).

5. Permittee and Permittee's Contractor agree to indemnify, hold harmless, defend and protect Park District, its officers, directors, agents, employees, invitees (each of which is an indemnitee) from and against any and all claims, losses, damages, demands, liabilities, suits, costs, expenses (including attorneys' fees), penalties, judgments, or obligations whatsoever for or in connection with injury (including death) or damage to any person or the loss or damage of property to whomsoever belonging or pecuniary or monetary loss resulting from, arising out of, or in any way related to activity conducted by or the omission of Permittee or Permittee's Contractor, including but not limited to Permittee's or Permittee's Contractor's development, construction, occupation, use, operation, maintenance and/or removal of the property, premises, or any facilities or operations thereon, including events occurring on or off the property, premises, or facilities, regardless of how the injury or damage was caused or suffered, unless the injury or damage resulted from the sole negligence or the intentional and willful misconduct of the Park District, its officers, directors, agents or employees.

6. Permittee agrees to restore any park facility disturbed to its pre-construction/project condition. The Park District may elect to make repairs and charge the Permittee the cost thereof. At the Permittee's sole expense, the Permitee shall provide a pre-construction photo and/or video record to document the site conditions before the start of the work.

7. Prior to any grading, trenching, digging, ditching, drilling, augering, tunneling, scraping or any other type of excavation, the Permittee shall provide the Park District with an initial inquiry identification number from Underground Service Alert.

8. Survey monuments shall be protected. Any survey monuments or property corners removed or disturbed shall be replaced at the Permittee's sole expense using survey practices acceptable to the Park District.

9. After both entering and exiting East Bay Regional Park District property, all gates must be closed and locked immediately.

10. All work performed shall be consistent with Encroachment Permit Application dated, _____ and all documents submitted to the Park District, attached as Exhibit(s) _____ through _____ and Supplementary Condition(s) _____

11. Permittee and Permittee's Contractor shall implement Best Management Practices (BMPs) consistent with Storm Water Pollution Prevention Plan (SWPPP).

12. Permittee shall implement the following invasive weed BMP's in lieu of submitting an Integrated Pest Management Plan and weed abatement program.
    a. Permittee shall use only weed-free straw mulch.
    b. Permittee shall wash all project equipment, prior to entering the work area. All vehicles shall be cleaned of dirt and debris per EBRPD Decontamination Protocol 2017 (attached).
    c. Permittee shall incorporate top soil salvage into the excavation efforts. The top 2-3 inches of soil will be scraped/excavated and placed in a separate location from all other excavated material. Upon the completion of Construction, the salvaged top soil will be placed back over the excavated area.
13. If hazardous waste is transported, Permittee shall provide the appropriate copy of the Uniform Hazardous Waste Manifest to the Park District.
14. No construction material shall be stored, nor equipment parked on Park District land.
15. No monofilament plastic mesh or line will be used for erosion control.
16. All vehicles traveling on Park District land shall be limited to speeds not to exceed 15 MPH. All vehicles shall yield right of way to park and trail users.
17. Upon completion of the work all debris, scraps, material, etc., shall be removed from the parkland.
18. All work performed within the parkland shall conform to recognized standards of construction.
19. The Permittee shall cease work in the vicinity of any archaeological resources that are revealed and notify the Park District immediately. A qualified archaeologist, retained by the Permittee, will evaluate the situation and make recommendations to the Park District concerning the continuation of the work. All resulting recommendations shall be incorporated in the work at no additional cost to Park District.
20. The Permittee is responsible for meeting all requirements of California Public Resources Code, Sections 4427 and 4431.

SECTION 4427. During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush-covered land, or grass-covered land, without doing both of the following:

(a) First clearing away all flammable material, including snags, from the area around such operation for a distance of 10 feet.

(b) Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.

This section does not apply to portable power saws and other portable tools powered by a gasoline-fueled internal combustion engine.

SECTION 4431. During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry

and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

SAMPLE

21. This Permit allows temporary trail or road closure only where allowed by Park Supervisor.
22. Permittee shall review Conditions of this Permit with all employees and subcontractors prior to any work.
23. The work site shall be enclosed by suitable barricades, fencing, signs and lights, as approved by Park District Representatives, to warn and protect public and traffic effectively.
24. Excavations made within the limits of the parklands shall be backfilled or securely covered before leaving the work for the night.
25. Permittee shall provide the Park District with copies of any reports or findings made as a result of this access.
26. Permittee shall provide the Park District with GIS data for any underground or above ground utilities installed or repaired under this Permit. The data shall be provided in the ESRI Shapefile format (.shp) in the following projection:
    a. Projection: CA Stateplane Zone III
    b. Datum: NAD83
    c. Units: Feet
27. This Permit does not authorize tree trimming or tree removal.
28. This Permit can be revoked at any time.
29. Permittee shall notify the Park Supervisor once the project is completed. A site visit may be scheduled to confirm all Conditions of this Encroachment Permit have been completed to Park District Representatives' satisfaction.
30. **A copy of this fully executed Encroachment Permit must be on site and presented to East Bay Regional Park District personnel upon request.**

Subject to the above conditions, A PERMIT IS HEREBY ISSUED FOR:

ISSUED BY: _____ **DATE:** _____
Nate Luna, Project Manager

CONDITIONS ACCEPTED BY: _____ **DATE:** _____
Permittee

ATTACHMENT E

"East Bay Communities" Regional Standards for Sanitary System Installation, Rehabilitation, and Repair, June 30, 2016

"East Bay Communities"
City of Alameda
City of Albany
City of Berkeley
City of Emeryville
City of Oakland
City of Piedmont
East Bay Municipal Utility District (EBMUD)
Stege Sanitary District

REGIONAL STANDARDS

for Sanitary Sewer System Installation, Rehabilitation and Repair
June 30, 2016

Prepared under Consent Decree Case. Nos. C09-00186-RS & C09-05684-RS

this page intentionally blank

Table of Contents

List of Abbreviations

1. Introduction 1
2. Background Information 1
3. Regional Standards Development 2
4. Future Standards Revisions and Reporting 3

Figures

Figure 1. EBMUD Service Area, Satellite Boundaries, and Facilities 2

List of Attachments

Attachment A. Best Management Practices (BMPs) 5
Attachment B. Amendment to Green Book Standard Specifications 17

List of Abbreviations

AMIP	Asset Management Implementation Plan
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BMP	Best Management Practice
CCTV	Closed Circuit Television
CD	Consent Decree
CIPP	Cured-In-Place Pipe
CLSM	Controlled Low Strength Material
EBC	East Bay Communities
EBMUD	East Bay Municipal Utility District
EPA	United States Environmental Protection Agency
GB	Green Book
HDPE	High Density Polyethylene
I/I	Inflow and Infiltration
LF	Linear Feet
MH	Manhole
MWWTP	Main Wastewater Treatment Plant
PE	Polyethylene
PSL	Private Sewer Lateral
RTSP	Regional Technical Support Program
SSO	Sanitary Sewer Overflow
UPC	Uniform Plumbing Code
VCP	Vitrified Clay Pipe
WWF	Wet Weather Facility

1. Introduction

East Bay Municipal Utility District (EBMUD) and seven Satellite Agencies (the Cities of Alameda, Albany, Berkeley, Emeryville, Oakland, and Piedmont, plus Stege Sanitary District, which serves El Cerrito, Kensington, and Richmond Annex) entered into a Consent Decree in United States, et al. v. East Bay Municipal Utility District (Case Nos. CV 09-00186 and CV 09-05684, N.D. Cal.) with the United States Environmental Protection Agency (EPA), state and regional water boards, San Francisco Baykeeper, and Our Children's Earth Foundation. The Consent Decree, approved by the court on September 22, 2014, requires EBMUD and the Satellites to eliminate discharges from EBMUD's three wet weather facilities (WWFs) by 2036 in all storms not exceeding the magnitude of the storm event specified in the Consent Decree.

The Consent Decree (CD) requires EBMUD and the Satellites, jointly referred to as the East Bay Communities (EBC), to create Regional Standards for sewer installation, repair, and rehabilitation, to assist inflow/infiltration (I/I) reduction in the regional wastewater collection system. The CD further states that a group report of the recommended Regional Standards is to be submitted for EPA's review and approval by June 30, 2016 and every five years thereafter.

These Regional Standards have been developed as required pursuant to the Satellites' and EBMUD's I/I Reduction Program requirements in Paragraphs 33, 43c, 54c, 64c, 73c, 83d, 96c, and 107c of the Consent Decree.

2. Background Information

EBMUD conveys and treats wastewater generated by the seven Satellites. Each Satellite owns and operates its own sanitary sewer system that collects wastewater generated in their respective communities and conveys the flows to EBMUD's Interceptor System. The Interceptor System then conveys the flows to the Main Wastewater Treatment Plant (MWWTP) where it is treated. Treated effluent from the MWWTP is discharged through an outfall located near the eastern span of the San Francisco-Oakland Bay Bridge. During significant precipitation events, excessive amounts of rain and groundwater enter the collection system through multiple avenues, such as deteriorated and defective pipes or illicit storm drain connections, causing an increase in I/I. Currently, during certain significant wet weather events, the MWWTP is relieved by, and primary treatment is provided at EBMUD's WWFs, located at Point Isabel, Oakport, and San Antonio Creek.

During wet weather events, flows related to I/I are dominant compared to flows during dry weather conditions. Peaking factors, calculated as a ratio of peak flow to dry weather flow (i.e., base sanitary flow plus groundwater infiltration), are approximately 13:1 on a system-wide average, with some locations having ratios determined to be as high as 40:1. Comparatively, designs for new separated sanitary sewer collection systems assume peaking factor ratios of 3:1, while older systems have ratios in the 7:1 range.

Figure 1 shows EBMUD's service area, the boundaries of the Satellites, and the location of conveyance and treatment facilities. EBMUD's Interceptor System includes approximately 29 miles of gravity sewers, 8 miles of force mains, and 15 pump stations; the Satellite collection systems include approximately 1,600 miles of sewers (gravity and force mains) and numerous pump stations.

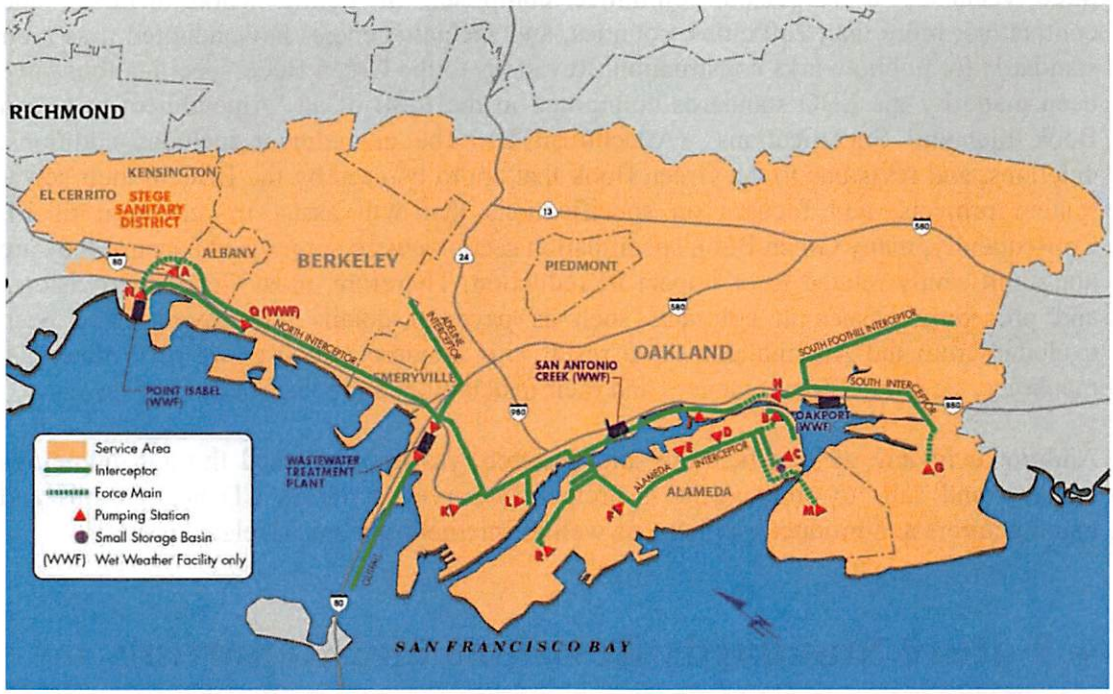


Figure 1. EBMUD Service Area, Satellite Boundaries, and Facilities

3. Regional Standards Development

These Standards have been developed as the result of a joint, collaborative effort of the East Bay Communities (EBC). Meetings to review construction standards, specifications and other details were conducted between June 2015 and June 2016. A standards committee (committee), consisting of representatives from the eight agencies, attended these meetings and were active participants in the review, discussion, and decisions made regarding the standards.

Best Management Practices (BMPs)

The committee decided that in addition to construction specifications, preferred practices regarding important I/I related sewer system construction issues should be identified. The committee considered many issues and developed practices in the major categories of: manholes, laterals, connections, construction and rehabilitation, and construction inspection. The developed BMPs are included in Attachment A.

Specifications

The specifications are based on the latest edition (2015) of the "Standard Specifications for Public Works Construction", commonly referred to as the Green Book. The Green Book was originally developed in 1967 by a 400-person task force made up of representatives of public agencies and contractors. It is now reviewed and revised every three years by a 15-person committee comprised of public works officials and contractors; more than 200 cities, counties, and special agencies have adopted it as their standards for public works construction. Revisions to the Green Book specifications have been made by the EBC standards committee in the form of an "Amendment to Green Book Standard Specifications" (Attachment B). The amendment includes additions, deletions, and revisions to the Green Book that are to be used by the EBC in their sewer system projects, and focuses on specifications that will assist in reduction of I/I. Consequently, many Green Book specification sections were not revised because they are not significantly related to or impact I/I reduction. Therefore, most General Provisions, and procedural issues in contracts such as payment details and paving have been excluded from the Amendment. As a result, this document focuses on pipe materials, manholes, cleanouts, appurtenances and their installation, and rehabilitation of sewers.

Additional review of specifications and research was accomplished through numerous contacts and calls to other agencies previously surveyed during CD negotiations and manufacturers and product suppliers, as well as internet searches of related issues.

4. Future Standards Revisions and Reporting

The Consent Decree requires the EBC to submit a group report for EPA's review and approval every five years subsequent to June 30, 2016. An ongoing effort by EBC is required to address the review of current practices, materials and methods of construction, and the CD requirement for updates and revisions to these Regional Standards.

The EBC standards committee will meet quarterly to review and discuss results of construction efforts, both successes and failures, and to review current and new materials, methods, products, and techniques that may potentially benefit the EBC in their effort to reduce I/I and make the sewer systems as watertight as is feasible. Additionally, EBC agencies will pilot new products and practices that may be included as future specifications or BMPs; these results will be presented to the committee when available. Therefore, these Standards will be in a state of continuous analysis and improvement, so the EBC can adapt to an ever-changing industry regarding I/I. Some of these efforts to try new and different practices for work on collection system components such as manholes, and service and manhole connections will be monitored and analyzed as part of the RTSP.

As required by the CD, each EBC agency will include, beginning in 2017, a section in their respective annual reports that describes the extent of their compliance with the Regional Standards.

this page intentionally blank

ATTACHMENT A

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMP)

Manholes

- New, Replacement, and Rehabilitation
- Covers

Laterals

- General
- Abandoned

Connections

- Laterals to Main Lines
- Main Lines to Manholes

Construction/Rehabilitation

- Prohibited Rehabilitation Methods and Materials
- Acceptance and Testing
- Contractor Licensing

Inspection Coverage

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

MANHOLES - NEW, REPLACEMENT, AND REHABILITATION

Objective Ensure the short and long-term integrity of manholes through the use of appropriate rehabilitation standards, so I/I is minimized as a result.

Explanation Manholes can be a significant source of I/I and ones in poor condition can also lead to a cause of sanitary sewer overflows (SSOs). The installation of new manholes and/or the use of proper materials and rehabilitation methods as part of pipeline rehabilitation projects can help to prevent future manhole problems and failures that may also cause I/I.

Practices

- Manholes will be replaced as a part of rehabilitation and replacement projects unless there are localized, specific conditions that dictate rehabilitation of manholes is needed rather than replacement with a new manhole. Manholes may not necessarily need to be replaced depending upon specific circumstances - e.g., a manhole may have been replaced within the recent past using materials and methods that are consistent with the Regional Standards, do not show any evidence of I/I, and therefore would not need replacement. A statistically representative sample of brick manholes that have been coated with epoxy rather than replaced or lined will be inspected at a frequency not to exceed five years.

- If new manholes are lined, coated, or waterproofed, it will be done with products as specified in EBC's Amendment to the Green Book (GB) (201-10.6.1).

- Testing and acceptance will be done as described in the testing and acceptance BMP and as specified in EBC's amendment to the GB (303-9.2).

- Any rehabilitation of manholes will be in accordance with the EBC amendments to the GB section on Manhole Rehabilitation (500-2). Epoxy coatings will usually be the means of rehabilitation, and the mortar and epoxy coatings used will be products as specified in EBC's amendment to the GB (201-10.6 and 500-2.3).

- EBC will replace covers and frames, as needed depending upon specific conditions, as part of manhole rehabilitation.

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

MANHOLES - COVERS

Objective Ensure that manhole covers in areas that are prone to flooding are watertight so that I/I is minimized as a result.

Explanation Manhole covers that are prone to being submerged during storms or other events can be a significant source of I/I and can also lead to a cause of sanitary sewer overflows (SSOs). The use of proper cover types can help to prevent SSOs and excessive I/I.

Practices

- EBC will install watertight manhole covers on any manholes it finds that may be submerged during storms and wet weather events.
- EBC will identify manholes that are prone to vandalism, or in areas where vandalism could result in significant SSO or I/I issues, and install locking manhole covers on those manholes.

LATERALS - GENERAL

Objective Ensure the short and long-term integrity of laterals through the use of appropriate standards for materials and practices used for the installation, repair, and rehabilitation of laterals, so I/I is minimized as a result.

Explanation Laterals are often a primary cause of sanitary sewer overflows (SSOs) and are a significant source of I/I. The use of proper materials and construction methods can help to prevent the occurrence of defects in laterals that may compromise their integrity and lead to SSOs and I/I. Although all or some portions of laterals are privately owned, agencies should regulate them as part of their overall program for I/I and SSO control and reduction.

Practices

- All work on private laterals, or building sewers, will be done in accordance with the current versions of the Uniform Plumbing Code and California Plumbing Code (Chapter 7, Part II, Building Sewers).
- Connections to sewer mains will adhere to the GB and EBC amendments to the GB.
- Materials used for laterals will also be in accordance with the materials used for public facilities in the GB and EBC amendments to the GB.
- EBC will have the ability to inspect laterals and require replacement or rehabilitation of defective laterals.
- Testing of laterals will be done per EBMUD's PSL Program requirements for laterals. (Note: Berkeley has their own program with similar requirements)

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

LATERALS - ABANDONED

Objective Ensure the short and long-term integrity of main lines and laterals through the use of appropriate acceptance testing standards after the installation, repair, and rehabilitation of collection system facilities, so I/I is minimized as a result.

Explanation Abandoned laterals that are still connected to other laterals or main lines can be a significant source of I/I & can cause sanitary sewer overflows (SSOs) due to excessive flows through voids or defects. Disconnection and capping or plugging of abandoned laterals can help to prevent SSOs and I/I.

Practices

- All abandoned laterals discovered through CCTV and video work will be plugged and capped at the main line, in accordance with the California Plumbing Code, Chapter 7 (722.0), and within five feet of the building drain.

- The approved manner of capping and plugging will include the disconnection of the abandoned lateral such that the lateral is definitely separated from the main line or other lateral to which it is connected. Low strength concrete, or CLSM (section 201-6 in EBC's amendment to the GB), may also be placed in the area of the plug or cap to ensure no connection still exists.

- Agencies will actively look for abandoned laterals as a part of construction of new pipe, rehabilitation of pipe, review of redevelopment or infill projects, or in the process of inspections in regards to lateral inspections. This may include additional video work or dye testing to verify or confirm whether or not laterals are active or abandoned.

- EBC and EBMUD will look for abandoned laterals as part of EBMUD's lateral and RTSP programs.

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/3016)

CONNECTIONS - LATERALS TO MAIN LINES

Objective Provide service connections that are the best, current practices and technology that will minimize I/I, in both the near and long term time frames.

Explanation Service connections, or the connections of laterals to main lines, are often a significant source of I/I. The use of current best practices and technology can help to prevent connection problems and failures that may cause SSOs and I/I.

Practices

- Rehabilitation projects - Re-establishment of external service connections will be made with the use of polyethylene saddles and stainless steel bands, and flexible couplings, according to EBC amendments to the GB (500-1.1.7(a)).

- Rehabilitation projects - The materials used for service connections to main lines when HDPE pipe is used for rehabilitation will be according to EBC amendments to the GB (500-1.6.6), use of electrofusion saddles.

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

CONNECTIONS - MAIN LINES TO MANHOLES

Objective Provide manhole connections that are the best, current practices and technology that will minimize I/I, in both the near and long term time frames.

Explanation Manhole connections, or the connections of main lines to manholes, are often a significant source of I/I. The use of current best practices and technology can help to prevent connection problems and failures that may cause SSOs and I/I.

Practices

- Newly installed manholes - Pipe stubouts will be installed for future main line connections (303-9.1.h in EBC's amendment to the GB).
- Connection to existing manholes - connections will be made per EBC amendments to the GB (303-9.1.o in EBC's amendment to the GB).
- Rehabilitation projects - connections will be made in accordance with EBC amendments to the GB, either by waterstop gasket and grout or HDPE thermal-fused pipe restraints (500-1.6.7 in EBC's amendment to the GB).

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

CONSTRUCTION/REHABILITATION - PROHIBITED REHABILITATION METHODS AND MATERIALS

Objective Ensure the short and long-term integrity of sewer infrastructure through the use of appropriate rehabilitation methods and materials standards, so I/I is minimized as a result.

Explanation Rehabilitation methods and materials used in sewer rehabilitation projects vary, have changed significantly since the 1980s, and there very likely will be developments and changes in the future. The use of proper materials and rehabilitation methods can help to prevent future mainline problems and failures that may also cause SSOs and increased I/I. Consequently, certain methods and materials should be prohibited for use by EBC.

Practices

- **Materials** that shall not be used -
  Non-reinforced concrete pipe
  Cast iron soil pipe
  Corrugated steel pipe and arch pipe
  Structural steel plate pipe and arch
  Corrugated aluminum pipe and pipe arch
  Structural aluminum plate pipe and arch
  ABS pipe

- **Methods** that should not be used -
  PVC Pipe lining systems
  External in-place wrap
  Folded and re-formed PVC pipe liner
  PVC closed profile liner pipe
  Machine spiral wound PVC pipe liner

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

CONSTRUCTION/REHABILITATION - ACCEPTANCE AND TESTING

Objective Ensure the short and long-term integrity of main lines and laterals through the use of appropriate acceptance and testing standards after the installation, repair, and rehabilitation of collection system facilities, so I/I is minimized as a result.

Explanation Inadequate construction can be a cause of sanitary sewer overflows (SSOs) and a significant source of I/I. The use of proper acceptance and testing standards can help prevent substandard construction that may lead to SSOs and I/I.

Practices

- All new installations of gravity main lines will be pressure and leak tested (either water or air) in accordance with Green Book specifications (306-7.8.2 in EBC's amendment to the GB).
- All new and rehabilitated gravity lines will be cleaned prior to acceptance (500-1.1.4 in EBC's amendment to the GB).
- All pipeline rehabilitation and replacement work will undergo leakage testing and acceptance standards as established in the EBC amendments to the GB for pipeline rehabilitation (500-5).
- All new and rehabilitated manholes will be vacuum tested as specified in the EBC amendments to the GB (303-9.2).
- All pipe installed by pipe bursting will be inspected by CCTV or video inspection prior to acceptance, per EBC amendments to the GB for pipe bursting (500-1.6.13).
- Completion, acceptance, and warranty items will be handled according to the GB (Part 1, 6-8 in EBC's amendment to the GB).

EAST BAY COMMUNITIES
REGIONAL STANDARDS
BEST MANAGEMENT PRACTICES (BMPs)
(6/30/16)

CONSTRUCTION/REHABILITATION - CONTRACTOR LICENSING

Objective Enhance the likelihood that there is a high quality of all work on sanitary sewer facilities by requiring licensing of contractors that will perform the work.

Explanation California law and code sections require that contractors performing certain work shall be licensed by the state in regards to the specific type of work to be performed. The use of contractors with the applicable licenses enables conformance with California law as well as helping to ensure that work will be of good quality and help the EBC attain the I/I reductions required by the CD and help attain the required I/I reductions.

Practices

- EBC will use or permit contractors that have at least one or more of the following State contractors licenses, depending upon the type of work to be done:
  - A General Engineering
  - B General Building
  - C-34 Pipeline
  - C-36 Plumbing
  - C-42 Sanitation System

- The work that that a C-36 licensed contractor may perform is restricted to laterals, excluding the connections to public main lines.

- A "B-licensed" Contractor must also hold a C-34 license in order to be able to work on sewers and to make lateral connections to main lines.

INSPECTION COVERAGE

Objective Ensure that work on pipeline projects is of high quality and in accordance with specifications by providing adequate construction management, inspection, and oversight.

Explanation Poor construction and construction that doesn't conform to specifications can occur if proper construction inspection and oversight is not provided. This can result in facilities that degrade and perhaps even fail earlier than their expected useful life, and significant I/I may result. Proper inspection will help to prevent pipeline, manhole, and other problems and failures that may cause SSOs and I/I.

Practices

- EBC will assign construction inspectors to every I/I - related project.
- EBC inspectors will witness as many main line connections to manholes and lateral reconnections to newly installed main lines in sanitary sewer or I/I projects as is practically possible.
- An inspector will be present to witness acceptance testing processes that include the extent of the entire project.

this page intentionally blank

ATTACHMENT B

EAST BAY COMMUNITIES
AMENDMENT TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK)

2015 edition (6/30/16)

For Collection System Construction, Rehabilitation and Repair in Agencies Located in Special District No. 1, East Bay Municipal Utility District (EBMUD)

This Amendment to the Standard Specifications for Public Works Construction applies to the construction, rehabilitation, and repair of the East Bay Communities wastewater collection and transmission systems, including agency sewer mains and interceptors, laterals, force mains, and manholes. This amendment is the "Regional Standards" referred to in the 2014 Consent Decree (CD) - the CD defines them thusly: Regional Standards shall mean a collection of details, specifications, and practices prescribing how the Work on Sewer Mains, Manholes and Sewer Laterals is to be performed so as to optimize the I&I reductions resulting from the Work. This Amendment was developed for the on-going asset management construction and activities ("Work") of the East Bay Communities. The amendment was prepared for the Cities of Albany, Alameda, Berkeley, Emeryville, Oakland, Piedmont, the Stege Sanitary District, and EBMUD (individually referred to as "Agency" in EBC's amendment to the GB specifications). This Amendment modifies the Standard Specifications for Public Works Construction (Green Book), 2015 Edition, and its provisions take precedence over those Standard Specifications. This Amendment incorporates only the amended sections and not the entire Green Book.

this page intentionally blank

AMENDMENT - TABLE OF CONTENTS

PART 1 – GENERAL PROVISIONS

2-5.2 Precedence of Contract Documents

PART 2 – CONSTRUCTION MATERIALS

201-6 CONTROLLED LOW STRENGTH MATERIAL (CLSM)
201-6.1 General and Quality Assurance
201-6.1.1 Cementitious Material
201-6.1.2 Mix Proportions
201-6.1.3 Strength and Density
201-6.1.4 Mixture
201-6.1.5 Native and Imported Soils
201-6.2 Mix Design
201-6.2.1 Submittals-Mix Design and Testing
201-6.3 Materials
201-6.4 Execution - Batching and Mixing, and Installation
201-6.4.1 Batching and Mixing
201-6.4.2 Installation

201-10 MANHOLES, CLEANOUTS AND APPURTENANT MATERIALS
201-10.1 Materials
201-10.1.1 Rock Base
201-10.1.2 Cement Mortar.
201-10.2 Manholes
201-10.2.1 Cast-In-Place Concrete Manholes
201-10.2.2 Pre-cast Manhole Sections
201-10.2.3 Manhole Bases
201-10.2.4 Plastic Pipe Connections
201-10.2.5 Manhole Extensions
201-10.2.6 Jointing Manhole Sections
201-10.3 Cleanouts
201-10.4 Lampholes
201-10.5 Appurtenant Materials
201-10.5.1 Pipe and Fittings
201-10.5.2 Pipe Stubouts for Future Sewer Connections
201-10.6.1 Sealing Manhole Walls
201-10.6.1 (a) Cement-Epoxy Mixtures
201-10.6.1 (b) Chemical Grout
201-10.6.1 (c) Polyurethane Coatings
201-10.6.1 (d) Modified Polyester/Polymorphic Coatings
201-10.6.1 (e) Epoxy Coating
201-10.6.1 (f) Fiberglass Liners

201-10.6.1 (g) HDPE Liners
201-10.6.1 (h) Cementitious Crystalline Waterproofing

207-19 POLYETHYLENE (PE) SOLID WALL GRAVITY PIPE
207-19.1 General

207-25 POLYETHYLENE (PE) LARGE DIAMETER (36 INCH DIAMETER OR GREATER) PROFILE WALL PIPE
207-25.1 General
207-25.2 Material Composition
207-25.3 Test Requirements
207-25.4 Marking
207-25.5 Dimensions

PART 3 – CONSTRUCTION METHODS

303-9 INSTALLATION OF MANHOLES, CLEANOUTS AND APPURTENANCES
303-9.1 General
303-9.1.a Structure Excavation and Backfill
303-9.1.b Rock Base
303-9.1.c Concrete Manhole Base
303-9.1.d Placing Precast Manhole Sections
303-9.1.e Manhole Channels
303-9.1.f Drop Manholes/Drop Connection Manholes
303-9.1.g Flexible Joints
303-9.1.h Pipe Stubouts for Future Sewer Connections
303-9.1.i Permanent Plugs.
303-9.1.j Manhole Extensions
303-9.1.k Manhole Frames and Covers
303-9.1.l Manhole over Existing Sewers
303-9.1.m Connection to Existing Manholes
303-9.1.n Special Manholes.
303-9.1.o Sewer Cleanouts
303-9.2 Structure Testing
303-9.2.a Vacuum Testing.
303-9.2.b Hydrostatic Testing

306-3 TRENCH EXCAVATION
306-3.1 General
306-3.5 Maximum Length of Open Trench
306-7 Prefabricated Gravity Pipe
306-7.4 Vitrified Clay Pipe (VCP)
306-7.4.4 Special Joints
306-7.8.2.1(e) Pressure Testing and Leakage Inspection

306-16 BUILDING SEWERS
306-16.1 General
306-16.1.1 Records to be Kept
306-16.2 Material

PART 5 – PIPELINE SYSTEM REHABILITATION

500-1 PIPELINE REHABILITATION.
500-1.1.5 Television Inspection
500-1.1.6 Sampling, Testing and Installation
500-1.1.7 Miscellaneous
500-1.1.7 a) Service Connections
500-1.2.6 Installation and Field Inspection
500-1.3 High Density Polyethylene (HDPE) Solid Wall Liner
500-1.3.1 General
500-1.4 Cured-in-Place Pipe Liner (CIPP) Liner
500-1.4.1 General
500-1.4.2 Material Composition and Testing

TABLE 500-1.4.2 (A)
CIPP Liner Minimum Flexural Requirements for Polyester Resin

500-1.4.4 Chemical Resistance
500-1.4.5 Installation
500-1.4.8 Repair and Rejection
500-1.4.9 Material Testing
500-1.4.10 Spill Prevention in Curing Process

500-1.5 Polyvinyl Chloride (PVC) Pipe Lining System

500-1.6 Pipe-Bursting Method
500-1.6.1 General
500-1.6.1.1 Preliminary Surface Inspection
500-1.6.2 Contractor Qualifications
500-1.6.2.1 Field Supervisory Qualifications
500-1.6.3 Contractor Submittals
500-1.6.3.1 Contractor Qualifications
500-1.6.3.2 Drawings and Documents

500-1-6-4 Materials
500-1.6.4.1 High Density Polyethylene (HDPE) Pipe
500-1.6.5 Pipe Joining for Sections of HDPE Pipe
500-1.6.6 Service Connection Materials
500-1.6.7 Sealing Connections at Manholes
500-1.6.8 Pipe Bursting Equipment

500-1.6.9 Execution of Work - General
500-1.6.10 Preparation of Work
500-1.6.11 Insertion of the HDPE Pipe
500-1.6.12 Service Reconnections
500-1.6.13 Testing and Acceptance

500-1.7 Deformed/Reformed HDPE Liner

500-1.9 External In-Place Wrap

500-1.10 Folded and Re-formed PVC Pipe Liner

500-1.12 Polyvinyl Chloride (PVC) Closed Profile Liner Pipe

500-1.13 Machine Spiral Wound Polyvinyl Chloride (PVC) Pipe Liner

500-2 MANHOLE AND STRUCTURE REHABILITATION.
500-2.1 General
500-2.2 Leakage at Frames and Covers
500-2.2.1 Replace Cover
500-2.2.2 Adjust Frame and Cover
500-2.2.3 Replace Frame and Cover
500-2.3 Sealing Manhole Walls
500-2.4 Remove and Replace Existing Sewer Structure
500-2.5 Testing

500-5 ACCEPTANCE TESTING
500-5.1 General
500-5.2 Leakage Testing
500-5.3 Miscellaneous Testing
500-5.4 Acceptance

Part 1 – GENERAL PROVISIONS

Section 2 – Scope and Control of Work

REPLACE SUBSECTION 2-5.2 WITH THE FOLLOWING:

2-5.2 Precedence of Contract Documents.

The principal contract specifications for this project are the "Standard Specifications for Public Works Construction, 2015 edition", commonly referred to as the Green Book. The Contractor shall note that the Green Book is not reproduced in this document, but is self-contained under separate cover and the Contractor shall obtain it separately.

The East Bay Communities Amendment to the Standard Specifications for Public Works Construction, 2015 edition contains modifications and additions to the Green Book that are specific to collection system work. These provisions shall take precedence over the Green Book.

If there is a conflict between any of the Contract Documents, the document highest in the order of precedence shall control. The order of precedence from highest to lowest, shall be as follows:

a) Permits issued by jurisdictional/regulatory agencies
b) Change Orders and Supplemental Agreements; whichever occurs last
c) Contract/Agreement
d) Addenda
e) Bid/Proposal
f) Special Provisions
g) Plans (Project)
h) East Bay Communities Amendment to the Standard Specifications for Public Works Construction, 2015 edition (Green Book) and 2015 edition of the Green Book (if Agency uses the Green Book as its Standards specifications)
i) Standard Plans and Details (Agency)
j) Standard Specifications (Agency)
k) Reference Specifications

Part 2 – CONSTRUCTION MATERIALS

REPLACE SECTION 201-6 WITH THE FOLLOWING:

201-6 CONTROLLED LOW STRENGTH MATERIAL (CLSM).

201-6.1 General and Quality Assurance.

201-6.1.1 Cementitious Material. CLSM shall be composed of a cementitious material, water and suitable native or imported soils as described in this section.

The cementitious materials shall be Portland cement. Fly ash may be substituted for cement provided the requirements of this section are met.

201-6-1.2 Mix Proportions. The appropriate CLSM mix proportions shall be determined by preparing test batches and testing trial cylinders in accordance with 201-6.2.

201-6.1 Strength and Density. CLSM shall have an unconfined compressive 28 day strength from 50 psi to a maximum of 150 psi and a density of 110 to 130 pounds per cubic foot.

201-6.1.4 Mixture. The mixture shall have a consistency such that the CLSM completely fills the space between the pipe and the excavated trench walls without bleeding or segregation of soil materials.

The CLSM mixture shall contain no particles larger than 3 inches.

201-6.1.5 Native and Imported Soils:

The soil shall be free of organic impurities.

The amount of material passing a #200 sieve shall not exceed 30 percent.

The plasticity index of the soil shall not exceed 3. The sand equivalent of the soil shall be at least 15. For native material with a sand equivalent between 10 and 15, approval shall be dependent on production and successful testing of a sample batch of CLSM.

During full-scale CLSM placement, the Engineer will take samples and perform tests to determine compliance with the specified unconfined compressive strength requirements.

201-6.2 Mix Design. The design of the CLSM mix shall be the responsibility of the Contractor, and shall be subject to review and approval by the Engineer before a full-scale field mix is used. Mix shall result in a final product that meets the requirements of this section.

201-6.2.1 Submittals - Mix Design and Testing. CLSM mix shall be designed, in accordance with ASTM D4832-02 Standard Test Method for Preparation and Testing of Controlled Low Strength Material Test Cylinders. The CLSM used in test cylinders shall be prepared using the same equipment proposed for full-scale batching and mixing.

The testing laboratory shall submit certified copies of all laboratory trial mix reports to the Engineer.

CLSM shall not be used prior to the Engineer's review of test reports and approval of the mix design.

The minimum cement content for the mix design shall be 3 percent by dry mass of the soil.

Cementitious fly ash (Class C or F) may be used in the mix provided the strength and consistency requirements in 201-6.1 are met.

Air entraining admixtures may be used in the mix provided the strength and consistency requirements in 201-6.1 are met.

The CLSM shall be sampled according to ASTM D5971.

The following tests shall be conducted on the native soils proposed for use in preparing CLSM: ASTM D422 and ASTM D4318.

The following tests shall be conducted for each CLSM trial batch: ASTM D4832, ASTM D6023, ASTM D6024.

The Contractor shall submit the results of the laboratory testing program and the selected design mix for full-scale field production for review and approval by the Engineer. After acceptance, the batch and mix process or native soil source material shall not be changed without submitting new test information.

The Contractor shall provide a submittal showing the proposed methods to support the pipe during CLSM placement.

The Contractor shall provide a submittal showing the proposed methods to prevent pipe flotation during CLSM placement.

The Contractor shall provide a submittal detailing the proposed batching and mixing process including the following:

The proposed equipment and methods to process native soils into source material in compliance with 201-6.1.

The proposed staging and batch plant mixing areas relative to the work areas where the CLSM will be placed.

The proposed means of transport for mixed CLSM material from the batching and mixing area to the work where the CLSM will be placed.

201-6.3 Materials.

Cement shall conform to ASTM C150, Type II.

Cementitious fly ash (Class F or C) may be used in the mix provided that the strength and consistency requirements in 201-6.1 are met. The fly ash shall conform to ASTM C618 and shall not contain more than 3% carbon (low).

Air entraining admixtures may be used in the mix provided that the strength and consistency requirements in 201-6.1 are met.

Native soils used in the CLSM mix shall be predominantly granular and meet the requirements of 201-6.1.

Water shall be free from oil, salts and other impurities that would have an adverse effect on the quality of the CLSM.

201-6.4 Execution - Batching and Mixing, and Installation.

201-6.4.1 Batching and Mixing: Batch and mix the CLSM in the field with the processed native soils similar to that used in the trial mix program.

201-6.4.2 Installation:

Use sufficient shores or other supports to prevent soil from caving onto pipe. Remove soil fallen into trench before placing CLSM.

CLSM shall be placed on one side of the pipe and allowed to flow under until it is seen on the other side.

The CLSM shall be brought uniformly to the elevation as shown on the drawings.

Place CLSM between the trench bottom and 0.15 D above the bottom of the pipe as part of a single lift, where D is the diameter of the pipe.

The CLSM shall be placed so there is complete contact between the pipe and excavated pipe trench walls.

Prevent CLSM from entering bell holes before joint coating and testing are complete.

If CLSM is placed near a joint before application and testing of joint coating, place a blanket or cover over joint to prevent CLSM spatter onto joint area.

The support materials used to haunch the pipe and contain the CLSM during placement shall not exceed the compressive strength of the CLSM.

The Contractor shall take the necessary measures to prevent flotation of the pipe during CLSM placement.

CLSM shall not be placed when the air temperature is below 4°C (40°F).

Allow CLSM to set before placing backfill above CLSM.

No equipment or traffic shall be allowed on the CLSM until the surface of the CLSM will withstand the weight of the equipment or traffic without displacement or damage. Suitability for load applications shall be determined by ASTM D6024.

If necessary to prevent displacement or damage, provide steel trench plates that span the trench or other means that prevent equipment or traffic contact with CLSM.

ADD NEW SUBSECTION 201-10 TO READ AS FOLLOWS:

201-10 MANHOLES, CLEANOUTS AND APPURTENANT MATERIALS.

Material quality, the manufacture process, and the finished sections shall be subject to the Engineer's inspection and approval. Such inspection may be made at the manufacture place and/or on the job site after delivery. The materials shall be subject to rejection at any time for failure to meet any of the Specification requirements even though samples may have been accepted as satisfactory at the manufacture place. Materials rejected after delivery to the job site shall be marked for identification and shall be removed at once from the job site. All materials damaged after delivery and prior to project acceptance by City shall be rejected, even if installed. The Engineer's judgment on the materials shall be final. The Contractor may attempt to make acceptable repairs on installed material(s), if the Engineer so agrees. However, the Engineer's judgment on the repairs' acceptability will be final. Unsatisfactory material shall be removed and replaced with satisfactory material entirely at the Contractor's expense. The Engineer may accept a certification indicating compliance with the specifications in lieu of inspection.

201-10.1 Materials.

201-10.1.1 Rock Base. Rock base shall conform to the requirements of 200-1.2 and shall be the ¾" inch mix according to Table 200-1.2 (A).

201-10.1.2 Cement Mortar. Cement mortar shall conform to the requirements of 201-5.

201-10.2 Manholes

201-10.2.1 Cast-In-Place Concrete Manholes. Materials used in cast-in-place concrete manholes shall be as shown on the plans and in accordance with the applicable requirements of 201.

201-10.2.2 Pre-cast Manhole Sections. Pre-cast manhole sections, where not otherwise modified in the Plans, shall conform to ASTM C478 and meet the following requirements:

a. The wall thickness shall not be less than 5 inches.
b. All sections shall be fully cured and shall not be shipped nor subjected to loading until the design compressive strength has been reached.
c. Pre-cast base sections shall have the base slab integral with the sidewalls. Pre-cast base sections may only be used if the invert plan and base alignment of the sewer connections exactly match the field-measured angles between the connecting sewers.

201-10.2.3 Manhole Bases. Materials used in cast-in-place concrete manhole bases shall be in accordance with the applicable requirements of Section 201. At the Contractor's option and with the Engineer's approval, pre-cast base sections with integral floor conforming to ASTM C478 may be used.

201-10.2.4 Pipe Connections. Pipe connections to manholes shall have a rubber waterstop tightly banded to the pipe and cast into the manhole base. Banding materials shall be 316 stainless steel or other approved corrosion resistant materials secured with Type 316 stainless steel nuts and bolts. See Section 500-1.6.7, Sealing Connections at Manholes, for HDPE pipe.

201-10.2.5 Manhole Extensions. Concrete grade rings for extensions shall be a maximum of six inches thick. In general, manhole extensions will be used on all manholes in roads, streets or other locations where a subsequent change in existing grade may be likely. Extensions will be limited to a maximum height of 12inches.

201-10.2.6 Jointing Manhole Sections. Male and female joints of manhole sections shall be sealed with a round rubber "O" ring gasket or a preformed flexible joint sealant. The "O" ring shall conform to ASTM C443. The preformed flexible joint sealant shall conform to Federal Specifications SS-S00210, and shall be Kent Seal No. 2 as manufactured by Hamilton-Kent; Ram-Nek as manufactured by K. T. Snyder Company; or equal. The size of the preformed joint sealant shall be as recommended by the manufacturer of the pre-cast manhole sections

201-10.3 Cleanouts. Cleanouts shall be as shown on the Plans or the Standard Details and shall be the same material type as approved for use in main or building sewer construction.

201-10.4 Lampholes. Lampholes shall be as shown on the Plans or the Standard Details and shall be the same material type as approved for use in main sewer or building connection sewer construction.

201-10.5 Appurtenant Materials.

201-10.5.1 Pipe and Fittings. Pipefittings, including material for drop connections at the manhole, shall be the type and dimensions as shown on the Plans or Agency Standard Details, as applicable, or as specified in these specification amendments.

201-10.5.2 Pipe Stubouts for Future Sewer Connections. Pipe stubouts shall be the same type as approved for use in lateral, main, or trunk sewer construction. Strength classifications shall be same class as in adjacent trenches. Where there are two different pipe classes at a manhole, the higher strength pipe will govern strength classification. Rubber-gasketed watertight plugs shall be furnished with each stub-out and shall be adequately braced against all hydrostatic or air pressures.

201-10.6.1 Sealing Manhole Walls. Manhole walls shall be sealed where shown or specified, or as directed by the Engineer. Sealing of the manhole walls shall be accomplished by any of the methods specified below:

201-10.6.1.a Cement-Epoxy Mixtures. Openings, cracks, and deteriorated joints in manhole walls shall be repaired and sealed by utilizing cement-epoxy mixtures manufactured for this purpose, such as those manufactured and/or supplied by Standard Dry Wall Products; Water-Wastewater Products & Systems, Inc.; IPA Systems, Inc.; Stonehard, Inc.; or approved equal.

201-10.6.1.b Chemical Grout. Openings, cracks, and deteriorated joints in manhole walls shall be repaired and sealed using chemical grout and applicable procedures specified for sewer system rehabilitation.

201-10.6.1.c Polyurethane Coatings. Sprayable polyurethane coating shall be used to seal manhole walls. The coating shall be a high-build polyurethane specifically formulated for use in a sewer system environment. The minimum thickness of the dry coating shall be 125 mils.

201-10.6.1.d Modified Polyester/Polymorphic Coatings. Spray-applied modified polyester/polymorphic resin shall be used to seal manhole walls. The coating shall be a two-component, 100% solids system. Prior to applying the prime coat, the manhole surface shall be sandblasted or hydroblasted and properly dried.

201-10.6.1.e Epoxy Coating. Sprayable or brushable epoxy coatings may be used to seal manhole walls. The coating shall be a high-build epoxy, Mainstay DS-5 or approved equal, specifically formulated for use in the sewer system and applied in accordance with manufacturer's recommendations and guidelines and at 50-125 mils thickness in one or two coats. Prior to coating, the manhole walls shall be thoroughly sandblasted or hydroblasted and cleaned as recommended by the manufacturer to ensure complete coverage and bonding. Openings and cracks larger than 1/8 inch in the manhole walls shall be filled with mortar, Mainstay ML-72 or ML-72F, or approved equal, at one-half to one inch thickness, prior to trimming and applying the epoxy coating.

201-10.6.1.f Fiberglass Liners. Existing manhole walls shall be thoroughly sandblasted and cleaned or primed as recommended by the materials manufacturer to ensure complete coverage and bonding. Openings and cracks larger than 1/8 inch in the manhole walls shall be filled with mortar prior to priming and applying the fiberglass.

i) **Factory-Manufactured Fiberglass Liners**. Manhole liners shall be made of fiberglass reinforced plastic (FRP), having an inside diameter of not less than 42 inches. Manhole liners shall meet the requirements of ASTM D3753. The liner shall be installed in accordance with manufacturer's recommendations including removal of the existing cone, grouting of the annular space between the liners and existing manhole walls, rebuilding or replacing the cones, backfilling, installing steps, and installing cast iron frames and covers.

ii) **Field-Fabricated Fiberglass Liners.** Manhole liners shall be field-fabricated by applying glass fibers and resin to the manhole walls. The completed lining thickness shall be not less than 1/4 inch at any location.

201-10.6.1.g HDPE Liners. Lining manufacturer shall be GSE "Studliner", GU-International AGRU "Suregrip" or equal. Polymer mortar shall consist of a primer if recommended by the manufacturer and a liquid binder and a dry aggregate mixed together to make a mortar of consistency as required for the application. The mortar shall be designed for application to vertical or overhead surfaces and must be accepted by the lining manufacturer. The liquid binder shall be chemical and oil resistant, stress relieved, low modulus, moisture insensitive, two-component epoxy-resin compound. The consistency shall be similar to lightweight oil for proper mixing with aggregate. Material shall conform to ASTM C881, type 3, Grade 1, Sika Corporation Sikadur 22 Lo-Mod Series or equal.

i) HDPE lining, joint strips and angle strips (hereinafter collectively referred to as "lining") shall be made from minimum 97 percent virgin high density polyethylene (HDPE). Color shall be gray.

ii) Lining shall be impermeable to sewage gases and liquids and shall be nonconductive to bacterial or fungal growth. All linings shall be factory checked to ensure freedom from porosity.

iii) Lining shall have good impact resistance, shall be flexible, and shall have elongation sufficient to bridge up to ¼ inch settling crack.

iv) Once cast into the concrete of the manhole wall, lining shall be permanently and physically attached to the concrete by the lining studs and shall not rely on an adhesive bond unless otherwise specified at a specific location.

v) Locking studs shall be made of the same material as the lining and integrally extruded with the sheet. Stud spacing shall be on approximately 1.25-inch centers, such that there are approximately 110 studs per square foot.

vi) Plasticizer shall not be added to the resin formation.

vii) Lining shall be free of holes, pinholes, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.

viii) Adhesive to bond HDPE lining to metal shall be in accordance with the recommendations of the HDPE lining manufacturer.

ix) All work shall be in strict conformity with all applicable specifications, instructions, and recommendations of the lining manufacturer.

x) Prior to shipping lined precast manhole sections and then again after field welding is complete, the lining shall be spark tested in the presence of the Engineer. The spark test shall be done with an approved electrical holiday detector (Turnhert Rasor, model AP-W with power pack or equal) with the instrument set at a minimum of 20,000 volts. Any imperfection shall be repaired in accordance with the manufacturer's recommendations and with the approval of the Engineer.

201-10.6.1.h Cementitious Crystalline Waterproofing. Waterproofing manufacturer shall be Xypex Chemical Corporation, Xypex Concentrate, Modified, Patch'n Plug or equal. Application shall be in accordance with Xypex recommended specifications.

i) For use in new manholes, the Xypex materials Admix C-500, Admix C-1000, Admix C-2000 or equal shall be used.

207-19 POLYETHYLENE (PE) SOLID WALL GRAVITY PIPE.

207-19.1 General.

ADD THE FOLLOWING TWO SENTENCES TO THE END OF THE SUBSECTION:

HDPE pipe used for direct burial shall be a minimum of SDR 17. HDPE pipe used for the pipe-expanding method of Subsection 500-1.6 shall be SDR 17.

ADD NEW SUBSECTION 207-25 TO READ AS FOLLOWS:

207-25 POLYETHYLENE (PE) LARGE DIAMETER (36 INCH DIAMETER OR GREATER) PROFILE WALL PIPE.

207-25.1 General. Polyethylene (PE) profile wall pipe and fittings for use in gravity flow sanitary sewers and storm drains, and for use as liners for sanitary sewers shall comply with ASTM F894.

207-25.2 Material Composition. Pipe fittings shall be made from a plastic compound meeting the requirements of type III, class C, category 5, grade P 34 as defined in ASTM D1248 and with established hydrostatic design basis (HDB) of not less than 1250 psi for water at 73.4 degrees F determined in accordance with method ASTM D2837. Materials meeting the requirements of cell classification PE 334433 C or higher cell classification in accordance with ASTM D3350 are also suitable.

Materials other than those specified above may be used as part of the profile construction (for example, as a core tube to support the shape of the profile during the processing, provided that these materials are compatible with the PE material, are completely encapsulated in the finished product, and in no way compromise the performance of the PE pipe product in the intended use.

Materials shall meet the chemical resistance tests of 210-2.3.3.

207-25.3 Test Requirements. Pipefittings shall meet the requirements of the section titled "Requirements" of ASTM F894. The Engineer will require certification by the manufacturer that the test results comply with specifications requirements. Sampling and inspection shall meet the requirements of the section titled "Sampling, Inspection, and Retest" of ASTM F894.

207-25.4 Marking. Each standard and random length of pipe shall be clearly marked with the following information: the nominal pipe size (in inches); the legend "PE sewer and drain pipe"; the RSC classification; the material designation: P-34 grade or cell classification; the manufacturer's name; the production code and plant location; and manufacture date.

207-25.5 Dimensions. Pipe dimensions shall comply with dimensions given in Table I of ASTM F894. Pipe shall have a RSC as shown on the Plans. RSC is defined in ASTM F894.

Part 3 – CONSTRUCTION METHODS

ADD NEW SUBSECTION 303-9 TO READ AS FOLLOWS:

303-9 INSTALLATION OF MANHOLES, CLEANOUTS AND APPURTENANCES.

303-9.1 General.

303-9.1.a Structure Excavation and Backfill. Structure excavation and backfill shall conform to the applicable requirements of 300-3 and 306-1.

303-9.1.b Rock Base. Prior to placing the concrete manhole base, a minimum of six inches of rock base or crushed rock approved by the Engineer shall be placed upon the earth subgrade and compacted to 90 percent (90%) relative compaction by mechanical means.

303-9.1.c Concrete Manhole Base. Concrete manhole base shall be constructed as shown on the Plans and Agency Standard Details, as applicable, and shall conform to the applicable requirements of Section 303. The concrete shall be vibrated to density and screened so that the first precast manhole section will be placed on a level uniform bearing surface for the full circumference. An approved metal forming ring shall be used to form a level joint groove in the fresh concrete of the manhole base to receive the first precast manhole section. Sufficient mortar or Ram-Nek shall be deposited on the base to assure a watertight seal between base and manhole wall or the first precast manhole section shall be placed on the concrete base before the concrete has set. The first section shall be properly located and plumbed.

303-9.1.d Placing Precast Manhole Sections. Precast manhole sections shall be carefully inspected prior to installation. Sections with chips or cracks in the tongue shall not be used. The ends of precast manhole sections shall be cleared of foreign materials.

The precast sections shall be installed in a manner that will result in a watertight joint. Rubber "O" Ring gaskets or preformed flexible joint sealant shall be installed in strict conformance with the manufacturer's recommendations. Only pipe primer furnished by the gasket manufacturer shall be used. If leaks appear in the manholes, the inside joint shall be caulked with non-shrink epoxy mortar to the satisfaction of the Engineer.

303-9.1.e Manhole Channels. Manhole channels shall be constructed as shown on the Plans and Agency Standard Details, as applicable, and with smooth transitions to ensure unobstructed flow through the manhole. All sharp edges or rough sections that tend to obstruct flow shall be removed. Where a full section of pipe is laid through a manhole, a neatly cut half pipe shall be laid to form the channel. The exposed edge of the pipe shall be completely covered with mortar. All mortar surfaces shall be troweled smooth. Breaking out the top half section of pipe after installation is not acceptable.

303-9.1.f Drop Manholes/Drop Connection Manholes. Drop manholes and drop connection manholes shall be constructed at locations indicated and as shown on the plans. The drop assembly shall be connected to the sewer pipe with an adapter approved by the Engineer. The lower elbow shall be supported by concrete poured monolithically with the manhole base.

303-9.1.g Flexible Joints. Flexible joints shall be provided not more than 1-1/2 feet from manhole walls. Pipes entering manholes shall be installed on firmly compacted base rock or crushed rock approved by Engineer.

303-9.1.h Pipe Stubouts for Future Sewer Connections. Manhole stubouts for future sewer connections shall be installed as shown on Plans or required by the Engineer. Maximum and minimum length outside the manhole wall shall be as shown on the Agency's Standard Details, as applicable. Pipes in precast walls or manhole base shall be constructed in accordance with details shown on the Plans. Compacted base rock or crushed rock approved by Engineer as specified herein before shall be placed upon the earth under all stubouts.

Semi-permanent plugs shall be installed in the stubout ends with gasket joints similar to the sewer pipe being used. Plugs shall be capable of withstanding all internal or external pressures without leakage and remain watertight. All plugs shall be adequately braced to prevent blowoffs.

303-9.1.i Permanent Plugs. Interior contact surfaces of all pipes to be cut off or abandoned shall be cleaned. Concrete plugs shall be constructed in the end of all pipe 18 inches or less in diameter. Minimum length of concrete plugs shall be 8 inches. All plugs shall be watertight and capable of withstanding all internal and external pressures without leakage, as approved by the Engineer.

303-9.1.j Manhole Extensions. Extensions shall be installed in conformance with the details shown on the Plans and to a height to match finished grade. Grade rings shall be lined in mortar with the sides plumb and tops level. Joints shall be sealed as specified for manhole sections. Extensions shall be watertight.

303-9.1.k Manhole Frames and Covers. Frames and covers shall be installed on top of manholes to prevent all infiltration of surface water or groundwater into manholes. Frames shall be set in a bed of mortar with mortar carried over the flange of the ring as shown on the Plans. Frames shall be set so cover tops are flush with surface of adjoining pavement or ground surface, unless otherwise shown or directed. Concrete manhole collars shall be provided and installed as shown on the Plans and Agency's Standard Details, as applicable. Manhole covers and frames for manholes identified as ones likely to be periodically submerged in wet weather events shall be prevented from blowing off during sewer surcharging by installation of manhole frames with bolted lids, and bearing surfaces shall be sealed with a neoprene gasket, if shown on plans.

303-9.1.l Manhole over Existing Sewers. Manholes shall be constructed over existing operating sewer lines at locations indicated. Excavation shall be as specified. Flow through existing sewer lines shall be maintained at all times. New concrete and mortar work shall be protected for a period of seven days after concrete has been placed. The Contractor shall advise Engineer of plans for diverting sewage flow and obtain the Engineer's approval before starting. The Engineer's approval shall not relieve the Contractor of the responsibility for maintaining adequate flow capacity at all times and adequately protecting new and existing work.

The new manhole base shall be constructed under and around the existing sewer as specified herein. The top half of the existing pipe shall be neatly removed within the new manhole, the edges covered with mortar, and troweled smooth.

303-9.1.m Connection to Existing Manholes. Sewers shall be connected to existing manholes at locations indicated. The Contractor shall provide all diversion facilities and perform all work necessary to maintain sewage flow in existing sewers during connection to the manholes. The Contractor shall break out existing manhole bases or grouting as necessary and regrout to provide smooth flow into and through existing manholes.

303-9.1.n Special Manholes. Special manholes shall be constructed in conformance with the applicable requirements of Section 303 and as shown on the Plans.

303-9.1.o Sewer Cleanouts. Cleanout construction shall be as shown on the Plans and Agency's Standard Details, as applicable. The cleanout shall be the same material as the main line sewer unless approved otherwise by the Engineer.

303-9.2 Structure Testing.

303-9.2.a Vacuum Testing. All project manholes shall be vacuum tested. The Contractor shall furnish all materials, equipment and labor for making a vacuum test. Vacuum test procedures and requirements shall be as follows:

1. All manhole openings shall be sealed with plugs and a rubber ring "donut" type plug inserted inside the cone opening.
2. A small vacuum pump shall be attached to a hose connected to the plug and 4 psi of vacuum shall be applied.
3. The vacuum shall be permitted to stabilize at 3.5 psi for one minute; then the test shall begin. The manhole must maintain vacuum such that no greater then 0.5-psi of vacuum shall be lost during the specified test period.
4. The specified test period is as follows:

Manhole Depth (Ft.)	Test Period (Min.)
0-5	4.5
5-10	5.5
10-15	6.0
Greater than 15	6.5

6. Manholes failing the test shall be patched as required and re-tested.
7. A vacuum regulator shall be provided on the vacuum pump such that no pressure greater than 10 psi can be applied to the manhole during the test. All manholes not meeting the leakage test or are unsatisfactory from a visual inspection shall be repaired to the Engineer's satisfaction.

303-9.2.b Hydrostatic Testing. At the Contractor's option and with the Engineer's approval, hydrostatic testing may be substituted for vacuum testing. The test shall consist of plugging all inlets and outlets and filling the manhole with water to a height determined by the Engineer. Leakage in each manhole shall not exceed 0.1 gallon per hour per foot of head above the invert. All manholes that do not meet the leakage test or are unsatisfactory from a visual inspection shall be repaired to the Engineer's satisfaction. Contractor is responsible for supplying water for testing.

306-3 TRENCH EXCAVATION.

306-3.1 General.

ADD THE FOLLOWING PARAGRAPH TO THE END OF SUBSECTION 306-3.1:

Where directed to pothole to verify the depths of underground utility crossings, the Contractor shall excavate to locate said underground utility crossings and relay this depth information to the Engineer.

REPLACE SUBSECTION 306-3.5 WITH THE FOLLOWING:

306-3.5 Maximum Length of Open Trench. Except with the Engineer's written permission, the maximum length of open trench at any one time shall be 300 feet (91 meters).

306-7 PREFABRICATED GRAVITY PIPE.

306-7.4 Vitrified Clay Pipe (VCP).

ADD NEW SUBSECTION 306-7.4.4 TO READ:

306-7.4.4 Special Joints. Type "D" joints shall be used to join sections of pipe of dissimilar material.

306-7.8.2.1(e) Pressure Testing and Leakage Inspection.

ADD THE FOLLOWING TO THE END OF SUBSECTION 303-7.8.2.1(e)

Pipeline cleaning shall be performed prior to CCTV inspection in accordance with 500-1.1.4.

ADD NEW SUBSECTION 306-16 TO READ:

306-16 BUILDING SEWERS.

306-16.1 General. Building sewer work shall consist of reconnecting existing building sewers to the new pipe or rehabilitated sewer main in accordance with 500-1.1.7(a), the Standard Specifications, and as specified herein.

The two uppermost lateral connections on a sewer main below a cleanout, lamphole or manhole with no upstream sewer shall be connected with a wye-connection.

306-16.1.1 Records to be Kept. The Contractor shall maintain a list of the active/inactive building sewers showing:

1. Approximate distance from upstream manhole on public sewer
2. Building sewer status: active or inactive
3. Address being served by active building sewer

The Contractor shall deliver to the Engineer two copies of the completed logs prior to acceptance of work. Logs shall be provided in an electronic format, acceptable for incorporation with existing geospatial information systems.

306-16.2 Material. Pipe for building sewers shall be vitrified clay, high density polyethylene, cast iron, or any other material approved by the Engineer. Connections of building sewers to public sewer mains shall be made only by using a Wye branch, a Tee branch, a drilled tap or saddle as approved by the Engineer.

The size of any building sewer shall be at least as large as the existing building sewer to which it connects, but in no case less than four inches (102 mm).

When an existing five-inch (127 mm) building sewer is encountered, the Contractor shall install a six-inch (152 mm) connection to the main and construct six-inch (152 mm) building sewer to the reconnection point. At the reconnection point, a five-inch to six-inch increaser shall be used.

PART 5 – PIPELINE SYSTEM REHABILITATION

500-1 PIPELINE REHABILITATION.

500-1.1.5 Television Inspection.

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

All inspections shall be documented with written reports that include a NASSCO Pipeline Assessment Certification Program (PACP) coding of all defects, or the Agency's standard coding of defects if different than NASSCO. The PACP coding shall be accomplished by an operator or worker who holds current PACP certification.

500-1.1.6 Sampling, Testing and Installation.

ADD THE FOLLOWING THREE PARAGRAPHS TO THE END OF THE SUBSECTION:

Prior to beginning work, Contractor shall clean sewer pipe of any obstruction and debris including roots in accordance with 500-1.1.4. The Contractor shall provide pre-rehabilitation CCTV inspection in accordance with 500-1.1.5. Point Repairs, if required, shall be performed as specified in 500-1.2.

All insertion processes shall be carried out in compliance with all applicable Cal-OSHA requirements. The installation Contractor shall have the necessary Cal-OSHA licenses before the work commences. Special attention shall be paid to the safety requirements involving work in confined spaces and work with steam.

The Contractor shall remove all protruding laterals that may prevent proper liner insertion. The removal method for protruding laterals shall be submitted with the shop drawings for approval.

500-1.1.7 Miscellaneous.

500-1.1.7 a) Service Connections.

ADD THE FOLLOWING TO THE END OF SUBSECTION 500-1.1.7a).

External Service Reconnections. The Contractor shall expose the building sewer and make arrangements with the occupant and/or owner to access all the plumbing fixtures in each building and perform dye tests to determine if the exposed building connection sewer is active. If the occupant or owner denies access to the building, the exposed building connection sewer shall be assumed active unless otherwise directed by the Engineer and shall be reconnected in accordance with these specifications.

If the service connection is to be re-established with an external reconnection, the existing service connections shall be excavated and disconnected at the joint. The existing sewer (now the host or carrier pipe for the liner) shall be carefully broken/removed to expose the liner to the extent necessary without damaging the liner. The liner pipe shall be allowed to normalize to ambient temperature and to cool down before a hole is drilled out. This (and any other) "coupon" shall be retrieved and handed over to the Engineer for inspection of liner integrity, if requested by the Engineer. A pre-fabricated polyethylene saddle equipped with a neoprene gasket and a protruding stub-out shall be installed onto the exposed liner with an epoxy-bonding agent over the cut out. The saddle's attached stub-out must protrude into the liner a distance equal to the liner's wall thickness. The strap-on saddle shall then be tightened with two Type 301 stainless steel or higher-grade bands, one on each side. The nuts and bolts shall be Type 305 stainless steel. The new stub-out, or lateral, shall be connected to the existing service line with a flexible coupling. The stubout attached to the saddle shall not be smaller than the nominal size of the service line to which it is to be attached. All exposed liner shall be encased in concrete. The entire connection structure, including the main, saddle, stub-out, and exposed building connection sewer shall be backfilled as specified in 500-1.3.6.3.

For service reconnection locations in the street, all CIPP lined sewers shall have service connections reconnected externally. The Contractor may elect to temporary reconnect the lateral by internal method, but no additional payment shall be made for the temporary connection.

Internal Service Reconnections. For service reconnections locations in the sidewalks and in easements where CIPP lined sewers are installed, Internal service reconnections shall be. Internal service reconnections use a remote-control cutting device operating within small diameter pipe or directly for man-entry pipe. A color, pivot head CCTV camera shall be attached to the cutting device for precise location of service connections and inspection of the liner pipe. The CCTV inspection shall be performed in the same direction as the CCTV inspection performed before liner insertion.

The Contractor shall have a fully operation backup device for the remote-control cutting device. If the Contractor is unable for any reason to re-establish remotely the service connections, the Contractor shall re-establish each service connection by open excavation at no additional cost.

The remote-control cutting device must provide nearly full-diameter holes, free from burrs or projections, each hole providing a minimum of 95% and a maximum of 100% of the original service connection diameter and area. The new hole edges shall be smooth and crack free with no loose material. The service connection invert shall match the bottom of the reinstated service opening.

REPLACE SUBSECTION 500-1.2.6 WITH THE FOLLOWING:

500-1.2.6 Installation and Field Inspection. The installation of the replacement pipe and/or repair work shall conform to Section 306. One or a combination of the following three point repair methods shall be used. The selected method shall be subject to the Engineer's approval prior to implementation.

a) **Repair Clamp.** Install full circle repair clamps as recommended by the manufacturer and approved by the Engineer. All full circle repair clamps shall be of Type 316 stainless steel fastened with Type 305 stainless steel nuts and bolts.
b) **Heat-Shrink Sleeve.** Install in accordance with manufacturer's recommendations.
c) **Remove and Replace Pipe or Fittings.** Remove defective pipe or fittings to the nearest joint or by cutting perpendicular to the pipe axis to leave a plain end. Prepare a replacement section of like pipe material (or as otherwise approved by the Engineer or shown on the drawings). Make connections using shielded couplings, or heat-shrink sleeves.

500-1.3 High Density Polyethylene (HDPE) Solid Wall Liner.

REPLACE SUBSECTION 500-1.3.1 TO READ:

500-1.3.1 General. HDPE solid-wall liner pipe shall comply with ASTM D3350 and ASTM F714. Fittings shall comply with ASTM D2683 or ASTM D3261. Fittings fabricated by mitered, butt fusions are also permitted. Unless otherwise specified or approved, the outside diameter of the line shall not be less than 90 percent of the inside diameter of existing pipes, and the standard dimension ratio (SDR) of the liner for sliplining shall be equal to 26.

500-1.4 Cured-in-Place Pipe Liner (CIPP) Liner.

REPLACE THE WORDS "epoxy or epoxy vinyl-ester resin" WITH "epoxy, or epoxy vinyl-ester resin" WHEREVER THEY APPEAR IN SUBSECTION 500-1.4.

500-1.4.1 General.

REPLACE SUBSECTION 500-1.4.1 WITH THE FOLLOWING:

500-1.4.1 General.

- CIPP liner for pipeline rehabilitation shall be either of two types:
  Type A – inversion process in compliance with ASTM F1216 or
  Type B – pull-in-place process in compliance with ASTM F1743.
- The CIPP liner shall use an approved epoxy, or epoxy vinyl-ester resin-impregnated flexible fabric tube.
- **The minimum liner thickness shall be 0.236 inch (6.0 mm).**
- Prior to commencing work, the Contractor shall provide submittals on all lining materials and resins and shall furnish manufacturer certification that the liner material complies with the requirements stated herein. The submittals shall include information about all component materials. In accordance with 2-5.3, the Contractor shall submit shop drawings of construction details, including complete manufacturer's recommendations for storage procedures, temperature control, removing roots and protruding laterals, liner handling and insertion, curing details, re-establishing service connections, trimming and finishing. The shop drawings shall include placement location(s) and method(s) and bypass location(s) with sufficient detail to assure that the work can be accomplished without sewage spill. The Contractor shall also provide manufacturer's certification, field measurements and pipe-sizing calculations that demonstrate that the liner has been properly sized to avoid the creation of wrinkles or folds and to avoid gaps between the liner and the host pipe. Only manufacturer-licensed and certified contractors shall install CIPP liner.

500-1.4.2 Material Composition and Testing.

REPLACE THE WORDS "epoxy or epoxy vinyl-ester resin" WITH "epoxy, or epoxy vinyl-ester resin" WHEREVER THEY APPEAR IN SUBSECTION 500-1.4.2.

ADD THE FOLLOWING TO THE END OF THE SECOND PARAGRAPH OF SUBSECTION 500-1.4.2:

The certified test results shall be from liner samples that have undergone the same curing process, formulation, size and thickness as that proposed to be installed. All material testing shall be performed at the Contractor's expense by a registered, independent, third party laboratory approved by the Engineer. A certificate of compliance and certified test results from an independent third-party laboratory shall also be provided for long-term flexural modulus.

ADD TABLE 500-1.4.2 (A) TO READ:

TABLE 500-1.4.2 (A)

CIPP Liner Minimum Flexural Requirements for Polyester Resin			
Type of Polyester Resin [1]	Flexural Modulus (E) (Initial[2], psi)	Flexural Modulus (E_L) (Long Term[3], psi)	Flexural Strength (psi)
Enhanced	400,000	200,000	4,000
Standard	300,000	150,000	4,500

[1] Only one type of resin shall be used for this project.
[2] The initial flexural modulus is defined in ASTM D790.
[3] The long-term flexural modulus is defined as fifty years and is determined by ASTM D2990 Test Method.

The Engineer may, at any time prior to installation, direct the Contractor to obtain cured samples and test them in accordance with the appropriate ASTM standards.

REPLACE SUBSECTION 500-1.4.4 WITH THE FOLLOWING:

500-1.4.4 Chemical Resistance.

The CIPP liner furnished shall meet the chemical resistance requirements of ASTM D5813. The CIPP liner shall also meet the chemical resistance requirements of ASTM F1216 or ASTM F1743, depending upon the installation method. The Contractor shall submit to the Engineer verification that the CIPP liner complies with the ASTM testing requirements. This verification of compliance shall be in written form of a finalized, signed, and dated independent laboratory report. The date on this report shall constitute the compliance date.

REPLACE SUBSECTION 500-1.4.5 WITH THE FOLLOWING:

500-1.4.5 Installation

- The outer diameter of the tube shall be properly sized to allow for expansion to ensure that the CIPP can fit snugly against the host pipe. The installed CIPP liner shall tightly fit the internal circumference and length of the original pipe. The gap between the existing pipe ID (inside diameter), and the OD (outside diameter) of the installed liner pipe shall not exceed 0.25 inches at any point along the pipeline. The pipe shall be rejected if shrinkage exceeds this amount.
- The CIPP shall be installed in accordance with the manufacturer's recommendations as approved by the Engineer and ASTM F1216 or ASTM F1743. Immediately prior to installation, the CIPP liner tube shall be saturated with resin (on or off the job site) and stored / transported at a cool temperature as recommended by the resin manufacturer.
- Before tube installation, the manufacturer shall provide data on the tube's maximum allowable stresses and elongation. The exterior of the manufactured tube shall be marked along its length at regular intervals not exceeding five feet. These marks shall be used as a gauge to measure elongation during installation. Any tube length experiencing overall elongation greater than five percent shall be rejected and replaced at the Contractor's expense.

- If the cured pipe does not fit tightly against the host pipe at its termination point(s), the void shall be sealed by filling with a resin mixture compatible with the CIPP Liner.
- Wrinkles in the finished liner pipe that cause a backwater, reduce the pipe's hydraulic capacity or structural stability, or create voids between the liner and pipe wall are unacceptable and shall be removed and repaired at the Contractor's expense.
- Measurements to confirm that the liner's outside diameter is within the acceptable tolerance shall be made at the lateral connections, manholes and terminal ends after liner stabilization has occurred and prior to re-establishing the service connections.
- Laterals shall be reconnected the same day of the liner installation.

REPLACE SUBSECTION 500-1.4.8 WITH THE FOLLOWING:

500-1.4.8 Repair and Rejection. The Contractor shall replace the pipeline in any reaches that the liner samples fail to meet the standard specifications.

ADD SUBSECTION 500-1.4.9 TO READ:

500-1.4.9 Material Testing. The Contractor shall provide certified test results of the short term structural properties of the cured lining material from the actual installed liner at a minimum of one location per each liner insertion setup as part of the acceptance requirements. All material testing shall be performed by a registered, independent, third party laboratory approved by the Engineer at the Contractor's expense.

The cured liner shall be sampled and tested for flexural strength and flexural modulus (short term) in accordance with the requirements of ASTM F1216 or ASTMF1743 and ASTMD790. The liner shall be in conformance with the structural properties specified in 500-1.4.2.

In addition, the Contractor shall furnish all liner ends for each installation to the Engineer for inspection and thickness verification. These samples shall be used to confirm the liner's thickness meets the specified requirement.

The Contractor shall replace the pipeline in any reach that the liner samples fail to meet the project specifications.

ADD NEW SUBSECTION 500-1.4.10 TO READ:

500-1.4.10 Spill Prevention in Curing Process. In addition to the Spill Prevention and Control in section 7-8.6, the Contractor is required to submit a plan for review by the Engineer to prevent and contain any water leak/spill during curing process. No water from the boiler is allowed to spill into street, gutters, storm drains or creek.

500-1.5 Polyvinyl Chloride (PVC) Pipe Lining Systems.

DELETE THE SUBSECTION.

500-1.6 Pipe-Bursting Method.

500-1.6.1 General. The pipe bursting method is a type of trenchless construction in which a bursting tool splits/fractures the existing pipe while simultaneously installing a new polyethylene pipe of the same size or larger using a static or pneumatic pipe bursting technique. The Contractor shall furnish all labor, equipment, materials, tools, and appurtenances necessary or proper for the performance and completion of pipe bursting work.

500-1.6.1.1 Preliminary Surface Inspection. The Contractor shall make a careful preliminary surface inspection of the site along which the operation is run. Special note shall be taken and a photographic record shall be kept of the following:

1) Signs of surface cracks in roadways, sidewalks, and other paved areas;
2) Evidence of cracks and misalignments in boundary walls and structure walls near the trench;
3) Evidence of recent road work;
4) Current work in progress by other contractors;
5) Signs of possible leakage from water or gas mains; and
6) Other relevant features present before operations commence.

The preliminary surface inspection work shall be considered part of the sewer installation work and no separate payment will be made.

500-1.6.2 Contractor Qualifications. The Pipe Bursting Contractor shall have experience and qualifications in the installation of pipe using pipe bursting as required by the Agency.
500-1.6.2.1 Field Supervisory Qualifications. Field supervisory personnel employed by the pipe bursting contractor shall have at least three (3) years of documented experience in the performance of the work and tasks as stated in contract documents.

500-1.6.3 Contractor Submittals.
500-1.6.3.1 Contractor Qualifications. The Contractor shall submit, with other bid documents, documentation of their project and personnel experience with other projects similar in size and nature to the project specified in the contract documents.
500-1.6.3.2 Drawings and Documents. Shop drawings, catalog data, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings shall be submitted prior to installation. A manufacturer's compliance certificate for these specifications shall be provided by the Contractor for all material furnished under this specification. Prior to beginning pipe installation the Contractor shall provide a certificate of conformance to the applicable ASTM specifications.

500-1-6-4 Materials.
500-1.6.4.1 High Density Polyethylene (HDPE) Pipe. Polyethylene pipe shall be high density polyethylene pipe (HDPE) and meet applicable requirements of ASTM F714 and ASTM D3035. HDPE pipe and fittings shall be used in accordance with the material specifications. All additional appurtenances (manholes, tees, gaskets, etc.) shall meet the material specifications.
Pipe Joining. All pipe installed by pipe bursting shall be joined by butt fusion, electro fusion (per ASTM F2620), or full circle clamp as detailed in 500-1.6.5, Pipe Joining.
Pipe Production. HDPE pipe shall be produced from resins meeting the requirements of ASTM D1248, designation PE3408, ASTM D3350 cell classification PE345444C, and will meet the requirements of AWWA C901 and C906. HDPE pipe shall meet the minimum stability requirements of ASTM D3350.
Pipe Markings. Pipe shall be legibly marked at intervals of no more than five (5) feet with the manufacturer's name, trademark, pipe size, HDPE cell classification, appropriate legend such as SDR 17, ASTM D3035, AWWA C901 or C906, date of manufacture and point of origin.
Pipe Material. All pipe shall be made of virgin material. No rework material except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
Pipe Color and Quality. For CCTV inspection purposes, the HDPE pipe shall have a light-colored interior achieved with a homogeneous, light-colored material throughout or with a fully-bonded light-colored interior meeting the above specifications.
Liner Pipe Dimensions. The minimum wall thickness shall conform to Standard Dimension Ratio (SDR) of 17 when measured in accordance with ASTM D2122. The minimum inside diameter (ID) of new pipe to be installed shall be as specified in the plans. Depending on the availability of pipe product, the nearest size to the specified pipe shall be required, upon the Engineer's approval.
Pipe - General. All HDPE pipe without an ultraviolet inhibitor shall not be stored uncovered outside. The Contractor shall exercise care during the unloading, handling, and storage of all polyethylene pipe to ensure that the pipe is not cut, gouged, scored, or otherwise damaged.

500-1.6.5 Pipe Joining for Sections of HDPE Pipe. The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak-proof joint, and in conformance with ASTM D2620. Insertion of pipe shall be in accordance with ASTM F585. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.
Terminal Sections. Terminal sections may also be joined by Electrofuse Couplings, Friatec, or approved equal. Terminal sections may also be joined by full circle repair clamps by Smith Blair, JCM, or approved equal.

500-1.6.6 Service Connection Materials. The preferred method of sewer service connections to the HDPE sewer main shall be the use of electrofusion saddles by Central Plastics, Friatec, or equal as approved by the Engineer. Mechanical taps, Inserta Tees made by Fowler Manufacturing or approved equal, may also be used for sewer service connections if approved by the Engineer. Depending upon site conditions and if approved by the Engineer, sewer service connections to the HDPE main may be made by plastic saddles with stainless steel straps, by GPK, or approved equal, or rubber saddles with stainless steel straps by Fernco Company, DFW, or approved equal

500-1.6.7 Sealing Connections at Manholes. The annular space at each manhole may also be sealed with a waterstop gasket by Fernco Company or approved equal, and finished with a quick setting grout. Pipe to manhole connections shall be made with ISCO HDPE thermal-fused pipe restraints or approved equal. Pipe shall be allowed to relax in accordance with 506-1.6.11.d.

500-1.6.8 Pipe Bursting Equipment. The pipe bursting unit shall be designed and manufactured to force its way through the existing line by fracturing the pipe and compressing the broken pieces into the surrounding soil as the equipment progresses. The bursting unit shall generate sufficient force to burst and compact the existing pipeline. In each case the pipe bursting unit shall pull the polyethylene pipe with it as it moves forward.

500-1.6.9 Execution of Work - General. Bypass pumping shall be accomplished when and where necessary. The Contractor shall provide flow diversion with pumps adequate in size and capacity to handle all flows generated during the pipe bursting process. All costs for bypass pumping shall be incidental unless specific pay items for this work are included in the bid and pay schedule. Excavation of insertion pits shall be at locations determined by the Contractor. Insertion pits shall be of sufficient length to allow the bursting head and new HDPE pipe to enter the host pipe at an angle that will maintain the grade of the existing sanitary sewer.

500-1.6.10 Preparation of Work. All sewer service connections shall be located prior to pipe bursting the main, by pre-CCTV inspection, and then exposed prior to pipe bursting. If the pre-inspection reveals obstructions or pipe materials that will prevent the existing pipe from being pipe burst properly and cannot be removed by conventional cleaning equipment, a point repair will be made by the Contractor, with approval from the Engineer. If the pre-CCTV inspection reveals a sag or hump, sag or hump removal shall be made by the Contractor, with approval from the Engineer.

500-1.6.11 Insertion of the HDPE Pipe.
500-1.6.11.a. The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak-proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be in compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of HDPE pipe and/or fusing equipment.

500-1.6.11.b. Insertion shall be in accordance with ASTM F585. The butt-fused joint shall be in true alignment and shall have uniform rollback beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All defective joints shall be cut out and replaced at the expense of the Contractor. The inside weld bead shall be removed by cutting the bead away without scoring the inside wall of the pipe, to the satisfaction of the Engineer.
500-1.6.11.c. Service connections to the HDPE pipe shall be made with materials submitted and approved in accordance with 500-1.6.6.
500-1.6.11.d. A relaxation period shall be allowed prior to making service connections and connections to manholes. The relaxation period shall be appropriate with and dependent upon site conditions, but not less than eighteen (18) hours unless otherwise determined by the Contractor.
500-1.6.11.e. If concrete encasements are encountered, a point repair shall be performed, with the approval of the Owner, to excavate and break out concrete prior to the pipe bursting operation to allow the steady and free passage of the pipe bursting head.
500-1.6.11.f. The new HDPE pipe shall be inserted immediately behind the pipe bursting head in accordance with the manufacturer's recommended procedures. The bursting tool shall be specifically designed and manufactured for the type of insertion process being used. It shall be utilized to guide and assist the bursting head during the operation. A pushing machine may be utilized to aid pipe insertion from the rear.
500-1.6.11.g. New HDPE pipe shall extend into each manhole, a maximum of two inches after pipe relaxation and prior to installation of any restraints. The annular space shall be sealed in accordance with 500-1.6.7.

500-1.6.12 Service Reconnections. Service connections to the HDPE pipe shall be made with materials submitted and approved in accordance with 500-1.6.6. After the new HDPE pipe has been installed and tested, the Contractor shall be responsible for reconnecting existing sewer services in accordance with 500-1.1.7.a. All service lines shall be the size indicated in the plans and specifications.

500-1.6.13 Testing and Acceptance. After the new HDPE pipe is installed and all services are reconnected, the pipe shall be inspected by CCTV. Post-CCTV video shall be submitted to the Engineer for approval and acceptance of the new pipe. Leakage testing will also be performed and both this testing and CCTV inspection shall be in accordance with 500-5, Acceptance Testing.

500-1.7 Deformed/Reformed HDPE Liner.
ADD THE FOLLOWING TWO PARAGRAPHS TO SUBSECTION 1.7.1:

Only manufacturer-licensed and certified contractors shall install Deformed/Reformed HDPE Liner.

The HDPE liner minimum wall thickness shall conform to the Standard Dimension Ratio (SDR) of 26 when measured in accordance with ASTM D2122.

500-1.9 External In-Place Wrap.
DELETE THE SUBSECTION.

500-1.10 Folded and Re-formed PVC Pipe Liner.
DELETE THE SUBSECTION.

500-1.12 Polyvinyl Chloride (PVC) Closed Profile Liner Pipe.
DELETE THE SUBSECTION.

500-1.13 Machine Spiral Wound Polyvinyl Chloride (PVC) Pipe Liner.
DELETE THE SUBSECTION.

REPLACE SUBSECTION 500-2 WITH THE FOLLOWING:

500-2 MANHOLE AND STRUCTURE REHABILITATION.

500-2.1 General.

- The section covers repair and rehabilitation of existing manholes, lampholes, cleanouts, and appurtenances. Rehabilitation methods include sealing of walls, covers, pipes entering and leaving manholes; replacing cast iron frames and/or covers; replacing manhole steps; rebuilding manhole walls; removing and replacing the entire structure; and other related miscellaneous work. Sewer flow control, as necessary, shall be performed in accordance with 500-1.1.4c.
- All manhole rehabilitation materials shall be submitted to the Engineer and are subject to the approval of the Engineer. The manufacturer shall provide certification that the materials proposed for use are compatible with one another. All materials that shall contact the sewer environment shall be specifically designed for chemical resistance to the sewer environment. The manufacturer shall certify that the materials are resistant to the sanitary sewer environment and to the following: 5% nitric acid, 5% sulfuric acid, 10% phosphoric acid, 100% ASTM fuel C, 100% vegetable oil, 0.1% detergent, 0.1% soap, 5% sodium hydroxide, and 1% ferric chloride.

500-2.2 Leakage at Frames and Covers. Leakage at cast iron frames and covers shall be eliminated by one of the following methods of this subsection, or as directed by the Engineer.

500-2.2.1 Replace Cover. When an existing frame is in good, sound condition but the cover is broken or otherwise determined to be unusable (for example because of vent holes which allow infiltration), it shall be removed and replaced as shown or specified. It shall be replaced with a new cast iron manhole cover of approximately the same thickness and weight conforming to 206-7. The seating surface shall be machined to permit it to rest tightly against the surface of the frame without "rocking " under vehicular traffic. The cover's configuration must be such as to mate closely with that of the frame.

500-2.2.2 Adjust Frame and Cover. Structure frames and covers shall be adjusted where shown or specified. This repair consists of removing and replacing the manhole frame and the grade rings. This shall be accomplished by excavating as necessary, lifting off the frame and grade rings as directed, thoroughly cleaning the frame's bottom bearing surface, removing the old mortar from the manhole cone and grade rings, and replacing the existing frame and rings to the new grade as specified for new manholes in 303-9.

500-2.2.3 Replace Frame and Cover. When shown of specified, or when the condition of the frame is satisfactory but a replacement cover meeting the requirements described above is not available, the Contractor shall remove and replace the entire assembly with a new frame and cover in accordance with 201-8 and 303-9.

500-2.3 Sealing Manhole Walls. Manhole walls shall be sealed where shown or specified, or as directed by the Engineer. Sealing of the manhole walls shall be accomplished by any of the methods specified in sections 201-10.6.1, including:

Cement-Epoxy Mixtures. Openings, cracks, and deteriorated joints in manhole walls shall be repaired and sealed by utilizing cement-epoxy mixtures manufactured for this purpose, such as those manufactured and/or supplied by Standard Dry Wall Products; Water-Wastewater Products & Systems, Inc.; IPA Systems, Inc.; Stonehard, Inc.; or approved equal.

Chemical Grout. Openings, cracks, and deteriorated joints in manhole walls shall be repaired and sealed using chemical grout and applicable procedures specified for sewer system rehabilitation.

Polyurethane Coatings. Sprayable polyurethane coating shall be used to seal manhole walls. The coating shall be a high-build polyurethane specifically formulated for use in a sewer system environment. The minimum thickness of the dry coating shall be 125 mils.

Modified Polyester/Polymorphic Coatings. Spray-applied modified polyester/polymorphic resin shall be used to seal manhole walls. The coating shall be a two-component, 100% solids system. Prior to applying the prime coat, the manhole surface shall be sandblasted or hydroblasted and properly dried.

Epoxy Coating. Sprayable or brushable epoxy coatings may be used to seal manhole walls. The coating shall be a high-build epoxy, Mainstay DS-5 or approved equal, specifically formulated for use in the sewer system and applied in accordance with manufacturer's recommendations and guidelines and at 50-125 mils thickness in one or two coats. Prior to coating, the manhole walls shall be thoroughly sandblasted or hydroblasted and cleaned as recommended by the manufacturer to ensure complete coverage and bonding. Openings and cracks larger than 1/8 inch in the manhole walls shall be filled with mortar, Mainstay ML-72 or ML-72F, or approved equal, at one-half to one inch thickness, prior to trimming and applying the epoxy coating.

Fiberglass Liners. Existing manhole walls shall be thoroughly sandblasted and cleaned or primed as recommended by the materials manufacturer to ensure complete coverage and bonding. Openings and cracks larger than 1/8 inch in the manhole walls shall be filled with mortar prior to priming and applying the fiberglass.

i) Factory-Manufactured Fiberglass Liners. Manhole liners shall be made of fiberglass reinforced plastic (FRP), having an inside diameter of not less than 42 inches. Manhole liners shall meet the requirements of ASTM D3753. The liner shall be installed in accordance with manufacturer's recommendations including removal of the existing cone, grouting of the annular space between the liners and existing manhole walls, rebuilding or replacing the cones, backfilling, installing steps, and installing cast iron frames and covers.

ii) Field-Fabricated Fiberglass Liners. Manhole liners shall be field-fabricated by applying glass fibers and resin to the manhole walls. The completed lining thickness shall be not less than 1/4 inch at any location.

HDPE Liners. Lining manufacturer shall be GSE "Studliner", GU-International AGRU "Suregrip" or equal. Polymer mortar shall consist of a primer if recommended by the manufacturer and a liquid binder and a dry aggregate mixed together to make a mortar of consistency as required for the application. The mortar shall be designed for application to vertical or overhead surfaces and must be accepted by the lining manufacturer. The liquid binder shall be chemical and oil resistant, stress relieved, low modulus, moisture insensitive, two-component epoxy-resin compound. The consistency shall be similar to lightweight oil for proper mixing with aggregate. Material shall conform to ASTM C881, type 3, Grade 1, Sika Corporation Sikadur 22 Lo-Mod Series or equal.

i) HDPE lining, joint strips and angle strips (hereinafter collectively referred to as "lining") shall be made from minimum 97 percent virgin high density polyethylene (HDPE). Color shall be gray.

ii) Lining shall be impermeable to sewage gases and liquids and shall be nonconductive to bacterial or fungal growth. All linings shall be factory checked to ensure freedom from porosity.

iii) Lining shall have good impact resistance, shall be flexible, and shall have elongation sufficient to bridge up to ¼ inch settling crack.

iv) Once cast into the concrete of the manhole wall, lining shall be permanently and physically attached to the concrete by the lining studs and shall not rely on an adhesive bond unless otherwise specified at a specific location.

v) Locking studs shall be made of the same material as the lining and integrally extruded with the sheet. Stud spacing shall be on approximately 1.25-inch centers, such that there are approximately 110 studs per square foot.

vi) Plasticizer shall not be added to the resin formation.

vii) Lining shall be free of holes, pinholes, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.

viii) Adhesive to bond HDPE lining to metal shall be in accordance with the recommendations of the HDPE lining manufacturer.

ix) All work shall be in strict conformity with all applicable specifications, instructions, and recommendations of the lining manufacturer.

x) Prior to shipping lined precast manhole sections and then again after field welding is complete, the lining shall be spark tested in the presence of the Engineer. The spark test shall be done with an approved electrical holiday detector (Turnhert Rasor, model AP-W with power pack or equal) with the instrument set at a minimum of 20,000 volts. Any imperfection shall be repaired in accordance with the manufacturer's recommendations and with the approval of the Engineer.

Cementitious Crystalline Waterproofing. Waterproofing manufacturer shall be Xypex Chemical Corporation, Xypex Concentrate, Modified, Patch'n Plug or equal. Application shall be in accordance with Xypex recommended specifications.

i) For use in new manholes, the Xypex materials Admix C-500, Admix C-1000, Admix C-2000 or equal shall be used.

500-2.4 Remove and Replace Existing Sewer Structure. Where specified or shown, or directed by the Engineer, existing sewer structures shall be removed and new structures built in their place in conformance with the applicable specifications and details.

500-2.5 Testing. After rehabilitation work at each manhole has been completed, the manhole shall be tested for leakage in accordance with 303-9.2. Manholes rehabilitated only from the cover to the top of the cone will not require testing. Replaced lampholes and cleanouts shall be tested for leakage as an integral part of the sewer pipe system.

ADD NEW SUBSECTION 500-5 TO READ:

500-5 ACCEPTANCE TESTING.

500-5.1 General. The Contractor shall perform acceptance tests on all repaired, rehabilitated, or new facilities. Unless otherwise noted, no separate compensation will be paid for testing; the testing cost is to be included in the related pay items. If the work should fail to pass the tests, it is the Contractor's responsibility to correct the work and re-test with no additional compensation.

If, within the warranty period, any section of the sewer system is not acceptable due to subsequent excessive leakage or any other defects, although originally accepted, the Contractor shall repair or replace the affected portion at no cost to the Agency. It is understood that if the Contractor fails to do such work as required, the Surety shall be liable for said costs of repair or replacement.

500-5.2 Leakage Testing. All new sewers and those sewers rehabilitated by pipe expanding and cured-in-place lining methods shall be tested for leakage in accordance with 306-7.8.2. Sewer mains and building connection sewers in each reach shall be tested for leakage together, as an integral system, except as otherwise specified herein.

500-5.3 Miscellaneous Testing. The Agency, at its discretion, may perform tests to check compliance with the specifications as they pertain to backfill compaction, concrete strength, and other such items where test performance is not specified as the Contractor's responsibility. The Contractor shall cooperate with the Agency by providing samples, making necessary excavations, and other related services necessary to carry out the testing, at no cost to the Agency. In the event of failed tests, the Contractor shall bear the cost of correction and re-testing.

500-5.4 Acceptance. Prior to the Engineer's final acceptance of the sewer system, the Contractor shall flush and clean all system parts. The Contractor shall remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, the Contractor shall use mechanical rodding or bucketing equipment. A collection basket shall be used to capture all debris.

Following completion of the work, including cleaning and testing, the Contractor shall conduct a CCTV inspection of the sewers as specified in 500-1.1.5. The Contractor shall correct all defects discovered by this procedure before the work under the contract will be considered for final acceptance.

ATTACHMENT "F"

TECHNICAL PROVISIONS FOR CONSTRUCTION

CITY OF ALAMEDA
ALAMEDA COUNTY, CALIFORNIA

TECHNICAL PROVISIONS
FOR THE
CONSTRUCTION OF

CITY OF ALAMEDA
CYCLIC SEWER REPLACMENT PROJECT, PHASE 16

PROJECT NO. 05-19-26

SECTION 02200 – EXCAVATION AND BACKFILL

SECTION 02500 – RESTORATION OF IMPROVEMENTS

SECTION 02600 – SEWER LINE CONSTRUCTION – DIRECT BURIAL

SECTION 02602 – TRENCHLESS PIPE CONSTRUCTION

SECTION 02605 – MANHOLES

SECTION 02659 – CLEANUP AND VIDEO INSPECTION

SECTION 03330 – ANTIMICROBIAL CRYSTALLINE WATERPROOFING CONCRETE ADDITIVE

SECTION 03340 – REHABILITATION FO SEWER STRUCTURES

SECTION 13300 – CURED-IN-PLACE (CIPP) LINER FOR PIPELINES USING FELT TUBE

JUNE 2019

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02200

EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

The Contractor shall perform all operations necessary to excavate whatever substance encountered, including earth, sand, gravel, rock, buried structures, pipes or debris, to the depth shown on the plans and required for the installation, to remove unsuitable material and replace with suitable material for bedding and backfill, and to restore the ground surface or pavement to conditions satisfactory to the Engineer.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Sewer Line Construction – Direct Burial: Section 02600
2. Trenchless Pipe Construction: Section 02602
3. Manholes: Section 02605

1.02 DEFINITIONS

A. PIPE BEDDING

Pipe bedding shall be composed of that portion of the backfill material placed in the bottom of the trench for the pipe barrel to rest on.

B. PIPE ZONE BACKFILL

Pipe zone backfill shall comprise that portion of the backfill surrounding the installed pipe, extending after compaction from the foundation to a level twelve (12) inches above the top of the pipe.

C. INTERMEDIATE BACKFILL

Intermediate backfill shall comprise the portion of the backfill from twelve (12) inches above the top of the pipe to the surface.

D. SOUND EARTH

Sound earth shall mean most native soils, with the exception of highly organic spongy soils and fat, highly plastic expansive clays.

E. SOUND GRANULAR SOIL

Sand with a maximum particle size of 3-inch, or gravel with a minimum grain size of 3-inch, or pea gravel, or crushed rock mixed with sand shall comprise sound granular soil.

F. RELATIVE COMPACTION

Relative compaction shall be taken to mean field density values expressed as a percentage of the laboratory standard maximum density, as determined by the methods of ASTM D-1557-91 and D-1556-90 or ASTM D-2292-91 and D-3017-88 (Nuclear Method).

1.03 QUALITY ASSURANCE

The City will retain a Soils Engineer who will conduct compaction tests to determine compliance with soil compaction requirements as described herein above.

1.04 SUBMITTALS

A. The Contractor shall submit to the Engineer copies of his/her proposed methods of sheeting, shoring and bracing as approved by the Division of Industrial Safety, per these specifications.

B. The Contractor shall submit to the Engineer samples of all materials proposed for use as pipe bedding and backfill. When requested by the Engineer, the Contractor shall submit a sieve analysis of the materials proposed to be used at no cost to the City.

1.05 BRACING AND SHEATHING

A. The Contractor shall do and be solely responsible for all bracing, sheathing and shoring necessary to perform and protect all excavations as required for reasons of safety and to conform to governing laws. Where required by the Division of Industrial Safety, shoring shall be designed by a registered Civil Engineer. Excavations shall be supported so that the ground alongside the excavations will not slide, and all existing improvements, either on public or private property, will be fully protected from damage. Additional supports requested by the Engineer shall in no way relieve the Contractor of his/her responsibility for the sufficiency of his/her precautions.

B. All shoring, bracing and sheathing above the top of the pipe shall be removed from the trench or excavation. Sheathing which has been driven below the invert of the pipe must not be removed. Under wet soil conditions, sheathing shall be left in the trench up to the top of the pipe.

C. The cost of such bracing, shoring and sheathing shall be included in the price for shoring and no additional allowance will be made therefor.

1.06 CONTROL OF WATER

A. The Contractor shall remove all water which may accumulate in the excavation during the progress of the work by pumping or other suitable methods so that all work can be done in the dry. Trenches and other excavations shall be kept free of water while the pipe or structures are being installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the work against possible flotation or leakage. Water shall

be disposed of in such a manner as to cause no injury to public or private property or be a menace to the public health.

B. Where water is encountered, the trench excavation shall be carried twelve (12) inches below the pipe invert in which case the pipe bedding material shall be one and one half inch (1½") crushed rock.

C. The cost of such removal of water and additional excavation and pipe bedding material shall be included in the various bid items for pipeline construction and no additional allowance will be made therefor.

1.07 REMOVAL OF UNSTABLE MATERIAL

A. Where unstable soil is encountered or where the bearing capacity is unsatisfactory to the Engineer, the soil shall be removed to a depth of twelve (12) inches below the pipe barrel and replaced with one and one half inch (1½") crushed rock.

B. The Contractor shall not be relieved thereby of his/her responsibility otherwise to employ procedures necessary to keep the trench bottom in a workable condition and provide a firm and adequate bedding for the pipe.

C. The cost of trench stabilization shall be included in the various bid items for pipeline construction and no additional payment will be allowed.

1.08 PAYMENT

The cost of excavation, removal of unstable material, excavation of rock, backfilling, dewatering, compacting, imported material, backfill and compaction shall be included in the various bid items and no additional allowance will be made therefor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. GENERAL

The Contractor shall provide and install all materials as shown on the drawings and/or as specified herein.

B. CRUSHED ROCK

1. Crushed rock shall be hard, sound and durable and shall not slake or disintegrate in water.

2. One and one half inch (1½") crushed rock shall be uniformly graded with one hundred percent (100%) passing a one and one half inch (1½") sieve and not more than five percent (5%) passing a 3/8" sieve.

3. Three-quarter inch (3/4") crushed rock shall be uniformly graded with one hundred percent (100%) passing a three-quarter inch (3/4") sieve and not more than five percent (5%) passing a ¼" sieve.

C. CLASS 2 AGGREGATE BASE

Class 2 aggregate base shall be free from organic matter and other deleterious substances and shall be of such nature that it can be compacted readily with water and rolling to form a firm stable base. All class 2 aggregate base shall be virgin material with a sand equivalent of 25 and shall have the following gradation:

Sieve Size	Percentage passing
1"	100%
¾"	87-100
No. 4	30-65
No 30	5-35
No. 200	0-12

D. LIGHTWEIGHT FILL AND LIGHTWEIGHT BASE ROCK

Lightweight fill and lightweight base rock shall be products by Clearlake Lava, Inc. of Clearlake Oaks, California, or equal.

E. CONTROLLED DENSITY (ALSO INDICATED ON PLANS AS CDF)

Controlled Density Fill (CDF) shall be used where shown on the plans for backfill around new drainage pipes and structures.

CDF shall be flowable to fill the voids and self-leveling within the area to be backfilled. CDF shall have a cement content of 94 lbs per cubic yard and a total cementitious (cement and flyash) content of 200 to 250 lbs per cubic yard with a maximum aggregate size of 3/8-inch not to exceed 40% of the total aggregate content. Materials used for CDF shall have the following quantities:

1. Cement shall conform to ASTM C-150, Type II. The maximum percent alkalis shall not exceed 0.6%.

2. Aggregates shall comply with ASTM C-33 and shall be free from any substances that will react with the cement alkalis. The 3/8-inch aggregates shall be pea gravel.

3. Flyash shall conform to ASTM C 618 for Class F Pozzolans as modified herewith, and a loss on ignition (LOI) not to exceed 4%.

4. Water to be used in concrete shall be clean and free from objectionable quantities of organic matter, alkali, salts and other impurities which might reduce the strength, durability or otherwise adversely affect the quality of the CDF.

5. Air entraining agent shall conform ASTM C-260. Entrained air content shall be a minimum of 8.0%. The actual entrained air content shall be established for each particular job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

F. TOPSOIL

Topsoil shall be imported, fertile, friable, natural, productive soil containing a normal amount of humus and capable of sustaining healthy plant life. Topsoil shall be free of subsoil, heavy of stiff clay, rocks, gravel, brush, roots, weeds, noxious seeds, sticks, trash and other deleterious substances. Soil shall not be infested with nematodes or with other noxious animal life or toxic substances. Soil shall be obtained from well-drained, arable land and shall be of an even texture. Soil shall not be taken from areas on which are growing any noxious weeds, such as Morning Glory, Sorrel, or Bermuda Grass.

G. WATER

Water used for dust control and moisture conditions for compaction shall be reasonably free of objectionable quantities of silt, oil, organic matter, alkali, salts and other impurities as determined by the Engineer. Bay water or water from drainage ditches on the project site shall not be used. Treated and disinfected effluent from the City treatment plant may be used for these purposes providing all water trucks or pipelines are clearly marked with signs stating, "WASTEWATER - DO NOT DRINK." All use of reclaimed wastewater must conform to Health Department Requirements.

PART 3 - EXECUTION

3.01 EXCAVATION

A. The excavation shall be made to enable the pipe to be laid to the grades and alignment shown on the plans. Excavated materials not required for fill or backfill shall be removed from the site of the work.

B. Trenches shall be excavated either by hand (private property) or by machine beginning at the outlet structure and proceeding upgrade, except as may otherwise be permitted by the Engineer. Hand excavation or tunneling will be required when use of a machine will cause unnecessary destruction of trees, shrubs, lawns and existing structures above or below ground, or work area does not have machine access (private property).

C. The narrowest practicable trench width which will allow proper densification of pipe zone backfill materials shall be maintained with vertical sidewalls from the foundation to at least the top of the pipe. Trench width at the top of the pipe shall not exceed the maximum trench width shown in the County Specifications. Where general conditions make this impractical, means must be provided, with the approval of the Engineer, for adequately supporting the increased load on the pipe which such widening will cause.

D. Where sheathing is required, the width of trench shall be increased sufficiently to accommodate the sheathing and timbers.

E. Excavation for manholes and other structures shall have twelve (12) inch minimum and twenty four (24) inch maximum clearance on all sides. Bell holes shall be excavated accurately to size by hand.

F. Excavation shall not be carried below the required level. Excess excavation below the required level shall be backfilled at the Contractor's expense with gravel, crushed rock or concrete, as directed by the Engineer, and thoroughly tamped.

G. In rock, excavation shall be carried six (6) inches below the bottom of the pipe and replaced with an approved material thoroughly tamped to provide a uniform support for the pipe. Permits for blasting shall be secured by the Contractor from the proper authorities. The cost of drilling and blasting shall be included in the unit bid price for lineal foot of pipeline and no additional allowance will be made therefor.

H. The bottom of all trenches shall be excavated accurately to the required grade with a firm bed to fit the barrel of the pipe. Minor adjustments in elevation required to produce the required invert slope shall be made by adequately bedding the pipe with sound granular pipe bedding materials, as hereinbefore defined, thoroughly compacted along the length of the pipe, underneath, and on both sides. It is essential that a uniform solid bearing be provided under the entire section of pipe.

I. For flexible pipe (PVC and polyethylene pipe), the pipe bedding (bottom of trench) shall be firm, but not hard, and shall consist of pipe zone backfill, free from stones or lumps exceeding one (1) inch in greatest dimension which might bear against the pipe. Suitable foundations shall be prepared by providing a one (1) inch minimum leveling course with loose bedding material graded uniformly in one plane for the full length of the pipe. Foundations shall provide uniform support under the haunches of the pipe up to the spring line along the full length of each pipe section.

3.03 BACKFILL

A. GENERAL

1. After the pipelines and their appurtenances have been properly constructed and inspected and after joints, plaster and concrete have set sufficiently to prevent damage, backfilling shall be done with approved material free from large clods or stones. Unless otherwise specified all backfill shall be compacted to 90 percent relative compaction per ASTM 1557.

2. The Contractor's attention is called to the fact that it will be his/her responsibility to obtain an encroachment permit for all work to be done in streets, roads, highways or railroad rights-of-way from the proper City having jurisdiction and that the method of backfilling of trenches must conform to the requirements of such City . Where imported materials will be required, the cost of furnishing and placing such materials shall be included in his/her bid price for sewer construction and no additional allowance will be made therefor.

B. PIPE ZONE BACKFILL

1. Backfill materials shall be so placed that the pipe will not be displaced, excessively deflected, or damaged. Materials placed as pipe zone backfill shall be free of stones

or lumps exceeding one (1) inch in greatest dimension and shall be so placed as to prevent the formation of voids.

2. Pipe zone backfill preparation shall be placed and compacted determined on the basis of local native soil conditions and such that vertical ring deflection of flexible pipe will be limited to five percent (5%) of the nominal pipe diameter.

3. In general, pipe zone backfill shall be placed immediately after laying the pipe, provided the pipe is true to line and grade.

C. INTERMEDIATE BACKFILL

1. The backfill shall be blended sufficiently to secure the best practicable degree of compaction and stability.

2. Compaction may be performed by mechanical or hand tamping methods or by hydraulic methods as is necessary to achieve the required relative compaction.

3. Care shall be taken during compaction to prevent displacement of the pipe due to floating or shifting and to prevent hydrostatic or impact damage to the pipe and foundation. Heavy mechanical tamping or rolling equipment directly over the top of the pipe, such as might result in excessive reduction of the vertical diameter of the installed pipe, shall be avoided.

4. Intermediate backfill above the pipe zone backfill shall not be placed until conformance with specified relative compaction of pipe zone backfill material has been confirmed.

3.04 PRECAUTION AGAINST FLOTATION

The Contractor shall take every precaution against the flotation of the pipe due to water entering the trench or while pouring concrete encasement. In case of flotation, the Contractor shall replace the pipeline or portions thereof at his/her own expense and make good any injury or damage that may have resulted.

3.05 BACKFILL DEFECTS

Within one (1) year after acceptance of the project, the Contractor shall promptly refill and repair all trenches which settle or otherwise show defects. All shrubs, trees, lawns, patios, structures and other property disturbed during the course of the work shall be restored to their original condition to the satisfaction of the Engineer.

END OF SECTION

SECTION 02500

RESTORATION OF IMPROVEMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

Work included in this section shall consist of furnishing all labor, material, equipment, tools and services required for the performance of paving and surfacing operations, including repair of curbs, gutters, sidewalks, landscaping, irrigation lines, control wires, etc., as specified herein and/or as shown on the Drawings, or as necessary to complete the project. Any concrete curbs, gutters or sidewalks damaged by the work shall be repaired or replaced in kind.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02200: Excavation and Backfill
2. Section 02600: Pipeline Construction – Direct Burial
3. Section 02602: Trenchless Pipe Construction
4. Section 02605: Manholes

1.02 SPECIFICATIONS AND DETAILS

A. All improvements damaged by the work shall be restored in accordance with the City of Alameda Standard Specifications.

B. See Attachment "C" for Standard Drawings of curb, gutter, sidewalk and driveway repair.

1.03 SUBMITTALS

The Contractor shall submit to the Engineer data describing the proposed surface restoration materials including the following:

1. Certificate of compliance and mix design for asphalt concrete
2. Concrete mix design
3. Specifications for the curing compound

1.04 PAYMENT

A Restoration of all surfaces and surface improvements damaged as a part of the work, including asphalt pavement, paths, sidewalks, curbs, gutters, landscaping, etc., shall be included in paid the various bid items for surface restoration or the bid allowance (if applicable).

B The Contractor shall be responsible for any off-site improvements damaged as a result of the Contractor's operation or by the travel of trucks on roads to and from the work area. Any such off-site damage shall be replaced at the Contractor's expense.

PART 2 - PRODUCTS

2.01 GENERAL

A. Materials for paving and surfacing shall conform to the applicable provisions of the City of Alameda Standards. Pavement restoration for public roads shall conform to the requirements of the agency having jurisdiction over the roadway right-of-way.

2.02 PAVING AND SURFACING MATERIALS

A. AGGREGATE BASE

Aggregate base shall be Class 2, conforming to Section 26 of the State Standard Specifications. Minimum relative compaction shall be 95%. If pavement having a structural section greater than 15" is cut, additional base material may be required by the Engineer. Base shall be placed and compacted prior to placing of temporary paving.

B. ASPHALT CONCRETE

1. Asphalt concrete shall be Type A, ½" maximum aggregate with medium gradation, and shall conform to applicable requirements of Section 39 of the Standard Specifications. Paving asphalt of the Viscosity Grade AR 4000 shall be used unless otherwise permitted by the Engineer.

C. PORTLAND CEMENT CONCRETE PAVEMENT RESTORATION

Portland cement concrete (PCC) for pavement restoration shall be six (6) sack mix.

2.03 CONCRETE

Concrete for replacement of curbs, gutters, sidewalks, etc. shall be minimum six (6) sack mix.

Concrete shall be cured by the Curing Compound Method using non-pigmented curing compound conforming to the ASTM Designation: C309, Type 1, Class B.

For new concrete installation adjacent to existing, add 1.5 lbs, Davis Black #8084 per cubic yard of concrete to the concrete mix, in accordance to the City of Alameda Standard Specifications.

The Contractor shall take necessary measures to protect the work in accordance with Section 7-1.16, "Contractor's Responsibility for Work and Materials," of the State Standard Specifications. After concrete is poured, the concrete shall be protected from vandalism.

2.04 TRAFFIC STRIPES AND PAVEMENT MARKINGS

Traffic stripes and pavement markings removal and replacement shall conform to the City of Alameda requirements.

PART 3 - EXECUTION

3.01 TEMPORARY TRENCH RESTORATION

Only hot mix asphalt or trench plates meeting Caltrans Sections 39 and 92 shall be used. Temporary asphalt thickness shall be at least as thick as the existing section, but not less than 2 inches.

3.02 PLACEMENT OF ASPHALT CONCRETE

A. DELIVERY AND SPREADING

Bituminous mixtures shall be delivered to the roadbed at temperatures specified in Section 39 of the State Standard Specifications. Spreading of the mixture shall be in accordance with Section 39 of the State Standard Specifications. All loads shall be covered with tarpaulin or other material during transportation.

B. COMPACTION

Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be compacted in accordance with Section 39 of the State Standard Specifications. Compaction by vehicular traffic shall not be permitted.

C. PAVEMENT THICKNESS

Pavement shall match the existing adjoining pavement in thickness, or as indicated on the Drawings, or as specified, whichever is greater.

D. JOINING PAVEMENT

The joints between old and new pavements or between successive days' work shall be carefully made in such manner as to insure a continuous bond between old and new sections of the course. Edges of existing pavement shall be exposed and cleaned and edges cut to straight, vertical surfaces. All joints shall be painted with a uniform coat of tack coat before the fresh mixture is placed.

E. PAVEMENT CUTTING

Trenches and other excavations in asphalt paved areas shall be cut by means of a sawcutting to the full depth of the pavement. Pavement cuts shall be laid out by a chalk line and care shall be taken to ensure neat, straight edges.

After the Engineer has approved a section of trench for final paving, the Contractor shall strip out all temporary pavement and sawcut to the full depth of the new pavement section as specified in the City's standard trench restoration specifications. Spalled or cracked sections of pavement beyond the excavation limits which, in the opinion of the Engineer, show signs of having separated from the adjoining pavement or are moveable, shall be removed and replaced with new pavement. Broken edges of pavement shall be trimmed along lines parallel to the trench edges. Exposed subgrade materials shall be compacted to the same standards as the adjoining trench backfill.

F. CONFORMANCE TO EXISTING IMPROVEMENTS

Asphalt concrete overlays shall be tapered to conform to existing paving, gutters, catch basins, etc. as directed by the Engineer.

3.03 RESTORING OTHER AREAS

A. Other surfaced areas other than pavement shall be restored by replacement of identical surface and base when practicable. In no case shall the thickness and method of placement of curbs, sidewalks, etc., be less than that specified in the City Specifications.

B. All concrete curbs, gutters, aprons, patios, driveways, building slabs and sidewalks which are broken, crushed or damaged by the installation of the improvements shall be reconstructed by Contractor, of the same kind of material and of the same dimensions as the original work, with the minimum requirement that concrete shall be Class A (6-sack), and the minimum thickness for concrete slabs, etc., shall be four (4) inches. The repairs shall be made by removing or replacing the entire portions between joints or score lines by removing the damage portions by concrete saw and not by merely refinishing the damaged part. All work shall match the appearance of the existing improvements as nearly as practicable.

C. All building slabs removed to perform the work shall be replaced and epoxy doweled in to the existing slab with minimum 16" long #4 rebar dowels @ 12 inches on center, minimum 2 dowels per side. Epoxy dowels shall have a minimum embedment of 4 inches to the existing slab.

D. All trenches in landscaped or cultivated areas shall have the top twelve (12) inches backfilled with topsoil. After installation, the topsoil and any adjacent unimproved land which has been compacted by the operation of the Contractor shall be thoroughly scarified and the surface cleaned of all large clods, stones or debris.

E. In lawn areas, the Contractor shall replace any grass removed for excavations, or which is damaged by his operations, with sod. Ground cover materials other than lawn shall be replaced in kind to the satisfaction of the Engineer.

F. The Contractor shall maintain all restored lawn and landscaped areas for a minimum of thirty (30) days after acceptance of the project by the City.

G. All restoration work shall be included in the unit bid price for pipeline construction and no additional allowance will be made therefor unless determined to a private landscape improvement compensated by the bid allowance therefor.

END OF SECTION

SECTION 02600

SEWER LINE CONSTRUCTION - DIRECT BURIAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

Work included in this section shall consist of furnishing all materials, labor, equipment, tools, and services required for the fabrication, construction, and laying of gravity sewers, laterals, force mains and storm drains installed by direct burial methods and appurtenances as specified herein, and/or as shown on the drawings, or as necessary to complete the project.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02200: Excavation and Backfill
2. Section 02500: Surface Restoration
3. Section 02602: Trenchless Pipe Construction
4. Section 02605: Manholes
5. Section 02659: Cleaning and Video Inspection

1.02 DEFINITIONS

JOINT PULL

Joint pull shall be taken to mean the interior joint separation, measured from the inside shoulder step of the bell of one pipe to the end of the spigot of the adjacent pipe.

1.03 SUBMITTALS

Prior to manufacture, the Contractor shall furnish drawings for the information to the Engineer showing details of fabrication, including details of the joint he proposes to use, design of special fittings and bends, closures, and deflection of pipe joints as required to conform to the plan and profile of the pipeline.

1.04 PAYMENT

The cost of pipelines, pipeline installation, including the installation of lateral connections and wyes as specified above, and testing shall be included in the bid price per lineal foot of pipeline, and no additional allowance will be made therefor.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall be new, shall conform to these specifications and to the sizes, details and requirements shown on the plans. All materials shall be subject to test by the Contractor at the point of manufacture or at the site of the work. All materials which may fail to meet the requirements of the specifications herein referred to shall be rejected and shall be removed from the site of the work.

B. Pipe diameters shown on the plans are nominal pipe sizes.

2.02 PIPELINE MATERIALS

A. GENERAL

Pipeline materials allowable for each pipeline are shown on the plans. The pipe and materials specified in this section include all the types of pipe materials which could be used for one or more items in the project.

B. POLYETHYLENE PIPE AND FITTINGS (HDPE) – HDPE pipe and fittings are specified in section 02602 – 2.02.B.

C. POLYVINYL CHLORIDE (PVC) PLASTIC PRESSURE SEWER PIPE AND FITTINGS, C-900 AND C-905 (RUBBER RING JOINTS) - ALL DIRECT BURIAL GRAVITY SEWER MAINS AND LATERALS.

1. SCOPE. This specification designates general requirements for unplasticized polyvinyl chloride (PVC) Plastic Pipe with integral wall bell-and-spigot joints.

2. MATERIALS. PVC Pipe and Fittings shall conform to all the requirements of AWWA C-900 for pipe diameters 4" through 12" DR=18 and AWWA C-905 for pipe diameters 14" through 18" with a DR=18. Pipe color shall be white or green.

3. TYPE AND MANUFACTURE. All pipe, fittings, and accessories shall be of the same manufacture in order that bell-and-spigot configurations will be identical. Pipe shall be made up with rubber ring joints to provide for expansion and contraction. The bell shall consist of an integral wall section stiffened with two PVC retainer rings which securely lock the solid cross section rubber ring into position. Methods of installation shall be in strict conformance with the recommendations of the manufacturer.

4. RUBBER RINGS. The rubber ring gaskets shall consist of synthetic rubber compounds meeting the requirements of ASTM F-477.

5. FITTINGS. All fittings for C-900 and C-905 pipe shall be one piece and shall meet the requirements of ASTM D-1784. Fittings shall conform to requirements of DR 25. Fit tings shall be designed to withstand a minimum of 755 psi quick burst pressure @ 76° F tested in accordance with ASTM D-1599. Bells shall be gasketed joint conforming to ASTM D-3139 with gaskets conforming to ASTM F-477.

D. POLYVINYL CHLORIDE (PVC) PLASTIC PRESSURE SEWER PIPE AND FITTINGS, ASTM D-3034 (RUBBER RING JOINTS) - DIRECT BURIAL GRAVITY SEWER MAINS AND LATERALS.

1. SCOPE. This specification designates general requirements for unplasticized polyvinyl chloride (PVC) Plastic Pipe with integral wall bell-and-spigot joints.

2. MATERIALS. Pipe and Fittings shall conform to all the requirements of ASTM D-3034 with a DR = 26. Pipe color shall be white or green.

3. TYPE AND MANUFACTURE. All pipe, fittings, and accessories shall be of the same manufacture in order that bell-and-spigot configurations will be identical. Pipe shall be made up with rubber ring joints to provide for expansion and contraction. The bell shall consist of an integral wall section stiffened with two PVC retainer rings which securely lock the solid cross section rubber ring into position. Methods of installation shall be in strict conformance with the recommendations of the manufacturer.

4. RUBBER RINGS. The rubber ring gaskets shall consist of synthetic rubber compounds meeting the requirements of ASTM F-477.

5. FITTINGS. All fittings for ASTM D-3034 pipe shall be one piece and shall meet the requirements of ASTM D-1784. Fittings shall conform to requirements of DR 26. Bells shall be gasketed joint conforming to ASTM D-3139 with gaskets conforming to ASTM F-477.

2.03 PIPE COUPLINGS

A. GENERAL

The Contractor shall furnish and install the proper connecting pieces or transition sleeves in every case where it may become necessary to join pipes of different diameters, materials or types of joint. The connection between flanged pipelines and bell-and-spigot pipe shall be made with a standard connecting piece. The Contractor shall provide proper anchorage of the pipe to prevent pulling apart from pumping pressures or from expansion.

B. SEWER MAINS OF THE SAME MATERIAL

On the sewer mains, i.e., sewers 6" diameter or larger of the same material, adapter couplings shall be factory fabricated PVC fittings.

C. SEWER LATERALS AND SEWER MAINS OF DIFFERENT MATERIALS

Adapter couplings for sewer laterals and sewer mains of different materials shall be Caulder, Fernco, or approved equal, and shall be made from elastomeric polyvinyl chloride (PVC) with external adjustable Series 300 stainless steel shear bands, clamps and bolts.

PART 3 - EXECUTION

3.01 GENERAL

A. All pipelines shall be installed using procedures which will insure the integrity of the completed pipeline. Each section of pipe shall have its support well distributed under the pipe by providing proper bedding. Semi-rigid or flexible pipe shall be kept substantially round during unloading, storage, and throughout backfilling operations. This requires care in providing proper embedment with uniform support from the soil on the sides of the pipe as well as on the bottom.

B. The manufacturer's recommendation for assembling pipe sections and completing joint protection will be enforced. Rubber gaskets shall be stretched uniformly when in position on spigots; joint surfaces and gasket shall be clean and well lubricated; entry of spigot end into bell of adjacent pipe section shall be performed with reasonable care; position of the gasket shall be checked after joint closure; and, in the case of cement-lined and coated pipe, the inside and outside joint recess shall be correctly filled with cement mortar.

C. The Contractor shall perform the work of installation of the pipeline and appurtenances in accordance with the following procedures. Where conditions are found to exist which in the opinion of the Engineer will subject the pipe to severe or unusual loading conditions, the pipe manufacturer shall be consulted for recommendations in regard to alternate procedures. Alternate or modified procedures shall be subject to approval of the Engineer.

3.02 HANDLING PIPE AND FITTINGS

A. Proper tools, implements, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. During loading, transportation, and unloading, Contractors shall take every precaution to prevent injury to any and all pipe.

B. No pipe shall be dropped from cars or trucks nor allowed to roll down skids without proper restraining ropes. Each section of pipe shall be delivered in the field as near as practicable to the place where it is to be installed, and all bells shall be faced in the proper direction for laying. Pipe shall be distributed along the trench opposite to the spoil bank within easy reach of the workmen installing the pipe in the trench.

C. Pipe shall not be rolled nor dragged on the ground. Where pipe is placed in stockpiles, it shall be neatly piled and blocked with strips between tiers and with all bells facing in the same direction. Any pipe which may have been damaged in transportation or handling shall either be repaired by the Contractor before installation to the satisfaction of the Engineer or shall be permanently removed from the job site.

3.03 LOCATING THE ALIGNMENT OF EXISTING SEWERS

A. The plans show the alignment of existing sewers schematically and the actual alignment may vary and wander into or out of the alignment of the new sewer. Where the new sewer follows or is close to the alignment of the existing sewer is connecting to an existing sewer the Contractor shall accurately locate the existing sewer by potholing or other necessary means prior to sawcutting for the new sewer. The alignment of the existing sewer as located shall be marked with paint on the pavement. If the contractor does not accurately locate the exist-

ing sewer prior to sawcutting or trenching, no claim for extra work or delays will be considered.

B. The cost of locating the alignment of the existing sewer shall be included in the bid price for sewer construction and no additional compensation will be allowed. If the Contractor elects not to locate the alignment of the existing sewer and the existing sewer is different from the alignment shown on the plans no additional compensation will be allowed.

3.04 PIPELINE GRADE

A. The Contractor shall employ competent personnel or an independent licensed Civil Engineer acceptable to the Engineer who shall be responsible for accurately transferring lines and grades to the bottom of trenches or excavations for the construction of pipelines and structures.

B. All pipelines shall be laid true to line and grade. Pipe alignment shall reasonably conform to that shown on the plans, and in no event shall joint deflections exceed the pipe manufacturer's recommendations. The grade of all gravity sewers shall be within ±0.05 foot of the elevations and grades shown on the plans with the provision that in no event shall a gravity sewer or drain be allowed to have a sag or standing water greater than 0.10 feet deep in ten (10) inches or smaller inside diameter pipe and 0.20 feet in pipe larger than ten (10) inches inside pipe diameter. Pipeline grades which exceed this standard as determined by the television inspection to be performed by the Contractor shall be relaid at no expense to the City.

3.05 LOCATION AND POTHOLING OF SEWER LATERALS

A. The Contractor shall locate all existing live sewer laterals which connect to the pipe to be rehabilitated one (1) week in advance of the sewer main construction. Laterals shall be located either by inserting a "ferret" locating device, dye testing, pulling toilets, through roof vents, televising or by potholing with verification that the lateral is live. The Contractor shall contact the property owner as necessary to gain access for the purpose of locating the laterals.

B. Once the lateral is located it shall be potholed at the point of connection with the building lateral and/or sewer main.

C. The cost of locating the laterals shall be paid for in accordance with the unit bid price in the proposal, and no additional allowance will be made therefor.

3.06 TESTING AND CLEANING OF GRAVITY SEWERS AND LATERALS

A. GENERAL

1. Gravity sewer lines, laterals and appurtenances shall be substantially watertight. All precautions shall be taken by the Contractor to secure watertightness throughout the component parts of the system. All jointing of pipe shall be subject to rigorous inspection by the Engineer or his representative. In addition, before the acceptance of the work and prior to the admission of any sewage into the system, the Contractor shall perform the tests herein specified and otherwise demonstrate to the satisfaction of the Engineer the watertightness of the sewer lines, including laterals and manholes and appur-

tenances. All leakage in excess of the maximum allowable amount hereinafter stipulated shall be corrected.

2. Testing shall be performed after backfilling and after manholes are finished. The Contractor shall make whatever preliminary tests he deems necessary prior to backfilling to satisfy himself that the completed and backfilled line will meet the hydrostatic tests herein required.

3. The test shall be conducted to include the new sewer mains and all new house connecting sewers and laterals. The test shall meet the requirements as herein specified. Any visible infiltration into sewers or manholes, no matter how slight, shall be repaired.

4. The Contractor shall furnish all facilities, including labor, materials, pumps, equipment, and tools necessary to conduct the tests and cleaning operations, and he shall repair all leaks. The cost of testing and cleaning sewers shall be included in the various bid items for pipeline construction, and no additional allowance will be made therefor.

B. ISOLATION FROM EXISTING SYSTEM

The Contractor shall flush all sewer lines after backfilling and prior to testing. Accumulated material shall be removed at each manhole, and no material shall be allowed to enter the existing sewer system.

C. SIDE SEWER TESTING

All newly rehabilitated side sewers (laterals) shall be plugged at the cleanout and tested together with the sewer main.

D. AIR TESTING

Air testing of the sewer pipe will be permitted. The air test pressure shall be four (4) psi at the beginning of the test. For all pipe diameters there shall be no pressure drop over a ten (10) minute test period. Any leaks discovered shall be repaired by the Contractor at his expense.

E. SEWER CLEANING

After all grading and paving operations in the vicinity of the sewer lines are completed, the Contractor shall clean all lines of dirt and debris as specified in Section 02659.

F. TELEVISION INSPECTION

Prior to the start of pipeline construction, the Contractor shall arrange and pay for closed circuit television inspection of the sewer mains as specified in Section 02659.

After the sewers have been backfilled, completed, tested and cleaned, but before acceptance of the job, the Contractor shall arrange and pay for closed circuit television inspection of the sewer mains and each new lateral as specified in Section 02659.

3.07 PRECAUTION AGAINST FLOTATION

A. The Contractor shall take every precaution against the flotation of the pipe due to water entering the trench. In case of flotation, the Contractor shall replace the pipeline or portions thereof at his own expense and make good any injury or damage that may have resulted.

B. Care shall be taken in backfilling the pipe so as not to disturb the material supporting the pipe or otherwise cause displacement of the pipeline.

3.08 PRESERVATION AND CLEANING UP

A. The Contractor shall properly preserve and clean the work as it progresses. At regular intervals, or as directed, rubbish and debris shall be collected and removed by the Contractor.

B. Upon the completion of the work, the Contractor shall clean up the whole work, and all false-work, equipment, tools, rubbish, and other temporary material shall be removed from the site, which shall be left in a clean condition acceptable to the Engineer.

END OF SECTION

SECTION 02602

TRENCHLESS PIPE CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

Work included in this section shall consist of furnishing all materials, labor, equipment, tools, and services required for the fabrication, construction, and trenchless replacement of pipelines and appurtenances as specified herein, and/or as shown on the drawings, or as necessary to complete the project. Trenchless pipe replacement is defined as pipebursting, directional drilling and pilot tube boring.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02200: Excavation and Backfill
2. Section 02500: Surface Restoration
3. Section 02600: Sewer Line Construction – Direct Burial
4. Section 02605: Manholes
5. Section 02659: Cleaning and Video Inspection

1.02 SUBMITTALS

Prior to construction, the Contractor shall submit information to the Engineer showing details of the trenchless pipe replacement method he proposes to use, together with information of the specifications on the trenchless pipe replacement method, type and size of pipe, and connection details, pipe materials and lateral connections and the design of special fittings and bends, closures, and deflection of pipe joints as required to conform to the plan and profile of the pipeline.

1.03 PAYMENT

The cost of all trenchless pipe replacement, including all lateral connections and testing, shall be included in the bid price per linear foot of pipeline and no additional allowance will be made therefor.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall be new, shall conform to these specifications and to the sizes and details shown on the plans. All materials shall be subject to test by the Contractor at the point of manufacture or at the site of the work. All materials which may fail to meet the requirements of the specifications herein referred to shall be rejected and shall be removed from the site of the work.

B. Pipe diameters shown on the plans are nominal pipe sizes.

2.02 PIPELINE MATERIALS

A. GENERAL

Pipeline materials allowable for each pipeline are shown on the plans. The pipe and materials specified in this Section include all the types of pipe materials which could be used for one or more items in the project.

B. POLYETHYLENE PIPE AND FITTINGS (HDPE PIPE)

1. GENERAL. Where polyethylene pipe and fittings are shown on the Plans and/or specified, the Contractor shall furnish and install polyethylene pipe manufactured to conform to the following specifications.

2. TYPE AND MANUFACTURE. Polyethylene pipe and fittings shall be Type III Category 5, Grade P34, with a DR=17, having the following properties:

Property	Value	ASTM Test
Density, min.	0.960 gms/cc	D-1505
Melt Flow – 190° C/2.16 Kg	0.08 gms/10 min	D-1238
Environmental Stress Cracking Resistance w/no failures or stress crack initiation (Condition C)	1,000 hrs	D-1693
Tensile Strength, Yield 2 in/min	3,500 psi	D-638
Brittleness Temperature	103° F	D-746
Hydrostatic Design Basis @ 73°F	1,600 psi	D-2837
@ 140°F	800 psi	D-2837
Cell Classification	PE 445574C	D-3350

Polyethylene pipe shall be Driscoplex 4100 (IPS), or equal.

3. The polyethylene resin shall contain 2% carbon black antioxidant, well dispersed, and be stabilized against ultraviolet degradation to provide protection during processing and subsequent weather exposure. The interior of the pipe shall be gray.

4. Pipe shall be made to diameter and tolerances as shown in manufacturer's literature.

5. All pipe shall be made from virgin material. All resin in all the pipe and fittings must be produced by a single resin manufacturer and shall be fully traceable. No rework compound, except that obtained from the manufacturer's own production of the same formulation, shall be used.

   All pipe fittings and specials shall be furnished by the same pipe manufacturer.

6. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

7. The Contractor shall furnish and install the proper connecting pieces and/or transition sleeves in every case where it is necessary to join pipes of different diameters, materials, or types of joint.

8. Fusion joining and other procedures necessary for correct assembly of the polyethylene pipe and fittings will be done only by personnel trained in those skills to the satisfaction of the Engineer and the pipe supplier. Fused welds must be de-beaded and accepted by the City Inspector prior to pipe installation.

9. Only those tools designed for joining procedures and approved by the pipe supplier and Engineer shall be used for assembly of pipe and fittings to insure proper installation.

10. Where shown on the plans, polyethylene pipe shall be connected to systems or fitting of other materials by means of an assembly consisting of a polyethylene flange adapter butt-fused to the pipe, a backup ring of stainless steel made to ASA B-16 dimensional standards (with modified pressure rating, bolts of stainless steel and compound gasket).

11. The supplier shall provide polyethylene pipe with a permanently imprinted manufacturer's brand name, pipe size, and other identification for tracing pipe quality to raw material source. The HDPE pipe shall also be identified with a green stripe.

12. The pipe supplier shall furnish the system components, fusion machine of type specified and pipe support stands. The Contractor shall supply the power source for operation of the fusion machine.

2.03 MANHOLE CONNECTIONS

All pipeline connections to manholes shall be made by encasing a rubber stainless steel banded waterstop (Fernco Large Diameter Waterstop, or equal) around the pipe in the poured concrete manhole base to make a watertight connection.

PART 3 - EXECUTION

3.01 GENERAL

A. Where shown on the plans, the Contractor shall rehabilitate sanitary sewers by a trenchless pipe replacement method as specified herein.

B. The trenchless pipe replacement process shall utilize High Density Polyethylene Pipe as the carrier pipe.

C. All pipebursting shall be done by a licensed contractor.

3.02 LOCATION AND POTHOLING OF SEWER LATERALS

The Contractor shall locate all existing live sewer laterals which connect to the pipe to be inserted by means of the trenchless pipe replacement process or set forth in Section 02602-3.05, and as required on the Plans. In easement areas which are inaccessible to equipment potholing excavation shall be by hand.

3.03 PIPEBURSTING

A. When shown on the plans sewer mains shall be pipeburst using a method that will not cause undue vibration or impact in the ground around the pipe or damage adjacent utilities.

B. The size-for size or upsizing installation of new pipe shall be accomplished by the following procedures:

1. The polyethylene pipe shall be attached to the rear of the pipe bursting machine with the hose lines and cables passing through the annulus of the replacement pipe.

2. A cable or chain shall be inserted from the launching trench through the existing pipe to the reception manhole where it shall be attached to the winch and the pipe bursting head.

3. The pipe bursting system with the replacement polyethylene pipe attached shall be lowered into the launching trench while the directional winch chain is simultaneously being tensioned, locating the pipe bursting head in the existing sewer line.

4. The pipe bursting action shall be initiated following the continuously tension winch chain toward the receiving manhole.

5. When the system reaches the reception manhole or the point of connection to an existing pipeline the polyethylene pipe shall be disconnected from the rear of the machine and the unit prepared for the next run.

6. New HDPE laterals shall be reconnected to the new pipe by means of a thermal weld saddle. The polyethylene pipe shall be drilled out, deburred and smooth to the touch.

C. After the polyethylene pipe has been inserted in the existing manhole, the Contractor shall trim the polyethylene pipe and anchor the pipe to the manhole base. Care must be exercised to prevent the new pipe from slipping out of position prior to final sealing of the manhole. The polyethylene replacement pipe shall protrude far enough into the manhole to allow the sealing and trimming operations to be performed.

D. A minimum of twelve hours after pipe insertion, a rubber seal shall be placed in the annular space between the polyethylene pipe outside diameter and the inside diameter of the existing hole in the manhole at each manhole location, together with caulking and non shrink grout.

E. All rehabilitated sewer mains shall be tested, cleaned and TV-inspected as specified herein.

3.05 LATERAL RECONNECTIONS

Lateral connections to HDPE pipe shall be made by electrofusion HDPE saddles, Central, Friatec or approved equal.

The connection between the existing lateral and new polyethylene lateral shall be by a banded rubber coupling with stainless steel shear bands, Fernco, Caulder, or equal.

3.06 TESTING AND CLEANING OF GRAVITY SEWERS AND LATERALS

A. GENERAL

1. Gravity sewer lines, laterals and appurtenances shall be substantially watertight. All precautions shall be taken by the Contractor to secure watertightness throughout the component parts of the system. All jointing of pipe shall be subject to rigorous inspec-

tion by the Engineer or his representative. In addition, before the acceptance of the work and prior to the admission of any sewage into the system, the Contractor shall perform the tests herein specified and otherwise demonstrate to the satisfaction of the Engineer the watertightness of the sewer lines, including laterals and manholes and appurtenances. All leakage in excess of the maximum allowable amount hereinafter stipulated shall be corrected.

2. Testing shall be performed after backfilling and after manholes are finished. The Contractor shall make whatever preliminary tests he deems necessary prior to backfilling to satisfy himself that the completed and backfilled line will meet the hydrostatic tests herein required.

3. The test shall be conducted to include the new sewer mains and all new house connecting sewers and laterals. The test shall meet the requirements as herein specified. Any visible infiltration into sewers or manholes, no matter how slight, shall be repaired.

4. The Contractor shall furnish all facilities, including labor, materials, pumps, equipment, and tools necessary to conduct the tests and cleaning operations, and he shall repair all leaks. The cost of testing and cleaning sewers shall be included in the various bid items for pipeline construction, and no additional allowance will be made therefor.

B. ISOLATION FROM EXISTING SYSTEM

The Contractor shall flush all sewer lines after backfilling and prior to testing. Accumulated material shall be removed at each manhole, and no material shall be allowed to enter the existing sewer system.

C. SIDE SEWER TESTING

All newly rehabilitated side sewers (laterals) shall be plugged at the cleanout and tested together with the sewer main.

D. AIR TESTING

Air testing of the sewer pipe will be permitted. The air test pressure shall be four (4) psi at the beginning of the test. For all pipe diameters there shall be no pressure drop over a ten (10) minute test period. Any leaks discovered shall be repaired by the Contractor at his expense.

E. SEWER CLEANING

After all grading and paving operations in the vicinity of the sewer lines are completed, the Contractor shall clean all lines of dirt and debris as specified in Section 02659.

F. TELEVISION INSPECTION

Prior to the start of pipeline construction, the Contractor shall arrange and pay for closed circuit television inspection of the sewer mains as specified in Section 02659.

After the sewers have been backfilled, completed, tested and cleaned, but before acceptance of the job, the Contractor shall arrange and pay for closed circuit television inspection of the sewer mains and each new lateral as specified in Section 02659.

3.07 PRESERVATION AND CLEANING UP

A. The Contractor shall properly preserve and clean the work daily, or as directed; rubbish and debris shall be collected and removed by the Contractor.

B. Upon the completion of the work, the Contractor shall clean up the whole work, and all false-work, equipment, tools, rubbish, and other temporary material shall be removed from the site, which shall be left in a clean condition acceptable to the Engineer.

END OF SECTION

SECTION 02605

MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

Work included in this section shall consist of furnishing all materials, labor, equipment, tools, and services required for the fabrication, construction, and laying of pipelines and appurtenances as specified herein, and/or as shown on the drawings, or as necessary to complete the project.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02200: Excavation and Backfill
2. Section 02500: Surface Restoration
3. Section 02600: Sewer Line Construction – Direct Burial
4. Section 02602: Trenchless Pipe Construction
5. Section 02606: Manhole Rehabilitation
6. Section 03330: Antimicrobial Crystalline Waterproofing Concrete Additive

1.02 SUBMITTALS

Prior to manufacture, the Contractor shall furnish shop drawings to the Engineer showing details of fabrication of the manholes proposed to be used.

1.03 QUALITY CONTROL

All manhole and casting materials shall be inspected and approved prior to installation. The acceptance of any material or finished members by the Inspector shall not be a bar to their subsequent rejection, if found defective. Rejected material shall be immediately removed from the site and replaced promptly by the Contractor.

1.04 PAYMENT

The cost of all manhole construction including all excavation, manhole base, forming of channels, cast iron frame and cover, backfilling, compaction and steel plates, temporary resurfacing shall be paid for per manhole in accordance with bid item therefor and no additional allowance will be made therefor.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE MANHOLES

All precast manhole sections shall conform to ASTM C-478, except that Type II modified Portland cement shall be used. The design, the specifications and the name of the manufacturer of any precast manhole units shall be submitted to the City for approval prior to purchase.

All concrete used to cast manhole sections and manhole bases shall contain an antimicrobial crystalline waterproofing additive as described in Specification Section 03330.

2.02 CASTINGS

Castings shall conform to the requirements of ASTM A-48, Class 30.

Castings shall conform to the shape and dimensions shown on the Standard Drawings. All castings shall be clean and free from blow or sand holes or defects of any kind.

The cover and its seat in the frame shall be machined so that the cover will sit evenly and firmly in the frame.

Cast iron frames and covers shall be dipped or painted with asphalt which will form a tough, tenacious, non-scaling coating which does not have a tendency to become brittle when cold or sticky when hot. Covers shall be easily removable.

Salvaged manhole ring and covers shall not be reused on the new manholes.

2.02 HDPE MANHOLES

All HDPE manholes as shown on the plans shall be constructed using HDPE drainage pipe with a smooth interior and corrugated exterior, ADS N-12 drainage pipe, or equal. Manhole barrel sections must be constructed of a single section of pipe without joints or seams.

PART 3 - EXECUTION

3.01 PRECAST MANHOLE CONSTRUCTION

An approved form ring conforming to the dimensions of the precast barrel section joint shall be used to form a joint groove in the manhole base prior to setting the first barrel section. The concrete base shall be sufficiently cured to the satisfaction of the City before the first barrel section is set. All joint surfaces of precast sections and the manhole base shall be thoroughly cleaned prior to setting precast sections. These various sections shall be set in a Ram-Nek sealing gasket, or equal, and installed in accordance with the manufacturer's recommendations. The eccentric cone shall be center over the downstream channel

Handling of barrel sections after the sealing gasket has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or covering it with dirt or other foreign materials. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced. Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.

After manhole is in final position, all exterior joints between manhole sections shall be sealed with a minimum 6" wide extruded butyl adhesive tape designed to provide a high strength watertight seal, Press-Seal Corporation EZ Wrap butyl joint wrap with plastic backing, or equal. Concrete surfaces shall be primed with EZ-Stik #4 primer, or equal, prior to installing tape.

3.02 MANHOLE CHANNELS

Pipe shall be used as a form for the channel if the proper positions of the flexible joints can be maintained. Whether pipe or channel forms are used, after the manhole base concrete has taken a set, the channel shall be checked with the proper template. All channels shall be finished smooth with a steel trowel.

3.03 TEMPORARY COVERS AND PLUGS FOR MANHOLES

The City must have accessibility to manholes on all live sewers to allow maintenance of the system at all times. In streets, avenues, intersections, lanes, any public thoroughfares involving automobile traffic, buses, trucks, etc., the permanent manhole casting and cover shall be installed on all actively used sewers and sewer mains, including manholes, where live laterals are being used. The permanent manhole, casting and cover shall be brought up to the grade of the temporary asphalt. The manhole, frame and cover shall at a later date be raised to grade when the final permanent paving is done.

Temporary steel plate covers of approved design shall only be used on inactive sewer lines during the construction in subdivisions or other areas not subject to active vehicular traffic where final grades for unfinished roadbeds have not been determined, or where approved or ordered by the City. If the sewer being constructed is actively used, the Contractor shall install the permanent manhole frame and cover so the City can have access to the sewer for maintenance.

A temporary debris cover shall be placed over the base of any existing manhole prior to beginning any adjustment or repair work.

3.04 MANHOLE TESTING

A. GENERAL

All sanitary sewer manholes shall be watertight. All manholes shall be successfully tested either with clean water or by vacuum testing.

B. VACUUM TESTING OF MANHOLES

1. Sanitary sewer manholes may be vacuum tested in lieu of water testing. Vacuum testing of manholes shall be performed after backfilling.

2. The City representative shall be notified a minimum of two working days prior to the testing of the manholes.

3. The Contractor shall be responsible to perform the tests. The City's representative shall be present during all tests.

4. The Contractor shall document the tests and submit this documentation to the City.

5. Manholes shall be prepared for vacuum testing as follows:
   a. All lift holes shall be plugged.

b. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

7. Vacuum testing of manholes shall be conducted as follows:

   a. All manhole openings shall be sealed with plugs and a rubber ring "donut" type plug inserted inside the cone opening.

   b. A vacuum of 4 psi shall be drawn on the manhole. The vacuum shall be permitted to stabilize at 3.5 psi for one minute; then the test shall begin.

   c. The manhole must maintain vacuum such that no greater than 0.5 psi of vacuum shall be lost during the specified test period as shown in Table 1 below.

   d. If the manhole fails the initial test the leaks shall be located and the necessary repairs made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

TABLE 1 – SPECIFIED TEST PERIOD	
Manhole Depth (ft)	Test Period (Min)
0-5	4.5
5-10	5.5
10-15	6.0
Greater than 15	6.5

8. If the vacuum test fails, or 4 psi vacuum cannot be obtained the following procedure shall be followed to locate the leaks.

   - Shut off vacuum pump
   - Remove vacuum test plate from manhole
   - Then, using a 2 gallon hand pump sprayer (like a garden sprayer), spray the interior surface of the manhole with a soap and water mixture
   - Begin testing
   - After 30 second, stop vacuum and remove vacuum test plate once again
   - Check the inside of manhole for soapy bubbles, indicating the areas that leak

9. The Contractor shall furnish all facilities, including labor, materials, pumps, equipment, and tools necessary to conduct the testing operations, and he shall repair all leaks. The cost of testing manholes shall be included in the various bid items for manhole construction, and no additional allowance will be made therefor.

END OF SECTION

SECTION 02659

CLEANING AND VIDEO INSPECTION

1.01 DESCRIPTION

A. WORK INCLUDED

The work to be done under this Section consists of furnishing all labor, equipment, materials, plant and supervision necessary to clean and TV inspect the sewer main lines and laterals designated on the Plans attached hereto and made a part hereof and as specified herein.

Additional required work includes performing the sewer condition assessment, data input to a Pipeline Assessment Certification Program (PACP) database and capturing and storing digital images for each event, i.e. lateral connections and all defects, which are recorded on a DVD and written inspection report as the work proceeds.

1.02 RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02600: Sewer Line Construction – Direct Burial
2. Section 02602: Trenchless Pipe Construction
3. Section 02605: Manholes

1.03 DELIVERABLES

A. CLEANING RECORDS

The Contractor shall make a record of each sewer that is cleaned using the street name, address and structure number of the upstream manhole and the location and type of any problem found.

B. TELEVISED INSPECTION RECORDS

The Contractor shall furnish the City with two (2) copies of the following records:

a. Televised records of each sewer line TV inspected on a DVD or portable storage device properly labeled as to date and address or location.

b. Written reports of inspected sewer lines which include rating and classification of each defect found.

c. PACP database of inspected sewer lines.

d. Digital images of all lateral connections and all defects.

C. PACP REQUIREMENTS

All deliverables shall conform to the following list of requirements

a. Video inspection software shall be in NASSCO PACP and MACP version 4.3.2 and conform to its pipeline assessment procedures.

b. All observations and defects shall be documented in a database and shall include digital video recording and digital photographs.

c. Each video clip and photograph provided shall correspond to inspection data in the database, and each set of inspection data listed in the database shall be properly linked to the appropriate video clip and photos.

d. All observations should be standard PACP codes as outlined in NASSCO's current PACP Reference Manual with any additional comments regarding the observation indicated in the remarks box.

e. The severity of each defect or observation shall be recorded and rated according to the PACP method.

f. Each pipe segment (manhole to manhole) shall be identified with an initial text screen and completed in accordance with PACP's CCTV inspection form header Instructions.

g. The Contractor shall make a continuous color digital recording in MPEG 4 format for each pipe segment inspected.

h. The database, videos, and photographs shall have the ability to be "Exported". Export is the process of selecting all or portions of the original data, video, and pictures and creating a complete and independent copy of the information, which can be synchronized with the City's program. The export process will validate the PACP and MACP data and reject any non-compliant inspections, notifying the user via log files.

D. PROJECT STATUS REPORT

The Contractor shall provide a monthly status report describing the level of completion of various tasks of the work. This request will be used to determine payment as the work proceeds.

1.04 QUALITY REQUIREMENTS

A. COMPANY EXPERIENCE

As a minimum the company shall have at least three (3) years experience and the supervisor two (2) years experience in this type of work. The Contractor shall demonstrate that he/she owns or has access to backup equipment so that the work does not have to be suspended in the event of equipment breaking down.

B. QUALIFICATION OF WORKERS

The Contractor shall provide sufficient skilled workers and supervisor, who shall be present at all times during execution of the work described above, who shall be thoroughly familiar with the type of work involved and the materials and techniques specified. As a minimum the company shall have at least three (3) years experience and the supervisor two (2) years experience in this type of work.

C. PACP OPERATOR CERTIFICATION

Prior to initiating CCTV inspection work associated with condition assessment assignments, the Contractor shall present the Owner with copies of PACP certifications of operators that will be performing the work.

D. WORKER ATTIRE AND VEHICLES

All workers on the CCTV crew shall wear a photo identification badge, and lime green or orange safety vests. Vehicles shall be identified with the firm's name.

1.05 SUBMITTALS

The Contractor shall submit the following for approval.

a. Schedule of cleaning and televising.

b. Brand name, model, specifications of television equipment to be used and sample DVD as specified in Section 1.16, Equipment, to establish picture quality.

c. Traffic Control Plan.

d. Formal procedures demonstrating that current regulatory requirements are conformed to regarding safe manhole entry and verification that all employees are trained on manhole entry procedures.

1.06 NOTIFICATION TO RESIDENTS, BUSINESSES, SCHOOLS AND AGENCIES

The Contractor shall provide the following notifications to the residents, businesses, schools and agencies in the work area:

a. Post Notices of the cleaning and televising on barricades within the work area.

b. Deliver a second notification to the affected properties in the form of a door knob hanger forty-eight (48) hours prior to the actual work or as required by the City. Affected properties shall be defined as all the properties in the vicinity of the work including the properties through which and/or over which the Contractor must traverse and work.

The wording of the public notifications will be developed by the City in cooperation with the Contractor and furnished to the Contractor. The notices will have a blank line for the Contractor to write in the date work will be done on the specified property being notified. The City will make the appropriate number of copies and forward them to the Contractor.

The Contractor shall remove the posted notices immediately after the work is done.

1.07 SEWER CLEANING

A. GENERAL

All new sewers and laterals shall be cleaned prior to TV inspection. Cleaning shall consist of the use of a hydroflusher, rodder, root cutters including use of hand rodding equipment in easement areas where necessary as well as any other cleaning equipment necessary to remove foreign materials including adhered grease and dirt from the pipe walls together with all roots, rocks and debris from the sewer, manhole inverts and structures to obtain a clear picture of the internal condition of the line. Use of chemicals or herbicides is not permitted.

B. CLEANING PRECAUTIONS

During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools are to be used (which depend upon water pressure to provide their cleaning force), precautions shall be taken to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. The Contractor shall take particular care in cleaning plastic pipe so as not to damage it with the cleaning equipment. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant. The Contractor shall make his/her own arrangements for a water meter and any other utility service necessary to complete the work.

C. MANHOLE CLEANING

When necessary, all manhole structures, within the alignment of the sewer main to be televised, shall be cleaned using high-velocity City jet equipment. The cleaning process shall remove accumulated debris from all interior surfaces without damaging the structural integrity of the manhole.

If a manhole structure exhibits excessive damage during the cleaning operations, such as concrete spalling, exposed reinforcing, etc., cleaning operations shall immediately cease and the condition shall be immediately brought to the attention of the Engineer.

D. MATERIAL REMOVAL

All grease, sludge, dirt, sand, roots, rocks and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole or pump station of the section being cleaned. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand, rocks and debris in pump stations, or damage to pumping equipment, shall not be permitted.

E. ROOT REMOVAL

All roots shall be mechanically removed wherever root intrusion is significant enough to restrict the passage of the camera and/or obtaining a clear picture. Procedure may include the use of rodding machines. Tree roots found shall be routinely reported on the

Televised Inspection Report and peripheral work, as required as part of the Project.

1.08 CONTROL OF SEWAGE FLOW

A. PLUGGING OR BLOCKING

When necessary to plug or block the sewage flow, sewer line plug shall be inserted into the line upstream of the section being worked. The plug shall be so designated that all or any portion of the sewage can be released. During TV inspection, flow shall be reduced to levels that will allow full inspection of the pipe interior. After the work has been completed, flow shall be restored to normal.

The Contractor shall control the flow in the sewer being televised as necessary to allow the flow to be below the lens of the camera being used in order to get a clear picture. The Contractor shall notify the City prior to plugging any sewer line. Bypass pumping shall be provided at all times the line is being plugged. The Contractor at his/her option may perform the work on a sewer which has a high flow during the night when flows are low.

B. BYPASS PUMPING

When bypass pumping is required, the Contractor shall supply the pumps, conduits, and other equipment to divert the flow of sewage around the manhole section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flow plus any additional flow that may occur during a rainstorm. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the bypass pumping system. Engines shall be equipped in a manner to keep noise to a minimum.

C. FLOW CONTROL PRECAUTIONS

When flow in a sewer line is plugged, blocked, or bypassed, sufficient precautions must be taken to protect the sewer lines and connected homes from damage that might result from sewer surcharging. The discharge of any sewage from the sewer system to other than a downstream or adjacent sanitary sewer system is prohibited.

D. REMOVAL OF WATER IN SAGS

When the sewer has a sag where the TV camera goes under water the Contractor shall use jet or other equipment to remove the water in the sag(s) just prior to televising. The beginning, end and depth of the sag and standing water shall be noted on the TV report.

1.09 TELEVISED INSPECTION OF SEWER MAINS

A. GENERAL

After cleaning, the manhole sections shall be inspected by means of closed-circuit color television. The inspection will be done one manhole section at a time under a condition

of flow control.

B. EQUIPMENT

Pipe Inspection Camera – Produce a DVD using a pan-and-tilt, radial viewing, pipe inspection camera that pans ± 275 degrees and rotates 360 degrees. The television camera used for the inspection shall be specifically designed and constructed for such inspection. The camera shall be operative in 100% humidity conditions. Use a camera with an accurate footage counter that displays on the monitor the exact distance of the camera (to the nearest tenth of a foot) from the centerline of the starting manhole. Use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. A reflector in front of the camera may be required to enhance lighting in dark or large diameter pipe. The camera shall be capable of showing on the digital inspection the Owner's name, Project name, Contractor name, date, line size and material, line identification (Owner's manhole numbers at both ends) and ongoing footage counter. The camera, television monitor, and other components of the system shall be capable of producing picture quality to the satisfaction of the Owner; and if unsatisfactory, equipment shall be removed and replaced with adequate equipment. No payment will be made for an unsatisfactory inspection.

C. TELEVISED RECORDINGS

The purpose of televised recordings shall be to supply a visual and audio record, of problem areas of the lines that may be replayed. Televised recordings shall include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected (i.e., location, depth, diameter, pipe material), as well as describing connections, defects and unusual conditions observed during the inspection. Televised recording playback shall be at the same speed that it was recorded. Slow motion or stop-motion playback features may be supplied at the option of the Contractor. Once inspected, the CDs/DVDs shall be labeled and become the property of the Owner. The Contractor shall have all necessary playback equipment readily accessible for review by the Owner during the project.

D. TELEVISED INSPECTION REPORTS

Each DVD must be accompanied by a written inspection report approved by the Engineer. This report shall identify televised inspection date, time, project number, company, operator, tape number, location, notes, upstream manhole number, downstream manhole number, pipe type, pipe diameter, gauge dimensions, flow and camera direction and any other information required by the Engineer. The report shall contain a listing of all pipe events, defects, sags, service connection locations including quadrant location, infiltration points and conditions, etc., observed on a footage basis.
Each pipe event shall include a rating according to the Pipeline Assessment Certification Program (PACP) schedule - defect classification table for the following: cracks, breaks, collapsed sections, misaligned joints, broken joints, sags, debris, root intrusion, and infiltration. The severity of the defect should also be reported. The beginning of all sags of 1/4 pipe, 1/2 pipe and underwater as well as where the camera pulls out of sag should

be reported. For each service connection, the quadrant position, its condition and type must be recorded. All other information required for analysis such as degree of deterioration and deformed or collapsed pipe should be reported. All pipe event codes and locations entered on the inspection report must correspond to the event codes, pipe footage and counter displayed on the DVD. All televising shall be in color.

E. OPERATION

The camera shall be moved through the line in either direction at a moderate rate, allowing complete visibility of the pipe condition at all times. The camera shall be stopped when necessary to permit proper documentation of the sewer's condition. In no case will the camera be pulled at a speed greater than 30 feet per minute. Power winches that do not obstruct the camera view or interfere with proper documentation of the sewer conditions may be used to move the camera through the sewer line. If, during the inspection operation, the camera will not pass through the entire section of sewer due to an obstruction (i.e. offset, break, protruding lateral), the Contractor shall set up his/her equipment so that the inspection can be performed from the opposite manhole, a reverse set-up.

The importance of accurate distance measurements is emphasized. Measurements recorded on the DVD should start at the beginning of the pipe in the manhole and shall not include the depth of the manhole. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. The accuracy shall be to two tenths (0.2) of a foot.

F. LOCATION OF OBSTRUCTIONS

The Contractor shall locate on the ground any obstruction which necessitates a reverse set up as the City can hire a contractor to repair it. The obstruction shall be located on the ground surface by means of a radio wave transmitter and receiver and marked with green paint and/or a stake. Do not paint patios, walls or private property improvements

1.10 TELEVISING OF LATERALS

Where required the contractor shall televise laterals after cleaning using a suitable lateral camera. For each lateral televised, a written log shall be prepared together with a color DVD labeled as to date, and address or location. The written log and DVD shall use PACP format.

1.11 FINAL ACCEPTANCE

Acceptance of sewer line cleaning and televising shall be made upon delivery, evaluation and approval of the work products required by these specifications and as measured by the footage successfully televised, verified and approved by the Engineer.

1.12 PAYMENT

The cost for all labor, equipment and materials for sewer cleaning and televised inspection shall be included in the various bid items for pipeline construction and no

additional compensation will be allowed.

END OF SECTION

SECTION 03330

ANTIMICROBIAL CRYSTALLINE WATERPROOFING CONCRETE ADDITIVE

1.01 SUMMARY

A. Section Includes: Furnishing of all labor, materials, services and equipment necessary for the supply and installation of antimicrobial crystalline additive to concrete as indicated on the drawings and as specified herein.

B. Related Sections:

1. Section 02605 – Manholes
2. Section 03340 – Rehabilitation of Sewer Structures

1.02 REFERENCES

A. Applicable Standards: The following standards are referenced herein.

1. American Society for Testing and Materials (ASTM)
2. Army Corps of Engineers (CRD)
3. American Concrete Institute (ACI)
4. International Organization for Standardization (ISO)
5. European Standards (EN)

1.03 SYSTEM DESCRIPTION

Antimicrobial Crystalline Waterproofing Additive: Concrete protection and waterproofing system shall be of the antimicrobial crystalline type that chemically controls and permanently fixes both a non-soluble crystalline structure within the pores and capillary tracts of the concrete as well as bio-active mineral solids into the concrete matrix. This dual system additive causes the concrete to become sealed against the penetration of liquids from any direction, and protects the concrete from deterioration due to harsh environmental conditions. The product shall be an EPA registered integral concrete admixture for the prevention of microbial induced corrosion (MIC) typically found in concrete tanks, pipes, manholes, and other structures/elements in sewage and drainage systems.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. Testing Requirements: Antimicrobial crystalline waterproofing system shall have been tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.

B. Independent Laboratory: Testing shall have been performed by an accredited independent laboratory meeting the requirements of ASTM E 329 or other applicable international standard for certification of testing laboratories.

C. Indicator: The Admixture shall include an indicator that visually identifies concrete that includes Xypex Bio-San C500.

D. Antimicrobial Effect: Independent testing shall be performed according to ISO 22196 (Mod.) "Measurement of Antibacterial Activity on Plastics and other Non-Porous Surfaces". Treated and non-treated control concrete samples shall be tested and a definite anti-microbial effect shall be evidenced by a significant reduction in formation of Thiobacillus Novellus / Starkeya Novella bacteria on the treated samples versus the non-treated samples.

E. Concrete Corrosion Rate: Treated and non-treated control concrete samples shall be tested in a live wastewater environment with high concentrations of H_2S. Treated samples shall show at least 9 times less mass loss after 10 years as compared to control samples.

F. Long-term Antimicrobial Action and Efficacy: The antimicrobial admixture must show long-term antimicrobial action and efficacy as demonstrated by minimal bacterial concentration on the treated concrete after 10 years exposure to an elevated H_2S live wastewater environment.

G. Crystalline Formation: Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix.

H. Permeability 1: Independent testing shall be performed according to a U.S. Army Corps of Engineers CRD-C48 (Mod.) "Permeability of Concrete". Concrete samples shall be pressure tested to 150 psi (350 foot head of water) or 1.05 MPa (106 m head of water). After 5 days the untreated samples shall leak and the treated samples shall exhibit no measurable leakage.

I. Permeability 2: Independent testing shall be performed according to EN 12390-8. Treated samples shall be exposed to water with a pressure of 0.5 MPa for 72 hours. Treated samples must exhibit a reduction in permeability coefficient of at least 80% when compared to control concrete. Control samples must have a depth of penetration of at least 50 mm.

J. Sulfuric Acid Resistance: Independent testing shall be performed to determine "Sulfuric Acid Resistance of Concrete Specimens". Treated concrete samples dosed at 3% shall be tested against untreated control samples. All samples shall be immersed in 7% sulfuric acid and weighed daily until a control sample reaches a mass loss of 50%. On final weighing the percentage mass loss of the treated samples shall be significantly lower than the control samples.

K. Sulfate Resistance: Independent testing shall be performed to determine "Sulfate Resistance of Concrete Specimens" treated with integral crystalline admixture. Treated and untreated samples shall be immersed in a concentrated sulfate

solution for at least 4 months. On final weighing the percentage mass loss of the treated samples shall be significantly lower than the control samples.

L. Compressive Strength: Concrete samples containing the additive shall be tested against an untreated control sample of the same mix. At 28 days, the treated samples shall exhibit equal or increased compressive strength over the control sample.

1.05 SUBMITTALS

A. General: Submit listed submittals in accordance with conditions of the Contract.

B. Product Data: Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for concrete protection and waterproofing applications.

C. Test Reports: Submit, for acceptance, complete test reports from approved independent testing facilities certifying that antimicrobial crystalline waterproofing system conforms to performance characteristics and testing requirements specified herein.

D. Manufacturer's Certification: Provide document signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply with the requirements of this specification.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer to be ISO 9001 registered, and to have no less than 10 years experience in manufacturing crystalline waterproofing additives. Manufacturer must be capable of providing field service representation during construction phase. Manufacturers who cannot provide ongoing field support or who cannot provide the performance test data specified herein will not be considered for the project.

B. Installer: Ready-mix supplier and/or installer of antimicrobial crystalline waterproofing additive shall be approved by the manufacturer or manufacturer's representative in writing.

C. Pre-Installation Conference: Prior to installation of antimicrobial waterproofing system, conduct meeting with Architect/Engineer, owner's representative, concrete supplier, concrete placer and antimicrobial waterproofing manufacturer's representative to verify and review the following:

1. Project requirements for antimicrobial protection and waterproofing as set out in Contract Documents.
2. Manufacturer's product data including mixing and installation instructions.

D. Technical Consultation: The manufacturer's representative shall provide technical consultation on antimicrobial protection and waterproofing applications and shall provide on-site support as needed.

1.07 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver packaged waterproofing materials to project site in original undamaged containers, with manufacturer's labels and seals intact.

C. Storage: Store waterproofing materials in dry, enclosed location, at a minimum temperature of 45 °F (7 °C).

1.08 WARRANTY

A. Project Warranty: Refer to conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Manufacturer shall provide standard product warranty executed by authorized company official.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturer:

Xypex Chemical Corporation
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9
Tel: 800 961.4477 or 604 273.5265 Fax: 604 270.0451
E-mail: info@xypex.com Website: www.xypex.com

Note: Acceptable manufacturers include all licensed manufacturing operations of Xypex Chemical Corporation.

B. Proprietary Products: Xypex antimicrobial crystalline waterproofing materials as follows:

1. Xypex Bio-San C500

C. Substitutions: No substitutions permitted.

D. Submission of Alternate or Equal Products

1. All requests for considerations of substitutions or equal products must be made at the time of bidding. No requests for consideration of alternates or equals will be considered after the close of the tendering period.
2. All costs associated with evaluation of any requested substitutions or equals will be paid by the bidder making the request. Costs will be paid before close of tender for the bid to be considered.

E. Source Quality: Obtain all proprietary antimicrobial crystalline waterproofing products from a single manufacturer.

2.02 DOSAGE

A. General: Xypex Bio-San C500 must be added to concrete mix at time of batching.

B. Dosage Rate: Under normal conditions, the antimicrobial crystalline powder shall be added to the concrete mix at the following rates:

1. Xypex Bio-San C500 1% by weight of cementitious materials content

PART 3 – EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data regarding installation, including technical bulletins, product catalogue, installation instructions and product packaging labels.

3.02 PROJECT CONDITIONS

A. Crack Control: All reinforcement shall be in accordance with applicable standards. Concrete elements shall be designed and constructed to minimize and control cracking.

B. Setting Time and Strength: Xypex Bio-San C500 is set neutral. Some delay of set may occur when using Xypex Bio-San C500 products depending upon the concrete mix design, dosage rate of the Bio-San C500, other admixtures, temperature of the concrete and climatic conditions. Concrete containing Xypex Bio-San C500 may develop higher ultimate strengths than plain concrete. Conduct trial mixes under project conditions to determine setting time and strength of the concrete. Consult with manufacturer or manufacturer's representative regarding concrete mix design, project conditions and proper dosage rate.

C. Weather Conditions: For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices such as those referred to in ACI 305R (Hot Weather Concreting) and ACI 306R (Cold Weather Concreting) or other applicable standards.

3.03 APPLICATION

A. General: Xypex Bio-San C500 is added to the concrete at the time of batching. It is important to obtain a homogeneous mixture of Xypex Bio-San C500 with the concrete. Do not add dry Bio-San C500 powder directly to wet mixed concrete as this could cause clumping and thorough dispersion may not occur.

B. Concrete Batching & Mixing: Procedures for addition of Xypex Bio-San C500 will vary according to type of batch plant operation and equipment.

1. Addition to Coarse Aggregate Belt: Add Xypex Bio-San C500 powder directly to the course aggregate conveyor belt manually or through computer controlled mass batching system. Account for worker health and safety issues relating to moving belts and wind-blown dust.
2. Addition to Ready Mixed Truck at Plant: Add Xypex Bio-San C500 in bulk powder or soluble bag form to the drum of the ready-mix truck immediately prior to driving the truck under the batch plant. Then add the balance of the materials or the premixed concrete in accordance with standard concrete batching practices. Take measures to ensure that soluble bags are dispersed properly. Such measures can include: a) adding the bags as far forward in the drum as possible, b) adding a small amount of batch water along with the bags, and c) spinning the drum prior to adding remaining components. Avoid delays in adding other components and utilize high speed mixing to ensure homogeneity of mix. Where there may be insufficient water for thorough dispersion of the bulk powder, mix the Bio-San C500 powder with water to form a slurry and add to the truck mixer drum prior to batching. Account for added water in the mix design and slump.
3. Addition to Central Mixer: Load the Xypex Bio-San C500 in bulk powder form or in soluble bags along with the other components. Mix in accordance with standard batching practices to ensure thorough dispersion and a homogeneous mixture. Account for worker safety issues when accessing the equipment.
4. Precast Batch Plant - Pan Type Mixer: Add Xypex Bio-San C500 to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass shall be blended using standard practices.

Note 1: While it is preferable to install the Xypex Admix at the batch plant; when necessary, a slurry mixture containing the Admix can be added on site to the ready mix truck. To create a slurry, mix 5 parts Admix powder to 3 parts water by volume (i.e. a water to powder ratio of 0.67 by mass). Following addition to the drum, mix concrete for a minimum of 5 minutes on high speed or until thoroughly dispersed. Account for added water in the mix design and slump.

Note 2: Consult with local Xypex Technical Services Representative concerning additional procedures for addition and mixing.

C. Construction and Cold Joints: In addition to specified waterstops apply one coat of Xypex Concentrate slurry at a rate of 2 lb./sq. yd. (1 kg/m^2) to joint surfaces

between concrete pours. Moisten surfaces prior to slurry application. Apply slurry and keep moist for 12 hours then allow slurry to set or dry. Where joint surfaces are not accessible prior to pouring new concrete, contact Xypex Technical Services Representative for assistance.

Note: Inclusion, type and position of waterstops are at the discretion of the designer. Expanding waterstops may be placed on Xypex after it has dried or before Xypex slurry application. Xypex slurry may only be applied over waterstop if approved by waterstop manufacturer.

D. Sealing Strips: Where hydrostatic conditions exist, sealing strips shall also be applied at construction joints by filling grooves that are created along the joints. Dimensions of the grooves shall be 1 inch (25 mm) wide and 1.5 inches (37 mm) deep. If grooves have not been pre-formed then chip grooves to those dimensions. Fill the groves as follows:

1. Apply slurry coat of Xypex Concentrate to slot in accordance with manufacturer's instructions or recommendations.
2. While slurry coat is still tacky, fill slot with Xypex Concentrate Dry-Pac.
3. Compact tightly using pneumatic packer or hammer and block so that the compacted material fills half the depth of the slot.
4. Fill the remainder of the slot with Xypex Megamix II with Bio-San.

E. Form Tie Holes: Form tie holes shall be waterproofed as follows:

1. Prepare the tie hole to create a straight sided void with a profile of at least ICRI CSP-3. For through-element tie holes such as those created by taper ties the prepared void is to be at least 5" (125 mm) deep. For cone ties the void is to be to the bottom of the cone.
2. For through-element tie holes create a solid plug of material at the bottom of the profiled hole using Xypex Patch'n Plug leaving at least 4" (100 mm) of empty tie hole from the top of the plug to the surface of the concrete element.
3. Apply a coat of Xypex Concentrate slurry at a rate of 1.5 lb./sq. yd. (0.8 kg/m^2) to the inside of the tie hole. .
4. Fill and compact the tie hole with Xypex Concentrate Dry-Pac so that the level of the compacted material is approximately ¾" (20mm) below the surface of the concrete .
5. Fill the remainder of the hole with Xypex Megamix II with Bio-San.

F. Repair of Defects: Concrete defects shall be repaired generally as follows:

1. Cracks and Faulty Construction Joints:
   a. Chip out cracks, faulty construction joints and other defects to a depth of 1.5 inches (37 mm) and a width of one inch (25 mm). A "V" shaped slot is not acceptable. The slot may be saw cut instead of chipped but ensure that the slot is dovetailed or otherwise shaped such that there will be mechanical interlock of materials placed into the slot at a later stage.

b. Clean slot of debris and dust. Soak area with water and remove excess surface water. Apply a slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m^2) to the slot.
c. While slurry coat is still tacky, fill cavity with Dry-Pac. Compress tightly into cavity using pneumatic packer or block and hammer so the compacted material fills half the depth of the cavity
d. Fill the remainder of the slot with Xypex Megamix II with Bio-San.

2. Rock Pockets, Honeycombing or other defective concrete: All areas of poor concrete consolidation (honeycomb or rock pockets) shall be repaired. It is recommended that Xypex Megamix II with BioSan or Ready Mixed concrete dosed with Xypex BioSan C500 be used for infill concrete.

Note: Where there is active water-flow contact Xypex Technical Services Representative for assistance.

3.04 PLACING

A. Concrete Placement: Concrete placement shall be in accordance with "309R: Guide for Consolidation of Concrete" or other applicable standard. Special attention is to be given to consolidation at joints, penetrations and other potential leakage locations.

3.05 CURING

A. General: Concrete containing Xypex Bio-San C500 shall be moist cured in accordance with ACI 308, "Standard Practice for Curing Concrete" or other applicable standard.

B. Curing Compounds: Curing compounds may be used in the event that project requirements or conditions prevent moist curing. Curing compounds shall comply with ASTM C-309 or other applicable standard.

3.06 PROTECTION

A. Protection: Protect installed product and finished surfaces from damage during construction.

3.07 FIELD QUALITY CONTROL

A. Examination for Defects: Do not conceal Xypex treated concrete before it has been observed by Architect/Engineer, manufacturer's representative or other designated entities. Concrete shall be examined for structural defects such as honeycombing, rock pockets, tie holes, faulty construction joints, cold joints and cracks larger than 1/64" (0.4 mm). Such defects to be repaired in accordance with manufacturer's repair procedures as noted above.
B. Testing for Tanks

Testing: Fill tanks as soon as practical so that the structure shall be exposed to its normal service conditions. Examine for leaks.

1. Monitoring:
   a. Actively leaking cracks and joints shall be left to self-heal for as long as practical. Depending on job site and ambient conditions crack healing can be expected to take several days to weeks.
   b. Any crack or joints that do not heal in the allowable time frame shall be repaired.
   c. Moving cracks shall be repaired using polyurethane injection or other appropriate method.
2. Repair: Use Xypex repair procedures to seal any static crack or joint that does not self-heal. See Method Statements (www.xypex.com/technical/statements) or contact Xypex Technical Services Representative for appropriate repair procedures.

   Note: Lower temperatures will extend the times for crystalline development.

3.08 INTERACTION WITH OTHER MATERIALS

A. Backfilling: Normal backfilling procedures may be used after concrete has been cured.

B. Paint, Epoxy, Grout, Cement Parge Coat, Plaster or Stucco: Xypex Bio-San C500 treatment of concrete does not adversely affect the bond of subsequently applied materials. Follow surface preparation and other relevant directions of the coating or parge material manufacturer.

END OF SECTION

SECTION 03340

REHABILATION OF SEWER STRUCTURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Furnishing of all labor, materials, services and equipment necessary for the supply and installation of an antimicrobial crystalline waterproofing and chemical resistant repair mortar to patch or resurface deteriorated concrete and/or brick substrates, including vertical or overhead surfaces, in sewer manholes and other structures as indicated on drawing and as specified herein.

B. Related Documents: Drawings, Conditions of Contract, General Requirements and Supplementary Conditions that apply to this Section.

C. Related Sections:

1. Section 02605 – Manholes
2. Section 03330 – Antimicrobial Crystalline Waterproofing Concrete Additive

1.02 REFERENCES

A. Applicable Standards: The following standards are referenced herein.

1. ASTM C 109 - Test Method for Compressive Strength of Hydraulic Cement Mortars.
2. ASTM C 78 - Flexural Strength.
3. ASTM C 496 - Splitting Tensile Strength.
4. ACI 503 R Appendix A – Direct Tensile Bond Strength to Concrete
5. EN 13421 – Elastic Modulus
6. ASTM 672 – Scaling Resistance
7. ASTM C 1202 - Rapid Chloride Permeability.
8. EN 13290 – Carbonation Depth
9. ASTM C1012 – Sulfate Resistance
10. ASTM C267 – Acid Resistance
11. National Sanitation Foundation NSF 61.
12. ASTM C 266 - Setting Time.

1.03 SYSTEM DESCRIPTION

A. Resurfacing Repair Mortar: A one component, cementitious mortar that can be sprayed or trowel-applied at a thickness of 3/8 "(10 mm) to 2" (50 mm) per layer for patching and resurfacing of deteriorated concrete. The proprietary blend of components produces a high performance repair mortar that is enhanced by the inclusion of unique antimicrobial bioactive mineral solids and "Crystalline Waterproofing and Protection Technology".

B. Crack Repair Materials: Blend of Portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline

formation of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction.

1.04 YSTEM PERFORMANCE REQUIREMENTS

A. Testing Requirements:

1. Repair mortar shall have been tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance as specified herein.

1. Compressive Strength (ASTM C 109)	24 hrs	2600 psi	(18 MPa)
	3 days	4600 psi	(32 MPa)
	7 days	6100 psi	(42 MPa)
	28 days	7700 psi	(53 MPa)
2. Flexural Strength (ASTM C 78)	28 days	1190 psi	(8.2 MPa)
3. Splitting Tensile Strength (ASTM C 496)	28 days	603 psi	(4.2 MPa)
4. Direct Tensile Bond Strength to Concrete ASTM C 1583	90 days	330 psi	(2.3 MPa)
5. Elastic Modulus (EN 13412)	28 days	290,000 psi	20.4 GPa
6. Scaling Resistance (ASTM 672)	50 scaling		No scaling
7. Rapid Chlorine Permeability (ASTM C 1202)	28 days	= or <	572 coulombs
	90 days	= or <	420 coulombs
8. Carbonation Depth (EN 13290)	49 days @ 1% CO2	No measurable carbonation depth in 56 day sample	
9. Sulfate Resistance (ASTM C 1012)	6 mo expansion 12 mo expansion	0.027% 0.029%	
10. Acid Resistance (ASTM C 267)	Mass Loss (84 days)	Negligible.(retained 99.8% mass)	
11. Setting Time (ASTM C 266)	Initial (hrs:min)	3:25	
	Final (hrs:min)	5:00	

Results may differ based on statistical variability and site conditions. Recommended minimum specified strength for field conditions are: Compressive Strength: > 6,500 psi (45 MPa) and Bond Strength: > 130 psi (0.9 MPa).

2. Leaking crack repair materials shall have been tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance as specified herein.

1. Compressive Strength (ASTM C 109)	24 hrs	1740 psi	(12 MPa)
	28 days	3630 psi	(25 MPa)
2. Setting Time (ASTM C 266)	Initial (min:sec)	1:30 – 4:00	
	Final (min:sec)	4:30 – 9:00	

3. "Antimicrobial Technology" in repair mortar shall have been tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance as specified herein.

   i. Antimicrobial Effect: Independent testing shall be performed according to ISO 22196 (Mod.) "Measurement of Antibacterial Activity on Plastics and other Non-Porous Surfaces". Treated and non-treated control concrete samples shall be tested and a definite anti-microbial effect shall be evidenced by a significant reduction in formation of Thiobacillus Novellus / Starkeya Novella bacteria on the treated samples versus the non-treated samples.

   ii. Concrete Corrosion Rate: Treated and non-treated control concrete samples shall be tested in an elevated H2S live wastewater environment. Treated samples shall show at least 9 times less mass loss after 10 years as compared to control samples.

   iii. Long-term Antimicrobial Action and Efficacy: The antimicrobial admixture must show long-term antimicrobial action and efficacy as demonstrated by minimal bacterial concentration on the treated concrete after 10 years exposure to an elevated H2S live wastewater environment.

4. "Crystalline Waterproofing and Protection Technology" in Repair Mortar and Dry crack repair materials shall have been tested as a coating on concrete in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance as specified herein.

   i. Crystalline Penetration: Crystallizing capability of waterproofing material shall be evidenced by independent SEM (Scanning Electron Microscope) photographs documenting penetration of crystal-forming waterproofing material to a depth of 2 inches (50 mm) at 21 days. Independent SEM testing at 1000 times magnification documenting evidence of crystal growth at 30 cm from the surface having had the coating applied when tested at 1 year after application shall be provided.

   ii. Permeability: Independent testing shall be performed according to U.S. Army Corps of Engineers CRD C48 "Permeability of Concrete". Concrete samples shall have design strength of 2000 psi (14 MPa) and thickness of 2 inches (50 mm). Treated samples shall have 2 coats of crystalline waterproofing applied per manufacturer's directions. Samples to be pressure tested to 175 psi (405 foot head of water) or 1.2 MPa (123.4 m head of water). Control samples shall leak and treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage.

   iii. Permeability - Negative Side Application: Independent testing shall be performed according to EN 12390 – 8 or other recognized direct pressure test. Concrete

samples shall have a design strength of 25 MPa (3600 psi). Treated samples shall have 1 heavy coat of crystalline waterproofing applied per manufacturer's directions and be cured for 28 days. Treated samples shall be exposed to water pressure on the side opposite to the crystalline coating. Coated samples shall exhibit a greater than 90% reduction in depth of water penetration as compared to the control samples.

iv. Chemical Resistance: Independent testing shall be performed according to ASTM C 267 "Chemical Resistance of Mortars" and ASTM C 39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples (treated and untreated) shall have design strength of 4000 psi (27.6 MPa). Treated samples shall have 2 coats of crystalline waterproofing applied per manufacturer's directions. Untreated and treated specimens to be immersed for a minimum of 84 days in following chemical solutions: hydrochloric acid (3.5 pH), brake fluid, transformer oil, ethylene glycol, toluene, caustic soda. Treated specimens shall exhibit no detrimental effects after exposure, and shall have a minimum of 14% increase in compressive strength versus untreated control specimens.

v. Permeability Against Petroleum Products: Independent testing shall be performed according to a modified EN 12390 – 8 or other recognized direct pressure test. Concrete samples to have design strength of 4000 – 4500 psi (25 MPa – 30 MPa) Permeability of Gasoline, Diesel and Transformer Oil shall be compared for treated samples versus control samples. Samples treated with 2 coats of Crystalline Waterproofing shall exhibit an over 90% reduction in depth of penetration for all three petrochemicals tests.

vi. Air Permeability Testing: Concrete samples 30 mm long shall be treated with 2 coats crystalline material, cured for 2 days and allowed to dry for 18 days. Air shall be forced through the control and treated samples at 100 KPa and the treated samples shall show a 50% reduction in air passage.

vii. Independent Laboratory: Testing shall be performed by a qualified independent testing laboratory.

1.05 SUBMITTALS

A. General: Submit listed submittals in accordance with conditions of the Contract and with Division I Submittal Procedures Sections.

B. Product Data: Submit product data, including Manufacturer's specifications, installation instructions, and general recommendations for repair of concrete surface. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.

C. Test Reports: Submit for acceptance, complete test reports from approved independent testing laboratories certifying that repair system conforms to performance characteristics and testing requirements specified herein.

D. Manufacturer's Certification: Provide certificates signed by manufacturer or manufacturer's representative certifying that materials to be installed comply in all respects with the requirements of this specification, and that the installer is qualified and approved to install the materials in accordance with the manufacturer's product data.

E. Manufacturer's Field Report: Provide copy of report from manufacturer's representative confirming that the surfaces to which the repair mortar is to be applied are in a condition suitable to receive same.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be ISO 9001:2000 registered, and have no less than 10 years experience in manufacturing cementitious repair materials. Manufacturers that cannot provide test data specified herein will not be considered for the project. Manufacturer must also be able to provide on-site technical representation to advise on installation.

B. Applicator's Qualifications: Applicator shall be experienced in work of the type specified in this section, and shall be approved in writing by the manufacturer.

C. Pre-Installation Meeting: Prior to installation of repair mortar, conduct meeting with the applicator; and owner's representative to verify and review the following:

1. Project Requirements for repair procedures as set out in the Contact Documents.
2. Manufacturer's product data including application instructions.
3. Substrate conditions and procedures for substrate preparation and repair mortar installation.

D. Technical Consultation: The manufacturer's representative shall provide technical consultation on repair mortar application.

1.07 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver packaged repair mortar material to project site in original, undamaged containers with manufacturer's labels and seals intact.

1.08 PROJECT CONDITIONS

A. Compliance: Comply with manufacturer's product data regarding condition of substrate to receive repair mortar, weather conditions before and during installation, and protection of the installed repair mortar.

1.09 WARRANTY

A. Manufacturer's Material Warranty: Manufacturer shall provide standard material product warranty executed by authorized company official. Term of warranty shall be 1 year from Date of Substantial Completion.

B. Applicator's Warranty: Applicator shall warrant the installation against defects caused by faulty workmanship or materials for a period of 1 year from Date of Substantial Completion. The warranty will cover the surfaces treated and will bind the applicator to repair, at his

expense, any defects due to the integrity or bond of the repair mortar, which are not due to other causes beyond the applicator's control such as fire, earthquake, tornado, and hurricane. Applicator's liability shall be limited to repair, replacement or correction of defective workmanship or material. Applicator shall not be liable for defects caused by structural failure or movement of the structure, or any other causes beyond applicator's control.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturer:

Xypex Chemical Corporation
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9
Tel: 800-961-4477 or 604-273-5265 Fax: 604-270-0451
Website: www.xypex.com E-mail: info@xypex.com

B. Proprietary Products:

1. Repair and Reprofiling Mortar - Xypex Megamix II with Bio-San
2. Dry Crack Repair Materials - Xypex Concentrate
3. Actively Leaking Crack Repair Materials - Xypex Patch'n' Plug

C. Substitutions: No substitutions permitted.

D. Source Quality: Obtain proprietary repair mortar containing antimicrobial crystalline technology from a single manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Site Visit: Prior to repair mortar installation, arrange visit to project site with Manufacturer's Representative. Representative shall inspect and certify that the concrete surfaces are in acceptable condition to receive repair mortar application.

B. Examination of Defects: Examine surfaces to which the repair mortar is to be applied for any structural defects such as honeycombing, rock pockets, faulty construction joints and cracks. Such defects are to be repaired prior to the application of the repair mortar in accordance to Manufacturer's product data.

3.02 REPAIR OF DEFECTS

Mixing Procedure

A. General: Mix waterproofing material by volume with clean water which is free from salt and deleterious materials. Mix waterproofing material in quantities that can be applied within 20 to 30 minutes from time of mixing. As mixture thickens, stir frequently, but do not add

additional water. Do not mix bonding agents or admixtures with crystalline waterproofing materials.

B. Brush Application Mix: Measure dry Xypex Concentrate powder and place in mixing container. Measure water and mix into the dry powder with a paddle on a slow speed electric drill (250 RPM) or other type mixer which is acceptable to manufacturer. Mixing proportions shall be as follows:

Coverage	Proportions (by Volume)
lb./sq. yd. (0.8 kg/m2)	5 powder to 2 water
2.0 lb./sq. yd. (1.0 kg/m2)	3 powder to 1 water

C. Dry-Pac Mix: Using a trowel, mix 1 part clean water with 6 parts Xypex Concentrate waterproofing powder for 10 to 15 seconds. It is acceptable that lumps may be present in mixture. Mix only as much as can be applied in 15 minutes.

D. Leaking Crack Mortar: Using trowel mix 1 part clean water with 3.5 parts Patch'n' Plug by volume and mix to the consistency of a stiff putty. Do not mix more than can be used in 3 minutes. For best results, water temperature should be approximately 60°F – 70°F (15°C – 20°C).

Application Procedure

A. Clean laitance, curing compounds, excess form oil, dirt film, paint, coatings or other foreign matter harmful to the performance of waterproofing from surfaces of cured concrete to be treated. Prepared surface should extend to several inches to either side of defect.

B. Prepare cured surfaces if necessary to provide open capillary surface to provide tooth and suction for treatment; use acid etching, sandblasting, water blasting, or other methods.

C. Cracks, faulty construction joints, form tie holes, and other defects to sound concrete, and repair.

1. Chip defective areas into a U-shaped slot 1 inch (25 mm) wide and minimum 1.5 inch (37 mm) deep.
2. Clean slot, saturate with water and remove surface water.
3. Apply Xypex Concentrate slurry coat to slot at rate of 2 pounds per square yard.
4. Allow slurry coat to reach initial set.

If no active water flow:

5. Fill cavity with Xypex Concentrate dry pack (6 parts Xypex Concentrate to 1 part water by volume) to within ¼" of surface.
6. Compress tightly into cavity using pneumatic packer or hammer and blocks.
7. Fill slot to surface with Xypex Patch'n Plug

If actively flowing water

5. Fill bottom half of cavity with Patch'n'Plug to stop up water flow
6. Fill cavity with Xypex Concentrate dry pack repair compound to within ¼" of surface.
7. Compress tightly into cavity using pneumatic packer or hammer and blocks.
8. Fill slot to surface with Xypex Patch'n'Plug

3.03 RESURFACING, REPROFILING OF CONCRETE SURFACE

A. Equipment: Apply Megamix II with Bio-San using hand trowel or by specialized spray equipment, such as conventional shotcrete, mortar or plaster pump. Equipment shall be capable of low pressure spraying with sufficient velocity to compact and build required thickness of the repair mortar. Consult with Manufacturer's Representative for recommendations.

B. Mixing Procedures: Mix Megamix II with Bio-San powder with clean water using a mechanical mortar mixer with a capacity for low-speed continuous blending. For smaller quantities a paddle mixer can be substituted. Mix 0.9 US gallons (3.5 liters) of clean water per 55 lb. (25 kg) bag of Megamix II with Bio-San. Add approximately 90% of the required amount of water to mixer followed by the Megamix II with Bio-San powder. Mix briefly, and then add balance of required water. Mix for 3 to 5 minutes to achieve a uniform consistency.

C. Application Procedures: Saturate the repair area with clean water and allow the surface to come to a "saturated, surface-dry" condition. Maintain concrete substrate in this condition throughout application process.

1. Trowel Application - For improved bond, apply "scrub coat" of Megamix II with Bio-San onto prepared surface using a stiff bristle brush or gloved hand. While scrub coat is still wet, apply full coat of Megamix II with Bio-San.
   Spray Application – Spray apply full coat of Megamix II with Bio-San. Ensure that spray nozzle is close enough to ensure good penetration of mortar into substrate surface.
2. Thickness of the Megamix II with Bio-San shall be between 3/8 in. (10 m) and 2 in. (50 mm) depending jobsite conditions and requirements. For overhead applications a maximum thickness of 1.5" (37 mm) is recommended.
3. Roughen or "score" surface of Megamix coat before applying successive coats or layers and apply immediately following initial set of the previous coat or layer. Use of mechanical anchorage is at the discretion of the specifying engineer.
4. Finish the Megamix II with Bio-San application to desired surface texture using wood or rubber float or steel trowel.

Note: Prior to the installation, it is recommended that a test section be completed under anticipated ambient and project conditions to demonstrate acceptable bond.

3.04 CURING

A. Curing: Curing of Megamix II with Bio-San material shall commence immediately after application and final finishing. Cure by using either moisture or suitable curing compound.

B. Moist Curing: Spray moisture onto Megamix II with Bio-San repair from continuous source, or place wet burlap and polyethylene sheet over repair surface. Maintain curing for a minimum of three days.

C. Curing Compound: Curing compounds shall be ASTM C-309 compliant and shall be applied in a continuous film at a rate specified by curing compound manufacturer.

D. Containment Structures: For containment structures such as reservoirs, water treatment tanks and wet wells, moist cure the Megamix II with Bio-San coating for three days prior to filling structure with liquid

3.05 INTERFACE WITH OTHER MATERIALS

A. Backfilling: Backfilling can take place as soon as the Megamix II with Bio-San has gained enough strength that it will not be dislodged or otherwise adversely impacted by this activity. A minimum of 24 hours is recommended. If backfilling prior to the end of the 72 hour curing period ensure that the backfill is moist.

B. Paint, Epoxy, Stucco or Other Coatings: Ensure that Megamix II with Bio-San surface is sufficiently rough to accept paints or other coatings. Where necessary, use a suitable bonding agent to obtain proper adhesion to the Megamix II with Bio-San surface.

C. Responsibility to Ensure Compatibility: Xypex Chemical Corporation makes no representations or warranties regarding compatibility of the Megamix II with Bio-San treatment with other coatings, plasters, stuccos, tiles or other surface-applied materials that is applied over the Megamix II with Bio-San repair mortar.

END OF SECTION

SECTION 013300

CURED-IN-PLACE (CIPP) LINER
FOR PIPELINES
USING FELT TUBE

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE OF WORK

The contractor shall furnish all labor, equipment and materials for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube, which is tightly formed to the original conduit. The resin shall be cured using either hot water under hydrostatic pressure or steam pressure within the tube. The Cured-In-Place Pipe (CIPP) liner shall be continuous and tight fitting. The Contractor shall assume groundwater is present and is responsible to use the appropriate curing method to prevent bubbles or deformities of the liner. Any deformities are the responsibility of the Contractor and shall be corrected at no cost to the Owner. All lateral connections to the lined pipe shall be reinstated.

B. RELATED WORK SPECIFIED IN OTHER TECHNICAL SECTIONS

1. Section 02659: Cleaning and Video Inspection

C. REFERENCED DOCUMENTS

This specification references standards, from the American Society for Testing and Materials which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern, including the following:

ASTM F1216 – Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743 – Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

ASTM D790 – Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials

D2990 – Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

1.02 QUALITY ASSURANCE

A. GENERAL

Since pipeline products are intended to have a 50-year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long-term

track records will be approved. The trenchless rehabilitation products and installers shall provide documentation in the form provided in Section 00300 and will be checked for conformance with the requirements below prior to award.

B. CIPP PRODUCTS AND INSTALLERS

CIPP Products and Installers must meet all of the following criteria to be deemed Commercially Acceptable:

1. For a CIPP Product to be considered Commercially Proven, a minimum of five successful sewer/sewer collection system projects of a similar size and scope of work shall be performed in the U.S. and documented to the satisfaction of the Owner to assure commercial viability

2. For a CIPP Installer to be considered as Commercially Proven, the Installer must satisfy all insurance, financial, and bonding requirements of the Owner, and the Contractor's job superintendent who shall be assigned full time to the project, must have had at least 3 (three) years active experience in the commercial installation of CIPP lining using felt tubes. In addition, the Installer must have successfully installed at least 100,000 linear feet of a cured-in-place product in wastewater/sewer collection systems.

3. Pipeline rehabilitation products submitted for approval must provide third party test results supporting the structural performance (short-term and long-term) of the product and such data shall be satisfactory to the Owner. No product will be approved without independent third party testing verification.

4. The rehabilitation manufacturing processes shall operate under a quality management system which is third-party certified to ISO 9000 or other recognized organization standards. Proof of certification shall be required for approval.

5. The owner authorizes the use of proven materials that serve to enhance the pipe performance specified herein. Proven materials must have passed independent laboratory testing, not excluding long-term (10,000 hour) structural behavior testing, and have been successfully installed to repair failing host pipes in the U. S. for at least 4 years. In addition to the aforementioned, the Owner may require that the contractor demonstrate that the enhancements proposed exceed the specifications herein, prior to the installation of the enhanced material systems. This section in no way shall be interpreted as authorization to deviate from the minimum standard practices set forth herein.

1.03 SUBMITTALS

A. GENERAL

After the award of the Contract and before any sewer system rehabilitation materials are delivered to the job site, the contractor shall submit to the Engineer a detailed description of the method proposed to be used and a complete list of all material proposed to be furnished and installed.

1. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturers' recommendations

as to method of installation.

2. The actual methods of installation used in the work must be favorably reviewed by the Engineer.

3. The Contractor shall not permit any CIPP sewer lining component to be brought onto the job site until it has been favorably reviewed by the Engineer.

B. FIELD MEASUREMENTS

The inside diameter of the existing sewer pipe to the lined may vary from that shown on the plans and from section to section. The Contractor shall field measure the inside diameter of the existing sewer pipe at every manhole access to determine the exact diameter of CIPP liner.

C. VIDEO INSPECTION

The Contractor shall conduct a pre-rehabilitation video inspection of the sewer to receive the CIPP liner.

Verification of all CIPP sewer main diameter and pipe lengths and sewer lateral pipe lengths, diameters, and lateral connection shapes (WYE's or TEE's). The contractor shall submit all pre-installation reports to the owner prior to fabricating or delivering any material required for the project.

D. SHOP DRAWINGS

The contractor shall submit a summary of all the proposed CIPP materials required for the project including the specific items listed below. The Owner will review this list prior to the Contractor's order for purchase and delivery of CIPP materials. Any materials ordered prior to the Owner's authorization shall be solely at the risk of the Contractor.

Submit shop drawings of the following:

1. Lining materials to be installed

2. Resin to be utilized in producing the CIPP lining in accordance with the specifications

3. Design calculations for the CIPP thickness of the liner system

4. Procedures for preparing CIPP samples and testing of physical properties

E. INSTALLATION AND PROCEDURES PLAN

At least two (2) weeks prior to the conduct of the work the Contractor shall provide to the City an Installation and Procedures Plan which shall detail the exact equipment proposed to be used, the size of the equipment, the desired placement of the equipment, noise levels of the equipment, times of operation and duration of the placement of the equipment. The plan shall take into account available on-street parking and minimization of disruption and noise to residents, offices and churches.

When necessary to minimize disruptions the Contractor may request weekend work.

F. BYPASS PLAN

Submit a detailed bypass plan during CIPP installation if drainage flow is present.

G. SAFETY PLAN

Submit a detailed safety plan for the project.

H. STANDARDS COMPLIANCE

Submit manufacturer's certificates of conformance or compliance for each of the following materials, which are specified to conform to publications referenced under paragraph "Materials" in this Section for the selected rehabilitation process.

I. TESTS

The Contractor shall submit all tests required by the applicable referenced publications, which indicate that all materials conform to the applicable requirements. Submittals shall include the following information:

1. Chemical resistance submittals – The Contractor shall submit test results of the resin proposed that meet the chemical resistance requirements of the reference specifications.

2. CIPP Field Samples – Field sampling procedure shall be in accordance with the reference specifications.

3. Creep resets per paragraph 2.04.B.

4. MSDS Sheets – The Contractor shall submit Material Safety Data Sheets for all resins, and other additives such as accelerants, colorants, and lubricants utilized in the pipe liner/lining process.

5. Manufacturer Protocols - The Contractor shall submit manufacturer information that describes the materials, curing speeds, curing installation processes, installation pressures, temperature limitations, and recommended post curing documentation.

1.04 DELIVERY, STORAGE, AND HANDLING OF MATERIALS:

Inspect materials delivered to site for damage; store with minimum handling. Store materials on site in enclosures or under protective coverings. Store all materials liners, resins, etc. under cover out of direct sunlight. Do not store materials directly on the ground.

Handle rehabilitation materials and other accessories in such a manner as to ensure delivery to the liner pipe in sound undamaged condition. Use all means necessary to protect rehabilitation materials before, during, and after installation and to protect the installed work and materials of all other trades.

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer, at no additional cost to the City.

1.05 EXAMINATION OF SITE

The Contractor shall examine the site and shall compare it with the drawings and specifications and satisfy itself as to the conditions under which the work is to be performed. If, upon such examination, the Contractor encounters site differing condition, it shall notify the City immediately, in writing, with a proposed resolution or a request for clarification. No allowance shall be made subsequently in Contractor's behalf for any extra expense which he may incur due to failure or neglect on its part to make such examination.

1.06 SAFETY

The Contractor shall carry out all operations in strict accordance with OSHA and the manufacturer's safety requirements. Particular attention is drawn to those safety requirements involving working with scaffolding and entering confined spaces.

1.07 PUBLIC NOTIFICATION

The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting the Homeowner's Association and each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

1. Written notice to be delivered to all homes, businesses, schools and agencies the day prior to the beginning of work being conducted on the section and a local telephone number of the Contractor they can call to discuss the project or any problems which could arise.

2. Personal contact with any homes, business, school or agency which cannot be reconnected within the time stated in the written notice.

3. Location of the contractor's trucks and equipment

1.08 WARRANTY

The Contractor shall provide a one year warranty from the date of final acceptance against defect in material, workmanship and installation. The warranty shall cause the Contractor to repair or replace the liner at no cost to the Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

CIPP lining of gravity pipelines with a felt tube shall be accomplished with products specified herein. All products shall be new and supplied by the Contractor. The Contractor shall use CIPP liner to complete the rehabilitation work.

2.02 CURED IN PLACE PIPE LINER

A. Tube - The Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216, Section 5.1 or ASTM F1743, Section 5.2.1 or ASTM D 5813, Sections 5 and 6. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

B. Felt tubes shall be manufactured by Applied Felts, Mississippi Textiles Corporation or approved equal.

C. The wet out Tube shall have a relatively uniform thickness that when compressed at installation pressures will equal or exceed the calculated minimum design CIPP wall thickness.

D. The Tube shall be manufactured to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during installation.

E. The outside layer of the Tube shall be coated with an impermeable, flexible membrane that will contain the resin and allow the resin impregnation (wet out) procedure to be monitored.

F. The Tube shall contain no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

G. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

H. Seams in the Tube shall be stronger than the non-seamed felt material.

I. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 10 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

J. End Seals – The Contractor shall seal the pipe CIPP liner at each end where it enters the manhole or sewer structure with a compatible epoxy grout.

2.03 RESIN

A. Resin - The resin system shall be a corrosion resistant vinyl ester system including all required catalysts, initiators that when cured within the tube create a composite that satisfies the requirements of ASTM F1216, ASTM D5813 and ASTM F1743, the physical properties herein, and those which are to be utilized in the submitted and approved design of the CIPP for this project. The resin shall produce a CIPP that will comply with the structural and chemical resistance requirements of this specification.

B. The resin shall be shipped directly from the resin manufacturer's facility to the CIPP wet-out facility. The resin shall not be sent to any intermediate mixing facility.

C. The contractor shall submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility to include the date of manufacture.

2.04 CIPP STRUCTURAL REQUIREMENTS

A. The CIPP shall be designed as per ASTM F1216, Appendix XI. The CIPP design shall assume no bonding to the original pipe wall.

B. The Contractor's material supplier or material manufacturer must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing as defined within the relevant ASTM standard. A percentage of the instantaneous flexural modulus value (as measured by ASTM D790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Retention values exceeding 50% of the short-term test results shall not be applied unless substantiated by qualified third party test data to the Owner's satisfaction. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

C. The Enhancement Factor 'K=7' shall be used for a 'Fully Deteriorated' design condition.

D. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If the layers separate during field sample testing, new samples will be required to be obtained from the installed pipe. Any reoccurrence may cause rejection of the work.

E. The wall thickness design of cured pipe (CIPP) shall be per ASTM F1216 Appendix XI using the following design parameters:

1. All pipes shall be considered as fully deteriorated.

2. Pipe ovality at the circumference shall be 2%.

3. H-20 live load shall be included in the design.

4. Resin System E_1 = 250,000 psi (Vinyl ester Resin)

5. Safety factor shall be 2.0.

6. Flexural Strength = 4,500 psi

7. Soil Density = 125 lbs/cubic foot

8. Poisson's ratio = 0.3

9. Retention factor for Long-Term Flexural Modulus to be used in Design (as determined by Long Term tests described in Paragraph 5.2) = 50% maximum.

10. Soil/cover, feet = As shown on Plans

11. Groundwater depth is to be assumed at the ground surface.

12. Soil Modulus, psi = 500

F. The minimum wall thickness of the cured-in-place pipe (CIPP) shall be as follows:

8" diameter pipe – 6.0 mm
12" diameter pipe – 8.5 mm
15" diameter pipe – 10.0 mm
18" diameter pipe – 12.0 mm

Contractor shall provide wall thickness calculations per ASTM F1216 based on parameters listed and actual pipe depth. The more restrictive thickness in comparison to the list above and the calculation shall govern.

G. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

2.05 TESTING REQUIREMENTS

A. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical-testing requirements.

B. Hydraulic Capacity - Overall, the hydraulic cross-section shall be maintained as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.

C. CIPP Field Samples - When requested by the Owner, the Contractor shall submit test results from field installations of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 5.5 have been achieved in previous field applications. Samples for this project shall be made and tested as described in Section 3.05.

PART 3 EXECUTION

3.01 INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

A. The Owner will locate and designate all manhole, catch basin, or and drainage inlet access points open and accessible for the work, and provide rights-of-access to these locations. The Contractor is responsible for determining how the project is to be

accomplished considering the steepness of the topography and the limited street access to manholes.

B. The Contractor shall make arrangements with the East Bay Municipal Utility District for use of water hydrants for cleaning, installation and other process related work items requiring water and pay for all water used.

C. Cleaning of Pipelines - The Contractor shall remove all internal debris and cut all roots out of the pipeline that will interfere with the installation of CIPP (see Section 02659). The Contractor shall make all arrangements and pay for disposal of debris removal from the pipeline during the cleaning operation at a legal disposal site. Any hazardous waste material encountered during this project will be considered as a changed condition.

D. Bypassing Drainage Flow - The Contractor shall provide for the flow of drainage around the section or sections of pipe designated for repair. The drainage bypass shall consist of plugging the line at an existing upstream manhole and pumping the flow out into a truck or into a downstream catch basin or adjacent system. The pump(s) and bypass line(s) shall be of adequate capacity to accommodate the drainage flow.

E. Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections using close circuit television (CCTV) inspection techniques as specified in Section 02659. The pipeline interior shall be carefully inspected to determine the location of any conditions that may prevent proper installation of CIPP. These shall be noted and corrected. A videotape and suitable written log for each line section shall be produced for later reference by the Owner (see Section 02659).

F. Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, roots and protruding laterals that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the installation process and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

G. The Contractor shall be responsible for locating all branch service connections prior to installing the CIPP. The Contractor shall notify each resident not to use any plumbing fixtures over the course of the work. The Contractor shall insert a temporary plug in a clean out on the lateral to prevent water from entering the sewer main while the CIPP liner is being installed and cured.

3.02. INSTALLATION

A. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:

B. Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the potential loss of resin during installation through cracks and irregularities in the original pipe wall, as applicable.

C. Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method as defined within relevant ASTM standards previously stipulated. If pulled into place, a power winch or its equivalent should be utilized and care shall be exercised so as to prevent damage to the tube as a result of pull-in friction. The tube shall be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

D. Temperature gauges shall be placed between the tube and the host pipe's invert position to monitor the temperatures during the cure cycle.

E. Curing shall be accomplished by utilizing steam under pressure in accordance with the manufacturer's recommended cure schedule. A cool-down process shall be conducted that complies with the resin manufacturer's specification.

F. End Seals – The CIPP liner shall extend at least 6" into the upstream and downstream manhole to help lock the liner in place. Each end of the CIPP liner shall be sealed with Neopoxy NCR-5305 epoxy, or equal applied between the liner and host pipe to seal up any annular space.

3.03 COOL DOWN AND RESIN DISPOSAL

All water that has come in contact with uncured resin during the process (heating water and /or steam condensate) shall be removed from the sewer and filtered through activated carbon prior to discharge back into the sanitary sewer. The Contractor shall apply for and follow the constraints for a groundwater discharge permit (discharge from Cured-in-Place Installation) from the East Bay Municipal Utility District.

3.04 REINSTATEMENT OF BRANCH CONNECTIONS

A. The Contractor shall reinstate all branch connections (sewer laterals) to buildings. Branch connections shall be re-opened without excavation, utilizing a remotely controlled cutting device, monitored by a CCTV. The Contractor shall certify a minimum of two complete functional cutters plus key spare components are on the job site before each installation or are in the immediate area of the jobsite and can be quickly obtained. After a suitable cool down period the temporary plugs in the laterals shall be removed and all branch connecters shall be reinstated. Reinstatement of branch connecters is defined as establishment of a circular opening in the CIPP liner at the lateral connection that is the same diameter as the lateral, with no obstructions to flow from the lateral to the sewer main, as approved through visual inspection of televised information furnished by the Contractor and conducted by the Owner.

No additional payment will be made for excavations for the purpose of reopening connections and the contractor will be responsible for all costs and liability associated with such excavation and restoration work.

B. If the branch connection is to be out of service for more than 8 hours the Contractor shall provide temporary pumping.

3.05 POST REHABILITATION

A. The Contractor shall prepare CIPP samples for each installation designated by the owner/engineer or approximately 20% of the project's installations. Pipe physical properties shall be tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in the table on page 4 of this specification, Table 1 of ASTM F1216 or the values submitted to the Owner by the contractor for this project's CIPP wall design, whichever is greater.

B. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the submitted minimum design wall thickness required.

3.06 FINISHED PRODUCT REQUIREMENTS

A. The finished liner shall be continuous over entire length of insertion run between two sewer structures or access points and shall be free from defects such as foreign inclusions, dry spots, pinholes and delamination.

B. Wrinkles in finish liner pipe:

1. Wrinkles ½ inch or more above the spring line, wrinkles below the spring line, wrinkles that reduce the hydraulic capacity of the pipe, or that create a backwater of 1 inch or more are unacceptable and shall be removed and repaired by Contractor at Contractor's expense. Allowances will be made for those wrinkles that can be determined to be attributed to defects in the host pipe.

2. Remove section of pipe, if directed by Engineer, to determine if a void between wrinkle and pipe wall exists.

a. If void exists, Contractor shall repair and replace that section of pipe at Contractor's expense.

b. If void does not exist, Contractor shall repair and replace section of pipe at City's expense.

c. Methods of repair shall be submitted to the Engineer for review

3.07 PIPELINE CLEANING

After all completion of the CIPP liner installation the Contractor shall clean all CIPP lined sewers of dirt and debris as specified in Section 02659.

3.09 TELEVISION INSPECTION

After CIPP liner installation but before acceptance of the job, the Contractor shall arrange and pay for CCTV inspection of the CIPP lined pipelines and furnish the owner with DVD's and a written CCTV log as specified in Section 02659.

3.10 CLEAN-UP

Upon acceptance of the installation work and testing, the Contractor shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

END OF SECTION