

CITY OF BURLINGAME
PARKS & RECREATION DEPARTMENT

NOTICE TO BIDDERS

INSTRUCTION TO BIDDERS

PROPOSAL AND AGREEMENT

SPECIAL PROVISIONS

FOR

WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT NO. 85670

FOR USE IN CONNECTION WITH
STANDARD SPECIFICATIONS DATED 2010
AND STANDARD PLANS DATED 2010
OF THE CALIFORNIA DEPARTMENT OF TRANSPORTATION

MAYOR: DONNA COLSON, MAYOR

CITY COUNCIL: EMILY BEACH, VICE MAYOR
MICHAEL BROWNRIGG
ANN KEIGHRAN
RICARDO ORTIZ

CITY MANAGER: LISA GOLDMAN

CITY CLERK: MEAGHAN HASSEL-SHEARER

MARGARET GLOMSTAD
PARKS & RECREATION DIRECTOR

BIDS WILL BE OPENED AT 3:00 P.M. ON APRIL 23, 2019
IN CONFERENCE ROOM "B" OF THE BURLINGAME CITY HALL
TIME FOR COMPLETION: 120 WORKING DAYS

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City Standard details are available upon request or found on the City webpage at:
http://www.dot.ca.gov/hq/esc/oe/construction_standards.html



The City of Burlingame

PARKS DIVISION
(650) 558-7330

CITY HALL - 501 PRIMROSE ROAD
BURLINGAME, CALIFORNIA 94010-3997

RECREATION DIVISION
(650) 558-7300

NOTICE TO BIDDERS

For the **WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA, CITY PROJECT NO. 85670**, sealed proposals will be received at the office of the City Clerk, City Hall, 501 Primrose Road, Burlingame, California, until 3:00 P.M., on Tuesday, April 23, 2019. Sealed bids will be publicly opened and read at 3:00 P.M. on that date in City Hall Conference Room "B", in the City of Burlingame, San Mateo County, California.

Plans and Specifications covering the work may be obtained by prospective bidders upon application and a cash, check, or credit card non-refundable fee of \$45.00, or \$60.00 if contract documents are mailed (USPS only), at Burlingame Recreation Center, 850 Burlingame Avenue, Burlingame, CA 94010. Project documents (Read-Only) are available for viewing at <http://www.burlingame.org/washingtonplayground>.

Basic Project: Contractor shall provide all labor and materials required for project construction including but not limited to: construction preparation, temporary fencing and erosion control, demolition and clearing of areas within the project limits, grading and drainage, wet and dry utility work, tree protection and tree removal, pedestrian asphalt paving, pedestrian concrete, curbs, stabilized decomposed granite, bioretention areas, landscape, irrigation, site lighting, concrete seat walls, chain link and decorative fences, multi-use sports court, site furnishings installation, heritage tree installation, and other miscellaneous items. Existing bleachers/benches adjacent to the existing baseball field and picnic barbecue grills shall be salvaged and re-installed. Refer to Package 1: Washington Park Playground, Sports Court, and Picnic Area documents for detail on the full scope of work.

Procurement and/or Work by Others: The City will be responsible for procuring and the Contractor will be responsible for installing a number of site furnishings as described herein, including but not limited to: benches, picnic tables, trash and recycling bins, bicycle racks, and a heritage tree. The City will be procuring play equipment and playground synthetic surface separately and will arrange for another contractor to install them during the normal course and schedule of construction. Contractor shall be responsible for coordinating Basic Project scope of work with play equipment and playground surface work by others.

The Engineer's Estimate for this project is \$1,406,205.

Special Provisions, Specifications and Plans, including prevailing wage rates to be paid in compliance with Section 1773.2 of the California Labor Code and related provisions, may be inspected in the office of the City Engineer during normal working hours at City Hall, 501 Primrose Road, Burlingame, California, and are also available for review at the State of California Department of Industrial Relations' Web site.

A pre-bid meeting (non-mandatory) associated with this project will be held on **Tuesday, April 9, 2019, at 10:00 a.m.** in the Burlingame Recreation Center Ceramics Room, 850 Burlingame Avenue, Burlingame, California.

The Contractor shall possess a Class A license prior to submitting a bid.

No contractors and subcontractor may be listed on the bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.5(a)].

All contractors and subcontractors will be required to furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).

All work specified in this project, shall include the base bid and alternate bids (if shown in Proposal), and shall be completed within **120 of Working Days (WD) (one hundred twenty working days)** from date of the Notice to Proceed.

DATE OF POSTING: 03/29/19

Margaret Glomstad
Parks & Recreation Director

INSTRUCTIONS TO BIDDERS**WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670**

Proposals shall be submitted in accordance with the Special Provisions and these Instructions.

General Instructions

- A. Bids shall be made upon the form provided, properly executed and with all items completed. All signatures shall be in longhand.
- B. Bids shall not be unbalanced. Any apparent unbalancing of bids may be considered sufficient grounds for rejection of a proposal.
- C. A proposal shall cover all items of the bidding schedule. Blank spaces in the bid shall be properly filled in, and the wording thereof must not be changed. Additions shall not be made to the items mentioned therein. Any unauthorized conditions, limitations or provisions attached to a proposal may cause its rejection. Alterations by erasures or interlineation shall be explained or noted in the bid over the signature of the bidder.
- D. Late bids will be returned to the bidder unopened.
- E. Each bid shall be addressed to the City Clerk of the City of Burlingame, and shall be delivered to the office of the City Clerk of the City of Burlingame, 501 Primrose Road, Burlingame, California 94010, on or before the day and time set for the opening of bids. The bid shall be enclosed in a sealed envelope bearing the title of the project, the name of the bidder, and the date and time of the opening. It is the sole responsibility of the bidder to ensure that the bid is received in proper time at the office of the City Clerk.
- F. Cash deposits for Plans and Specifications will not be refunded.

Licensure

All bidders shall have the class of license(s) listed in the Notice Inviting Sealed Bids prior to submitting a bid.

Bidder's Bond

Each bid must be accompanied by cash, a certified or cashier's check, or a bidder's bond in the sum of not less than ten percent (10%) of the total aggregate of the bid, and such a check or bond shall be made payable to the City of Burlingame as set forth in Section 2 of the Special Provisions. If the successful bidder fails to file the bonds or to provide the insurance required by the Contract Documents, or refuses to enter into a contract within the specified time, it shall be liable for any difference by which the cost of procuring the work exceeds the amount of its bid and the bond or the amount of cash or check shall be available to offset such difference.

Examination of Plans, Specifications and Site Work

Before submitting a bid, each bidder shall carefully read the Specifications and all other Contract Documents. The bidder shall visit the site of the Project and shall fully inform itself as to all existing conditions and limitations under which the work is to be performed, and it shall include in its bid a sum to cover the cost of all items necessary to perform the work as set forth in the Contract Documents. No allowance of any kind whatsoever will be made to any bidder because of lack of such examination or knowledge. The submission of a bid shall be conclusive evidence that the bidder has made such an examination. *Bidders shall report any discrepancies in the field conditions or Contract Documents that they discover to the City before bids are opened.*

Competency of Bidder

Any bidder may be required to furnish evidence satisfactory to City that it and its proposed subcontractors have sufficient means and experience in the type of work called for to insure completion of the contract in a satisfactory manner.

Withdrawal of Bid

Any bidder may withdraw its bid, either personally or by a written request, at any time prior to the scheduled time for opening of bids.

Award or Rejection of Bids

The Contract, if awarded, will be awarded to the lowest responsible bidder subject to City's right to reject any or all bids and to waive informalities to the fullest extent provided by law in the bids.

Withdrawal of Bids after Opening

No bidder may withdraw its bid for a period of sixty (60) calendar days after the date set for the opening thereof, and the same shall be subject to acceptance by the City during this period.

Execution of Agreement

The successful bidder, as Contractor shall, within ten (10) calendar days after notice of award, execute and deliver to City one original and one counterpart of the Agreement, which is included in the Contract Documents.

Performance Bond, Labor and Materialpersons Bond, Deposit of Securities

At or prior to the delivery of the signed Agreement, Contractor shall deliver to the City a Faithful Performance Bond and a Contractor's Payment (Labor and Materials) Surety Bond, as are required by the Special Provisions. All bonds shall be in the general forms designated by City, and each shall be in an amount equal to one hundred percent (100%) of the contract price. All bonds shall be approved by the City Attorney before the successful bidder may proceed with the work. Failure or refusal to furnish bonds in the form satisfactory to the City Attorney shall subject the bidder to penalties for delay in commencement of the work or revocation of the award of contract.

Pursuant to Section 22300 of the California Public Contract Code, the Contractor will be permitted, at its request and sole expense, to substitute securities for any monies withheld by the City, as provided in the Special Provisions.

Insurance

At or prior to the delivery of the signed Contract Agreement, Contractor shall deliver to the City the policies of insurance and certificates and endorsements that are required by the Special Provisions. Failure or refusal to furnish insurance policies or certificates in the form satisfactory to the City Attorney shall subject the bidder to penalties for delay in commencement of the work or revocation of the Award of Contract. All policies,

endorsements, and certificates of insurance shall be approved by the City Attorney before the successful bidder may proceed with any work.

Interpretation of Drawings and Documents Prior to Bidding

If any potential bidder is in doubt as to the true meaning of any part of the Plans, Specifications, or other Contract Documents, or finds discrepancies in, or omissions from the Plans or Specifications, it may submit to the Parks & Recreation Director a written request for an interpretation or correction thereof not later than five working days before the date bids will be opened. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will be made only by addendum. Bidders shall confirm the existence of any and all addenda. The City will not be responsible for any other explanation or interpretation of the Contract Documents.

Addenda

Addenda issued during the time of bidding shall become a part of the documents furnished to bidders for the preparation of bids, shall be covered in the bids and shall be made a part of the Contract Documents. Each bid shall include specific acknowledgement in the space provided of receipt of all Addenda issued during the bidding period. Failure to do so may result in the bid being rejected and labeled as nonresponsive. Failure of any bidder to receive such Addenda shall not be grounds for non-compliance with the terms of the instructions. It is the responsibility of the Contractor to contact the City to determine the existence of any and all addenda.

Bidders Interested in More than One Bid

No person, firm or corporation shall be allowed to make or file or be interested in more than one bid for the same work, unless alternate bids are called for. A person, firm or corporation submitting a sub-proposal to a bidder, or who has quoted prices on materials to a bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other bidders.

Special Notice

Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be or is now performed, and, so far as possible, the successful bidder must employ such methods and means in carrying out his/her work as will not cause any interruption or interference with any other Contractor.

List of Subcontractors

Bidders shall submit a list of their proposed subcontractors in compliance with Sections 4100-4113 of the Public Contract Code of the State of California. A form for this designation is furnished in the Contract Documents.

Additional Sureties

If at any time during the continuance of the contract the Sureties, or any of them, shall, in the opinion of City, be no longer responsible, the City shall have the right to require additional and sufficient Sureties which Contractor shall furnish to the satisfaction of City within ten (10) working days after notice.

Definition of Contract Documents

The term "Contract Documents" is defined in section 1.03 Definitions and Terms of the Special Provisions and in the AGREEMENT FOR PUBLIC IMPROVEMENT. The submission of any bid shall be deemed a thorough and complete understanding of all provisions of the Contract Documents.

Business License

All Contractors, whether they are general Contractors or subcontractors, who transact or carry on business in the City, shall acquire a Business License in conformance with the Burlingame Municipal Code.

Wages

Workers employed in the work must be paid at rates at least equal to the then current prevailing wage scale as determined by the State Director of the Department of Industrial Relations. A copy is on file in the City Department of Public Works, and is also available for review at the State of California Department of Industrial Relations' web site at www.dir.ca.gov/DLSR/PWD.

Pursuant to Labor Code Section 1770 *et. seq*, any Contractor who is awarded a public works project and intends to use a craft or classification not shown on the general prevailing wage determinations, may be required to pay the wage rate of that craft or classification most closely related to it as shown in the general determinations effective at the time of the calls for bids.

Unit Prices

Because unit prices are key elements of bid award and contract administration, in case of discrepancy between the unit price and the total set for a unit basis item, the unit price shall prevail. If, however, the unit price is omitted, ambiguous, unintelligible, or uncertain for any reason, or if it is the same amount as set forth in the "Total" column, then the amount set forth in the "Total" column for the item shall prevail and shall be divided by the estimated quantity to determine the unit price.

GENERAL

**WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #1**

TO THE CITY OF BURLINGAME, CALIFORNIA: _____, 20__

Pursuant to the foregoing Notice to Contractors, the undersigned bidder herewith submits its proposal on the Bid Form, Designation of Subcontractors, and Statement of Experience Qualifications, Non-Collusion Declaration, and Statement under Public Contract Code Section 10285.1 attached hereto and made a part hereof, and binds itself on award by the City of Burlingame under this proposal to execute in accordance with such award, a contract, of which this Proposal and the Notice to Contractors, Instructions to Bidders, Special Provisions, Standard Specifications, and Plans and Specifications are hereby made a part of this Proposal and all provisions thereof are hereby accepted.

In submitting this proposal, the bidder has confirmed the existence of any and all addenda and accepts the changes to the contract included in all addenda.

The bidder further agrees that in case of its default in executing the Contract Documents, and providing the required bonds and insurance, the cash, check or Bidder's Bond, accompanying its proposal and the money payable thereon shall be and remain the property of the City of Burlingame, as provided in the Instructions to Bidders and the Special Provisions.

Company name: _____

(Corporate Seal)

Signature _____

Address _____

Contractor's license number: _____

Contractor's telephone no. _____

Contractor's facsimile no. _____

If a corporation, organized under the laws of the state of: _____,

Nature of firm (corporation, partnership, etc.) and names of individual members of the firms, or names and titles of officers of the corporation:

Name _____ Title _____

Name _____ Title _____

Name _____ Title _____

Name _____ Title _____

DESIGNATION OF SUBCONTRACTORS(Public Contract Code Sections 4100 *et seq.*)

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID PROPOSAL

**WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #2**

As a bidder on the above-entitled project, the undersigned hereby designates the subcontractors that will perform work or labor or render services to the Contractor in or about the construction of the project in an amount in excess of one-half (1/2) of one percent (1%) of the Contractor's total bid or \$10,000 whichever is greater.

The undersigned understands and agrees that should it fail to specify a subcontractor for any portion of the work as above stated, it agrees that the undersigned is fully qualified to perform that portion of the work itself, and that it shall perform that portion itself. Penalties for failure to comply with this provision are provided in the Subletting and Subcontracting Fair Practices Act commencing with Section 4100 of the Public Contract Code.

Pursuant to Public Contract Code Section 6109, Contractor shall not allow or permit any subcontractor that is ineligible to perform work on a public works project pursuant to Labor Code Section 1777.1 or 1777.7, to perform any work on this Project.

The undersigned agrees that it shall not, without written consent of the City Council, make any substitution, assignment or sublet to or of the following list of subcontractors which is made a part of this proposal and then only after compliance with the provisions of the Subletting and Subcontracting Fair Practices Act. [ATTACH ADDITIONAL PAGES IF NECESSARY]

LIST OF SUBCONTRACTORS

| NAME OF SUBCONTRACTOR | ADDRESS OF SUBCONTRACTOR | <u>STATE</u> <u>CONTRACTORS</u> <u>LICENSE #</u> | DIR REGISTRATION # | WORK TO BE DONE BY SUBCONTRACTOR |
|--------------------------|-----------------------------|--|--------------------------|-------------------------------------|
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| | | | | |

NAME OF BIDDER: _____

Signature: _____

STATEMENT OF EXPERIENCE QUALIFICATIONS
TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID PROPOSAL
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #3

The following statement as to experience qualifications of the bidder is submitted in conjunction with the Proposal, as a part thereof, and the truthfulness and accuracy of the information is guaranteed by the Bidder.

The bidder has been engaged in the contracting business, under the present business name, for ten (10) years. Experience in work of a nature similar to that covered in the proposal extends over a period of five (5) years with a minimum of six (6) projects each exceeding \$500,000, or three (3) projects each exceeding \$1,000,000.

The bidder, as a contractor, has never failed to satisfactorily complete a contract awarded to it, except as follows:

The following contracts have been satisfactorily completed in the last three years for the persons, firm or authority indicated, and to whom reference is made:

| YEAR | TYPE OF WORK PROJECT NAME | CONTRACT AMOUNT | LOCATION | FOR WHOM PERFORMED | CONTACT NAME AND PHONE NO. |
|------|------------------------------|--------------------|----------|-----------------------|----------------------------------|
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The following is a list of plant and equipment owned by the bidder, which is definitely available for use on the proposed work as required:

| QUANTITY | NAME, TYPE, CAPACITY | CONDITION | LOCATION |
|----------|----------------------|-----------|----------|
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| | | | |
| | | | |

NAME OF BIDDER: _____

Signature: _____

NON-COLLUSION DECLARATION

(PUBLIC CONTRACT CODE SECTION 7106)

**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID PROPOSAL
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #4**

I, _____, declare under penalty of perjury that I am (sole owner, partner, president, etc.) of _____, the party making the foregoing bid; that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract or anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly, or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

I declare under penalty of perjury that the foregoing is true and correct and this was executed on the date shown below at _____.
(City, State)

Dated: _____

NAME OF BIDDER: _____

Signature _____

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #5**

In accordance with Public Contract Code Section 10285.1 (Stats. 1985, Ch. 376), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder has _____, has not _____ been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

[NOTE: THE BIDDER MUST PLACE A CHECK MARK AFTER "HAS" OR "HAS NOT" IN ONE OF THE BLANK SPACES ABOVE.]

The above Statement is part of the Proposal. Bidders are warned that making a false certification may subject the certifier to criminal prosecution.

I declare under penalty of perjury that the foregoing is true and correct and this was executed on the date shown below at _____.
(City, State)

Dated: _____

NAME OF BIDDER: _____

Signature _____

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #6**

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID PROPOSAL

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

No _____ Yes _____

If the answer is yes, explain the circumstances below:

I declare under penalty of perjury that the foregoing is true and correct and this was executed on the date shown below at _____.
(City, State)

Dated: _____

NAME OF BIDDER: _____

Signature _____

PUBLIC CONTRACT CODE 10232 STATEMENT

**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #7**

In accordance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

I declare under penalty of perjury that the foregoing is true and correct and this was executed on the date shown below at _____.
(City, State)

Dated: _____

NAME OF BIDDER: _____

Signature _____

**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #8**

BID FORM

Basis of award shall be the stated grand total bid for the project. Any discrepancy between the additive total and the stated total, the stated total shall prevail.

| DIV NO. | DESCRIPTION | ESTIMATED QUANTITY | UNIT TYPE | TOTAL PRICE |
|---------|--------------------------------------|--------------------|-----------|-------------|
| 01 | General Requirements | 1 | LS | \$ |
| 11-6800 | Base Course per Details 5&6 / L4.0 | 1 | LS | \$ |
| 26-0500 | Basic Electrical Requirements | 1 | LS | \$ |
| 26-0800 | Testing | 1 | LS | \$ |
| 26-2700 | Basic Electrical Materials & Methods | 1 | LS | \$ |
| 26-5601 | Site Lighting | 1 | LS | \$ |
| 31-1000 | Site Clearing | 1 | LS | \$ |
| 31-1001 | Plant Protection | 1 | LS | \$ |
| 31-1100 | Pavement Course | 1 | LS | \$ |
| 31-2000 | Earth Moving | 1 | LS | \$ |
| 31-2100 | Utility Trenching and Backfill | 1 | LS | \$ |
| 32-1216 | Asphalt Paving | 1 | LS | \$ |
| 32-1312 | Site Concrete | 1 | LS | \$ |
| 32-1313 | Concrete Pavement | 1 | LS | \$ |
| 32-1318 | Cement & Concrete Exterior Imp. | 1 | LS | \$ |
| 32-1541 | Stabilized DG Paving | 1 | LS | \$ |
| 32-1713 | Parking Bumpers | 1 | LS | \$ |

| | | | | |
|---------|---------------------------------|---|----|----|
| 32-1816 | Synthetic Turf Safety Surfacing | 1 | LS | \$ |
| 32-1823 | Recreational Court Surfacing | 1 | LS | \$ |
| 32-3110 | Decorative Fences & Gates | 1 | LS | \$ |
| 32-3114 | Vinyl Coated Chain Link Fencing | 1 | LS | \$ |
| 32-3300 | Site Furnishings | 1 | LS | \$ |
| 32-8400 | Irrigation | 1 | LS | \$ |
| 32-9000 | Planting | 1 | LS | \$ |
| 33-1000 | Water System | 1 | LS | \$ |
| 33-4100 | Storm Utility Drainage Piping | 1 | LS | \$ |
| 33-4600 | Subdrainage | 1 | LS | \$ |
| | | | | |

| | |
|-----------------------------------|----|
| GRAND TOTAL BID PRICE FOR PROJECT | \$ |
|-----------------------------------|----|

GRAND TOTAL BID PRICE (In Words):

BIDDING CONTRACTOR'S SIGNATURE: _____

BIDDING CONTRACTOR'S NAME: _____

CONTRACTOR'S LICENSE NUMBER

EXPIRATION DATE

CONTRACTOR'S ADDRESS

CONTRACTOR'S TELEPHONE NO.

DATE

REQUIRED DOCUMENTS PAGE**TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID PROPOSAL
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670
Required Document #9**

The following items must be completed, signed where applicable, and submitted as part of completed Proposal. Failure to submit any of the following may result in disqualification of the subject bid. Forms may be removed for use, or photocopied from the Specifications. See the Notice Inviting Sealed Bids form for time and location for submitting bids.

Required Bid Documents

| | | |
|------------|----------------|---|
| 1. | Initial | General Signatures Page |
| 2. | Initial | Designation of Subcontractors & List of Subcontractors |
| 3. | Initial | Experience Qualifications |
| 4. | Initial | Non-Collusion Declaration |
| 5. | Initial | Public Contract Code Section 10285.1 Statement |
| 6. | Initial | Public Contract Code Section 10162 Questionnaire |
| 7. | Initial | Public Contract Code 10232 Statement |
| 8. | Initial | Bid Sheet |
| 9. | Initial | Required Documents (this page) |
| 10. | Initial | Proposal Security (required as part of Proposal) Cashier's check, certified check or bidder's bond, payable to: City of Burlingame |
| | | |

Bidder (name) _____

AGREEMENT FOR PUBLIC IMPROVEMENT
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670

THIS AGREEMENT, made in duplicate and entered into in the City of Burlingame, County of San Mateo, State of California on _____, 2019 by and between the CITY OF BURLINGAME, a Municipal Corporation, hereinafter called "City", and _____, a [State of incorporation] [Corporation or other form of business], hereinafter called "Contractor."

WITNESSETH:

WHEREAS, City has taken appropriate proceedings to authorize construction of the public work and improvements herein provided for and to authorize execution of this Contract; and

WHEREAS, pursuant to State law and City requirements, a notice was duly published for bids for the contract for the improvement hereinafter described; and

WHEREAS, on _____, after notice duly given, the City Council of Burlingame awarded the contract for the construction of the improvements hereinafter described to Contractor, which the Council found to be the lowest responsive, responsible bidder for these improvements; and

WHEREAS, City and Contractor desire to enter into this Agreement for the construction of said improvements.

NOW, THEREFORE, IT IS AGREED by the parties hereto as follows:

1. Scope of work.

Contractor shall perform the work described in those Contract Documents entitled:

WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670

2. The Contract Documents.

The complete contract between City and Contractor consists of the following documents: this Agreement; Notice Inviting Sealed Bids, attached hereto as Exhibit A; the accepted Bid

Proposal, attached hereto as Exhibit B; the specifications, provisions, addenda, complete plans, profiles, and detailed drawings contained in the bid documents titled Washington Park Playground, Sports Court, & Picnic Area - City Project 85670 attached as Exhibit C; the State of California Standard Specifications 2010, as promulgated by the California Department of Transportation; prevailing wage rates of the State of California applicable to this project by State law; and all bonds; which are collectively hereinafter referred to as the Contract Documents. All rights and obligations of City and Contractor are fully set forth and described in the Contract Documents, which are hereby incorporated as if fully set forth herein. All of the above described documents are intended to cooperate so that any work called for in one, and not mentioned in the other, or vice versa, is to be executed the same as if mentioned in all said documents.

3. Contract Price.

The City shall pay, and the Contractor shall accept, in full, payment of the work above agreed to be done, the sum of _____ dollars (\$_____), called the "Contract Price". This price is determined by the lump sum and unit prices contained in Contractor's Bid. In the event authorized work is performed or materials furnished in addition to those set forth in Contractor's Bid and the Specifications, such work and materials will be paid for at the unit prices therein contained. Said amount shall be paid in progress payments as provided in the Contract Documents.

4. Termination

At any time and with or without cause, the City may suspend the work or any portion of the work for a period of not more than 90 consecutive calendar days by notice in writing to Contractor that will fix the date on which work will be resumed. Contractor will be granted an adjustment to the Contract Price or an extension of the Time for Completion, or both, directly attributable to any such suspension if Contractor makes a claim therefor was provided in the Contract Documents.

The occurrence of any one or more of the following events will justify termination of the contract by the City for cause: (1) Contractor's persistent failure to perform the work in accordance with the Contract Documents; (2) Contractor's disregard of Laws or Regulations of any public body having jurisdiction; (3) Contractor's disregard of the authority of the Engineer; or (4) Contractor's violation in any substantial way of any provision of the Contract Documents. In the case of any one or more of these events, the City, after giving Contractor and Contractor's sureties seven calendar days written notice of the intent to terminate Contractor's services, may initiate termination procedures under the provisions of the Performance Bond. Such termination will not affect any rights or remedies of City against Contractor then existing or that accrue

thereafter. Any retention or payment of moneys due Contractor will not release Contractor from liability. At the City's sole discretion, Contractor's services may not be terminated if Contractor begins, within seven calendar days of receipt of such notice of intent to terminate, to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 calendar days of such notice.

Upon seven calendar days written notice to Contractor, City may, without cause and without prejudice to any other right or remedy of City, terminate the Contract for City's convenience. In such case, Contractor will be paid for (1) work satisfactorily completed prior the effective date of such termination, (2) furnishing of labor, equipment, and materials in accordance with the Contract Documents in connection with uncompleted work, (3) reasonable expenses directly attributable to termination, and (4) fair and reasonable compensation for associated overhead and profit. No payment will be made on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

5. Provisions Cumulative.

The provisions of this Agreement are cumulative and in addition to and not in limitation of any other rights or remedies available to the City.

6. Notices.

All notices shall be in writing and delivered in person or transmitted by certified mail, postage prepaid.

Notices required to be given to the City shall be addressed as follows:

Karen Hager
Management Analyst
City of Burlingame
850 Burlingame Avenue
Burlingame, California 94010

Notices required to be given to Contractor shall be addressed as follows:

Name
Company Name
Address

7. Interpretation

As used herein, any gender includes the other gender and the singular includes the plural and vice versa.

8. Waiver or Amendment.

No modification, waiver, mutual termination, or amendment of this Agreement is effective unless made in writing and signed by the City and the Contractor. One or more waivers of any term, condition, or other provision of this Agreement by either party shall not be construed as a waiver of a subsequent breach of the same or any other provision.

9. Controlling Law.

This Agreement is to be governed by and interpreted in accordance with the laws of the State of California.

10. Successors and Assignees.

This Agreement is to be binding on the heirs, successors, and assigns of the parties hereto but may not be assigned by either party without first obtaining the written consent of the other party.

11. Severability.

If any term or provision of this Agreement is deemed invalid, void, or unenforceable by any court of lawful jurisdiction, the remaining terms and provisions of the Agreement shall not be affected thereby and shall remain in full force and effect.

12. Indemnification.

Contractor shall indemnify, defend, and hold the City, its directors, officers, employees, agents, and volunteers harmless from and against any and all liability, claims, suits, actions, damages, and causes of action arising out of, pertaining or relating to the actual or alleged negligence, recklessness or willful misconduct of Contractor, its employees, subcontractors, or agents, or on account of the performance or character of the services, except for any such claim arising out of the sole negligence or willful misconduct of the City, its officers, employees, agents, or volunteers. It is understood that the duty of Contractor to indemnify and hold harmless includes the duty to defend as set forth in section 2778 of the California Civil Code. Notwithstanding the foregoing, for any design professional services, the duty to defend and indemnify City shall be limited to that allowed by state law. Acceptance of insurance certificates and endorsements required under this Agreement does not relieve Contractor from liability under this indemnification and hold harmless clause. This indemnification and hold harmless clause shall apply whether or not such insurance policies shall have been determined to be applicable to any of such damages or claims for damages.

IN WITNESS WHEREOF, two identical counterparts of this Agreement, consisting of five pages, including this page, each of which counterparts shall for all purposes be deemed an original of this Agreement, have been duly executed by the parties hereinabove named on the day and year first hereinabove written.

CITY OF BURLINGAME,
a Municipal Corporation

By _____
Lisa K. Goldman, City Manager

Approved as to form:

Kathleen Kane, City Attorney

ATTEST:

Meaghan Hassel-Shearer, City Clerk

“CONTRACTOR”

By _____
Print Name:
Company Name:

CITY OF BURLINGAME
PARKS & RECREATION DEPARTMENT

SPECIAL PROVISIONS

FOR

**WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670**

GENERAL CONDITIONS

SECTION 1. DEFINITIONS AND TERMS

1.01 General

The following shall be added to Standard Specifications Section 1-1.01:

The work contemplated herein shall be done in accordance with these Specifications as defined in the Special Provisions Section 1.03, and the Municipal Code of the City of Burlingame, insofar as the same may apply and in accordance with the following Special Provisions.

In the 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.

1.02 Abbreviations

Abbreviations of the Standard Specifications shall be amended to include the following:

| | |
|-------|--|
| AIA | American Institute of Architects |
| APWA | American Public Works Association |
| ASA | American Standard Association |
| CSI | Construction Specifications Institute |
| IAMPO | International Association of Mechanical & Plumbing Officials |
| ICBO | International Conference of Building Officials |
| UBC | Uniform Building Code |
| UPC | Uniform Plumbing Code |

1.03 Definitions and Terms

The definitions in Standard Specifications Section 1-1.07B are amended as follows:

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

Agency: The legal entity for which the work is being performed.

Authorized Laboratory: The laboratory authorized by the Engineer to test materials and work involved in the contract.

Contract Documents: The Contract Documents shall include the complete contract between City and Contractor, which shall consist of the following documents: the Agreement and Notice Inviting Sealed Bids; the accepted Bid Proposal; the specifications, provisions, addenda, complete plans, profiles, and detailed drawings contained in the bid documents entitled "South Rollins Road Utility Improvements – Phase 1, City Project No. 83520"; the State of California Standard Specifications 2010, as promulgated by the California Department of Transportation; prevailing wage rates of the State of California applicable to this project by State law; and all bonds. All rights and obligations of City and Contractor are fully set forth and described in the Contract Documents, which are hereby incorporated as if fully set forth herein. All of the above described documents are intended to cooperate so that any work called for in one, and not mentioned in the other, or vice versa, is to be executed the same as if mentioned in all said documents. In case of any inconsistencies among the various documents, the Agreement shall prevail.

Contract Acceptance: The formal written contract acceptance of an entire contract by the City Council at a regularly scheduled meeting, recorded in the County of San Mateo Recorder's Office, titled "Notice of Completion," signed by an authorized official of the City of Burlingame, which has been completed in all respects in accordance with the plans and specifications and any modification thereof previously approved.

City: The City of Burlingame, State of California.

Department: The Parks & Recreation Department of the City of Burlingame.

Director: The Parks & Recreation Department of the City of Burlingame, California.

Engineer: The City Engineer of the City of Burlingame, State of California, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

Inspector: An inspector employed or retained by the City to perform inspection during construction of the work under the direction of the Director.

Legal Holiday: A holiday as specified in Section 5.04 of these Special Provisions.

Owner: The City of Burlingame, a political subdivision of the State of California.

Plans: Standard plans, revised standard plans and project plans.

1. **Project plans:** Drawings specific to the project, including authorized shop drawings.
2. **Standard plans:** *2010 California Department of Transportation Standard Plans, City of Burlingame Standard Details*, and any other local agency or district standard plans or details referenced in project plans.

The California Department of Transportation standard plans are available at:
http://www.dot.ca.gov/hq/esc/oe/construction_standards.html

The City of Burlingame Standard Details are available at:
https://www.burlingame.org/departments/public_works/city_standard_details.php

Specifications: Standard specifications, and special provisions, as follows:

1. **Special Provisions:** Specifications specific to the project. These specifications are in a section titled *Special Provisions* of this bid book titled *Notice to Bidders/Proposal and Agreement/Special Provisions*.
3. **Standard Specifications:** Specifications standard to City construction projects. These specifications are in a book titled State of California Department of Transportation *Standard Specifications 2010* (Standard Specifications or SS). These standard specifications are available at:
www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/2010_StdSpecs/2010_StdSpecs.pdf

Any reference therein to the State of California or a State agency, office or officer, acting under the Standard Specifications shall be interpreted to refer to the City or its corresponding agency, office or officer acting under this contract.

State: In references where context applies to "State" as the owner of the Project, the City of Burlingame.

Supplementary General Conditions: The part of the Contract Documents that makes additions, deletions, or revisions to these General Conditions.

Technical Specifications: Those portions of the Contract Documents consisting of the written technical descriptions of products and execution of the Work.

Work: The entire completed construction required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

*** END OF SECTION ***

SECTION 2. BIDDING

2.01 General

The bidder's attention is directed to the provisions in Section 2, "Bidding," of the Standard Specifications and these Special Provisions for the requirements and conditions which it shall observe in the preparation of the proposal form and the submission of the bid.

The following Sections in the Standard Specifications are deleted:

- 2-1.15, "Disabled Veterans Business Enterprises".
- 2-1.18, "Small Business and Non-small Business Subcontracting Preferences".
- 2-1.27, "California Companies"

2.02 Subcontractor List

Standard Specifications Section 2-1.10, "Subcontractor List," is replaced by the following:

2-1.10 SUBCONTRACTOR LIST

On the Subcontractor List form, list each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

For each subcontractor listed, the Subcontractor List form must show:

1. Business name and the location of its place of business.
2. California contractor license number for a non-federal-aid contract.
3. Public works contractor registration number
4. Portion of work it will perform.

2.03 Proposal Pages

Standard Specifications Section 2-1.33, "Bid Document Completion" is amended to provide that the bid documents shall include the required proposal pages or copies thereof completed and signed, including Proposal to the City of Burlingame, Designation of Subcontractors, Experience Qualifications, Non-Collusion Declaration, Public Contract Code Compliance Statement and Questionnaire, and Bid Sheet in these Special Provisions.

2.04 Compliance Statement

The Contractor shall complete a statement indicating compliance with Public Works Contracts Code Section 10285.1 and Public Contract Code Section 10162 Questionnaire. These documents shall be completed and included in the Proposal.

2.05 Bidder's Security

Standard Specifications Section 2-1.34, "Bidder's Security" is replaced with the following:

If Contractor's bid is greater than \$25,000, a Contractor shall submit bid with one of the following forms of bidder's security equal to at least 10 percent of the bid:

1. Cashier's check
2. Certified check
3. Signed bidder's bond by an admitted surety insurer

A sample bid bond is provided at the end of this Section.

Bidders shall submit a cashier's check, a certified check, or a bidder's bond to the City before the bid opening time. The bidder's security shall be made payable to the City of Burlingame.

*** END OF SECTION ***

BIDDER'S BOND

KNOW ALL PERSONS BY THESE PRESENTS:

That we, _____ as
Principal, _____ and
_____ as
Surety, are held and firmly bound unto the City of Burlingame, a municipal corporation
of the State of California (hereinafter called "City") in the penal sum of ten percent (10%)
of the total aggregate amount of the bid of the Principal above named, submitted by said
Principal to the City for the work described below, for the payment of which sum in
lawful money of the United State, well and truly to be made, we bind ourselves, our heirs,
executors, administrators and successors, jointly and severally, firmly by these presents.
In no case shall the liability of the Surety hereunder exceed the sum of
_____ (\$ _____) Dollars.

The condition of this obligation is such that a bid to the City for certain construction
specifically described as follows, for which bids are to be opened on _____,
_____, 20____, at ____:_____, has been submitted by Principal to City:

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 the
Principal for signature, enters into a written contract, in the prescribed form, in
accordance with the bid, and files two bonds with the City, one to guarantee faithful
performance of the Contract and the other to guarantee payment for labor and materials
as provided by law as well as files insurance certificates and equal employment
opportunity documentation required under the bid, then this obligation shall be null and
void; otherwise, it shall remain in full force.

In the event suit is brought upon said bond by City, and judgment is recovered, the Surety
shall pay all costs incurred by City in such suit, including a reasonable attorney's fee to be
fixed by the Court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this day of _____, 20 ____.

_____(Seal)

_____(Seal)

_____(Seal)

_____(Seal)

_____(Seal)

NOTE: Attach notary acknowledgment for signatures of those executing for Principal and Surety

SECTION 3. AWARD AND EXECUTION OF CONTRACT

3.01 General

The bidder's attention is directed to the provisions of Standard Specifications Section 2, "Bidding," and Section 3 "Contract Award and Execution," , and to "Proposal Requirements and Conditions," of these Special Provisions for the requirements and conditions concerning award and execution of the contract, with the following clarifications, changes and additions.

The second paragraph of Standard Specifications Section 3-1.02A, "General," is replaced with the following:

In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

(a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;

(b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentagewise the unit price or item total in the Agency's Engineer Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Cents symbols also have no significance in establishing any unit price or item total because all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

Standard Specifications Section 3-1.02B, "Tied Bids," is replaced with:

3-1.02B Tied Bids

The Department breaks a tied bid with a coin toss.

Standard Specifications Sections 3-1.08, "Small Business Participation Report," and 3-1.11, "Payee Data Record," are deleted.

3.02 Award of Contract

To the fullest extent provided by law, the City reserves the right to waive any irregularities and/or informalities in any bid received.

The award of the contract, if it be awarded, will be to the lowest responsive and responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within forty-five (45) days after the opening of the proposals. If the lowest responsive bidder refuses or fails to execute the contract, the City may award the contract to the second lowest responsive and responsible bidder. Such award, if made, will be made within sixty (60) days after the opening of proposals. If the second lowest responsive bidder refuses or fails to execute the contract, the City may award the contract to the third lowest responsive and responsible bidder. Such award, if made, will be made within seventy-five (75) days after the opening of the proposals. The periods of time specified above within which the award of contract may be made shall be subject to extensions for such further periods as may be agreed upon in writing between the City and the bidder concerned.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

3.03 Contract Bonds

Standard Specifications Section 3-1.05, "Contract Bonds (Pub Cont Code Sections 10221 and 10222)," is replaced with the following:

The surety or sureties on all bonds furnished must be approved by the City. Any modifications or alteration made in the plans or specifications shall not operate to release any surety from liability on any bond or bonds herein required to be given. All contract bonds shall be payable to the City of Burlingame and shall reference the project name and number.

All alterations, extensions of time, extra and additional work, and other changes authorized by these specifications or any part of the contract may be made without securing the consent of the surety or sureties on the contract bonds.

(a) Faithful Performance Bond

Contractor shall provide, at the time of the execution of the contract for the work, and at its own expense, a surety bond in an amount equal to at least one hundred percent (100%) of the contract price as security for the faithful performance of the contract.

(b) Contractor's Payment (Labor and Materials) Surety Bond

Contractor shall also provide, at the time of the execution of the contract for the work, and at its own expense, a separate surety bond in an amount equal to at least one hundred percent (100%) of the contract price as security for the payment of all persons performing labor and furnishing materials in connection with this contract; a sample is attached at the end of this section.

(c) Maintenance Bond

The Contractor shall furnish a Corporate Surety Maintenance Bond for faulty workmanship and materials in the amount of ten percent (10%) of the total contract cost. This bond shall be for the term of one year after completion and acceptance of the work and shall be delivered to the Engineer before acceptance of the contract.

3.04 Agreement Execution

The Contractor shall sign and return the contract agreement and furnish required bonds and insurance certificates within ten (10) working days after the date of the letter of Notice of Contract Award. If the insurance and bonds are not provided within this time period, the City may proceed to declare the bid bond forfeited and award the bid to another bidder.

3.05 Return of Proposal Guaranties

Bidders' attention is directed to Standard Specifications Section 3-1.19, "Bidders' Securities."

3.06 Insurance

BIDDERS' ATTENTION IS DIRECTED TO THE INSURANCE REQUIREMENTS BELOW AND IN STANDARD SPECIFICATIONS SECTIONS 3-1.07, "INSURANCE POLICIES," and 7-1.06, "INSURANCE."

IT IS HIGHLY RECOMMENDED THAT BIDDERS CONFER WITH THEIR RESPECTIVE INSURANCE CARRIERS OR BROKERS TO DETERMINE IN ADVANCE OF BID SUBMISSION THE AVAILABILITY OF INSURANCE CERTIFICATES AND ENDORSEMENTS AS PRESCRIBED AND PROVIDED HEREIN. IF AN APPARENT LOW BIDDER FAILS TO COMPLY STRICTLY WITH THE INSURANCE REQUIREMENTS, THAT BIDDER MAY BE DISQUALIFIED FROM AWARD OF THE CONTRACT OR THE AWARD MAY BE REVOKED AND SUFFER LOSS OF BID BOND.

Contractor shall procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, Contractor's agents, representatives,

employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

Standard Specifications Section 7-1.06, "Insurance," is amended to include the following:

(a) Minimum Scope of Insurance

Coverage shall be at least as broad as:

- (1) Insurance Services Office form number GL 0002 (Ed. 1/73) covering Comprehensive General Liability and Insurance Services Office form number GL 0404 covering Broad Form Comprehensive General Liability; or Insurance Services Office Commercial General Liability coverage ("occurrence" form GC 0001).
- (2) Insurance Services Office form number CA 0001 (Ed. 1/78) covering Automobile Liability, code 1 "any auto" and endorsement CA 0025.
- (3) Worker's Compensation insurance as required by the Labor Code of the State of California and Employers Liability insurance.

(b) Minimum Limits of Insurance

Contractor shall maintain limits no less than:

- (1) General Liability: \$2,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this Project/location or the general aggregate limit shall be twice the required occurrence limit.
- (2) Automobile Liability: \$1,000,000 combined single limit per accident for bodily injury and property damage.
- (3) Workers' Compensation and Employers Liability: Worker's compensation limits as required by the Labor Code of the State of California and Employers Liability limits of \$1,000,000 per accident.

(c) Deductibles and Self-insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

(d) Other Insurance Provision

The policies are to contain, or be endorsed to contain the following provision:

(1) General Liability and Automobile Liability Coverages

- (A) The City of Burlingame, its officers, officials, employees and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the Contractor, products and completed operations of the Contractor, premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City of Burlingame, its officers, officials, employees, or volunteers. The endorsement providing this additional insured coverage shall be equal to or broader than ISO Form CG 20 10 11 85 and must cover joint negligence, completed operations, and the acts of subcontractors.
- (B) The Contractor's insurance coverage shall be primary insurance as respects the City of Burlingame, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Burlingame, its officers, officials, employees, or volunteers shall be excess of the Contractor's Insurance and shall not contribute with it.
- (C) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City of Burlingame, its officers, officials, employees, or volunteers.
- (D) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

(2) Workers' Compensation and Employers Liability Coverage

The insurer shall agree to waive all rights of subrogation against the City of Burlingame, its officers, officials, employees, or volunteers for losses arising from work performed by the Contractor for the City of Burlingame.

(3) All Coverages

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty days prior written notice by certified mail, return receipt required, has been given to the City of Burlingame.

(e) Acceptability of Insurers

Insurance is to be placed with insurers with a Best's rating of no less than A-:VII and be authorized to conduct business with regard to the proffered lines of insurance in the State of California.

(f) Verification of Coverage

Contractor shall furnish the City with certificates of insurance and with original endorsements effecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements are to be on forms approved by the City. All certificates and endorsements are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, at any time.

(g) Subcontractors

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

*** END OF SECTION ***

CONTRACTOR’S PAYMENT (LABOR AND MATERIALS) SURETY BOND

Sample

WHEREAS, the City Council of the City of Burlingame, State of California (“City”) and _____, (hereinafter designated as "Principal") have entered into an agreement dated _____, and identified as _____ (“Agreement”), which is hereby referred to and made a part here of, whereby Principal agrees to install and complete certain designated public improvements; and

WHEREAS, under the terms of said agreement, Principal is required before entering upon the performance of the work to file a good and sufficient payment surety bond with City to secure the claims to which reference is made in Titles 1 and 3 (commencing with Section 8000) of Part 6 of Division 4 of the Civil Code of the State of California.

NOW, THEREFORE, Principal and _____, as Surety, incorporated under the laws of the State of _____, and duly authorized to transact business as an admitted surety, under the Laws of the State of California, are held and firmly bound unto City in the penal sum of _____ dollars (\$_____), this amount being not less than one hundred percent of the total amount payable by the terms of the Agreement per Civil Code section 9554, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that if Principal, Principal’s subcontractors, heirs, executors, administrators, successors, or assigns shall fail to pay any of the persons, companies, or corporations, referred to in Section 9100 of the California Civil Code, as amended, with respect to any work of labor performed or materials supplied by any such persons, companies, or corporations, which work, labor, or materials are covered by the above-mentioned agreement and any amendments, changes, change order, additions, alterations, or modifications thereof, or any amounts due under the California Unemployment Insurance Code with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and its subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, as amended, with respect to such work and labor, the Surety will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, the Surety will pay reasonable attorney’s fees in an amount to be fixed by the court.

It is hereby expressly stipulated and agreed that this surety bond shall inure to the benefit of any and all persons, companies, and corporations entitled named in Section 9100 of the California Civil Code, as amended, so as to give a right of action to them or their assigns in any suit brought upon this surety bond.

The Surety hereby stipulates and agrees that no amendment, change, change order, addition, alteration, or modifications to the terms of the agreement of the work to be performed thereunder or the specifications accompanying the same, shall in any way affect its obligations on this surety

bond, and it does hereby waive notice of any such amendment, change, change order, addition, alteration, or modification to the terms of the agreement or to the work performed thereunder or to the specifications accompanying the same. Surety hereby waives the provisions of California Civil Code Sections 2845 and 2849.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on _____, 20__.

PRINCIPAL SURETY

By: _____

By:

Address

NOTE: Attach notary acknowledgement for signatures of those executing for Principal and Surety

FAITHFUL PERFORMANCE BOND

Sample

WHEREAS, the City Council of the City of Burlingame, State of California, and _____ (herein designated as “Principal”) have entered into an Agreement whereby Principal agrees to construct and complete certain designated public improvements, which said agreement, dated _____, 20____, and identified as **PROJECT #** _____, is hereby referred to and made a part hereof: and

WHEREAS, said Principal is required under the terms of said Agreement to furnish a bond of the faithful performance of said Agreement.

NOW, THEREFORE, we, the Principal and _____, as Surety, are held and firmly bound unto the City of Burlingame (hereinafter called “City”), in the penal sum of _____ dollars (\$ _____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, formally by these presents.

The condition of this obligation is such that if the above bounded Principal, his/her or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said Agreement and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless City, its offices, agents and employees, as therein stipulated, and this obligation shall become null and avoid; otherwise it shall be and remain in full force and effect.

Principal and Surety further agree that upon City’s final acceptance of the work, ten percent (10 %) of this bond shall remain in effect to guarantees the repair and/or replacement of defective materials and/or workmanship, one years after City’s final acceptance of the work.

As a part of the obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs and reasonable expenses and fees, including reasonable attorney’s fees, incurred by City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the agreement or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligations on this bond, and it

does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on _____ 20____.

PRINCIPAL

SURETY

By:_____

By:_____

Address

Address

NOTE: Attach notary acknowledgement for signatures of those executing for Principal and Surety.

SECTION 4. SCOPE OF WORK

4.01 General

Attention is directed to Standard Specifications Section 4, "Scope of Work," and these Special Provisions.

4.02 Value Engineering

The last paragraph of Section Standard Specifications 4-1.07C, "Value Analysis Workshop." is replaced with:

The Contractor will be responsible for all workshop costs. The City will not reimburse Contractor for any associated costs with conducting a value analysis workshop.

Attention is directed to the provisions in Standard Specifications Sections 8-1.04, "Start of Job Site Activities," Section 8-1.05, "Time," and Section 8-1.10, "Liquidated Damages," and these Special Provisions.

4.03 Increases of More than Twenty-Five Percent (25%) of Engineer's Estimate

The last paragraph in Standard Specifications Section 9-1.06B, "Increases of More Than Twenty-Five Percent," is amended to read as follows:

"When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the Engineer's Estimate, is less than \$5,000 at the applicable contract unit price, the Engineer reserves the right to make no adjustment in said price if the Engineer so elects, except that an adjustment may be made if requested in writing by the Contractor.

It is the Contractor's responsibility to continually analyze and apply the estimated quantities provided in the Contract and to use the knowledge gained from site visits, construction, and professional experience, to update the estimated quantities as the work progresses. If and when the Contractor reaches seventy-five percent (75%) of the estimated quantities of materials required for any portion of the work as specified in the Plans and Specifications and has any reasonable belief that the Contractor will be required to exceed those estimated quantities by more than ten percent (10%), the Contractor shall provide written notice to the Engineer of the possibility and the estimated quantities required to complete the work. If the Contractor fails to provide that written notice before delivering materials in excess of the originally estimated quantities, the Contractor shall not be entitled to any additional compensation or payment for the additional work or materials needed for the additional materials above one hundred and ten percent (110%), but nevertheless shall be required to complete the work."

4.04 Changes Initiated by the City

The City reserves the right to change the scope of this contract to accommodate budget constraints. The City shall have full authority and discretion to determine the decrease or increase in quantities required as well as the sub-projects that will be altered, added, or deleted. The Contractor shall not be entitled to any additional compensation or adjustment in the unit prices bid because of the above-stated rights.

*** END OF SECTION ***

SECTION 5. CONTROL OF WORK

5.01 General

The control of the work shall be in conformance with Standard Specifications Section 5, "Control of Work," , except as herein amended.

The following sections in the Standard Specifications are deleted:

- Section 5-1.09, "Partnering"
- Section 5-1.13C, "Disabled Veteran Business Enterprises"
- Section 5-1.13D, "Non-Small Businesses"
- Section 5-1.27E "Change Order Bills"
- Section 5-1.43E "Alternative Dispute Resolution"

5.02 Coordination and Interpretation of Plans, Specifications and Special Provisions

Standard Specifications Section 5-1.02, "Contract Components," is replaced with the following:

5-1.02 CONTRACT COMPONENTS

A component in one Contract part applies as if appearing in each. The parts are complementary and describe and provide for a complete work.

If a discrepancy exists:

1. The governing ranking of Contract parts in descending order is:
 - 1.0 Proposal, and Agreement
 - 1.1 Supplementary General Conditions of the Special Provisions
 - 1.2 General Conditions of the Special Provisions
 - 1.3 Technical Specifications of the Special Provisions
 - 1.4 Project plans
 - 1.5 City of Burlingame Standard Details
 - 1.6. Standard Specifications
 - 1.7 (State) Standard Plans
 - 1.8 Supplemental project information
2. Written numbers and notes on a drawing govern over graphics
3. A detail drawing governs over a general drawing
4. A specification in a section governs over a specification referenced by that section

In the event of a discrepancy between units shown on plans, in the special provisions and in the proposal, the units shown in the proposal shall govern.

If a discrepancy is found or confusion arises, submit an RFI.

5.03 Superintendence

Standard Specifications Section 5-1.16, "Representative," is amended to include the following:

The Contractor's representative shall be available to personally talk to the Engineer within any eight (8) hour period when work is being performed on the project. A telephone number for such purpose shall be given to the Engineer at the start of the project.

The Contractor shall furnish to the Engineer the telephone number of a representative or answering service which will be responsible for responding to emergency calls (e.g., barricade replacement) from the Engineer during non-scheduled working hours.

If the Contractor fails to respond and correct the emergency condition within three (3) hours, and if, in the judgment of the Engineer, correction of the emergency condition should not be deferred until the next regularly scheduled working day, then the Engineer shall have the right to make appropriate arrangements to correct such emergency condition and charge the cost thereof to the Contractor.

5.04 Inspection

The following is added to Standard Specifications Section 5-1.01, "General:" :

The Contractor shall not perform any work during weekend days or City Holidays without the written permission of the Engineer. A fine of \$5000 per violation will be deducted from the next progress payment should the Contractor perform unauthorized weekend or Holiday work.

The Contractor shall pay for all inspections required to be performed by City employees due to the scheduling of work by the Contractor between 5:00 P.M. and 8 A.M. on weekdays, and anytime on Saturdays, Sundays and City Holidays, and shall include travel time of the inspector.

City holidays are as follows:

- *New Year's Day
- *Martin Luther King's Birthday
- *President's day
- *Memorial Day
- *Independence Day
- *Labor Day
- Columbus Day
- *Veteran's Day
- *Thanksgiving Day
- Day After Thanksgiving
- ½ Day Christmas Eve
- *Christmas Day
- ½ Day New Year's Eve

*Indicates holidays covered by "Construction Hours" restrictions of these Special Provisions Section 7.02.

Contact the City of Burlingame to determine the specific holiday dates for the current calendar year.

Holidays falling on Saturday or Sunday will be observed on Friday or Monday, respectively.

5.05 Payments to Subcontractors

The following is added to Standard Specifications Section 5-1.13A, "General," :

The Contractor shall comply with the provisions in Business and Professions Code Section 7108.5 concerning prompt payment to subcontractors.

The Contractor shall furnish a written statement showing all work to be subcontracted, giving the names and addresses of all subcontractors and a description of each portion of the work to be subcontracted. The Designation of Subcontractors statement shall be on the form furnished by the City as part of the Bid documents and shall be considered an integral part of those documents.

Pursuant to Public Contract Code Section 6109, no contractor or subcontractor that is ineligible under Labor Code Section 1777.1 or 1777.7 may bid or work on this project. Any contract entered into between the Contractor and such an ineligible subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on this project, and any public money that may have been paid to a debarred subcontractor by the Contractor on the project shall be returned to the City. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the project.

5.06 Permits

The Contractor shall obtain all permits, licenses, bonds, pay all charges and fees (including inspection fees); and other authorization required by all affected jurisdictions involved in this job, at its own expense, unless otherwise specified in Supplementary General Conditions of these Special Provisions. The City's issuance of permits shall not relieve the Contractor of its responsibility as described in this section.

City permits, if required, shall have all fees waived, except for City business licenses. All subcontractors performing work within the limits of the City of Burlingame shall also obtain a City Business Licenses in accordance with these Special Provisions Section 5.07, "City Business License."

Compliance with NPDES Permit. The Contractor shall comply with all requirements of the permit and shall not, directly or indirectly, cause a sanitary sewer overflow or prevent the City from complying with the requirements of the permit. Penalties imposed on the City as a result of any discharge violation caused by the actions of the Contractor, or its employees, or subcontractors shall be borne in full by the Contractor, including fines, legal fees, and other expenses to the City resulting directly or indirectly from such discharge violations. The City may recover such sums by deduction from the construction progress payments.

5.07 City Business License

The Contractor and all Subcontractors are required to have City business licenses in accordance with the Burlingame Municipal Code. Business license information is available at https://www.burlingame.org/departments/finance/business_license.php

5.08 Engineering Submittals

The following shall be added to Standard Specifications Section 5-1.23A, "General:"

Contractor's failure to make submittals in a timely manner will not be a basis for any time extensions and shall count against the Contractor's work days.

5.09 Project Appearance

The following shall be added to Standard Specifications Section 5-1.31, "Job Site Appearance:"

"PROJECT APPEARANCE. The Contractor shall maintain a neat appearance at the job site.

In any area visible to the public, the following shall apply: when practical, broken concrete and debris developed during the clearing and grubbing shall be disposed of concurrently with its removal. If stockpiling is necessary, the material shall be removed or disposed of weekly, unless otherwise granted by the City.

The Contractor shall furnish portable toilets for workmen and trash bins for all debris from structure construction. All debris shall be placed in trash bins daily. Forms or false work that are to be reused shall be stacked neatly concurrently with their removal. Forms and false work that are not to be reused shall be recycled concurrently with their removal.

5.10 Lines and Grades

Standard Specifications Section 5-1.26, "Construction Surveys," is replaced with the following:

Contractor shall perform all necessary construction surveys. Construction surveys shall be done in accordance with Chapter 12, "Construction Surveys," of the California Department of Transportation's *Survey Manual*.

All work shall be constructed to the lines and grades shown on the contract drawings. Unless authorized by the Engineer, any work done without construction survey line and grade will be done at the Contractor's risk.

5.11 Project Plans

Four (4) full-size sets of the project plans will be supplied to the successful bidder without charge. Additional sets will be supplied at the cost of reproduction.

5.12 Construction Area Lighting

The Contractor shall ensure that all working areas utilized during darkness are lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders. In addition, the Contractor shall ensure that the lighting provides adequate safety to pedestrians in permitted portions of the construction area.

All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic.

5.13 Areas for Contractor's Use

The second and third paragraphs of Standard Specifications Section 5-1.32, "Areas of Use," are replaced with the following:

If no City-owned or City-secured area is designated on the plans for the Contractor's use, the Contractor will be responsible to secure additional staging/stockpiling areas at Contractor's own expense in order to perform the work.

The Contractor shall defend, indemnify, and hold the City harmless for any damage to or loss of materials or equipment in conformance with the indemnification requirements in the City's construction agreement.

5.14 Nonhighway Facilities

Standard Specifications Section 5-1.36D, "Nonhighway Facilities." is amended to include the following:

Unless otherwise permitted by the Engineer, the Contractor shall conduct its operations in a manner which will permit continuous operation of all utility facilities. The Contractor shall contact Underground Services Alert (USA) at 811 or 800-642-2444 at least forty-eight (48) hours before excavation so that underground facilities may be marked in the field. Locations of existing utility mains and utility connections, if shown on the plans, are only approximate. The Engineer assumes no responsibility for accuracy or completeness of said data, which is offered solely for the convenience of the Contractor. If the Contractor finds that a known utility has not marked the job site with either locations or no facilities, Contractor shall be responsible for contacting the utility, or USA regarding the discrepancy before proceeding with work.

Attention is directed to the possible existence of underground main or trunk line facilities not indicated on the plans or in the special provisions. The Contractor shall ascertain the exact location of underground main or trunk lines whose presence is indicated on the plans or in the special provisions, the location of their service laterals or other appurtenances and of existing service lateral or appurtenances of any other underground facilities which can be inferred from the presence of visible facilities such as buildings, meters and junction boxes prior to doing work that may damage any of such facilities or interfere with their service.

If the Contractor discovers underground main or trunk lines not indicated on the Plans or in the special provisions, it shall immediately give the Engineer and the Utility Company written notification of the existence of such facilities. Such mains or trunk lines shall be located and protected from damage as directed by the Engineer and the cost of such work will be paid for as extra work as provided in Section 4-1.05. Damage due to the Contractor's failure to exercise reasonable care shall be repaired at its cost and expense.

5.15 Acceptance of Contract

Standard Specifications Section 5-1.46, "Inspection and Contract Acceptance," is amended to include the following:

However, nothing in this Section 5-1.46 shall be construed to relieve the Contractor of full responsibility for correcting or replacing defective work or materials found at any time before the expiration of the one-year maintenance bond required under Section 3.03 of these Special Provisions.

5.16 Availability of Plans

Contractor shall maintain on the job site at a specific location an official set of Contract Documents, readily available at all times to the Engineer or Inspector.

*** END OF SECTION ***

SECTION 6. CONTROL OF MATERIALS

6.01 General

Attention is directed to Standard Specifications Section 6, "Control of Materials," and these Special Provisions.

6.02 City-Furnished Materials

City-furnished materials shall be furnished in conformance to Standard Specifications Section 6-1.02 and as described herein.

The City-furnished materials on this project, if any, are listed in Section 2, "Supplementary General Conditions," of these Special Provisions.

The Contractor shall submit a written request to the Project Manager for materials at least forty-eight (48) hours in advance of the date and time of their intended use. The request shall state the quantity and type of each material. Unless otherwise specifically provided in the Special Provisions, City-furnished materials will be stored at the City Parks Yard at 420 Carolan Avenue, Burlingame. Materials will be available for pickup on weekdays, holidays excepted, from 8:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 4:30 p.m.

All City-furnished materials that are not used on the project shall remain the property of the City and shall be returned to the City in as-furnished condition at the locations designated by the Engineer.

Any water use from fire hydrants shall be metered. A cash deposit shall be posted at the City Water Department Office at 501 Primrose Road, Burlingame, California, as assurance that the meter is returned in good condition. Meters shall be obtained from and returned to the Water Department Repair Shop at the City Corporation Yard at 1361 North Carolan Avenue, Burlingame, California,. If the meter is returned in good condition, a refund shall be mailed to the Contractor. Contractor shall also pay for the amount of water used. Water drawn from the City-furnished meter shall only be used for this project.

Any damage to the meters while in the Contractor's possession shall be its responsibility and deductions will be made from the deposit for repairs to the meters. Meters must be returned to the City within 10 working days after work is completed and payment made for water used prior to final payment.

6.03 Local Materials

The second paragraph of Standard Specifications Section 6-2.04, "Local Materials," is replaced with the following:

Testing of local materials to be used in the work for compliance with the specifications will be at the Contractor's expense.

6.04 Buy America

Standard Specifications Section 6-2.05, “Buy America,” is deleted, unless this is a federally-funded contract.

6.05 Specific Brand or Trade Name and Substitution

Standard Specifications Section 6-3.02, “Specific Brand or Trade Name and Substitution,” is amended to include the following:

The City Engineer’s decision to accept substitution is final.

*** END OF SECTION ***

SECTION 7. LEGAL RELATIONS AND RESPONSIBILITY

7.01 General

This section shall conform to Standard Specifications Section 7, "Legal Relations and Responsibility to the Public," with the following clarifications and amendments. The Contractor is responsible for protecting both its work and the public.

7.02 Construction Hours

Contractor shall not (including excavation and grading) work other than between the hours of 8:00 A.M. and 5:00 P.M. on weekdays (see Section 5.04 of these specifications), except in the case of urgent necessity in the interest of public health and safety, and then only with express permission of the Engineer. In the vicinity of any schools, the contractor shall not begin any operation until after 9:00 A.M. when school is in session.

7.03 Excavation Safety

Standard Specifications Section 7-1.02K(6)(b), "Excavation Safety," is amended to include the following:

If required the Contractor shall submit a trenching and shoring plan signed and stamped by a license civil engineer or licensed geotechnical engineer for approval by the City. The plan shall include trenching and shoring support calculations.

Designate a competent person to be on site at all times while trench excavation work is being performed. The competent person shall be certified and make daily inspection in accordance with all OSHA requirements. A competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Additionally, the Contractor shall provide upon request by the Engineer calculations and details proving the adequacy of any proposed steel plate trench or excavation bridging to carry traffic loads.

The Contractor shall comply with Public Contract Code § 7104 while excavating.

7.04 Assignment of Antitrust Actions

The Contractor's attention is directed to Standard Specifications Section 7-1.02L(2), "Antitrust Claims."

7.05 Highway Construction Equipment

Attention is directed to Standard Specifications Section 7-1.02O, "Vehicle Code."

7.06 Sound Control Requirements

Sound control shall conform to the provisions of Standard Specifications Section 14-8, "Noise and Vibration," and these special provisions.

The Contractor shall keep noise pollution due to construction activities as low as possible. In no case shall noise levels produced by the Contractor exceed either of the following maximums:

- A. No individual piece of equipment shall produce a noise level exceeding 85dBA at a distance of 25 feet.
- B. The noise level at any point outside of the property line or temporary construction area shall not exceed 85dBA. No equipment violating these standards will be allowed to operate.

In no case shall the Contractor's operations violate the noise ordinance (Municipal Code Chapter 10.40).

This noise level requirement shall apply to all equipment on the job or related to the job, including, but not limited to, trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud signals shall be avoided in favor of light warnings, except those required by safety laws for the protection of personnel.

7.07 Relations with Property Owners

The Contractor shall notify, in writing, property owners or residents at least forty eight (48) hours in advance of all work affecting access into and out of their property or place of business.

Forms for such notices will be provided to the Contractor at start of construction and shall be distributed to the property owners by the Contractor throughout the length of the Contract, whenever appropriate.

Concrete pouring shall be scheduled to re-open new and replace concrete driveways within seventy-two (72) hours after being closed.

Access to any place of business shall be maintained at all times and shall be coordinated with the business owner. Complete closure of any business access shall be only as approved in writing by the Engineer.

7.08 Public Convenience

Section 7-1.03 "Public Convenience" shall be amended by adding the following:

Attention is directed to Section 7 of the Standard Specifications regarding the fact that the Contractor is responsible for protecting both its work and the public.

The Contractor shall conduct his operations in a manner to minimize inconvenience to the homeowners, residents and the traveling public.

Closed driveways shall be re-opened for safe passage of vehicle and pedestrians by end of the each work shift.

Closed driveways during working hours shall be reopened temporarily as requested by property owners or residents to allow access to their driveways. The Contractor shall re-open the closed driveway within ten minutes (10) of such request.

Access to any place of business shall be maintained at all times and shall be coordinated with the business owner. Complete closure of any business access shall be only as approved in writing by the Engineer.

The Contractor shall conduct his operations in a manner to minimize inconveniences to property owners and residents and to avoid damage on private property. The Contractor shall maintain property owner and resident access to the homes at all times. The Contractor shall keep the work site on the private property in a tidy and neat manner. The Contractor shall remove all tools, equipment and material from the property at the end of each workday.

7.09 Indemnification

Contractor shall indemnify, defend, and hold the City, its directors, officers, employees, agents, and volunteers harmless from and against any and all liability, claims, suits, actions, damages, and causes of action arising out of, pertaining or relating to the actual or alleged negligence, recklessness or willful misconduct of Contractor, its employees, subcontractors, or agents, or on account of the performance or character of the services, except for any such claim arising out of the sole negligence or willful misconduct of the City, its officers, employees, agents, or volunteers. It is understood that the duty of Contractor to indemnify and hold harmless includes the duty to defend as set forth in section 2778 of the California Civil Code. Notwithstanding the foregoing, for any design professional services, the duty to defend and indemnify City shall be limited to that allowed by state law. Acceptance of insurance certificates and endorsements required under this Agreement does not relieve Contractor from liability under this indemnification and hold harmless clause. This indemnification and hold harmless clause shall apply whether or not such insurance policies shall have been determined to be applicable to any of such damages or claims for damages.

*** END OF SECTION ***

SECTION 8. PROSECUTION AND PROGRESS

8.01 General

Prosecution and progress shall conform to Standard Specifications Section 8, "Prosecution and Progress," and these Special Provisions.

8.02 Progress Schedule

The work to be done shall be performed in stages to minimize the inconvenience to the public.

The Contractor shall develop and maintain the appropriate level critical path method schedule for this project in compliance with Standard Specifications Section 8-1.02, "Schedule." In addition to the required schedule reports to be submitted to the City in accordance with Standard Specifications Section 8-1.02, "Schedule," the Contractor shall maintain and furnish to the Engineer on a weekly basis a "three week look ahead" report detailing planned work for the following three weeks, highlighting critical path items of work.

8.03 Start of Job Site Activities

The Contractor shall sign and return the Contract Documents and furnish required bonds and insurance certificates within ten (10) working days after the date of the Notice of Contract Award. If the insurance and bonds are not provided within this time period, the City may declare the bid bond forfeited and award the bid to another bidder. Alternatively, the City may begin to count the elapsed time as "working days" under the Agreement.

The Contractor shall be able to begin work within fifteen (15) calendar days after receiving notice that the Contract has been approved by the City of Burlingame and shall diligently prosecute the same to completion before the expiration of the number of working days as set forth in the "Notice to Bidders." The "Notice to Proceed" shall indicate the "Beginning of Work" date to be used to determine the date of completion.

The "Notice to Proceed" will be given at the preconstruction meeting and will indicate the "Beginning of Work" date to be used to calculate the date of completion.

Even though the counting of working days may have begun, the Contractor shall not begin work before the preconstruction conference. The Contractor shall furnish all specified submittals to the Engineer at, or prior to, the preconstruction conference and shall obtain all specified approvals contained in the Standard Specifications and these Special Provisions prior to the beginning of job site activities.

8.04 Liquidated Damages

The Contractor's attention is directed to the Supplementary General Conditions for Liquidated Damages.

8.05 Contractor's Control Termination

The Contractor's attention is directed to Standard Specifications Section 8-1.13, "Contractor's Control Termination" and these Special Provisions.

If the Contractor's control of the work is terminated or it abandons the work and the contract work is completed in conformance with the provisions of Section 10255 of the Public Contract Code, any dispute concerning the amount to be paid to the City by the Contractor or its surety, under the provisions of Section 10258 of said Act, shall be subject to arbitration in accordance with the section of these special provisions entitled "Arbitration." The surety shall be bound by the arbitration award and is entitled to participate in such arbitration proceedings.

8.06 As-Built Data

The Contractor shall submit all information to the Engineer before project acceptance, including legible marked up plans of what was constructed, as required by the Engineer to verify as-built drawings for all permanent project work.

*** END OF SECTION ***

SECTION 9. MEASUREMENT AND PAYMENT

9.01 General

Measurement and payment shall be in conformance with these specifications in Section 9, "Payment," of the Standard Specifications and these Special Provisions.

Contractors' attention is directed to Standard Specifications Section 9-1.03, "Payment Scope," and as amended herein.

The fourth paragraph in Standard Specifications Section 9-1.03, "Payment Scope," is as follows:

Full compensation for work specified in divisions I, II and X of the Standard Specifications, and in Sections 1 and 2 of these special provisions is included in the payment for the bid items unless:

1. Bid item for the work is shown on the Bid Item List.
2. Work is specified as change order work.

When an (F) is included after a bid item name on the Bid List, that bid item quantity is a final pay item.

The Contractor shall agree that the approximate quantities shown in the Bid Item List are solely for the purpose of comparing bids. The Contractor's compensation will be computed upon the basis of the actual quantities of work marked by the Engineer and completed, whether they be more or less than those shown in the Bid Item List.

Linear measurement shall be determined from measurements of bid items complete and in place. Unit counts will be made of the unit items complete and in place. Weight measurements will be based on weight receipts issued by a qualified weight master. Any other method of establishing the quantities not listed specifically herein, or defined in other portions of the contract provisions, shall be determined by referring to the applicable section of the Standard Specifications.

9.02 Payment Adjustments for Price Index Fluctuations

Standard specifications Section 9-1.07, "Payment for Adjustments for Price Index Fluctuations," is deleted, unless otherwise specified in the Supplementary Conditions.

9.03 Lump Sum Bid Item Progress Payments

The first paragraph of Standard Specification Section 9-1.16B, "Schedule of Values," is amended to include the following:

If a schedule of values is not specified to be submitted or a payment breakdown is not provided in the payment clause of the applicable Standard Specifications or these Special Provisions, progress payments for lump sum bid items will be a percentage of the lump sum

bid item price based on the Engineer's determination of the amount of lump sum work already performed. At Contractors option, submit a lump sum breakdown that provides sufficient detail for the Engineer to determine the value of work performed. The Engineer may consider but not exclusively base the determination of progress payments on Contractors lump sum breakdown. The Engineer's determination of progress payments for lump sum bid items under the Contract will be final in accordance with Standard Specifications Section 5-1.03.

9.04 Materials On-Hand

Standard Specifications Section 9-1.16C, "Materials on Hand," is replaced by the following:

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

9.05 Mobilization

Standard Specifications Section 9-1.16D, "Mobilization," is replaced with the following:

9-1.16D Mobilization

Public Contract Code Section 10104 defines "mobilization." The Contractor is eligible for partial payments for mobilization if the Contract includes a bid item for mobilization. The Department will make partial payments no less often than as specified under Public Contract Code Section 10264. If the Contract does not include a mobilization bid item, mobilization is included in the payment for the various bid items.

9.06 Retentions

Standard Specifications Section 9-1.16F, "Retentions," is replaced with the following:

9-1.16F Retentions

The City shall retain 5 percent of the estimated value of the work done and 5 percent of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for Contractors fulfillment of the contract.

Pursuant to Public Contract Code Section 22300, the Contractor will be permitted, at its request and sole expense, to substitute securities for any monies withheld by the City to ensure performance under the contract. Said securities will be deposited either with the City or with the state or federally chartered bank as escrow agent. Securities eligible for this substitution are those listed in Government Code Section 16430 or bank or savings and loan certificate of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other mutually agreed to by Contractor and the City. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

9.07 Progress Payments

On or before the first day of every month the Contractor and Engineer shall meet and prepare a written estimate of progress payments. From this amount, five percent (5%) will be deducted and, from the remaining ninety five percent (95%), there will be deducted any amounts due City from Contractor for supplies, materials, services, damages or otherwise deductible under the terms of the contract and the amount of all payments previously made to Contractor. The remainder will be paid by the City to the Contractor as a progress payment by the 20th day of the month. The remaining five percent (5%) thereof shall be paid to Contractor thirty-five (35) days after the recording of the Notice of Completion.

Pursuant to Public Contract Code Section 20104.50, the City will promptly process all requests for progress payments pursuant to this contract. As to any undisputed payments that are made more than thirty (30) days after receipt of an undisputed and properly submitted payment request from the Contractor, the City will pay interest equivalent to the legal rate set forth in Code of Civil Procedure Section 685.10.

9.08 Final Payment After Contract Acceptance

Standard Specifications Section 9-1.17D (1), "General" is amended to include the following:

Upon satisfactory completion of the entire work, the Engineer will recommend the acceptance of the work to the City Council. If the City Council accepts the completed work, it will cause a Notice of Completion to be recorded with the County Recorder.

Thirty-five days after the filing of the Notice of Completion, the Contractor will be entitled to the balance due for the completion and acceptance of the work, if certification is made by sworn written statement that all claims have been filed with the City based upon acts or omissions of the Contractor and that no liens or withhold notices have been filed against said work or the property on which the work was done.

9.09 Claim Resolution

Any claim by the contractor in connection with this project shall be resolved pursuant to Section 9204 of the Public Contract Code; the full text of which is as follows:

SECTION 1. Section 9204 is added to the Public Contract Code, to read:

- (a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.
- (b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.
- (c) For purposes of this section:

- (1) “Claim” means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:
 - (A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.
 - (B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.
 - (C) Payment of an amount that is disputed by the public entity.
- (2) “Contractor” means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.
- (3)
 - (A) “Public entity” means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.
 - (B) “Public entity” shall not include the following:
 - (i) The Department of Water Resources as to any project under the jurisdiction of that department.
 - (ii) The Department of Transportation as to any project under the jurisdiction of that department.
 - (iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.
 - (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
 - (v) The Military Department as to any project under the jurisdiction of that department.
 - (vi) The Department of General Services as to all other projects.
 - (vii) The High-Speed Rail Authority.
- (4) “Public works project” means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.
- (5) “Subcontractor” means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d)

(1)

- (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.
- (B) The claimant shall furnish reasonable documentation to support the claim.
- (C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.
- (D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2)

- (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.
- (B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If

mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

- (C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.
 - (D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.
 - (E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.
- (3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.
 - (4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.
 - (5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.
- (e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.
 - (f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements

in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

- (g) This section applies to contracts entered into on or after January 1, 2017.
- (h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.
- (i) This section shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.

9.10 Adjustment of Overhead Costs

Irrespective of the final payment to be made to the Contractor under this contract, there will be no adjustment of overhead costs.

9.11 Damages

Any provision in the Contract which limits the City's liability to an extension of time for delay for which the City is responsible and which delay is unreasonable under contemplation of the circumstances involved, and not within the parties', shall not be construed to preclude the recovery of damages by the Contractor or subcontractor. This section shall not be construed to void any provision in this Contract which requires notice of delays, provides for arbitration or other procedure for settlement, or provides for liquidated damages.

9.12 Compensation for General Conditions and Supplementary General Conditions

Compensation for doing any work under the General and Supplementary General Conditions shall be included in the various items of work, and no additional payment shall be made.

*** END OF SECTION ***

SECTION 10. MAINTAINING TRAFFIC

10.01 General

Attention is directed to Section 7-1.03, "Public Convenience," 7-1.04, "Public Safety," and Section 12, "Temporary Traffic Control," of the Standard Specifications. Nothing in these General Conditions shall be construed as relieving the Contractor from its responsibility as provided in said Section 7-1.09.

The Contractor is responsible for posting "No Parking" signs which will be furnished by the City, including "Hooding" or otherwise posting on all parking meters in the areas of work. The Contractor shall clean all construction area sign panels at the time of installation.

To properly provide for changing traffic conditions and damage caused by public traffic or otherwise, the Contractor shall be prepared to furnish on short notice additional portable signs and sign mounting devices. The Contractor shall maintain an inventory of the commonly required items at the jobsite or shall make arrangements with a supplier who is able, on a daily basis, to furnish such items on short notice.

10.02 Portable Delineators

When work is in progress in a trench or other excavation adjacent to the traveled way, portable delineators, conforming to Section 12-3.04, "Portable Delineators," of the Standard Specifications, shall be placed on the edge of pavement. At other times, the portable delineators shall be placed off of and adjacent to the edge of pavement. The portable delineators shall be spaced as necessary for proper delineation. The spacing between delineators shall not exceed one hundred feet (100') on tangents or fifty feet (50') on curves.

10.03 Lane Closures

A traffic control system shall consist of closing traffic lanes in accordance with the details shown on the Traffic Control Plan, the provisions in Section 12, "Temporary Traffic Control," of the Standard Specifications and the following requirements.

No work shall be allowed to begin before closing any intersection or street. A "Road Closed Ahead" sign, mounted on a sturdy mounting device, shall be placed at the far end of every block converging on that intersection or street.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component and shall restore the component to its original location.

When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder.

10.04 Parked Vehicles

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

The Contractor shall notify the Engineer of its intent to begin work at least five (5) days before work is begun. The Contractor shall cooperate with the Engineer relative to handling traffic through the area and shall make its own arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at twenty-five-foot (25') intervals to a point not less than twenty-five feet (25') past the last vehicle or piece of equipment. A minimum of nine (9) cones or portable delineators shall be used for the taper. Contractor's warning signage and markings shall conform to the requirements of the Caltrans Traffic Manual, and in any event, a C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags prior to the taper.

10.05 Traffic Control

The Contractor shall provide and erect such warning lights, directional signs and barriers as are necessary to prevent accidents and avoid damage or injury to passing traffic. The Contractor shall comply with Section 12 of the Standard Specifications.

Full compensation for all traffic control, including any flagging costs, shall be considered as included in the bid schedule.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if, in the opinion of the Engineer, public traffic will be better served and the work expedited. Such deviations shall not be adopted until the Engineer has indicated written approval. All other modifications will be made by contract change order.

The Contractor shall prosecute the work in such a manner as not to damage any private property. All equipment and material shall be stored by the Contractor off the traveled way during non-working hours. Should any such structures or property be damaged during the operations of the Contractor, it shall immediately notify the proper owners or authorities and shall arrange for the immediate repair of same at its expense.

(A) Driveway Entrance Road Access

The Contractor's attention is directed to the fact that access to all driveways and entrance roads shall be maintained at all times, except during the time such driveways or entrance roads are being resurfaced as part of this contract. The Contractor shall provide the Engineer and the affected property occupants with written notice five (5) days in advance of beginning such driveway or entrance road resurfacing work, and shall complete such resurfacing work and restore vehicular access to each driveway or entrance road within six (6) hours after commencement of such resurfacing work. Forms of such notice of driveway closure will be

provided to the Contractor at start of construction and shall be distributed to the property owner by the Contractor through the length of the contract, whenever appropriate.

Compensation for distributing such written notice shall be considered as included in the appropriate contract bid item necessitating the closure, and no additional compensation will be allowed therefor.

(B) Pedestrian Facilities

Existing pedestrian facilities shall be maintained in a safe condition through construction areas within the Project right of way at all times. In local residential areas the requirement for paved walkway area may be waived if other suitable and safe surface is available and is approved by the Engineer. However, all pedestrian facilities provided through or around construction areas shall be accessible for persons with disabilities in conformance with the requirements of the Americans with Disabilities Act and implementing laws and regulations.

(C) Temporary Steel Plate Bridging with Non-Skid Surface

When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a nonskid surface and shoring may be required to preserve unobstructed traffic flow. In such cases, the following conditions shall apply:

1. Steel plates used for bridging must extend a minimum of 12" (305 mm) beyond the edges of the trench.
2. Steel plate bridging shall be installed to operate with minimum noise.
3. The trench shall be adequately shored to support the bridging and traffic loads.
4. Temporary paving with cold asphalt concrete shall be used to feather the edges of the plates, if plate installation by Method (2) described below, is used.
5. Bridging shall be secured against displacement by using adjustable cleats, shims, or other devices.

Steel plate bridging and shoring shall be installed using either Method (1) or (2):

- 1) Method 1 [For speeds greater than 45 mph (70 Km /hr)]: The pavement shall be cold planed to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate.
- 2) Method 2 [For speeds less than 45 mph (70 Km/hr)]: Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 2" (50 mm) into the pavement. Subsequent plates are butted to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope 8.5 % with a minimum 12" (305 mm) taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with

either graded fines of asphalt concrete mix, concrete slurry or an equivalent slurry that is satisfactory to the Caltrans' representative.

Contractor is responsible for maintenance of the steel plates, shoring, and asphalt concrete ramps.

Unless specifically approved by the Engineer, use of steel plate bridging over the width of the open pipe trench should not exceed four (4) consecutive working days in any given week.

Backfilling of excavations shall be covered with a minimum 3" (75 mm) temporary layer of cold asphalt concrete.

The following table shows the advisory minimal thickness of steel plate bridging required for a given trench width (A-36 grade steel, designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual).

Trench Width Minimum Plate Thickness

- 1) Span < 10" the minimum plate thickness is (0.25 m) ½" (13 mm)
- 2) Span > 10" < 1'-11" the minimum plate thickness is (0.58 m) ¾" (19 mm)
- 3) Span > 1'-11" < 2'-7" the minimum plate thickness is (0.80 m) 7/8" (22 mm)
- 4) Span > 2'-7" < 3'-5" the minimum plate thickness is (1.04 m) 1" (25 mm)
- 5) Span > 3'-5" < 5'-3" the minimum plate thickness is (1.60 m) 1 ¼" (32 mm)

NOTE: For spans greater than 5'-3" (1.6 meters), a structural design shall be prepared by a California registered civil engineer.

All steel plates within the right-of-way whether used in or out of the traveled way shall be without deformation. Inspectors can determine the trueness of steel plates by using a straight edge and any plate that is permanently deformed shall be rejected.

Steel plates used in the traveled portion of the highway shall have a surface that was manufactured with a nominal Coefficient Of Friction (COF) of 0.35 as determined by California Test Method 342 (See Appendix H). If a different test method is used, Contractor may utilize standard test plates with known coefficients of friction available from each Caltrans District Materials Engineer to correlate skid resistance results to California Test Method 342. Based on the test data, Contractor shall determine what amount of surface wear is acceptable, and independently ascertain when to remove, test, or resurface an individual plate.

A Rough Road sign (W33) with black lettering on an orange background may be used in advance of steel plate bridging. This sign is used along with any other required construction signing.

Surfacing requirements are not necessary for steel plates used in parking strips, on shoulders not used for turning movements, or on connecting driveways, etc., not open to the public.

10.06 Contractor Representative

As specified here and in Section 5.03 of these specifications, the Contractor shall be represented at all times during working operations.

One person at the work site shall be designated as having responsibility for carrying out directions from the Engineer.

10.07 Portable Flashing Beacons

Portable flashing beacons conforming to the provisions in Section 12, " Temporary Traffic Control," of the Standard Specifications shall be furnished, placed and maintained at the locations as directed by the Engineer.

If flashing beacons are displaced or are not in an upright position, from any cause, during the progress of the work, the Contractor shall immediately repair and repaint or replace the flashing beacons in their original locations.

At the end of each work shift, all portable flashing beacon units shall be removed from the traveled way. Full compensation for placing, removing and storing flashing beacon units daily as the work progresses shall be considered as included in the contract unit price paid for the various items of work and no additional compensation will be allowed therefor.

10.08 Portable Barricades

Type III barricades conforming to the provisions in Section 12-3, "Traffic-Handling Equipment and Devices," of the Standard Specifications shall be furnished, placed, and maintained in sturdy working manner at the locations designated by the Engineer and in accordance with the provisions in Section 7-1.03, "Public Convenience," of the Standard Specifications and these General Conditions.

The barricades shall conform to the details shown on Caltrans Standard Plan A73 and as specified in Section 12-3.02, "Barricades," of the Standard Specifications, except that minor variations in dimensions may be accepted if approved by the Engineer.

Barricades damaged from any cause during the progress of the work shall be replaced or repaired (including painting and reflectorized material) by the Contractor at its expense.

10.09 Temporary Delineation

If permanent or temporary traffic delineation operations are not properly performed by the working day completion time(s) specified, the City may elect to perform such operations; cost for all such City-performed operations will be at the Contractor's expense, with all costs therefor deducted from Contractor's progress payments.

10.10 Procedures and Posting of "No Parking" Signs on City Streets

The City's policy is to post effectively and prior to towing, attempt to contact all those in violation of the properly posted restrictions. Advanced coordination with the Police Department is required to make sure that the officers have sufficient notice and accurate construction time schedules for this activity. The Contractor is responsible for contacting the Police Department and effecting this notification procedure. Time must also be allowed for towing equipment to be notified and tow any vehicles.

The Police Traffic Sergeant's office hours are 8:00 a.m. to 9:00 a.m. and 2:30 p.m. to 4:00 p.m. The Traffic Sergeant may be reached by phone at 777-4100. If you need to contact the Sergeant immediately - when the sergeant is not in the office, contact Police Dispatch at the above number and ask them to contact the Sergeant. Prior to start of any work under this Contract, Contractor shall arrange a meeting with the Traffic Sergeant to go over the specific job needs.

Requirements for "No Parking" Posting and Any Required Towing Are As Follows:

- 1) Signs shall have date(s) of the "No Parking" (the actual day[s] of work – for example: 5/24/03 to 5/25/03) and hours (for example: 6:00 a.m. to 4:30 p.m.) indicated.
- 2) The No Parking areas shall be posted at least forty-eight (48) hours ahead of effective time. If the No Parking area is to take effect on a Monday, then the No Parking Area shall be posted pursuant to this section no later than the preceding Thursday evening. If the No Parking area is to take effect on the day following a holiday, then the No Parking area shall be posted pursuant to this section no later than the evening of the second preceding business day. For example, if the holiday falls on a Monday, the area shall be posed by Thursday evening; if the holiday falls on a Thursday, the area shall be posted by Tuesday evening. At the time of posting, the Contractor shall notify Police Dispatch with the following information: a) name and phone number of the person doing the posting; b) time and date posted; c) times and dates when the No Parking will be in effect; and d) location of the posting by street addresses.
- 3) Post on all trees and poles between barricades facing in the direction that drivers in traffic can read. Signs shall be mounted such that the words, "No Parking" are at an elevation at least 3 feet and not more than 7 feet above the adjacent flow line. Signs placed on trees shall be attached by string only. Signs placed on existing poles shall be attached by either string or tape only so as not to cause any damage to existing poles.
- 4) Barricades or temporary poles containing the no parking information shall be placed every twenty-five feet (25') on center or less.
- 5) Lighted barricades shall be installed on centers of no more than 150' if placed in the street.
- 6) The Contractor shall promptly reset or replace all damaged or defective signs.
- 7) Upon completion of work in each area, all signs, mounting materials, stakes, and barricades shall be promptly and completely removed by the Contractor.
- 8) Contractor shall notify Police Department of the work location and start time on the day before. Also, Contractor shall notify the Police Department at starting time for each street

or area of work during the day. In addition, the Contractor shall update time schedule, if any changes, by phone: Call Police Department at (650) 777-4100 and have them notify the Traffic Sergeant and Parking Enforcement Officers.

THE POLICE DEPARTMENT HAS THE AUTHORITY TO REFUSE TOWING IF CONTRACTOR HAS NOT PLACE SIGNAGE APPROPRIATELY IN ACCORDANCE WITH THESE GENERAL CONDITIONS.

*** END OF SECTION ***

SUPPLEMENTARY GENERAL CONDITIONS
WASHINGTON PARK PLAYGROUND, SPORTS COURT, & PICNIC AREA
CITY PROJECT 85670

The General Conditions and Standard Conditions are hereby amended as follows:

1. Section 6.02 of the General Conditions is amended by adding the following:

The City-furnished materials for this project that will be purchased by the City and Installed by the Contractor are:

- a. Site Drinking Fountains
- b. Park Benches
- c. Trash and Recycle Receptacles
- d. Bike Racks
- e. Picnic Tables
- f. Park Grills

The Contractor will provide the Project Manager with at least 48 hours notice to arrange for pick-up of the pre-purchased items at either 250 Anza Boulevard, Burlingame or 420 Carolan Avenue, Burlingame.

The following items will be purchased and installed by others:

- a. Washington Park Playground Equipment & Installation will be installed under a separate contract with Ross Recreation. The Contractor will coordinate the schedule with Alex Hailey phone: 707.538.3800 or email: alexh@rossrec.com
- b. The turf surfacing will be installed by Robertson, Inc. The Contractor will coordinate the schedule with Shelly Vasquez email: Shelly.Vasquez@playcoresurfacing.com or phone 650-433-0655.

2. Section 8.04 of the General Conditions is amended by adding the following:

“Contractor’s failure to achieve substantial completion of the work described in the Contract Documents will cause the City to incur losses of types and in amounts which are impossible to compute and ascertain with certainty. The Contractor shall pay to the City of Burlingame liquidated damages in the amount of \$1000 per day for each day and every calendar days’ delay in finishing the work in excess of the number of days (120) referred to in these specifications. The amount may be assessed and recovered by the City as against Contractor and its Surety. Such liquidated damages are intended to represent estimated actual damages and are not intended as a penalty, and Contractor shall pay them to the City, without limiting City's any of the City’s rights as provided in the Contract Documents.”

3. The Contractor shall complete the project within 120 working days from the Notice to Proceed. Within the 120 working days, the Contractor shall coordinate and schedule for the installation of play equipment and play surfacing by a Contractor under separate contract with the City. Within the overall 120 working day schedule the Bidder shall include and account for:
 - a. 15 working days for installation of playground equipment
 - b. 10 working days for installation of playground surfacing.
4. Bidder's scope shall include preparation of sub-grade and placement of base grade for playground surfacing installation. See Details 5 & 6 / L4.0

*** END OF SECTION ***

Washington Park Playground, Sports Court and Picnic Area

Package 1

Bid Set

March 25, 2019

Architect's Project Number 12421-04

City's Project Number 85670

**Group 4 Architecture Research + Planning, Inc.
211 Linden Avenue
South San Francisco, CA
(650) 871-0709**

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| SECTION 01 4339 | MOCK-UPS |
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| SECTION 01 5050 | EROSION CONTROL |
| SECTION 01 5639 | 01 7TEMPORARY TREE AND PLANT PROTECTION |
| SECTION 01 5723 | STORM WATER POLLUTION CONTROL |
| SECTION 01 6000 | PRODUCT REQUIREMENTS |
| SECTION 01 6161 | VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTION |
| SECTION 01 7123 | 01 7FIELD ENGINEERING |
| SECTION 01 7300 | EXECUTION REQUIREMENTS |
| SECTION 01 7329 | CUTTING AND PATCHING |
| SECTION 01 7419 | CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL |
| SECTION 01 7700 | CLOSEOUT PROCEDURES |
| SECTION 01 7823 | OPERATION AND MAINTENANCE DATA |
| SECTION 01 7834 | WARRANTIES |
| SECTION 01 7839 | PROJECT RECORD DOCUMENTS |
| SECTION 01 7900 | DEMONSTRATION AND TRAINING |
| SECTION 01 8113 | SUSTAINABLE DESIGN REQUIREMENTS |
| SECTION 01 8121 | ENVIRONMENTAL IMPACT OF MATERIALS |

FACILITY CONSTRUCTION SUBGROUP:

DIVISION 2 – EXISTING CONDITIONS – NOT USED

DIVISION 3 – CONCRETE – NOT USED

DIVISION 4 – MASONRY – NOT USED

DIVISION 5 – METALS – NOT USED

DIVISION 6 – WOOD, PLASTICS, AND COMPOSITES – NOT USED

DIVISION 7 – THERMAL AND MOISTURE PROTECTION – NOT USED

DIVISION 8 – OPENINGS – NOT USED

DIVISION 9 – FINISHES – NOT USED

DIVISION 10 – SPECIALTIES – NOT USED

DIVISION 11 – EQUIPMENT

SECTION 11 6800 PLAY EQUIPMENT

DIVISION 12 – FURNISHINGS – NOT USED

DIVISION 13 – SPECIAL CONSTRUCTION – NOT USED

DIVISION 14 – CONVEYING EQUIPMENT – NOT USED

FACILITY SERVICES SUBGROUP:

DIVISION 21 – FIRE SUPPRESSION – NOT USED

DIVISION 22 – PLUMBING – NOT USED

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING – NOT USED

DIVISION 26 – ELECTRICAL

SECTION 26 0500 BASIC ELECTRICAL REQUIREMENTS

SECTION 26 0800 TESTING

SECTION 26 2700 BASIC ELECTRICAL MATERIALS & METHODS

SECTION 26 5601 SITE LIGHTING

DIVISION 27 – COMMUNICATIONS – NOT USED

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY – NOT USED

SITE AND INFRASTRUCTURE SUBGROUP:

DIVISION 31 – EARTHWORK

| | |
|-----------------|--------------------------------|
| SECTION 31 1000 | SITE CLEANING |
| SECTION 31 1001 | PLANT PROTECTION |
| SECTION 31 1100 | PAVEMENT COURSE |
| SECTION 31 2000 | EARTH MOVING |
| SECTION 31 2100 | UTILITY TRENCHING AND BACKFILL |

DIVISION 32 – EXTERIOR IMPROVEMENTS

| | |
|-----------------|---|
| SECTION 32 1216 | ASPHALT PAVING |
| SECTION 32 1312 | SITE CONCRETE |
| SECTION 32 1313 | CONCRETE PAVEMENT |
| SECTION 32 1318 | CEMENT & CONCRETE FOR EXTERIOR IMPROVEMENTS |
| SECTION 32 1541 | STABILIZED DG PAVING |
| SECTION 32 1713 | PARKING BUMPERS |
| SECTION 32 1816 | SYNTHETIC TURF SAFETY SURFACING |
| SECTION 32 1823 | RECREATIONAL COURT SURFACING |
| SECTION 32 3110 | DECORATIVE FENCES & GATES |
| SECTION 32 3114 | VINYL COATEDCHAIN LINK FENCING |
| SECTION 32 3300 | SITE FURNISHINGS |
| SECTION 32 8400 | IRRIGATION |
| SECTION 32 9000 | PLANTING |

DIVISION 33 – UTILITIES

| | |
|-----------------|-------------------------------|
| SECTION 33 1000 | WATER SYSTEM |
| SECTION 33 4100 | STORM UTILITY DRAINAGE PIPING |
| SECTION 33 4600 | SUBDRAINAGE |

PROCESS EQUIPMENT SUBGROUP: NOT USED

END OF DOCUMENT 00 0110

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SECTION 01 1100 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

- A. Abbreviated Written Summary: Briefly and without force and effect upon the Contract Documents, the Work of the Contract can be summarized as follows
 1. The Project consists of an Early Site Package that entails site improvements including multi-use court, picnic area, playground, pathways and utility infrastructure as shown on Documents prepared by Group 4 Architecture, Research + Planning, Inc.
 2. Sitework:
 - a. With the goal of providing uninterrupted community access to the existing playground, an early site package has been developed. The Early Site Package includes civil, landscape and electrical/lighting site work for the new relocated playground, picnic area and multi-use court site amenities located west of the existing emergency vehicle access road.
 3. Schedule:
 - a. The work plan for the playground project anticipates construction completion by the end of December 2019.
 4. Location: Burlingame, California,
 5. Date: March 25, 2019
- B. Site demolition Work will be as described in Division 31.

1.3 HAZARDOUS MATERIALS

- A. Hazardous Materials Removal: Hazardous materials management is not a part of the scope of work (NIC). The Architect Group 4 Architecture, Research + Planning, Inc., and any of the Architect's consultants, assume no responsibility for the management of hazardous materials that may be on this site. The Contractor shall contact the Owner to coordinate any and all issues related to hazardous material management. The Contractor shall comply with applicable codes, laws, regulations and standards regarding work with and around potentially hazardous materials. The Contractor shall be responsible for insuring that personnel within the work area are protected from exposure to hazardous materials. If materials are discovered that may be hazardous, the Contractor shall immediately notify the Owner and cease work until conditions can be corrected.

1.4 CONTRACTOR USE OF PREMISES

- A. Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public.
- B. Coordinate use of premises and access to site with the Owner.

- C. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
- D. Keep driveways and entrances clear at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize requirements for storage of materials.
- E. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.
- F. Limit use of site for work and storage to areas within the site boundaries unless specific areas are allowed in writing by the Owner.
- G. Move any stored products, under Contractor's control, which interfere with operations of the Landlord, or separate contractor.
- H. If necessary, obtain and pay for the use of additional storage or work areas needed for operations. Unless otherwise agreed upon, on-site storage shall be limited to areas of new construction.
- I. Do not unreasonably encumber space with materials.
- J. Work area must be kept clean and safe at all times.
- K. No propane or similar flammable gas or liquid used in construction is permitted to be stored on the premises. It is to be removed from the premises when not in use during the off hours and weekends.
- L. Repair damage caused by construction operations. Take precautions necessary to protect the building and occupants during the construction period.
- M. Contractors shall submit both home and office numbers to the Owner's Project Manager's office for a minimum of 2 employees in the event they must be contacted during off hours or weekends.

1.5 COORDINATION

- A. Coordinate work to assure efficient and orderly sequence of installation of construction elements.
- B. Verify that characteristics of interrelated operation equipment are compatible; coordinate work having interdependent responsibilities for installing, connection to, and placing such equipment in service. Coordinate space requirements and installation of mechanical and electrical work; make runs parallel with lines of building.
- C. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated. Coordinate locations of fixtures and outlets with finish elements.
- D. Coordinate construction schedule and operations with Owner and Architect.

- E. Verify all existing conditions prior to bidding and re-verify conditions prior to commencement of any portion of the work. Notify Architect of any discrepancies between the existing conditions and those indicated in the contract documents prior to bidding or commencement of construction activities.
- F. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

1.6 FIELD ENGINEERING

- A. Provide project engineering service; establish lines and levels by use of recognized engineering survey practices.
- B. Locate and protect control and reference points.

1.7 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS

- A. Regulatory Requirements:
 - 1. Architect has contacted governing authorities and reviewed design requirements of local, state and federal agencies for applicability to Project.
 - 2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.
- B. Reference Standards:
 - 1. For Products specified by association or trade standards, comply with requirements of referenced standard, except when more rigid requirements are specified or are required by applicable codes.
 - 2. Applicable date of each standard is that in effect as of Contract date, except when a specific date is specified.

1.8 ENVIRONMENTAL PROTECTION AND NOISE CONTROL

- A. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner's Representative not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's Representative's written permission before proceeding with disruptive operations.

1.9 ORDERING OF MATERIALS

- A. Certain materials are considered custom or long-lead items and must be expedited through submittals and ordering. Contractor shall verify delivery for all materials and schedule submittals and orders accordingly.
- B. Contractor shall provide written verification that each custom or long-lead item has been ordered in sufficient time to meet proposed construction schedule.

1.10 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except in the case of urgent necessity in the interest of public health and safety, and then only with express permission of the Engineer, and except as otherwise indicated.
 - 1. Limit construction equipment maintenance to the same hours.
 - 2. In the vicinity of any schools, the contractor shall not begin any operation until after 9:00 A.M. when school is in session.
 - 3. No construction shall occur on State holidays (e.g., Thanksgiving, Labor Day).
 - 4. Weekend Hours: Obtain hours from Engineer.
 - 5. Early Morning Hours: Obtain hours from Engineer.
 - 6. Hours for Utility Shutdowns: Obtain from Owner's Representative.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's Representative written permission before proceeding with utility interruptions.
- D. Nonsmoking Building: Smoking is not permitted within the buildings or within 25 feet (8 m) of entrances, operable windows, or outdoor air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

1.11 CERTIFICATE OF SUBSTANTIAL COMPLETION

- A. Certificate of Substantial Completion will be executed for the Work occupied.
- B. Prior to Owner occupancy, electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 1100

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SECTION 01 2513 – PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

- A. “Basis-of-Design” where specified these Specifications shall be interpreted to require the named Basis-of-Design product or acceptable comparable product where additional manufacturers are listed. If no other manufacturers are listed, the Specification shall be interpreted to mean ‘no known equal’.
- B. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
- C. "Materials" are products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- D. "Named Products" are items identified by manufacturer's product name, including make or model designation indicated in the manufacturer's product literature.
- E. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock.
- F. “Substitutions”: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
- G. Descriptive Specification Requirements: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that provides the characteristics and otherwise complies with requirements.

1.4 REQUIREMENTS AND CONDITIONS

- A. Contractor is presumed to have bid products, materials, equipment, and methods meeting specified requirements. Substitutions must appear and function as intended and be approved as specified in this Section.

- B. Proposals for substitution must include full and complete data and necessary information required to evaluate the proposal. Proposals must include any cost and or time modifications at the time of proposal. Subsequent claim for cost and or time will not be considered.
 - 1. Where such substitutions are proposed by Contractor and are accepted by the Owner, Contractor shall assume costs required to make necessary revisions and modifications including additional costs to the Owner for evaluations of modifications of the project design submitted by Contractor to the Owner.
- C. Contractor is responsible for any changes to the Work caused by acceptance of substitutions. Acceptance of substitutions does not relieve Contractor from responsibility for compliance with the requirements of the Contract Documents.
- D. Where products, materials, equipment, and or method is specified and designated as "Basis-of-Design", Contractor is responsible for any required changes to the Work where the second or subsequently designated item is incorporated.
- E. Unless otherwise noted or specified, catalog description designated by the specified manufacturer's catalog number constitutes requirements for specified item. Such numbers and associated description and requirements establish standards of design and quality for materials, construction, fabrication, and installation. Equivalent items may be used provided they comply with the requirements specified and found to be equal in the opinion of the Architect/Engineer.
- F. The Architect/Engineer may use for comparison all characteristics of specified items as they appear in manufacturer's published data even though they may not have been particularly mentioned in the Specifications. The Architect/Engineer may request, at the Contractor's expense, additional data, field tests, or physical presentation as may be required.
- G. Substitute items shall not be ordered and or used without written acceptance of the Owner.
- H. Contractor will be required to provide specified item if substitution is not accepted.
- I. Failure of the Contractor to submit proposed substitutions for acceptance in the manner described and within the time prescribed shall be sufficient cause for rejection by the Owner of the proposed substitutions.
- J. The Contractor shall be responsible at its own expense for any changes resulting from its proposed substitutions that affect other parts of its own work or the work of other Contractors.
- K. Where proposed substitutions are not acceptable to the Owner and the originally specified item is not available through no fault of the Contractor, the Architect/Engineer will select an alternate. When such selection results in a cost and or time modification, contract will be adjusted in accordance with the General Conditions and Supplementary Conditions.
- L. The Owner reserves the right to revoke acceptance if items are not justifiably equal to those originally specified. Rejected items shall be replaced with the specified item at the Contractor's expense.

1.5 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than **15 business days** prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed unless otherwise indicated.

1.6 ACTION SUBMITTALS

- A. Submit list of proposed substitutions in accordance with the requirements in the General Conditions, Supplementary Conditions and this Section. Tabulate list by specification section number and name.
- B. Submit each specific request for substitution in ample time so as not to delay the execution of the Work or impede proper sequence of construction.
- C. Where the terms 'or equal', 'or accepted equal', or 'or accepted equivalent' are used in the specifications, this shall be interpreted as a requirement to request a substitution subject to the provisions of this Section and are used to establish the standards of quality, utility, and appearance required. Substitutions that are equal in quality, utility, and appearance to those specified will be approved, subject to the provisions of this Section.
- D. The first listed manufacturer is to be considered the 'Basis-of-Design' whether stated or not. Any additional manufacturers are to be considered substitutions, subject to the procedures and provisions of this Section.
- E. Requests for substitutions, submitted to the Architect by the Contractor after commencement of construction, will be reviewed at the Architect's standard hourly rate. The time required to review the substitution request and any subsequent changes to the drawings shall be charged to the Contractor.

- F. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Limit each request to one proposed substitution.
 2. Consecutively number each submittal and identify as to Contract Drawing number(s), Specification Section and other applicable identification.
 3. Requests for substitutions will only be considered if the Contractor supports the proposal with sufficient information to permit the Architect/Engineer to make a fair, equitable, and informed judgment. Sufficient data, drawings, samples, literature, and other detailed information shall be supplied that will demonstrate to the Architect/Engineer that the proposed substitute is equal in quality, utility, and appearance to the material specified.
 4. Substitution Request Form: Use form provided at the end of this Section or another similar form acceptable to Owner and Architect.
- G. Documentation: Show compliance with complete data substantiating compliance with the Contract Documents and the following, as applicable:
1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 2. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 4. Product Data, including drawings and descriptions of products and fabrication and installation procedures. Include the following:
 - a. Full product line catalog.
 - b. Pertinent sales and technical literature.
 - c. Name of local representative.
 - d. List of references. Include names and phone numbers of contact persons.
 - e. Specifications.
 - f. Test data and certificates.
 - g. Color charts.
 - h. Samples.
 - i. Additional information as requested by the Architect/Engineer.
 5. Samples, where applicable or requested.
 - a. If tests for the determination of quality and utility are required by the Architect, they shall be made at the expense of the Contractor by a testing laboratory, with acceptance of the test procedure first given by the Architect.
 6. Certificates and qualification data, where applicable or requested.
 7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 8. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 9. Research reports evidencing compliance with building code in effect for Project, from ICC-ES where applicable.

10. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - a. List of other trades, if any, which will be affected by the substitution.
 11. Cost information, including a proposal of change, if any, in the Contract Sum.
 - a. Where required, itemize comparison of proposed substitution with specified item and list variations or differences.
 - b. If the proposed substitution requires that portions of the Project be redesigned or construction be removed in order to accommodate the substituted item, submit design and engineering calculations prepared by a California licensed design professional. The Contractor shall bear all costs resulting from the substitution.
 12. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 13. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- H. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within **7 business days** of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within **15 business days** of receipt of request, or **7 business days** of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
- I. If more than two submissions of data are required, the cost of reviewing these additional submissions shall be charged directly against the Contractor; the Owner will withhold the funds necessary to cover these costs.
- J. Substitutions will not be considered when:
1. They are indicated or implied on shop drawing or product data submittals without formal request for substitution from the Contractor.
 2. They are requested by anyone other than the Contractor.
 3. They require substantial revision to the Contract Documents.
- K. Environmental Criteria for Evaluation of Substitute Products: The following environmental criteria will be used by the Architect to evaluate substitute products proposed by the Contractor.
1. Meeting sustainability objectives.
 2. Recycled Content: Post-consumer content and/or pre-consumer content.
 3. Toxicity.
 - a. Elimination of toxic substances as noted in MSDS Sheets
 - b. Off-gassing.
 4. Manufacturing Process.

- a. Off-gassing.
 - b. Potential soil/water contamination.
 - c. Embodied energy to produce and transport the product.
5. Proximity of manufacturing plant to the Project site.
 6. Recyclability.
 - a. Ease of deconstruction.
 - b. Ease of separation of contaminants.
 - c. Manufacturer program for recycling products.

1.7 QUALITY ASSURANCE

- A. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

1.8 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.
- B. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.
- C. Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 1. Revisions to Contract Documents requested by the Owner or Architect.
 2. Specified options of products and construction methods included in Contract Documents.
 3. Compliance with governing regulations and orders issued by governing authorities.

1.9 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming one or More Manufacturers with a Provision for Substitutions: Submit a request for substitution, during Bidding only, for any manufacturer not named.

1.10 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.11 CONTRACTOR'S REPRESENTATION

- A. Requests for substitution constitute a representation that the Contractor:
1. Has investigated proposed substitution and determined it meets or exceeds item in all respects.
 2. Will provide same warranty for substitution as for specified item.
 3. Will coordinate installation and make changes as may be required for Work to be complete in all respects.
 4. Waives claims for additional costs and time extensions not identified at time of request for substitution.
 5. Will reimburse Owner for review and redesign services associated with reapproval by authorities having jurisdiction.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 2513

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SUBSTITUTION REQUEST FORM

(During Bidding/Negotiation)

Project: _____ Substitution Request Number: _____
_____ From: _____
To: _____ Date: _____
_____ A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- The proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
_____ Telephone: _____

A/E's REVIEW AND ACTION

- Substitution approved: Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution approved as noted: Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution rejected: Use specified materials.
- Substitution Request received too late: Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples
 Tests Reports Other

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Coordination.
- B. Administrative and supervisory personnel.
- C. General installation provisions.
- D. Cleaning and protection.

1.3 COORDINATION

- A. Coordinate activities included in various Sections to assure efficient and orderly installation of each component. Coordinate operations included under different Sections that are dependent on each other for proper installation and operation.
- B. Where installation of one component depends on installation of other components before or after its own installation, schedule activities in the sequence required to obtain the best results.
- C. Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.
- D. Make provisions to accommodate items scheduled for later installation.
- E. Prepare memoranda for distribution to each party involved outlining required coordination procedures. Include required notices, reports, and attendance at meetings.
- F. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

1.4 ADMINISTRATIVE PROCEDURES

- A. Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress.
- B. Preparation of schedules.
- C. Installation and removal of temporary facilities.
- D. Delivery and processing of submittals.

E. Progress meetings.

F. Project closeout activities.

1.5 COORDINATION DRAWINGS

A. Prepare Coordination Drawings where close coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space necessitates maximum utilization of space for efficient installation of different components.

B. Show relationship of components shown on separate Shop Drawings.

C. Indicate required installation sequences.

D. Refer to Division 26 Section "Common Work Results for Electrical" for requirements for electrical installations.

1.6 INSPECTION OF CONDITIONS

A. The Installer of each component shall inspect the substrate and conditions under which Work is performed. Do not proceed until unsatisfactory conditions have been corrected.

1.7 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's installation instructions and recommendations, to the extent that they are more stringent than requirements in Contract Documents.

B. Inspect material immediately upon delivery and again prior to installation. Reject damaged and defective items.

C. Provide attachment and connection devices and methods necessary for securing each construction element. Secure each construction element true to line and level. Allow for expansion and building movement.

1.8 VISUAL EFFECTS

A. Provide uniform joint widths in exposed Work. Arrange joints to obtain the best effect. Refer questionable choices to the Architect for decision.

B. Recheck measurements and dimensions, before starting installation.

C. Install each component during weather conditions and project status that will ensure the best results. Isolate each part from incompatible material as necessary to prevent deterioration.

D. Coordinate temporary enclosures with inspections and tests, to minimize uncovering completed construction for that purpose.

1.9 MOUNTING HEIGHTS

A. Where mounting heights are not indicated, install components at standard heights for the application indicated. Refer questionable decisions to the Architect.

1.10 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as often as necessary through the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise operations to ensure that no part of construction, completed or in progress, is subject to harmful or deleterious exposure. Such exposures include:
 - 1. Excessive weathering.
 - 2. Excessively high or low temperatures or humidity.
 - 3. Air contamination or pollution.
 - 4. Water or ice.
 - 5. Chemicals or solvents.
 - 6. Heavy traffic, soiling, staining and corrosion.
 - 7. Rodent and insect infestation.
 - 8. Unusual wear or other misuse.
 - 9. Contact between incompatible materials.
 - 10. Theft or vandalism.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 3100

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SECTION 01 3131 – REQUEST FOR INTERPRETATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specifications, apply to this Section.

1.2 SECTION INCLUDES

- A. Procedures to be followed by Contractor upon discovery of any apparent conflicts, omissions, or errors in Contract Documents or upon having any question concerning interpretation.

1.3 PROCEDURES

- A. Notification by Contractor:
 - 1. Submit all requests for clarification and additional information in writing to Architect using the Request for Interpretation (RFI) form provided by Architect or a similar form approved by Architect.
 - 2. Number RFIs sequentially. Follow RFI number with sequential alphabetical suffix as necessary for each resubmission. For example, the first RFI would be “001”. The second RFI would be “002”. The first resubmittal of RFI “002” would be “002a”.
 - 3. Limit each RFI to one issue on one subject and to no more than five questions.
 - 4. Submit RFIs if one of the following conditions occur:
 - a. Contractor discovers an unforeseen condition or circumstance that is not described in the Contract Documents.
 - b. Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents.
 - c. Contractor discovers what appears to be an omission from the Contract Documents that cannot be reasonably inferred from the intent of the Contract Documents.
 - d. RFIs will not be recognized or accepted if, in the opinion of Architect, one of the following conditions exist and may result in the Architect requesting monetary compensation from the Contractor for time spent to review any of the following:
 - 1) Contractor submits the RFI as a request for substitution.
 - 2) Contractor submits the RFI as a submittal.
 - 3) Contractor submits the RFI under the pretense of a Contract Documents discrepancy or omission without thorough review of the Documents.
 - 4) Contractor submits the RFI in a manner that suggest that specific portions of the Contract Documents are assumed to be excluded or by taking an isolated portion of the Contract Documents in part rather than whole.
 - 5) Contractor submits an RFI in an untimely manner without proper coordination and scheduling of work or related trades.

5. Ask for any clarification or request for information immediately upon discovery. Submit RFIs in a reasonable time frame so as not to affect the project schedule while allowing the full response time described below.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect and Construction Manager.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

1.4 RESPONSE TIME

- A. Architect, whose decision will be final and conclusive, shall resolve such questions and issue instructions to Contractor within a reasonable time frame. In most cases, RFIs will receive a response within 7 calendar days. In some cases this time may need to be lengthened for complex issues, or shortened for emergency situations, as mutually agreed by all parties.
- B. Should Contractor proceed with the work affected before receipt of a response from Architect, within the response time described above, any portion of the work which is not done in accordance with Architect's interpretations, clarifications, instructions, or decisions is subject to removal or replacement and Contractor shall be responsible for all resultant losses.
- C. Additional Detailed Instructions:
1. Architect may furnish additional detailed, written instructions to further explain the work and such instructions shall be a part of Contract Documents. Should additional detailed instructions in the opinion of Contractor constitute work in excess of the scope of Contract, Contractor shall submit written notification thereof to Architect within seven calendar days following receipt of such instruction, and in any event prior to the commencement of work thereon.
 2. Architect will then consider such notice and if Architect considered it justified, Architect's instructions will be revised, or an extra work authorization will be issued.
 3. Contractor has no claim for additional compensation or extension of the schedule because of any such additional instructions unless Contractor gives Architect written notice thereof within the time frame as specified above.

- D. Failure to Agree: In the event of failure to agree as to the scope of Contract requirements, Contractor shall follow procedures set forth in the disputes clause.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 3131

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SECTION 01 3200 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Special reports.

1.3 RELATED SECTIONS

- A. Section 01 3100 - Project Management and Coordination: Submitting and distributing meeting and conference minutes.
- B. Section 01 3300 - Submittal Procedures: Submitting schedules and reports.
- C. Section 01 4000 - Quality Requirements: Submitting a schedule of tests and inspections.

1.4 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time belongs to Owner is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.5 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's and Construction Manager's final release or approval.
- B. Preliminary Construction Schedule: Submit two opaque copies.
 - 1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
- C. Preliminary Network Diagram: Submit two opaque copies, large enough to show entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
 - 1. Submit an electronic copy of schedule to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date.
- E. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining

duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
 4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work the Notice to Proceed until most recent Application for Payment.
- F. Daily Construction Reports: Submit two copies at weekly intervals.
- G. Material Location Reports: Submit two copies at weekly intervals.
- H. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- I. Special Reports: Submit two copies at time of unusual event.

1.6 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing work stages area separations interim milestones and partial Owner occupancy.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review time required for review of submittals and resubmittals.
 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 8. Review time required for completion and startup procedures.
 9. Review and finalize list of construction activities to be included in schedule.
 10. Review submittal requirements and procedures.
 11. Review procedures for updating schedule.

1.7 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule network diagram. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
 - a. Update schedule and submit at each project meeting.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work the Notice to Proceed to date of Substantial Final Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than **20** days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include required number of days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.

- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
 2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 3. Each activity cost shall reflect an accurate value subject to approval by Architect.
 4. Total cost assigned to activities shall equal the total Contract Sum.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the Work the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first **60** days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within **30** days of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.5 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within **14** days of date established for commencement of the Work. Outline significant construction activities for the first **60** days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than **30** days after date established for commencement of the Work.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.

8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the Schedule of Values).
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.6 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial Completions and occupancies.
 19. Substantial Completions authorized.

- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation on form agreed to by Architect, Owner, and Contractor. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.7 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within **one** day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 3200

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Submittal schedule requirements.
- B. Administrative and procedural requirements for submittals.

1.3 RELATED SECTIONS

- A. Section 01 4000 - Quality Requirements: Submitting test and inspection reports.
- B. Section 01 4339 - Mock-ups.
- C. Section 01 4349 - Delegated Design.
- D. Section 01 7823 - Operation and Maintenance Data for submitting operation and maintenance manuals.
- E. Section 01 7700 - Closeout Procedures: Submitting closeout submittals, maintenance material submittals, and warranties.
- F. Section 01 7834 - Warranties: Submitting warranties.
- G. Section 017900 - Demonstration and Training for submitting videotapes of demonstration of equipment and training of Owner's personnel.
- H. Section 01 8113 - Sustainable Design Requirements - CALGreen.
- I. Divisions 2 through 35 Sections for specific requirements for submittals in those Sections.

1.4 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.5 SUBMITTAL SCHEDULE

- A. Within **30 calendar days** after the date of commencement specified in the Notice to Proceed, submit schedule of submittals required under Divisions 2 through 32. Schedule shall list submittals and indicate date submittal will be made.
- B. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Construction Manager and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 3. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's and Construction Manager final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.
- C. Distribute copies of the Submittal Schedule to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the temporary field office. When revisions are made, distribute to the same parties and post in the same locations.
- D. Updating: Revise Schedule after each meeting or activity, where revisions have been made. Issue the updated Schedules concurrently with report of each meeting.
- E. No portion of Work requiring submittals shall be commenced until submittal has been accepted by Architect. All such portions of Work shall be in accordance with accepted submittals.

1.6 SUBMITTAL FORMATS

- A. Submittal Information: Use electronic form acceptable to Owner, containing the following information:
 - 1. Project name.
 - 2. Dates and revision dates.
 - 3. Name of Architect.
 - 4. Name of Construction Manager.

5. Name of Contractor.
 6. Name of firm or entity that prepared submittal.
 7. Names of subcontractor, manufacturer, and supplier.
 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.
 13. Indication of full or partial submittal.
 14. Location(s) where product is to be installed, as appropriate.
 15. Related physical samples submitted directly.
 16. Submittal and transmittal distribution record.
 17. Other necessary identification.
 18. Remarks.
 19. Signature of transmitter.
- B. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. Number all submittals for identification, with the number consisting of 1) the Specification section (with spaces between numbers eliminated); 2) the consecutively numbered item within each Specification section; and 3) the version number.
 - 1) Examples: number 092900-001-0 to indicate the original version of original version of item 1 submitted in section 092900; number 092900-001-1 to indicate the first re-submittal of the same item.
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 4. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- C. Options: Identify options requiring selection by Architect.
- D. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect and Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

- E. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.7 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: At Contractor's written request, electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 - 1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - 2. Digital Drawing Software Program: The Contract Drawings are available in REVIT 2018.
 - 3. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
 - 4. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Site plans.

1.8 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - 2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 - 3. Architect, through Construction Manager, will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Owner and Architect reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals: The Consultant shall review Contractor's submittals, including Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

1. The Consultant's action shall be taken with such reasonable promptness so as to cause no delay in the work, while allowing sufficient time in the Consultant's judgment to permit adequate review unless otherwise agreed to.
 2. Submittals critical to work flow as indicated on the Contractor's critical path construction and submittal schedules and as mutually identified and agreed to by the Consultant, Construction Manager, and Contractor at the OAC shall be prioritized and responded to within a timely manner from receipt, targeting a maximum review time of **15 working days** while recognizing that submittals that require coordination with subconsultants and/or large/complex submittals will take additional review time.
 3. Submittals that are mutually agreed to as not being on the critical path by the Construction Manager and Contractor will be reviewed and returned in a timely fashion after critical path submittals have been reviewed.
 - a. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performance equipment or systems designed by the Contractor, all of which remain the responsibility of the Contractor to the extent required by the Contract Documents.
 4. The Consultant's review shall not constitute review of safety precautions or, unless otherwise specifically stated by the Consultant, of construction means, methods, techniques, sequences or procedures.
 5. The Consultant's review of specific items shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Consultant shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.
- D. Request for Information (RFIs): The Consultant shall respond to Contractor's Requests for Information (RFI). Interpretations and decisions of the Consultant shall be consistent with the intent of and reasonably inferable from the Contract Documents and shall be in writing or in the form of drawings.
1. When making such interpretations and initial decisions, the Consultant shall secure faithful performance by both City and Contractor, shall not show partiality to either, and shall not be liable for results of interpretations or decisions so rendered in good faith. Consultant will target a maximum of **14 calendar days** to respond but will endeavor to respond promptly where possible to allow for the orderly progress of construction.
 2. Large/complicated RFIs will be reviewed with all parties (Contractor, sub-contractor, Consultant, sub-consultants and City) to establish a deadline. RFIs mutually determined at the OAC to be non-critical will be reviewed and returned in a timely fashion after RFIs determined to be critical have been responded to.
- E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "Approved as Noted."
- F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections. Submit one electronic copy unless specified otherwise.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Product data may be submitted digitally provided that the associated physical sample is submitted to the Architect simultaneously for review.
 - 4. Electronic submission data/document management system through submittal exchange site.
 - 5. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's written recommendations.
 - c. Manufacturer's product specifications.
 - d. Manufacturer's installation instructions.
 - e. Standard color charts.
 - f. Statement of compliance with specified referenced standards.
 - g. Testing by recognized testing agency.
 - h. Application of testing agency labels and seals.
 - i. Mill reports.
 - j. Notation of coordination requirements.
 - k. Standard product operation and maintenance manuals.
 - 6. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 7. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
 - 8. Number of Copies: Where electronic submittals are not provided, submit three paper copies of Product Data, unless otherwise indicated. Architect, through Construction Manager, will return two copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.

- c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring Diagrams: Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
2. Shop Drawing Format: PDF electronic file.
 3. Paper Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 - a. Three opaque (bond) copies of each submittal. Architect, and Construction Manager will retain two copies; remainder will be returned.
 4. Variations: If shop drawings show variations from Contract requirements because of standard shop practice or other reason, make specific mention of such variations in letter of transmittal, as well as on drawings, in order that (if acceptable) suitable action may be taken for proper adjustment of Contract. Unless specific changes have been noted and accepted, no deviations from Contract Documents will be permitted.
- D. Samples: Submit physical Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of appropriate Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
 4. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect and Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
7. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements specified in Section 014523 - Testing and Inspecting Services, and individual specifications sections.
 4. Contractor's statement that the Submittal complies with the Construction Documents.

- B. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Subcontract List Format: PDF electronic file.
 - a. Mark up and retain one returned copy as a Project Record Document.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- E. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Test and Research Reports:
1. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
 2. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.
- G. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000.
- H. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- I. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- J. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.

7. Other required items indicated in individual Specification Sections.

- K. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage. See Section 017834 for additional requirements.
- L. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
 - 1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.3 DELEGATED DESIGN SUBMITTALS

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
 - 2. See Section 014349 for additional requirements.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- C. Contractor shall not be relieved of responsibility for deviation from requirements of Contract Documents by approval of submittal unless Contractor has specifically informed the Architect/Engineer in writing of such deviation at time of submittal and the Architect/Engineer has given written approval to specific deviation. Approval shall not relieve Contractor of responsibility for errors or omissions in submittals.

- D. Review and stamp submittals from subcontractors prior to submitting to the Architect/Engineer.
1. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.
 2. Return submittals which vary significantly from Contract Documents for correction and resubmittal prior to submittal to the Architect/Engineer.
 3. Submittals which vary significantly from Contract Documents and which fail to indicate thorough Contractor review prior to submission will be returned without review.
 4. Cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.
 5. Review, approve and submit submittals required by Contract Documents with reasonable promptness and so as to cause no delay in Work or in activities of the Architect/Engineer or of separate contractors.
 6. Submit shop drawings for each specification section at the same time to facilitate coordination of related items.
 - a. Submit all formwork shop drawings at the same time.
 - b. Submit reinforcing steel and stressing tendons shop drawings for each floor at the same time.
 7. Submittals made by Contractor which are not required by Contract Documents may be returned without action.
 8. Submittal represents Contractor has determined and verified materials, field measurements and field construction criteria, and has checked and coordinated information with requirements of Work and of Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Architect will review submittals for conformance with Contract Documents and acceptance by Architect covers only such conformance. Effort will be made by Architect to discover errors, but responsibility for accuracy and correction and resubmittal shall be the Contractor's.
- C. Acceptance of submittals will be general and shall not relieve Contractor from responsibility for proper fitting and construction of Work, nor from furnishing materials and Work required by Contract which may not be indicated on submittals.
- D. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. "Reviewed": Submittal has been reviewed only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor is responsible for compliance with the requirements of the plans and specifications. Review of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site, information that pertains solely to the fabrication process or to the means, methods, techniques, sequences and procedures of construction, coordination of the work of all trades and

- for performing all work in a safe and satisfactory manner. No comments have been recorded and no resubmittal is required.
2. "Reviewed, Make Corrections Noted" or similar language: Submittal has been reviewed in accordance with the above. When the Contractor has made the corrections noted in the review comments, the submittal will be considered to have the same status as if it had been marked "Reviewed". No resubmittal is required and no action resubmittal shall be made. However the Contractor, Agency or Architect may request that a record copy be submitted as an Informational Submittal for any of the concerned parties.
 3. "Revise and Resubmit": The Contractor shall revise the submittal based on the review comments provided and shall resubmit the entire submittal until a mark of 'Reviewed' or 'Reviewed, Make Corrections Noted, No Resubmittal Required' is obtained.
 4. "Rejected": The submittal does not comply with the Contract Documents. Resubmit in conformance with the Contract Documents.
 5. "For Information Only": Submittal has been reviewed only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor is responsible for compliance with the requirements of the plans and specifications. Review of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site, information that pertains solely to the fabrication process or to the means, methods, techniques, sequences and procedures of construction, coordination of the work of all trades and for performing all work in a safe and satisfactory manner. No comments have been recorded and no resubmittal is required.
 6. "Not Reviewed": Submittal has not been reviewed and is returned.
- E. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- F. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- G. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 3300

Project Name _____

Project number _____

Format: Revit 2018, AutoCAD 2018 _____

Recipients:

Person A Company _____

Person B Company _____

Person C Company _____

AGREEMENT AND RELEASE REGARDING USE OF

ELECTRONIC MACHINE---READABLE INSTRUMENTS OF SERVICE

PREPARED BY Group 4 Architecture Research + Planning, Inc.

In connection with the project identified above (hereinafter “Project”) for which Group 4 Architecture Research + Planning, Inc., (“Architect”) has been retained to provide services, Recipient has requested certain Instruments of Services prepared by Architect and its consultants in electronic machine-readable format (“Autocad” or “Revit”) hereinafter referred to as “Electronic Documents.”

In consideration of Architect’s agreement to release Electronic Documents, the Recipient agrees as follows:

1. The Electronic Documents are and shall remain Architect’s “Instruments of Service” prepared solely for use in connection with the Project. Architect and its consultants retain all common law, statutory and other reserved rights, including the copyright unless, and to the extent such rights belong to Architect’s Client or the Project as part of the agreement between Architect and its Client.
2. The Electronic Documents are provided as a convenience to the Recipient for informational purposes only. Recipient acknowledges that the Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications, which are, and remain, the Contract Documents for the project.
3. Electronic Documents will not be signed or sealed by Architect or Architect’s consultants.
4. The Electronic Documents are not, nor shall they be construed to be, a product. There are no warranties of any kind in such Electronic Documents or in the media in which they are contained, either expressed or implied.
5. Any further conversion of the format by the Recipient is solely the responsibility of the Recipient. The conversion of Electronic Documents from the machine-readable format used by Architect to some other format may introduce errors or other inaccuracies.
6. The media in which any Electronic Documents are transmitted can deteriorate over time and under various conditions. Architect is not responsible for such deterioration.
7. Where the Recipient has received specific permission to use the Electronic Documents in connection with Recipient’s obligation to prepare certain documents for Project, the Recipient shall be obligated to remove Architect’s or Architect’s consultant’s title block for the Electronic Documents use by Recipient.

8. Architect does not warrant that the information contained in the Electronic Documents is free from errors or omissions; or free from damage or deletion in part or in whole. The recipient may not rely on the accuracy or completeness of the Electronic Documents. The Recipient accepts all responsibility for any errors or inaccuracies and releases Architect and its consultants from any liability of claim for recovery of damages or expenses arising as the result of such errors or inaccuracies.
9. Recipient understands and agrees that these Electronic Documents were prepared by Architect for the sole purpose of creating a printed set of Construction Documents, and are not intended to be a "model" with any other functionality. Any changes to the Electronic Documents or additional information necessary for the Recipient to use the Electronic Documents for his use are solely his responsibility.
10. Recipient will not use, or allow others to use, the Electronic Documents, in whole or in part, for any purpose or project other than as stated herein without the express prior written permission of Architect.
11. The Recipient waives any and all claims and liability against Architect and its consultants from any failure by Recipient to comply in any way with the requirements of this Agreement for the delivery of Electronic Documents.
12. The Recipient shall indemnify and save harmless Architect and its consultants and each of their partners, officers, shareholders, directors and employees from any and all claims, judgments, suits, liabilities, damages, cost or expenses (including reasonable defense and attorney's fees) arising as the result of either: 1) Recipient's failure to comply with any of the requirements of this Agreement or 2) Defects, errors or omissions in the Electronic Documents or the information contained therein, which defect, errors or omissions were not contained in the Contract Documents as defined in Paragraph 2 or where the use of such Contract Documents would have prevented the claim, judgment, suit, liability, damage, cost or expense.
13. Recipient acknowledges that the project may have changed after these Electronic Documents were created; therefore these electronic documents may not accurately reflect the contract documents or the "As-built" conditions of the project.

Signature of this Agreement expressly certifies to the Architect that the person(s) signing below is/are authorized by the Recipient to accept and commit to the terms and conditions included in this Agreement and Release on behalf of the Recipient.

Agreed to and accepted by:

Signature

Date:

Name/Title:

Company:

Legal Address:

(If address is a P.O. Box Number, include actual building location address)

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SECTION 01 3544 – STORM WATER POLLUTION PREVENTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work of this section consists of implementing measures to prevent Storm Water Pollution during construction activities, in accordance with Federal, State, and local regulations, and in accordance with the Storm Water Pollution Prevention Plan (SWPPP) to be prepared for this project.

1.2 SUBMITTALS

- A. Submit Storm Water Pollution Prevention Plan to Owner after contract award and before the preconstruction conference.
- B. Plans showing proposed arrangements and methods for control of erosion, sedimentation, and pollutant conveyance in storm water resulting from construction activities. Show that the Storm water Pollution Prevention Plan satisfies all State NPDES permit requirements.
- C. Provide sufficient information for evaluation of the following:
 - 1. Erosion protection measures and products.
 - 2. Drainage management strategies.
 - 3. Surface restoration.
- D. Submit schedules for inspection and monitoring of all storm water pollution prevention measures.
- E. Submit manufacturer's product information and installation recommendations for silt fence, filter fabric and erosion control blanket, straw bales, and any other materials proposed for use on this project.

1.3 QUALITY ASSURANCE

- A. Before commencing construction activities, such as grading, excavation or filling in any part of the site, Contractor shall plan for temporary structures to guide runoff away from the work area and to capture eroded material before it reaches natural water courses. The measures shall be in accordance with reviewed and approved storm water pollution prevention plans.
- B. Arrange construction activities to minimize erosion to the maximum practical extent. Clearing, excavation, and grading shall be limited to those areas of the project site necessary for construction. Minimize the area exposed and unprotected.
- C. Clearly mark and delineate the limits of work activities. Do not allow equipment to operate outside the limits of work or to disturb existing vegetation. Complete excavation and grading during the dry season to the maximum extent possible.

1.4 REGULATORY REQUIREMENTS

- A. Apply and obtain all required permits in a timely fashion, as there may be significant lead time in obtaining permits from the local NPDES Permitting Agency.
- B. Implement the requirements of the National Pollutant Discharge Elimination System (NPDES) for erosion control due to storm water runoff during construction.
- C. Notice of Intent (NOI)
 - 1. The Contractor shall file a Notice of Intent (NOI), implement the accepted SWPPP during construction and, upon completion of the construction, file a Notice of Termination (NOT), all as described in the following requirements. Implement all good housekeeping practices, inspections and record keeping.
 - 2. Provide a Draft SWPPP for the project which includes the following information and forms:
 - a. Site description.
 - b. Expected sequencing of operations and construction schedule.
 - c. Weather monitoring procedure.
 - d. Descriptions and details of erosion controls, including dust control.
 - e. Erosion control plans.
 - f. Controls for other potential onsite storm water pollutants.
 - g. Applicable specifications.
 - h. Maintenance and inspection procedures and forms.
 - i. Description of potential non-storm water discharges at site.
 - j. Notice of Intent (NOI) form.
 - k. Notice of Termination (NOT) form.
 - l. Contractor and subcontractor Certification forms.
 - m. Other record keeping forms and procedures.
 - n. Good housekeeping practices and procedures, including vehicle wash-down areas, protection of equipment storage and maintenance areas, and sweeping of roadways related to hauling activities.
 - 3. The Contractor and Owner will jointly review the draft SWPPP and agree to any needed revisions. The Contractor will then accept and sign the revised SWPPP. When the SWPPP is accepted, it will be the document in force on the project. The accepted SWPPP will describe and ensure implementation of the practices which will be used to reduce the pollutants in storm water discharges to assure compliance with the terms and conditions of the EPA permit. Place the SWPPP and all updates in a three-ring binder so that completed inspection forms and other records may be inserted. The Contractor shall maintain a current copy of the SWPPP and all associated records and forms at the jobsite throughout the duration of the project. The SWPPP shall be available for public inspection.

4. Implement the SWPPP as required throughout the construction period and maintain all erosion control elements in proper working order. Do not perform clearing and grubbing or earthwork until the SWPPP has been implemented. Prior to construction, the Contractor and all subcontractors shall sign certifications (included in the SWPPP) that they understand the requirements of the NPDES permit. All subcontractors shall comply with the requirements of the NPDES under the supervision of the Contractor. The contractor shall designate the erosion control supervisor who will be responsible for implementing the SWPPP. The erosion control supervisor shall be familiar with the SWPPP procedures and practices and shall ensure that emergency procedures and the SWPPP are updated as needed and available for inspection. The SWPPP (including inspection forms) and all data used to complete the NOI shall be provided to the Owner at the completion of the project.

5. Inspections and Revisions to Plan:
 - a. The Contractor will perform a weekly inspection of the site. The inspection shall include disturbed areas that have not been finally stabilized, areas used for storage of materials, locations where vehicles enter or exit the site, and all erosion and sediment controls that are included in the Plan. Inspections shall be documented on forms provided in the Plan. The inspection forms shall be retained onsite in the Plan notebook throughout the construction period.
 - b. It may be necessary to revise the Plan during construction to make necessary improvements or revisions or to respond to unforeseen conditions noted during construction or site inspections. For that purpose, the Plan shall specify the mechanism whereby revisions may be proposed by the Contractor or the Landlord and incorporated into the Plan, including review and acceptance of minor changes. The Contractor and the Landlord will jointly accept and sign each revision to the Plan before implementation. Accepted modifications will be implemented within 7 calendar days following the date of the inspection when deficiencies or necessary corrections are first noted.
 - c. Temporary erosion and pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during design, that are needed prior to installation of permanent control features, or that are needed temporarily to control erosion that developed during normal construction practices but are not associated with permanent control features on the project.
 - d. Provide additional temporary erosion and pollution controls made necessary by Contractor's errors or negligence at no additional cost to the Owner.
 - e. Maintain erosion and sediment control features until final acceptance of project.

D. Notice of Termination (NOT)

1. Upon final acceptance, the Contractor shall file a NOT.

1.5 PROJECT CONDITIONS

- A. The Contractor shall maintain records of work performed on the sediment control structures.

- B. The Contractor shall not remove any erosion or sediment control measure without prior permission from the Owner.

- C. The Contractor shall obtain approval from the Owner prior to making changes to erosion control plans.

1.6 SEQUENCE OF CONSTRUCTION

- A. The Contractor shall be responsible for arranging and conducting an Erosion and Sediment Control meeting/briefing to inform all parties scheduled to be on-site during the project of the measures to be implemented for proper erosion and sediment control (may be included as part of the preconstruction meeting).
 - 1. Installation of silt fences, storm drain protection, and all other forms of erosion and sediment control shall not begin until after this meeting has occurred.
- B. The Contractor shall notify the Owner in writing and by telephone of the following events:
 - 1. The required erosion and sediment control meeting/briefing.
 - 2. Following installation of required sediment control structures.
 - 3. Prior to removal of or modification to sediment control structures.
 - 4. Prior to removal of all sediment control structures.
- C. Silt fences, storm drain protection, and all other forms of erosion and sediment control shall be installed, inspected, and accepted by the Contractor before beginning any utility excavation.
- D. Temporary silt fences shall be installed around any stockpiles and/or excavated material that cannot be backfilled during the same day in which it was excavated. Temporary silt fences shall also be placed immediately downstream of any utility trench that has not been backfilled at the end of the working day. Temporary silt fences shall be installed prior to leaving the work site for the day.
- E. Silt fences and storm drain protection shall be inspected by the Contractor weekly. Repairs to these devices shall be completed prior to leaving the work site for the day.
- F. The Contractor shall prevent the deposition of materials onto paved areas. The Contractor shall inspect the paved areas for deposited materials weekly and remove the materials immediately.
- G. Silt fences shall be removed with permission of the Landlord within 20 working days after final acceptance of the project and/or after the establishment of permanent stabilization of all excavations and fill areas.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Before the work begins, sufficient equipment shall be available on the site to assure that the operation and adequacy of the erosion control plans can be continuously maintained.

2.2 EROSION CONTROL MEASURES

- A. Erosion control measures shall consist of silt fencing or equivalent (eg. Wattles, etc.), barrier protectors, straw bales, temporary soil retention blankets, excelsior drainage filters, sediment traps and berms.
- B. Berms and excelsior drainage filters shall be used to form sediment traps and to control run-on and run-off into other areas, including creeks, streams, marshes, access roads, well areas, and the staging areas.
- C. Erosion control measures shall be used to contain only direct precipitation in the construction zone. The contained water shall be allowed to percolate into the ground or drain slowly through the drainage filter sediment traps.
- D. Earthen sediment traps or holding ponds shall not be used unless accepted by the Owner.

PART 3 - EXECUTION

3.1 GENERAL DESCRIPTION

- A. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent erosion to the maximum extent practical, including implementation of Best Management Practices (BMPs).
 - 1. Temporary measures shall be to Contractor's own design and Contractor shall be solely responsible for risks related to the management of erosion control during construction.
- B. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operations that will disturb the natural erosion protection.
- C. Schedule work to expose areas subject to erosion for the shortest possible time, and preserve natural vegetation to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

3.2 METHODS

- A. Construct berms to reduce runoff velocity as well as direct surface runoff around and away from all fuel containment, storage, and borrow areas.
- B. Divert surface runoff around and away from cut and fill slopes by constructing berms or ditches at the base of disturbed slopes. Provide conveyance for the runoff in temporary pipes or protected channels to temporary sediment traps.
- C. Place drainage filters around all catch basins to create sediment traps to control run-off from the construction area.
- D. Excess water used for dust control shall be contained within the demolition areas by the erosion control measures.

3.3 MAINTENANCE OF TEMPORARY FACILITIES

- A. Inspect erosion and sediment control structures weekly. Ensure erosion and sediment control structures remain effective throughout excavation and grading operations. Relocate structures as necessary.
- B. Inspect control structures after each significant rainfall. Promptly repair breaches which occur.
- C. The Contractor shall remove entrapped sediment from behind excelsior drainage filter after each storm.

3.4 DISPOSAL OF SEDIMENT FROM STORM WATER POLLUTION CONTROL STRUCTURES

- A. Sediment excavated from temporary sediment control structures shall be disposed on the site with general fill, or with topsoil. Sediment shall be allowed to dry out as required before reuse.
- B. Contractor shall place the sediment removed from traps and other structures where it will not enter a storm drain or watercourse and where it will not immediately reenter the basin.

3.5 REMOVAL OF TEMPORARY STORM WATER POLLUTION CONTROL MEASURES

- A. All temporary control measures shall be removed with permission of the Owner within 20 working days after final acceptance of the Project or once grading is completed and slopes have stabilized.

END OF SECTION 01 3544

SECTION 01 4000 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for quality assurance and quality control services.
- B. Testing and Inspection Service: As required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Contractor's quality control.
- D. Progress cleaning.
- E. Pre-construction conferences.
- F. Repair and protection of ongoing construction.

1.3 RELATED SECTIONS

- A. Divisions 2 through 35 Sections for specific test and inspection requirements.

1.4 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.5 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.6 SUBMITTALS

- A. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- B. Qualification Data: For entities and agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience.
 - 1. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 INSPECTION AND TESTING AGENCY SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality control service.
- B. Submit a certified written report of each inspection, test or similar service, to the Architect, in triplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

- C. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
1. Date of issue.
 2. Project title and number.
 3. Name, address and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making the inspection or test.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete inspection or test data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.

1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- F. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State of California.

- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E548, and that specializes in types of tests and inspections to be performed.
- H. Provide inspection and testing services as required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance, nor are they intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Documents requirements.

1.9 QUALITY CONTROL SERVICES AND RESPONSIBILITIES

- A. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities.
- B. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
 - 1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Testing agency will submit a certified written report of each test, inspection, and similar quality control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Testing agency will retest and re-inspect corrected work.
- D. Contractor Responsibilities: Unless otherwise indicated, provide quality control services specified and required by authorities having jurisdiction.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services.
 - 2. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 4. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
 - 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field-curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.

 - F. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

 - G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- 1.10 TESTING AND INSPECTION AGENCY SERVICES
- A. Provide inspections, tests and similar quality control services, except where they are specifically indicated to be the Owner's responsibility. Include costs for these services in the Contract Sum.

 - B. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

 - C. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
 - 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 - 5. Do not perform any duties of Contractor.

 - D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

1.11 CONTRACTOR'S QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, fabrication, and installation, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise fabrication and installation.
- E. Perform work by persons qualified to fabricate and install materials of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.12 PRE-CONSTRUCTION CONFERENCES

- A. Convene a pre-construction conference after execution of the Agreement and prior to commencement of construction activities. Review responsibilities and personnel assignments.
- B. Attendees: The Owner, Architect, the Contractor and his superintendent, subcontractors, suppliers, manufacturers, and other concerned parties shall be represented by persons authorized to conclude matters relating to the Work.
- C. Agenda: Discuss significant items that could affect progress, including the tentative construction schedule, critical sequencing, use of the premises, procedures for processing Change Orders and equipment deliveries.
- D. Review progress of other activities and preparations for the activity under consideration at each conference, including time schedules, manufacturers' recommendations, weather limitations, substrate acceptability, compatibility problems and inspection and testing requirements.
- E. Use conferences to assure accurate coordination among trades where appearance of intersecting materials is critical. Follow agendas laid out in individual Sections.
- F. Record significant discussions, agreements and disagreements of each conference, along with the approved schedule. Distribute the meeting record to everyone concerned, promptly, including the Owner and Architect.
- G. Do not proceed if the conference cannot be successfully concluded. Initiate necessary actions to resolve impediments and reconvene the conference at the earliest feasible date.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
- D. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

3.2 PROGRESS CLEANING

- A. Preconstruction Conference: Conduct a meeting at the site prior to commencement of all construction activities to establish required procedures for maintaining a clean site that meets the Owner's requirements. Conference shall be attended by Contractor, Owner, Architect, and Contractor's superintendent.
 - 1. Review intended progress cleaning procedures and schedule.
 - 2. Establish intervals required by Owner for progress cleaning to take place and meetings to review effectiveness of progress cleaning.
 - 3. Establish the need for identification badges for construction and cleaning personnel.
 - 4. Discuss security procedures required by Owner.
 - 5. Review reporting procedures for any violations of established and agreed upon procedures.
- B. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- C. Site: Maintain Project site free of waste materials and debris.
- D. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
 - F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
 - G. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
 - H. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
 - I. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
 - J. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 - K. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - L. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
 1. Protect adjacent existing buildings from deleterious effects of ongoing construction operations.

END OF SECTION 01 4000

SECTION 01 4216 - DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. Basic Contract definitions are included in the Conditions of the Contract.
- B. Acceptable: Contractor is obligated to provide and install one of the named products. Manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in the Contract Documents is not changed, as judged by the Design Professional. A substitution request is necessary for use of any other manufacturer or products other than what is named.
- C. Approve, Approved: Where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- D. Accepted Equivalent: Where used in conjunction with the Architect's action on the Contractor's submittals and substitution requests, is as stated in the Conditions of the Contract for Architect's responsibilities and duties as the Design Professional.
- E. Basis of Design: Where specified these Specifications shall be interpreted to require the named Basis-of-Design product or acceptable comparable product where additional manufacturers are listed. If no other manufacturers are listed, the Specification shall be interpreted to mean 'no known equal'. Substitutions will be handled and processed in accordance with Section 012513.
- F. Delegated Design Entity: Fabricator who assumes full responsibility for engineering, testing, fabrication, and installation of a portion of the Work.
- G. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.
- H. Experienced: When used with the term Installer, means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
- I. Furnish: Means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

- J. Indicated: Refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as shown, noted, scheduled, and specified are used, it is to help the reader locate the reference.
- K. Install: Describes operations at Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- L. Installer: An Installer is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- M. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- N. Project Site: Is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- O. Provide: Means to furnish and install, complete and ready for the intended use.
- P. Regulations: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- Q. Testing Laboratories: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SUBMITTALS

- A. It shall be understood that the various submittals required by the individual specifications sections are to be submitted to the Architect for review and approval as specified in the General Conditions.
- B. Unless "no substitution" or similar language is used to specify a unit or portion of the Work, these Specifications shall be interpreted to include the words "or approved equal" after

every product specified by manufacturer's brand name or model number. Substitutions will be handled and processed in accordance with Section 01 2513.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes 2 different or conflicting minimums or levels of quality, the most stringent requirement (which is generally recognized to be also the most costly is intended and will be enforced, unless specifically detailed language written into the contract documents (not by way of reference to an industry standard) clearly indicates that the less stringent requirement is to be fulfilled.
 - 1. Refer apparently equal-but-different requirements, and uncertainties as to which of 2 levels of quality is the more stringent, to the Owner for a decision before proceeding.
 - 1. Contractor's Option: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, the option is intended to be the Contractors' regardless of whether specifically indicated as such in the text.

1.5 GOVERNING DICTIONARY

- A. The definitions of the words used in these Specifications, which are not defined in the Section, the General Conditions, or in referenced standards, are as given in "Webster's Third New International Dictionary", The Definitive Merriam-Webster Unabridged Dictionary of the English Language.

1.6 ABBREVIATIONS AND NAMES

- A. Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.
- B. Trades; Names: Except as otherwise indicated, the use of trade titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesman or the corresponding generic name (such as a carpenter), nor that the

specified requirements apply exclusively to work by tradesmen of that corresponding generic name.

1.7 SPECIFICATION FORMAT AND LANGUAGE

- A. These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 50-Division format and MASTERFORMAT 2018 numbering system.
- B. Language used in the Specifications and other Contract Documents is abbreviated. Words that are implied, but not stated shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
- C. Imperative language is used generally. Requirements expressed in the imperative mood are to be performed by the Contractor. The indicative mood is employed on occasion when such sentence structure is necessary to convey the intended meaning in a more accurate or understandable format. (The imperative and indicative moods of sentence structure are defined in CSI's Manual of Practice.)
- D. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
- E. Streamlining: Employs the colon as a symbol for the words "shall be", "shall have", "shall conform with", "shall meet the requirements of", or "shall comply with".
- F. A colon is also used to set off a paragraph title or heading from the text that follows. This is the case when a grammatically complete sentence follows a heading and a colon. It is also used as a punctuation mark in a sentence to direct attention to matter that follows. This is not streamlining.

1.8 INTERPRETATIONS

- A. In order to reduce the length of these Specifications, certain phrases are written without objects and shall be interpreted as described below.
- B. As indicated: Whenever "as indicated" is specified in these Specifications, it shall be understood to read "as indicated on the Drawings".
- C. As required: Whenever "as required" is specified in these Specifications, it shall be understood to read "as required for a complete and finished installation" or "as required for a complete and finished, operable installation".
- D. As specified: Whenever "as specified" is specified in these Specifications, it shall be understood to read "as specified herein" or "as specified in these Specifications".

1.9 STANDARD OF QUALITY

- A. Where one certain kind, type, brand or manufacturer of material is named in these Specifications, it shall be regarded as the required minimum standard of quality. Submit requested substitutions in accordance with Section 01 2513.

1.10 PERMITS, LICENSES, AND CERTIFICATES

- A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 4216

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SECTION 01 4339 – MOCK-UPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Mock-up requirements.

1.3 RELATED SECTIONS

- A. Divisions 2 through 35 Sections for specific mock-up requirements.

1.4 DEFINITIONS

- A. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Accepted mockups establish the standard by which the Work will be judged.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test mockups representative of proposed products and construction.
 - b. Submit test mockups in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test mockups when required in individual specification Sections, using installers who will perform same tasks for Project.
 - e. When testing is complete, remove test mockups; do not reuse products on Project.

1.6 QUALITY ASSURANCE

- A. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or City's Representative.

2. Notify Architect and City's Representative seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
- B. Obtain Architect's and City's Representative's approval of mockups before starting work, fabrication, or construction.
- C. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
- D. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- E. Demolish and remove mockups when directed, unless otherwise indicated.
- F. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect and City's Representative.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 4339

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Temporary services and facilities, including utilities.
- B. Construction and support facilities.
- C. Security and protection.

1.3 RELATED SECTIONS

- A. Section 01 3300 – Submittal Procedures: Procedures for submitting copies of implementation and termination schedule and utility reports.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. Owner's construction forces.
 - 2. Occupants of Project.
 - 3. Architect.
 - 4. Testing agencies.
 - 5. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.5 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.6 GENERAL

- A. Provide facilities ready for use. Maintain, expand and modify as needed. Remove when no longer needed, or replaced by permanent facilities.

1.7 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Submittals: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities. Submit a schedule showing implementation and termination of each temporary utility within 15 days of commencement of the Work.

1.8 REGULATIONS

- A. Comply with OSHA and applicable laws and regulations.

1.9 QUALITY ASSURANCE

- A. Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".
- B. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared by AGC and ASC.
- C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- D. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
- E. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.10 SITE CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.
 - 3. Operate in a safe and efficient manner. Take necessary fire prevention measures.

4. Do not overload, or permit facilities to interfere with progress.
5. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- C. Lumber and Plywood: Comply with requirements in Section 06 1000.
- D. Paint: Comply with requirements in Section 09 9100.
- E. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- F. Water: Potable.
- G. Plywood for Barricades: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated where indicated on Drawings, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.
- H. Dust Barrier: Flame-retardant polyethylene sheet with the following characteristics:
 1. Thickness: 6 mil, minimum.
 2. Burning Characteristics: ASTM E84:
 - a. Flame Spread Index: 10.
 - b. Smoke Developed: 60.
 3. Tensile Strength: ASTM D882:
 - a. MD: 1700 psi.
 - b. TD: 1200 psi.
 4. Elongation: ASTM D882:
 - a. MD: 225 percent.
 - b. TD: 350 percent.
 5. Dart Impact: ASTM D1709; 260g.
 6. Water Vapor Transmission Rate: ASTM D96; 0.13 perms.
- I. Tape: Type recommended by polyethylene sheet manufacturer for required application.

2.2 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

2.3 EQUIPMENT

A. General: Provide equipment suitable for use intended.

B. Common-Use Field Office: Provide a prefabricated, insulated, weathertight, air-conditioned mobile field office for use as a common facility by all personnel engaged in construction activities, with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.

1. Furnish with a conference table and chairs, a file cabinet, plan table and plan rack and bookcase. Equip with a water cooler.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services.

1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.

D. Lifts and Hoists: Provide facilities for hoisting materials and personnel over three stories. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

E. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

F. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

G. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.

1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).

H. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

- I. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Ensure that supervisory personnel are present when work begins and during its progress.
- D. Prohibit smoking by personnel performing work on or near project site.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Where connections are made to existing services, provide separate metering and reimburse Owner for cost of utilities used.

3.3 TEMPORARY WATER SERVICE

- A. Arrange with utility service company and Owner, provide and maintain suitable quality water service required for construction operations.
- B. Install water service and distribution piping of sizes and pressures adequate for construction where existing service is not adequate or not available. Sterilize water piping prior to use.
- C. Locate outlets with threaded connections so that water is available through hoses. Provide 3/4" heavy-duty, rubber hoses 100 ft. long with shut-off nozzle at each outlet.
- D. Pay all costs for installation, maintenance and removal, and service charges for water used.

3.4 SEWERS AND DRAINAGE

- A. If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
- B. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify Architect immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.
 - 1. Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.
 - 2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.5 TEMPORARY ELECTRIC POWER SERVICE

- A. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics where existing service is not adequate or not available. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear. Install service underground.
 - 1. Install electric power service underground, unless overhead service must be used.
 - 2. Connect temporary service to Owner's existing power source, as directed by electric company officials.
- B. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets; not less than 1 per 2,000 sf. Provide outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords, 100 ft long maximum, where exposed to traffic.
- E. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
 - 1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

3.6 TEMPORARY LIGHTING

- A. Provide temporary lighting with local switching to fulfill security requirements and provide illumination for construction operations and traffic conditions. Lighting shall achieve a minimum lighting level of 2 watt/sq ft.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

2. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- B. Lamps and Light Fixtures: Provide general service incandescent lamps in guard cages where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- C. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment and one land-based telephone line(s) for each field office.
1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineers' offices.
 - f. Owner's office.
 - g. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.7 TEMPORARY SANITARY FACILITIES

- A. Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities. Locate where directed by Owner.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
 3. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).

3.8 TEMPORARY ROADS AND PAVED AREAS

- A. Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to civil engineering requirements on Drawings.
 3. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course.

3.9 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access and in an area that does not interfere with ongoing facility activities.
- B. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- C. Storage and Fabrication Sheds: Install sheds, equipped to accommodate materials and equipment involved. Sheds may be open shelters or fully enclosed spaces within the Project Site.

3.10 TEMPORARY ENCLOSURES

- A. Site Enclosure Fence: Before construction operations begin, install enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Set fence posts in concrete bases.
 - 2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
 - 3. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
- B. Protect persons, motor vehicles, surrounding surfaces of building being spray-finished, building site, plants, and surrounding buildings from harm or damage resulting from applications of exterior finishes.
- C. Do not apply finishes to surfaces during winds of sufficient force to spread finishes to unprotected surfaces of adjacent existing construction.

3.11 BULLETIN BOARD

- A. Provide a weatherproof bulletin board, 36" wide by 30" high, with hinged glass door, adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board must be securely mounted on not less than two posts. Both bulletin board and posts must be painted or have approved factory finish. The bulletin board must be easily accessible at all times and must contain wage rates, equal opportunity notice, and other items required to be posted.
- B. Maintain bulletin board in good condition throughout the life of the Project. The bulletin board must remain the property of the Contractor and upon completion of the project must be removed from the site.

3.12 TEMPORARY FIRE PROTECTION

- A. Do not change from use of temporary security and protection facilities to permanent facilities until Substantial Completion.

- B. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
- C. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- D. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
- E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
- F. Store combustible materials in containers in fire-safe locations.
- G. Provide supervision of welding operations, combustion type temporary heating units, and sources of fire ignition.

3.13 PROTECTION OF TEMPORARY FACILITIES

- A. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- B. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- C. At Owner's request hire a firm specializing in construction site security to provide off-hours surveillance of Project.
- D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
 - 1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
 - 2. Prepare temporary signs to provide directional information to construction personnel and visitors.

3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

3.14 ENVIRONMENTAL PROTECTION AND WASTE COLLECTION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Collection and Disposal of Waste: Collect waste daily. Comply with NFPA 241 for removal of combustible waste. Enforce requirements strictly. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose in a lawful manner.
- C. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- D. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.
 1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
- F. Tree and Plant Protection, General: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- G. Protect landscape work adjacent to or within work areas as follows:
 1. Provide barriers to protect tree trunks.
 2. Bind spreading shrubs.
 3. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time.
 4. Set scaffolding and ladder legs away from plants.

3.15 PARKING

- A. Make arrangements with Owner for accommodation of construction personnel vehicles.
- B. When site space is not adequate, provide additional off-site parking.

3.16 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- C. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

3.17 OPERATION

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Maintain markers for underground pipelines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Section 01770.

3.18 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Where finished openings or surfaces are damaged due to lack of adequate protection, repair and refinish damaged openings or surfaces at no additional cost to Owner.
- D. At Substantial Completion, renovate permanent facilities used during the construction period, including but not limited to:
 - 1. Replace worn parts and parts subject to unusual operating conditions.
 - 2. Replace burned out lamps.

END OF SECTION 01 5000

SECTION 01 50 50 – EROSION CONTROL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Contractor shall provide all materials, labor and equipment necessary to complete all work as specified herein, including but not limited to the following:
 - 1. Apply specified treatments to all cuts and fill slopes, soil stockpiles, and all disturbed areas.
 - 2. Install all temporary erosion control devices per Plans and Specifications.
- B. All other labor and materials reasonably incidental to the satisfactory completion of the work, including cleanup of the site.

1.2 RELATED SECTIONS

- A. Section 01 10 00, Supplemental General Requirements

1.3 RELATED DOCUMENTS

- A. Caltrans Standard Specifications, 2015
 - 1. Section 21, Erosion Control
- B. Association of Official Seed Analysts Procedures
- C. California State Seed Law of the Department of Food and Agriculture

1.4 CONTRACTOR SUBMITTALS

- A. The Contractor shall submit, in accordance with Section 01 10 00, Supplemental General Requirements, manufacturer's letters of compliance and manufacturer's literature for the following items:
 - 1. Seed Mixes (or individual items)
 - 2. Mulches
 - 3. Binders/Tackifiers
 - 4. Fertilizer
 - 5. Humate
 - 6. Soil inoculates
 - 7. Straw (Weight receipts from scales shall be required)
 - 8. Erosion Control Blanket

1.5 SITE CONDITION

- A. It is the responsibility of the Contractor to visit the site to determine existing conditions including access to the site, the nature and extent of existing improvements upon adjacent public and private property, the nature of materials to be encountered, and other factors that may affect the work of this section.
- B. It is the responsibility of the Contractor to have finished the grading of the slopes, including track walking the areas to be treated with erosion control treatments.

1.6 WORK SCHEDULE

- A. The Contractor shall proceed with work during a period of June through December, 2019. The work shall progress as soon as the site becomes available consistent with normal seasonal limitations.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products shall be delivered to the site in manufacturer's unopened standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- B. All materials shall be stored in designated areas and in such a manner as to protect them from weather or other conditions that might damage or impair the effectiveness of the product.

1.8 ANALYSIS OF SAMPLES AND TESTS

- A. Samples: The Owner reserves the right to take and analyze samples of materials for conformity to the Specifications at any time. On request, seed shall be delivered to Owner's Representative 30 days prior to seeding so seed can be tested. Seed samples shall be drawn in accordance with procedures outlined in Association of Official Seed Analysts.
- B. Rejected material: Rejected materials shall be removed immediately from the site at Contractor's expense. Contractor shall pay the cost of testing replacement materials.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products shall be in conformance with the Specifications listed below. Any changes to products to be used shall be approved, in writing, by the Owner or Owner's representative prior to job site delivery.

2.2 SEED MIX [SEED MIX NEEDS TO BE PROVIDED BY LANDSCAPE CONSULTANT OR SEED COMPANY FOR THE PROJECT AREA]

- A. Seed shall conform to the provisions in Section 21-2.02F, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Owner's Representative.
- B. Seed shall be delivered to the project site in unopened separate containers with the seed tag attached. Containers without a seed tag attached will not be accepted.
- C. Composition:

| Species | Common Name | PLS lbs. /acre |
|----------------|-------------------------|-----------------------|
| <i>Gazania</i> | <i>Trailing Gazania</i> | <i>4 lbs. /acre</i> |

NON-LEGUME SEED

| Botanical Name (Common Name) | Percent Germination (Minimum) | Kilograms Pure Live Seed Per Hectare (Slope Measurement) |
|--|----------------------------------|--|
| Baccharis pilularis var. pilularis (Coyote Bush) | 20 | 0.05 |
| Artemisia californica (California Sagebrush) | 25 | 0.5 |
| Mimulus aurantiacus. (Sticky Monkeyflower) | 25 | .1 |
| Elymus glaucus, (Blue Wildrye,) | 40 | 9 |
| Festuca idahoensis (Idaho Festuca) | 35 | 4 |
| Hordium brachyantherum californicum (Meadow Barley) | 40 | 8 |
| Regreen | 60 | 45.0 |

D. Quality

1. All seed shall be in conformance with the California State Seed Law of the Department of Food and Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. In addition, the container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained.
2. Prior to seeding at the request of the Owner, the Contractor shall provide a letter of certification, original Association of Official Seed Analysts (AOSA) seed test results, and calculations of PLS.
3. All legume seed shall be pellet-inoculated. Inoculant sources shall be species specific and shall be applied at a rate of 2 pounds of inoculant per one hundred pounds of seed.

2.3 MULCH

- A. Mulch shall be 100% wood hydroseed and shall be composed of wood fiber derived from whole wood chips with no growth or germination inhibiting substances, and shall be manufactured in such a manner that when thoroughly mixed with seed, fertilizer, organic stabilizer, and water, in the proportions specified, will form a homogeneous slurry which is capable of being sprayed to form a porous mat.
- B. The fibrous mulch in its air-dry state shall contain no more than 15% by weight of water. The fiber shall have a temporary green dye and shall be accompanied by a certificate of compliance stating that the fiber conforms to these Specifications.

2.4 ORGANIC STABILIZER/TACKIFIER

- A. Stabilizer and tackifier shall be an organic substance supplied in powder form and shall be psyllium-based and packed in clearly marked bags stating the contents of each package. The California Department of Food and Agriculture shall certify the material as an Auxiliary Soil Chemical.

2.5 Fertilizer

- A. Fertilizer shall be of commercial quality, conform to the requirements of the California Department of Food and Agriculture Code, shall have a guaranteed analysis for nitrogen, phosphorus and potassium of 7-2-3. Products specified as slow-release shall have been tested and demonstrate a nearly linear release curve.

2.6 HUMATE

- A. Humate shall be OMRI listed and contain at least 40 % Humic acid. It shall be a natural granular humic acid based material that functions as an organic chelator and microbial stimulator. Humate shall not burn plant material and shall be non-toxic and non-staining.

- B. Humate Soil Conditioner

| | |
|-------------------------------|-------------------|
| Humic Acids (from Leonardite) | 40 .00 % |
| Organic matter | 40 .00 % - 50.00% |
| Carbon | 50.00 % - 60.00% |
| Nitrogen | 0.05 % - 1% |
| Phosphoric Acid | 0.07 % |
| Potash | 0.13 % |
| Sulfur | 0.21 % |
| Magnesium | 0.18 % |
| Calcium | 0.32 % |
| pH | 4.0 |
| Soluble Salts | 1.8 |

2.7 MYCORRHIZAL INOCULUM

- A. Endo (arbuscular) mycorrhizal inoculum shall be registered by the California Department of Food and Agriculture and consist of spores, mycelium and mycorrhizal root fragments in a solid carrier suitable for handling by hydro-seeding. The carrier shall be the material in which the inoculum was originally produced, and may include organic materials, vermiculite, perlite, calcined clay, or other approved materials consistent with mechanical application and with good plant growth.
- B. Each endomycorrhizal inoculum shall carry a supplier's guarantee of 80,000 propagules minimum per kilogram. The minimum propagule count shall be shown on each label provided. If more than one fungal species is claimed by the supplier, the label shall include a guarantee for each species of mycorrhizal fungus claimed.
- C. Endomycorrhizal fungal species shall be suitable for the pH of the soil at the planting site. If the inoculum consists of a mixture of species, no more than 20% of the claimed propagule count shall consist of fungal species known to be unsuitable for the pH of the soil at the planting site.
- D. A sample of approximately 28 grams (one ounce) of inoculum will be taken from each inoculum container by the Owner's Representative. The number of propagules will be determined by laboratory testing. Propagules shall include live spores, mycelial fragments and viable mycorrhizal root fragments.

- E. Endomycorrhizal inoculum shall be stored, transported and applied at temperatures of less than 32° C (90° F).

2.8 STRAW

- A. Shall be derived from irrigated rice or clean cereal grain straw.
- B. The Contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw from outside the County in which it is to be used is delivered to the site of the work.
- C. Straw that has been used for bedding is prohibited.

2.9 EQUIPMENT

- A. Equipment used for application of slurry shall be a commercial-type Hydro-Seeder and have a built-in agitation system with an operation capacity sufficient to agitate, suspend and homogeneously mix slurry.
- B. Tank capacity shall be a minimum of 1,500 gallons and shall be mounted on a truck to allow access to the site.
- C. Pump shall be able to generate 150 psi at the nozzle.
- D. Straw blowers: Equipment shall be specifically designed and manufactured for the application of straw and shall be of sufficient horsepower to break up and distribute straw at the specified application rate.

2.10 WATER

- A. Water shall be furnished by Owner and shall be made readily available at the sites indicated on the project map. Water shall be of potable quality.
- B. Contractor shall add 4-6 lbs. of Vulpia Microstachys or 20 lbs. of Regreen per acre if hydroseeding occurs in the fall or winter months.
- C. Hydroseed mix can be obtained from Pacific Coast Seed, Inc., (925) 373-4417, or other local seed company.

2.12 EROSION CONTROL BLANKETS

- A. Erosion control must be Erosion Control Technology Council (ECTC) Type 2D and made of processed natural fibers that are mechanically, structurally, or chemically bound together to form a continuous matrix that is surrounded by 2 natural nets. Erosion control blanket must comply with the requirements shown in the following table:

| Erosion Control Blanket | | | | |
|--------------------------------|-------------|-------------|--------|--------|
| Quality characteristic | Test method | Requirement | | |
| | | Type A | Type B | Type C |
| Roll width (min, inches) | -- | 72 | | |
| Matrix (%) | -- | 70/30 | -- | -- |
| | | -- | 100 | -- |
| | | -- | -- | 80 |

| | | | |
|---|------------|--------|--|
| Straw/coconut Woven coir (coconut fiber) Wood excelsior (6 inches or longer) | | | |
| USLE C-Factor for a 1:1 (H:V) unvegetated slope | -- | ≤ 0.20 | |
| Shear stress (max, psf) | ASTM D6460 | 1.75 | |
| Tensile strength (min, psf) | ASTM D5035 | 75 | |
| Functional longevity (months) | -- | 12 | |

PART 3 - EXECUTION

3.1 SOIL PREPARATION

- A. No soil amendments shall be required except as noted on the Plans.
- B. Verification: Contractor shall verify:
 - 1. That all areas to receive erosion control treatments are free of vegetation and other objectionable material.
 - 2. That grades are final for permanently treated areas and within reasonable standard for temporary treatments.
 - 3. That all sloped areas are uniformly compacted: wherever possible, the surface compaction of the top 1 foot shall be 85% or less.

3.2 EROSION CONTROL BLANKET INSTALLATION

- A. Before placing the erosion control blankets, Contractor shall ensure the subgrade has been graded smooth and has no depressed voids. The subgrade must be free from obstructions, such as tree roots, projecting stones, or foreign matter greater than 1 inch in diameter. Overlap the end of the erosion control blanket by 24 inches. Use 18 inch staples staked at maximum of 4 feet on center in staggered pattern. Do not drive vehicles on the erosion control blanket.

3.3 HYDROSEEDING AREA

- A. Areas to receive erosion control treatments include all graded areas as shown on the site plan and other areas as determined by the Owner.
- B. Perform erosion control treatments on a section by section basis. On approval of the Owner, and as soon as possible after grading, complete treatments in the following order of priority: stream zones, graded slopes, non-trafficked road and parking areas, building pads and other flat areas.
- C. Contractor shall be available to re-treat areas disturbed by on-going activities.
- D. Preparation: All slurry preparation to be conducted at the job site.
 - 1. Water, mulch, fertilizer, compost, binder and other ingredients shall be added to the tank simultaneously so that the finished load is a homogenous mix of the specified ingredients.

2. Seed shall be added last and shall be discharged within 2 hours. Loads held over 2 hours will be recharged with ½ the seed rate before application.
 3. Once fully loaded, the complete slurry shall be agitated for 3-5 minutes to allow for uniform mixing.
- E. Application: Apply specified slurry in a sweeping motion to form a uniform application.
1. Step One - with hydroseeder apply:
 1. Seed Mix Total 4 lbs./acre
 2. 100% Cellulose Fiber Mulch 500 lbs./acre
 3. Biosol 7-2-3 (Organic Fertilizer) 1,600 lbs./acre
 4. AM120 (Mycorrhizal Inoculant) 60 lbs./acre
 2. Step Two - with straw blower apply:
 1. Rice or Clean Cereal Grain Straw 4,000 lbs./acre
 3. Step Three - with hydroseeder apply:
 1. 100% Cellulose Fiber Mulch 500 lbs./acre
 2. M-Binder 100 lbs./acre
 4. Under suitable conditions straw shall be uniformly spread at the specified rates. The straw may be pneumatically applied as long as the resulting straw is predominately 3 to 6 inches in length. The straw shall be treated with mulch and tackifier before it can blow off the site but in no case shall straw be left untreated for more than 24 hours. The Contractor will clean up areas of straw which are blown from the site, and the areas shall be retreated at no additional expense to the Owner.
- F. Protection: Contractor is to stay off treated areas.
- G. Unused Loads: If mixture remains in tank for more than 8 hours it shall be removed from the job site at Contractor's expense.
- H. Preliminary Inspection: Notify the Owner's Representative 48 hours in advance of all seeding. Inspection and favorable review of completed work shall begin the plant establishment period.
- 3.4 Plant Establishment Maintenance
- A. General plant maintenance shall immediately follow seeding and continue for **90 days**.
[Enter plant maintenance period]
 - B. Protect areas against all damage, including erosion and trespass, and provide proper safeguards. Maintain and keep in good repair all temporary barriers erected to prevent trespassing. Check all barrier and temporary fencing daily, and make immediate repairs or replacements
 - C. Repair all damage to seeded areas.
 - D. Maintain constant moisture depth in soil to insure vigorous growth.
- 3.5 Final Inspection and Acceptance:

- A. Final inspection will be conducted upon completion of maintenance, replacements and corrective work. Five (5) days' notice shall be given. If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the Owner's Representative, maintenance shall continue at Contractor's expense until such time as work has been successfully completed.

3.6 Guarantee and Replacement

- A. Guarantee all planting to be in a healthy, thriving condition until the end of the maintenance period or beyond that time until active growth is evident and for one year from date of acceptance.
- B. Replace all seeded areas not in vigorous condition as soon as directed by Owner's Representative. Seed mixture used for replacement must be of the same kind and quantity as specified in this section.

3.7 Clean-up

- A. Erosion control work areas shall be maintained in a neat and orderly condition. Keep paved area free of erosion treatment, soil, and other debris.
- B. Overspray: Installing Contractor is responsible for washing or otherwise cleaning excess material off all areas not intended to receive treatment.
- C. Debris: Clean up and remove erosion control associated materials and debris from project site before Final Acceptance.

END OF SECTION

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SECTION 01 5639 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section describes measures taken to protect trees and minimize the impact of construction. Contractor shall provide all labor and materials necessary to complete tree protection as specified.
- B. Tree protection includes watering trees, installing fences around trees, and protective measures described below.

1.3 QUALITY ASSURANCE

- A. Provide at least one person who shall be present on site at all times during execution of this portion of the Work who shall direct all Work performed in this Section.
- B. Contractor shall arrange a pre-construction meeting to be attended by the Contractor, appropriate subcontractors, Construction Manager, Owner, and selected consultants. This meeting shall review procedures for performing Work in the area of the trees and protection of the trees identified to remain.
- C. All work on or around trees shall be according to International Society of Arboriculture (ISA) standards. All work on trees shall be performed under the guidance and direction of an ISA-certified arborist.

1.4 SUBMITTALS

- A. Submit manufacturer's specifications for all products to be used.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fencing – Chain link fencing 6 feet high or approved alternative.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install a 6-foot chain link fence or approved alternate at or outside of the drip line of every tree to be preserved. Leave fence in place throughout construction.

- B. Protect trees from stockpiling of construction materials such as lumber, steel, debris, and bricks. Do not park vehicles under trees.
- C. Protect trees from dumping of wastes such as paint, chemicals, cement water, around the base of the tree.
- D. Protect root systems from flooding, erosion, excessive wetting and drying resulting from dewatering and other operations.

3.2 EXCAVATION AROUND TREES

- A. Cut roots with sharp instruments. Do not tear or rip roots with a backhoe or other digging device. After cutting, keep cut ends moist with damp burlap or approved equivalent.
- B. Maintain existing grade within the dripline of the tree unless otherwise directed on Drawings. Prior to digging within the dripline of trees meet with project manager and Owner's arborist on site to discuss work to be performed.

3.3 COMPENSATION FOR DAMAGED TREES

- A. Contractor shall pay Owner the value of existing trees that die or are damaged because of the Contractor's failure to provide adequate protection and maintenance, in compliance with the schedule of values, using the "tree caliper" method (greatest trunk diameter measured 30 inches above ground) or by the method established in the most recent issue of the Guide for Establishing Values of Trees and Other Plants, prepared by the Council of Tree and Landscape Appraisers, whichever is greater.
- B. The requirements of this article shall apply throughout the one year guarantee period after final completion of the project.

3.4 CLEANUP

- A. Keep all areas of work clean, neat and orderly at all times.
- B. Upon completion of work remove all rubbish debris and other undesirable materials resulting from this work.

END OF SECTION 01 5639

SECTION 01 57 23 – STORM WATER POLLUTION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. State Water Resources Control Board Construction General Permit for Storm Water Discharges associated with construction and land disturbance activities, adopted Order 2009-0009-DWQ (As amended by 2010-0014-DWQ and 2012-0006-DWQ)

1.2 RELATED SECTIONS

- A. Section 01 10 00 Supplemental General Requirements

PART 2 - EXECUTION

2.1 EXECUTION AND IMPLEMENTATION

- A. Execution and implementation of this work shall be as identified by the approved erosion control during construction plan and SWPPP as determined by the QSD, and executed by the QSP.

2.2 SUMMARY

- A. All construction or demolition activity, including, but not limited to, clearing, grubbing, grading, or excavation, or any other activity that results in a land disturbance shall be subject to the State Water Resources Control Board Construction General Permit Order No. 2009-0009-DWQ (As amended by 2010-0014-DWQ and 2012-0006-DWQ)
- B. In compliance with the State and Federal regulations on construction storm water management and urban runoff pollution control, no pollutants will be allowed to enter the storm drainage system.
- C. The Owner's Representative have prepared a site specific Storm Water Pollution Plan (SWPPP) and have prepared and filed the Notice of Intent and will file the Notice of Termination at the end of the project on behalf of the Owner.
- D. The Contractor shall coordinate with the Owner to ensure the delivery of all engineering, material, labor and equipment for planning, documenting, submitting, monitoring, testing, installing, implementation and maintenance of all surface-water pollution prevention and erosion control measures. This work includes but is not necessarily limited to:
 - 1. Providing a Qualified SWPPP Practitioner (QSP) for monitoring and implementation.
 - 2. Implementing the site specific Storm Water Pollution Prevention Plan (SWPPP).
 - 3. Furnishing, placing, and installing effective measures for preventing runoff of soil, silts, gravel, hazardous chemicals or other materials prohibited by the Regional Water Quality Control Board (RWQCB) from entering the storm water drainage system.

4. Management of on-site construction materials in such a manner as to prevent said materials from contacting storm water or wash water and running off into the storm drain system.
 5. Complying with applicable standards and regulations specified herein.
 6. Maintaining the most current revised SWPPP plan at the Contractor's work site.
 7. Reviewing any changes in the SWPPP plan at the weekly progress meetings. The Contractor shall submit a numbered checklist of the current status of each prevention measure on the job site.
- E. In this section, the term "storm drain system" shall include: storm water conduits; storm drain inlets; and other storm drain structures, street gutters, channels, and ditches.
- F. Contractor shall have storm water pollution prevention measures in place and conduct inspections daily or as required by RWQCB requirements. Contractor's QSP shall develop a Rain Event Action Plan as required by the requirements, and Contractor shall bear the costs of all Likely Precipitation Events, and all Qualifying Rain Events. It is the responsibility of the Contractor to be prepared for a rain event in the non-rainy and rainy season, and to be aware of weather predictions. The Owner is not responsible for informing the Contractor of rain predictions.

2.3 DEFINITIONS

- A. LRP: Legally Responsible Party, the owner of the property, the Owner. As the LRP, it is the intention of the Owner to ensure through this Contract that the Contractor shall properly follow, implement, and execute all provisions of the State Water Resources Control Board Construction General Permit for Storm Water Discharges on the behalf of the Owner, and that the Contractor shall include all such costs within their bid.
- B. Data Submitter. Data Submitter is any individual authorized by the LRP or an Approved Signatory to enter data on behalf of the LRP. The Owner will authorize and link the Contractor as a Data Submitter, to allow Contractor to upload and submit the required documents to the SMARTS system.
- C. PRD: Permit Registration Documents, which consist of the Notice of Intent, Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the LRP, and the annual fee.
- D. QSD: Qualified SWPPP Developer, a certified person responsible for preparing, amending and certifying the project SWPPP; in this case the Owner's Representative.
- E. QSP: Qualified SWPPP Practitioner, a certified person responsible for non-storm water and storm water visual observations, sampling and analysis, and for ensuring full compliance with the General Permit and implementation of all elements of the SWPPP.
- F. RWQCB: Regional Water Quality Control Board, one of nine Regional Boards of SWRCB.
- G. SMARTS: Storm Water Multiple Application and Report Tracking System.
<https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp>
- H. SWRCB: State Water Resources Control Board is the State

- I. SWPPP: Storm Water Pollution Prevention Plan, to be developed and certified by a QSD and to be implemented by a QSP. QSP shall direct Contractor on all aspects of the SWPPP.

2.4 SUBMITTALS AND RESPONSIBILITIES

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. The Owner's Representative on behalf of the Owner have developed and submitted a site specific State of California Storm Water Pollution Prevention Plan (SWPPP) in PDF format which was uploaded by the Owner's Representative (as Data Submitter) to the State Water Resources Control Board's SMART system. The Owner will review the submittal and approve it in the SMARTS system, for review by the SWRCB. The Preparation of the SWPPP was in accordance with the State Regional Water Quality Control Board Order No. 2009-0009-DWQ (As amended by 2010-0014-DWQ and 2012-0006-DWQ).
- D. Permit Registration Documents (PRDs) as defined in Attachment B of the Construction General Permit include the Notice of Intent, Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the LRP, and the first annual fee. The PRDs has been provided by and electronically filed to the State SMARTS system by the Owner's Representative on behalf of the Owner. The Owner shall supply the signed certification statement. The Owner will electronically review and approve the PRDs to the State Water Resources Board via the SMARTS system, after uploaded to the SMARTS by the Owner's Representative.
- E. No construction work shall begin until the Contractor receives written notification from the Owner that the Permit Registration Documents components have been deemed complete by the SMARTS system and a Waste Discharge Identification (WDID) number has been emailed to the Owner by the system.
- F. The Contractor shall ensure that all elements of the project SWPPP will be implemented by a Qualified SWPPP Practitioner (QSP). The QSP must meet the Construction General Permit certification requirements.
- G. The Contractor shall implement, maintain and be responsible for collection and input of data and for the effectiveness of the SWPPP measures in accordance with the Risk Level as determined by the Risk Assessment procedure as described in the General Permit Appendix 1. The Owner's Representative will determine the Risk Level.
- H. The Contractor shall maintain a rain gauge at the site and record daily (Monday through Friday) rainfall amounts until the project is complete.
- I. The project SWPPP was prepared to address the following:
 - 1. All known/potential pollutants and their sources associated with construction activities.
 - 2. All non-storm water discharges are identified and either eliminated, controlled, or treated.
 - 3. Best Management Practices (BMPs) are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges during construction.
 - 4. Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed, effective, and maintained.

- J. The project SWPPP shall be made available at the construction job site during working hours while construction is occurring and shall be made available upon request by the Owner or State Inspector.
- K. The Contractor shall notify the Owner if the QSP is no longer associated with the work. The Owner shall be notified and a qualified replacement shall be named within twenty-four (24) hours.
- L. The Owner’s Representative shall provide SWPPP Amendment documents on a regular basis to the Owner in electric PDF format and the Owner’s Representative shall submit those files as required to the State SMARTS system on behalf of the Owner. The Owner’s Representative will inform the Owner after documents are uploaded to the system so the Owner may process them in the system as required. SWPPP Amendments shall be provided at a minimum of once every three (3) months. If a SWPPP Amendment is not needed, the Owner’s Representative and QSP shall send notification to the Owner stating “Amendment is not necessary” for the period of construction.
- M. The Owner’s Representative shall provide all documentation required for Annual Reporting and the Notice of Termination to the SMARTS system in PDF format in a timely manner as required by the SWRCB. The Owner’s Representative will inform the Owner when documents are ready for Owner certification in the SMARTS system.

2.5 PERMIT VIOLATIONS

- A. If there is a Permit violation, the Contractor shall notify the Owner immediately and corrections shall be made as necessary to comply with the General Permit.
- B. The Contractor is responsible for any fines, and additional sampling, testing and monitoring that result from their negligence to comply with the General Permit requirements without any compensation from the Owner. If the Owner is forced to pay any fines or fees to the SWRCB due to the negligence of the Contractor to comply with the General Permit requirements, the costs shall be deducted from the Contractor’s contract value.
- C. If the Regional Water Quality Board or City inspector is at the site, the Contractor shall notify the Owner within twenty-four (24) hours and shall provide a written notice of any deficiencies noted and/or changes requested by the inspector.
- D. Violation of the General Permit may cause the Owner to issue a stop-work notice and take necessary actions to require the Contractor to correct and comply with the Permit requirements and regulations. All costs related to the stop-work action and corrective work to come into compliance with the General Permit shall be at the sole expense of the Contractor.

PART 3 - PRODUCTS

3.1 PRODUCTS AND MATERIALS

- A. Products and materials used in the implementation of this work shall be as identified by the approved SWPPP plan determined by the Owner’s Representative.

4.1 EXECUTION AND IMPLEMENTATION

- A. Execution and implementation of this work shall be as identified by the approved SWPPP plan determined by the Owner's Representative, and executed by the Contractor's QSP.

END OF SECTION

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SECTION 01 6000 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section describes basic requirements governing material and equipment including but not limited to:
 1. Products.
 2. Fabrication and installation.
 3. Manufacturers' instructions.
 4. Product delivery, storage, handling, and protection.

1.3 RELATED REQUIREMENTS

- A. Section 01 3300 – Submittal Procedures.

1.4 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.5 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 3. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: See Section 01 2513.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 <Insert time> days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.6 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 26 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or accepted equivalent," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Comply with specifications and referenced standards as minimum requirements.
- C. Provide new materials, except as specifically allowed by the Contract Documents.
- D. Comply with industry standards except when more stringent tolerances are required. Perform work by persons qualified to produce fabricate, and install materials of specified quality.
- E. Components required to be supplied in quantity within a specification section shall be the same and shall be interchangeable.
- F. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 4. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the

- specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
 7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
 8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, and textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

2.3 FABRICATION AND INSTALLATION

- A. Comply with industry standards except when more restrictive tolerances or requirements indicate more rigid standards or precise fabrication and installation.

- B. Perform work by persons qualified to fabricate and install materials and products of specified quality.
- C. Secure products in-place plumb, level and true to line, in correct relation with adjacent material and with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

2.4 MANUFACTURERS' INSTRUCTIONS

- A. When work is specified to comply with manufacturers' instructions, distribute copies to persons involved, and maintain one set in field office.

PART 3 - EXECUTION - NOT USED

END OF SECTION 01 6000

SECTION 01 6116 VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

1. Section 01 3000 - Administrative Requirements: Submittal procedures.
2. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Interior of Building: Anywhere inside the exterior weather barrier.

1.4 REFERENCE STANDARDS

- A. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.
- B. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Carpet and Rug Institute; Current Edition.

1.5 SUBMITTALS

- A. See Section 01 3300 – Submittal Procedures, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the Project, submit evidence of compliance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of Federal, State, and local requirements, or these specifications.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. City reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to City.

- B. All additional costs to restore indoor air quality due to installation of non-compliant products shall be borne by Contractor.

END OF SECTION 01 6161

SECTION 01 7123 – FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Verification of property lines and bench mark.
- B. Verification of existing utility elevations.
- C. Layout of building and other site features.
- D. Field engineering.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by professional engineer.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 GENERAL

- A. Furnish all materials, labor, transportation and equipment necessary to complete this portion of the Contract.
- B. Establish location of items on site with appropriate offsets to allow for grading work.
- C. Reset property stakes, if required.
- D. Reset bench mark, if required.
- E. Define locations of paving, walks and other site features including manholes and underground utility locations.
- F. Verify the inverts or flow lines of all existing utility structures adjacent to the site or to be connected to, including but not limited to stubs, drainage channels, laterals, catch basins, junction boxes, manholes and gutters.

3.2 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

END OF SECTION 01 7123

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SECTION 01 7300 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Verification of property lines and bench mark.
- B. Verification of existing utility elevations.
- C. Layout of building and other site features.
- D. General installation of products.
- E. Coordination of Owner-installed products.
- F. Progress cleaning.
- G. Starting and adjusting.
- H. Protection of installed construction.
- I. Correction of the Work.

1.3 RELATED SECTIONS

- A. Section 01 7700 – Closeout Procedures: Final cleaning.

1.4 SUBMITTALS

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least **10 days** prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.

5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
 - D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
 - E. Certified Surveys: Submit two copies signed by professional engineer.
 - F. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.
- 1.5 QUALITY ASSURANCE
- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
 - B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 GENERAL

- A. Furnish all materials, labor, transportation and equipment necessary to complete this portion of the Contract.
- B. Establish building location with appropriate offsets to allow for grading work.
- C. Reset property stakes, if required.
- D. Reset bench mark, if required.
- E. Define locations of paving, walks and other site features including manholes and underground utility locations.
- F. Verify the inverts or flow lines of all existing utility structures adjacent to the site or to be connected to, including but not limited to stubs, drainage channels, laterals, catch basins, junction boxes, manholes and gutters.

3.2 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.3 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

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SECTION 01 7329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of Work.
- B. Contractor shall be responsible for cutting, fitting and patching required to complete the following work:
 - 1. Make its parts fit together properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract Documents.
 - 5. Remove samples of installed work as required for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit. In-fill and patch openings left by removal of piping, conduit, etc.
- C. Coordinate unanticipated cutting and demolition with the Architect prior to executing work.
- D. Provide special care to protect the areas of the building to be retained. Match surrounding materials and finishes. All new concrete shall match the texture, degree of smoothness and corner conditions of existing adjacent concrete.
- E. Contractor shall be responsible for patching of existing walls and ceilings to a reasonably smooth condition. This may require the removal and cutting of existing ceiling framing, hangers and brackets and patching of the remaining indents and holes.
 - 1. Contractor shall be responsible for cutting, fitting and patching required to complete Work.
 - 2. Coordinate unanticipated cutting and demolition with the Contracting Officer prior to execution of the work.
 - 3. Provide special care to protect the historic fabric of the buildings scheduled to be retained. Match surrounding materials and finishes.

1.3 RELATED SECTIONS

- A. Section 01 11 00 - Summary of Work: Work by City or by separate contractors.
- B. Section 01 25 13 – Product Substitution Procedures.
- C. Section 01 33 00 – Submittals Procedures.
- D. Individual Product Specification Sections:
 - 1. Cutting and patching incidental to work of the Section.

2. Advance notification to other Sections of openings required in work of those Sections.
3. Limitations on cutting structural and other types of members.

1.4 SUBMITTALS

- A. Shop Drawings: Submit prior to cutting of any structurally or visually significant portion of the Work which is not specifically shown on the Drawings. Obtain written permission for exact location and size of openings from the Architect.
 1. Before cutting into any portion of the structure, obtain written permission from the Architect for each hole to be cut or enlarged. Submit shop drawings indicating exact location and size of detail of reinforcement of such openings.
- B. Submit written request in advance of cutting or alteration which affects:
 1. Structural integrity of any element of Project.
 2. Integrity of weather-exposed or moisture-resistant element.
 3. Efficiency, maintenance, or safety of any operational element.
 4. Visual qualities of sight exposed elements.
 5. Work of City or separate contractor.
- C. Include in request:
 1. Identification of Project.
 2. Location and description of affected work.
 3. Necessity for cutting or alteration.
 4. Description of proposed work, and products to be used.
 5. Alternatives to cutting and patching.
 6. Effect on work of City or separate contractor.
 7. Written permission of affected separate contractor.
 8. Date and time work will be executed.

1.5 QUALITY ASSURANCE

- A. Standards: For seismic restraints of mechanical systems comply with SMACNA Manual unless more stringent requirements are indicated in Division 23.

1.6 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Primary Products: Identical to those required for original installation.
 1. For exposed surfaces, use materials that virtually match existing adjacent surfaces to fullest extent possible if identical materials are unavailable or cannot be used.
 2. Use materials whose installed performance will equal or surpass that of existing materials.

- B. Product Substitution: For any proposed change in materials, submit request for substitution under provisions of Section 01 2513.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing work, inspect conditions affecting performance of work.
- C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instruction.
- D. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.
- C. Maintain excavations free of water.
- D. Avoid cutting existing pipes or conduit serving the site but scheduled to be removed or relocated until provisions have been made to bypass them.
- E. Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at earliest feasible time and complete.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and subsequent fitting and patching required to restore surfaces to original condition.

3.3 PERFORMANCE

- A. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. When warranty may be affected by alterations to original installation of weather exposed and moisture resistant elements, and sight-exposed surfaces, employ original installer to perform cutting and patching.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work air tight to pipes, sleeves, conduit, and other penetrations through surfaces.

3.4 CUTTING AND PATCHING

- A. General: Execute cutting, fitting, and patching including excavation and fill to complete work.
 - 1. Fit products together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective or non-conforming work.
 - 4. Remove samples of installed work for testing when requested.
 - 5. Provide openings in the work for penetration of mechanical and electrical work.

- B. Cutting:
 - 1. Perform cutting, associated structural reinforcing, and patching in a manner to prevent damage to other Work, and to provide proper surfaces for the installation of new materials, equipment and repairs. Adjust and fit products to provide a neat installation.
 - 2. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior written approval.

- C. Patching:
 - 1. Patch surfaces to match adjacent surfaces. Finish to nearest intersection. For an assembly, refinish entire unit.
 - 2. Patch to achieve security; strength; weather protection, as applicable; efficiency, operational life, maintenance, and safety of operational elements; and to preserve continuity of existing fire ratings.
 - 3. Patch surfaces to successfully duplicate undisturbed adjacent profiles, materials, textures, finishes and colors. Use materials which match existing construction.
 - 4. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the Architect's decision will be final.
 - 5. Fit work to pipes, sleeves, conduit, and other penetrations through surfaces.

3.5 FINISHING

- A. Finish or refinish, as applicable, cut and patched surfaces to match adjacent finishes. Replace materials which are damaged or abused and cannot be neatly repaired as a result of cutting and patching operations.

- B. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection or natural break.
 - 2. For an assembly, refinish entire unit.

- C. Painting: Paint over complete surface planes, unless otherwise indicated or directed. Over patched wall and ceiling surfaces, paint to nearest cutoff line for entire surface, unless otherwise indicated or directed. Painted surfaces shall not appear spotty or touched-up.

END OF SECTION 01 7329

SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for the following:
 1. Salvaging non-hazardous demolition and construction waste.
 2. Recycling non-hazardous demolition and construction waste.
 3. Disposing of non-hazardous demolition and construction waste.

1.3 RELATED SECTIONS

- A. Section 02 4116 - Structure Demolition: Disposition of waste resulting from partial demolition of structures and site improvements.

1.4 REFERENCES

- A. CALGreen – California Green Building Standards with City of Burlingame Amendments, 2016 Edition.

1.5 WASTE MANAGEMENT GOALS FOR THE PROJECT

- A. The Owner has established that this Project shall minimize the creation of construction and demolition waste on the job site. Contributing factors include over-packaging, ordering error, poor planning, improper storage, breakage, mishandling, and contamination. Recycle as many of the waste materials as economically feasible. Minimize waste sent to landfills.
- B. Diversion Goals: A minimum of 50% of total project waste shall be diverted from landfill. The following waste categories, at a minimum, shall be diverted from landfill through recycling or salvage:
 1. Clean dimensional wood, pallet wood
 2. Plywood, OSB, and particleboard
 3. Concrete
 4. Cardboard, paper, packaging
 5. Metals
 6. Paint
 7. Glass
 8. Plastics
 9. Beverage containers
- C. Salvage may include donations of materials to charitable organizations.

1.6 PERFORMANCE GOALS

- A. Use resources efficiently.
 - 1. Reuse existing building materials from demolished buildings where possible.
 - 2. Select materials that use resources efficiently.
 - 3. Use construction practices that achieve the most efficient use of resources and materials.
 - 4. Recycle minimum 50% (by weight) of construction, demolition and land-clearing debris.
 - 5. Select recycled content materials (target is 20% of building materials that contain in aggregate a minimum average the post-consumer recycled content and 50% post industrial recycled content).
 - 6. Select materials that can be recycled at the end of their useful life (e.g. metal products, etc.).

- B. Use durable materials.
 - 1. Select materials with the longest usable life.
 - 2. Select materials with the least burdensome maintenance requirements.

1.7 SUBMITTALS

- A. Waste Management Plan: Within 1 week of contract award, the Contractor shall submit to the Owner a Waste Management Plan. The Plan shall contain the following:
 - 1. Designation of the party who will implement the plan
 - 2. Analysis of the estimated job-site waste to be generated, including types and quantities
 - 3. Proposed Alternatives to Landfilling: a list of each material planned to be salvaged or recycled during the course of the Project and the proposed destination of each material

- B. Progress Reports: Submit bi-monthly, a Waste Management Progress Report. The report shall contain the following information:
 - 1. Project title, name of company completing report, and dates of period covered by the report
 - 2. Amount (in tons or cubic yards) of material landfilled from the Project and identity of the landfill
 - 3. For each material recycled or salvaged from the Project, provide the following:
 - a. Amount (in tons or cubic yards)
 - b. Date(s) removed from the job site
 - c. Receiving party
 - d. Cost: Bin rental, hauling, and facility fees
 - e. What was done with the material
 - 4. Include legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling, or disposal.

- C. Project Completion Report:
 - 1. Submit a letter at project close out tabulating the total waste material, quantities diverted and the means by which diverted, and declaring that the waste management

goal has been met. Calculations may be done by weight or volume, but must be consistent throughout.

- D. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 PROJECT MEETINGS

- A. Waste management plans and implementation shall be discussed at the following meetings:
 1. Pre-bid meeting
 2. Pre-construction meeting
 3. Regular job-site meetings

1.9 QUALIFIED CONSTRUCTION WASTE RECYCLING SERVICES

- A. Construction waste shall be delivered to appropriate, qualified recycling services

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Coordinate waste materials handling and separation for all trades, and document results of the Waste Management Plan.
- B. Provide separation, handling, transportation, recycling, salvage, and landfilling for all demolition and waste materials.
- C. Designate a specific area for separation of material for salvage and recycling. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing materials.
- D. Maintain an on-site log, which includes for each load of materials removed from site: type of material, load volume and/or weight, recycling/hauling service, date accepted by recycling service or landfill, and facility fee.
- E. Do not handle, separate, store, salvage, or recycle hazardous materials with other materials. Follow material-specific instructions any hazardous materials. Contact Project Manager if no instructions are evident.
- F. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

- G. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 01 5000 for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 7419

SECTION 01 7700 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Procedures for substantial and final completion.
- B. Inspection and final acceptance.
- C. Record document submittals.
- D. Final cleaning.

1.3 RELATED SECTIONS

- A. Section 01 4000 – Quality Control: Progress cleaning.

1.4 SUBSTANTIAL COMPLETION

- A. In the Application for Payment that coincides with the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed substantially complete.
- B. Submit specific warranties, bonds, maintenance agreements, final certifications and similar documents.
- C. Submit record drawings, maintenance manuals, property survey, and similar record information.
- D. Complete start-up testing of systems, and instruction of the Owner's personnel. Remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
- E. Complete final clean up. Touch-up, repair, and restore marred exposed finishes.

1.5 INSPECTION PROCEDURES

- A. On receipt of a request for inspection, the Architect will proceed or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
- B. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.

- C. Results of the completed inspection will form the basis of requirements for final acceptance.

1.6 FINAL ACCEPTANCE

- A. Owner will notify Architect 30 days prior to anticipated substantial completion to schedule inspection.
- B. Before requesting inspection for certification of final acceptance and final payment, complete the following:
 - 1. Submit final payment request with releases.
 - 2. Submit a final statement, accounting for changes to the Contract Sum.
 - 3. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
 - 4. Submit final meter readings for utilities, a record of stored fuel, and similar data as of Substantial Completion.
 - 5. Submit consent of surety to final payment.
 - 6. Submit evidence of continuing insurance coverage complying with insurance requirements.

1.7 REINSPECTION PROCEDURE

- A. The Architect will reinspect the Work upon receipt of notice that the Work has been completed, except items whose completion has been delayed because of circumstances acceptable to the Owner.
- B. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
- C. If necessary, reinspection will be repeated.

1.8 RECORD DOCUMENT SUBMITTALS

- A. Do not use Record Documents for construction purposes; protect from loss in a secure location; provide access to Record Documents for the Architect's reference.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark-up these drawings to show the actual installation. Mark whichever drawing is most capable of showing conditions accurately. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
- C. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover.
- D. Record Specifications: Maintain one copy of the Project Manual, including addenda. Mark to show variations in actual Work performed in comparison with the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot be readily discerned later by direct observation. Note related record drawing information and Product Data.

- E. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.
- F. Delete Architect/Engineer title block and seal from all documents.
- G. Submit documents to Architect/Engineer with claim for final Application for Payment. Documents will be forwarded to Owner for approval.

1.9 FINAL CLEANING

- A. Employ experienced workers for final cleaning. Clean each surface to the condition expected in a commercial building cleaning and maintenance program.
- B. Perform cleaning prior to requesting inspection for certification of Substantial Completion.
- C. Remove labels that are not permanent labels.
- D. Clean transparent materials. Remove glazing compound. Replace chipped or broken glass.
- E. Clean exposed hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- F. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- G. Clean the site of rubbish, litter and other foreign substances. Sweep paved areas; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- H. Removal of Protection: Remove temporary protection and facilities.
- I. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials from the site and dispose of in a lawful manner.
- J. Adjust operating Products and equipment to ensure smooth and unhindered operation.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 7700

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SECTION 01 7823 – OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Format and content of manuals.
- B. Instruction of Owner's personnel.
- C. Posted operating instructions.
- D. Scheduling of submittals.

1.3 RELATED SECTIONS

- A. Section 01 2900 – Payment Procedures: Final application for payment.
- B. Section 01 3300 – Submittal Procedures.
- C. Section 01 4000 - Quality Requirements: Manufacturer's reports.
- D. Section 01 7700 – Closeout Procedures.
- E. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.4 SUBMITTALS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes in final form prior to final Application for Payment. Copy will be returned with Architect/Engineer comments. Revise content of documents as required prior to approval of final Application for Payment.
- D. Submit two copies of revised volumes of data in final form within ten days after final inspection.

1.5 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. CALGreen:
 - 1. Provide educational materials, operation and maintenance manuals to ensure buildings and equipment are properly maintained.
 - 2. Provide information pertaining to landscape design and maintenance, public transportation options, recycling opportunities, special inspection reports and energy incentive programs.

1.6 MAINTENANCE MANUALS

- A. Organize maintenance data into sets of manageable size. Bind in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark identification on front and spine of each binder. Include the following information:
 - 1. Emergency instructions.
 - 2. Spare parts list.
 - 3. Copies of warranties.
 - 4. Wiring diagrams.
 - 5. Recommended "turn around" cycles.
 - 6. Inspection procedures.
 - 7. Shop Drawings and Product Data.
 - 8. Fixture lamping schedule.
- B. Operating and Maintenance Instructions: Arrange for the installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Include a detailed review of the following:
 - 1. Maintenance manuals.
 - 2. Spare parts and materials.
 - 3. Tools.
 - 4. Lubricants.
 - 5. Control sequences.
 - 6. Hazards.
 - 7. Warranties and bonds.
 - 8. Maintenance agreements and similar continuing commitments.
- C. As part of instruction for operating equipment, demonstrate the following procedures:
 - 1. Start-up and shutdown.
 - 2. Emergency operations.
 - 3. Noise and vibration adjustments.
 - 4. Safety procedures.

1.7 POSTED OPERATING INSTRUCTIONS

- A. Prepare operating instructions for posting near equipment.
- B. Format: Photographic or equal non-fading reproductions framed under glass or encased in non-discoloring plastic.

- C. Include copies of operating instructions in operation and maintenance manuals; use as a basis for training Owner's personnel in the operation and maintenance of systems and related installed equipment.
- D. Content: Simplified, consolidated equipment, control, and power diagrams graphically representing the entire system and actual equipment installed, including concise written instructions on how to start and stop systems, what settings and conditions are to be observed, and what control adjustments are to be made or maintained by the operation.
- E. Posted operating instructions must include, but are not limited to the following:
 - 1. One-line schematic diagrams of water supply (plumbing).

1.8 TRAINING

- A. Provide training for Owner personnel in the operation and maintenance of mechanical and electrical equipment. Coordination must be maintained with systems designers for developing the hours of instruction and scope of material to be covered.
- B. Do not begin training until the Owner has approved the final submittal copy of the operation and maintenance manual.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 7823

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SECTION 01 7834 – WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties, warranties on products and special warranties.
- B. Refer to the General conditions for terms of the Contractor's special warranty of fabrication, installation, and materials.
- C. Specific requirements for warranties for the work and products and installations that are specified to be guaranteed or warranted are included in the individual Sections of Divisions 2 through 35.
 - 1. Where not specifically stated in individual sections, provide a minimum one year warranty for labor and materials.
 - 2. Provide manufacturer's standard form in which manufacturer or installer as appropriate to the system specified, agrees to repair or replace components of the specified system or components that do not comply with requirements or that deteriorate within one year from the date of Substantial Completion.
- D. Certifications and other commitments and agreements for continuing services to the Owner are specified elsewhere in the Contract Documents.
- E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. The terms product guaranty or warranty are synonymous for this Project and shall be taken to mean the required guaranty or warranty required by the Contract General Conditions or by the Contract Drawings or Specifications.
- B. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- C. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner. Special Warranties shall be in writing.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit a copy of the Standard or Special written warranties to the Owner for each specification section as part of the complete submittal package for review and approval by the Architect.
- B. Submit written warranties to the Owner prior to the date of acceptance by the Owner. Submittal of the project Guarantees and Warranties is a requirement precedent to the filing of the Notice of Completion by the Owner.
 - 1. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period but prior to acceptance of the entire project, contractor shall submit properly executed warranties to the Owner within fifteen days of occupancy or use of that designated portion of the work.
- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

- D. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- E. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-inch by 11-inch paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name, of the product, and the name, address and telephone number of the installer.
 - 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES, GUARANTEES, AND BONDS", the Project title or name, and the name of the Contractor.
 - 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION - NOT USED.

END OF SECTION 01 7834

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SECTION 01 7839 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Section 01 7700 - Closeout Procedures: For general closeout procedures.
 - 2. Section 01 7823 - Operation and Maintenance Data: For operation and maintenance manual requirements.
 - 3. Divisions 02 through 35 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal: Submit PDF electronic files of marked-up record prints and one set of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal: Submit PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

- E. Reports: Submit written report weekly indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager.

When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Architect through Construction Manager for resolution.
 4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - a. Refer to Division 01 Section "Submittal Procedures" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Note related Change Orders, record Product Data, and record Drawings where applicable.

- B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked up paper copy of Product Data.
 - 1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked up miscellaneous record submittals.
 - 1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction.
- C. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 01 7839

SECTION 01 7900 – DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Sections include the following:
 - 1. Divisions 2 through 35 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

- A. Instruction Program: Submit **two** copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. At completion of training, submit **one** complete training manual(s) for Owner's use.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
- E. Demonstration and Training Video Recordings: Submit **two** copies within **seven** days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of photographer.
 - c. Name of Architect and Construction Manager.
 - d. Name of Contractor.
 - e. Date video recording was recorded.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

2. Transcript: Prepared on 8-1/2-by-11-inch (215-by-280-mm) paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
1. Equipment.
 2. Lighting equipment and controls.
 3. Irrigation system controls.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.

- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 2. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect, , through Construction Manager, with at least **seven** days' advance notice.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01 7900

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SECTION 01 8113 – SUSTAINABLE DESIGN REQUIREMENTS, CALGREEN COMMERCIAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements and procedures for compliance with California Green Building Standards Code – CALGreen Section 703.1 Documentation.
- B. Related Sections include the following:
 - 1. Section 01 7419 - Construction Waste Management: Administrative and procedural requirements for salvaging, recycling, and disposing of demolition and construction waste.
 - 2. Section 01 9113 – General Commissioning Requirements.
 - 3. Divisions 1 through 35 Sections for CALGreen requirements specific to the Work of each of those Sections. These requirements may or may not include reference to CALGreen.
- C. 2016 California Green Building Standards Code (CALGreen): This project is subject to all mandatory measures of CALGreen and any additional amendments as may have been adopted by the local AHJ.

1.3 DEFINITIONS

- A. CALGreen: California Green Building Standards Code 2013, California Code of Regulations, Title 24, Part 11.
- B. Chain-of-Custody (COC): A tracking procedure for a product from the point of harvest or extraction to its end use, including all successive stages of processing, transformation, manufacturing, and distribution.
- C. Chain-of-Custody Certification: Awarded to companies that produce, sell, promote, or trade forest products after audits verify proper accounting of material flows and proper use of the Forest Stewardship Council name and logo.
- D. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- E. Recycled Content: The proportion, by mass, of pre-consumer or postconsumer recycled material in a product (ISO 14021).

1. Postconsumer Recycled Content: The percentage of material in a product that was consumer waste. The recycled material was generated by household, commercial, industrial, or institutional end-users and can no longer be used for its intended purpose.
2. Preconsumer Recycled Content (formerly known as postindustrial content): The percentage of material in a product that is recycled from manufacturing waste.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect regarding CALGreen compliance that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the AHJ has made its determination on the project's CALGreen compliance. Document responses as informational submittals.

1.5 ACTION SUBMITTALS

- A. General: Submit additional CALGreen submittals required by other Specification Sections.
- B. CALGreen submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated CALGreen requirements.
- C. CALGreen Division 5, Section A5.106.1: Storm Water Pollution Prevention Plan (SWPPP):
 1. Submit SWPPP after contract award and before the pre-construction conference.
 - a. Plan to include drawings and/or a written plan with specifications that detail the proposed arrangements and methods for control of runoff, sedimentation, and pollutant conveyance in storm and other water resulting from construction activities. Show that the Storm water Pollution Prevention Plan conforms to the State Storm water NPDES Construction Permit or local ordinance, whichever is stricter, as is required for projects one acre or more. Indicate parties responsible for implementation.
 - b. Submit documentation over the course of the work activities indicating implementation of the plan, through date-stamped photos, inspection logs or reports with descriptions of corrective action in response to problems, etc.
- D. CALGreen Division 5, Section A5.106.3: Low Impact Development (LID):
 1. Submit documentation showing LID strategies to be employed during the course of construction to reduce impact of peak run-off.
- E. CALGreen Division 5, Section 5.408.1: Construction Waste Management: See Section 017419.

1.6 INFORMATIONAL SUBMITTALS

- A. CALGreen Compliance Documentation Submittals:
 1. CALGreen Division 5, Section 5.106.8: Light Pollution Reduction: Product Data for interior and exterior lighting fixtures that stop direct-beam illumination from leaving the building site.
 2. CALGreen Division 5, Section 5.304.3 Irrigation Controllers: Product Data for automatic controllers showing that installed controllers and sensors are weather- or

- soil moisture-based, work automatically, and have compliant rain sensors connected to the controllers.
3. CALGreen Division 5, Section 5.408.1.4 Construction Waste Reduction, Disposal and Recycling: Submit construction and demolition management plan and completed waste management report showing that a minimum of 50% of nonhazardous construction and demolition debris has been recycled and/or salvaged for reuse. See Section 017419.
 4. CALGreen Division 5, Section 5.410.4.2 and 5.410.4.3 Testing Systems: Documentation showing development of a written plan of procedures for testing and adjusting systems, with procedures listed demonstrating compliance with requirements of AHJ.
 5. CALGreen Division 5, Section 5.410.5.5: Building Maintenance and Operation:
 - a. Provide educational materials, operation and maintenance manuals to ensure buildings and equipment are properly maintained.
 - b. Provide information pertaining to landscape design and maintenance, public transportation options, recycling opportunities, special inspection reports and energy incentive programs.
 6. CALGreen Division 5, Section 5.504.3 Paints and coatings. Architectural paints and coatings shall comply with Table 5.504.4.3 unless more stringent local limits apply:
 - a. 5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances (CCR, Title 17, Section 94520, et seq.).
 - b. 5.504.4.3.2. Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency.
 - c. Product Data for paints and coatings used inside the weatherproofing system indicating chemical composition and VOC content in g/L of each product used.
 7. CALGreen Division 5, Section 5.504.4.5 Composite Wood Products, and 5.504.4.5.2 Documentation:
 - a. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table 5.504.4.5.
 - b. 5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following :
 - 1) Product certifications and specifications.
 - 2) Chain of custody certifications.
 - 3) Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.).
 - 4) Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
 - 5) Other methods acceptable to the enforcing agency.
 - c. Product Data for composite wood and agrifiber products indicating that products contain no added urea-formaldehyde resin. For CALGreen, submit at least one of the following: product certification and specifications, chain of custody certifications, or other methods acceptable to the enforcing agency.
 - d. Include statement indicating adhesives and binders used for each product.

8. CALGreen Division 5, Section 5.507.4.1 Exterior Noise Transmission: Calculations showing composite STC rating or OITC rating, and indicating method used for calculations.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Provide products and procedures necessary to meet CALGreen provisions required in this Section. Although other Sections may specify some requirements that contribute to CALGreen, the Contractor shall determine additional materials and procedures necessary to meet CALGreen provisions indicated.

2.2 RECYCLED CONTENT OF MATERIALS

- A. CALGreen Division 5, Section 5.408.1: Recycle and salvage for reuse a minimum of 50% of nonhazardous construction and demolition waste:
 1. Cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
 2. Do not include plumbing, mechanical and electrical components, and specialty items such as elevators and equipment in the calculation.
 3. Recycled content of materials shall be defined according to the International Organizations of Standards document, ISO 14021, Environmental labels and declarations – Self-declared environmental claims (Type II environmental labeling).

2.3 POLLUTION CONTROL

- A. CALGreen, Division 5, Section 5.504.4.1, adhesives, sealants and caulks (Table 5.504.4.1): For compliance, for field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content in compliance with the local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown (such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds – chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene – except for aerosol products as specified in CALGreen Division 5, Section 5.504.8.1.2:
 1. Architectural Applications:
 - a. Indoor Carpet Adhesives: 50 g/L.
 - b. Carpet Pad Adhesives: 50 g/L.
 - c. Outdoor Carpet Adhesives: 150 g/L.
 - d. Wood Flooring Adhesive: 100 g/L.
 - e. Rubber Floor Adhesives: 60 g/L.
 - f. Subfloor Adhesives: 50 g/L.
 - g. Ceramic Tile Adhesives: 65 g/L.
 - h. VCT and Asphalt Tile Adhesives: 50 g/L.
 - i. Gypsum Board and Panel Adhesives: 50 g/L.
 - j. Cove Base Adhesives: 50 g/L.
 - k. Multipurpose Construction Adhesives: 70 g/L.

- l. Structural Glazing Adhesives: 100 g/L.
 - m. Single-Ply Roof Membrane Adhesive: 250 g/L.
 2. Specialty Applications:
 - a. PVC Welding Compounds: 510 g/L.
 - b. CPVC Welding Compounds: 490 g/L.
 - c. ABS Welding Compounds: 325 g/L.
 - d. Plastic Cement Welding Compounds: 250 g/L.
 - e. Adhesive Primer for Plastic: 550 g/L.
 - f. Contact Adhesive: 80 g/L.
 - g. Special-Purpose Contact Adhesive (contact adhesive that is used to bond melamine-covered board, metal, unsupported vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
 - h. Structural Wood Member Adhesive: 140 g/L.
 - i. Top and Trim Adhesive: 250 g/L.
 3. Substrate-Specific Applications:
 - a. Metal-to-Metal Adhesives: 30 g/L.
 - b. Plastic Foam Adhesives: 50 g/L.
 - c. Adhesives for Porous Materials (Except Wood): 50 g/L.
 - d. Wood Glues: 30 g/L.
 - e. Fiberglass Adhesives: 80 g/L.
 4. Sealants:
 - a. Architectural Sealants: 250 g/L.
 - b. Marine Deck Sealant: 760 g/L.
 - c. Nonmembrane Roof Sealants: 300 g/L.
 - d. Roadway Sealant: 250 g/L.
 - e. Single-Ply Roof Membrane Sealants: 450 g/L.
 - f. Other Sealants: 420 g/L.
 5. Sealant Primers:
 - a. Architectural, Nonporous Substrates: 250 g/L.
 - b. Architectural, Porous Substrates: 775 g/L.
 - c. Modified Bituminous Sealant Primers: 500 g/L.
 - d. Other Sealant Primers: 750 g/L.
- B. CALGreen, Division 5, Section 5.504.4.3, Paints and Coatings (Table 5.504.8.3): Use paint and coatings that comply with the 2007 California Air Resources Board Suggested Control Measure unless local limits that are more stringent apply. Aerosol paints and coatings shall meet the PWMIR limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520, and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49:
 1. Flat Paints and Coatings: VOC not more than 50 g/L.
 2. Non-Flat Paints and Coatings: VOC not more than 100 g/L.
 3. Non-Flat High Gloss Paints and Coatings: VOC not more than 150 g/L.
 4. Specialty Coatings:
 - a. Aluminum Roof Coatings: 400 g/L.
 - b. Basement Specialty Coatings: 400 g/L.
 - c. Bituminous Roof Coatings: 50 g/L.
 - d. Bituminous Roof Primers: 350 g/L.
 - e. Bond Breakers: 350 g/L.

- f. Concrete Curing Compounds: 350 g/L.
 - g. Concrete/Masonry Sealers: 100 g/L.
 - h. Driveway Sealers: 50 g/L.
 - i. Dry Fog Coatings: 150 g/L.
 - j. Faux Finishing Coatings: 350 g/L.
 - k. Fire Resistive Coatings: 350 g/L.
 - l. Floor Coatings: 100 g/L.
 - m. Form-Release Compounds: 250 g/L.
 - n. Graphic Arts Coatings (Sign Paints): 500 g/L.
 - o. High Temperature Coatings: 420 g/L.
 - p. Industrial Maintenance Coatings: 250 g/L.
 - q. Low Solids Coatings: 120 g/L.
 - r. Magnesite Cement Coatings: 450 g/L.
 - s. Mastic Texture Coatings: 100 g/L.
 - t. Metallic Pigmented Coatings: 500 g/L.
 - u. Multi-Color Coatings: 250 g/L.
 - v. Pre-Treatment Wash Primers: 420 g/L.
 - w. Primers, Sealers, and Undercoaters: 100 g/L.
 - x. Reactive Penetrating Sealers: 350 g/L.
 - y. Recycled Coatings: 250 g/L.
 - z. Roof Coatings: 50 g/L.
 - aa. Rust Preventative Coatings: 250 g/L.
 - bb. Shellacs:
 - 1) Clear: 730 g/L.
 - 2) Opaque: 550 g/L.
 - cc. Specialty Primers, Sealers, and Undercoaters: 100 g/L.
 - dd. Stains: 250 g/L.
 - ee. Stone Consolidants: 450 g/L.
 - ff. Swimming Pool Coatings: 340 g/L.
 - gg. Traffic Marking Coatings: 100 g/L.
 - hh. Tub and Tile Refinish Coatings: 420 g/L.
 - ii. Waterproofing Membranes: 250 g/L.
 - jj. Wood Coatings: 275 g/L.
 - kk. Wood Preservatives: 350 g/L.
 - ll. Zinc-Rich Primers: 340 g/L.
5. Restricted Components: Paints and coatings shall not contain any of the following:
- a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.

- p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- C. CALGreen, Division 5, Section 5.504.4.5 Composite Wood Products: Do not use composite wood and agrifiber products that contain added urea-formaldehyde resin. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resin.

PART 3 - EXECUTION

3.1 STORM WATER POLLUTION CONTROL

- A. CALGreen Division 5, Section 5.106.1 and 5.106.2 Storm Water Pollution Prevention: Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers without authorization of the receiving sanitary sewer service, and all possible Best Management Practices (BMPs) shall be taken to prevent such materials from entering any drain to watercourse.
- B. The Contractor shall implement BMPs during construction activities as specified in the California Storm Water Best Management Practices Handbook (Stormwater Quality Task Force, 1993) and/or the Manual of Standards for Erosion and Sediment Control Measures (ABAG, 1995). Erosion and sedimentation control practices shall include installation of silt fences, straw wattle, soil stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, including but not limited to, detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sand bag dikes.
- C. In the event that dewatering of excavations is required, Contractor shall obtain all necessary approvals and permits for discharge of the dewatering effluent from the local jurisdiction. Contractor shall be responsible for assuring that water quality of such discharge meets the appropriate permit requirements prior to any discharge.

3.2 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with CALGreen, Division 5, Section 5.408.1 and Section 01 7419 "Construction Waste Management and Disposal."

END OF SECTION 01 8113

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SECTION 01 8121 – ENVIRONMENTAL IMPACT OF MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Objectives: To obtain acceptable Indoor Air Quality (IAQ) for the completed project and minimize the environmental impacts of the construction and operation, the Contractor during the construction phase of this project shall implement the following procedures singly or in combination:
 - 1. Select products that minimize consumption of non-renewable resources, consume reduced amounts of energy, and minimize amounts of pollution to produce, and employ recycled and/or recyclable materials. Obtain City Representative's approval of all materials listed in Part 2 prior to placing the order with the manufacturer of the material.
 - 2. Maintain a materials log book and verification that materials used have been reviewed for environmental considerations as outlined in this Section.
 - 3. Control sources of potential IAQ pollutants by controlled selection of materials and processes used in project construction in order to attain acceptable IAQ as defined in this section.
- B. Products and processes that achieve the above objectives to the extent currently possible and practical have been selected and shown in the Contract Documents. The Contractor is responsible to maintain and support these objectives in developing means and methods for performing the work of this Contract and in proposing product substitutions and/or changes to specified processes.

1.3 RELATED SECTIONS

- A. Section 01 7419 - Construction Waste Management and Disposal: Administrative and procedural requirements for salvaging, recycling, and disposing of demolition and construction waste.
- B. Section 01 8113 – Sustainable Design Requirements: LEED requirements.
- C. Section 01 8419 – Interior Finish Performance Requirements: Sequencing of installation of finish materials during construction to avoid IAQ contamination of building systems.
- D. Division 23 Section "Testing, Adjusting, and Balancing": Baseline testing for Indoor Air Quality and duct cleaning requirements.

1.4 DEFINITIONS

- A. IAQ: Indoor air quality.

1.5 SUBMITTALS

- A. Submit the following in accordance with Conditions of the Contract and Division 1 specification sections.
 - 1. Materials Log: Maintain a notebook with sectional dividers for each material specification listed in Part 2 of this Section. Each divider shall be labeled with the specification section number and shall record the VOC content as specified in Table 2.1, the recycled content as specified in Table 2.2, and other environmental specifications of the material such as identified in Part 2 below. The section will also include the Manufacturer's Safety Data Sheet (MSDS), product label and/or manufacturer's data verifying conformance with the environmental specifications, and shall identify in general terms where the product is to be used in the building. This notebook shall be maintained weekly as materials are ordered, shall be accessible to the City Representative at all times, and submitted in bound form as part of the project requirements specified in Division 1 "Project Closeout Section".

1.6 QUALITY ASSURANCE

- A. General: Perform the work of this Section as a supplement and in accordance with applicable requirements of Division 1 "Contractor Quality Control Program".
- B. As part of the Coordination and Mutual Understanding Meeting specified in Division 1 "Contractor Quality Control Program", and prior to the start of construction, discuss the IAQ and environmental impact compliances required by this Contract. The purpose of this agenda item is to develop a mutual understanding of the IAQ and environmental impact program requirements, and coordination of the Contractor's management of the program with the Contracting officer and the Construction Quality Manager.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: The following special IAQ and environmental impact requirements apply to materials specified in their respective technical specification sections of this Project Manual. See Tables 2.1 and 2.2 for definitions of low VOC content and recycled content.
- B. Division 03 - Concrete:
 - 1. Cast-in-Place Concrete:
 - a. Per FAR, cement must include 20 percent fly ash.
 - b. Reinforcing steel shall maximize recycled scrap steel content.
 - c. Form release agents shall be low VOC content.
 - d. Liquid membrane-forming curing and sealing compound shall be low VOC content.
 - 2. Structural Precast Concrete:
 - a. Cement for all precast with standard finish shall include 20 percent fly ash content.
 - b. Form release agent shall be low VOC content.
 - c. Reinforcing bars shall maximize recycled steel content.
 - 3. Architectural Precast Concrete:
 - a. Form release agent shall be low VOC content.

- b. Reinforcing bars shall maximize recycled steel content.
- C. Division 04 - Masonry: Not Used.
- D. Division 05 - Metals:
 - 1. Structural Steel: Framing steel shall maximize the use of recycled steel.
 - 2. Ornamental Handrails and Railings: Wood cap originates from a sustainably managed forest certified by a Forest Stewardship Council (FSC) accredited certification group such as Smartwood, Scientific Certification Systems (SCS), or other independent forest management certification agency.
- E. Division 07 – Thermal and Moisture Protection: Not used.
- F. Division 08 – Openings: Not used.
- G. Division 09 - Finishes: Not used.
- H. Division 10 – Specialties: Not used.
- I. Division 11 - Equipment: Not used.
- J. Division 12 - Furnishings: Not used.
- K. Division 22 - Plumbing:
 - 1. Basic Piping Materials and Methods: Use solder that does not contain lead.
 - 2. Pipes and Pipe Fittings: Use solder that does not contain lead.
 - 3. Plumbing Fixtures: Plumbing fixtures must meet water conservation requirements of the Energy Policy Act.
- L. Division 31 – Earthwork:
 - 1. Site Clearing: Topsoil shall be provided by the Contractor from on-site material which has been stockpiled for re-use. Off-site borrow should only be used when on-site sources are exhausted.
 - 2. Aggregate Base Course: Aggregate base course for on-site paved areas shall maximize use of recycled ABC.
- M. Division 32 – Exterior Improvements:
 - 1. Asphaltic Paving: Asphalt paving shall maximize use of recycled asphalt paving.
 - 2. Portland Cement Concrete Paving: Per Federal Acquisition Regulations (FAR) requirements, there will be a minimum of 20 percent fly ash content in cement.
 - 3. Landscaping:
 - a. All wood fiber or cellulose hydromulch shall be 100 percent recovered content.
 - b. All herbicides must be EPA approved and applied per manufacturer's instructions. All herbicide use must be approved by the City's Representative.
- N. Division 33 - Utilities:
 - 1. Underground Utilities - Basic Piping Materials and Methods: Use solder that does not contain lead.
 - 2. Site Potable Water Lines and Underground Chilled Water (CHW) Piping System: No solder will be used with lead content.

2.2 VOC CONTENT

A. The following tables define VOC content levels and recycled content requirements.

Table 2.1 Definition of Low VOC Content Levels

| Material or Product | Low VOC Content Level |
|---|------------------------------|
| Form Release Agents | 350 g/L VOC content |
| Plastic Laminate Adhesive | 20 g/L VOC content |
| Casework And Millwork Adhesives | 20 g/L VOC content |
| Transparent Wood Finish Systems | 350 g/L VOC content |
| Cast Resin Countertop Silicone Sealant | 20 g/L VOC content |
| Garage Deck Sealer | 600 g/L VOC content |
| Water Based Joint Sealants | 50 g/L VOC content |
| Non-Water Based Joint Sealants | 350 g/L VOC content |
| Portland Cement Plaster | 20 g/L VOC content |
| Gypsum Drywall Joint Compound | 20 g/L VOC content |
| Terrazzo Sealer | 250 g/L VOC content |
| Acoustic Panel Ceiling Finish | 50 g/L VOC content |
| Resilient Tile Flooring Adhesive | 100 g/L VOC content |
| Vinyl Flooring Adhesives | 100 g/L VOC content |
| Carpet Adhesive | 50 g/L VOC content |
| Carpet Seam Sealer | 50 g/L VOC content |
| Water-Based Paint & Polychromatic Finish Coatings | 150 g/L VOC content |
| Solvent -Based Paint | 380 g/L VOC content |
| High Performance Water-Based Acrylic Coatings | 250 g/L VOC content |
| Pigmented Acrylic Sealers | 250 g/L VOC content |
| Catalyzed Epoxy Coatings | 250 g/L VOC content |
| High Performance Silicone | 250 g/L VOC content |
| Casework Sealant | 50 g/L VOC content |
| Liquid Membrane-Forming Curing & Sealing Compound | 350 g/L VOC content |

Table 2.2 Required Minimum Recycled Content of Materials

| Material or Product | Recommended Recycle Content |
|--------------------------------------|--|
| Asphaltic Concrete Paving | 100 percent by weight ³ |
| Reinforcing Steel In Concrete | 60 percent recycled scrap steel ¹ |
| Reinforcing Bars In Precast Concrete | 60 percent recycled steel ¹ |
| Concrete Unit Masonry | 50 percent recycled content |
| Reinforcing Bars In Concrete Unit | 60 percent recycled steel ¹ |
| Framing Steel | 30 percent recycled steel ¹ |

| | |
|--|--|
| Fiberglass Batt Insulation | 20 percent recycled glass cullet ² |
| Fiberglass Board Insulation | 20 percent recycled glass cullet ² |
| Mineral Wool Insulation | 75 percent recycled material (slag) ² |
| Mineral Wool Fire Safing Insulation | 75 percent recycled material by weight |
| Gypsum Board | 10 percent recycled or synthetic gypsum |
| Facing Paper Of Gypsum Board | 100 percent recycled newsprint including |
| Mineral Fiber Sound Attenuation Blankets | 75 percent recovered material by weight |
| Steel Studs, Runners, And Channels | 60 percent recycled steel ¹ |
| Acoustic Panel Ceilings | 60 percent recycled material by weight |
| Ceiling Suspension Systems | 60 percent recycled material ¹ |
| Rubber Floor Tiles | 90-100 percent recycled materials ² |
| Hydromulch | 100 percent recovered materials ² |
| Structural Fiberboard | 80-100 percent recycled content ² |

Notes for Table 2.2:

1. 60 percent represents the average recycled content for the U. S. steel industry. Use of U. S. manufactured steel will meet this requirement.
2. As per EPA Comprehensive Guideline for Procurement of Products Containing Recovered Materials (60 FR 21370, effective May 27, 2009).
3. As per Alameda County California Waste Management recommendations.

PART 3 - EXECUTION

3.1 GENERAL

- A. Submit to the City's Representative for review and approval product data such as MSDS and environmental impact data prior to ordering project materials.
- B. Prepare and maintain a Materials Log, providing information on content of materials, where specific materials are to be used, MSDS, and environmental specifications of the material. Maintain the log book weekly as materials are ordered.

3.2 FIELD QUALITY CONTROL

- A. City reserves the right to take samples and perform, at random, tests of approved materials delivered to the job site to verify compliance of actual materials with specifications.

END OF SECTION 01 8121

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SECTION 11 6800 – PLAY EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE

- A. ***The City of Burlingame has contracted the play equipment separately under another contract.*** The play equipment contractor (Ross Recreation Equipment) will be responsible for coordinating and installing all play equipment as shown and specified. This work includes, but is not necessarily limited to footing excavation, concrete footings, play equipment installation, removing and re-installing existing playground train and miscellaneous items.
- B. Related work specified elsewhere:
1. Site Concrete – Section 32 1312
 2. Synthetic Turf Safety Surfacing – Section 32 1816

- 1.2 COORDINATION: Project Contractor to provide layout of the playground perimeter concrete path to confirm layout of play equipment will not overlap on hard surfaces.

1.3 STANDARDS

- A. Unless otherwise shown or specified, all materials and methods shall conform to the appropriate current sections of:
1. Applicable ASTM Specifications as they reasonably apply to this work.
 2. United States Consumer Product Safety Commission (CPSC), CPSC Handbook for Public Playground Safety
 3. California Code of Regulations

1.4 PERFORMANCE REQUIREMENTS

PART 2 - PRODUCTS

2.1 PLAY EQUIPMENT: not applicable

- A. Landscape Structures Equipment as provided by Ross Recreation Equipment to the City of Burlingame.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING: not applicable.

3.2 PREPARATION

- A. Prior to start of excavation, Project Contractor shall layout the entire outdoor playground area and stake location of all elements, including playground equipment, utilities, use zones and perimeter concrete path. Use zones shall not overlap hard surfaces, and shall meet criteria of ASTM F 1292 and 1487. The Owner's Representative reserves the right to adjust the equipment locations and other elements to meet field conditions and use safety zone requirements.

3.3 EQUIPMENT INSTALLATION: not applicable

3.4 PLAY AREA LAYOUT

3.2 PREPARATION

- A. Prior to start of excavation, Project Contractor shall layout the entire outdoor playground area and stake location of all elements, including playground equipment, utilities, use zones, perimeter concrete path, and based on actual playground equipment supplied to be installed. Use zones shall not overlap hard surfaces, and shall meet criteria of ASTM F 1292 and 1487. The Owner’s Representative reserves the right to adjust the equipment locations and other elements to meet field conditions and use safety zone requirements.

3.3 EQUIPMENT INSTALLATION: not applicable

3.4 PLAY AREA LAYOUT

- A. The play area equipment layout, as shown on the drawings, is based on the use of specific equipment as designated for the purpose of showing the desired arrangement.
- B. If conflicts arise with fall zones that prevent the layout and installation from occurring as intended, including the perimeter concrete path, the Project Contractor shall make the proper field adjustments to the layout to ensure there is adequate room. Layout to be approved by Owner’s Representative.
- C. After the field adjustment, if there are still conflicts and it is evident the structure will not adequately fit in the space, the contractor shall notify the City’s Representative immediately.

3.5 PLAY AREA SECURITY

- A. The Project Contractor shall provide the means to keep the public from using any play equipment until safety surfaces have been installed, the area cleaned and cleared, and all installation reviewed and approved by an independent playground auditor.

3.6 SAFETY AUDIT

- A. The playground safety audit/certificate of Compliance shall be performed by a third-party Certified Playground Safety Inspector (CPSI) selected by the Owner and in compliance with CPSC publication #325, 2010 edition. The playground will then be accepted if the installation is found to be in compliance. If the installation is not in compliance, the contractor shall make the necessary repairs at no extra cost to the City, according to the report and the playground equipment manufacturer’s recommendations. The contractor will need to have the playground re-inspected, at no additional cost to the City, until the installation is brought in to compliance, and certified by a CPSI.
- B. All field-testing of safety surface attenuation shall also be included in the safety audit.
- C. Refer to Section 32 1816, Synthetic Turf Safety Surfacing for safety surface performance requirements.

END OF SECTION

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SECTION 26 05 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to provide and install the Electrical Work as shown on the drawings and as specified hereinafter, including, but not limited to the following:
1. Branch circuit wiring, wiring devices and connections to all equipment requiring electrical service.
 2. Lighting fixtures, including controls, raceways and wiring.
 3. All required incidental work, such as electrical testing, title 24 acceptance testing, and temporary power.
 4. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.
 5. It is the intent of the drawings and specifications that systems be complete and, except as otherwise noted, be ready for operation.

1.2 RELATED WORK

- A. Division 1 - General Requirements

1.3 INCORPORATED DOCUMENTS

- A. Requirements of the General Conditions, Supplementary Conditions, and Division 1 Sections apply to all work in this Section, unless modified herein.
- B. Published specifications, standard tests or recommended methods of trade, industry or government organizations apply to work of this Section where cited by abbreviations noted below, unless modified herein.
1. 2016 California Code of Regulations.
 2. 2016 California Building Standards Administrative Code, Part 1, Title 24, C.C.R.
 3. 2016 California Building Code (CBC), Part 2, Title 24, C.C.R. (Based on 2015 International Building Code with 2016 California Amendments).
 4. 2016 California Electrical Code (CEC), Part 3, Title 24, C.C.R. (Based on 2014 National Electrical Code with 2016 California Amendments).
 5. California Energy Code, Part 6, Title 24, C.C.R.
 6. 2016 California Green Building Standards (CALGreen) Code, Part 11.7
 7. American Society of Civil Engineers 7-10 (ASCE/SEI), Minimum Design Loads for Buildings and Other Structures.
 8. Underwriters' Laboratories, Inc. (UL).
 9. Local Utility Company regulations.
- C. All State and Municipal Codes and Ordinances.

1.4 CONDITIONS AT SITE:

- A. Visit to site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.
- B. Lines of other services that are damaged as a result of this work shall promptly be repaired at no expense to the Owner to the complete satisfaction of the Owner.

1.5 QUALITY ASSURANCE

- A. Conformance:
 - 1. All work shall conform to the applicable requirements of Article 1.3 above.
 - 2. The Contractor shall notify the Architect, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.
 - 3. If after contract is awarded, minor changes and additions are required by aforementioned authorities, even though such work is not shown on the drawings or covered in the specifications, they shall be included at Contractor's expense.
- B. Coordination:
 - 1. The Contractor shall become familiar with the conditions at the job site, and with the drawings and specifications and plan the installation of the electrical work to conform with the existing conditions and that shown and specified so as to provide the best possible assembly of the combined work of all trades.
 - 2. The Contractor shall work out in advance all "tight" conditions, involving all trades and if found necessary, supplementary drawings shall be prepared by this Contractor, for the Architect's approval, before work proceeds in these areas. No additional costs will be considered for work, which must be relocated due to conflicts with the work of other trades.

1.6 SUBMITTALS

- A. Product Data:
 - 1. Comply with the provisions of Section 01 33 00 - Submittals.
 - 2. Within 15 days after award of the Contract, submit:
 - a. Complete electrical, and lighting systems material list of all items proposed to be furnished and installed under this Division. Provide manufacturers data sheets for all devices, raceways, fixtures, equipment, and related products to be used for the Division 26 work.
 - b. Manufacturers' specifications and other data required demonstrating compliance with the specified requirements.
 - c. Manufacturers' recommended installation procedures which, when approved by the Architect, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.
 - 3. Shop Drawings: Furnish shop drawings and/or equipment cuts for the following:
 - a. Light fixtures.
 - b. Lighting controls.
 - b. Receptacle Pedestals.
 - 4. Test Reports:

- a. Factory Tests: As specified for specific equipment.
 - b. Field Tests: Performance tests as specified for specific equipment.
 - c. Megger Tests: As specified under TESTING.
 - d. Manufacturer's Seismic Certification or Project-Specific Design of Supports and Attachments for all other equipment and fixtures as per CBC Section 1616A and ASCE/SEI 7-10 requirements.
5. Maintenance and Operating Manuals:
- a. Systems Description: Description of operating procedures.
 - b. Controls: Diagrams and description of operation of each system.
 - c. Equipment: Manufacturer's brochures, ratings, certified shop drawings, maintenance data, and parts lists with part numbers. Mark each sheet with equipment identification number and actual installed condition.
 - d. Materials and Accessories: Manufacturer's brochures, parts lists with part numbers, and maintenance data where applicable. Mark each sheet with identification number of system and location of installation.
6. Record Documents: "As-builts": As specified under Paragraph 3.2 of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all trades.
- B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with approved manufacturers' recommendations.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.
- D. This Contractor shall personally, or through an authorized representative, check all materials upon receipt at jobsite for conformance with approved shop drawings and/or plans and specifications.

1.8 SCHEDULING/SEQUENCING

- A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet the construction schedule, together with any special handling charges, shall be borne by this Contractor.
- B. The Contractor shall coordinate production and delivery schedule for all Owner-supplied equipment with the equipment suppliers to ensure that all Owner-supplied equipment is delivered to site in coordination with the construction schedule and in such a manner as to cause no delays in completion of the Contract as scheduled.

1.9 REQUIREMENTS

- A. The contract drawings indicate the extent and general arrangements of the conduit wiring systems, etc. If any departures from the contract drawings are deemed necessary by the

Contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable, and within thirty-five (35) days after award of the electrical contract.

- B. Unless material list and data is received as a complete and all-inclusive submittal within the stipulated time all items shall be provided as specified, with no deviations permitted.
- C. Any and all additional costs incurred by the substitution of electrical material or equipment, or installation thereof, whether architectural, structural, plumbing, mechanical or electrical, shall be borne by the Contractor under this Section.
- D. Burden of proof of equality of any substitution for a specified product is the responsibility of this Contractor.
- E. Where required by Architect to ascertain equality of substitute product, Contractor may be requested to provide the specified item and the submitted substitution for comparison, at no additional cost to the Owner.

1.10 SEISMIC CERTIFICATION AND INSTALLATION OF EQUIPMENT

- A. Manufacturer's Seismic Certification or Project-Specific Design of Supports and Attachments for all other equipment and fixtures as per CBC Section 1616A and ASCE/SEI 7-10 requirements.
- B. Provide seismic restraints per applicable code and as specified or indicated. Design restraints to prevent permanent displacement in any direction caused by lateral motion, overturning, or uplift.
- C. Rigidly Supported Equipment, Conduits, and Raceways.
- D. Electrical Cabinets:
 - 1. Electrical cabinet design shall conform to National Electrical Manufacturers Association (NEMA) 250 and NEMA ICS6 standards. Cutouts in the lower shear panel that do not appear to have been made by the manufacturer and significantly reduce the strength of the cabinet are not permitted unless analysis demonstrates that the remaining strength is sufficient.
 - 2. Single freestanding cabinets shall have a minimum of four anchor bolts designed and specified with one anchor located at each corner.
 - 3. Multiple sections of cabinets or enclosures located adjacent to each other shall be bolted together. Minimum acceptable bolting is three bolts in the front and back along the adjacent vertical faces - 6 bolts total.
 - 4. Multiple cabinets bolted together to form a section or line-up shall have at a minimum two anchors specified for each cabinet, one at the front and one at the rear.
 - 5. Base anchorage shall be installed through anchor points designated by the Manufacturer. The largest bolt diameter for the anchor hole provided in the equipment shall be provided.
 - 6. A latch or fastener to prevent opening during an earthquake event and damaging the cabinet and internal components shall secure all doors.
 - 7. Slide-out components in electrical control panels, etc., shall have a latching mechanism to hold contents in place.
 - 8. Attached cabling shall have adequate slack or flexibility between the cabinets and surrounding structure supporting the conduit to preclude severing of the cabling due to differential seismic displacements.

- E. The design load shall include the effects of loading on the equipment imposed by attached utility or service lines that are also attached to separate structures.
- F. The attachment of additional external items is not permitted unless such items have either been provided by the Manufacturer, or analysis shows that their effects are supported by design.

1.11 GUARANTEE

- A. This Contractor shall guarantee that all work executed under this Section will be free from defects of materials and workmanship for a period of one (1) year or as per the General Conditions of this project, whichever is longer. Dates shall be from the date of final acceptance of the building. The contractor shall further guarantee that he will, at his own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the guarantee. Such repair or replacement shall be guaranteed for one (1) year from the date of repair or replacement.

1.12 PERMITS AND INSPECTIONS

- A. This Contractor shall arrange for and obtain all required permits and inspections.
- B. Do not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

1.13 IDENTIFICATION

- A. Panels, disconnect switches, motor disconnect switches, cabinets, and other apparatus used for the operation of, or control of circuits, appliances or equipment, shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on apparatus using stainless steel screws. Nameplates shall have white letters with black background and be submitted to the Architect for approval. Cardholders in any form are not acceptable.
- B. Provide p-touch style labeling of circuit designations for all receptacles on the project.
- C. Each branch circuit of panel boards to have a permanently fixed number with load directory, mounted under celluloid on inside of cabinet door, showing circuit numbers and typewritten description of equipment supplied by breakers. Where changes are made to existing panelboards, newly typewritten circuit directories shall be prepared to replace existing directories.
- D. Provide label on all motors: "Caution. Automatic equipment. May start at any time."
- E. Provide identification of all pull boxes, junction boxes, and conduit stub-ups on the project as outlined below:
 - 1. For Power Feeders:
 - a. Stencil cover with identifying circuit number.
 - b. Lettering 1" high.
 - c. Color of lettering black.
 - d. Place lettering on cover in neat manner; run parallel to long sides of box.
 - 2. For branch circuits, grounding, communication, signal, and control systems boxes and blank conduit stub-outs:

- a. Paint inside back of each j-box, front of each cover, and ends of each blank conduit stub-out with identifying system color as listed below:
 - 1) 120/208-volt Blue
 - 2) Ground system Green

PART 2 - PRODUCTS

2.1 GENERAL

- A. Refer to applicable Division 26 Sections for complete products specifications.

2.2 MATERIALS

- A. Materials of the same type or classification, used for the same purpose, shall be the product of the same manufacturer.

2.3 ACCEPTABLE MANUFACTURERS

- A. Materials shall be of make mentioned elsewhere in this specification. All materials shall be the best of their several kinds, perfectly new and approved by the Underwriters' Laboratories.
- B. Where material, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality, style and utility and shall be the basis of the bid. Materials so specified shall be furnished under the contract unless changed by written approval of the Architect. Where two or more designations are listed, choice shall be optional with this Contractor, but this Contractor must submit his choice for final approval.

2.4 POSTED OPERATING INSTRUCTIONS

- A. Furnish approved operating instructions for systems and equipment where indicated in the technical sections for use by operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including startup, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each system or equipment. Provide weather-resistant materials or weatherproof enclosures for operating instruction exposed to the weather. Operating instruction shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

2.5 CATALOGED PRODUCTS/SERVICE AVAILABILITY

- A. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2-year field

service record will be acceptable if a certified record of satisfactory field operation for not less than 6,000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonable convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which the work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Drawings:
 - 1. The general arrangement and location of wiring and equipment is shown on the electrical drawings and shall be installed in accordance therewith, except for minor changes required by conflict with the work of other trades.
 - 2. The Contractor shall coordinate and verify all backbox, device, lighting fixture, or equipment mounting requirements with the devices or equipment to be installed, prior to rough in.
 - 3. Drawings indicate the circuit and panel which supplies each device or fixture. Provide and install conduit and conductors to make all connections from panel to nearest device and from first device to additional devices on same circuit. Conduit size and fill shall satisfy NEC requirements. Do not exceed 4 #12 or 3 #10 conductors in a ½" conduit, 7 #12 or 5 #10 in a ¾" conduit, and 11 #12 or 9 #10 in a 1" conduit, unless otherwise noted. Provide common handle-tie on breakers for multi-wire branch circuits (with common neutral), per NEC. If more than three current carrying conductors are installed in one conduit, conductor size shall be increased as required per NEC. Do not share neutrals for branch circuits.
 - 4. All branch circuit wiring No. 12 or No. 10 as noted, all control wiring No. 14, except as noted next to "slash marks" on the drawings, or as noted under "Wire," as specified herein.
 - 5. All dimensions, to be taken from the Architectural Drawings, verified at site by this Contractor.
 - 6. Maintain "as-built" records at all times, showing the exact location of concealed conduits and feeders installed under this contract, and actual numbering of each circuit. Upon completion of work and before acceptance can be considered, this Contractor must forward to the Architect, updated CAD plans, corrected to show the electrical work as actually installed.
 - 7. Branch circuit conductors shall be #12 minimum and #10 minimum for runs longer than 150 feet.
- B. Measurements: Before ordering any material or closing in any work, verify all measurements on the job. Any differences found between dimensions on the drawings and actual measurements shall be brought to the Architect's attention for consideration before proceeding.

3.3 FIELD QUALITY CONTROL

- A. All workmanship shall be first class and carried out in a manner satisfactory to and approved by the Architect.
- B. This Contractor shall personally, or through an authorized and competent representative, constantly supervise the work and so far as possible keep the same foreman and workmen on the job throughout.

3.4 INSTALLATION/APPLICATION/ERECTION

- A. All electrical raceways and devices shall be installed concealed (for raceways) and/or flush mounted (for devices), unless otherwise noted. Provide cut-in boxes and "fish" flexible MC or flex conduit and wire through existing walls to remain, unless shown otherwise on plans. Cut and patch to facilitate such installation to match adjacent and original finish.
- B. All cutting, repairing and structural reinforcing for the installation of this work shall be done by the General Contractor in conformance with the Architect's requirements.

3.5 TEMPORARY LIGHTING AND POWER

- A. Provide and install temporary lighting and power systems for the duration of construction, of adequate size to accommodate the required lighting and power loads. Coordinate with other trades to insure adequate sizing.
- B. Provide distribution equipment as required to support all construction activities.

3.6 FIRE STOPPING AND FIRE RATED PENETRATIONS

- A. All electrical equipment mounted in, on, or through fire rated construction shall be installed to maintain the fire rating of the construction.
- B. Provide fire rated pads (or other suitable assembly) around all electrical junction boxes in fire rated walls/ceilings/floors to maintain the fire rating.
- C. Provide fire rated construction around all recessed light fixtures and/or panel board / cabinets mounted flush in fire rated walls to maintain the fire rating. Coordinate depth of construction with other trades to avoid conflicts.
- D. Conduit sleeves shall be provided as a means of routing cables through fire-rated walls or floors. Openings in sleeves and conduits used for system cables and those which remain (empty) spare shall be sealed with an approved fireproof, removable sagging material. Sleeves which pass vertically from floor to floor shall be sealed in a similar manner using an approved re-enterable system.

3.7 ADJUSTING AND CLEANING

- A. All electrical equipment, including existing equipment not "finish painted" under other sections, shall be touched up where finished surface is marred or damaged.
- B. All equipment, lighting fixtures, etc., shall be left in clean condition, with all shipping and otherwise unnecessary labels removed there from.

3.8 SCHEDULES

- A. Coordination: Coordinate installation of electrical items with the schedule for other work to prevent unnecessary delays in the total Work.

3.9 WARNING SIGN MOUNTING

- A. Provide the number of signs required to be readable from each accessible side, but space the signs a maximum of 30 feet apart.

3.10 PAINTING OF EQUIPMENT

- A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test, except equipment specified to meet requirements of ANSI C37.20 shall have a finish as specified in ANSI C37.20.
- B. Field Applied: Paint electrical equipment as required to match finish or meet safety criteria. Painting shall be as specified in the respective equipment section.

3.11 TESTS

- A. Testing and inspection: See Section 26 08 00 - Testing.

END OF SECTION

SECTION 26 08 00 - TESTING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work Included in This Section: All materials, labor, equipment, services, and incidentals necessary to perform the testing and inspection of the electrical work, including but not limited to the general systems noted below:
 - 1. Grounding system.
 - 2. Lighting system.
 - 3. Distribution system.
 - 4. Lighting control system.
- B. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.
- C. All work shall comply with Sections 26 05 00 and 26 27 00.
- D. The purpose of these tests is to assure that all tested electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.

1.2 APPLICABLE CODES, STANDARDS, AND REFERENCES

- A. All inspections and tests shall be in accordance with the International Electrical Testing Association - Acceptance Testing Specifications ATS-2017 (referred to herein as NETA ATS-2017).

PART 2 - PRODUCTS

2.1 THIS ARTICLE DOES NOT APPLY TO TESTING.

PART 3 - EXECUTION

3.1 GENERAL

- A. Final test and inspection to be conducted in presence of the Authority having Jurisdiction (AHJ) or Inspector of Record (IOR). Test shall be conducted at the expense of, and managed by, the Contractor, at a mutually agreed time. Submit written test report of all tests, with test result values and overall outcome.
- B. All portions of the electrical installation shall be inspected and tested to ensure safety to building occupants, operating personnel, conformity to code authorities and Contract Documents, and for proper system operation.

3.2 INSPECTIONS AND TESTS

- A. Tests: Field tests shall be performed and reports submitted, as per Section 26 05 00, Part 1.

1. Final Inspection Certificates: Prior to final payment approval, deliver to the Owner, with a copy to the Architect, signed certificates of final inspection by the appropriate local authority having jurisdiction.

- B. Grounding System:
 1. All ground connections shall be checked for continuity.
 2. Ground tests shall meet or exceed the requirements of the National Electric Code.

- C. Lighting Systems:
 1. The lighting systems shall be checked for proper local controls and operation of entire installation, including the operation of the lighting control system.

- D. Power Distribution System:
 1. Test each individual circuit at each panelboard with equipment connected for proper operation. Inspect the interior of each panel.
 2. Check verification of color coding, tagging, numbering, and splice make-up.
 3. Verify that all conductors associated with each circuit are in same conduit.
 4. Demonstrate that all lights, switches, outlets, and equipment operate satisfactorily and as called for.

- E. Title 24 Acceptance Testing: Contractor shall complete the requirements for Title 24 Acceptance Testing, as per CA Title 24, Part 6.
 1. Perform testing requirements as per Title 24 Lighting Acceptance requirements.
 2. Complete and submit all required forms for complete Acceptance Testing.
 3. Obtain required review and approval of Acceptance Forms to allow final certificate of occupancy to be granted.

END OF SECTION

SECTION 26 27 00 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to install the electrical work as shown on the drawings and as specified hereinafter, including but not limited to the work listed below:
 - 1. Raceways, feeders, branch circuit wiring, wiring devices, safety switches and connections to all equipment requiring electric service.
- B. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.
- C. All work shall comply with Section 26 05 00.

1.2 RELATED WORK

- A. Division 09 - Finishes

1.3 SUBMITTALS

- A. Comply with the provisions of Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to Section 26 05 00, Basic Electrical Requirements, Part 2 - Products.
- B. List of Equipment Manufacturers:

Conduit and Conduit Fittings

Allied Tube and Conduit, Wester Tube and Conduit, LTV Steel Tubular, National Electric Products, AFC, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, Killark Electric Manufacturing Company, Raco, VAW Aluminum Company, Bridgeport, Steel City, Thomas & Betts, Carlon, O.Z. Gedney, Appleton, Regal.

Wire and Cable (600V)

American Wire Company, General Wire and Cable Corporation, Okonite Company, Rome Cable Corporation, Cerrowire, American Insulated Wire, AFC Cable Systems, Essex, Simplex Wire and Cable Company, Southwire.

Solderless Lugs and Grounding Connections

Burndy Engineering Company Inc, O.Z. Gedney Company Inc, Penn Union Electric Corporation, Thomas and Betts Company Inc.

Pull Boxes, Gutters, Special Cabinets

Schneider-Square D Company, Columbia Electric Manufacturing Company, General Electric Company, Eaton Inc.

Outlet Boxes

Appleton Electric Company, Killark Electric Manufacturing Company, Lew Electric Fittings Company, National Electric Products Corporation, Raco, Steel City Electric Company, Carlon, Bowers.

Wiring Devices

Leviton, Arrow-Hart, Cooper, Hubbell, Lutron, Bryant.

Conduit Racks, Hangers

General Electric Company, Killark Electric Manufacturing Company, Caddy, National Electric Products Corporation, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, VAW Aluminum Company, Superstrut, B-Line.

Safety Switches (Disconnect and Fusible)

Schneider-Square D Company, Eaton-Cutler Hammer Inc, General Electric Company.

Fuses

Bussman Manufacturing Company, Chase-Shawmut Company.

Firestopping

3M, Nelson.

2.2 MATERIALS

- A. Raceways: Only the raceways specified below shall be utilized on this project. Substitutions shall be pre-approved in writing. All bare conduit ends (stub-ups or stub-outs) shall be provided with bushed ends or manufactured insulated throat connectors:
1. Rigid Type - hot dip galvanized or sherardized steel, use on all interior and exterior locations, below grade or in concrete slab, and to 18" on either side of structural expansion joints in floor slabs, with completely watertight, threaded fittings throughout. Compression fittings are not acceptable.
 - a. All rigid steel conduit couplings and elbows in soil or concrete or under membrane to be ½ lap wrapped with Scotch #50 tape and threaded ends coated with T&B #S.C.40 rust inhibitor prior to installation of couplings.
 - b. ½ lap wrap all rigid steel conduit stub-ups from slab or grade to 6" above finished grade level with Scotch #50 tape.
 2. In lieu of rigid steel conduit for power and control raceways and branch circuit conduits in soil or concrete slabs, "Schedule 40" PVC with Schedule 80 PVC conduit elbows and stub-ups may be used with code size (minimum No. 12) ground wire. A "stub-up" is considered to terminate 6" above the finished surface.

- a. Schedule 80 PVC conduit shall be used in all concrete footings or foundations and to 18" of either side of footings or foundation walls.
- b. Schedule 80 PVC conduit shall be used in all concrete masonry unit (CMU) walls or columns.
- c. All conduit runs in concrete floor slabs (where allowed) shall be installed to comply with all applicable CBC and structural codes to maintain the structural integrity of the floor slab. Where conflicts occur, alternate routing shall be provided at no additional cost to the Owner.
- d. Where schedule 80 PVC is coupled to schedule 40 or other raceways with differing interior dimensions, each end shall be reamed with a reaming tool to reduce the edge profile for protection of the passing conductors during the pull.
3. Intermediate metal conduit may be used in all exposed interior locations, except that electrical metallic tubing may be used in some locations as noted below. Utilize steel compression type fittings for all exposed conduit runs, unless otherwise noted. Cast fittings are unacceptable.
4. Electrical metallic tubing may be used exposed in interior electrical and mechanical rooms, in interior unfinished spaces, and in interior concealed and furred spaces, made up with steel watertight or steel set screw type fittings and couplings. EMT shall not be used in under-building crawl spaces or other areas subject to moisture. Set screws shall have hardened points. Cast fittings are unacceptable.
5. Surface mounted rectangular steel raceways and boxes: use for all surface mounted installations, unless otherwise noted (all catalog numbers listed are Wiremold - equals allowed) – color Ivory, unless otherwise noted;
 - a. #V500 for branch power runs on ceilings and walls (used with V500 series straps, elbows, connectors and V5000 series low profile boxes and covers).
 - b. #2000 or 2400 low profile for larger power run requirements on ceiling or walls (used with V2000 series straps, elbows, connectors and low profile boxes and covers).
 - c. #2400D for dual service power and tel/data run requirements (used with divided V2400 boxes and covers).
6. Surface mounted rectangular non-metallic dual service raceways; Wiremold #5400 (Ivory) or equal with all required compatible activation covers, bezels, inserts, and blank plates for a complete installation. Refer to drawings for outlet quantities in raceway and feed points. All raceway fed flush from rear with horizontal j-boxes, unless otherwise noted.
7. Flexible conduit shall be used in the following instances:
 - a. For all motor, transformer and recessed fixture connections, minimum ½"; "Seal tite" type used outdoors and in all wet locations, provide with code size (minimum No. 12) bare ground wire in all flexible conduit.
 - b. Where existing conditions preclude the installation of EMT in existing walls to remain, provide and install cut-in type boxes and "fish" flexible MC or flexible conduit and wire through existing walls to remain, unless shown otherwise on plans.
 - c. With the exception of the above, flexible conduit shall not otherwise be used on this project.
8. All conduit cuts (factory or field cut) shall be perfectly square to the length of the conduit and cut ends shall be reamed with a reaming tool to provide a smooth edge to the passing conductors and to remove all burrs and scrapes. Use of a hand file is not acceptable.
9. All electrical raceways shall be installed concealed, unless otherwise noted. Cut and patch to facilitate such installation to match adjacent and original finish. All exposed conduits, where required, shall be installed parallel to building members.

10. All emergency source circuits shall be installed in separate raceways (from normal power), per 2017 NEC 700.10(B), or the applicable code at the time of permitting.
 11. Fasten conduits securely to boxes with locknuts and bushings to provide good electrical continuity.
 12. Provide chrome escutcheon plates at all exposed wall, ceiling and floor conduit penetrations.
 13. Support individual suspended conduits with heavy malleable strap or rod hangers; supports for ½ inch or ¾ inch conduit placed on maximum 7-foot centers; maximum 10-foot centers on conduits 1 inch or larger.
 14. Support multiple conduit runs from Kindorf B907 channels with C-105 and C-106 straps.
 15. Conduit bends - long radius.
 16. Flash conduits through roof, using approved roof jack; coordinate with General Contractor.
 17. To facilitate pulling of feeder conductors, install junction boxes as shown or required.
 18. All empty conduits on the project shall be provided with a nylon pull rope to allow pulling of future conductors intended for the specific raceway. Provide plastic wire-tie style nameplate tags on each end of pull rope with printed identification of conduit use and the location of the opposite end of the rope. Pull ropes for telecommunications service conduits shall meet the utility company requirements.
 19. Where conduits pass through structural expansion joints in floor slab, rigid galvanized conduit shall be used 18" on either side of joint, complete with Appleton expansion couplings and bonding jumpers, or equal. All above grade expansion joint crossings shall also utilize expansion joint couplings or flex conduit transitions as required for each particular installation. Installed condition shall allow for a minimum deflection of raceway and wire (in any direction) equal to the structural expansion joint dimension (building to building). No solid conduits shall be allowed to cross expansion joints without proper provisions for building and seismic movement.
 20. Minimum cover of conduits in ground outside of building - 36 inches, unless otherwise noted.
 21. Provide and install exterior wall conduit seals and cable seals in the locations listed below. Coordinate installation and scheduling with other trades:
 - a. Conduit seals through exterior wall or slab (below grade): O.Z. Gedney series "FSK" in new cast in concrete locations, series "CSM" in cored locations.
 - b. Conduit seals through exterior wall or slab (above grade): O.Z. Gedney series "CSMI."
 - c. Cable seals at first interior conduit termination after entry through exterior wall or slab: O.Z. Gedney series "CSBI." Coordinate quantity of conductors at each location.
- B. Outlet Boxes and Junction Boxes. Verify all backbox requirements with devices to be installed prior to rough-in.
1. One piece steel knockout type drawn boxes, unless otherwise noted, sized as required for conditions at each outlet or as noted.
 2. Flush-mounted boxes equipped with galvanized steel raised covers for device mounting flush with finished surface. Provide extension rings as required on all acoustical or additional wall treatment areas to bring top of cover flush with finished surface (coordinate with architectural drawings). Devices shall be capable of being tightly mounted to boxes without distorting or bending device or mounting hardware.
 3. Boxes for fixture outlets: 4-inch octagon or larger as required, or as noted.

4. Switch and receptacle outlets - not smaller than 4-inch-square in furred walls, with raised cover for single device; ganged where required.
 5. Outlet and switch boxes for wet locations, cast aluminum FS or FD type with cast aluminum gasketed spring lid cover. Weatherproof "Bell" type boxes are not acceptable.
 6. All connectors from conduit to junction or outlet boxes shall have insulated throats. Connectors shall be manufactured with insulated throats as integral part. Insertable insulated throats are unacceptable.
 7. Outlet boxes for telecommunications, 4" square or larger as required or noted, multi-ganged for voice, data, and other services where indicated on the drawings.
 8. Conduit Bodies: Malleable iron type, with lubricated spring steel clips over edge of conduit body, O-Z/Gedney type EW, or equal.
 9. Floor Boxes:
 10. Pull boxes: All site pull boxes shall be flush in-ground concrete, with engraved covers identifying service use (i.e. electrical, communications, etc.). Boxes shall be Nema 250, Type 6, outside flanged, with recessed cover for flush mounting, by Christy or equal, with required depth to provide box and conduit depths shown or required.
 - a. Provide concrete covers for all boxes in planted or paved areas (up to available concrete cover size).
 - b. Provide galvanized steel covers for all larger boxes (when concrete is not available), or in traffic areas. No cast iron covers.
 - c. Provide bolted covers and slab bottoms (with grouted perimeter) or vault type boxes for all electrical distribution and signal system pull boxes used for site distribution, to prevent rodent entry. No collar type boxes with dirt or gravel bottoms
 - d. Provide drain hole at bottom of all vault type boxes, with loose aggregate base below, for proper drainage.
 - e. All covers to be completely flush with finished adjacent surfaces.
 - f. Provide galvanized steel H20 rated covers and installation of box rated for H20 in all traffic areas.
 - g. Provide pullboxes per utility company specifications for all electrical primary and secondary services and for telecommunications service runs. Verify exact size and type prior to order with each utility company.
- C. Wire and Cable (line voltage and signal systems):
1. 600-volt class where used for or run with line voltage power wiring, insulation color coded, minimum No. 12 AWG for power branch circuits, No. 14 for power control circuits, and wiring size and type as directed by signal system manufacturer for each signal system.
 2. All conductors shall be copper.
 3. Size and insulation type:
 - a. Use 75 degree C insulation ratings on this project, regardless of insulation allowable ratings, unless specifically indicated otherwise on the drawings.
 - b. Standard locations: #12 to #1 AWG: THWN/THHN dual rated for all wet and dry locations; #1/0 through #4/0 AWG: XHHW (55 Mils) for all wet and dry locations; 250MCM and larger: XHHW (65 Mils). All wire sizes used shall be based on a 75 degree insulation rating, unless specifically used with 90 degree rated breakers and devices.
 - b. All wiring (power and signal) installed underground between buildings, or in wet or damp locations, shall be outside listed and rated for wet locations.

- c. High temperature and non-standard locations: Provide wire type and insulation category suitable for area of use as defined in NEC Article 310.
- d. Photovoltaic applications: provide 90 degree C insulation ratings.
- 4. Conductors No. 8 and larger and as otherwise noted on drawings shall be stranded. Power conductors No. 12 and No. 10 shall be solid or stranded. Power conductors No. 14 or smaller shall be solid.
- 5. Provide signal system wiring for each system to meet the system manufacturers requirements and recommendations for each device or equipment type. Signal wiring systems shall be provided with shielding and/or insulation type and cable quantities as directed by the manufacturer, and meet all NEC requirements for locations used.
- 6. Install all wiring branch circuits and feeders (low voltage and line voltage) in conduit unless noted otherwise on the drawings. Contractor shall mandrel all feeders and pass a "sock" (or utilize other suitable means) through each raceway prior to pull to remove all water and construction debris. All raceways shall be completely clear of any obstructions or debris and all cut ends shall be reamed, prior to pull. Utilize pulling compound on all runs to insure minimum friction and pulling tension.
- 7. Megger test all feeders prior to energizing. See section 26 08 00 for additional information.
- 8. Approximately balance branch circuits about the neutral conductors in panels.
- 9. Connections to devices from "thru-feed" branch circuit conductors to be made with pigtails, with no interruption of the branch circuit conductors.
- 10. Neutral conductor identified by white outer braid, with different tracers of "EZ" numbering tags used where more than one neutral conductor is contained in a single raceway.
- 11. Neatly arrange and "marlin" wires in panels and distribution panelboards with "T and B Ty-rap" or approved equal plastic type strapping.
- 12. All wire and cable shall bear the Underwriters' Label, brought to the job in unbroken packages; wire color-coded as follows:

| Voltage | Phasing | A | B | C | N |
|---------|---------|-------|--------|--------|-------|
| 120/208 | 3PH4W | Black | Red | Blue | White |
| 2083PH | 3W | Black | Red | Blue | -- |
| 277/480 | 3PH4W | Brown | Orange | Yellow | White |
| 4803PH | 3W | Brown | Orange | Yellow | -- |
- 13. The equipment grounding conductor shall be insulated copper; where it is insulated, the insulation shall be colored green.
- 14. Label each wire of each electrical system in each pull box, junction box, outlet box, terminal cabinet, and panelboard in which it appears with "EZ" numbering tags indicating the connected circuit numbers.
- 15. Properly identify the "high leg" of 4-wire delta connected systems (in each accessible location) as required by NEC 110.15 and 230-56.
- 16. Provide permanently affixed adhesive labels with machine printed lettering (min. 1/8" high) at junction boxes serving fixtures that are supplied by (2) electrical sources (i.e. normal and emergency lighting). Label to read "CAUTION - This light fixture is powered by (2) separate sources. The normal power source breaker and the emergency power source breaker must be turned off before servicing this light fixture."
- 17. Install feeder cables in one continuous section unless splices are approved by Architect. Exercise care in pulling to avoid damage or disarrangement of conductors, using approved grips. No cable shall be bent to smaller radius than the spool on which it was delivered

from the manufacturer. Color code feeder cables at terminals. Provide identifying linen tags in each pullbox.

- D. Switches: Model numbers are Hubbell, color to be selected by architect, unless otherwise noted. All switches to utilize screw terminals for wire connections - no plug-in terminations:
1. Single Pole - No. HBL1221
 2. Two Pole - No. HBL1222
 3. Three Way - No. HBL1223
 4. Momentary contact - No. HBL1557
- E. Receptacles: Mounting straps and contacts shall be one piece design, constructed of minimum .050" solid brass. Base shall be high strength, heat resistant, glass reinforced nylon. Device shall accept up to #10 wire, side or back wired with screw terminals - no plug-in terminations. Hubbell, Leviton, Pass & Seymore, or equal. Color to be selected by architect, unless otherwise noted. Numbers listed below are Hubbell:
1. 15A 3PG 125 volt duplex - No. HBL5262
 2. 20A 3PG 125 volt duplex - No. HBL5362
 3. 20A 3PG 125 volt ground fault interrupter receptacle; GFI receptacles shall conform to the 2006 UL requirements to a) interrupt power to the unit in the event of internal failure, or b) provide an audible or visual indication of internal failure of the GFI; No. GF20 or equal. Through wiring to down stream GFI designated receptacles is not acceptable.
 4. 15A 3PG 125 volt half controlled duplex receptacle - No. BR15C1(color), with permanent "controlled" marking, factory applied.
- F. Plates: Leviton, or equal, except as noted:
1. The color of all faceplates shall match the color of the devices installed under/in the faceplate, except as specifically noted otherwise.
 2. Plates for surface-mounted outlets: galvanized steel unless otherwise noted.
 3. Weatherproof duplex receptacle plates for exterior locations with ground fault interrupter receptacles in type FS or FD boxes – Hubbell #WPFS26 or compatible equal. Verify cover compatibility with box type and device installed.
 4. Weatherproof "in-use" cover, vertical or horizontal mount, for exterior with GFCI receptacles. Die-cast metal alloy, TayMac MX series or equal with openings to match installed devices.
 5. Locking plates for duplex receptacles where noted; Pass & Seymour #WP26-L (non-weather proof).
 6. Locking plates for duplex exterior GFCI receptacles (or in wet or damp locations); Heavy duty cast aluminum flush cover with locking latch and key, Pass & Seymour #4600 with appropriate mounting plate for type of device installed. Coordinate backbox requirements and finished wall trim-out with wall installer prior to rough-in to insure an adequate and neat trim appearance upon completion.
- G. Time Clocks: Electronic type with 365 day schedule, holidays, astro-dial, and non-volatile memory back-up.
1. 2-Channel (momentary or maintained contact output) – Tork #DZM200A
 2. 4-Channel (maintained contact output) – Tork #DZS-400A
- H. Equipment Disconnects: All disconnects shall be located to allow proper code required clearance in each area. Locations shown on drawings are diagrammatic only. The contractor

shall coordinate exact locations in the field (with other trades) prior to rough-in to insure proper clearances.

1. Motor Disconnect Switches and Safety Switches: General Electric Company Heavy Duty Type "THD", cover interlocked with operating handle so that cover cannot be opened with switch in closed position and switch cannot be closed with cover in open position. 240V or 480V rating, single or multi-pole as required or as noted on drawings, in Nema 1 enclosure indoors or Nema 3R enclosure outdoors unless otherwise noted. Provide dual element motor circuit fuses sized as recommended by equipment manufacturer (for final equipment actually installed).
 2. Code required disconnects: Provide a local disconnect in addition to the branch circuit protection device for all equipment as required by code (whether shown or not). Disconnects shall consist of a motor rated switch (or disconnect) for all motor loads less than 3/4HP or other suitable disconnect sized to match branch circuit conductors and load current of equipment, with number of poles as required.
- I. Lugs and Connectors: Thomas and Betts "lock-tite", for No. 4 and larger wire; 3M "Scotchlock" fixed spring screw-on type wire connectors with insulator for No. 6 and smaller wire.
1. All splices shall be made up with screw-on type connectors - no plug-in or push-in style connectors acceptable. Wires shall be solidly twisted together with electricians pliers before screw-on connector is installed to ensure a proper connection in the event of wire nut failure. No exceptions.
 2. Connectors listed or labeled for "no wire twisting required" are not an acceptable substitute for actual wire twisting.
 3. Utilize porcelain type connectors in all high temperature environments (above 105 degrees Celsius).
- J. Splice Insulation: "Scotch" electrical tape with vinyl plastic backing or rubber tape with protective friction tape for interior work.
1. Splices in electrical cables of 600 volt insulation class in underground system duct shall be made only in accessible locations such as pullboxes, light pole handholes, etc., using a compression connector on the conductor and by insulating and waterproofing (for exterior and underground locations) by one of the following methods:
 - a. Cast type splice insulation shall be provided by means of a molded casting process employing a thermosetting epoxy resin insulating material which shall be applied by a gravity poured method or by a pressure injected method. The component materials of the resin insulation shall be in a packaged form ready for convenient mixing after removing from the package. Do not allow the cables to be removed until after the splicing material has completely set.
 - b. Gravity poured method shall employ materials and equipment contained in an approved commercial splicing kit which includes a mold suitable for the cables to be applied. When the mold is in place around the joined conductors, the resin mix shall be prepared and poured into the mold. Do not allow cables to be moved until after the splicing materials have completely set.
- K. Identification: Refer to Section 26 05 00.
- L. Firestopping: as manufactured by 3M Fire Protection Products or equal.
1. Fire-rated and smoke barrier construction: Maintain barrier and structural floor fire and smoke resistance ratings including resistance to cold smoke at all penetrations,

- connections with other surfaces or types of construction, at separations required to permit building movement and sound vibration absorption, and at other construction gaps.
2. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetration type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations. Systems or devices must be asbestos free.

PART 3 - EXECUTION

3.1 REFER TO BASIC ELECTRICAL REQUIREMENTS - SECTION 26 05 00 FOR WORK UNDER THIS SECTION.

3.2 TESTS

- A. Testing and Inspection: See Section 26 08 00 - Testing.

END OF SECTION

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SECTION 26 56 01 - SITE LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Luminaires
- B. LED's
- C. Power Supplies/Drivers
- D. Poles
- E. Pole bases
- F. Controls and wiring

1.2 SYSTEM DESCRIPTION

- A. Furnish all labor, materials, apparatus, tools, equipment transportation, temporary construction and special or occasional services as indicated on the Drawings or described in these Specifications and as required to make a complete working site lighting system.
- B. Illumination levels shall be in accordance with recommendations by the Illuminating Engineering Society (IES).

1.3 INCORPORATED DOCUMENTS

- A. Section 26 05 00 and Section 26 51 01 apply to all work in this Section.

1.4 SUBMITTALS

- A. Catalog Information:
 - 1. Luminaire (each type) with photometric pattern.
 - 2. Contactors.
 - 3. Ballast or Driver (each type)
 - 4. Poles.
 - 5. Brackets.
- B. Shop Drawings.
- C. Manufacturer's Recommendations: Provide two copies before material is used.
 - 1. PVC conduit joints and junctions.
 - 2. Solvent welding directions.
 - 3. Pole bases.
- D. Laboratory Test: Determine soil density relationships for compaction of backfill material in accordance with ASTM D1557, Method D.

PART 2 - PRODUCTS

2.1 MATERIAL AND EQUIPMENT

- A. Provide new materials and equipment unless otherwise specifically indicated or specified. Materials shall be listed by Underwriter's laboratories, Inc. (U.L.) and bear evidence of such approval where applicable.
- B. Luminaires: Site luminaires shall be weatherproof. Reflectors and refractors shall provide the light configuration indicated and conforming to IES recommendations.
- C. Luminaires and poles shall be finished in epoxy enamel designed to withstand the effects of salt spray. Lens shall be securely attached to the lens frame for security during maintenance and relamping.
- D. Lighting Contactors: NEMA ICS 2. Electrically operated, magnetically held unit in NEMA enclosure, rated poles and ratings as indicated on Drawings. Units shall have silver alloy double breaker contacts and coil clearing contacts and shall require no arcing contacts. On-off selector switch.
- E. Poles, Brackets, Pole Bases and Attachments: Shall be rated for service with wind velocities of 100 mph considering the force exerted by the wind on the maximum exposure of the fixture luminaire selected.
- F. Poles shall be anchor base type round, height and style as indicated, finished to match luminaire, complete with handhole and gasketed cover, anchor bolts with leveling and locking screws, grounding connection, and matching base cover.
- G. Concrete pole bases shall be cast-in-place reinforced concrete as indicated with anchor bolts and conduit entries as per manufacturer. Concrete shall be rated 3,000 PSI at 28 day test.
- H. Concrete:
 - 1. Concrete for electrical requirements shall be at least 3,000 psi concrete with 1-inch maximum aggregate conforming to the requirements of Division 3 for Cast-In-Place concrete.

2.2 SOLID STATE LUMINAIRES

- A. Housing, where applicable:
 - 1. Steel bonderized or equal rust protected, or aluminum, rigid construction. Minimum gauge thickness shall be as follows:
 - a. Interior locations: No. 20-gauge steel, No. 16-gauge aluminum.
- B. Finish:
 - 1. Baked enamel finish (except when otherwise specified).
 - a. Concealed interior surfaces (this applies to interior hardware, circuit boards, etc.) matte black.
 - b. Concealed exterior surfaces: matte black.
 - c. Visible surfaces: color and texture as specified below for each luminaire type or as selected.
 - d. Exterior luminaire finish: refer to Luminaire Schedule.

- C. Light Emitting Diode (LED) requirements:
1. Correlated color temperature (CCT) for phosphor-coated white LEDs must have one of the following designated CCT's and fall within the following binning standards.
 - a. 3000K defined as 3045 +/- 175K
 2. Color spatial uniformity shall be limited to variations in chromaticity for different directions (i.e. changes in viewing angle) within 0.004 from the weighted average point on the CIE 1976 (u',v') diagram.
 3. Color maintenance shall be limited to a maximum change in chromaticity of 0.007 on the CIE 1976 (u',v') diagram over the lifetime of the product.
 - a. Color rendering index: Color rendering index to be determined using ANSI C78.377-2008 and applicable IESNA standards.
 - b. Laboratory tests must be produced using specific module(s)/array(s) and power supply combination that will be used in production.
 - c. Manufacturers must provide a test report from a laboratory accredited by NVLAP or one of its MRA signatories
 4. Lumen depreciation
 - a. Lumen depreciation to be measured using IESNA LM-80-08 standard for IES approved method of measuring lumen maintenance of LED light sources.
 - b. Phosphor coated white LED module(s)/array(s) shall deliver at least 70% of initial lumens for a minimum of 50,000 hours when installed in-situ and operated at 100% output and the maximum specified operating temperature.
 - c. Colored LED module(s)/array(s) shall deliver at least 50% of initial lumens for a minimum of 50,000 hours when installed in-situ and operated at 100% output and the maximum specified operating temperature.
 5. Acceptable LED manufacturers:
 - a. Cree
 - b. Nichia
 - c. Osram Opto Semiconductors
 - d. Philips Lumileds
- D. Luminaire Efficacy:
1. Luminaire efficiency shall be measured using IESNA LM-79-08 standard for electrical and photometric measurements of solid state lighting products.
 2. Manufacturer shall provide published luminaire efficacy, which is defined as luminaire light output divided by luminaire input power measured in a 25 degree Celsius environment. Efficacy shall include power supply, thermal, optical, and luminaire losses.
- E. Thermal Management:
1. Solid state luminaire shall not exceed LED manufacturer's maximum junction temperature requirements when operated in-situ at luminaire manufacturer's maximum ambient operating temperature and 100% light output.
 2. Solid state luminaires shall be thermally protected using one of more of the following thermal management techniques:
 - a. Metal core board
 - b. Gap pad
 - c. Internal monitoring firmware
 3. Solid state luminaire housing shall be designed to transfer heat from the LED board to the outside environment.
- F. Power Supply/Driver requirements:

1. Power factor of 0.90 or greater for primary application
2. Input current shall have Total Harmonic Distortion (THD) of less than 20%.
3. Minimum operating temperature of minus 20 degrees Celsius or below when used in luminaires intended for outdoor applications.
4. Output operating frequency to be equal to or greater than 120 Hz.
5. Operate with sustained input variations of +/- 10% (voltage and frequency) with no damage to the driver.
6. Tolerate sustained open circuit and short circuit output conditions without damage and without need for external fuses or trip devices.
7. Output shall be regulated to +/- 5% across published load range.
8. Class A sound rating.
9. Outputs shall have current limiting protection.
10. Operate LEDs at constant and regulated current levels. LEDs shall not be overdriven beyond the diode manufacturer's specified nominal voltage and current.
11. Inrush currents not exceeding peak currents specified in NEMA 410.

G. System Installation

1. Hardwired connections to solid state luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
2. All solid state luminaires (100% of each lot) shall undergo a minimum eight-hour burn-in test during manufacturing. Solid state lighting installations shall be UL Listed as a low-voltage lighting system including, but not limited to, luminaire, power supply, controller, keypad, and wiring.

H. Warranty

1. Luminaires, drivers, and controllers for solid state lighting systems shall be covered by a five-year warranty against defects in workmanship or material. Warranty shall include in-warranty service program providing for payment of authorized labor charges incurred in replacement of inoperative in-warranty equipment.

2.3 LUMINAIRE CONSTRUCTION

- A. Sheet metal: materials and thicknesses shall be 20 gauge (0.7 mm or 0.027") min., free of dents, scratches, oil-can, or other defects.
- B. Painted luminaires: exposed weld marks, joints, and seams shall be filled and sanded smooth before finishing.
- C. All edges cleaned and dressed to remove sharp edges or burrs.
- D. Extrusions: 1/10" min. wall thickness, smooth and free of tooling lines, with cast end plates that exactly match extrusion profiles.
- E. Castings: smooth, free of pits, scales, gate marks, or blemishes.
- F. Spinings shall have 1/32" min. thickness, smooth, free of spinning lines or blow-back, with clean edges.
- G. Welds: Follow recommendations of American Welding Society. All welds continuous and free of spatter, residue, or warping.

- H. No light leaks visible. Field paint exterior of housing with high temperature paint if necessary.
- I. Exposed end plates and joiners, with concealed fasteners.
- J. Hardware:
 - 1. Steel or aluminum exterior luminaires: stainless steel hardware.
 - 2. Stainless steel luminaires: stainless steel hardware.
 - 3. Copper alloy luminaires: brass hardware.
- K. Raceways: Where used for through wiring, luminaires must be approved for use as raceways.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Refer to Section 26 27 00, Part 2.2, for wiring and splicing requirements.
- B. Underground cable installation shall conform to National Electrical Code except as otherwise specified or indicated.
- C. Contractor Damage: The Contractor shall promptly cause repairs to be made to any indicated utility lines or systems damaged by his operation.
- D. Under roads and paved areas, ducts shall be EPC-80-PVC polyvinyl chloride conduit.
- E. Cables shall be in one piece without splices between connections except where the distance exceeds the lengths in which the cable is furnished.
- F. Bends in cables shall have an inner radius of not less than 12 times the cable diameter.
- G. Horizontal slack of approximately 3 feet shall be left in the ground on each end of cable runs, on each side of connection and at all points where connections are to be made above ground level.
- H. Earthwork: Earthwork for electrical requirements shall conform to the requirements of Division 31.
- I. Coordinate work with other trades. Pre-ship anchor bolts and templates for use in preparing bases for installation. After leveling luminaires, pack grout between mounting plate and concrete footing. Provide weep holes to prevent accumulation of moisture inside pole base.

3.2 TESTS

- A. Test under provisions of Division 1, Section 26 08 00, and Section 26 51 01.
- B. The Owner shall be notified at least three working days in advance of the Contractor's proposed date of the tests to permit scheduling, and to permit witnessing of the tests. The Contractor shall furnish the Owner with three copies of the results of the tests.
- C. Circuits: The Contractor shall test each circuit, all controllers, and components of the system for proper operation. The Contractor shall furnish the Owner with three copies of the test results.

- D. Compaction Tests: Backfill shall be tested for compaction in accordance with ASTM D1556.
- E. Operating Test: Contractor shall operate the system in the presence of the Owner proving the proper operation.

END OF SECTION

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Removal of existing trees and vegetation
- B. Clearing vegetation, debris, trash and other materials within limits indicated
- C. Grubbing of vegetation within limits indicated
- D. Stripping of topsoil within limits indicated
- E. Removing above-grade site improvements within limits indicated
- F. Disconnecting, capping or sealing, and abandoning site utilities in place
- G. Disconnecting, capping or sealing, and removing site utilities
- H. Disposing of objectionable material

1.2 RELATED SECTIONS

- A. Section 31 20 00, Earth Moving
- B. Section 32 12 16, Asphalt Paving
- C. Section 32 13 13, Concrete Pavement

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation – Burlingame Community Center, Murray Engineers, Inc., July 2018.
- B. ANSI A300: Industry Standards for Tree Care Practices
- C. Applicable Publications
 - 1. “Trees and Building Sites,” official publication of the International Society of Arboriculture.
 - 2. “Arboriculture,” the care of trees and shrubs by Dr. Richard Harris.

1.4 DEFINITIONS

- A. ANSI: American National Standards Institute
- B. CAL-OSHA: California Occupational Safety and Health Administration
- C. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than

underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

1.5 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

1.6 QUALITY ASSURANCE

- A. Do not remove or prune trees without first securing a permit from the appropriate agency.
- B. Prune to the standards of the International Society of Arborists and to ANSI A300.

1.7 PROJECT CONDITIONS

- A. Except for materials indicated to be stockpiled or to remain the Owner's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the Owner's Representative. Avoid damaging materials designated for salvage.
- C. Unidentified Materials;
 - 1. If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner's Representative.
 - 2. If necessary, the Owner's Representative will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to engineered fill defined in Section 31 20 00, Earth Moving.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.

- C. Protect existing site improvements to remain during construction.

3.2 TREE REMOVAL

- A. Remove trees designated for removal prior to the construction of new improvements in the vicinity:
 - 1. When demolishing trees indicated to be removed within areas for new pavement or hardscape, remove tree, stump to a depth of two (2) feet below finish grade, and all roots located in the top twelve (12) inches of soil. Remove wood chips created from grinding process down to remaining stump then refill void and re-compact to 80% relative compaction. Use import soil as indicated in specifications for this purpose. Import soil and compaction in future paved areas shall be in accordance with Section 32 12 16, Asphalt Paving and Section 32 13 13, Concrete Pavement.
 - 2. When demolishing trees indicated to be removed within new landscaped areas, removal shall be done in one of the following ways:
 - a. For trees located in accessible areas, remove tree and grind stump to four (4) inches below finish grade. Backfill the void and re-compact to 80% relative compaction. Use import soil as indicated in specifications for this purpose. Do not remove existing roots.
 - b. For trees located in inaccessible areas, cut stump flush with finish grade, and cover with 3 inches of bark mulch. Do not grind the stump and do not remove existing roots.
- B. Perform tree removal work in a safe and proper manner, adhering to CAL-OSHA tree work protection standards and ANSI A300 Standards.
- C. All trees to be demolished shall be removed in such a way as to not damage branches, trunks, or root systems of adjacent trees.

3.3 RESTORATION

- A. Restore damaged improvements to their original condition, as acceptable to the Owner's Representative.
- B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, as directed by the Owner's Representative.
 - 1. Employ a qualified arborist, licensed in jurisdiction where the Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the Owner's Representative.

3.4 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.
- B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner's Representative or others unless authorized in writing by the Owner's representative, and then only after arranging to provide temporary utility services according to requirements indicated.
- D. Coordinate utility interruptions with utility company affected.
- E. Do not proceed with utility interruptions without the permission of the Owner's Representative and utility company affected. Notify Owner's Representative and utility company affected two working days prior to utility interruptions.
- F. Excavate and remove underground utilities that are indicated to be removed.
- G. Fill abandoned piping with cement slurry.
- H. Securely close ends of abandoned piping with tight fitting plug or cement slurry minimum 6 inches thick.

3.5 CLEARING AND GRUBBING

- A. Areas to be graded shall be cleared of existing vegetation, rubbish, existing structures, and debris.
- B. Remove obstructions, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
- C. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
- D. Use only hand methods for grubbing within drip line of remaining trees.

3.6 SITE STRIPPING

- A. Strippings and spoils shall be disposed at an off-site location, per geotechnical recommendations.
- B. Remove vegetation before stripping soil.
- C. Surface soils that contain organic matter should be stripped. In general, the depth of required stripping will be relatively shallow (i.e. less than 2 inches); deeper stripping and grubbing may be required to remove isolated concentrations of organic matter or roots.
- D. Remove trash, debris, weeds, roots, and other waste materials.
- E. Stockpile soil materials designated to remain on site at a location approved by the Owner's Representative at a location away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- F. Do not stockpile soil within drip line of remaining trees.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.8 BACKFILL

- A. Place and compact material in excavations and depressions remaining after site clearing in accordance with Section 31 20 00, Earth Moving.

3.9 DISPOSAL

- A. Remove surplus soil material, unsuitable soil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

END OF SECTION

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SECTION 31 1001 – PLANT PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Preserve and protect existing trees, shrubs and other plant materials to remain, including protecting plants on adjoining properties during site preparation work and construction.
- B. Provide tree and shrub pruning and removal in accordance with these Specifications if required by the Contract Documents.
- C. Layout and review of utility and irrigation trenches that occur in the Tree Protection Root Zone.
- D. Related requirements specified elsewhere include:
 - 1. Section 31 1000, Site Clearing
 - 2. Section 32 8400, Irrigation
 - 3. Section 32 9000, Planting

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard than is required by the above-mentioned codes and regulations, the provisions of these Specifications and Drawings shall take precedence. Furnish without extra charge additional materials and labor required to comply with above rules and regulations.
 - 2. International Society of Arboriculture, Guide for Plant Appraisal, latest version.
- B. Pre-installation Conference:
 - 1. Conduct conference at the project site. Contractor shall review and identify with the Owner's Representative the limits of Work and extent of plant materials and other improvements to be protected. Notify Owner's Representative of discrepancies between existing conditions and Drawings before proceeding with Work.
 - 2. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel, and equipment needed
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement with the locations of protection zones.
 - e. Trenching by hand or with air spade within protection zones.
- C. At the Owner's discretion, an Arborist may represent the Owner to review the work of the Contractor in regard to plant protection. Arborist Qualifications: ISA Certified Arborist licensed to work in the State of California.
- D. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this

Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

1.3 PROJECT CONDITIONS

- A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.
- B. Nuisances: Keep dirt, dust, noise and other objectionable nuisance to a minimum. Use temporary enclosures, coverings and sprinkling, and combinations thereof, as necessary to limit dust to lowest practicable level, except do not use water to the extent that it causes flooding or contaminated run-off.
- C. Traffic: Conduct work to ensure minimum interference with vehicular and pedestrian traffic, and to permit unencumbered access to site and adjacent properties.
 - 1. Do not close or obstruct streets, sidewalks, alleys or other public passageways without permission from authorities having jurisdiction.
 - 2. If required by governing authorities, provide alternate routes around closed and obstructed traffic ways.
- D. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Moving or parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust toward protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

1.4 DEFINITIONS

- A. Diameter at breast height (DBH): diameter of a trunk as measured at a height 54 inches above the ground line.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and as identified on the drawings or otherwise by a certified arborist.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.
- E. Structural Root Zone: A circular area with the tree trunk at the center and a radius equal to 3 times the diameter of the tree trunk measured at breast height (4.5 feet above ground line). This zone, where most of the structural roots exist, is based upon tree failure research conducted by E.T. Smiley at the Bartlett Tree Research Laboratory. Any structural (buttress) root, which has been severed or is rotten within this zone, can no longer provide adequate support to the tree and must be considered missing.
- F. Dripline: The area of the ground directly beneath the vertical projection (shadow) of the tree's foliage canopy.

1.5 SUBMITTALS

- A. Product Data: For each type of product.
- B. Soil Analysis Report:

1. Provide soil analysis report for any top soil to be removed and stockpiled for reuse as planting soil. Soils analysis report to be performed by a certified soil analysis laboratory, and include agricultural suitability analysis and recommendations for amending the soil. Subsoil will not be approved as planting soil.
- C. Samples: For each type of the following:
 1. Organic Mulch: 1-quart of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 2. Planting Soil: 1-quart of soil; in sealed plastic bags; for soils to be used within the protection zones.
- D. Shop Drawings:
 1. Include plans and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones. Indicate extent of trenching by hand or with air spade within protection zones.
 2. Protection-Zone Signage
- E. Qualification Data: For arborist and tree service firm.
- F. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- G. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- H. Survey of Existing Conditions: Provide to Owner a Survey of Existing Conditions. Record existing conditions, including underground utilities, etc. on As Built Drawings by use of field measurements and preconstruction photographs. Make permanent record of measurements, materials, and construction details required to make exact reproduction.
- I. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 1. Revise subparagraphs below to suit Project.
 2. Species and size of tree.
 3. Location on site plan. Include unique identifier for each.
 4. Reason for pruning.
 5. Description of pruning to be performed.
 6. Description of maintenance following pruning.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Backfill Soil: Approved planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 1. Type: Wood and bark chips
 2. Size Range: ½'-2"
 3. Color: Natural Brown.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:
 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch- diameter wire chain-link fabric; with pipe

posts, minimum 2-3/8-inch- OD line posts, and 2-7/8-inch- OD corner and pull posts; with 1-5/8-inch- OD top and bottom rails; with tie wires, hog ring ties, and other accessories for a complete fence system.

- a. Height: 72 inches
2. Gates: Swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
 1. Text: “Tree Protection Zone. No Heavy Equipment.”
 2. Lettering: 3-inch- high minimum, black characters on white background.
- E. Tree Branch & Trunk Protection: for branches trunks exposed to, or at risk of exposure to impact by construction equipment.
 1. 2x lumber
 2. 1/2”-wide steel straps

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas in which work is to be performed. Report in writing to the Owner's Representative all prevailing conditions that will adversely affect the existing plant materials to remain. Do not proceed with work until a solution acceptable to the Owner's Representative has been arrived at.
- B. Survey of Existing Conditions: Record existing conditions, including underground utilities, etc. by use of measured drawings and preconstruction photographs.
- C. Starting work constitutes acceptance of the existing conditions and the Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective work encountered.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain and/or be relocated. Tie a 1-inch blue vinyl tape around each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.
- D. Install and maintain temporary fencing and other required protective devices and exclude construction activities from tree/shrub zones except as supervised by the Arborist / Owner's Representative.
- E. If tree/plant protection zones cannot be protected with fencing, a four-inch layer of mulch with minimum 1.25-inch-thick, metal strap linked plywood shielding shall be maintained in the tree/shrub zone where heavy equipment will be operated.

3.3 PROTECTION ZONES

- A. Protect trees and shrubs against cutting, breaking, skinning and bruising of bark; permit no traffic or stockpiling within drip line.

- B. Do not change earth surface within drip line of trees and shrubs except as approved in writing by the Owner.
- C. Do not park vehicles or store materials, supplies and construction equipment within Tree Protection Zone.
- D. Verify details of protection-zone fencing before retaining last option in "Protection-Zone Fencing" Paragraph below.
- E. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect. Post may be steel driven type, or self-supporting type.
 - 3. Access Gates: Install where required; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- F. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, with signs each facing a different direction.
- G. Where tree branches & trunks are exposed to, or at risk of exposure to impact by construction equipment, secure 2x lumber radially around tree branches and/or trunk to prevent damage. Secure lumber with steel strapping.
- H. Maintain protection zones free of weeds and trash.
- I. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION & TRENCHING

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without

breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.

- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as approved by certified arborist.
1. Generally cutting of roots two inches or greater shall be avoided. Roots one inch and greater in diameter that must be cut shall be cut cleanly and obliquely with the cut surface facing down.
 2. Exposed and pruned roots shall be covered with light well-drained soil backfill and mulch over. The area shall be kept moist. Retain applicable subparagraphs below.
 3. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 4. Cut Ends: Do not paint cut root ends
 5. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 6. Cover exposed roots with burlap and water regularly.
 7. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots 6 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

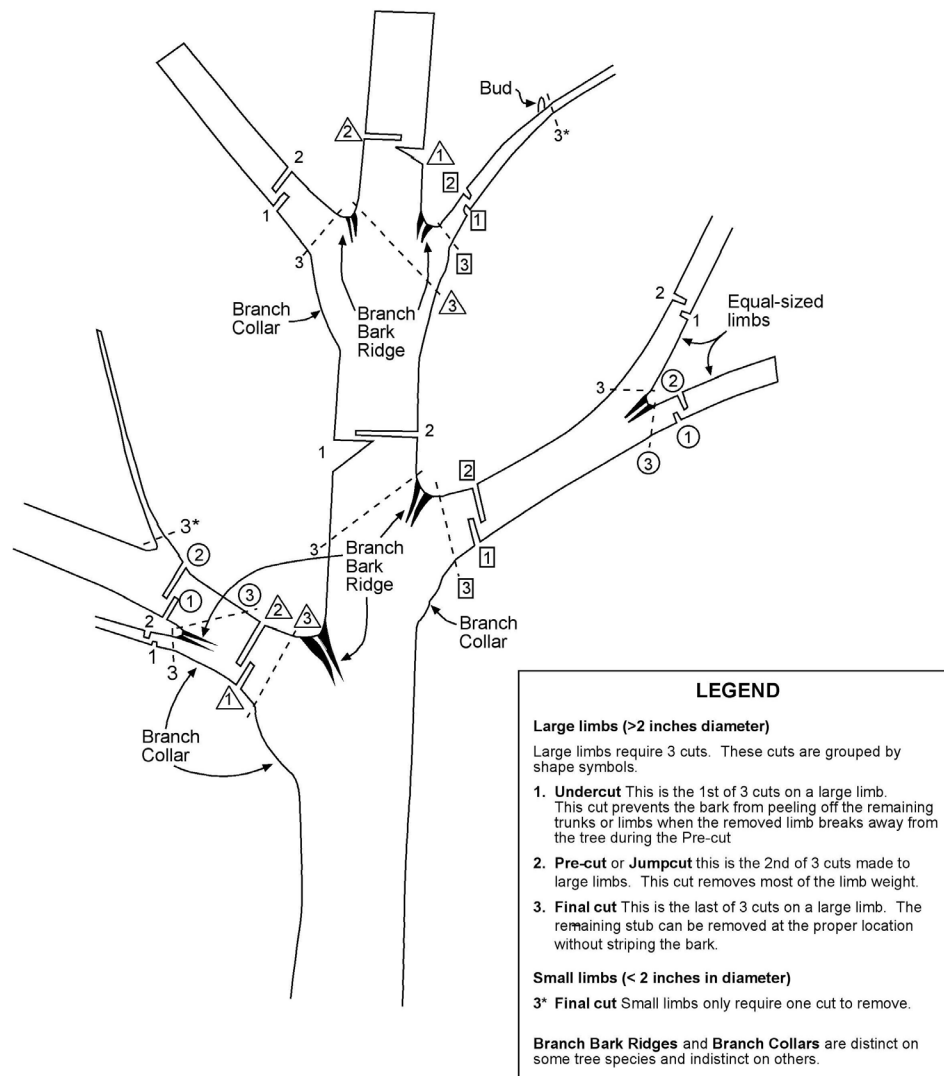
3.6 AIR SPADING:

- A. Air spading, or hand removal of soil or tunneling is required for excavation in the Tree Protection Zone of any trees for the installation of infrastructure where roots 2 inches in diameter and larger are encountered. The "critical root zone" is defined as any area around a tree in which a two-inch diameter root is encountered. The Arborist / Owner's Representative shall define the critical root zone and the Contractor shall excavate using a pneumatic excavator (AIR-SPADE or equivalent) as follows:
- B. Trenching for utility lines or other infrastructure may be done mechanically outside the Tree Protection Zone. As the equipment operator approaches the canopy radius, or for certain species up to 1.5 times the canopy radius out from the base of the tree (Oaks, Poplars, Redwoods, etc.) the operator shall be assisted by a spotter who shall inspect the excavation for roots. If a root of two inches diameter is encountered the spotter shall halt mechanical excavation and pneumatic excavation shall proceed. If no other two inch or greater diameter root is encountered in an excavation of two feet forward and two feet deep, the single two-inch root may be cleanly cut proximal to (on the tree side of) any fracture or torn bark. Mechanical excavation may continue until a two-inch diameter root is encountered, and the pneumatic excavation, exploration is then repeated.

- C. The Contractor shall control dust and the spread of soils excavated. The air-spade operator shall moisten the soil to field capacity and to a minimum probe depth of 2.5 feet with a watering needle (hydro-spear) 48 hours prior to pneumatic excavation. The spread of excavated soil shall be contained to the area adjacent to the trench path with upright plywood sheeting.
- D. These specifications shall not be considered operating instructions or a requirement to use a specific pneumatic excavation product. It is the responsibility of the Contractor to read and understand the pneumatic excavator operation instructions and safety procedures (including the proper and safe use of air compressor, hoses, excavation tools, etc.) prior to operations.

3.7 TREE PRUNING

- A. Obtain specific instruction from Arborist / Owner's Representative for pruning of trees, shrubs, roots or disturbance of soil within spread of tree branches. The Contractor shall utilize protection measures as outlined by Arborist / Owner's Representative, which may include directional drilling, or hand clearing to expose the roots.
- B. Provide periodic watering for all planting within Contract limit and any adjacent areas affected by the work. Maintain moisture to a minimum 6" depth, minimum.



- C. Using an approved pruning saw, provide selective tree limb pruning as accepted by the Landscape Architect if branches interfere with new construction. Limb diameter shall be limited to 5" diameter and shall be pruned just outside the branch collar in accordance with American National Standards Institute, (ANSI 300) and International Society of Arboriculture, (ISA) standards.
- D. Approved branches to be shortened must be cut just above a fork with another living branch which is plus or minus 1/2 the diameter of the removed branch as shown in the pruning figure herein. Branches to be removed which exceed 2" in diameter shall be severed with a 3-step cut to prevent bark peeling. Final cuts must not injure the branch collar or branch bark ridge of the remaining branches and trunk.
- E. Prune branches that are affected by temporary and permanent construction.
 - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 - 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 - 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1)
- F. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.
- G. Cut branches with sharp pruning instruments; do not break or chop.
- H. Do not paint or apply sealants to wounds.
- I. Provide subsequent maintenance pruning during Contract period as recommended by arborist.
- J. Chip removed branches and stockpile in areas approved by Architect

3.8 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 6inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.9 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.10 TREE & PLANT REMOVAL & REPLACEMENT

- A. Field Verification: Before removing non-designated trees, shrubs, stumps, bushes, vines, rubbish, undergrowth and deadwood as shown on the Drawings and as specified, obtain verification from Owner's Representative.

- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- C. Backfill and compact areas excavated and open pits and holes resulting from removal operations. Comply with requirements herein and as specified in Earth Moving, Section 31 2000 for backfill materials, compaction and installation methods.
- D. Remove all stumps and roots in their entirety. Tree trunks shall be removed minimum depth of 2 1/2 feet below existing grade or finish grade, whichever is deeper. Stump grinding is an acceptable method of removal of roots and stumps of trees and shrubs; however, the chip contaminated soil shall be replaced with approved clean planting soil in planting areas and with approved clean fill soil in all other areas.
- E. Backfill and compact voids excavated and open pits and holes resulting from removal operations. Comply with Earthwork Specification for backfill materials, compaction and installation methods. Unless required otherwise, in planting areas backfill holes with clean approved planting soil compacted to 90% relative compaction to a minus 12 inches below finish grade and 85% relative compaction for the top 12 inches, except as required elsewhere to a greater degree by Civil or Structural Engineer. In non-planting areas backfill holes with approved fill soil compacted to 95% relative compaction.
- F. Remove and replace trees indicated to remain that are more than 25% dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
- G. Plant Replacement: Contractor shall replace trees cut or severely damaged due to the Contractor's work as follows:
 - 1. An ISA Certified Arborist may be retained by the Owner to determine the condition of trees in question as to their ability to survive in a healthy condition and in their original shape, or a pruned aesthetically pleasing shape acceptable to the Owner. Comply with recommendations to rehabilitate as recommended by the Arborist, or to replace in accordance with the requirements below.
 - 2. Trees size shall be determined by Diameter at Breast Height (DBH). Replacement of trees and shrubs shall also include providing acceptable plant installation, automatic irrigation system and a minimum maintenance period of 120 days. If plant(s) is not acceptably maintained and is not healthy and thriving at the end of the 120-day maintenance period, the Contractor shall continue the maintenance work until such time that healthy tree(s) and/or shrub(s) is achieved.
 - 3. Replace any damaged planting in kind using "specimen" plants as follows and at no cost to Owner:
 - a. Trees up to 3" DBH: Replace with 36" box size.
 - b. Trees 3" to 6" DBH: Replace with 72" box size.
 - c. Trees 6" to 12" DBH: Replace with 84" box size.
 - d. Trees 12" DBH and larger: Tree value shall be determined by Arborist using Council of Tree and Landscape Appraisers (CTLA) method. Replace damaged tree with largest available nursery boxed tree and cash

difference between value of damaged tree and nursery stock replacement cost.

- e. Shrubs: Replace with 15-gallon can size.
 - 4. Plant and maintain new trees as specified
 - H. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 3-inch uniform thickness to remain.
 - I. Soil Aeration: Where directed by arborist, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches (300 mm) deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.
- 3.11 CLEANUP AND DISPOSAL, per Section 01 7000.
- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.
 - B. Clean excess soil may be distributed on site as accepted by Owner's Representative, if it does not adversely affect specified finish grades or percolation of water into planting soil.
 - C. Upon completion of work under this Section, remove all tools, equipment and temporary protections, enclosures and structures.

END OF SECTION

SECTION 32 11 00 – PAVEMENT BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aggregate subbase
- B. Aggregate base
- C. Cement treated base
- D. Lime stabilization

1.2 RELATED SECTIONS

- A. Section 01 10 00, Supplemental General Requirements
- B. Section 01 50 50, Erosion Control
- C. Section 31 20 00, Earth Moving

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation – Burlingame Community Center, Murray Engineers, Inc., July 2018.
- B. ASTM:
 - 1. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 2. D3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
 - 3. E329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
 - 4. E548, Guide for General Criteria Used for Evaluating Laboratory Competence
- C. Caltrans Standard Specifications, 2015
 - 1. Section 24, Stabilized Soils
 - 2. Section 25, Aggregate Subbases
 - 3. Section 26, Aggregate Bases
 - 4. Section 27, Cement Treated Bases

1.4 DEFINITIONS

- A. Geotechnical Testing Agency: An independent testing agency qualified according to ASTM E329 to conduct soil materials and rock definition testing, as documented according to ASTM D3740 and ASTM E548.
- B. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material $\frac{3}{4}$ cubic yards or more in volume that when tested by an

independent geotechnical testing agency, according to ASTM D1586, exceeds a standard penetration resistance of 100 blows/2 inches.

- C. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.
- D. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials. Perform work in accordance with Section 31 20 00, Earth Moving.

1.5 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Submit material certificates signed by the material producer and the Contractor, certifying that that each material item complies with, or exceeds the specified requirements.

1.6 QUALITY ASSURANCE

- A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.
- B. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D1557.
- C. Perform installation of base materials under the observation of the Geotechnical Engineer. Materials placed without approval of the Geotechnical Engineer will be presumed to be defective and, at the discretion of the Geotechnical Engineer, shall be removed and replaced at no cost to the Owner. Notify the Geotechnical Engineer at least 24 hours prior to commencement of base material installation and at least 48 hours prior to testing.
- D. Do not mix or place cement treated base when the temperature is below 36 degrees F or when the ground is frozen.
- E. Finish surface of material to be stabilized prior to lime treatment shall be in accordance with Caltrans Standard Specification Section 24, Stabilized Soils.
- F. Finish surface of the stabilized material after lime treatment shall be in accordance with Caltrans Standard Specifications Section 24, Stabilized Soils.
- G. Finish surface of cement treated base shall be in accordance with Caltrans Standard Specification Section 27, Cement Treated Bases.
- H. Do not project the finish surface of aggregate subbase above the design subgrade.
- I. Finish grade tolerance at completion of base installation: +0.05 feet

1.7 PROJECT CONDITIONS

- A. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.
- B. Temporarily stockpile material in an orderly and safe manner and in a location approved by the Owner.
- C. Provide dust and noise control in accordance with Section 01 10 00, Supplemental General Requirements.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE

- A. Material: Class 2, 1 ½ inch maximum in accordance with Caltrans Standard Specification Section 26, Aggregate Bases.

PART 3 - EXECUTION

3.1 GENERAL

- A. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.

3.2 WET WEATHER CONDITIONS

- A. Do not place or compact subgrade if above optimum moisture content.
- B. If the Geotechnical Engineer allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Geotechnical Engineer.

3.3 AGGREGATE SUBBASE

- A. Spreading and Compacting: In accordance with Caltrans Standard Specification Section 25-1.03D, Spreading and 25-1.03E, Compacting.

3.4 AGGREGATE BASE

- A. Watering, Spreading and Compacting: In accordance with Caltrans Standard Specification Section 26-1.03D, Spreading and 26-1.03E, Compacting.

3.5 CEMENT TREATED BASE

- A. Proportioning and Mixing Plant-Mixed: In accordance with Caltrans Standard Specification Section 27-1.03D.

3.6 LIME STABILIZATION

- A. Lime stabilization shall conform to Caltrans Standard Specification Section 24, Stabilized Soils, and the following:
 - 1. Add lime in the amount specified by the Geotechnical Engineer.

2. Lime treat subgrade soils from back of curb to back of curb to a depth specified by the Geotechnical Engineer.
3. Mix in two mixing periods, both with the tines lowered to the same depth. Both mixing periods shall be monitored and verified by the Geotechnical Engineer. The second mixing shall occur at about 24 hours after the initial mixing.
4. Compact and grade the lime mixed subgrade immediately after the second mixing.
5. Compact the lime treated subgrade to 93 percent as determined by ASTM D1557.
6. After application of the curing seal, do not allow traffic on the lime treated material for a period of 7 days in lieu of the 3 days specified in Caltrans Standard Specifications, Section 24.
7. Proof-roll the stabilized subgrade after compacting to confirm that a non-yielding surface has been achieved. Yielding areas, if any, shall be mitigated. Mitigation could consist of over-excavation, utilization of stabilization fabric, or chemical treatment. Each case shall be addressed individually in the field by the Geotechnical Engineer.

3.7 DISPOSAL

- A. Lawfully dispose of all unsuitable and excess or surplus material off-site at no cost to the Owner.

END OF SECTION

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SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Excavation and/or embankment from existing ground to subgrade, including soil sterilant, for roadways, driveways, parking areas, building pads, walks, paths, or trails and any other site improvements called for on the Plans.

1.2 SECTION EXCLUDES

- A. Earthwork related to underground utility installation shall be performed in accordance with Sections 31 21 00, Utility Trenching and Backfill.

1.3 RELATED SECTIONS

- A. Section 01 10 00, Supplemental General Requirements
- B. Section 01 50 50, Erosion Control
- C. Section 31 10 00, Site Clearing
- D. Section 31 23 19, Dewatering
- E. Section 33 46 00, Subdrainage

1.4 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation – Burlingame Community Center, Murray Engineers, Inc., July 2018.
- B. ASTM
 - 1. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 2. D1586, Method for Penetration Tests and Split-Barrel Sampling of Soils
 - 3. D2487, Classification of Soils for Engineering Purposes
 - 4. D3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 - 5. D4318. Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils
 - 6. E329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
 - 7. E548, Guide for General Criteria Used for Evaluating Laboratory Competence
- C. California Building Code, California Code of Regulations, Title 24, Part 2, Chapter 18, Soils and Foundations, and Chapter 33, Safeguards During Construction
- D. Caltrans Standard Specifications, 2015
 - 1. Section 17, General
 - 2. Section 19, Earthwork

- E. CAL/OSHA, Title 8.

1.5 DEFINITIONS

- A. Borrow: Approved soil material imported from off-site for use as Structural Fill or Backfill.
- B. Excavation: Removal of material encountered above subgrade elevations.
 - 1. Authorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions as shown on plans or authorized by the Geotechnical Engineer.
 - 2. Unauthorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions without authorization by the Geotechnical Engineer. Unauthorized excavation shall be without additional compensation.
- C. Geotechnical Testing Agency: An independent testing agency qualified according to ASTM E329 to conduct soil materials and rock definition testing, as documented according to ASTM D3740 and ASTM E548.
- D. Structural Backfill: Soil materials approved by the Geotechnical Engineer and used to fill excavations resulting from removal of existing below grade facilities, including trees.
- E. Structural Fill: Soil materials approved by the Geotechnical Engineer and used to raise existing grades.
- F. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material $\frac{3}{4}$ cubic yards or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D1586, exceeds a standard penetration resistance of 100 blows/2 inches.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.
- H. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials.
- I. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.
- J. Unsuitable Material: Any soil material that is not suitable for a specific use on the Project. The Geotechnical Engineer will determine if a soil material is unsuitable.
- K. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure ASTM D1557.
- L. Utilities: onsite underground pipes, conduits, ducts and cables.

1.6 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Samples:
 - 1. If required by the Geotechnical Engineer, provide 20 pound samples, sealed in airtight containers, tagged with source locations and suppliers of each proposed soil material from on-site or borrow sources, 72 hours prior to use. Do not import materials to the Project without written approval of the Geotechnical Engineer.
 - 2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Engineer.
- C. Classification according to ASTM D2487 of each onsite or borrow soil material proposed for fill and backfill.
 - 1. Laboratory compaction curve in conformance with ASTM D1557 for each onsite or borrow soil material proposed for fill and backfill.

1.7 QUALITY ASSURANCE

- A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.
- B. Conform all work in accordance with Caltrans Standard Specification Section 17, General and Section 19, Earthwork.
- C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D1557.
- D. Perform excavation, filling, compaction and related earthwork under the observation of the Geotechnical Engineer. Materials placed without approval of the Geotechnical Engineer will be presumed to be defective and, at the discretion of the Geotechnical Engineer, shall be removed and replaced at no cost to the Owner. Notify the Geotechnical Engineer at least 24 hours prior to commencement of earthwork and at least 72 hours prior to testing.
- E. The Geotechnical Engineer will perform observations and tests required to enable him to form an opinion of the acceptability of the Project earthwork. Correct earthwork that, in the opinion of the Geotechnical Engineer, does not meet the requirements of these Technical Specifications and the Geotechnical Report.
- F. Upon completion of the construction work, certify that all compacted fills and foundations are in place at the correct locations, and have been constructed in accordance with sound construction practice. In addition, certify that the materials used are of the types, quality and quantity required by these Technical Specifications and the Geotechnical Report. The Contractor shall be responsible for the stability of all fills and backfills constructed by his forces and shall replace portions that in the opinion of the Geotechnical Engineer have been displaced or are otherwise unsatisfactory due to the Contractor's operations.
- G. Finish subgrade tolerance at completion of grading:
 - 1. Building and paved areas: ± 0.05 feet
 - 2. Other areas: ± 0.10 feet

1.8 PROJECT CONDITIONS

- A. Promptly notify the Owner’s Representative of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner’s Representative verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless the Contractor has notified the Owner’s Representative in writing of differing conditions prior to the Contractor starting work on affected items.
- B. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.
- C. Prevent erosion of freshly-graded areas during construction and until such time as permanent drainage and erosion control measures have been installed in accordance with Section 01 50 50, Erosion Control.
- D. Temporarily stock-pile fill material in an orderly and safe manner and in a location approved by the Owner’s Representative.
- E. Environmental Requirements: When unfavorable weather conditions necessitate interrupting earthwork operation, areas shall be prepared by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion. After interruption, compaction specified in last layer shall be re-established before resuming work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: On-site soils are considered suitable for use as fill provided the materials are placed in accordance with Geotechnical Recommendations. Highly expansive soils shall not be used as select structural fill, or used as backfill for trenches located within hardscape areas.
- B. Imported fill soils, if required, should be predominantly granular in nature, and should be free of organics, debris, or rocks over 3 inches in size, and shall be approved by the Geotechnical Engineer before importing to the site. Imported non-expansive soils shall have a Plasticity Index less than 15 as determined by ASTM D4318, an R-value of at least 20, and fines content between 15 and 65 percent. Import fill shall be considered non-hazardous per Department of Toxic Substances Control guidelines (DTSC, 2017) and non-corrosive per Caltrans Corrosion Guidelines (Caltrans, 2015).

2.2 SOIL STERILANT

- A. Commercial chemical for weed control, registered by EPA. Provide granular, liquid or wet-able powder form.

PART 3 - EXECUTION

3.1 GENERAL

- A. Perform work in accordance with Caltrans Standard Specification Section 19, Earthwork, as modified by the Contract Documents.
- B. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.
- C. The use of explosives will not be permitted.
- D. Grading and earthwork operations shall be observed and tested by a representative of the Geotechnical Engineer for conformance with the project plans/specifications and the geotechnical recommendations. This work includes site preparation, selection of satisfactory materials, and placement and compaction of the subgrades and fills. Sufficient notification prior to commencement of earthwork is essential to make certain that the work will be properly observed.

3.2 CONTROL OF WATER AND DEWATERING

- A. Comply with Section 31 23 19, Dewatering, if dewatering is necessary.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the site and surrounding area. Provide dewatering equipment necessary to drain and keep excavations and site free from water.
- C. Dewater during backfilling operation so that groundwater is maintained a least 1 foot below level of compaction effort.
- D. Obtain the Geotechnical Engineer's approval for proposed control of water and dewatering methods.
- E. Protect subgrades from softening, undermining, washout and damage by rain or water accumulation.
- F. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.
- G. Maintain dewatering system in place until dewatering is no longer required.

3.3 WET WEATHER CONDITIONS

- A. Do not prepare subgrade, place or compact soil materials if subgrade or materials are above optimum moisture content.
- B. If the Geotechnical Engineer allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Geotechnical Engineer.

3.4 BRACING AND SHORING

- A. Conform to California and Federal OSHA requirements.

- B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
- C. Be solely responsible for all bracing and shoring and, if requested by the Owner's Representative, submit details and calculations to the Owner's Representative. The Owner's Representative may forward the submittal to the Geotechnical Engineer, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner's Representative.
- D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.5 TOPSOIL STRIPPING

- A. Remove topsoil in accordance with Section 31 10 00, Site Clearing.

3.6 EXCAVATION

- A. Excavate earth and rock to lines and grades shown on plans and to the neat dimensions indicated on the plans, required herein or as required to satisfactorily compact backfill.
- B. Remove and dispose of large rocks, pieces of concrete and other obstructions encountered during excavation.
- C. Excavation through buried concrete and other unknown obstructions will require specialized techniques for demolition and removal.
- D. Where forming is required, excavate only as much material as necessary to permit placing and removing forms.
- E. Provide supports, shoring and sheet piles required to support the sides of excavations or for protection of adjacent existing improvements.

3.7 GRADING

- A. Uniformly grade the Project to the elevations shown on plans
- B. Finish ditches, gutters and swales to the sections, lines and grades indicated and to permit proper surface drainage.
- C. Round tops and bottoms of slopes as indicated or to blend with existing contours.

3.8 SUBGRADE PREPARATION

- A. Subgrade Preparation: Prior to backfilling depressions created by the removal of old foundations and utility lines, scarify the bottom of the excavation to an approximate depth of 8 inches and uniformly moisture condition the scarified surfaces to a moisture content that is at least 2 percent over optimum. Compact the scarified surfaces to a minimum of 90 percent relative compaction at above optimum moisture content.
- B. Over-excavate any remaining soft (pumping) areas down to firm soil and backfill the area.
- C. Subgrade shall be maintained in a moist, but not wet, condition by periodically sprinkling water prior to the placement of additional fill or installation of roads. Subgrade that has been permitted to dry out and loosen or develop desiccation cracking should be scarified, moisture conditioned, and re-compacted as recommended above.
- D. Install underground utilities and service connections prior to final preparation of subgrade and placement of base materials for final surface facilities. Extend services so that final surface facilities are not disturbed when service connections are made.
- E. Prepare subgrades under the structural section of paved areas, curbs, gutters, walks, structures, other surface facilities and areas to receive structural fill.
- F. Protect utilities from damage during compaction of subgrades and until placement of final pavements or other surface facilities.
- G. Obtain the Geotechnical Engineer's approval of subgrades prior to placing pavement structural section.

3.9 KEYWAYS AND BENCHES

- A. Provide keyways as indicated for fill slopes steeper than 6 horizontal to 1 vertical. Extend keyway 5 feet minimum into competent, undisturbed soil or 3 feet minimum into competent, undisturbed rock as directed by the Geotechnical Engineer.
- B. Place subsurface drains in bottom of keyway in accordance with Section 33 46 00, Subdrainage.
- C. Bench subgrade as indicated above toe of fill.
- D. Place subsurface drains at benches every 20 vertical feet or as directed by the Geotechnical Engineer.

3.10 LOT FINISH GRADING

- A. Blade finish lots to lines and grades indicated.

3.11 FILL PLACEMENT AND COMPACTION

- A. Place fill in uniformly moisture conditioned and compacted lifts not exceeding 8 inches in loose thickness. Each lift should be thoroughly moisture conditioned and compacted to 90 percent before successive fill layers are placed.

- B. In order to achieve satisfactory compaction in the subgrade and fill soils, it may be necessary to adjust the soil moisture content at the time of soil compaction per geotechnical recommendations. This may require that water be added and thoroughly mixed into any soils which are too dry or that scarification and aeration be performed in any soils which are too wet.
- C. Obtain the Geotechnical Engineer's approval of surface to receive structural fill prior to placement of structural fill material.
- D. Place structural fill on prepared subgrade.
- E. Do not drop fill on structures. Do not backfill around, against or upon concrete or masonry structures until structure has attained sufficient strength to withstand loads imposed and the horizontal structural system had been installed.
- F. Do not compact by ponding, flooding or jetting.
- G. Perform compaction using rollers, pneumatic or vibratory compactors or other equipment and mechanical methods approved by the Geotechnical Engineer.
- H. Compaction requirements (unless specified otherwise by the Geotechnical Engineer):
 - 1. Compact structural fills less than 5 feet thick to 90 percent compaction.
 - 2. Compact structural fill 5 feet thick or greater to 95 percent compaction.
 - 3. Compact the upper 6 inches of subgrade soils beneath pavements, curbs and gutters to 95 percent compaction. Extend compaction 5 feet beyond pavement edges unless specified otherwise by the Geotechnical Engineer.
 - 4. Compact the upper 6 inches of subgrade soils under walks, structures and areas to receive structural fill to 90 percent compaction.

3.12 SOIL STERILIZATION

- A. Apply soil sterilant to areas indicated, such as beneath asphalt concrete pavement, brick pavement, concrete pavement and at grade concrete slabs, including sidewalks, curbs and gutters. Also where indicated apply soil sterilant below expansion and control joints and at areas where pipes, ducts or other features penetrate slabs.
- B. Apply soil sterilant uniformly and at the rates recommended by the manufacturer.
- C. Apply soil sterilant to prepared subgrade, or after installation of aggregate base as recommended by the manufacturer.

3.13 DISPOSAL

- A. Lawfully dispose of all unsuitable and excess or surplus material off-site at no cost to the Owner.

END OF SECTION

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SECTION 31 21 00 – UTILITY TRENCHING AND BACKFILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Excavation, bedding, and backfill for underground storm drain, sanitary sewer, and water piping, underground HVAC piping, electrical conduit, telephone conduit, gas piping, cable TV conduit, etc., and associated structures.
- B. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:
 - 1. Select Backfill Material
 - 2. Aggregate Base
 - 3. Detectable Tape
 - 4. Trench Excavation
 - 5. Pipe Bedding
 - 6. Trench Backfill
 - 7. Trench Surfacing
- C. This section excludes drainage fill material and placement around subdrains. See Section 33 46 00 – Subdrainage.

1.2 RELATED SECTIONS

- A. Section 31 10 00 – Site Clearing
- B. Section 31 20 00 – Earthwork Moving
- C. Section 31 23 19 - Dewatering
- D. Section 33 10 00 – Water System
- E. Section 33 30 00 – Sanitary Sewer System
- F. Section 33 41 00 – Storm Utility Drainage Piping
- G. Section 33 46 00 – Subdrainage

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation – Burlingame Community Center, Murray Engineers, Inc., July 2018.
- B. ASTM
 - 1. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 2. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity-Flow Applications.

- C. California Administrative Code, Title 24, Part 2 - Basic Building Regulations, Chapter 24, Excavations, Foundations, and Retaining Walls.
- D. Caltrans Standard Specifications, 2015
 - 1. Section 19, Earthwork
 - 2. Section 26, Aggregate Bases
 - 3. Section 68, Subsurface Drains
 - 4. Section 96, Geosynthetics
- E. CAL/OSHA, Title 8

1.4 DEFINITIONS

- A. AC: Asphalt Concrete
- B. ASTM: American Society for Testing and Materials
- C. Base: The layer placed between the subgrade and surface pavement in a paving system.
- D. Bedding: Material from bottom of trench to bottom of pipe
- E. CDF: Controlled Density Fill
- F. DIP: Ductile Iron Pipe
- G. Engineered Fill:
 - 1. Soil or soil-rock material approved by the Owner and transported to the site by the Contractor in order to raise grades or to backfill excavations.
 - 2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.
- H. Excavation: Consists of the removal of material encountered to subgrade elevations
- I. Initial Backfill: Material from bottom of pipe to 12 inches above top of pipe
- J. PCC: Portland Cement Concrete
- K. RCP: Reinforced Concrete Pipe
- L. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure ASTM D1557.
- M. Springline of Pipe: Imaginary line on surface of pipe at a vertical distance of ½ the outside diameter measured from the top or bottom of the pipe.
- N. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.
- O. Subsequent Backfill: Material from 12 inches above top of pipe to subgrade of surface material or subgrade of surface facility or to finish grade.

- P. Trench Excavation: Removal of material encountered above subgrade elevations and within horizontal trench dimensions.
 - 1. Authorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions as shown on plans or authorized by the Geotechnical Engineer.
 - 2. Unauthorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions without authorization by the Geotechnical Engineer. Unauthorized excavation shall be without additional compensation.

- Q. Utility Structures:
 - 1. Storm drainage manholes, catch basins, drop inlets, curb inlets, vaults, etc.
 - 2. Sanitary sewer manholes, vaults, etc.
 - 3. Water vaults, etc.

1.5 SUBMITTALS

- A. Follow submittal procedures outlined in Section 01 10 00 – Supplemental General Requirements.

- B. Test Reports: Submit the following report for import material directly to the Owner from the Contractor's testing services:
 - 1. Compaction test reports for aggregate base.

- C. Samples:
 - 1. If required by the Geotechnical Engineer, provide 20-pound samples of all imported trench bedding and backfill material sealed in airtight containers, tagged with source locations and suppliers of each proposed material. Do not import materials to Project without written approval of the Geotechnical Engineer and the Owner.
 - 2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Engineer and the Owner.

1.6 QUALITY ASSURANCE

- A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.

- B. Conform all work to the appropriate portion(s) of the Caltrans Standard Specifications, Section 19, Earthwork.

- C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.
[Use either Article D or E depending on whether the Owner or the Contractor will be performing the soil testing.]

- D. The Geotechnical Engineer will perform observations and tests required to enable him to form an opinion of the acceptability of the trench backfill. Correct the trench backfill that, in the opinion of the Geotechnical Engineer, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

1.7 PROJECT CONDITIONS

- A. Promptly notify the Owner of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless Contractor has notified the Owner in writing of differing conditions prior to contractor starting work on affected items.
- B. Barricade open excavations and post with warning lights.
 - 1. Operate warning lights and barricades as required.
 - 2. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.
 - 3. Protect open, trenches, and utility structure excavations with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.
- C. Stockpile on-site and imported backfill material temporarily in an orderly and safe manner.
- D. Provide dust and noise control in conformance with Section 01 10 00 Supplemental General Requirements.
- E. Environmental Requirements:
 - 1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.
 - 2. Protect existing streams, ditches and storm drain inlets during work on this project.
- F. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.
- G. Transport all excess soils materials by legally approved methods to disposal areas.
 - 1. Coordinate with the Engineer.
 - 2. Any additional fill requirements shall be the responsibility of the Contractor.

1.8 EXISTING UTILITIES

- A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.
 - 1. Locating of existing underground utilities shall include but not be limited to pot-holing prior to the start of construction.
- B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Owner and/or utility agency immediately for directions.
 - 1. Cooperate with the Owner and public and private utility companies in keeping their respective services and facilities in operation.
 - 2. Repair damaged utilities to the satisfaction of the agency with jurisdiction.
- C. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Import materials will be subject to approval of the Geotechnical Engineer.
- B. For approval of imported fill material, notify the Owner at least 7 days in advance of intention to import material.

2.2 PIPE BEDDING AND INITIAL BACKFILL

- A. ASTM D2321, Class IA, IB or II.
 - 1. Clean and free of clay, silt or organic matter.
- B. Permeable Material: In accordance with Section 68-2.02F of Caltrans Standard Specifications, Class 1, Type A or Class 2.
- C. Class 2 Aggregate Base: In accordance with Section 26 of Caltrans Standard Specifications, $\frac{3}{4}$ inch maximum.
- D. Sand: In accordance with Section 19-3.02F of Caltrans Standard Specifications.

2.3 SELECT BACKFILL

- A. Select backfill material shall be gravel, free of clay or organic matter and shall conform to the following gradation:

| Sieve Size | Percentage Passing |
|--------------------|--------------------|
| 1 inch | 100 |
| $\frac{3}{4}$ inch | 90 - 100 |
| No. 4 | 35 - 60 |
| No. 200 | 2 - 9 |

- B. For gas pipe and fuel piping select backfill shall be clean, graded building sand conforming to the following gradation:

| Sieve Size | Percentage Passing |
|------------|--------------------|
| No. 4 | 100 |
| No. 200 | 0 - 5 |

2.4 WARNING TAPE

- A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.
 - 1. Warning Tape Color Codes
 - a. Red: Electric
 - b. Yellow: Gas, Oil; Dangerous Materials
 - c. Orange: Telephone and Other Communications

- d. Blue: Water Systems
 - e. Green: Sewer Systems
 - f. White: Steam Systems
 - g. Gray: Compressed Air
- 2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.
 - 3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.5 DETECTION WIRE FOR NON-METALLIC PIPING

- A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

2.6 SUBSEQUENT BACKFILL

- A. Conform to on-site or imported structural backfill in Section 31 20 00, Earth Moving.

2.7 CONTROLLED DENSITY FILL (CDF) (IN TRENCHES)

- A. Provide non-structural CDF, from bottom of trench to finish subgrade of subbase or base material, that can be excavated by hand and produce unconfined compressive 28-day strengths from 50-psi to a maximum of 150-psi. Provide aggregate no larger than 3/8 inch top size. The 3/8 inch aggregate shall not comprise more than 30% of the total aggregate content.
- B. Cement: Conform to the standards as set forth in ASTM C150, Type II Cement.
- C. Fly Ash: Conform to the standards as set forth in ASTM C618, for Class F pozzolan. Do not inhibit the entrainment of air with the fly ash.
- D. Air Entraining Agent: Conform to the standards as set forth in ASTM C260.
- E. Aggregates need not meet the standards as set forth in ASTM C33. Any aggregate, producing performances characteristics described herein will be accepted for consideration. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.
- F. Provide CDF that is a mixture of cement, Class F pozzolan, aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.

- G. The Contractor shall determine the actual mix proportions of the controlled density fill to meet job site conditions, minimum and maximum strengths, and unit weight. Entrained air content shall be a minimum of 4.0%. The actual entrained air content shall be established for each 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.
- H. Mix design shall meet the Geotechnical Engineer's approval.

2.8 CONCRETE STRUCTURE BEDDING AND BACKFILL

- A. Precast Structures: Same materials to the same heights as specified for pipe bedding and backfill, or other material approved by the Geotechnical Engineer.
- B. Poured-in-Place Structures:
 - 1. Bedding: Bedding shall meet the approval of the Geotechnical Engineer. In general, bedding is not required, pour bases against undisturbed native earth in cut areas and against engineered fill compacted to 90% relative compaction in embankment areas.
 - 2. Side Backfill: On-site or imported structural fill meeting the requirements given in Section 31 20 00, Earth Moving.

2.9 GEOSYNTHETICS

- A. Filter Fabric:
 - 1. Filter Fabric: Section 96-1.02 of Caltrans Standard Specifications.
 - 2. Mirafi 140N, Mirafi Inc., or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the recommendations of the Geotechnical Engineer.
- B. Protect existing trees to remain. No grading is permitted under the drip line of protected trees.
- C. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.
- D. Unless otherwise indicated in the Plans, all excavation for pipelines shall be open cut.
- E. Prior to commencement of work, become thoroughly familiar with site conditions.
- F. In the event discrepancies are found, immediately notify the Owner in writing, indicating the nature and extent of differing conditions.
- G. Backfill excavations as promptly as work permits.
- H. Do not place engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the Owner.

- I. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
- J. In excavations, use satisfactory excavated or borrow material.
- K. Under grassed areas, use satisfactory excavated or borrow material.

3.2 SITE PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.

3.3 EXISTING UTILITIES

- A. Identify the location of existing utilities.
 - 1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Plans, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.
 - 2. The Contractor shall contact Underground Service Alert (USA) at 1-800-227-2600 for assistance in locating existing utilities.
 - 3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Owner to clear the utility.
- B. Protect all existing utilities to remain in operation.
- C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.
- D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
 - 1. Use hand or light equipment for excavating immediately adjacent to known utilities or for excavations exposing a utility or buried structure.
 - 2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
 - 3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
 - 4. Report damage of utility line or subsurface structures immediately to the Owner.
- E. Backfill trenches resulting from utility removal in lifts of 8 inches maximum.

3.4 TRENCH EXCAVATION

- A. General

1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.
 2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.
 3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.
 4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.
- B. Existing Paving and Concrete:
1. Existing pavement over trench shall be sawcut, removed, and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations.
 2. Existing concrete over the trench shall be sawcut to a full depth in straight lines, at a minimum distance of 12 inches beyond the edge of the trench, either parallel to the curb or a right angles to the alignment of the sidewalk.
 3. Boards or other suitable material shall be placed under equipment outrigging to prevent damage to paved surfaces.
- C. Trench Width:
1. The maximum allowable trench widths at the top of the all pipe materials outside diameter of barrel pipe plus 18 inches. shall be as follows:
 - a. The maximum trench width shall be inclusive of all shoring.
 - b. If the maximum trench width is exceeded, the State's representative may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.
 2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.
- D. Excavation Width at Springline of Pipe:
1. Up to a nominal pipe diameter of 24 inches: Minimum of twice the outside pipe diameter, or as otherwise allowed or required by the Geotechnical Engineer.
 2. Nominal pipe diameter of 30 inches through 36 inches: Minimum of the outside pipe diameter plus 2 feet, or as otherwise allowed or required by the Geotechnical Engineer.
 3. Nominal pipe diameter of 42 inches through 60 inches: Minimum of the outside pipe diameter plus 3 feet, or as otherwise allowed or required by the Geotechnical Engineer.
- E. Open Trench:
1. The maximum length of open trench shall be 300 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.
 2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.
 3. Excavate by hand or machine. For gravity systems begin excavation at the outlet end and proceed upstream. Excavate sides of the trench parallel and equal distant from the centerline of the pipe. Hand trim excavation. Remove loose matter.
 4. Excavation Depth for Bedding: Minimum of 6 inches below bottom of pipe or as otherwise allowed or required by the Geotechnical Engineer, except that bedding is not required for nominal pipe diameters of 2 inches or less.

5. Over-Excavations: Backfill trenches that have been excavated below bedding design subgrade, with approved bedding material.
 6. Where forming is required, excavate only as much material as necessary to permit placing and removal of forms.
 7. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.
- F. Excavated Material:
1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.
 2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.
 3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.5 CONTROL OF WATER AND DEWATERING

- A. Contractor attention is directed to Section 31 23 19, Dewatering.
- B. Be solely responsible for dewatering trenches and excavations and subsequent control of ground and surface water. Provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage to the satisfaction of the Geotechnical Engineer and the Owner until backfilling is completed.
- C. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.
- D. Obtain the Geotechnical Engineer's approval for proposed control of water and dewatering methods.
- E. Reroute surface water runoff away from open trenches and excavations. Do not allow water to accumulate in trenches and excavations.
- F. Maintain dewatering system in place until dewatering is no longer required.

3.6 BRACING AND SHORING

- A. Conform to California and Federal OSHA requirements.
- B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
- C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Geotechnical Engineer, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and

specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Owner.

- D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the line, grade, or backfill compaction or operation of the utility being installed or adjacent utilities and facilities.

3.7 PIPE BEDDING

- A. Obtain approval of bedding material from the Geotechnical Engineer.
- B. Accurately shape bedding material to the line and grade called for on the Plans. Carefully place and compact bedding material to the elevation of the bottom of the pipe in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of bedding material will not be permitted.
- C. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The State's inspector will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock as necessary.
- D. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing select backfill material. Sufficient select backfill material shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90 percent. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.8 BACKFILLING

- A. Initial Backfill:
 - 1. Obtain approval of backfill material from Geotechnical Engineer.
 - 2. Bring initial backfill up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Carefully place and compact initial backfill material to an elevation of 12 inches above the top of the pipe in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of initial backfill material will not be permitted.
- B. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.
- C. Subsequent Backfill:
 - 1. Above the level of initial backfill, the trench shall be backfilled with non-expansive native material from trench excavation or with imported select backfill material

(Contractor's option). Subsequent backfill shall be free of vegetable matter, stones or lumps exceeding 3 inches in greatest dimension, and other unsatisfactory material.

2. Bring subsequent backfill to subgrade or finish grade as indicated. Carefully place and compact subsequent backfill material to the proper elevation in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction, except that the upper 36 inches in areas subject to vehicular traffic shall be compacted to at least 95% relative compaction, unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of subsequent backfill material will not be permitted.
- D. Do not use compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive pipe displacement or damage the pipe. Jetting of trench backfill is not permitted.
 - E. Utility backfill shall be inspected and tested by the Geotechnical Engineer during placement. Cooperate with the Geotechnical Engineer and provide working space for such tests in operations. Backfill not compacted in accordance with these specifications shall be re-compacted or removed as necessary and replaced to meet the specified requirements, to the satisfaction of the Geotechnical Engineer and the Owner prior to proceeding with the Project.
 - F. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.9 CLEANUP

- A. Upon completion of utility earthwork all lines, manholes catch basins, inlets, water meter boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the Owner.

END OF SECTION

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SECTION 32 12 16 – ASPHALT PAVING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Hot Mix Asphalt
- B. Tack coat
- C. Hot Mix Asphalt paving
- D. Adjusting manholes, valves, monument covers and other structures to grade

1.2 RELATED SECTIONS

- A. Section 01 10 00, Supplemental General Requirements
- B. Section 31 20 00, Earth Moving
- C. Section 32 11 00, Pavement Base Course

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation – Burlingame Community Center, Murray Engineers, Inc., July 2018.
- B. ASTM
 - 1. D979: Standard Practice for Sampling Bituminous Paving Mixtures
 - 2. D1188: Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
 - 3. D2041: Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
 - 4. D2726: Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
 - 5. D2950: Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
 - 6. D3549: Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
- C. Caltrans Standard Specifications, 2015
 - 1. Section 20: Landscape
 - 2. Section 39: Asphalt Concrete
 - 3. Section 88: Engineering Fabrics
 - 4. Section 92: Asphalt Binder
 - 5. Section 94: Asphaltic Emulsions
 - 6. Section 96: Geosynthetics

1.4 DEFINITIONS

- A. ASTM: American Society for Testing Materials.
- B. Caltrans: State of California, Department of Transportation

1.5 QUALITY ASSURANCE

- A. Testing Agency: Owner's Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Thickness of hot mix asphalt: In-place compacted thickness of asphalt courses will be determined according to ASTM D3549.
- D. Surface Smoothness: Finished surface of each asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D979.
 - 1. Reference maximum theoretical density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement may be determined by testing core samples according to ASTM D1188 or ASTM D2726.
 - a. One core sample may be taken for every 1000 square yard or less of installed pavement, but in no case will fewer than 3 cores be taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726.

1.6 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Job-Mix Designs: Certificates signed by manufacturers certifying that each hot mix asphalt mix complies with requirements.
- C. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations:
 - 1. Tack Coat: Minimum surface temperature of 60 F at application.

2. Asphalt Base Course: Minimum surface temperature of 40 F and rising at application.
3. Asphalt Surface Course: Minimum surface temperature of 60 F at application.
4. Reinforcing Fabric: Air temperature is 50 F and rising and pavement temperature is 40 F and rising.

PART 2 - PRODUCTS

2.1 HOT MIX ASPHALT

- A. Type A In accordance with Caltrans Standard Specifications Section 39-2, Hot Mix Asphalt.
- B. Hot Mix Asphalt Materials:
 1. Asphalt Binder: Grade PG 64-10 in accordance with Caltrans Standard Specification Section 92, Asphalt Binders.
 2. Tack Coat: Grade SS1 in accordance with Caltrans Standard Specification Section 94, Asphaltic Emulsions.
- C. Aggregates: 3/4 inch max gradation for virgin aggregate and recycled asphalt pavement (RAP) in accordance with to Caltrans Standard Specification Section 39-2.02, Type A Hot Mix Asphalt.
- D. Geosynthetic Pavement Interlayer: Paving Fabric in accordance with Caltrans Standard Specification Section 96, Geosynthetics.
- E. Soil Sterilant: In accordance with Caltrans Standard Specifications Section 20-5.03, Inert Ground Covers and Mulches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
- B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.
- C. If necessary, perform subgrade preparation or remediation in accordance with Section 31 20 00, Earth Moving.
- D. Notify Owner in writing of any unsatisfactory conditions. Do not begin paving until these conditions have been satisfactorily corrected.

3.2 SOIL STERILANT

- A. Furnish and apply to areas per manufacturer's specifications.

3.3 SURFACE PREPARATION FOR AGGREGATE BASE MATERIALS

- A. General: Immediately before placing asphalt materials remove loose and deleterious material from substrate surfaces and ensure that prepared subgrade is ready to receive

paving in accordance with Caltrans Standard Specification Section 39-2.01C(3)(b) and in accordance with Section 32 11 00, Pavement Base Course.

- B. Tack Coat: Apply uniformly and at specified rates between HMA layers, to vertical surfaces of curbs, gutters and construction joints, and to existing pavement, including planed surfaces, in accordance with Caltrans Standard Specification Section 39-2.01C(3)(f).
 - 1. Allow tack coat to cure undisturbed before paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 GEOSYNTHETIC PAVEMENT INTERLAYER

- A. Place geosynthetic pavement interlayer in accordance with Caltrans Standard Specification Section 39-2.01C(3)g.

3.5 HOT MIX ASPHALT SPREADING AND COMPACTING EQUIPMENT

- A. Provide spreading and compacting equipment in accordance with Caltrans Standard Specification Section 39-2.01C(2).

3.6 HOT MIX ASPHALT PLACEMENT

- A. Place, spread and compact hot mix asphalt to required grade, cross section, and thickness in accordance with Caltrans Standard Specification Sections 39-2.01C(2), 39-2.01C(3), and 39-2.01C(8).
- B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

- A. Construct joints to ensure continuous bond between adjoining paving sections in accordance with Caltrans Standard Specification Sections 39-2.01C(4)
 - 1. Construct joints free of depressions with same texture and smoothness as other sections of asphalt course.
 - 2. Clean contact surfaces and apply tack coat.
 - 3. Offset longitudinal joints in successive courses a minimum of 6 inches.
 - 4. Offset transverse joints in successive courses a minimum of 24 inches.
 - 5. Compact joints as soon as hot mix asphalt will bear roller weight without excessive displacement.

3.8 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact in accordance with Caltrans Standard Specification Sections 39-2.01C(2).
- B. Compaction Requirements: See Geotechnical Report, “Compaction” section.

- C. Finish Rolling: Finish roll paved surfaces to remove roller marks while asphalt is still warm.
- D. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method.
- E. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh asphalt. Compact by rolling to specified density and surface smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 ADJUSTING MANHOLES, VALVES, MONUMENT COVERS AND OTHER STRUCTURES TO GRADE

- A. Remove pavement, using vertical cuts, as needed to remove frame and provide for concrete collar. Do not damage adjacent pavement.
 - 1. Circular Covers: Cut circle with radius 6 inches larger than cover and concentric with cover.
 - 2. Rectangular Covers: Cut rectangle 6 inches larger than cover on all sides.
- B. Install grade rings or blocking as needed to raise cover to finish grade.
- C. Pour concrete collar:
 - 1. Bottom of Collar: Top of existing collar or 6 inches below top of proposed collar, whichever is at a higher elevation.
 - 2. Top of Collar: Bottom of existing asphalt pavement.
 - 3. Apply tack coat to all exposed surfaces.
 - 4. Fill excavation with hot mix asphalt and, while still hot, compact flush with adjacent surface.

3.10 INSTALLATION TOLERANCES

- A. Hot Mix Asphalt Pavement:
 - 1. Course thickness and surface smoothness shall be in accordance with Caltrans Standard Specification Section 39-2.01A(4)(i)(iii)
 - 2. Total Thickness: Not less than indicated.
- B. Trench Patch:
 - 1. Compacted surface: Within 0.01 foot of adjacent pavement.
 - 2. Do not create ponding.

END OF SECTION

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SECTION 32 1312 – SITE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide Portland cement concrete site work complete, including the following principal items:
 - 1. Footings for posts and structures.
 - 2. Standard cast-in-place concrete paving
- B. Related requirements specified elsewhere include:
 - 1. Section 31 2000, Earth Moving
 - 2. Section 31 1100, Pavement Course
 - 3. Section 32 1313, Concrete Pavement

1.2 QUALITY ASSURANCE

- A. Reference and Standards
 - 1. Soils Reports: Reports of geotechnical investigations by Murray Engineers, Inc., dated June 2018.
 - 2. Perform work in accordance with all applicable laws, codes and regulations required by City of Burlingame.
 - 3. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
 - 4. The American Concrete Institute (ACI): "Manual of Concrete Practice," Parts 1, 2 and 3.
 - 5. The American Concrete Institute (ACI): "Recommended Practice for Concrete Formwork" (ACI 347R)
 - 6. The American Concrete Institute (ACI): "Hot Weather Concreting", 305R-99
 - 7. The American Concrete Institute (ACI): Guide for Concrete Slab construction, 302.1R-07
 - 8. The American Concrete Institute (ACI): "Standard Specification for Cold Weather Concreting, 306.1-90 (R2002)
 - 9. United States Voluntary Product Standard for Construction & Industrial Plywood (PS 1-95).
 - 10. American Plywood Association's "Guide to Plywood Grades" (APA).
 - 11. West Coast Lumber Inspection Bureau's "Standard Grading Rules No. 17" (WCLIB)
 - 12. Concrete Reinforcing Steel Institute (CRSI): "Manual of Standard Practice" and "Recommended Practice for Placing Reinforcing Bars".
 - 13. American Welding Society: AWS A5.1 and AWS D1.1 and D1.2.
 - 14. Americans with Disabilities Act (ADA), Federal ADA/State of California Title 24 Standards.
 - 15. California Code of Regulations, Title 24, 2010 Edition, also known as California Building Code (CBC).
- B. Stipulations
 - 1. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.
 - 2. At no point shall paving surface fail to drain.

3. Finish Concrete Surface Slip Resistance: Shall have a minimum slip resistance coefficient of 0.65 on concrete pavement with less than 5% slope and 0.8 on concrete pavement with more than 5% slope.
4. Contractor shall pour adjacent slabs in a way that does not impact finish quality or construction (expansion) joint dimensional stability.
- C. Conform to ACI 318, Section 5.13 during hot weather and to ACI 318, Section 5.12 during cold weather.
- D. Requirements of ACI 318 shall govern work, materials and equipment related to this Section; specifications herein set minimum results required, and references to procedures are intended to establish minimal guides.
- E. The Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements. Contractor shall confirm that site soils do not contain elevated levels of sulfate that would require sulfate resistant concrete as outlined in Table 4.3.1 of the ACI 318 Building Code or Table 19B-A-3 of the Uniform Building Code. If the site soils contain elevated levels of sulfate, it is the Contractor's responsibility to request mixes that meet the aforementioned requirements.
- F. Placing of concrete by means of pumping will be an acceptable method of placement providing that the Contractor can demonstrate that:
 1. Specified concrete strengths will be met.
 2. Equipment has a record of satisfactory performance under similar conditions and using a similar mix.
 3. Trial batches have been successfully made.
- G. Installer Qualifications: Concrete work shall be by firm with 5 years experience with work of similar scope and quality.
- H. Formwork Design Criteria: Formwork shall conform to ACI 318, Section 6.1 and CBC Section 1906A.
 1. Formwork:
 - a. Shall prevent leakage or washing out of cement mortar.
 - b. Shall resist spread, shifting, and settling.
 - c. Shall reproduce accurately required lines, grades and surfaces within tolerances specified.
 2. Safety: The Contractor shall be responsible for adequate strength and safety of all formwork including falsework and shoring.
 3. Formwork allowable tolerances: Formwork shall produce concrete within tolerance limits recommended in ACI 318, Section 6.1, unless otherwise noted.

1.3 TESTS

- A. The Owner will select a qualified testing laboratory to take samples for testing during the course of the work as considered necessary. Costs for such tests will be paid by the Owner. Contractor shall cooperate in arranging tests and shall be responsible for notifying the designated laboratory in sufficient time to allow taking of samples at time of pour.
- B. Should tests show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Owner. Full cost of removal of low strength concrete, its replacement with concrete of proper specified strength and testing, shall be borne by Contractor.

1.4 COORDINATION

- A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in the concrete and for the provision of holes, openings, etc., necessary to the execution of the work of the trades.
- 1.5 SUBMITTALS, per Section 01 3300.
- A. Samples of all materials under this Division shall be supplied for testing as requested by the Owner.
 - B. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements.
 - C. Submit color additive manufacturer's color chart and sample chip(s), indicate color additive number and required dosage rate.
 - D. Submit two full-scale mock-up (minimum 4' by 4') sample panels of all concrete finishes and color. The samples shall include curing compound if any is to be used, and include an expansion joint and a score joint, as indicated on the Drawings. Approved samples shall be kept at the job site to serve as a prerequisite for all finishes until acceptance of the Work.
- 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Supply ready mixed concrete throughout. Batch, mix and transport in accordance with ASTM C-94, "Specifications for Ready Mixed Concrete."
 - B. Mix and deliver concrete in quantities that will permit immediate use only.
 - C. Indiscriminate addition of water for any reason will be cause for rejection of the load.
- 1.7 LEED REQUIREMENTS
- A. Cast-in-place concrete shall contain a minimum of fly ash by weight as indicated in concrete mix design.
- 1.8 LEED SUBMITTALS
- A. Submit certification in a letter indicating percentages by weight of fly ash content for cast-in-place concrete.
 - B. Submit product data highlighting percentages by weight of fly ash content for cast-in-place concrete.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Cement and aggregates shall have proven history of successful use with one another. Sources of cement and aggregate shall remain unchanged throughout work.
- B. Mixes:
 - 1. Ready-mixed concrete shall meet requirements of ASTM C94.
 - 2. The Contractor shall perform tests or assemble the necessary data indicating conformance with specifications.
 - 3. For each mix, submit data showing that proposed mix will attain the required strength in accordance with requirements of Caltrans Standard Specifications, Section 90.
 - 4. Instruct Laboratory to base mix design on use of materials specified and approved by the Owner's Representative.
 - 5. Mix design shall include compression strength test reports per CBC Section 1905A.6.3.

6. Insure mix designs will produce concrete to strengths specified and of uniform density without segregation.
 7. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard, without changing cement content.
 8. Introduction of calcium chloride will not be permitted.
 9. Mix design shall be in accordance with CBC Section 1905A.3.
- C. Concrete Types (See Drawings for any other miscellaneous items not listed below):

| Type | 28-Day Strength | Aggregate Size | Finish & color | Comments |
|---------------|-----------------|----------------|----------------|----------|
| Slab on grade | 3,000 | 1" X #4 | See Drawings | |
| Seat Walls | 3,000 | 1/2" X 1/4" | See Drawings | |
| Curb & Gutter | 3,000 | 1" X #4 | See Drawings | |

2.2 FORMWORK MATERIALS

- A. Curbs may be formed with approved metal form systems.
- B. Chamfer Strips: Meadow-Burke Concrete Accessories, PVC type CSF ½-inch or as otherwise shown, all exposed corners.
- C. Form Release Agent: Must not stain or otherwise adversely affect architectural concrete surfaces. “Nox-Crete Form Coating”; Industrial Synthetics Corp.’s “Synthex”; or equal.
- D. Form Ties: Burke "Penta-Tie," or equal, cone and rod type with 1-inch break-back.

2.3 REINFORCING MATERIALS

- A. New, free of rust, Billet steel bars: Current ASTM designation A615.
- B. Bar Reinforcement: ASTM A615.
 1. #3 and smaller: Grade 40.
 2. #4 and larger: Grade 60.
 3. Tie wire: #6 minimum, black and annealed.
- C. Bar Reinforcement recycled content shall be a minimum of 75% recycled post-consumer steel.
- D. Wire Fabric Reinforcement: ASTM A185. Size (6" by 6" / W1.4 By W1.4 (#10 ga. by #10 ga.)
- E. All reinforcing steel, bolts anchors, sleeves, etc. shall be securely anchored in place before concrete is placed. All reinforcing details, fabrication and installation shall conform to ACI Standard 315, latest edition, except as noted. Stagger all splices where practical and not otherwise detailed. Minimum concrete protection for reinforcement shall be as follows unless otherwise noted:
 1. 3" clearance where concrete is placed against the earth.
 2. 2" clearance where concrete is exposed to earth but placed in forms.
- F. Accessories: Metal and plaster spacers, supports, ties, etc. as required for spacing, assembling and supporting reinforcing in place. Legs of accessories to be of type that will rest on forms without embedding into forms. Galvanized metal items where exposed to moisture, or use other approved non-corrodible, non-staining supports.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type II, except if water or soil is high in sulfates use Type V Portland Cement as described above under Quality Assurance. Use one brand of cement throughout project.

- B. Fly Ash: ASTM C618,08A.
- C. Aggregates: ASTM C33, materials from established sources with proven history of successful use in producing concrete with minimum shrinkage.
- D. Water: Clear and potable, free from deleterious impurities.
- E. Admixtures:
 - 1. Admixtures are optional; however, a water reducer or plasticizing admixture shall be included in the concrete mix and it must be compatible with color pigments where color pigments are required. Any proposed admixture shall comply with ASTM C494.
 - 2. Where more than one admixture is proposed, include statement from admixture manufacturer indicating that admixtures proposed for use are compatible, such that desirable effects of each admixture will be realized.
 - 3. Accelerating admixtures and admixtures containing more than 0.05 percent chloride ions are not permitted. If an accelerator is used, it shall be a non-chloride accelerator.
 - 4. Liquid admixtures shall be considered part of the total water.
 - 5. Refer to Color Additives/Pigments herein for color admixtures.
- F. Color Additives/Pigments:
 - 1. Color additives containing carbon black are not acceptable

2.5 CONCRETE MIXES

- A. Concrete mixes shall be approved and shall be in accordance with Caltrans Standard Specifications Section 90. Unless otherwise noted, mix shall contain not less than 590 pounds of cementitious material per cubic yard (Class "2", 3,000 psi,) Type II Portland cement and a maximum aggregate blend of 1" by #4.
- B. Cementitious Material: An intimate blend of type II Portland cement and fly ash. Cementitious material shall include 15% maximum fly ash by weight unless the strength is specified to be achieved on 7 or 14 days.
- C. Lampblack: As supplied by batch plant for plain non-colored concrete work. Concrete for non-colored pavements shall be darkened by the addition of lampblack at the mixer. The proportion of lampblack or other approved colorant shall be that required to properly darken the concrete to reduce glare, and shall be subject to the approval of the Owner's Representative. Provide $\frac{3}{4}$ pound of lampblack per cubic yard of concrete unless required otherwise.

2.6 ANCILLARY MATERIALS

- A. Aggregate Base: Crushed aggregate, R-78 minimum, 3/4-inch maximum, conforming to Standard Specification 26.1.02A, Class 2.
- B. Expansion Joint Material
 - 1. Fiber Expansion Joint: A non-extruding resilient filler, saturated with high quality bituminous materials having preserving characteristics. Conform to ASTM-D1751-04.
 - 2. Caulked Expansion Joint: "Sonolastic Sealant Two-Part" as manufactured by Sonneborn-Contech, Building Products Division, Contech, Inc.; or approved equal. Joint caps or bond breaker tape to be as recommended by sealant manufacturer.
- C. Curing Materials for non-colored Concrete:
 - 1. Waterproof Paper: ASTM C171, Type 1.1.1.1, regular. Same as Sisalkraft Division of St. Regis Paper Co.'s "Orange Label", or equivalent.
 - 2. Impervious sheeting: 4 mil white polyethylene laminated to 10 oz. Burlap, ASTM C171, Type 1.1.3, fungus-resistant.

3. Curing Compound: ASTM C309. Product: Sealtight 1100 Clear-Series by WR Meadows, Burke Azua Resin Cure by Edocol, or equal that will not discolor concrete or affect bonding of other finishes applied thereafter, and which restricts loss of water to not more than 0.500 grams per sq. centimeter of surface when tested per ASTM C156, "Test Method for Water Retention by Concrete Curing Materials."
- D. Curing Compound for Colored Concrete: Water-base acrylic type, free of permanent color, oil or wax, complying with ASTM C309: "W 1000" by Davis Colors, Los Angeles, CA (800) 356-4848; "Cureseal" semi-gloss by L.M. Scofield Co., Los Angeles, CA (800) 800-9900; or equal.
- E. Grout: Premixed high strength non-shrink grout requiring only addition of water at the site. Burke's "Non-Ferrous, Non-Shrink Grout"; Master Builders "Masterflow 928 Grout", or equal.
- F. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand. Provide integrally colored patching mortar as required to match color and finish of colored concrete surfaces.

2.7 PERMEABLE DRAIN ROCK

- A. Permeable drain rock used in subsurface drain installations to be Class 2 permeable material in conformance with Section 68 "Subsurface Drains" of the Standard Specifications; gradation to 3/4" maximum size. Submit Sample for approval.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all concrete work true to line and grade as indicated on the drawings.
- B. Correct irregularities to the satisfaction of the Owner's Representative.
- C. Plain non-colored, exposed concrete shall contain lampblack, approximately 3/4 pound of lampblack per cubic yard, as accepted by Owner's Representative.
- D. The intent of the Grading Drawings is to provide positive drainage and to maintain slopes on walkways as required by the Americans with Disabilities act and California Title 24 throughout the project site. Notify the Owner's Representative immediately of any discrepancies between the Drawings and actual field conditions and/or conflicts between the design and Code requirements.

3.2 PREPARATION

- A. Examine subgrades and installation conditions. Do not start concrete work until unsatisfactory conditions are corrected.
- B. Provide subgrade preparation and the base material installation complete, including clearing, grading, excavation, filling and dewatering. Take every precaution to obtain a subgrade of uniform bearing power compacted to a minimum of 95% relative compaction as determined by the ASTM D1557 laboratory test procedure and in Sections 19 and 20 of the Caltrans Standard Specifications.
- C. Subgrade shall be kept moist and shall not be allowed to dry out before placement of concrete. Place no material on muddy subgrade. Remove un-compactable material and replace with clean fill and compact as required.
- D. Aggregate base, where indicated, shall be placed and compacted in conformance with Caltrans Standard Specifications 26-1.04 and 26-1.05.
- E. Obtain approval of subgrade from Owner's Representative prior to placing steel and concrete.

3.3 FORMS

- A. Forms shall be constructed in accordance with ACI 318, Section 6.1 and shall be of sufficient strength and sufficiently tight to prevent visible distortion or leakage of mortar and fines.
- B. Forms for exposed surfaces shall be constructed to protect intended finish. Deflection of facing material between studs shall not exceed 0.0025 of the span. Facing material and pattern of joints shall be as approved by the Owner's Representative.
- C. For vertical surface of wall footings below grade, clean cut trench may be used in lieu of form if character of soil will permit installation without sluffing and width of concrete is increased at least 1 inch beyond indicated dimension of each face poured against earth.
- D. Curb and pavement edge forms shall extend full depth of concrete and shall be coordinated with installation of planting root barriers where required. Curves shall be formed with flexible metal or wood made up of thin laminations. Curve forms shall extend one stake space straight beyond tangent point. Where curbs and pavement are adjacent to areas to receive root barriers, provide smooth uniform edges. Remove any excess concrete as required to allow installation of root barriers without gaps between curbs and/or pavement and barriers.
- E. Maintain forms within the following tolerances.
 - 1. Top of Form: Plus or minus 1/8 inch in 10 feet and no abrupt variations; at required elevation to plus 3/8 inch.
 - 2. Face of Form: Plus or minus 1/4 inch in 10 feet longitudinal and no abrupt variations; perpendicular to surface plus or minus 1/8 inch.
- F. Form Ties: Align form ties as accepted by Owner's Representative. Obtain approval of form work from Owner's Representative prior to placing concrete.
- G. Forms may be reused upon cleaning and coating with parting compound to ensure separation from concrete without damage.
- H. After concrete is placed, the following minimum times shall elapse before removal of forms.
 - 1. Footing sides: 24 hours.
 - 2. Curbs: 1 hour

3.4 REINFORCEMENT

- A. All concrete footings, walls, grade-beams shall be steel reinforced unless specifically noted to be "not reinforced." If no reinforcement is shown, reinforce in same manner as that shown in similar places or as accepted by Owner's Representative.
- B. Fabricate and place reinforcement as indicated on the Drawings and in accordance with ACI "Detailing Manual" SP-66. No reinforcement shall be placed prior to distribution of the approved shop drawings.
- C. Secure reinforcement in position by suitable supports and by wiring at intersections with tie wire. Supports shall be of sufficient number and strength to resist crushing or displacement under full load. Metal shall not extend to surface of concrete.
- D. At time of placing concrete, reinforcing shall be free of excessive rust, mill scale, or other bond reducing matter. Immediately before placing concrete, check and adjust position, support and anchorage.

3.5 CLEANING, PATCHING AND DEFECTIVE WORK

- A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing, mismatched color, or is otherwise defective, and, in the Owner's Representative's judgment, these defects impair proper strength or appearance of the

work, the Owner's Representative will require its removal and replacement at the Contractor's expense.

- B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, etc., with patching mortar colored and textured to match concrete. Remove ledges and bulges.
- C. Compact mortar into place and neatly file defective surfaces to produce level, true planes. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.
- D. Rock Pockets:
 - 1. Cut out to full solid surface and form key.
 - 2. Thoroughly wet before casting mortar.
 - 3. Where the Owner's Representative deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid surface, and replace.
- E. Cleaning
 - 1. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds, if permitted and other materials employed in work of concreting that would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
 - 2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

3.6 MIXING AND PLACING CONCRETE

- A. Conform to applicable requirements set forth in Caltrans Standard Specifications Section 51-1.09 and Section 90.
- B. Mixes for integrally colored concrete shall have pigment added early enough to ensure complete dispersal and uniform color, but not less than 15 minutes before placing.

3.7 JOINTS AND GROOVES IN FLAT WORK

- A. Plane of joints shall be perpendicular to surface. Where new pavements join existing, joints shall align.
- B. Sawn Contraction Joints:
 - 1. General: Provide where shown. Saw cut straight, true, and uniform, 1/8 -inch and not less than 1/4 of slab thickness in depth, unless otherwise noted. Cut with a power saw fitted with a diamond blade.
 - 2. Commence saw cutting operations after concrete has cured long enough to resist damage by the saw cutting operations and early enough to avoid random contraction cracks.
 - 3. Contractor shall coordinate form removal and sequencing of adjacent concrete placement to minimize unnecessary saw cutting of adjacent surfaces.
 - 4. Contractor shall plan for the use of varying types of saw cutting apparatus to provide acceptable finishes in areas limited in accessibility.
 - 5. Fill saw cut over-runs and inadvertent saw cutting of adjacent surfaces with cement mortar to match color and finish of sawn pavement.
 - 6. If the joint pattern is not shown, provide joints not exceeding 6 feet in either direction and located to conform to column centerlines, wall corners, etc. as accepted by Owner's Representative.
- C. Tooled Joints / Score Joints

1. Form joints in fresh concrete using a jointer to cut the groove so that a smooth, uniform impression is obtained to 1/4 depth of pavement unless shown otherwise.
 2. All joints shall be struck before and after brooming. Tool concrete both sides of joint.
 3. If joint pattern is not shown, provide joints not exceeding 6 feet in either direction and located to conform to column centerlines, wall corners, etc. as accepted by Owner's Representative.
- D. Expansion Joints in Flat Work: Provided at the location and intervals as shown on the drawings, and at all locations where concrete paving abuts buildings, curbs, walls, columns, or other structures, and not more than 20 feet on center. Specified and shown joint material shall be placed with top edge 1/8" below the paved surface and shall be securely held in place to prevent movement. Joint and other edges shall be formed in the fresh concrete using an edging tool to provide a smooth uniform impression. All edges shall be struck before and after brooming.
- E. Sealed Joints: After the curing period, expansion joints shall be carefully cleaned and filled with approved joint sealant to just below adjacent paved surface in such a manner as to avoid spilling on paved surfaces or overflowing from joint.

3.8 FINISHING

- A. Flatwork and Curbs
1. Surface Finishes
 - a. Float Finish (typical preliminary finishing for slabs to receive other finishes): The surface of the slab shall be screeded and all surface water and laitance removed. Floating shall be started as soon as the screeded surface has stiffened sufficiently. Floating shall be performed by hand using a wood float and shall be the minimum necessary to produce a relatively smooth, level, even-textured surface.
 - b. Light - Medium Broom Finish: Obtain by drawing a stiff bristled broom across a floated finish for a nonslip surface. Perform brooming while concrete is still wet enough to receive broom marks to match approved sample. Direction of brooming to be perpendicular to direction of work or as otherwise shown on the drawings.
 - c. Sand Finish: Washed and finish shall be achieved by rubbing with bristle brush and flooding surface so that concrete fines are exposed slightly and resultant surface is similar to medium grit sandpaper.
 - d. Steel Trowel Finish: After surface water disappears and floated surfaces sufficiently hardened, steel trowel and retrowel to smooth surface. After concrete has set enough to ring trowel, retrowel to a smooth uniform finish free of trowel marks or other blemishes. Avoid excessive troweling that produces burnished areas.
 - e. Abrasive Finish: tamp and float concrete under normal installation procedures. While concrete is still in a plastic state, evenly dispense specified Abrasive Grains over surface at the rate of 1/4 lb. per square foot. Care-fully tamp and float in Abrasive Grains to depress grains into concrete, but do not cover grains. Allow concrete to set and cure thoroughly under normal procedure.

3.9 CURING

- A. Cure non-colored exposed concrete in accordance with Caltrans Standard Specifications Section 90-7.
- B. Cure colored exposed concrete using Curing Compound for Colored Concrete as specified herein.
- C. When applying Curing Compound, apply after initial set of fresh concrete when bleed water has evaporated from surface using a “Hudson-type” airless sprayer in accordance with manufacturer’s specifications.
- D. Only water or curing compounds which impart no permanent color or gloss shall be used for curing concrete.

3.10 CLEANUP: Per Section 01 7700.

END OF SECTION

SECTION 32 13 13 – CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnishing, placing, spreading, compacting and shaping portland cement concrete pavement with undoweled transverse weakened plane joints, for vehicular traffic.
- B. Form construction and use in placing portland cement concrete pavement.
- C. Joints for portland cement concrete pavement.
- D. Finishing portland cement concrete pavement.
- E. Curing and protecting portland cement concrete pavement.

1.2 RELATED SECTIONS

- A. 01 10 00, Supplemental General Requirements
- B. 31 20 00, Earth Moving
- C. 32 11 00, Pavement Base Course
- D. 32 13 18, Cement and Concrete for Exterior Improvements

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation report titled “Geotechnical Investigation, Burlingame Community Center, 850 Burlingame Avenue, Burlingame, California” prepared by Murray Engineers, Inc. dated July 2018.
- B. AASHTO Standard Specifications
 - 1. T132: Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars
- C. ASTM Standards
 - 1. D36: Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
 - 2. A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 3. A706: Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
 - 4. A775: Standard Specification for Epoxy Coated Steel Reinforcing Bars.
 - 5. A934: Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
 - 6. A996: Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
 - 7. C94: Standard Specification for Ready-Mixed Concrete

8. C603: Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants
9. C639: Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants
10. C661: Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
11. C679: ASTM C679-15 Standard Test Method for Tack-Free Time of Elastomeric Sealants
12. C719: Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
13. C793: Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
14. C881: Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
15. D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
16. D1640: Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings
17. D2628: Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
18. D2835: Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements.
19. D3963: Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
20. D6690: Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

D. Caltrans Standard Specifications, 2015

1. Section 10, General
2. Section 40, Concrete Pavement
3. Section 52, Reinforcement
4. Section 95, Epoxy

E. Caltrans Standard Plans:

1. Plan P1: Jointed Plan Concrete Pavement – New Construction
2. Plan P10: Concrete Pavement Dowel Bar Details

1.4 DEFINITIONS

- A. AASHTO: American Association of State Highway and Transportation Officials
- B. ASTM: American Society for Testing and Materials
- C. Caltrans: State of California, Department of Transportation

1.5 QUALITY ASSURANCE

- A. Testing Agency: Owner’s Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
- D. Installer Qualification: An experienced installer who has completed pavement work similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

1.6 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.
- C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements.
 1. Cementitious materials and aggregates
 2. Steel reinforcement and reinforcement accessories
 3. Admixtures
 4. Curing compound
 5. Applied finish material
 6. Bonding agent of adhesive
 7. Joint filler
 8. Joint Sealant
 9. Tie Bars
 10. Epoxy
 11. Backer Rods

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

- A. In accordance with Section 32 13 18, Cement and Concrete for Exterior Improvements.

2.2 BASE MATERIAL

- A. In accordance with Section 32 11 00, Pavement Base Course.

2.3 TIE BARS

- A. Deformed reinforcing steel bars conforming to the requirements of ASTM Designation A615, Grade 40 or 60
- B. Epoxy-coat in accordance with Caltrans Standard Specification Section 52-2.02, Epoxy-Coated Reinforcement, except bars must comply with ASTM A706; ASTM A996; or ASTM A615, Grade 40 or 60.
- C. Do not bend tie bars.

2.4 EPOXY

- A. Bond tie bars to existing concrete with epoxy resin in accordance with Caltrans Standard Specification Section 95-1.02D, Epoxy Adhesive for Bonding Freshly Mixed Concrete to Hardened Concrete.

2.5 SILICONE JOINT SEALANT

- A. Furnish low modulus silicone joint sealant in a one-part silicone formulation. Do not use acid cure sealants. Compound to be compatible with the surface to which it is applied and conform to the following requirements:

| Specification | Test Method | Requirement |
|---|--------------------|--|
| Tensile stress, 150% elongation, 7-day cure at 77°± 1°F and 45% to 55% Relative Humidity | ASTM D412 (Die C) | 45 psi max. |
| Flow at 77° ± 1°F | ASTM C639a | Shall not flow from channel |
| Extrusion Rate at 77° ± 1°F | ASTM C603b | 75-250 g per min. |
| Specific Gravity | ASTM D792 Method A | 1.01 to 1.51 |
| Durometer Hardness, at 0°F, Shore A, cured 7 days at 77° ± 1°F | ASTM C661 | 10 to 25 |
| Ozone and Ultraviolet Resistance, after 5000 hours | ASTM C793 | No chalking, cracking or bond loss |
| Tack free at 77° ± 1°F and 45% to 55% Relative Humidity | ASTM C679 | Less than 75 minutes |
| Elongation, 7 day cure at 77° ± 1°F and 45% to 55% Relative Humidity | ASTM D412 (Die C) | 500 percent min. |
| Set to Touch, at 77° ± 1°F and 45% to 55% Relative Humidity | ASTM D1640 | Less than 75 minutes |
| Shelf Life, from date of shipment | — | 6 months min. |
| Bond, to concrete mortar-concrete briquets, air cured 7 days at 77° ± 1°F | AASHTO T132c | 50 psi min. |
| Movement Capability and Adhesion, 100% extension at 0°F after air cured 7 days at 77° ± 1°F, and followed by 7 days in water at 77° ± 1°F | ASTM C719d | No adhesive or cohesive failure after 5 cycles |

Notes:

- a. ASTM Designation: C639 Modified (15 percent slope channel A).
- b. ASTM Designation: C603, through 1/8 inches opening at 50 psi.
- c. Mold briquets in conformance with the requirements in AASHTO Designation: T132, sawed in half and bonded with a 1/16 inches maximum thickness of sealant and tested in conformance with the requirements in AASHTO Designation: T132. Briquets shall be dried to constant mass at 212 ± 10°F.
- d. Movement Capability and Adhesion: Prepare 12 inch x 1 inch x 3 inch concrete blocks in conformance with the requirements in ASTM Designation: C719. A sawed face shall be used for bond surface. Seal 2 inch of block leaving 1/2 inches on each end of specimen unsealed. The depth of sealant shall be 3/8 inches and the width 1/2 inches.

B. Formulate the silicon joint sealant to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

C. Furnish to the Owner's Representative a Certificate of Compliance. Accompany certificate with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. Provide the certificate and accompanying test report for each lot of silicone joint sealant prior to use on the project.

2.6 ASPHALT RUBBER JOINT SEALANT

A. Conform to the requirements of ASTM Designation: D6690 as modified herein or to the following:

1. Provide a mixture of paving asphalt and ground rubber. Ground rubber to be vulcanized or a combination of vulcanized and de-vulcanized materials ground so

- that 100 percent will pass a No. 08 sieve and contain not less than 22 percent ground rubber, by mass. Modifiers may be used to facilitate blending.
2. The Ring and Ball softening point shall be 135°F minimum, when tested in conformance with the requirements in ASTM D36.
 3. Provide asphalt rubber sealant material capable of being melted and applied to cracks and joints at temperatures below 400°F.
- B. The penetration requirements of Section 4.2 of ASTM Designation: D6690 do not apply. The required penetration at 77°F, 5 oz, 5s, shall not exceed 120.
- C. The resilience requirements of Section 4.5 of ASTM Designation: D6690 do not apply. The required resilience, when tested at 77°F, shall have a minimum of 50 percent recovery.
- D. Accompany each lot of asphalt rubber joint sealant shipped to the job site, whether as specified herein or conforming to the requirements of ASTM Designation D6690, as modified herein, by a Certificate of Compliance, storage and heating instructions and precautionary instructions for use.
- E. Heat and place in conformance with the manufacturer's written instructions and the details shown on the Plans. Provide manufacturer's instructions to the Owner's Representative. Do not place when the pavement surface temperature is below 50 °F.

2.7 PREFORMED COMPRESSION JOINT SEALANT

- A. Material: ASTM Designation: D2628.
1. Number of cells: 5 or 6.
 2. Lubricant Adhesive: ASTM Designation D2835.
 3. Install compression seals along with lubricant adhesive according to the manufacturer's recommendations. Submit manufacturer's recommendations to the Owner's Representative`.
- B. Accompany each lot of compression seal and lubricant adhesive by a Certificate of Compliance, storage instructions and precautionary instructions for use. Also submit the manufacturer's data sheet with installation instructions and recommended model or type of preformed compression seal for the joint size and depth as shown on the Plans. Show evidence that the selected seal is being compressed at level between 20 and 50 percent at all times for the joint width and depth shown on the Plans.

2.8 BACKER RODS

- A. Provide backer rods that have a diameter prior to placement at least 25 percent greater than the width of the saw cut after sawing and are expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond, adverse reaction occurs between the rod and sealant. In no case use a hot pour sealant that will melt the backer rod. Submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

2.9 SLIP RESISTIVE AGGREGATE FINISH

- A. Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum

oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

PART 3 - EXECUTION

3.1 WATER SUPPLY

- A. Provide water supply in accordance with Caltrans Standard Specification Section 10-6, Watering.

3.2 SUBGRADE

- A. Prepare subgrade in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.3 SOIL STERILANT

- A. Furnish and apply to areas indicated in accordance with Section 31 20 00, Earth Moving.

3.4 PLACING

- A. Prepare concrete in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.5 SPREADING COMPACTING AND SHAPING

- A. Conform to the following:
 - 1. Stationary Side Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Stationary Side-Form Construction.
 - 2. Slip Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Slip Form Construction.

3.6 INSTALLING TIE BARS

- A. Install at longitudinal contact joints, longitudinal weakened plane joints, and transverse contact joints as shown on the Plans. In no case, shall any consecutive width of new portland cement concrete pavement tied together with tie bars exceed 50 feet. In no case shall tie bars be used at a joint where portland cement concrete and asphalt concrete pavements abut.
- B. Tie bars shall be installed at longitudinal joints by one of the 3 following methods:
 - 1. Drilling and bonding in conformance with the details shown on the Plans. Provide a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C881, Type V. Grade 3 (Non-Sagging), Class shall be as follows:

| <u>Temperature of Concrete</u> | <u>Required Class of Epoxy Resin</u> |
|--------------------------------|--------------------------------------|
| Lower than 40° F | A |
| 40° F through 60° F | B |
| Above 60° F | C |

2. Provide, at least 7 days prior to start of work, a Certificate of compliance and a copy of the manufacturer's recommended installation procedure. The drilled holes shall be cleaned in accordance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during the curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Tie bars that are improperly bonded, as determined by the Owner's Representative, will be rejected. If rejected, adjacent new holes shall be drilled, as directed by the Owner's Representative, and new tie bars shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
3. Insert the tie bars into the plastic slip-formed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished to such an extent that there is no evidence on the surface of the completed pavement that there has been any insertion performed. Any loose tie bars shall be replaced by drilling and grouting into place with epoxy as described in method 1 above at the Contractor's expense.
4. By using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance and installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.

3.7 JOINTS

- A. Construct joints in accordance with Caltrans Standard Specification Section 40-1.03B, Joints, except that tie bars shall be as specified under Part 1, Materials.
 1. Construction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B(2), Construction Joints.
 - a. Construct a construction joint at the end of each day's work, or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.
 - b. If sufficient concrete has not been mixed to form a slab to match the next contraction joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of any excess concrete shall be at the Contractor's expense. Any excess material shall become the property of the Contractor and shall be properly disposed of.
 - c. A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of tie bars.
 2. Contraction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B (3), Contraction Joints, except that the insert method of forming joints in pavement shall not be used.

3.8 FINISHING

- A. Finish concrete in accordance with Caltrans Standard Specification Section 40-1.03H, Finishing.

- B. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions and as follows:
1. Uniformly spread 40 lb per 100 sq. ft. of dampened, slip-resistive aggregate over paving surface in two applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
 2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over paving surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.

3.9 CURING

- A. Cure concrete in accordance with Caltrans Standard Specification Section 40-1.03I, Curing.

3.10 SEALING JOINTS

- A. Liquid Joint Sealant Installation.
1. The joint sealant detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after sealant has been placed, completely remove the joint material and disposed of, and replace at the Contractor's expense. Recess sealant below the final finished surface as shown on the Plans.
 2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.
 3. Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, clean the joint walls by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 2 inch on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means approved means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of $1/4 \pm 1/32$ inches and a minimum pressure of 90-psi.
 4. Install backer rod as shown on the Plans. Provide an expanded, closed-cell polyethylene foam backer rod that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Install backer rod when the temperature of the portland cement concrete pavement is above the dew point of the air and when the air temperature is 40°F or above. Install backer rod when the joints to be sealed have been properly patched, cleaned and dried. Do not use a method of placing backer rod that leave a residue or film on the joint walls.
 5. Immediately after placement of the backer rod, place the joint sealant in the clean, dry, prepared joints as shown on the Plans. Apply the joint sealant by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Apply adequate pressure to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint

walls. After application of the sealant recess the surface of the sealant as shown on the Plans.

6. Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. Conform the finished surface of joint sealant to the dimensions and allowable tolerances shown on the Plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the Plans shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.
7. After each joint is sealed, remove all surplus joint sealer on the pavement surface. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

B. Preformed Compression Joint Seal Installation

1. The compression seal alternative joint detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after the compression seal has been placed, completely remove the joint materials and disposed of, and replace at the Contractor's expense. Compression seal shall be recessed below the final finished surface as shown on the Plans.
2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.
3. Seven days after the concrete pavement placement and not more than 4 hours before placing preformed compression joint seals, clean the joint walls by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 50 mm on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of $1/4 \pm 1/32$ inches and a minimum pressure of 90 psi.

3.11 PROTECTING CONCRETE PAVEMENT

- A. Protect pavement in accordance with Caltrans Standard Specification Section 40-1.03J Protecting Concrete Pavement.

END OF SECTION

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SECTION 32 13 18 – CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Materials for portland cement concrete
- B. Aggregate and aggregate grading for portland cement concrete
- C. Water for portland cement concrete
- D. Admixtures for portland cement concrete
- E. Proportioning for portland cement concrete
- F. Mixing and transporting portland cement concrete
- G. Formwork for cast in place portland cement concrete
- H. Embedded materials for portland cement concrete
- I. Steel reinforcement for portland cement concrete
- J. Placing and finishing portland cement concrete
- K. Curing portland cement concrete
- L. Protecting portland cement concrete

1.2 RELATED SECTIONS

- A. Section 31 20 00, Earth Moving
- B. Section 32 12 16, Asphalt Paving
- C. Section 32 13 13, Concrete Pavement

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation report titled “Geotechnical Investigation, Burlingame Community Center, 850 Burlingame Avenue, Burlingame, California” prepared by Murray Engineers, Inc. dated July 2018.
- B. ASTM Standards
 - 1. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - 2. A1064, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
 - 3. C94, Standard Specification for Ready-mixed Concrete
 - 4. C150, Standard Specification for Portland Cement

5. C260, Standard Specification for Air-Entraining Admixtures for Concrete
 6. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 7. C494, Standard Specification for Chemical Admixtures for Concrete.
 8. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Portland Cement
 9. C1017, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
 10. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 11. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- C. Caltrans Standard Specifications, 2015
1. Section 51: Concrete Structures
 2. Section 73: Concrete Curbs and Sidewalks
 3. Section 90: Concrete

1.4 DEFINITIONS

- A. ASTM: American Society for Testing and Materials

1.5 SUBMITTALS

- A. Follow submittal procedures outlined in Section 01 10 00, Supplemental General Requirements.
- B. Concrete Mix Design: Have all concrete mixes designed by a testing laboratory and approved by the Consulting Engineer. Conform all mixes to the applicable building code requirement, regardless of other minimum requirements listed herein or on the Plans. Submit mix designs for review before use. Show proportions and specific gravities of cement, fine and coarse aggregate, and water and gradation of combined aggregates.
- C. Reinforcing Steel Shop-Drawings

1.6 QUALITY ASSURANCE

- A. Concrete shall be subject to quality assurance in accordance with Section 90 of the Caltrans Standard Specifications.
1. Slump tests: Have available, at job site, equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch. Allowable maximum slump shall be 4 inches for walls and 3 inches for slabs on grade and other work.

- B. Certifications:
1. Provide Owner's Representative at the time of delivery with certificates of compliance signed by both Contractor and Supplier containing the following statements:
 - a. Materials contained comply with the requirements of the Contract Documents in all respects.
 - b. Proportions and mixing comply with the design mix approved by the Consulting Engineer. Design mix shall have been field tested in accordance with the herein requirements of the Caltrans Standard Specifications and produces the required compressive strength under like conditions.
 - c. Statement of type and amount of any admixtures.
 2. Provide Owner's Representative, at time of delivery, with certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

1.7 DESIGNATION

- A. General: Whenever the 28 day compressive strength is designated herein or on the Plans is 3,600 psi or greater, the concrete shall considered to be designated by compressive strength. The 28 day compressive strength shown herein or on the plans which are less than 3,600 psi are shown for design information only and are not considered a requirement for acceptance of the concrete. Whenever the concrete is designated by class or as minor concrete herein or on the Plans, the concrete shall contain the cement per cubic yard shown in Section 90-2 of the Caltrans Standard Specifications.
- B. Unless specified otherwise herein or on the Plans, portland cement concrete for curbs, gutters, sidewalks and their appurtenances such as island paving, curb ramps and driveways, shall be minor concrete as specified in Section 90-2 of the Caltrans Standard Specifications.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT

- A. General: Type II or Type V cement conforming to the requirements of ASTM C150. Contractor may substitute pozzolan for portland cement in amounts up to 15% of the required mix unless high early strength concrete is specified. Pozzolan shall consist of Class F Fly Ash meeting the requirements of ASTM C618.
- B. Color: As specified by Landscape Architect specifications

2.2 AGGREGATE AND AGGREGATE GRADATION

- A. General: Fine and coarse aggregates shall be $\frac{3}{4}$ inch maximum size; clean and crushed aggregate free of materials which may cause staining. Aggregates shall conform to the requirements of section 90-1.02C of the Caltrans Standard Specifications.
- B. Aggregate Size and Gradation: Conform to the requirements of section 90-1.02C(4)(d) of the Caltrans Standard Specifications for 1 inch maximum combined aggregate.

2.3 WATER

- A. General: Water shall be clean, free from injurious amounts of oil, alkali, organic matter, or other deleterious material, and not detrimental to concrete per ASTM C94. Water shall conform to the requirements of section 90-1.02D of the Caltrans Standard Specifications, for mixing and curing portland cement concrete and for washing aggregates.

2.4 CHEMICAL ADMIXTURES

- A. Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Admixtures shall conform to the requirements of section 90-1.02E of the Caltrans Standard Specifications and as noted herein or on the Plans.
1. Air-Entraining Admixture: ASTM C260/C260M
 2. Water-Reducing Admixture: ASTM C494/C494M, Type A
 3. Retarding Admixture: ASTM C494/C494M, Type B
 4. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D
 5. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F
 6. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G
 7. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II

2.5 CLASSIFICATION OF PORTLAND CEMENT CONCRETE

- A. Unless specified otherwise herein or on the Plans, portland cement concrete for the following items shall be designated as follows:
1. Curbs, Gutters, and Sidewalks: Minor concrete.
 2. Cast in Place Concrete Pipe: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.
 3. Thrust Blocks: The concrete shall have a minimum compressive strength of 3,000 psi.
 4. Sign and Fence Footings: The concrete shall consist of a minimum of 376 pounds of portland cement per cubic yard of concrete.
 5. Water, Storm, and Sanitary Structures: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.

2.6 EXPANSION JOINT MATERIAL

- A. Material for expansion joints in portland cement concrete improvements shall be premolded expansion joint fillers conforming to the requirements of ASTM D1751. Expansion joint material shall be shaped to fit the cross section of the concrete prior to being placed. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site. Unless specified otherwise herein or on the Plans, expansion joint thickness shall be as follows:
1. Concrete Slope Protection, Gutter Lining, Ditch Lining and Channel Lining: ½ inch
 2. Structures: As indicated

2.7 REINFORCEMENT AND DOWELS

- A. Bar reinforcement for concrete improvements shall be deformed steel bars of the size or sizes called for on the plans conforming to the requirements of ASTM A615 for Grade 60 bars. Size and shape for bar reinforcement shall conform to the details shown or called for on the Plans. Substitution of wire mesh reinforcement for reinforcing bars will not be allowed.
- B. Slip dowels, where noted or called for on the Plans or detail drawings shall be smooth billet-steel bars as designated and conforming to the requirements of ASTM A615 for Grade 60 bars. Ends of bars inserted in new work shall be covered with a cardboard tube sealed with cork; no grease or oil shall be used.
- C. Mesh for reinforcement for concrete improvements shall be cold drawn steel wire mesh of the size and spacing called for on the plans conforming to the requirements of ASTM A1064. Size and extent of mesh reinforcement shall conform to the details shown or called for on the plans.
- D. Tie wire for reinforcement shall be eighteen (18) gauge or heavier, black, annealed conforming to the requirements of ASTM A1064.
- E. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

2.8 COLOR AND PATTERN FOR DECORATIVE SURFACES

- A. Refer to Landscape Specifications

2.9 CURING AND SEALING MATERIALS

- A. Curing Compounds:
 - 1. Concrete surface repellent-vertical and/or flatwork: Repello surface treatment, invisible chemical treatment barrier system.
 - 2. Curing and sealing-exterior: Colorcure concrete cureseal manufactured by L.M. Scofield Company or approved equal. Color-matched, water-based curing and sealing compound that complies with ASTM C309.

2.10 FORMS

- A. Conform to the requirements of Section 73-1.03C and Section 90-1.03B(5) of the Caltrans Standard Specifications.
- B. Tolerance: Not to deviate more than ¼ inch in 10 feet in grade and alignment.

2.11 PRECAST CONCRETE STRUCTURES

- A. Conform to the following Sections of Caltrans Standard Specifications:
 - 1. 51-7, Minor Structures
 - 2. 70-5.02, Flared End Sections

2.12 CONCRETE VEHICULAR PAVEMENT

- A. General: See Section 32 13 13, Concrete Pavement.

PART 3 - EXECUTION

3.1 STRUCTURAL EXCAVATION

- A. Structural excavation may be either by hand, or by machine and shall be neat to the line and dimension shown or called for on the plans. Excavation shall be sufficient width to provide adequate space for working therein, and comply with CAL-OSHA requirements.
- B. Where an excavation has been constructed below the design grade, refill the excavation to the bottom of the excavation grade with approved material and compact in place to 95% of the maximum dry density as determined by ASTM D1557.
- C. Remove surplus excavation material remaining upon completion of the work from the job site, or condition it to optimum moisture content and compact it as fill or backfill on the site.

3.2 BRACING AND SHORING

- A. Conform to California and Federal OSHA requirements.
- B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
- C. Be solely responsible for all bracing and shoring and, if requested by the Owner's Representative, submit details and calculations to the Owner's Representative. The Owner's Representative may forward the submittal to the Consulting Engineer for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner's Representative.
- D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.3 PLACING CONCRETE FORMS

- A. Form concrete improvements with a smooth and true upper edge. Side of the form with a smooth finish shall be placed next to concrete. Construct forms rigid enough to withstand the pressure of the fresh concrete to be placed without any distortion.
- B. Thoroughly clean all forms prior to placement and coat forms with an approved form oil in sufficient quantity to prevent adherence of concrete prior to placing concrete.

- C. Carefully set forms to the alignment and grade established and conform to the required dimensions. Rigidly hold forms in place by stakes set at satisfactory intervals. Provide sufficient clamps, spreaders and braces to insure the rigidity of the forms.
- D. Provide forms for back and face of curbs, lip of gutters and edge of walks, valley gutters or other surface slabs that are equal to the full depth of the concrete as shown, noted or called for on the Plans. On curves and curb returns provide composite forms made from benders or thin planks of sufficient ply to ensure rigidity of the form.

3.4 PLACING STEEL REINFORCEMENT

- A. Bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or reduce the bond. All bending shall be done cold, to the shapes shown on the plans. The length of lapped splices shall be as follows:
 - 1. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, and reinforced bars Nos. 9, 10, and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the plans.
 - 2. Splice locations shall be made as indicated on the plans.
- B. Accurately place reinforcement as shown on the plans and hold firmly and securely in position by wiring at intersections and splices, and by providing precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Provide supports and ties of such strength and density to permit walking on reinforcing without undue displacement.
- C. Place reinforcing to provide the following minimum concrete cover:
 - 1. Surfaces exposed to water: 4 inches.
 - 2. Surfaces poured against earth: 3 inches.
 - 3. Formed surfaces exposed to earth or weather: 2 inches.
 - 4. Slabs, walls, not exposed to weather or earth: 1 inch.
- D. Minimum spacing, center of parallel bars shall be two and one half (2 ½) times the diameter of the larger sized bar. Accurately tie reinforcing securely in place prior to pouring concrete. Placing of dowels or other reinforcing in the wet concrete is not permitted.

3.5 MIXING AND TRANSPORTING PORTLAND CEMENT CONCRETE

- A. Transit mix concrete in accordance with the requirements of ASTM Designation C94. Transit mix for not less than ten (10) minutes total, not less than three (3) minutes of which shall be on the site just prior to pouring. Mix continuous with no interruptions from the time the truck is filled until the time it is emptied. Place concrete within one hour of the time water is first added unless authorized otherwise by the Owner's Representative.
- B. Do not hand mix concrete for use in concrete structures.

3.6 PLACING PORTLAND CEMENT CONCRETE

- A. Thoroughly wet subgrade when concrete is placed directly on soil. Remove all standing water prior to placing concrete.
- B. Do not place concrete until the subgrade and the forms have been approved.

- C. Convey concrete from mixer to final location as rapidly as possible by methods that prevent separation of the ingredients. Deposit concrete as nearly as possible in final position to avoid re-handling.
- D. Place and solidify concrete in forms without segregation by means of mechanical vibration or by other means as approved by the Owner’s Representative. Continue vibration until the material is sufficiently consolidated and absent of all voids without causing segregation of material. The use of vibrators for extensive shifting of fresh concrete will not be permitted.
- E. Concrete in certain locations may be pumped into place upon prior approval by the Owner’s Representative. When this procedure requires redesign of the mix, such redesign shall be submitted for approval in the same manner as herein specified for approval of design mixes.

3.7 PLACING ACCESSORY MATERIALS

- A. Place water stops and other items required to be embedded in of portland cement concrete structures at locations shown or required in accordance with Section 51-2.04 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans.
- B. Curing Compounds:
 - 1. Regular Portland Cement Concrete: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Color Conditioned Decorative Portland Cement Concrete: Apply in accordance with the manufacturer’s and Landscape Architect specifications

3.8 FORM REMOVAL

- A. Remove forms without damage to the concrete. Remove all shores and braces below the ground surface, before backfilling.
- B. Do not backfill against concrete until the concrete has developed sufficient strength to prevent damage.
- C. Leave forms for cast-in-place walls in place at least 72 hours after pouring.
- D. Leave edge forms in place at least 24 hours after pouring.

3.9 DECORATIVE SURFACING CONSTRUCTION

- A. Decorative surfacing concrete walks shall conform to the manufacturer’s and Landscape Architect specifications

3.10 FIELD QUALITY CONTROL

- A. Finish subgrade for concrete improvements shall be subject to approval prior to placement of forms.
- B. No concrete shall be placed prior to approval of forms.

- C. Concrete improvements constructed shall not contain "bird baths" or pond water and shall be smooth and ridge free.
- D. Conform the finish grade and cross section of concrete improvements to the design grades and cross sections.
- E. Variation of concrete improvements from design grade and cross section as shown or called for on the plans shall not exceed the tolerances ACI 117 and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10 foot long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 - 8. Joint Spacing: 3 inches, unless otherwise indicated.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.11 RESTORATION OF EXISTING IMPROVEMENTS

- A. Replace in kind all pavement or other improvements removed or damaged due to the installation of concrete improvements.
- B. Remove, landscaping or plantings damaged or disturbed due to the installation of concrete improvements. Replace in kind.

END OF SECTION

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SECTION 32 1541 – STABILIZED DECOMPOSED GRANITE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide decomposed granite (DG) paving stabilized with copolymer as indicated on the drawings and as specified herein.

1.2 QUALITY ASSURANCE

- A. Reference Standards
 - 1. Perform all work in accordance with all applicable laws, codes and regulations required by City of Burlingame.
 - 2. Reference to "Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
- B. Copolymer treated decomposed granite can permanently stain concrete and other masonry surfaces. Protect adjacent pavement, curbs, etc. from contact with decomposed granite. Remove any spillover immediately.
- C. Stabilized DG paving shall be installed so as to create a firm, stable slip-resistant surface.

1.3 SUBMITTALS: Per Section 01 3300.

- A. Copolymer/Granite Mix: Submit a 6-foot-square sample of copolymer-treated decomposed granite in the field along with a copolymer mix design which states the proportions and recommended application rates. The design intent is to provide a consistent, stabilized, full lift of decomposed granite surface as specified and as shown on the drawings and without changing the color of the decomposed granite after it cures.
- B. Copolymer: "Organic Based Soil Stabilizer" is not acceptable in lieu of polyvinyl acrylic copolymer Contractor shall furnish, if requested, signed copies of a compliance statement certifying that the copolymer complies with the specifications including weight per gallon, solids, pH, trade name of copolymer and gallons purchased.

PART 2 - MATERIALS

2.1 BASE

- A. Crushed rock conforming with Class 2 standards of Section 26, 1.02 A of Caltrans Standard Specifications, $\frac{3}{4}$ " maximum.

2.2 ROCK SURFACE

- A. Clean, hard, durable particles of 3/8" minus select crushed granite. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, 50% of the material by weight retained on a No. 4 sieve shall have one fractured face. Material shall be Trade name "California Gold," available from Felton Quarry, Granite Construction Co. in Felton, CA, (831) 335-3445 or approved equal.
- B. The crushed aggregate screenings shall be free from clay lumps, vegetable matter, and deleterious material.
- C. Sand Equivalent (CT 217) of 25.
- D. Unit Weight - Maximum dry Density: 133 pcf
- E. Grading requirements for "Path Fines":

1. Percent of Weight Passing a Square Mesh Sieve
AASHTO T11-82 and T27-82

| <u>Sieve Size</u> | <u>% Passing</u> |
|-------------------|------------------|
| 3/8 inch | 100 |
| No. 4 | 85-100 |
| No. 8 | 56-80 |
| No. 30 | 30-45 |
| No. 200 | 10-20 |

2.3 WATER: Potable.

2.4 COPOLYMER

- A. Soilshield-LS polyvinyl acrylic copolymer colorless emulsion available from Soil-Loc, Inc., Scottsdale, Arizona, (888) 828-7300 or approved equal. The stabilizing agent shall be a nonflammable concentrated polyvinyl acrylic copolymer with a formulation containing a minimum of 60% solids that may be diluted for application at job site. After drying, the copolymer shall form a colorless, transparent micro-plastic like film to agglomerate particles and allow exchange of air and moisture. The product shall have a minimum effective service life of at least two years, provided surface is maintained according to manufacturer's recommendations. When cured, the copolymer emulsion shall not re-emulsify and shall be biodegradable and nontoxic to plant and animal life. After application and drying, a core of the treated section shall be able to maintain a portion of its shape, elasticity, and a portion of its strength after being submerged in water for a 24-hour period.
- B. Store material as recommended by manufacturer.
- C. The use of "Organic Stabilizers" such as Plantago, Pysllium Husk, Guar and Starches will not be accepted.

2.5 EDGES

- A. Except where edges are otherwise restrained by curbs, pavement, etc. provide 2x 6 composite board edging and metal edging as specified in the Planting Specification or as shown or specified otherwise.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General Grading: Excavate, fill and fine grade the decomposed granite areas and adjacent areas so that the paving has positive surface drainage and follows the required alignment with a minimum 2% slope and maximum 3% slope as approved by the Owner's Representative. All low areas shall be filled and the areas to be paved shall be above the surrounding finish grade after compaction to prevent water from standing on the paved surface.
- B. Prepare subgrade in accordance with Caltrans Section 26, Aggregate Bases. Compact subgrade to minimum 90% relative compaction to receive base rock. Compact base rock to 95% relative compaction.
- C. Prior to placing the decomposed granite, complete all earthwork, borders, header boards, and adjacent improvements.

3.2 INSTALLATION

- A. Over approved base rock, apply decomposed granite material loosely and evenly to required depths prior to application of copolymer. Screed the loosely graded material to the required grade so that after compaction, the compacted material will meet required thickness and finish grade.
- B. Apply copolymer evenly and uniformly to the loose, screeded material using approved sprayer at the rate recommended below.
 - 1. 2” Granite Depth Stabilization: One (1) gallon concentrate per 100 square feet diluted with 14 to 20 parts water. The exact amount of water to be added to the concentrate depends on moisture level of the DG.
- C. Spray apply solution slowly enough to ensure full penetration with a minimum of two passes. Bow rake surfaces after first pass to reduce surface tension. Repeat applications until solution has percolated full depth of decomposed granite material to be stabilized. Rake and till as required between sprayed applications to thoroughly mix the solution evenly throughout the decomposed granite material. Verify full penetration of copolymer by hand sampling prior to compaction.
- D. Allow material to dry to compactable consistency (optimum moisture) and roll and compact with 1 – 3 ton roller or vibratory plate compactor to 90 percent relative compaction.
- E. Do not allow stabilizer treated DG to contact adjacent pavements or other surfaces. Provide protection of adjacent surfaces with plastic or other materials to prevent staining. Remove any stabilized DG from adjacent surfaces immediately upon discovery and correct any stain damage.
- F. After the pavement has cured for a minimum of 72 hours, remove excess material and dress the shoulders of the pavement. Fill low shoulders and fine grade as required and accepted by the Owner's Representative. Saw cut, remove and replace any unacceptable pavement as approved by Owner's Representative.

3.3 CLEANUP: Per Section 01 7700.

END OF SECTION

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SECTION 32 1816 – SYNTHETIC TURF SAFETY SURFACING

PART 1 - GENERAL

1.1 SCOPE

- A. Synthetic Turf Safety Surfacing: The City of Burlingame will purchase the Synthetic Turf, infill and SBR cushion layer separately and have surfacing installed under another contract by Tot Turf.
- B. The Project Contractor should not include any of the materials or labor required for the safety surfacing work except for preparing the subgrade, installation and coordination of drainage structures and placement of aggregate base course compacted to 90%.
- C. Related work specified elsewhere:
 - 1. Site Concrete – Section 32 1312
 - 2. Play Equipment – Section 11 6800
 - 3. Site Furnishings – Section 32 3300

1.2 SUBMITTALS:

- A. Class 2 Permeable Aggregate

1.3 QUALITY ASSURANCE: Not applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURER: Not applicable

2.2 Class 2 Permeable Aggregate

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive playground safety surfacing. Notify Owner's Representative if areas is not acceptable. Do not begin installation of subgrade, drainage structures and base course until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Prepare subsurface as shown on the Drawings to ensure proper slope, support and drainage for playground safety surfacing.
- B. Aggregate Base Course: Class 2 permeable base rock, relative compaction 90%.

3.3 INSTALLATION

- A. Ensure prepared subgrade, base course and any drainage is complete.

3.4 PROTECTION

- A. Protect playground subgrade and aggregate base course and synthetic turf during construction.

END OF SECTION

SECTION 32 1823 – RECREATIONAL COURT SURFACING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide surface color coating system for new asphaltic concrete multi-purpose court.

1.2 RELATED WORK SPECIFIED ELSEWHERE INCLUDES:

- A. Section 32 1216, Asphalt Paving

1.3 REFERENCE STANDARDS

- A. American Sports Builders Association (ASBA).
- B. State of California, Business and Transportation Agency, Department of Transportation: "Standard Specifications."
- C. Manufacturer's specifications and recommendations.

1.4 SUBMITTALS, per Section 01 3300.

- A. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.
- B. Samples: Submit manufacturer's color samples of color coating and line paint.
- C. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- D. Manufacturer's Project References: Submit manufacturer's list of successfully completed asphalt Tennis, basketball and/or multi-purpose court cushioned surface color coating system projects, including project name, location, and date of application.
- E. Applicator's Project References: Submit applicator's list of successfully completed asphalt basketball & multi-purpose court surface color coating system projects, including project name, location, type and quantity of color coating system applied, and date of application.
- F. Warranty Documentation: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Manufacturer regularly engaged, for past 5 years, in manufacture of asphalt basketball, tennis & multi-purpose court surface color coating systems of similar type to that specified.
 - 2. Member: ASBA.
- B. Applicator's Qualifications:
 - 1. Applicator regularly engaged, for past 5 years, in application of basketball, tennis & multi-purpose court surface color coating systems of similar type to that specified.
 - 2. Employ persons trained for application of basketball, tennis & multi-purpose court surface color coating systems.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.

2. Keep materials in manufacturer's original, unopened containers and packaging until application.
3. Store materials in clean, dry area indoors.
4. Store materials out of direct sunlight.
5. Keep materials from freezing.
6. Protect materials during storage, handling, and application to prevent contamination or damage.
7. Close containers when not in use.

1.7 AMBIENT CONDITIONS

- A. Do not apply asphalt basketball & multi-purpose court cushioned surface color coating system when air or surface temperatures are below 50 degrees F during application or within 24 hours after application.
- B. Do not apply cushioned surface color coating system when rain is expected during application or within 24 hours after application.

1.8 FIELD ENGINEERING

- A. The Contractor shall provide and be responsible for all layout and survey work required for the completion of the work, and shall be responsible for the correctness of all final grades and lines

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Plexipave system and California Line Paint, California Products Corporation, Andover, MA www.plexipave.com. Plexipave/Plexichrome and California Line Paint products, materials and processes are specified to establish standards of quality and utility. Other similar systems' products or processes may be substituted, provided written approval of such substitution is obtained.
- B. The sports court surface color coating system shall be all from one manufacturer.
- C. If the Contractor desires to substitute a product, he/she shall list each item and note it as a "substitution" and provide descriptive information describing its similarities to the specified Plexipave System materials, products and processes.
- D. If the substituted system/product is approved and, in the opinion of the Owner's Representative, the substituted product does not perform as well as the specified product, the Contractor shall replace it with the specified product at no additional cost to the Owner.
- E. No offers for substitution will be acknowledged or considered from suppliers, distributors, manufacturers, or sub-contractors.
- F. The following sports court surface color coating and line paint system manufacturers will be considered as potential substitutes when submitted as required herein: Sportsmaster, Sport Court.

2.2 MATERIALS

- A. Plexipave Color Base – 100% acrylic resin containing no vinyl copolymerization constituent. Contains not more than 63% rounded silica sand.
 1. 13-14 pounds per gallon
 2. Colors: Basketball Court 'Pacific Blue', framed perimeter 'Cape Grey'. All color samples to be submitted and reviewed by Owner's Representative.

- B. California Line Paint – 100% acrylic resin containing no alkyds or vinyl constituents. Texturing shall be rounded silica sand.
 - 1. 12 pounds per gallon.
 - 2. Basketball Court: Yellow, Futsal Court: Dark Blue, Pickleball: White. All color samples to be submitted and reviewed by Owner’s Representative.
- C. Miscellaneous Furnishings: Refer to Section 32 3300, Site Furnishings, Basketball Standard, etc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine asphalt basketball court surfaces to receive color coating system.
- B. Verify asphalt basketball court meets ASBA requirements.
- C. Notify Owner’s Representative of conditions that would adversely affect application or subsequent use.
- D. Do not begin surface preparation or application until unacceptable conditions are corrected.

3.2 SURFACE PREPARATION

- A. Protection of In-Place Conditions: Protect adjacent surfaces and landscaping from contact with new asphalt multi-purpose court cushioned surface color coating system.
- B. Prepare surfaces in accordance with manufacturer’s instructions.
- C. Cure new asphalt surfaces a minimum of 14 to 30 days before application of asphalt basketball court cushioned surface color coating system.
- D. Remove dirt, dust, debris, oil, grease, vegetation, loose materials, and other surface contaminants which could adversely affect application of asphalt basketball & multi-purpose court surface color coating system. Pressure wash entire surface.
- E. Repair depressions, and surface defects in accordance with manufacturer’s instructions before application of filler course.
- F. Level depressions 1/8 inch and deeper with patch binder in accordance with manufacturer’s instructions.
- G. Apply 1 or 2 coats of filler course as required by surface roughness and porosity to provide smooth underlayment for application of color coatings.
- H. Ensure surface repairs are flush and smooth to adjoining surfaces.

3.3 APPLICATION

- A. Apply asphalt basketball court cushioned surface color coating system in accordance with manufacturer’s instructions at locations indicated on the Drawings.
- B. Mix materials in accordance with manufacturer’s instructions.
- C. Apply Filler Course and Color Coating with a 50-60 durometer, soft rubber squeegee.
- D. Filler Course:
 - 1. Apply 2 coats on new asphalt or existing acrylic surfaces with extensive cracks or low spot repair.
 - 2. Apply 1 coat on existing acrylic surfaces with minimal repairs.
- E. Color Coating: Apply a minimum of 3 coats of color coating to prepared surfaces in accordance with manufacturer’s instructions.
- F. Allow material drying times in accordance with manufacturer’s instructions before applying other materials or opening completed surface to foot traffic.

3.4 LINE MARKINGS

- A. Lay out 2 inch wide court line markings in accordance with appropriate governing body:
 - 1. Other required game layouts
- B. Apply line markings primer, after masking tape has been laid, to seal voids between masking tape and court surface to prevent bleed-under when line paint is applied.
- C. Apply a minimum of 2 coat of line paint by brush or roller at a minimum rate of 150-200 sg/gal. in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Allow a minimum of 24 hours curing time before opening basketball & multi-purpose courts for play.
- B. Protect applied asphalt court surface color coating system to ensure that, except for normal weathering, coating system will be without damage or deterioration at time of Substantial Completion.

- 3.6 CLEANUP – 01 7700. All splatter shall be removed from fencing, backstop post and equipment before acceptance.

END OF SECTION

SECTION 32 3100 – DECORATIVE FENCES AND GATES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide 4 foot high decorative fencing, including concrete footings and complete hardware.
- B. Related requirement specifications elsewhere:
 - 1. Section 32 1312, Site Concrete

1.2 STRUCTURAL DESIGN AND ENGINEERING

- A. Contractor shall be responsible for the engineering of shop drawings and shall submit shop drawings and details for review by the City's Representative. Shop drawings stamped by a licensed Engineer currently registered in the State of California. Said stamped shop drawings shall specify structural components, including footings, and methods required to withstand the design loads associated with handling and servicing.
 - 1. Structural design shall meet applicable local, state, and national codes, as well as testing laboratory listings, where required.

1.3 SUBMITTALS

- A. Procedures: In accordance with Section 01 3300.
- B. Product Data: If requested by Owner's Representative, submit manufacturers' catalog sheets, brochures, diagrams, schedules, charts, illustrations, test results and/or other standard descriptive data.
 - 1. Mark up each copy to identify pertinent materials, products or models.
 - 2. Show dimensions and clearances required.
- C. Shop Drawings:
 - 1. Shop drawings shall be neat, well organized and clearly legible. Elevations and plan views from the Drawings may be reproduced for the sake of expedience where appropriate.
 - 2. Shop drawings shall be drawn to scale and not subsequently reduced to fit a drawing format.
 - 3. Submit elevations and plan views for gate types, including graphic layouts, complete dimensions, materials, locations of fasteners and finishes. Determine the total quantity for each gate type and note it in the shop drawings.
 - 4. Submit comprehensive section drawings for gate types where applicable, including sections of typical members. Show fabrication and installation details, including details for securing members to one another, to structures, and/or to site work. Show interior construction, reinforcements, anchorages, components and finishes. Reproduction of section drawings shown in the Drawings shall not be acceptable.
 - 5. Site Condition Verification: Where required by the Owner's Representative for specific items, Contractor shall inspect site to confirm installation conditions, then submit shop drawings and/or written documentation for approval indicating proposed mounting devices.
- D. Samples:
 - 1. Color and Finish: Submit per Section 09 9100, Painting.
 - 2. Prior to submittal, Contractor shall verify that colors submitted as samples match accurately any samples or specifications provided by Owner's Representative.

1.4 QUALITY ASSURANCE

- A. Do not scale drawings for dimensions. Use only the written dimensions indicated on the Drawings, unless such be found in error. Contractor shall verify and be responsible for dimensions and conditions shown by the Drawings, and shall visit the site to inspect and verify field conditions prior to fabrication and installation. The City's Representative shall be notified, in writing, of discrepancies on Drawings, in field dimensions or conditions, and of changes required in construction details.
- B. Provide each type of gate as a complete unit produced by a single manufacturer, including required mounting accessories, fittings and fastenings.
- C. Details shown in the Drawings shall be followed for exterior appearance. Minor changes in interior construction will be accepted in order to conform to Contractor's shop practices or engineering requirements when, in the City's Representative's sole judgment, such changes do not detract materially from design concept or intent. Contractor shall circle such changes on the shop drawings.
- D. Completed work shall be structurally sound, and free from distortions, chips, breaks, holes, splits or other disfigurements considered as imperfections for the specific material.
- E. "Code of Arc and Gas Welding in Building Construction" of American Welding Society, WS D1.0, latest edition with current supplements and addenda, is hereby made a part of this Section and gate fabrication shall conform to the applicable requirements therein, except as otherwise specified herein or shown on the drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements or governing rules and regulations.
- F. All work shall conform to the American Institute of Steel Construction specifications for design, erection and fabrication, and acceptable standards of good practice. Finished members shall be true to line and free from twists and bends.
- G. All gate frame, hinges, anchors, etc. shall be hot-dipped galvanized, shop primed and shop painted and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. 4 foot high decorative fence (no gates) at playground with 'Post Fence A' system and decorative fence 3/16 inch aluminum powder coat panels design model 'C27' modular fence system manufactured by Bok Modern, (415) 749-6500.
- B. Steel Tubing: ASTM A500 (cold-formed), Grade A or B, welded or seamless.
- C. Steel Pipe: ASTM 53, Type E or S, unless otherwise noted.
- D. Miscellaneous Steel Plates and Structural Steel Shapes: conforming to ASTM A36.
- E. Bolts: Structural grade steel, ASTM A307, with suitable hex nuts and washers, all galvanized.
- F. Paint: See Section 09 9100, Painting.
- G. Welding Electrodes: As permitted by AWS Code D1.0.
- H. Fasteners, Hardware and Devices: Stock proprietary fastening devices of approved standard manufacture such as cadmium plated screws, bolts and washers, and stainless steel hinges.
 - 1. Conceal fasteners except where noted or shown otherwise.
 - 2. Finish on exposed devices to match overall gate finish, unless otherwise noted.
 - 3. Provide vandal-resistant fasteners at exposed locations unless otherwise noted.
 - 4. Use fasteners fabricated from metals that are non-corrosive to either the gate material(s) or the mounting surface.
- I. Hot Phosphate Treatment: conforming to SSPC-PT-4.

- J. Powder Coating: Cowel nylon coating powder applied per manufacturer's recommendations or approved equal. Color to be selected by Owner's Representative

2.2 FABRICATION

- A. Intent of Specifications: Finished work shall be of the highest quality in order to pass eye-level examination and scrutiny by City's Representative.
 - 1. Work shall be free from burrs, dents, raw edges and sharp corners.
 - 2. Finish welds on exposed surfaces as required so they are not visible in the finished Work.
 - 3. Finish surfaces smooth unless otherwise indicated or specified.
 - 4. Surfaces which are intended to be flat shall be free from bulges, gaps or other physical deformities. Such surfaces shall be fabricated to remain flat under installed conditions.
 - 5. Surfaces which are intended to be curved shall be smoothly free-flowing to the required shape(s).
 - 6. Edges shall be true, and corners shall be square.
 - 7. Isolate dissimilar materials. Exercise particular care to isolate nonferrous metals from ferrous metals as required to prevent corrosion.
- B. Provide colors and/or finish textures as specified or indicated in the Drawings or, where not specified or indicated, as selected by City's Representative.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall inspect installation locations for conditions that will adversely affect the execution, permanence and/or quality of the Work, and notify City's Representative in writing of any and unsatisfactory conditions. Contractor shall not proceed with installation until said unsatisfactory conditions have been corrected. Commencement of installation indicates acceptance of site conditions and guarantees delivery of an acceptable product.

3.2 INSTALLATION

- A. Provide reinforced concrete footings with dimensions as specified by Engineer. Use Sonotube-type formwork for post gates.
- B. Where a concrete footing is flush with finished grade, slope the top of the footing away from the gate posts minimally as required for drainage and to prevent puddling.
- C. Securely attach gates to footings or site work in accordance with Engineer's specifications.

3.3 SITE CLEANUP per section 01 7700

- A. Final cleanup:
 - 1. Clean and/or repair evidence of installation work or damage to site work or other adjacent surfaces.
 - 2. Remove excess materials and dispose of properly off site.

3.4 CONTRACT CLOSE-OUT ITEMS

- A. Provide owner with one gallon of paint for each paint color specified.

END OF SECTION

SECTION 32 3114 – VINYL COATED CHAIN LINK FENCING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide complete chain link fencing as shown on the drawings and as specified.
- B. Related requirement specifications elsewhere:
 - 1. Section 31 2000, Earth Moving
 - 2. Section 32 13 12, Site Concrete

1.2 QUALITY ASSURANCE

- A. Reference Standards
 - 1. State of California Department of Transportation (Caltrans), "Standard Specifications."
 - 2. Manufacturer's recommendations and specifications.
 - 3. ASTM A36 Standard Specification for Carbon Structural Steel
 - 4. ASTM A392 Standard Specification for Zinc-Coated Steel Chain-Link Fabric
 - 5. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings
 - 6. ASTM A817 Standard Specification for Metallic-Coated Steel Wire for Chain Link Fence Fabric and Marcellled Tension Wire
 - 7. ASTM A824 Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for use With Chain Link
 - 8. ASTM F552 Standard Terminology Relating to Chain Link Fencing
 - 9. ASTM F567 Standard Practice for Installation of Chain Link Fence
 - 10. ASTM F626 Standard Specification for Fence Fittings
 - 11. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric
 - 12. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates
 - 13. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
 - 14. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
 - 15. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence
 - 16. WLG2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing
 - 17. ASTM Standard F- 2049, Guide for Fencing/ Barriers around Playgrounds
 - 18. Local City or County Codes, whichever is more stringent.

1.3 SUBMITTALS: Per Section 01 3300.

- A. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.
- B. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.
- C. Submit sample of each fabric size and color if requested.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company having manufacturing facilities in the United States with 5 years experience specializing in manufacturing of chain link fence products.
- B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.
- C. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Anchor Fence/Master Halco Inc., Baltimore MD (800) 229-5615 (specified); Boundary Fence & Railing Systems, Richmond Hill, NY (800) 628-8928; or Approved Equal.
- B. Manufacturer: Company shall have manufacturing facilities in the United States with a minimum 5 years experience specializing in manufacturing of chain link fence products.

2.2 FENCE SYSTEMS

- A. CHAIN LINK FENCE: Round Schedule 40 black vinyl coated galvanized steel frame with concrete post footings and flush curb, round rail at top and at bottom, and 9-gauge, 2" mesh, black vinyl coated galvanized chain link fabric. All rods, bars, bands, clips, bolts, tension wire, and other fittings shall be black vinyl coated.

2.3 MATERIALS

- A. Conform to Caltrans Standard Specifications, Section 80, except as required otherwise herein:
 - 1. Fabric: Hot-dipped galvanized after weaving, conforming to ASTM A116-88. Tensile strength of fabric shall be 80,000 psi minimum. Fabric shall be knuckled top and bottom, single width fabric to full height of fence. 9-gauge wire size plus vinyl fused-bonded color coating. Vinyl bonded fabric shall be fused-bonded with a PVC coating of 7 to 12 MILS (.007" to .012") per ASTM- F668 Class 2B.
 - 2. Color of chain link fabric per ASTM F934 Black.
 - 3. Steel pipe: All fence frame posts, rails, braces, shall be round pipe ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface.
 - 4. Exterior of galvanized pipe to have F1043 PVC thermally fused color coating, minimum thickness 10 mils (0.254 mm).
 - 5. All fittings to be PVC thermally fused color coated having a minimum thickness of 0.006" (0.152 mm) per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation. Provide approved fused-bonded vinyl finish pivots and latch with eyes for padlocking (padlock N.I.C.). Provide fused-bonded vinyl finish cane bolt at both leaves of gate.
 - 6. Truss rod assembly: Fused-bonded vinyl finish galvanized steel minimum 5/16" diameter truss rod with pressed steel tightener, in accordance with ASTM F626
 - 7. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts with fused-bonded vinyl finish. Provide one cap for each post. When top rail is specified provide line post loop tops to secure top rail.

8. Tension wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664, 7 gauge steel core wire, 0.177", PVC coating class and color to match chain link fabric
 9. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.
 10. Top rail sleeves: 7" (178 mm) galvanized steel sleeve per ASTM F626. If expansion and contraction of the rail is of concern add a 0.137" wire diameter by 1.80" long expansion spring between the adjoining rails]
 11. Wire ties: 9 gauge (0.148") galvanized steel wire for attachment of fabric to line posts and rails. Pre-formed hog ring ties to be 9 gauge (0.148") galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings PVC coated and in compliance with ASTM F626. Color to match fabric color.
 12. Concrete: Minimum 28 day compressive strength of 3,000 psi.
- B. Fence Post Schedule:

| FENCE HEIGHT | END & CORNER POSTS | | LINE POSTS | | | |
|--------------|----------------------|----------------------|------------------|----------------------|------------------------|----------------------|
| | POST SIZE (O.D.) | FOOTING DEPTH & DIA. | POST SIZE (O.D.) | FOOTING DEPTH & DIA. | HORIZONTAL RAIL (O.D.) | MAXIMUM POST SPACING |
| 42" | 2 1/2" 3.65 lb/ft | 10" dia. 24" deep | 2" 2.72 lb/ft | 10" dia. 24" deep | 1 5/8" 2.27 lb/ft | 8'-0" o.c. |
| 4' | 2 1/2" 3.65 lb/ft | 10" dia. 24" deep | 2" 2.72 lb/ft | 10" dia. 24" deep | 1 5/8" 2.27 lb/ft | 8'-0" o.c. |

- C. Above post footing sizes indicate a post bury to a minus 4 inches from bottom of footing. Where center rails are required, provide braces and trusts top and bottom panels.

PART 3 - EXECUTION

3.1 SITE EXAMINATION

- A. Ensure property lines and legal boundaries of work are clearly established.
- B. Survey of fence location to be provided by general contractor.
- C. Verify areas to receive fencing are completed to final grade.

3.2 FENCE FABRICATION AND ERECTION: Shall be in accordance with Caltrans Standard Specification Section 80, except as otherwise specified herein:

- A. Post Installation: Set posts in undisturbed or compacted soil, evenly spaced, plumb and true to lines with top line uniform in concrete to depths herein specified. End, corner, pull and gate posts to be braced with same material as top rail and trussed to line posts with 3/8" rods and tighteners. Line posts shall be evenly spaced 10' or less as specified. Top rail shall pass through line post tops and form a continuous brace within each stretch and be securely fastened to terminal posts. Splices in top rail shall be made with couplings at approximately 20' spacing. Set each post in 3,000 psi concrete footing sized in accordance with above Fence Schedule.
- B. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
- C. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6' and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally

down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle

- D. Except as required otherwise, set top of concrete footing flush with grade and trowel smooth to slope away from post to drain. Post to extend to 4" from bottom of concrete footing. Allow concrete footings to cure 5 days before erection of fabric.
- E. Tension wire: Install tension wires so that it will be located 4" up from bottom the fabric. If top rail is not required, install the tension wire so that it will be located 4" down from the top of the fabric. Stretch and install tension wire before installing the chain link fabric and attach it to each post using wire ties.
- F. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces.
 - 1. Remove all metal shavings from cut area.
 - 2. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry.
 - 3. Apply 2 coats of custom finish paint matching fence color if fence is painted.

3.3 CHAIN LINK FABRIC ATTACHMENT

- A. Fabric: Install fabric on playing side pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 14" on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2" +/- 1" above finish grade.
- B. Secure fabric using wire ties to line posts at 14" on center and to rails and braces 24" on center, and to the tension wire using hog rings 24" on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.4 CLEANING: Per Section 01 7700.

- A. Clean up area adjacent to fence line from debris and unused material created by fence installation. Remove any concrete splash from fence posts.

END OF SECTION

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SECTION 32 3300 – SITE FURNISHINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish and install all site furnishings shown on the drawings and specified in accordance with the manufacturer's instructions and as shown on the drawings and as specified.
- B. The City of Burlingame will be responsible for purchasing the identified site furnishings, including Park Benches, Trash and Recycle Receptacles, Bike Racks, Picnic Tables, Park Grills and Drinking Fountains. The City will be purchasing these site furnishings in advance and will keep them stored off-site at 250 Anza Blvd, Burlingame, CA 94010. The Contractor shall be responsible for coordinating the pick up of equipment, delivery to the project site, assembly and installation. The City will also be purchasing the Play Equipment and Synthetic Turf Safety Surfacing separately and will arrange for other contractors to install them during the normal course and schedule of construction.
- C. Contractor to remove, relocate and install existing drinking fountain just west of project boundary near bathrooms. Existing drinking fountain shall be installed in picnic area.
- D. Related requirement specifications elsewhere:
 - 1. Section 11 6800 - Play Equipment
 - 2. Section 32 1312 - Site Concrete
 - 3. Section 32 1816 – Synthetic Turf Safety Surfacing

1.2 REFERENCES

- A. Perform work in accordance with all applicable laws, codes and regulations required by the City of Burlingame and the State of California.
- B. Manufacturer's Instructions:
- C. Where required in the Specifications that materials, products, processes, equipment or the like to be installed or applied in accordance with manufacturer's instructions, directions or specifications, or words to this effect, it shall be constructed to mean that said application or installation shall be in strict accordance with printed instructions furnished by the manufacturer of the material for use under conditions similar to those at the job site.
- D. All site furnishings shall be anchored or otherwise secured to prevent movement, unless stated otherwise. Provide concrete footings, corrosion resistant clips, etc. as accepted by the Owner's Representative.
- E. Reference Standards:
- F. State of California, Business and Transportation Agency, Department of Transportation: "Standard Specifications."
- G. Manufacturers' specifications and recommendations.

1.3 COORDINATION

- A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in concrete and for the provision of connections, holes, openings, etc., necessary to the execution of the work of the trades.
- B. Contractor shall be responsible for coordinating the pick up of Owner-purchased site furnishings, delivery to the project site, assembly and installation. The City will also be purchasing the Play Equipment and Synthetic Turf Safety Surfacing separately and will

arrange for other contractors to install them during the normal course and schedule of construction.

- 1.4 SUBMITTALS: Section 01 3300
- A. Park Benches: not applicable
 - B. Trash and Recycle Receptacles: not applicable
 - C. Bike Rack: not applicable
 - D. Picnic Tables: not applicable
 - E. BBQ Grills: not applicable
 - F. Basketball Standard
 - G. Drinking Fountains: not applicable
 - H. Log Bench Slab – general size and look.

PART 2 - MATERIALS

- 2.1 PARK BENCHES (shall be purchased by the City of Burlingame)
- A. Model: Neoliviano 69 inch backed domestically sourced thermally modified ash (DSTMA), aluminum finish, surface mount. Manufactured by Landscape Forms (800) 521-2546.
 - B. Model: Neoliviano 118 inch backed domestically sourced thermally modified ash (DSTMA), aluminum finish, mid armrest, surface mount. Manufactured by Landscape Forms (800) 521-2546.
- 2.2 TRASH AND RECYCLE RECEPTACLES (shall be purchased by the City of Burlingame)
- A. Model: Match City of Burlingame Washington Park trash and recycle receptacles.
- 2.3 BIKE RACK (shall be purchased by the City of Burlingame)
- A. Model: Loop bike rack, powder coat standard color finish, embedded mount. Manufactured by Landscape Forms (800) 521-2546
- 2.4 PICNIC TABLES (shall be purchased by the City of Burlingame)
- A. Model: TimberForm Greenway #2162-6 (4'-7" x 5'-10") with kiln-dried 4"x6" wood slats, black powder coated embed mount. Manufacturer Columbia Cascade (800) 547-1940.
 - B. Model: TimberForm Greenway Accessible #2163-8 (4'-7" x 7'-10") with kiln-dried 4"x6" wood slats, black powder coated embed mount. Manufacturer Columbia Cascade (800) 547-1940.
 - C. Model: 'Communal' TimberForm Greenway Accessible #21612-16 (4'-7" x 16') with kiln-dried 4"x6" wood slats, black powder coated embed mount. Manufacturer Columbia Cascade (800) 547-1940.
- 2.5 BBQ GRILLS (shall be purchased by the City of Burlingame)
- A. Model: Grill 21-00 for embedment. Manufactured by DuMor (800) 598-4018
 - B. Communal BBQ Grill Model: Grill 24-00 for embedment. Manufactured by DuMor (800) 598-4018.
- 2.6 BASKETBALL STANDARD:
- A. Model: #166FL-SD540 – Super Duty Outdoor System, 6' offset vertical 5-9/16" post with full bracing and 2' extended post. Manufacturer: Porter Athletic (888) 277-7778.
- 2.7 DRINKING FOUNTAINS (shall be purchased by the City of Burlingame)

- A. Model: #LK4430BF1U Elkay outdoor EZH2O Bottle filling station tri-level pedestal, non-filtered non-refrigerated. Color to be evergreen. Manufactured by Elkay Headquarters, Oak Brook, IL. (630) 574-8484.
- B. Model: #LK4420DB Elkay outdoor double-level pedestal with pet fountain basin, non-filtered non-refrigerated. Color to be evergreen. Manufactured by Elkay Headquarters, Oak Brook, IL. (630) 574-8484.

2.8 LOG BENCH SLABS

- A. 8 -12 feet long salvaged wood logs with a cut flat top and bottom surface minimum 18-24 inches wide seating area and a height of 16-18 inches. Contractor-provided log material and base attachment.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install manufactured items in accordance with the manufacturer's instruction and as shown in the drawings and as specified herein.
- B. Perform all work in accordance with all applicable laws, codes and regulations required by State of California and the City of Burlingame.
- C. Set all work true and square, plumb and level as noted. Remove and replace any wood that splits during or after erection until acceptance.
- D. Place washer under the head and nut of bolts where same bear on wood, except head of carriage bolt. Drill bolt holes same diameter as bolt.
- E. Size bolts to fit flush with nuts. Countersink nuts and bolts as detailed.
- F. Supply all miscellaneous metal units and install as specified.
- G. Galvanized metal that is cut, damaged or modified after fabrication shall be immediately painted with Zinc-rich paint to prevent rusting.
- H. Touch up paint any damaged surfaces to match original finish as accepted by Owner's Representative.
- I. Set site furniture, level or as acceptable to Owner's Representative

3.2 PARK BENCHES

- A. Install in accordance with the manufacturer's instruction and as shown.

3.3 TRASH AND RECYCLE RECEPTACLES

- A. Install in accordance with the manufacturer's instruction and as shown.

3.4 BIKE RACK – embed mount

- A. Install in accordance with the manufacturer's instruction and as shown.

3.5 PICNIC TABLES – imbed mount in stabilized dg, surface mount on concrete paving.

- A. Install in accordance with the manufacturer's instruction and as shown.

3.6 BBQ GRILLS

- A. Install in accordance with the manufacturer's instruction and as shown.

3.7 BASKETBALL STANDARD

- A. Install in accordance with the manufacturer's instruction and as shown.

3.8 DRINKING FOUNTAINS

- A. Install in accordance with the manufacturer's instruction and as shown.

3.9 LOG BENCH SLAB

A. Install in accordance with as shown on the Drawings and specified.

3.10 CLEANUP, per Section 01 7700.

END OF SECTION

SECTION 32 8400 – IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The CONTRACTOR shall provide all labor, materials, supplies, tools, and transportation and perform all operations in connection with and reasonably incidental to complete the installation of the automatic sprinkler irrigation systems as shown on the drawings. Items hereinafter are included as an aid to take off, and are not necessarily a complete list of work items.
1. Trenching, stockpiling, excavation, materials, and refilling trenches.
 2. Furnishing materials and installation for complete system including piping, valves, fittings, sprinkler heads, automatic controls, and final adjustment of heads to insure complete coverage.
 3. Line voltage connections to the irrigation controllers and low voltage control wiring from controllers to remote control valves.
 4. Replacement of unsatisfactory materials.
 5. Clean-up, inspection and approval.
 6. All work of every description mentioned in the specification and/or addenda thereto, all other labor, and materials reasonably incidental to the satisfactory completion of the work, including clean-up of the site, as directed by the Project Representative.
 7. Tests.
 8. As-built record drawings.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer catalog information on all material to be used on the project as specified on the legend, notes, details and plans. Redline or highlight exact items on page to be submitted. Complete material list shall be submitted prior to performing any work.
- B. Substitutions: No substitution will be permitted without prior written approval by the Project Representative. If the product is approved and, in the opinion of the Project Representative, the substituted product does not perform as well as the specified product, the Contractor shall replace it with the specified product at no additional cost to the Project Representative.
- C. All equipment or materials installed or furnished without prior approval of the Project Representative may be rejected and the Contractor may be required to remove the equipment or material at their own expense.

1.3 CLOSEOUT SUBMITTALS

- A. Project As-built Record Documents: The Contractor shall maintain in good order in the field office, one complete set of black line prints of all sprinkler drawings which form a part of the contract, showing all water lines, electrical, sprinklers, valves, stub-outs. In the event any work is not installed as indicated on the drawings, such work shall be corrected and dimensioned accurately from the building walls. All underground stub-outs for future connections and valves shall be located and dimensioned accurately from building walls on all as-built record drawings. In addition to the hard copies a full sized scanned PDF will be required at completion.
- B. Controller Chart:

1. Provide one laminated controller chart showing the area covered by controller for each automatic controller supplied at the maximum size controller door will allow. Chart shall be a reduced drawing of the actual "as-built" system. If controller sequence is not legible when the drawing is reduced to door size, the drawing shall be enlarged to a size that is readable and placed folded, in a sealed plastic container, inside the controller door.
 2. Controller chart shall be a blackline print with a different color used to show area of coverage for each station. Charts must be completed and approved by the Project Representative prior to final inspection of the irrigation system.
- C. Controller Cloud Based Communication and Flow Sensor installation confirmation:
1. Provide written confirmation that the cloud-based communications are set up and operational between controller(s) and cloud-based server.
 2. If controller is a two-wire type controller. Provide confirmation that the controller is communicating with each decoder valve on system and there are no error messages logged on the cloud-based communication system. Provide a printout of information to Landscape Architect or Irrigation Consultant.
 3. Provide written confirmation from the distributor/manufacturer's representative that the controller is communicating with flow sensors and that the correct "k" and "offsets" are setup and utilized properly. The "k" and "offsets" are pre-set numbers you plug into the controller software based on the flow sensor size and type when calibrating the flow sensor. Confirm that flow values have been "learned" and recorded for each valve on the controller, and the correct gpm per valve is shown and verified on a printout and provided to Landscape Architect or Irrigation Consultant. Flow alarms and automatic shut offs should be set up after plant establishment.
- D. Maintenance and Operating Instructions and Manuals:
1. Contractor shall prepare an Operation and Maintenance Manual, organized in a 3-ring binder, containing the following information.
 - a. Contractor's name, address, and telephone number. Duration of guarantee, periods as specified herein, list of equipment with names and addresses of local manufacturer's representatives with duration of written warranties. Complete operating and maintenance instructions on all equipment spare parts lists and related manufacturer's information.
 2. Submit the Operation and Maintenance Manual to the Project Representative within 10 Calendar Days of completion of work of this Section and as a condition of project acceptance.
- E. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis:
1. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who design the landscape or installed landscape.
 2. In large projects or projects with multiple landscape installations (i.e. production home developments) an audit rate of 1 to 7 lots or approximately 15% will satisfy this requirement.
 3. For new construction and rehabilitated landscape projects installed after December 1,2015, as described in Section 490.1:
 - a. The project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution

uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factor, slope, exposure and any other factors necessary for accurate programming.

1.4 QUALITY ASSURANCE & GENERAL REQUIREMENTS

- A. Qualifications: The Contractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible keep the same foreman and workmen on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workmen will be allowed on the job. A minimum of five years' experience of installing irrigation systems of similar scope, size and complexity as the system being installed under this scope of work is required for all on-site job superintendents.
- B. Manufacturer's installation instructions and best practices: Manufacturer's installation instructions shall be followed in all cases when not shown in the Drawings or Specifications.
- C. O.S.H.A. Compliance: All articles and services covered by this specification shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act of 1970, together with all amendments in effect as of the date of this specification.
- D. All irrigation systems shall be installed to meet or exceed the requirements set forth in the California Department of Water Resources Model Water Efficient Landscape Ordinance.
- E. Codes and Standards: Comply with all applicable codes and standards.
 - 1. All work and materials shall be in full accordance with the latest rules and regulations of the National Electric Code; published by the Western Plumbing Officials Association; California Code of Regulations, Title 23, Division 2. Department of Water Resources, Chapter 2.7. Model Water Efficient Landscape Ordinance; and other State or local laws regulations. Nothing in these drawings or specifications is to be construed as to permit work not conforming to these codes.
 - 2. When the specifications call for materials or construction of a better quality or larger size than required by the above mentioned rules and regulations, the provision of the specifications shall take precedence over the requirements of said rules and regulations.
 - 3. Contractor shall furnish, without extra charge, any additional material and labor when required by the compliance with these rules and regulations, though the work be not mentioned in these particular specifications or shown on the drawings.
 - 4. The Contractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by O.S.H.A. regulations for the protection of the public or workmen.
 - 5. Any existing buildings, equipment, piping, pipe covering sewers, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner satisfactory to the Project Representative and at Contractor's own expense, before final payment is made. The Contractor shall be responsible for damage caused by leaks in the piping systems being installed or having been installed under this contract. He/she shall repair, at his/her own expense, all damage so caused, in a manner satisfactory to the Project Representative.
 - 6. The Contractor shall pay for all permits, licenses, and fees required.

1.5 EXISTING CONDITIONS

- A. Protection of Existing Structures and Utilities
 - 1. The Drawings show, if applicable, existing above and below grade structures and utilities that are known to the Project Representative. Locate known existing installations before proceeding with construction operations that may cause damage to such installations. Existing installations shall be kept in service where possible and damage to them shall be repaired with no adjustment of Contract Sum. Verify with Project Representative if As Built drawings are available.
 - 2. If other structures or utilities are encountered, request Project Representative to provide direction on how to proceed with the Work. If a structure or utility is damaged, take appropriate action to ensure the safety of persons and property.
- B. Trench Interference with Existing Tree Root Systems: Prior to trenching, layout main and lateral line locations within drip Line of trees and review locations with Project Representative. Relocate any lines that may interfere with existing root systems to avoid or reduce damage to root systems as accepted by Project Representative.
- C. Provide barricades, coverings, warning signs, lights and other protection required by local code or OSHA to prevent damage to existing improvements to remain and to protect the public.

1.6 LAYOUT OF WORK

- A. The Contractor shall stake out the irrigation system as shown on the drawings. These areas shall be checked by the Contractor and Project Representative before construction is started. Any changes, deletions or additions shall be determined at this check.
- B. Due to the scale of the Drawings, it is not possible to indicate all piping offsets, fittings, sleeves, etc., which may be required. Carefully investigate the conditions affected all of the work and plan accordingly, and furnish all required fittings. Install system in such a manner to avoid conflicts with planting, utilities and architectural features.
- C. Do not install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences or discrepancies in arc dimensions exist that might not have been considered. Bring such obstruction or differences to the attention of the Project Representative. Notify and coordinate irrigation Work with applicable contractors for location and installation of piping and sleeves through or under walls, pavement and structures. In the event this notification is not given, the Contractor shall assume full responsibility for any revision necessary.

1.7 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install main line trenching prior to acceptance by Project Representative of rough grades completed under another Section.
- B. Coordination: Coordinate with the all other trades the sleeving, power requirements of the project, prior to the start of construction.

1.8 INSTRUCTION

- A. After the system has been installed and approved, the Contractor shall instruct the Project Representative and or Maintenance Contractor, in complete operation and maintenance of the irrigation system.

PART 2 - MATERIALS

2.1 PIPE AND FITTINGS

- A. Main lines (constant pressure); 4” and larger shall be polyvinylchloride (PVC) 1120-Class 200, ASTM D1785, Type 1, Grade 1 with rubber gasketed bell connections with ductile iron fittings with thrust blocks or joint restraints; 3” and smaller shall be PVC 1120-Schedule 40 plastic pipe. Pipe shall be made from NSF approved Type 1, Grade 1 PVC compound conforming to ASTM D1785.
 - 1. Join lengths of pipe by means of integrally formed bell end on pipe using rubber ring seal.
 - 2. Ring-tite main line: At changes in direction or branch mains, use appropriate Ductile Iron rubber ring seal fittings.
 - 3. Solvent weld main lines: At changes in direction or branch mains, use appropriate Schedule 40 PVC solvent weld fittings as approved by the Uniform Plumbing Code.
 - B. Lateral lines (non-pressure): 3/4" and larger shall be 1120-Schedule 40 PVC plastic pipe. All lateral lines shall be connected with Schedule 40, Type I, Grade I, PVC solvent weld fittings.
 - C. Connections between main lines and RCV’s shall be of Schedule 80 PVC (threaded both ends) nipples and fittings.
 - D. Risers shall be as follows:
 - 1. Schedule 80 PVC threaded nipples and Schedule 80 PVC ells as shown in the construction details. Offset risers shall be Cobra connector Model CC-600 (1/2"x6").
- 2.2 BACKFLOW PREVENTION DEVICE
- A. Backflow prevention device shall be the reduced pressure type with gate valves, check valves, test cocks, reduced pressure chamber and air vent.
 - B. Provide a freeze preventative blanket around backflow assembly. Blanket shall be green.
 - C. All metallic pipe and fittings installed below grade shall be may be wrapped with an approved asphaltic tape.
 - D. Backflow prevention device model and size shall be as shown on the drawings.
- 2.3 BACKFLOW PREVENTION DEVICE ENCLOSURE
- A. Enclosure shall be sized to completely enclosure backflow device.
 - B. Install enclosure device as detailed.
- 2.4 MASTER CONTROL VALVE
- A. Master control valve shall be a normally open and closed 24 VAC solenoid actuated globe pattern valve.
 - B. Valves shall be made of brass with a minimum pressure rating of 200 PSI
 - C. Valve shall have external and internal bleed for manual operation.
 - D. Valve model and size shall be as shown on drawings.
- 2.5 FLOW SENSORS
- A. Inline flow sensors shall be installed in accordance with the manufacturer’s installation instructions. Contractor is responsible for the installation, all required materials and connections of the flow sensors for complete operation with the irrigation controller.
 - B. Flow sensor size and model shall be listed on the drawings.
- 2.6 FLOW SENSOR CABLE AND CONDUIT
- A. Flow sensor wire shall be shielded cable Paige model 7171D or approved equal.
 - B. Maximum cable distance from controller to flow sensor shall be 2000 ft.
 - C. Install flow sensor cable in a 1” grey SCH 40 PVC conduit with long sweep elbows.

- D. Conduit and flow sensor cable shall be routed with mainline wherever possible. Provide a minimum 6” separation between conduit and pressure main line.
 - E. Provide 10” round gray electrical pull boxes a minimum of every 200 ft, at each change in direction and adjacent to each controller. Heat brand lid of pull box “FSB”.
- 2.7 DUCTILE IRON FITTINGS
- A. Fittings shall be deep bell push-on joint fittings manufactured for ASTM A536, Grade 65-45-12 ductile iron with a tensile strength of 65,000 psi.
 - B. Fittings shall be designed for use on IPS PVC pipe.
- 2.8 Ductile Iron Fitting Encasement:
- A. Encase all ductile iron fittings and gate valves with a 4-Mil high density, cross laminated (HDCL) polyethylene plastic sheeting (AWWA C105). Wrap and fold around fittings to prevent contact with soil.
- 2.9 GATE VALVES
- A. Gate valves 3” and smaller shall meet the following requirements:
 - 1. Valves shall be of stainless steel (304 or higher) construction with non-rising stem, cross handle and threaded connections.
 - 2. Valves shall be Leemco Model #LGT-SS or approved equal. Size as shown on the drawings
 - 3. Install in 10” diameter plastic valve box as detailed.
 - B. Gate valves 4” and larger shall meet the following requirements:
 - 1. Valves shall be cast iron with operating nut (2” square) and “O” ring connections for Class 200 PVC plastic pipe.
 - 2. Install in 10” diameter plastic valve box as detailed.
- 2.10 QUICK COUPLING VALVES
- A. Quick coupling valves shall be as shown on the drawings. Install in 10” diameter plastic valve box as detailed.
- 2.11 CONTROLLERS
- A. Controller’s size and model shall be as listed on the drawings.
 - B. Final location(s) of controller shall be approved by the Project Representative.
 - C. Controller requires 120v power. Maximum power output of controller is 2.5 amps.
 - D. Install Controller and accessories as detailed and per Manufacturer’s details.
- 2.12 CONTROL WIRE
- A. Control wire shall be copper with U.L. approval for direct burial in ground, size #14- Common ground wire shall have white insulating jacket; control wire shall have insulating jacket of color other than white or yellow. Runs over 2,000 lineal feet shall be #12- AWG-UF 600 volt copper wire. Splices shall be made with 3M Scotchcast 3570G waterproof splice kit.
 - B. Provide a separate ground wire for each controller.
 - C. Provide a minimum of two spare control wires into each RCV box for future. Spare wires shall be yellow in color.
- 2.13 ELECTRIC REMOTE CONTROL VALVES
- A. Electric remote control valves sizes shall be shown on drawings.

- B. Electric remote control valve shall be a normally closed 24 VAC solenoid actuated globe pattern valve.
- C. Valves shall be made of durable glass-filled nylon with a pressure rating of 200 PSI
- D. Valve shall have external and internal bleed for manual operation.
- E. Provide and install one Schedule 80 PVC FIPT threaded true union ball valve with EPDM O-rings on the upstream side of valve and one Schedule 80 union on the downstream side of valve. Ball valve shall be Spears True Union model 2300. Match valve size when sizing ball valve and union.
- F. All electric remote control valves for dripline or drip systems shall include a wye filter with a 200 mesh stainless steel screen and pressure regulator on the valve or downstream of the valve.

2.14 IDENTIFICATION TAG

- A. Identification tags for all electric control valves shall be manufactured by Christy. Tag numbers shall match stationing in controller and as shown on as-built drawings. Provide one yellow station number tag for each electric control valve as follows:
 - 1. Potable water systems: Christy ID.STD.Y1

2.15 VALVES BOXES

- A. ELECTRIC REMOTE CONTROL VALVE BOXES:
 - 1. All electric remote control valve boxes that service non-drip systems shall be installed within a NDS Pro Series Model 214BC, 213BCBLK (14"x19") or 221BCB, 222BCB BLK (13" x 24") plastic valve box with bolt down plastic lid or approved equal. Size of box is dependent on the size of valve. Lid shall be marked: "Irrigation Control Valve."
 - 2. All electric remote control valve boxes that service dripline or drip systems shall be installed within a NDS Pro Series Model 221 BCB (13" x 24") plastic valve box with bolt down plastic lid or approved equal. Lid shall be marked: "Irrigation Control Valve."
 - 3. Use black colored boxes in shrub and groundcover areas and green in turf areas.
 - 4. Heat brand controller letter and numbers into lid. Minimum text height to be 2".
- B. GATE VALVE AND QUICK COUPLING VALVE BOXES:
 - 1. All gate valve and quick coupling valve shall be installed within a NDS Pro Series Model 212BCB or 211BBCBLK plastic valve box with plastic lid or approved equal. Use 8" sleeve to encase gate valve.
 - 2. Use black colored boxes in shrub and groundcover areas and green in turf areas.
 - 3. Heat brand the letters "GV" into lid. Minimum text height to be 2".
- C. DRIP COMPONENT BOXES:
 - 1. All drip components shall be installed within a 6" round black plastic valve box with plastic lid. NDS Standard Series Model 107BC plastic valve box with plastic lid or approved

2.16 SPRINKLER HEADS AND BUBBLERS

- A. All sprinkler heads shall be as listed on the drawings.
- B. Pop-up spray sprinklers shall include a built in check valve in the body to hold up to 14 feet of head.
- C. Pop-up spray sprinklers shall include built in pressure regulation in the body.
- D. Use 30 psi regulators for all spray nozzles and 45 psi regulators for all rotating nozzles. Use 12" pop-ups in shrub and ground cover areas and 6" pop-ups in turf areas.
- E. Riser units and nipples shall be the same size as the inlet to the sprinkler body.

2.17 DRIPLINE & DRIPLINE COMPONENTS

- A. Dripline shall be as listed on the drawings.
- B. Tubing shall be low density, UV resistant, polyethylene tubing with internal pressure-compensating, drip emitters impregnated into the tubing spaced at 12 or 18 inches
- C. The built in emitters shall be capable of delivering 0.53 gallons per hour per emitter.
- D. All dripline systems shall have a manual flush valve at each isolated zone within the systems. Multiple flush valves may be required per drip zone.
- E. All dripline systems shall have air relief valve(s) at the highest elevation point(s) within each isolated zone. Install one air relief valve for every 500 linear feet of dripline.

2.18 CHECK VALVE

- A. Spring check valve shall be Schedule 40 PVC with ½ lb spring and stem rated at 150 PSI.
- B. Check valves shall be NDS. Use KSC series swing check valve for all uphill flow direction valves and KC series spring check for all downhill flow direction valves. Size per line size of lateral line.

2.19 MISCELLANEOUS INSTALLATION MATERIALS

- A. Solvent cement and primer for solvent weld joints shall be of make and type approved by manufacturer(s) of pipe and fittings. Cement shall be maintained at proper consistency throughout use.
- B. Lubricant for assembling rubber ring seal joints shall be of make and type approved by manufacturer of pipe.
- C. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as RectorSeal #5.

2.20 MISCELLANEOUS EQUIPMENT

- A. Provide all equipment called for by the drawings.
- B. Provide to the Project Representative at completion of the maintenance period, three (3) each of all operating and servicing keys and wrenches required for complete maintenance and operation of all heads and valve. Include all wrenches necessary for complete disassembly of all heads and valves.

PART 3 - INSTALLATION

3.1 PREPARATION

- A. Schedule and coordinate placement of materials and equipment in a manner to effect the earliest completion of work in conformance with construction and progress schedule.

3.2 HANDLING AND STORAGE

- A. Protect work and materials from damage during construction and storage as directed by the Project Representative.
- B. Handle plastic pipe carefully; especially protect it from prolonged exposure to sunlight. Any section of pipe that has been damaged will be discarded and removed and replaced if installed.

3.3 LAYOUT

- A. Lay out work as accurately as possible in accordance with diagrammatic drawings.

- B. Where site conditions do not permit location of piping, valves and heads where shown, notify Project Representative immediately and determine relocation in joint conference.
- C. Prior to installation, the Contractor shall stake out the routing of all pressurized main lines and sprinkler heads for approval by Project Representative.
- D. Run pipelines and automatic control wiring in common trenches wherever practical.

3.4 EXCAVATING AND TRENCHING

- A. Excavation shall be in all cases ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining.
- B. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:
 - 1. 18” minimum cover over main lines to control valves and quick coupling valves.
 - 2. 18” minimum cover over control wires from controller to valves.
 - 3. 12” minimum cover over RCV controlled lateral lines to sprinkler heads.
- C. Restore surfaces, existing underground installations, etc., damaged or cut as a result of excavations, to original conditions in a manner approved by the Project Representative.
- D. Where other utilities interfere with irrigation trenching and pipe work, adjust the trench depth as instructed by the Project Representative.

3.5 ASSEMBLING PIPELINES

- A. All pipe shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed.
- B. Install plastic pipe in accordance with manufacturer’s recommendations.
- C. Install 3” wide detectable warning tape above all pressurized main lines as shown in the details. Use Christy model #TA-DT-3-BIRR for potable irrigation systems.
- D. Rubber Ring Seal Joint:
 - 1. Use factory made male end or prepare field-cut male end to exact specifications of factory made end.
 - 2. Carefully clean bell or coupling and insert rubber ring without lubricant. Position ring carefully according to manufacturer’s instructions.
 - 3. Lubricate male end according to manufacturer’s instruction and insert male end to specified depth. Use hands only when inserting PVC pipe.
 - 4. Thrust blocks shall be provided where necessary to resist system pressure on ring-tite pipe and fittings. Blocks shall be concrete and the size shall be based on an average soil safe bearing load of 700# per square foot.
 - 5. Form thrust blocks in such a manner that concrete comes in contact only with the fittings. Thrust blocks shall be between solid soil and the fittings.
 - 6. Ductile Iron Fittings Encasement: Wrap valves, tees, elbows, etc. with a flat sheet or split length of polyethylene tube by passing the sheet under and then over the appurtenance and bringing it together around the body of the appurtenance. Make seams by bringing the edges of the polyethylene together, folding over twice and taping them down. Carefully pour thrust blocks so as not to damage polyethylene material.
- E. Solvent Weld Joint:
 - 1. Prepare joint by first making sure the pipe end is square. Then, de-burring the pipe end, and clean pipe and fitting of dirt, dust and moisture.
 - 2. Dry insert pipe into fitting to check for proper sizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.
 - 3. Coat the inside socket surface of the fitting and the male end of the pipe with P-70 primer (manufactured by Weld-On). Then without delay, apply Weld-On 711 cement liberally to the male end of the pipe and also apply 711 cement lightly to

- the inside of the socket. At this time, apply a second coat of cement to the pipe end.
4. Insert pipe immediately into fitting and turn 1/4 turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.
 5. Hold joint still for approximately thirty (30) seconds and then wipe the excess cement from the pipe and fitting.
 6. Cure joint a minimum of thirty (30) minutes before handling, at least six (6) hours before allowing water in the pipe.
- F. Threaded Joint:
1. Field threading of plastic pipe or fittings is not permitted. Only factory formed threads will be permitted.
 2. Factory made nipples shall be used wherever possible. Field cut threads in metallic pipe will be permitted only where absolutely necessary. When field threading, cut threads accurately on axis with sharp dies.
 3. All threaded joints shall be made up with pipe joint compound. Apply compound to male threads only.
 4. Where assembling metallic pipe to metallic fitting or valve, not more than three (3) full threads shall show when joint is made up.
 5. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.
 6. Where assembling plastic pipe, use strap type friction wrench only; do not use metal-jawed wrench.
- G. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstructions. Remove caps or plugs only when necessary to continue assembly.
- H. Where pipes or control wires pass through sleeves, provide removable non-decaying plug at ends of sleeve to prevent entrance of earth.

3.6 REMOTE CONTROL VALVES

- A. Install where shown on drawings and group together where practical. Limit one remote control valve per box. No exceptions!
- B. Locate valve boxes 12" from and perpendicular to walk edges, buildings and walls. Provide 12" between valve boxes where valves are grouped together.
- C. Thoroughly flush main line before installing valves.
- D. Install in shrub or groundcover areas where possible.
- E. Label control line wire at each valve with an I.D. tag, indicating identification number of valve (controller and station number). Attach label to control wire.
- F. Flow control stems shall be adjusted or tuned per manufacturer recommendations.

3.7 AUTOMATIC CONTROL WIRE

- A. Run lines along mains wherever practical. Tie wires in bundles with pipe wrapping tape at 10' intervals and allow slack for contraction between strappings.
- B. Loop a minimum of three (3) feet of extra wire in each valve box; both control wire and ground wire.
- C. Connections shall be made by crimping bare wires with brass connectors and sealing with watertight resin sealer packs.
- D. Splicing will be permitted only on runs exceeding 2500'. Locate all splices at valve locations within valve boxes.

- E. Where control lines pass under paving, they shall pass through Schedule 40 electrical PVC conduit. Do not tape wire in bundles inside conduit.

3.8 AUTOMATIC CONTROLLER

- A. Provide and install automatic irrigation controller in approximate locations shown on drawings. The exact location will be determined on the site by the Project Representative. Provide conduit and wire and connect to 120 volt switch accessible to controller for ease of maintenance.
- B. Connect control lines to controller in sequential arrangement according to assigned identification number on valve. Each control line wire shall be labeled at controller with a permanent non-fading label indicating station number of valve controlled. Attach label to control wire.
- C. Provide each irrigation controller with its own independent low voltage common ground wire.
- D. Provide each pedestal controller with its own ground rod. Separate the ground rods by a minimum of eight feet. The ground rod shall be an eight foot long by 5/8" diameter U.L. approved copper clad rod or as recommended by controller manufacturer. Install no more than 6" of the ground rod above finish grade. Connect #8 gauge wire with a U.L. approved ground rod clamp to rod and back to ground screw at base of controller with appropriate connector. Make this wire as short as possible, avoiding any kinks or bending. Install a minimum of 8' away from pedestal housing base unless otherwise noted.

3.9 BUBBLERS, SPRINKLER HEADS AND QUICK COUPLING VALVES

- A. Thoroughly flush lines before installing heads, bubblers or QCV's.
- B. Locate bubblers, heads and QCV's as shown in the drawings and details.
- C. Adjust sprinkler heads for proper distribution and trim.
- D. Install lawn heads 1" above grade in seeded lawn area at time of installation. Lower to finished grade after turf is well established and as directed by Project Representative.

3.10 DRIPLINE AND DRIPLINE COMPONENTS

- A. Thoroughly all flush lines driplines.
- B. Install dripline a minimum of 12" away from all buildings and 6" off hardscapes for shrubs and groundcover. 2" of paving for all no-mow or sod type grasses.
- C. Space driplines equally throughout the planting area as detailed. Refer to legend for emitter and row spacing of dripline. Adjust alternate rows so emitters are spaced in a triangular pattern.
- D. All dripline tubing shall be buried 4" below finish grade and stapled down every 4' and at each change in direction with a 6" tubing stake.
- E. For slopes greater than 10:1, modify dripline row spacing on the bottom 1/3 of the slope to be 25% greater at the bottom of the slope.
- F. Install flush valves at the low end of each drip zone minimum of 2 valves are required for each valve. Refer to manufacturer details for installation instructions.
- G. Install air vacuum relief valve(s) at high point(s) of each planting area. Refer to drawings for approximate locations. Revise locations in field based on actual grades of the site. Locate 1 valve per every 500' of dripline. Refer to manufacturer details for installation instructions.
- H. Thoroughly saturate soil prior to planting. Provide additional surface watering as required to keep plant root systems moist during planting establishment period.

3.11 BACKFILLING

- A. Backfill only after piping and wire has been inspected and approved.
- B. Backfill material shall be the earth excavated from the trenches, free from rocks, concrete chunks, and other foreign or coarse materials.
- C. Place backfill materials in 6" layers and compact by jetting or tamping to a minimum compaction of 90 percent of original soil density.
- D. Dress off areas to finish grade and remove excess soil, rocks, or debris remaining after backfill is completed.
- E. If settlement occurs along trenches, and adjustments in pipes, valves, and sprinkler heads, soil, sod, or paving are necessary to bring the system, soil, sod, or paving to the proper level or the permanent grade, the Contractor, as part of the work under this contract, shall make all adjustments without extra cost to the Project Representative.

3.12 FIELD QUALITY CONTROL

- A. Coverage Tests:
 - 1. Perform coverage tests in the presence of Project Representative, after sprinkler or drip system is completed. Test system to assure that all areas are irrigated completely and uniformly.
 - 2. Do not spray onto pavement or structures. Adjust arc nozzles as needed to provide full coverage without over spray.
- B. Adjusting and Cleaning:
 - 1. System adjustment:
 - a. Valves: Adjust flow for proper operation.
 - b. Heads: Adjust for alignment and coverage.
 - c. If it is determined that coverage could be improved by adding additional driplines or a nozzle change, make such changes as required to provide adequate coverage to all plant material.
 - d. Perform final cleaning of all risers, dripline, heads, and equipment for proper operation. Demonstrate operation and uniform coverage in the presence of the Project Representative prior before final acceptance.

3.13 TESTING

Perform test as specified below. Remake any faulty joints with all new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

Contractor shall:

- A. Notify the Project Representative at least three (3) days in advance of testing.
- B. Perform testing at his/hers own expense.
- C. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered
- D. Apply the following tests after welded plastic pipe joints have cured at least twenty-four (24) hours.
 - 1. Ring-Tite Mainline: Remove all the air from the piping system then test live (constant pressure) and QCV lines hydrostatically at 125 PSI minimum. Lines will be approved if test pressure is maintained for two (2) hours. Maintain pressure during this time period and measure the amount of water required to maintain that test pressure. Approved tables of allowable loss are below, and the line will be approved or not approved as such results may indicate. The Contractor shall make tests and repairs as necessary until test conditions are met.

Allowable leakage for PVC plastic pipe with elastomeric joints in U.S. gallons per hour at a test pressure of 150 PSI.

- a. 4" - 0.30 gallons per 1000 ft. or 50 joints
 - b. 6" - 0.45 gallons per 1000 ft. or 50 joints
 - c. 8" - 0.60 gallons per 1000 ft. or 50 joints
2. Solvent Weld Mainline: Remove all the air from the piping system then test live (constant pressure) and QCV lines hydrostatically at 125 PSI minimum. Lines will be approved if test pressure is maintained for six (6) hours. The lines shall be restored to the original test pressure. The Contractor shall make tests and repairs as necessary until test conditions are met.
 3. Test RCV controlled lateral lines with water at line pressure and visually inspect for leaks. Retest after correcting defects.

3.14 GUARANTEE

- A. It shall be the responsibility of the Contractor to fill and repair all depressions and replace all necessary lawn and planting due to the settlement of irrigation trenches for one year following completion and acceptance of the job.
- B. The Contractor shall also guarantee all materials, equipment and workmanship furnished by him to be free of all defects of workmanship and materials, and shall agree to replace at his expense, at any time within one year after installation is accepted, any and all defective parts that may be found.

3.15 MAINTENANCE

- A. Continuously maintain irrigation system in areas indicated in the Contract during the progress of work and for a period of 90 days after substantial completion.
- B. It is Contractor's responsibility to turn over the irrigation in a first-class condition at the end of the maintenance period.
- C. Maintenance Schedule: Contractor shall submit schedule of maintenance tasks to be performed for Project Representative review and approval. At a minimum, maintenance staff shall be on-site two times per month. It is not the intention of these Specifications to allow a "quick cleanup" at the end of the maintenance period, but rather that the work be continuous and ongoing.
- D. Proper irrigation system maintenance includes the overall supervision of the system, controller scheduling, routine adjustments and necessary repairs.
- E. Maintain irrigation system for optimum performance, as per manufacturer's specifications, by inspecting the entire system on an on-going basis. This includes cleaning and adjusting all bubbler heads, dripline and valves for proper coverage

3.16 CLEAN-UP

- A. When work of this section has been completed and at such other times as may be directed, remove all trash, debris, surplus materials, and equipment from site.

END OF SECTION

SECTION 32 9000 – PLANTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide planting work and planting maintenance complete as shown on the drawings and as specified including staking and layout of the landscaping, including soil sampling as required by the State of California Model Water Ordinance.
- B. The City of Burlingame will be responsible for purchasing the identified Specimen – Heritage Tree. The City will be purchasing the tree in advance and will keep it stored off-site at 250 Anza Blvd, Burlingame, CA 94010. The Contractor shall be responsible for coordinating the pick up of the tree, delivery to the project site, and install.
- C. Related work specified elsewhere includes:
 - 1. Section 31 1001, Plant Protection
 - 2. Section 31 2000, Earth Moving
 - 3. Section 32 8400, Irrigation

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. All local, municipal and state laws, codes and regulations relating to all portions of this work are to be incorporated as part of these Specifications. These specifications shall not be construed to conflict with any of the above codes, regulations or requirements. The Specifications and Drawings shall take precedence when they call for materials, workmanship or construction of a better quality or higher standard than required by the above mentioned codes and regulations. Furnish without extra charge additional materials and labor required to comply with above rules and regulations.
 - 2. State of California Model Water Ordinance
 - 3. Public utility agency having jurisdiction over the project work.
 - 4. "Sunset Western Garden Book," Lane Publishing Co., Menlo Park, California; current edition.
 - 5. "American Standards for Nursery Stock," American Association of Nurseryman, 230 Southern Building, Washington, D.C. 20005.
 - 6. International Society of Arboriculture, Guide for Plant Appraisal, latest version.
 - 7. US Composting Council Compost Analysis Program (CAP)
 - 8. US Composting Council (USCC) Seal of Testing Assurance (STA) program.
 - 9. Test Methods for the Evaluation of Composting and Compost (TMECC)
 - 10. Manufacturer's recommendations.
- B. Qualifications:
 - 1. Experience: Assign a full-time employee to the job as foreperson for the duration of the Contract who is certified landscape technician, certification through CLCA or minimum of four (4) years experience in landscape installation and maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification
 - 2. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work necessary to complete the tasks described herein in a competent, efficient manner acceptable to the Owner.
- C. Requirement

1. Site Visit: At beginning of work, visit and walk the site with the Owner's Representative to clarify scope of work and understand existing project/site conditions.
 2. Supervision: The foreperson shall directly supervise the work force at all times and be present during the entire installation. Notify Owner's Representative of all changes in supervision.
 3. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and a labor force uniformly dressed in a manner satisfactory to Owner's Representative.
 4. Protect all existing and new plants from construction activities, deer & rodents: Contractor shall be responsible for protection of all planting per Part 3.
- D. Plant Material Standards:
1. Quality and Size of Plants: Conform to the State of California Grading Code of Nursery Stock, No. 1 grade. Use only nursery-grown stock which is free from insect pests and diseases.
 2. Comply with federal and state laws requiring inspection for plant diseases and infestations. Submit inspection certificates required by law with each shipment of plants, and deliver certificates to the Owner. Obtain clearance from the County Agricultural Commissioner as required by law, before planting plants delivered from outside the County in which planted.
- E. Soils & Amendment Testing
1. All soils & amendments to be tested for agricultural suitability by one of the following accredited soil testing laboratories (or approved equal). Components of the test shall include all major nutrients, pH, salinity, boron, sodium, micronutrients, copper, zinc, manganese and iron, adsorption rate, organic content and texture. The laboratory report shall include recommendations for adjusting fertilizer and amendment quantities.

Waypoint Analytical, Inc.

4741 E. Hunter Ave, Suite A, Anaheim, CA 92807; (717-282-8777)

Wallace Laboratories, LLC

365 Coral Circle, El Segundo, CA 02345, (310-615-0016)

Soil Control Lab

Watsonville, CA (831-724-5422)

2. Upon approval of the laboratory's report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the soil preparation procedures, quantities of soil amendment, fertilizer and other additives shall be adjusted to conform with the report at no additional cost to the owner. Note that there is a minimum quantity of organic amendment specified elsewhere in this specification section.
3. Significant issues with soil quality will require soil to be retested in the locations identified on Soil Analysis Plan, prior to proceeding with plant installation, to ensure that the recommendations in the report have been followed and the In-Situ Topsoil is agriculturally suitable as described in Part 2.

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms. Subsoil is defined as either existing site soil located below the topsoil prior to

- construction activities, or select fill used for rough grading during construction. Subsoil cannot be considered for use as planting soil.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
 - C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches (50 mm) in diameter; and free of weeds, roots, toxic materials, or other non-soil materials.
 - D. Planting Soil: Approved existing topsoil or imported planting soil, meeting the requirements herein. Subsoil cannot be considered for use as planting soil.

1.4 SUBMITTALS, per Section 01 3300.

- A. The following shall be submitted to the landscape architect for approval prior to the installation of landscape materials and products.
 - 1. Manufacturer's Technical data sheets for fertilizers, turf, and all other products and materials listed herein.
 - 2. Manufacturer's technical data sheets for amendments. Reports to be dated no more than 3 months prior to soil preparation.
 - 3. 1-pint samples of imported soils, organic amendments/compost, mulches, and stones.
- B. Submit planting soil and organic amendment laboratory reports a minimum of [3] weeks prior to beginning soil prep. See below for required soil analysis reports.
- C. Required Soil Analysis Reports. Reports to be dated no more than [3] months prior to soil preparation.
 - 1. Soil Analysis Plan: Contractor to submit annotated plan showing confirmed locations of all required soil tests. Each location is to be identified with a unique label.
 - 2. Existing Planting Soil Analysis: After approval of the Soil Analysis Plan, rough grading, and topsoil placement, contractor to obtain 3 representative samples of in situ topsoil taken from approved site locations at depth of 4" to 6" below finish grade and submit to an accredited soils testing laboratory for "agricultural suitability" analysis, including particle size, infiltration rate, and evaluation of physical and chemical properties of soil and recommendations for adding amendments and fertilizers to the soil.
 - 3. Subsoil Analysis: In addition to the above required soil samples, contractor to obtain one representative sample of any subgrade soil that is to receive a layer of imported planting soil over it. The laboratory report shall include the soil's infiltration rate, total combined silt and clay content for determining the total allowable combined silt and clay content of the imported planting soil specified herein.
 - 4. Imported Planting Soil Analysis: Contractor to submit an "agricultural suitability" analysis report from an accredited soils testing laboratory, including particle size, infiltration rate, and evaluation of physical and chemical properties of soil and recommendations for adding amendments and fertilizers to the soil. Soil to conform to requirements in Part 2.
 - 5. Amended Planting Soil Analysis: Significant issues with soil quality will require soil to be retested in the locations identified on Soil Analysis Plan, prior to

proceeding with plant installation, to ensure that the recommendations in the report have been followed and the final Planting Soil is agriculturally suitable as described in Part 2.

- D. The Contractor is responsible to follow all local water ordinances and make available to the local agency the soil analysis report and verification of its implementation as required.
- E. Delivery Receipts upon request by Owner, provide delivery receipts for quantities of soil & amendments delivered to the site.
- F. Plant sample of each variety of plant. Samples to be delivered to the site 2 weeks prior to plant installation and stored and maintained separately from entire quantity of delivered plants. Contractor to maintain plants throughout maintenance period. Plants to be reviewed in a single site visit.
- G. Representative photos of each plant species. Photos to be of plants to be delivered to site and not a stock photograph.
- H. Entire plant quantity delivered to the site. Plants to be reviewed prior to installation during a single site visit.
- I. Representative photos of each tree species (unless trees previously tagged at nursery by landscape architect). Photos to be of trees to be delivered to site and not a stock photograph.

1.5 WARRANTY AND REPLACEMENT

- A. Maintenance Period: See Part 3.
- B. Warrant the work against weed growth for a period of four (4) months after application of Pre-Emergence Weed Killer.
- C. Warrant all plants to be in a healthy, thriving condition until the end of the maintenance period, and deciduous trees, shrubs and vines beyond that time until active growth is evident.
- D. Replace all dead and damaged plants and plants not in a vigorous condition immediately upon discovery and as directed by the Owner's Representative and at no cost to the owner. Install replacement plants before the final acceptance of the maintenance period in the size specified.
- E. Warrant all products, prepared soils and plant material installed and maintained by contractor against defects for a period of one year after final acceptance of the maintenance period.

PART 2 - PRODUCTS

2.1 SUBSOIL

- A. Submit soil analysis report from an approved soils laboratory for approval by the Landscape Architect. Refer to Part 1 for soil testing requirements.

2.2 EXISTING PLANTING SOIL (ON-GRADE):

- A. Existing Planting Soil is defined as on-site topsoil that is either to be removed and stockpiled for reuse or to remain in place during construction. Satisfactory planting soil shall be free of subsoil, clay, lumps, stones, and other objects over 4" in diameter, and without weeds, roots, and other objectionable material. The soil shall be fertile, friable, natural, productive soil containing a normal amount of humus, and shall be capable of sustaining healthy plant life. 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, equisetum, or Bermuda grass, etc.
- B. If herbicide contamination is suspected then a radish/ryegrass growth trial must be performed. Consult with Landscape Architect prior to decision to test or not.
 - C. Amended Planting Soils are to conform with the following target levels. Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

| | | | |
|----------------|--------------------|-----------|---------------|
| pH value | 6.5-7.9, | iron | 4-15 mg/kg |
| lime | none present | manganese | 0.6-3.0 mg/kg |
| salinity (ECe) | 0.5-3 milli-mho/cm | zinc | 1-3 mg/kg |
| chloride | <150 ppm | copper | 0.2-3.0 mg/kg |
| nitrate | 20-30 ppm | boron | 0.2-0.5 mg/kg |
| SAR | <3 | magnesium | 25-100 mg/kg |
| phosphorus | 8-20 mg/kg | sodium | <200 mg/kg |
| potassium | 60-180 mg/kg | sulfur | 25-100 mg/kg |

- D. If sufficient on-site surface topsoil is not available, contractor to provide imported planting soil as specified below. Placement of dissimilar soils shall be coordinated with irrigation zones by the contractor to maintain separate valves for dissimilar soils.
- E. Submit soil analysis report from an approved soils laboratory for approval by the Landscape Architect. Refer to Part 1 for soil testing requirements.

2.3 IMPORTED PLANTING SOIL (ON-GRADE):

- A. Imported planting soil shall be screened and shall be free of subsoil, heavy or stiff clay, rocks, gravel, brush, roots, weeds, noxious seeds, sticks, trash, and other deleterious substances.
- B. Imported Planting Soils are to conform with the following target levels. Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

| | | | |
|----------------|--------------------|-----------|---------------|
| pH value | 6.5-7.9, | iron | 4-15 mg/kg |
| lime | none present | manganese | 0.6-3.0 mg/kg |
| salinity (ECe) | 0.5-3 milli-mho/cm | zinc | 1-3 mg/kg |
| chloride | <150 ppm | copper | 0.2-3.0 mg/kg |
| nitrate | 20-30 ppm | boron | 0.2-0.5 mg/kg |
| SAR | <3 | magnesium | 25-100 mg/kg |
| phosphorus | 8-20 mg/kg | sodium | <200 mg/kg |
| potassium | 60-180 mg/kg | sulfur | 25-100 mg/kg |

- C. The silt and clay content of Imported Planting Soil shall not exceed that of the existing soil it is to be placed over. Except where otherwise required, it shall be a "Sandy Loam" as classified in accordance with USDA Standards with a combined total of between 25% to 40% Clay and Silt.
- D. **Submit soil analysis report** from an approved soils laboratory for approval by the Landscape Architect. Refer to Part 1 for soil testing requirements.
- E. Following approval of the sample, provide a one-half cubic yard sample, which shall be stored at the site of work for comparison with sample and subsequent loads of soil. The comparison sample shall be protected by a cover until the installation of all soil has been completed and accepted.

2.4 PLANTING SOIL FOR STORMWATER TREATMENT

- A. Planting soil for stormwater treatment shall be used in landscape areas designed for infiltration and the filtration of stormwater runoff before entering the storm drain system as specified below and as shown in drawings.
- B. Planting soil mixes for stormwater treatment are available from TMT Enterprises in San Jose, CA, (408-432-9040); American Soil and Stone in Richmond, CA (510-292-3000) and San Rafael, CA (415-456-1381); and Lyngso Garden Materials in Redwood City, CA, (650-364-1730); or approved equal.
- C. Planting soil for stormwater treatment shall conform to the following:
 - 1. All material shall be free of trash and debris, expansive clays or any other deleterious materials
 - 2. Material shall be free of seeds.
 - 3. The mineral component shall be classified as USDA sand or loamy sand and shall conform to the following particle size and characteristics.

| <u>US Sieve</u> | <u>Size (mm)</u> | <u>Class</u> | <u>% wt. retained</u> |
|-----------------|------------------|--------------|-----------------------|
| #10 | 2.0 | Gravel | 0-10 |
| #35 | 2.0-0.5 | coarse sand | 20-35 |
| #270 | <0.05 | Silt & Clay | 6-12 |

Rock ½ inch – 1 inch = 0-5% by volume with none > 1 inch
 Organic = 0-3% by weight

- 4. Percolation Rate must fall in the range of 10 inches per hour Initial Rate and 5 inches Sustained Rate as determined by SPL method A06-2, unless otherwise specified by civil engineer.
 Chemistry Suitability Considerations
- 5. Salinity: Saturation Extract Conductivity (ECe) Less than 3.0 dS/m @ 25o C.
 Sodium: Sodium Adsorption Ratio (SAR) Less than 6.0
 Boron: Saturation Extract Concentration Less than 1.0 ppm
 Reaction: pH of Saturated Paste: 5.5 – 7.8 without high lime content.

Top 6” should be amended with the approved organic composted yard waste. See Part 3 for amendment procedures.

- D. Submit Soil analysis report(s) for approval by the Landscape Architect and Civil Engineer. Refer to Part 1 for soil testing requirements.
 - 1. Submit soil analysis report (including infiltration rate) for planting soil mix for stormwater treatment from an approved soils laboratory.
 - 2. Submit subsoil analysis report (including infiltration rate) for subsoils if planting area is designed to allow stormwater to infiltrate into native subsoils.

2.5 ORGANIC AMENDMENT FOR PLANTING SOILS (ON-GRADE):

- A. Ground Redwood or Ground Fir Bark with the following properties:

| <u>Percent Passing</u> | <u>Sieve Designation</u> |
|------------------------|--------------------------|
| 100 | 9.51 mm 3/8" |
| 50-60 | 6.35 mm 1/4" |
| 20-40 | 4.76 mm No. 4 |
| 0-20 | 2.38 mm No. 8 8 mesh |

Redwood Sawdust

| | |
|--|--------------|
| Dry bulk density, lbs. per cu. yd. | 260-280 |
| Nitrogen stabilized - dry weight basis | 0.4% minimum |
| Salinity (ECe): | 4.0 maximum |
| Organic Content: | 90% minimum |
| Reaction (pH): | 4.0 minimum |

Ground Fir and/or Pine Bark

| | |
|---|--------------|
| Dry bulk density, lbs. per cu. yd. | 350 minimum |
| Nitrogen stabilized - dry weight basis, | 0.5% minimum |
| Salinity (ECe): | 4.0 maximum |
| Organic Content: | 90% minimum |
| Reaction (pH): | 4.0 minimum |

- B. Submit sample, product’s technical data sheet, and analysis report from an approved soils laboratory for approval by the Landscape Architect. The analysis report should include compliance to the specifications above and directions for product use.
- C. Contractor may use Composted Yard Waste Amendment in lieu of the above specified Organic Amendment pending approval of product’ technical data sheet.

2.6 COMPOSTED YARD WASTE AMENDMENT FOR PLANTING SOILS (ON-GRADE):

- A. The above ORGANIC AMENDMENT FOR PLANTING SOILS (ON-GRADE) is the specified organic amendment material. Acceptance of Composted Yard Waste Amendment in lieu of the above specified amendment material will be considered if the in situ planting soil salinity and soil structure is favorable for the inclusion of recycled yard waste organic matter, as approved by the Landscape Architect.
- B. Composted yard waste amendment will not be accepted for use in on-structure raised planters and pots.
- C. The composted yard waste amendment shall be a mixture of feedstock materials including green material consisting of chipped, shredded, or ground vegetation and mixed food waste, or clean processed recycled wood products. Single source, biosolids (sewage waste) compost will not be acceptable.
- D. The addition of the compost shall result in a final ECe of the amended soil of less than 4.0 dS/m @ 25 degrees C. as determined in a saturation extract. Use the following table to determine the maximum allowable Ece (dS/m of saturation extract) of compost at desired use rate and allowable Ece increase.

| DESIRED USE RATE | | MAXIMUM ALLOWABLE Ece INCREASE FROM AMENDMENT | | |
|---|--------------------------------|---|--------|--------|
| Cu. Yds. Amendment Per 1000 Sq. Ft. for Incorporation to 6” depth | Volume percentage of amendment | 1 dS/m | 2 dS/m | 3 dS/m |
| | | Maximum ECe of Compost | | |
| 1 | 5 | 14 | 28 | 42 |
| 2 | 11 | 7 | 14 | 21 |
| 3 | 16 | 5 | 9.5 | 14 |
| 4 | 22 | 3.5 | 7 | 10.5 |
| 5 | 27 | 3 | 5.5 | 8.5 |
| 6 | 32 | 2.5 | 4.5 | 7 |

Example: Specification calls for 6 cu. Yrds. Compost per 1000 sq. ft. for incorporation to 6" depth, and site soil has an ECe of 2.0. In order to avoid exceeding ECe of 4 in final blend, compost ECe shall be less than 4.5 dS/m.

E. Composted Yard Waste Soil Amendment properties to conform to the following:

1. Gradation:

| <u>% Passing by weight</u> | <u>Sieve Designation</u> |
|----------------------------|--------------------------|
| 90 | 1/2" |
| 85-100 | 9.51 mm 3/8" |
| 50-80 | 2.38 mm No. 8 |
| 0-40 | 500 micron No. 35 |

2. Organic Content: Minimum 50% based on dry weight and determined by ash method. Minimum 250 lbs. organic matter per cubic yard of compost.

3. Carbon to nitrogen ratio: Maximum 35:1 if material is claimed to be nitrogen stabilized.

4. pH: 5.5 – 8.0 as determined in saturated paste.

5. Soluble Salts: See D. above.

6. Moisture Content: 35-60%.

7. Contaminants: The compost shall be free of contaminants such as glass, metal and visible plastic. Heavy meals, fecal coliform and Salmonella shall not exceed levels outlined as acceptable in the California integrated waste management regulations.

8. Maturity: Physical characteristics suggestive of maturity include:

a. Color: Dark brown to black.

b. Acceptable Odor: None, soil-like, or musty.

c. Unacceptable Odor: Sour, ammonia or putrid.

d. Particle Characterization: Identifiable wood pieces are acceptable, but the balance of the material shall be soil-like without recognizable grass or leaves.

F. Submit sample, product's technical data sheet, and analysis report from an approved soils laboratory for approval by the Landscape Architect. The analysis report should include compliance to the specifications above, directions for product use, and a list of ingredients. It is the Contractor's responsibility to secure test of the proposed composted yard waste amendment (2 quart sample) and submit to a Soils Laboratory for evaluation and recommendations. The composted yard waste amendment sample shall be a grab sample from the currently available material that has been tested within the last 30 days and shall include the composter's Compost Technical Data Sheet that includes lab analytical test results and directions for product use along with list of ingredients. Refer to Part 1 for soil testing requirements.

G. Based on the Soils Laboratory evaluation, the addition of composted yard waste amendment shall not be acceptable if it creates a leaching requirement.

2.7 IMPORTED PLANTING SOIL (ON-STRUCTURE):

A. Imported planting soil for on-structure applications is defined as soil to be installed in all pots and raised planters located over architectural structures.

B. The soil profile for all pots and on-structure raised planters to be as follows:

1. Base Soil: installed to minus 12 inches from finish grade.

2. Topsoil: installed only in the top 12 inch soil layer.
- C. “Base Soil” shall be a mix of 50% Angular Planter Sand and 50% Lava Rock.
- D. Topsoil shall be delivered to the site in a damp condition and installed immediately to prevent the loss of humus content due to wind. Topsoil shall be a mix of 65% “Base Soil” for raised planter and 35% specified Organic Amendment and fertilizer ingredients listed below.

| | |
|------------|------------------------------|
| 0.75 pound | Potassium Nitrate 13-0-44 |
| 0.5 pound | Calcium Nitrate 15.5-0-0 |
| 0.5 pounds | Urea Formaldehyde 38.0 0 |
| 2.5 pounds | Single Superphosphate 0-25-0 |
| 4.0 pounds | Calcium Carbonate Lime |
| 4.0 pounds | Kaiser 65 Dolomite |
| 1.0 pounds | Iron Sulfate (min. 20% Fe) |

- E. Submit soil analysis report from an approved soils laboratory for approval by the Landscape Architect. Refer to Part 1 for soil testing requirements.

2.8 ORGANIC AMENDMENT FOR PLANTING SOILS (ON-STRUCTURE):

- A. Ground Fir Bark with the following properties (Redwood bark is not acceptable):

| <u>Percent Passing</u> | <u>Sieve Designation</u> |
|------------------------|---------------------------|
| 100 | 9.51 mm 3/8" |
| 95-100 | 6.35 mm 1/4" |
| 80-100 | 4.76 mm No. 4 |
| 60-100 | 2.38 mm No. 8 8 mesh |
| 20-70 | 1.00 mm No. 18 16 mesh |
| 0-30 | 500 micron No. 35 32 mesh |

Ground Fir and/or Pine Bark
Dry bulk density, lbs. per cu. yd., Min. 350
Nitrogen stabilized - dry weight basis, min. 0.5%
Salinity (ECe): 4.0 maximum
Organic Content: 90% minimum
Reaction (pH): 4.0 minimum

- B. Submit sample, product’s technical data sheet, and analysis report from an approved soils laboratory for approval by the Landscape Architect. The analysis report should include compliance to the specifications above and directions for product use.

2.9 PLANTS

- A. Plant the variety, quantity and size indicated on drawings. The total quantities indicated on the drawings are considered approximate and furnished for convenience only. Contractor shall perform plant quantity calculations and provide all plants shown on the drawings.
- B. Measure trees and shrubs with branches in normal position. Height and spread dimensions indicated refer to the main body of the plant, and not from branch tip to tip.
- C. Take precautions to ensure that the plants will arrive at the site in proper condition for successful growth. Protect plants in transit from windburn and sunburn. Protect and maintain plants on site by proper storage and watering.
- D. Install healthy, shapely and well rooted plants with no evidence of having been root-bound, restricted or deformed.

- E. Tag plants of the type or name indicated and in accordance with the standard practice recommended by the American Association of Nurserymen.
- F. Substitutions will not be permitted, except as follows:
 - 1. If proof is submitted to the Landscape Architect that any plant specified is not obtainable, a proposal will be considered for use of nearest equivalent size or variety with an equitable adjustment of contract price.
 - 2. Substantiate and submit proof of plant availability in writing to the Landscape Architect within 10 days after the effective date of Notice to Proceed.
- G. Tree Form
 - 1. Trees shall have a symmetrical form as typical for the species/cultivar and growth form.
 - 2. Central Leader for Single Trunk Trees: Trees shall have a single, relatively straight central leader and tapered trunk, free of co-dominant stems and vigorous, upright branches that compete with the central leader. Preferably, the central leader should not have been headed; however, in cases where the original leader has been removed, an upright branch at least ½ the diameter of the original leader just below the pruning point shall be present.
 - 3. Potential Main Branches: Branches shall be evenly distributed radially around and appropriately spaced vertically along the trunk, forming a generally symmetrical crown typical for the species.
 - 4. Headed temporary branches should be distributed around and along the trunk as noted above and shall be no greater than 3/8" diameter, and no greater than ½ diameter of the trunk at point of attachment.
- H. Tree Trunk
 - 1. Trunk diameter and taper shall be sufficient so that the tree will remain vertical without the support of a nursery stake.
 - 2. Trunk shall be free of wounds (except properly-made pruning cuts), sunburned areas, conks (fungal fruiting-bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers and/or lesions.
 - 3. Tree trunk diameter at 6" above the soil surface shall be within the diameter range shown for each container size below, except where shown otherwise:

| <u>Container</u> | <u>Trunk Diameter</u> | <u>Soil level from Container Top</u> |
|------------------|-----------------------|--------------------------------------|
| 5 gallon | 0.5" to 0.75" | 1.25 to 2" |
| 15 gallon | 0.75" to 1.0" | 1.75 to 2.75" |
| 24" Box | 1.5" to 2.5" | 2.25 to 3" |
| 36" Box | >2.5" | 2.25 to 3" |
| 60" Box | >2.5" | 3-6" |
 - 4. Tree trunks shall be undamaged and uncut with all old abrasions and cuts completely callused over. Do not prune plants prior to delivery.
- I. Tree Roots
 - 1. Trunk root collar (root crown) and large roots shall be free of circling and/or kinked roots. Contractor may be required to remove soil near the root collar in order to verify that circling and/or kinked roots are not present.
 - 2. The tree shall be well rooted in the container. When the trunk is lifted the trunk and root system shall move as one and the rootball shall remain intact.
 - 3. The top-most roots or root collar shall be within 1" above or below the soil surface. The soil level in the container shall be within the limits shown in above table.

4. The rootball periphery shall be free of large circling and bottom-matted roots.
5. On grafted or budded trees, there shall be no suckers from the root stock.

2.10 TURF GRASS

- A. Turf Sod: Blends as follows:
Tall Fescue Sod Mix or to match existing turf mix
80% to 90% Dwarf-type Fescue and Tall-type Fescue
10% to 20% Blue Grass
Available from Delta bluegrass (800) 637-8873

2.11 FERTILIZERS

- A. General Landscape Fertilizers
 1. Commercial fertilizer, pelleted or granular form, conform to the requirements of Chapter 7, Article 2, of the Agricultural Code of the State of California for fertilizing materials as follows:

Type A:

6% Nitrogen, 20% Phosphorus Acid and 20% Potash, (6-20-20)

Type B:

21 gram planting tablets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Agriform or 10gm BestPacks packets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Best Fertilizer Co.

Type C (Maintenance Fertilizer)

Complete fertilizer 21% Nitrogen, 7% Phosphoric Acid and 14% Potash (21-7-14).

2. If commercial fertilizer having the above analysis is not obtainable, other similar commercial fertilizer may be used providing it meets the approval of the Landscape Architect.

- B. Sod Fertilizer

1. Provided by grower.

2.12 IRON SULFATE: Dry form.

2.13 PERFORATED DRAIN PIPE

- A. Polyvinyl Chloride (PVC) pipe and pipe fittings shall meet extra strength minimum of SDR-35 of the requirements of ASTM Specification D3034.
- B. Perforated and non-perforated corrugated polyethylene pipe, 3- to 10-inch diameter, shall meet the requirements of ASTM D883 and ASTM F412, and shall conform to Section 68 of the Standard Specifications.
- C. Corrugated polyethylene pipe fittings shall comply with all requirements of AASHTO M-252-85I for 3- to 10-inch diameter pipe. Couplings shall be split or snap-on type for perforated pipe and split couplings with gaskets for non-perforated pipe. Cutting pipe with integral couplings will not be allowed.
- D. Corrugated polyethylene pipe and fittings manufactured by Advanced Drainage Systems, Inc., shall be considered the standard to determine compliance to this specification.
- E. Inspection Tube Cap: Paint cap one coat chocolate-brown color using Flat, exterior grade latex paint as accepted by Owner's Representative.

- 2.14 FILTER FABRIC / PERMEABLE LANDSCAPE FABRIC
- A. Polyester or polypropylene non-woven filter fabric with uniform fiber distribution by "Terra Bond" #1115, "Mirafi, Inc." #140N, or approved equal.
- 2.15 PERMEABLE DRAIN ROCK
- A. Permeable drain rock used in subsurface drain installations to be Class 2 permeable material in conformance with Section 68 "Subsurface Drains" of the Standard Specifications; gradation to 3/4" maximum size. Submit Sample for approval.
- 2.16 ROOT BARRIER
- A. UB 18-2 as manufactured by Deep Root Corporation (800) 458-7668, Root Solutions, Inc. (800) 554-0914, or equal. Install a minimum of 6 panels/12 linear feet centered on each tree, where tree is within 8 feet of sidewalk, paving, or utilities.
- 2.17 LANDSCAPE EDGING
- A. Aluminum Edging, 3/16" X 4" by 8' black anodized finish with 12" min long stakes set 1/2" below grade at each joint and maximum 4' spacing, in-line joints without offset or double thickness, by Sure-Loc, Aluminum Pro, or approved equal.
- 2.18 HEADER BOARD
- A. 2x6 composite wood for header staked with 2x4x18 inches redwood stakes on all straight and curving sections. Maximum spacing of stakes 4 feet.
- 2.19 TREE STAKES
- A. Lodge pole pine logs, clean, smooth, un-treated.
 - B. Unless otherwise shown on drawings, provide two-inch (2") diameter by eight feet (8') long for trees less than 8' high and 1" caliper.
 - C. Unless otherwise shown on drawings, provide three-inch (3") diameter by eight to ten feet (8' - 10') long for trees greater than 8' high and 1" caliper.
 - D. 2" and 3" O.D. Lodge pole tree stakes, painted black
- 2.20 TREE TIES
- A. Unless otherwise shown on drawings, provide rubber strap, 24-inch minimum length without sharp edges adjacent to trunk, V.I.T. cinch-tie, Dublin, CA, (818)882-9530, or approved equal.
 - B. Black corded rubber tree ties w/ clips by greensleeves.com
- 2.21 TREE GUYING SYSTEM:
- A. For trees up to 3" caliper, 3/16" galvanized steel cable, with rubber tree collar, 12" minimum long, and secured with cable clamp, and attached to anchor for below-grade location, Duckbill Model 40 DTS, or approved equal.
 - B. For trees 3" to 6" caliper, 3/16" galvanized steel cable with rubber tree collar, 18" minimum long, and secured with cable clamp, 3" take-up eye to eye turnbuckle, and attached to anchor for below-grade location, Duckbill Model 68 DTS, or approved equal.
- 2.22 VINE SUPPORT SYSTEM:
- A. Provide vertical supports for all vines as required for vines to climb onto shown horizontal supports (trellis, arbor, etc.). Vertical support shall be 3/16" stainless steel cables secured taut with in-line end fasteners at ground and top of structure. Anchor

cable at ground with 1 inch by 15 inch galvanized pipe stake driven flush with drilled hole to receive the cable. Train vine branches to supports with green nursery tape.

2.23 MULCH

- A. Organic Mulch:
 - 1. Fir tree or pine tree bark, dark in color; 3/4-inch to 1-inch size.
 - 1. Decorative Fir bark, dark in color; Medium 1/2-inch to 1-1/2-inch size.
- B. Rock Mulch:
 - 1. Hard, durable smooth, river washed stone, 3/4-inch to 1-inch diameter in brown color range, Lin Creek or equal.
- C. Submit samples of rock mulch for approval by Landscape Architect until acceptable to Owner, at no extra cost.

2.24 STONES

- A. Smooth 2”-8” tan river pebbles, Lin Creek or equal.
- B. Stones to be installed around Drainage Structures to prevent mulch from migrating into stormdrain, and where shown in drawings

PART 3 - EXECUTION

3.1 PLANT PROTECTION AND REPLACEMENT

- A. Inspect and protect all existing and new plants and trees against damage from construction activities, erosion, trespass, insects, rodents, deer, disease, etc. and provide proper safeguards, including trapping of rodent and applying protective sprays and fencing to discourage deer browsing. Maintain and keep all temporary barriers erected to prevent trespass.
- B. Repair all damaged planted areas. Replace plants and re-seed or re-sod turf immediately upon discovery of damage or loss.

3.2 TOPSOIL STRIPPING AND STOCKPILING

- A. Strip existing planting soil to whatever depths encountered in areas that may be compacted due to construction activities and in a manner to prevent intermingling with the underlying subsoil or other objectionable material. Topsoil stripping is limited to area outside “Drip Line” of existing trees to remain and areas indicated on drawings and as approved by the Owner's Representative.
- B. Remove heavy growths of grass from areas before stripping.
- C. Stockpile existing planting soil in storage piles in areas shown, or where designated by Owner. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.
- D. If herbicide contamination is suspected then a radish/ryegrass growth trial must be performed. Consult with Landscape Architect prior to decision to test or not.

3.3 LIME TREATED SOIL

- A. If site work includes Lime Treatment of the subsoil, the Contractor shall remove full depth of treated soil beyond 12” from structure(s) and replace with approved planting soil.
- B. Following removal of lime treated material, scarify subgrade to a minimum depth of 6 inches and test for drainage.
- C. Test subgrade in all planting areas for drainage by flooding with minimum 4-inch depth of water puddle and verify complete absorption of standing water within two hours. If standing water is still present after two hours, provide perforated pipe and drain rock "French Drain" system in bottom of non-draining planters and connect to storm drainage

system, as accepted by Owner's Representative prior to backfilling with approved planting soil.

3.4 GENERAL PREPARATION OF PLANTING SOIL

- A. Submit soil analysis report of amended soils from an approved soils laboratory for approval by the Landscape Architect. Refer to Part 1 for soil testing requirements.
- B. All planting soils to be amended as specified in soil laboratory analysis report(s).
- C. Provide a minimum of [12"] depth of amended planting soil in all planting areas, or more where shown or specified otherwise. Install soil in maximum [12"] lifts. Compact each lift prior to installing subsequent lifts.
- D. Thoroughly wet down the planting areas to settle the soil and confirm irrigation coverage and operation. Allow soil to dry so as to be workable as described herein.
- E. After the rototill work, float areas to a smooth, uniform grade as indicated on the drawings. Slope all planting areas to drain. Roll, scarify, rake and level as necessary to obtain true, even planting surfaces. Remove rocks, sticks and debris 1 inch and larger in size in turf areas and 2 inches or larger in shrub and ground cover areas. Secure approval of the grade by the Landscape Architect before any planting.
- F. Prior to planting, soil shall be loose and friable to a minimum depth of [12"] with a relative maximum compaction of 85%. Rip and scarify any overly compacted and re-compacted planting areas (in two directions full depth of compacted soil) prior to planting.
- G. Water settling, puddling, and jetting of soil and backfill materials as a compaction method is not acceptable.
- H. Prior to planting, soil shall be moist, but not so moist that it sticks to a hand shovel. Do not work planting soil in a wet or muddy condition or dump or spread in areas where subgrade is not in proper condition.
- I. Provide planting soil as a final lift in all planting areas within and adjacent to paved areas and other construction where native site soil has been covered by engineered fill and/or base rock. Unless otherwise shown or specified, finish grade in planting islands shall be crowned with a minimum 2% pitch to drain.
- J. Finish Grade: Hold finish grade and/or mulch surface in planting areas 1/2-inch below adjacent pavement surfaces, tops of curbs, manholes, etc. The subgrade of the mulch in mulched planting areas shall be a minus 2 inches at a distance of 12 to 18 inch from the edge of pavement. Drag finish grade to a smooth, even surface. Grade to form all swales and berms. Pitch grade with uniform slope to catch basins, streets, curb, etc., to ensure uniform surface drainage. Areas requiring grading include adjacent transition areas that shall be uniformly sloped between finish elevations. Slope surface away from walls so water will not stand against walls or buildings. Control surface water to avoid damage to adjoining properties or to finished work on the site. Take required remedial measures to prevent erosion of freshly graded areas.
- K. Planting operations shall be performed only during periods when beneficial results can be obtained. When excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped until conditions are satisfactory.

3.5 PREPARATION OF IN-SITU PLANTING SOIL

- A. In-Situ Planting Soil is defined as top soil left in its original place and undisturbed during construction activities which is to receive new planting
- B. Except within tree driplines, rip all planting areas in two directions full depth to a minimum of [12"] into undisturbed native subsoil prior to amending. Scarification of any planting area which cannot be accomplished with a tractor shall be accomplished by an

- alternative method approved by the Owner's Representative to the specified depth to ensure proper percolation/drainage.
- C. Inspect planting areas and remove all base rock and other foreign material. Verify placement of planting soil within dripline of trees with Owner's Representative.
 - D. Test depth of loose soil with hand shovel in presence of Owner's Representative in several locations as directed.
 - E. After acceptance of the planting condition, uniformly mix and amend soil with required fertilizers, nutrients, etc. per specifications herein and recommendations given in soils reports.
 - F. In the case of a contradiction between the quantity of organic amendment required by the soils laboratory analysis and the specified quantity below, the greater of the two quantities shall take precedence. Spread organic amendment, iron and Type A fertilizer evenly over installed and rough graded on-site topsoil in all planting areas including turf, ground cover and shrub areas at the following rates:
 - 1. Organic Amendment: 6 cubic yards per 1,000 square feet
 - 2. Fertilizer: Type A (6-20-20) at 20 lbs. per 1,000 square feet.
 - 3. Iron Sulfate: 10 lbs. per 1,000 square feet
 - G. Rototill above additives into soil [8-12"] inches deep. Keep iron sulfate off pavement and other surfaces to prevent rust staining. Correct all rust damage to work.
 - H. Final planting soil shall have a pH range of 6.5 to 7.5.
- 3.6 PREPARATION OF IMPORTED PLANTING SOIL (ON-GRADE)
- A. Uniformly distribute and spread Subsoil or select fill in planting areas to achieve rough grading and compact to a maximum of 85% relative compaction.
 - B. Except within tree driplines, rip all planting areas in two directions full depth to a minimum of [12" into undisturbed native subsoil prior to backfilling. Scarification of any planting area which cannot be accomplished with a tractor shall be accomplished by an alternative method approved by the Owner's Representative to the specified depth to ensure proper percolation/drainage.
 - C. Thoroughly water-settle subsoil to required subgrade prior to installing Top Soil.
 - D. Prior to placing planting soil secure the Owner's Representatives acceptance of the planting areas subgrade condition. Test depth of loose soil with hand shovel in presence of Owner's Representative in several locations as directed.
 - E. After acceptance of the planting areas subgrade condition, uniformly distribute and spread planting soil backfill over scarified subgrade in planting areas as specified.
 - F. Mix and amend soil with required fertilizers, nutrients, etc. per specifications herein and recommendations given in soils reports.
- 3.7 SOIL PREPARATION FOR STORMWATER TREATMENT PLANTING AREAS
- A. Earthwork, rough grading, and drainage materials shall be complete and approved prior to installation of planting soil.
 - B. Do any necessary finish grading in addition to that performed in accordance with earthwork to bring subgrades after final compaction to required grades and sections as indicated.
 - C. Install the approved specified soil mix for infiltration planting areas as shown in Drawings. Soil depth to be 18" minimum typical and 24" minimum for planting areas with trees, unless otherwise shown on drawings.
 - D. After placement of the mineral component, the top 6" should be blended with the approved compost for stormwater treatment planting areas. If bulk blended, proportions should be 1 part compost to 4 parts of the above mineral component. If blended in place, this is equivalent to 4 ½ cubic yards or 1,000 square feet for blending to 6-inch depth

- E. If organic content of the mineral component is less than 0.6% weight, then it should be blended with compost in volume proportions of 5% compost to 95% mineral.
- F. Finish Grade: Provide a smooth, even surface. Side slopes of stormwater planting areas (eg. bioswales, basins, etc) not to exceed 3:1 in any direction. Finish grade of flow through planters to be as shown in drawings.

3.8 WEED GERMINATION

- A. Work shall be done under the supervision of a person licensed by the State of California as a pest control applicator and holding a qualified applicator license or a Qualified Applicator Certificate.
- B. Following soil preparation and fine grading of planting areas, irrigate the planting areas to germinate any weed seeds for a minimum period of 21 days. Maintain the soil in a damp condition for a minimum depth of 4 inches. Following approval of the weed germination by the Owner's Representative, spray kill the weeds using a short lived systemic weed killer that will not affect subsequent planting. Confirm the weed kill and allow the soil to dry out to optimum degree for planting prior to planting.

3.9 ROOT BARRIER

- A. Install in continuous sheet parallel and adjacent to curb or pavement edge as required on drawings and in accordance with manufacturer's recommendations. Set top of barrier approximately 1/2-inch above finished soil surface to allow concealment with mulch, as accepted by Owner's Representative

3.10 ALUMINUM EDGING

- A. Install as shown in drawings in continuous strips as indicated and in accordance with manufacturer's recommendations with stakes spaced 48 inches on center maximum and at all joints.

3.11 HEADER BOARD

- A. Install in continuous, smooth alignment as indicated with stakes spaced 48 inches on center maximum and at all joints.

3.12 TREE AND SHRUB PLANTING

- A. Mark tree and shrub locations on site using stakes, gypsum or similar approved means and secure location approval by the Landscape Architect before plant holes are dug. Adjust location as required prior to planting.
- B. Review location of plants in relationship to irrigation heads and adjust location(s) that interfere with the function of the spray heads. Adjust locations as required to ensure that the plant roots receive the proper amount of water in order for the plants to thrive.
- C. Square Tree Pits
 - 1. Drilled tree pits shall be modified to a square pattern with pit walls scarified to promote root penetration.
- D. Excavate tree, shrub and vine pits as follows:

| | <u>Width</u> | <u>Depth</u> |
|-------------------------------|--------------|--------------|
| Boxed Trees | Box + 24" | Box depth |
| Canned Trees (15 gc) | Can + 18" | Can depth |
| Canned Shrubs/Vines (1- 5 gc) | Can + 12" | Can depth |
- E. Test drainage of plant beds and tree pits by filling with water (minimum 6"). The retention of water in planting beds and plant pits for more than two (2) hours shall be brought to the attention of the Landscape Architect. If rock, underground construction

- work, tree roots, poor drainage, or other obstructions are encountered in the excavation of plant pits, alternate locations may be selected by Landscape Architect.
- F. Break and loosen the sides and bottom of tree pits to ensure root penetration and water test hole for drainage as required above.
 - G. Excavate plant hole or tree pit keeping excavated planting soil layer on the surface when backfilling around the plant. Carefully set plants as detailed without damaging the rootball. Superficially cut edge roots vertically on three sides. Remove bottom of plant boxes before planting. Remove sides of boxes after positioning the plant and partially backfilling.
 - H. Set plants in backfill with top of the rootball 1 inch above finished grade of adjacent soil. Backfill remainder of hole and soak thoroughly by jetting with a hose and pipe section. Water backfill until saturated the full depth of the hole.
 - I. Backfill plant holes with mix as specified, free from rocks, clods or lumpy material. Backfill native soil free of soil amendments under rootball and foot tamp to prevent settlement. Backfill remainder of the hole with soil mix and place plant tablets or packets (Type B fertilizer) 3 inches below finish grade and 1/2-inch from roots at the following rates:
 - J. 1 gallon can plant - 1 tablet or packet
 - 5 gallon can plant - 3 tablets or packet
 - 15 gallon can plant - 6 tablets or packet
 - 24-inch box plant - 6 tablets or packet
 - 36-inch box plant - 8 tablets or packet
 - K. Except for acid loving plants (Azaleas, Rhododendrons, Ferns, Camellias, etc.), use a soil mix of 2 parts soil from the hole, and 1 part amendment with iron added at the following rates:
 - 1 gallon can plants - iron, 1/4 cup
 - 5 gallon can plants - iron, 1/3 cup
 - 15 gallon can plants - iron, 1/2 cup
 - 24" box and larger - iron, 1 cup
 - 1. For acid loving plants (Azaleas, Rhododendrons, Ferns, Camellias, etc.), mix 1 part soil from the hole and 1 part amendment to use a backfill around the plants.
 - 2. Mix the iron, amendment and soil thoroughly for use in the top 8 inches of backfill around plants. For acid loving plants, mixture to be 1/2 soil from the hole and 1/2 amendment.
 - L. Remove any soil from top of plant rootball and secure Landscape Architect's approval of rootball height prior to mulching.
 - M. After approval of rootball height, install mulch as required below.
 - N. Stake and/or guy trees as detailed. Drive stake(s) until solid (at least 12" beyond bottom of rootball) and remove excess stake protruding above top tree tie to prevent rubbing against branches. Avoid driving stakes through rootball. If subgrade does not accept stakes to a stable degree, delete stakes and guy the trees as specified herein and as detailed. Locate tree ties to avoid contact with tree branches. Locate top tie at tree flex point.
 - O. Build watering basin berms around trees and shrubs to drain through rootball. Basins are not required around trees in turf areas. Water backfill until saturated the full depth of the hole.

3.13 GROUND COVER PLANTING

- A. Plant in neat, straight, parallel and staggered rows as indicated on plan. Plant first row one-half required ground cover spacing behind adjacent curbs, structures, or other plant bed limits. Plant ground cover to edge of water basins of adjacent trees and shrubs.

3.14 SODDED TURF

- A. Install sod to patch and repair existing turf area due to re-grading or other construction activities.
- B. Lightly roll surface and re-shape to level humps and hollows. Secure Landscape Architect's approval prior to sodding. Do not sod on dry soil.
- C. Lay first strip of sod along a straight line (use a string in irregular areas). Butt joints tightly, do not overlap edges. On second strip, stagger joints. Use a sharp knife to cut sod to fit curves, edges and sprinkler heads.
- D. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to sod and to water until installation is complete.
- E. After laying all sod, roll lightly to eliminate irregularities and to form good contact between sod and soil. Avoid a heavy roller and excessive initial watering.
- F. Thoroughly water the completed sod surface to at least 8 inches deep. Repeat sprinkling at regular intervals to keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application.
- G. Protect turf areas by erecting fences, barriers and signs necessary to prevent trespass. Keep barriers neat and well maintained.

3.15 MULCH

- A. Except where rock mulch is required, mulch all tree, shrub and ground cover areas with organic mulch to a 3-inch depth, except mulch to 2-inch depth where planting with ground cover plants from flats.
- B. Hold bark mulch away from base (trunk) of plant 4" or as directed by the Landscape Architect.
- C. Individual trees and/or shrubs planted in non-irrigated areas shall, at minimum, receive bark mulch over their watering basin and berm.
- D. No mulch is required around trees in turf areas.
- E. Install rock mulch to depth as detailed, minimum 2-inches for full coverage of soil surface, whichever is greater.

3.16 WATERING

- A. Water all trees, shrubs and ground cover immediately after planting. Apply water to all plants as often and in sufficient amount as conditions may require to keep the plants in a healthy vigorous growing condition until completion of the Contract. Provide supplemental hand watering of trees and shrubs, as required, to maintain a moist root zones throughout plant establishment period.

3.17 PRE-MAINTENANCE PERIOD REVIEW AND APPROVAL OF PLANTING

- A. Maintain plants from time of delivery to site until final acceptance of landscape installation.
- B. Receive approval of the installed planting prior to commencement of planting establishment maintenance period. Notify the Landscape Architect or Owner's Representative a minimum of seven (7) days prior to requested review. Before the review, complete the following:
 - 1. Complete all construction work.
 - 2. Present all planted areas neat and clean with all weeds removed and all plants installed and appearing healthy.
 - 3. Plumb all trees and tree and shrub supports.
 - 4. No partial approvals will be given.

3.18 PLANTING ESTABLISHMENT MAINTENANCE

A. General Requirements

1. **Maintenance Period:** The planting establishment maintenance period required shall be **120 calendar days** after all planting and irrigation is complete, turf is installed/seeded, and as approved by Owner's representative. A longer period may be required if the turf is not thick, vigorous and even and has been mowed a minimum of 4 times, or if the plant material is not acceptably maintained during the maintenance period. The start of the maintenance period to be confirmed by Owner's representative. Contractor to notify landscape architect of start and end dates of maintenance period. The maintenance period may be suspended at any time upon written notice to the Contractor that the landscaping is not being acceptably maintained, and the day count suspended until the landscape is brought up to acceptable standards as determined by the Owner Representative.
2. Planting establishment maintenance immediately follows, coincides with, and is continuous with the planting operations, and continues through turf installation, and after all planting is complete and accepted; or longer where necessary to establish acceptable stands of thriving plants.
3. Protect all areas against damage, including erosion, trespass, insects, rodents, disease, etc. and provide proper safeguards. Maintain and keep all temporary barriers erected to prevent trespass.
4. Keep all walks and paved areas clean. Keep the site clear of debris resulting from construction or maintenance activities.
5. Repair all damaged planted areas, and replace plants and resod turf immediately upon discovery of damage or loss.
6. Check sprinkler systems at each watering; adjust coverage and clean heads immediately. Adjust timing of sprinkler controller to prevent flooding.
7. Maintain adequate moisture depth in soil to ensure vigorous growth. Check rootball of trees and shrubs independent of surrounding soils and hand water as required.
8. Keep contract areas free from weeds by cultivating, hoeing or hand pulling. Use of chemical weed killers will not relieve the Contractor of the responsibility of keeping areas free of weeds at all times.

B. Tree and Plant Maintenance

1. Maintain during the entire establishment period by regular watering, cultivating, weeding, repair of stakes and ties, and spraying for insect pests. Prune when requested by the Landscape Architect.
2. Keep watering basins in good condition and weed-free at all times.
3. Replace all damaged, unhealthy or dead trees, shrubs, grasses, vines and ground covers with new stock immediately; size as indicated on the drawings.

C. Turf Maintenance:

1. Maintain during the entire establishment period. Cut as frequently as growth of grass requires. Cut to a height of two inches (2"), unless otherwise directed by the Landscape Architect.
2. Maintain constant moisture to a depth of eight inches (8").
3. Trim edges of turf at paving and headerboards at time of second cutting, and at each later cutting.
4. Keep a 2-foot diameter area at tree trunk free of turf at all times to serve as a mowing band. Do not create low area around base of tree.
5. Keep turf areas free of undesirable weeds and grasses by the application of suitable selective weed killers or hand pulling.
6. Re-sod any turf areas damaged by construction activities as soon as evident.

7. Repair any gaps, hollow, settled or eroded areas by filling, rolling and re-sodding.
- D. Fertilizing:
1. Upon approval and after submitting fertilizer delivery tags, maintenance fertilization shall begin 30 days after planting is complete. Fertilize all turf and ground cover areas by broad-casting Type C (21-7-14) fertilizer at the rate of 5 lbs. per 1,000 square feet evenly throughout. Reapply every forty-five (45) days until acceptable.
 2. During the winter, for quick turf greening effect, calcium nitrate (15.5-0-0) may be applied at the rate of 6 lbs. per 1,000 square feet.
 3. Early spring and fall substitute a complete fertilizer such as 15-15-15 applied at the rate of 6 lbs. per 1,000 square feet, to help insure continuing adequate phosphorus and potassium.
 4. Apply ammonium sulfate fertilizer as necessary to maintain vigorous, green grass between fertilizations mentioned above.
 5. Observe plant's color, and if a soil pH imbalance is suspected, take soil samples and obtain laboratory analysis for confirmation. Take necessary action recommended in laboratory analysis such as top dressing with soil sulfur, leaching soil, etc.

3.19 FINAL PLANTING REVIEW AND ACCEPTANCE

- A. At the conclusion of the Maintenance Period, schedule a final review with the Owner, the Owner's maintenance person, and/or the Landscape Architect. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, continue the planting establishment maintenance period at no additional cost to the Owner until all work has been completed. This condition will be waived by the Owner under such circumstances wherein the Owner has granted an extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the Agreement.
- B. Submit written notice requesting review at least 10 days before the anticipated review.
- C. Prior to review, weed and restore all planted areas, mow and edge turf, plumb trees and tree supports, clear the site of all debris and present in a neat, orderly manner.

END OF SECTION

SECTION 33 10 00 – WATER SYSTEM

Refer to City of Burlingame Technical Specifications Section 02510 – Water System Piping and Accessories.

SECTION 33 41 00 – STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Roadway and/or site storm drainage system up to five feet of any on-site building

1.2 RELATED SECTIONS

- A. Section 31 21 00, Utility Trenching and Backfill
- B. Section 32 13 18, Cement and Concrete for Exterior Improvements

1.3 RELATED DOCUMENTS

A. AASHTO

- 1. M199: Precast Reinforced Concrete Manhole Sections
- 2. M252: Corrugated Polyethylene Drainage Pipe
- 3. M294: Corrugated Polyethylene Pipe, 12 to 604 inch Diameter

B. ASTM

- 1. A74: Cast Iron Soil Pipe and Fittings
- 2. A615: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- 3. C143: Standard Test Method for Slump of Hydraulic-Cement Concrete
- 4. C443: Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- 5. C478: Circular Precast Reinforced Concrete Manhole Sections
- 6. C564: Rubber Gaskets for Cast Iron Soil Pipe and Fittings
- 7. C923: Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
- 8. C1173: Flexible Transition Couplings for Underground Piping Systems
- 9. D1785: Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- 10. D2321: Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications
- 11. D2564: Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
- 12. D3034: Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- 13. D4101: Propylene Injection and Extrusion Materials
- 14. F477: Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- 15. F656: Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings
- 16. F679: Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- 17. F1336: Poly(Vinyl Chloride) (PVC) Gasket Sewer Fittings

C. AWWA

- 1. C104: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
- 2. C105: Polyethylene Encasement for Ductile-Iron Pipe Systems
- 3. C110: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. for Water
- 4. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

5. C115: Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
 6. C116: Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
 7. C150: Thickness design of Ductile Iron Pipe
 8. C151: Ductile-Iron Pipe, Centrifugally Cast
 9. C153: Ductile-Iron Compact Fittings
 10. C219: Bolted, Sleeve-type Couplings for Plain-End Pipe
 11. M41: Ductile Iron Pipe and Fittings
- D. Caltrans Standard Specifications, 2015
1. Section 51, Concrete Structures
 2. Section 52, Reinforcement
 3. Section 65, Concrete Pipe
 4. Section 66, Corrugated Metal Pipe
 5. Section 70, Miscellaneous Drainage Facilities
 6. Section 72, Slope Protection
 7. Section 75, Miscellaneous Metal
 8. Section 90, Concrete
- E. Caltrans Standard Plans, 2015
1. Plan D94A: Metal and Plastic Flared End Sections
 2. Plan D94B: Concrete Flared End Sections
 3. Plan D97A: Corrugated Metal Pipe Coupling Details No. 1, Annular Coupling Band Bar and Strap and Angle Connection
 4. Plan D97C: Corrugated Metal Pipe Coupling Details No. 3, Helical and Universal Couplers
 5. Plan D97D: Corrugated Metal Pipe Coupling Details No. 4, Hugger Coupling Bands
 6. Plan D97E: Corrugated Metal Pipe Coupling Details No. 5, Standard Joint
 7. Plan D97F: Corrugated Metal Pipe Coupling Details No. 6, Positive Joint
 8. Plan D97G: Corrugated Metal Pipe Coupling Details No. 7, Downdrain
 9. Plan D98A: Slotted Corrugated Steel Pipe Drain Details
 10. Plan D98B: Slotted Corrugated Steel Pipe Drain Details

1.4 DEFINITIONS

- A. AASHTO: American Association of State Highway and Transportation Officials
- B. ASTM: American Society for Testing Materials
- C. AWWA: American Water Works Association
- D. CMP: Corrugated metal pipe
- E. DIP: Ductile iron pipe
- F. HDPE: High-density polyethylene
- G. NPS: Nominal pipe size

- H. PE: Polyethylene
- I. PVC: Polyvinyl Chloride
- J. RCP: Reinforced concrete pipe

1.5 SUBMITTALS

- A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.
- B. Product data for the following:
 - 1. Piping materials and fittings
 - 2. Special pipe couplings
 - 3. Polymer-concrete, channel drainage systems (trench drains)
 - 4. Joint sealants
 - 5. Plastic area drains
 - 6. Cleanout plugs or caps
 - 7. Precast concrete catch basins, inlets, curb inlets, junction structures and area drains, including frames and grates
 - 8. Precast clean out boxes and box covers
 - 9. Concrete, metal and plastic flared end sections
 - 10. Sanitary sewer and storm drain manholes
- C. Shop drawings: Include plans, elevations, details and attachments for the following:
 - 1. Precast concrete manholes, frames and covers
- D. Design Mix Reports and Calculations: For each class of cast in place concrete
- E. Field Test Reports: Indicate and interpret test results for compliance with performance.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Storage
 - 1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store plastic piping and jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
 - 2. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.
- B. Handling
 - 1. Handle pipe, fittings, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. When handling lined pipe, take special care not to damage linings of pipe and fittings; if lining is damaged, make satisfactory repairs. Carry, do not drag, pipe to trench.
 - 2. Handle precast concrete pipe, manholes and other precast structures according to manufacturer's written instructions.
 - 3. Protect imported bedding and backfill material from contamination by other materials.

PART 2 - PRODUCTS

CAST IRON PIPE AND FITTINGS: 2 INCH THROUGH 15 INCH

- A. Hub and spigot, ASTM A74, service class
- B. Gaskets: ASTM C564, rubber, compression type, thickness to match class of pipe
- C. Special Pipe Coupling: ASTM C1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined

2.2 CORRUGATED METAL PIPE AND FITTINGS:

- A. CMP pipe shall be in accordance to Caltrans Standard Specification Section 66
- B. Bituminous Coating: Caltrans Standard Specification Section 66-1.02C
- C. Bituminous Lining: Caltrans Standard Specification Section 66-1.02C
- D. Bituminous Paving: Caltrans Standard Specification Section 66-1.02C
- E. Corrugated Aluminum Pipe: Caltrans Standard Specification Section 66-1.02F
- F. Corrugated Steel Pipe: Caltrans Standard Specification Section 66-1.02E
- G. Slotted Corrugated Steel Pipe: Caltrans Standard Specification Section 66-2
- H. Details: Caltrans Standard Plans D97A, D97C, D97D, D97E, D97F, D97G, D98A and D98B

2.3 DIP: SIZES 4 INCH THROUGH 48 INCH

- A. Pipe conforming to AWWA C151 and C150
- B. Pipe: Pressure Class Pressure Class: Minimum pressure class for size indicated
- C. Pipe and Fitting Lining: Cement Mortar, AWWA C104
- D. Pipe and Fitting Coating: Asphaltic, AWWA C151 or C115
- E. Fittings
 1. Standard: AWWA C110, sizes 4 inch through 48 inch
 2. Compact: AWWA C153, sizes 4 inch through 24 inch
 3. All fittings shall be fusion epoxy coated per AWWA C116
- F. Exterior Soil Corrosion Protection for Pipe and Fittings: Polyethylene encasement, AWWA C105
- G. Unrestrained Joints (Rubber Gasket Joints):
 1. Push-On Bell and Spigot Joint: Provide shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly conforming to AWWA C111.

2. Mechanical Joint: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets shall conform to AWWA C111.
- H. Insulating Flanged Joints:
1. Provide a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact at the joint between adjacent sections of dissimilar metals.
 2. Provide joint of the flanged type with insulating gasket, insulating bolt sleeves, and insulating washers.
 3. Provide gasket of the dielectric type, full face, as recommended in AWWA C115.
 4. Provide bolts and nuts as recommended in AWWA C115.
- I. Couplings:
1. Plain End Pipe to Plain End Pipe: Ductile iron or steel bolted couplings, manufacturer's shop coating with low alloy steel bolts and nuts. Steel couplings to conform to AWWA C219. Smith-Blair, Inc., Dresser, or approved equal.
 2. Plain End Pipe to Flanged Pipe: 1) Ductile iron or steel bolted flanged coupling adapters, manufacturer's shop coating with low alloy steel bolts and nuts. Steel flanged couplings to conform to AWWA C219. Smith-Blair, Inc., Dresser, or approved equal.
- 2.4 PE PIPE AND FITTINGS (HDPE): 4 INCH THROUGH 10 INCH
- A. Pipe shall be in accordance with AASHTO M252 Type S, smooth interior and corrugated exterior
 - B. Bell and spigot joints
 - C. Bell and Spigot Joint Gasket: Elastomeric seal, ASTM F477
 - D. Couplings: AASHTO M252, corrugated band type, engage a minimum of 4 corrugations, 2 on each side of pipe joint
- 2.5 PE PIPE AND FITTINGS (HDPE): 12 INCH THROUGH 48 INCH
- A. Pipe shall be in accordance to AASHTO M294. Type S, smooth interior and corrugated exterior.
 - B. Bell and spigot joints
 - C. Bell and Spigot Joint Gasket: Elastomeric seal, ASTM F477
 - D. Couplings: AASHTO M252, corrugated band type, engage a minimum of 4 corrugations, 2 on each side of pipe joint
- 2.6 PVC PIPE AND FITTINGS-SMALLER THAN 4 INCH
- A. Pipe shall be in accordance to ASTM D1785, Schedule 40.
 - B. Joints: Solvent Cement, ASTM D2564
 - C. Include primer according to ASTM F656

- D. Special Pipe Coupling: ASTM C1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined.

2.7 PVC PIPE, 4 INCH AND LARGER

- A. Pipe
 - 1. 4 inch through 15 inch: ASTM D3034, SDR 35
 - 2. 18 inch through 36 inch: ASTM F679, T-1 wall
- B. Bell and spigot joints
- C. Fittings:
 - 1. 4 inch through 27 inch: ASTM F1336
 - 2. 30 inch through 36 inch: ASTM D3034, SDR 35
- D. Joint Gasket: Elastomeric seal, ASTM F477
- E. Special Pipe Coupling: ASTM C 1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined

2.8 REINFORCED CONCRETE PIPE

- A. Designated by Class, rubber gasketed joints, Type II or V cement
 - 1. Circular Reinforced Concrete Pipe: Caltrans Standard Specification Section 65-2.02C(2). Class III
 - 2. Oval shaped (Elliptical) Reinforced Concrete Pipe: Caltrans Standard Specification Section 65-2.02D. Class HE-III and VE-III
- B. Rubber Gasketed Joints: Caltrans Standard Specification Section 65-2.02F
- C. Special Pipe Couplings: Portland cement collar as indicated

2.9 PIPE ANCHORS

- A. General: Location, configuration bearing area, etc. as indicated
- B. Portland Cement Concrete: Section 32 13 18, Cement and Concrete for Exterior Improvements

2.10 PIPE CLEANOUTS

- A. Piping: Same as storm drain line if possible
- B. Top Plug or Cap: Same material as piping if possible. Plug or cap to be secure but removable, threaded or non-threaded.
- C. Box Size: As required to provide access and allow easy removal and reinstallation of cap
- D. Box Types
 - 1. Non-Traffic Areas: Portland cement concrete box and box cover, light duty

2. Traffic Areas: Portland cement concrete box and box cover or steel or cast iron cover, heavy duty, both box and cover to be rated for AASHTO H20 loading
- E. Box Cover Markings: "S.D.," unless otherwise specified
- F. Available Manufacturers: Subject to compliance with requirements, box manufacturers offering products that may be incorporated into the Project include, but are not limited to the following:
 1. Associated Concrete Products, Inc.
 2. Brooks Products Inc.
 3. OldCastle Precast/Christy Concrete Products, Inc.

2.11 AREA DRAINS

- A. Grate and Riser: Area drain shall be as manufactured by Nyloplast or approved equal. Riser shall be constructed of 6 inch PVC SDR 35 piping per paragraph 2.1(A) of this section and connected to area drain by a gasket joint. Riser shall be vertical except as otherwise noted in the plans. Riser may include a reducer if necessary to make connection to the storm drain line.
- B. Elevation and Grading: Area Drain rim elevation shall be set and area around area drain shall be graded to drain away from any adjacent structures, walks, or roadways and towards area drain.

2.12 CURB INLETS, CATCH BASINS, DROP INLETS, JUNCTION STRUCTURES, AREA DRAINS, ETC.

- A. General: Size, shape, configuration, depth, etc. of structure and frame, grate, or cover shall be as indicated.
- B. Portland Cement Concrete and Reinforcing: Section 32 13 18, Cement and Concrete for Exterior Improvements.
- C. Precast Structure: Rate for AASHTO H20 loading in traffic areas.

If required, steps: ASTM C 478 or AASHTO M199. Manufacture from deformed, ½ inch steel reinforcement rod complying with ASTM A615 and encased in polypropylene complying with ASTM D4101. Include pattern designed to prevent lateral slippage off step. Acceptable manufacturer is Hanson Concrete Products, (Milpitas, CA) (Tel 408-262-1091).

- D. Frames, Grates and Covers: Caltrans Standard Specification Section 75-1.02, 75-1.02.B and 75-2
 1. Galvanize steel frames, grates and covers
 2. Grates and covers shall be non-rocking
 3. Rate for AASHTO H20 loading in traffic areas

2.13 MANHOLES

- A. Manholes shall be pre-cast concrete of the size and shape shown on the Plans and shall conform to ASTM C478. Equivalent poured-in-place structures may be used at the

Contractor's option. Concrete shall consist of Caltrans Type I/II cement. Rate for AASHTO H20 loading in traffic areas.

- B. All interior concrete surfaces shall be coated with "Xypex Crystalline" or approved equivalent. Use of a water-resistant admix is acceptable, at Contractor option.
- C. Frames and Covers: As indicated and in accordance with Caltrans Standard Specification Section 75-2.02B. Manhole covers shall have the words "STORM DRAIN" in letters not less than 2 inches cast into the cover. The clear opening for all manhole covers shall be 24 inches.
- D. Frames and lids for manholes shall be match-marked in pairs before delivery to the job site. The lids shall fit into their frames without rocking.
- E. Reinforcing Bars: Reinforcing bars shall be of intermediate grade billet steel conforming to ASTM A615 and shall be of the size shown on the Standard Details or in the Plans. Bars shall be of the round deformed type, free from injurious seams, flaws, or cracks, and shall be cleaned of all rust, dirt, grease and loose scales.
- F. Portland Cement Concrete: Concrete for manhole bases, inlets, and other concrete structures shall conform to the requirements of Caltrans Standard Specifications Section 90 and as herein specified. The concrete shall be Class "A" containing six (6) sacks of portland cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the CDT requirements of the three-quarter inch maximum. The consistency of the fresh aggregate shall be such that the slump does not exceed four inches, as determined by ASTM C143. The concrete shall have a minimum design compressive strength of 3,000 psi after 28 days.

If required, steps: ASTM C478 or AASHTO M199. Manufacture from deformed, ½ inch steel reinforcement rod complying with ASTM A615 and encased in polypropylene complying with ASTM D4101. Include pattern designed to prevent lateral slippage off step. Acceptable manufacturer is Hanson Concrete Products, or approved equal.

2.14 JOINT SEALANT FOR PRECAST STRUCTURES AND MANHOLES

- A. Mortar: Caltrans Standard Specification Section 51-1.02F
 - 1. Use to seal around pipes at connections to structures and manholes. Also use to seal joints between precast sections of structures and manholes.
- B. Gaskets: Preformed flexible rubber or plastic gasket
 - 1. Rubber Gaskets: ASTM C443
 - 2. Plastic Gaskets: Federal Specification SS-S-00210 (GSA-FSS), Type I, Rope Form; or alternate standard which may exist. Acceptable material is "Ram-Nek," as manufactured by Henry Company, or approved equal.

2.15 PIPE TO STRUCTURE CONNECTOR/SEAL

- A. A flexible pipe to manhole connector shall be used for all pipe penetrations to pre-cast and/or cast-in-place concrete structures.
 - 1. The seal shall provide a flexible, positive, watertight connection between pipe and concrete wastewater structures. The connector shall assure that a seal is made

between (1) the connector and the structure wall, and (2) between the connector and the pipe. The seal between the connector and the manhole wall shall be made by casting the connector integrally with the structure wall during the manufacturing process in such a manner that it will not pull out during coupling. The seal between connector and pipe will be made by way of a stainless steel take down band compressing the gasket against the outside diameter of the pipe.

2. The connector shall be molded from materials whose physical/chemical properties meet or exceed the physical/chemical resistant properties outlined in ASTM C923. The connector and stainless steel hardware shall meet or exceed the performance requirements proscribed in ASTM C923.
3. The connector shall be of size specifically designed for the pipe material being used and shall be installed in accordance with recommendations of the manufacturer.
4. Connectors shall be Z-LOK or G3 connectors manufactured by A-LOK Products Inc. or approved equivalent.

2.16 POLYMER-CONCRETE TRENCH DRAINS

- A. General: Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total length required.
- B. Include the following components:
 1. Channel Sections: Interlocking-joint, precast modular units with end caps. Inside width as indicated with deep, rounded bottom, with built in slope or flat invert as indicated and outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
 2. Frame and Grate: Gray iron, ductile iron or galvanized steel as indicated. Where drain is located in traffic areas, rate for AASHTO H20 loading.
- C. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
 1. "Polydrain" by ABT Inc.
 2. "ACO Drain" by ACO Polymer Products Inc. , or approved equal

2.17 METAL, CONCRETE OR PLASTIC FLARED END SECTIONS

- A. General: Caltrans Standard Specification Section 70-5.02 and Caltrans Standard Plan D94A and D94B

2.18 SLOPE PROTECTION

- A. Rock Slope Protection: Caltrans Standard Specification Section 72-2.02B
 1. Class:
 2. Fabric: Caltrans Standard Specification Section 72-2.02C
- B. Concrete/Shotcrete Slope Protection: Caltrans Standard Specification Section 72-5

1. Bar Reinforcement: Caltrans Standard Specification Section 52-1.02B, minimum Grade 40
 2. Welded Wire Fabric: Caltrans Standard Specification Section 52-1.02C. Use 6 x 6-W1.4 x W1.4 unless otherwise indicated.
- C. Concreted-Rock Slope Protection: Caltrans Standard Specification Section 72-3
1. Class:
- D. Sacked Concrete Slope Protection
1. Concrete: Section 32 13 18 Cement and Concrete for Exterior Improvements
 2. Sacks: 10 ounce burlap measuring approximately 19.5 inches by 36 inches when empty and laid flat

2.19 CONCRETE/SHOTCRETE DITCH LINING

- A. General: Caltrans Standard Specification Section 72-5.02
1. Bar Reinforcement: Caltrans Standard Specification Section 52-1.02B, minimum Grade 40
 2. Welded Wire Fabric: Caltrans Standard Specification Section 52-1.02C. Use 6 x 6-W1.4 x W1.4 unless otherwise indicated.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

- A. General: Install pipe, fittings, and appurtenances utilizing best practices, manufacturer's instructions, and in accordance with Section 6 and 7 of ASTM D 2321 for plastic pipe, Caltrans Standard Specification Section 65-2.03 for reinforced concrete pipe, Caltrans Standard Specification Section 66-1.03 for corrugated metal pipe, and chapter 11.3.3 of AWWA M41 for cast iron and ductile iron pipe.
- B. Pipe Depth and Trench Configuration: Conform to typical trench section(s) indicated.
- C. Excavation, Bedding, Backfill, and Compaction: Section 31 21 00, Utility Trenching and Backfill
- D. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with the manufacturer's recommendations.
- E. Laying: Before lowering pipe into the trench, remove all stakes, debris, loose rock and other hard materials from the bottom of the trench. Lay accurately in conformance with lines and grades indicated. Start laying the pipeline at the low end and proceed upstream. Lay bell and spigot pipe with the bell end facing upstream. Lay pipe on a bed prepared by handwork, dug true to grade. Furnish firm bearing for pipe throughout its entire length with bell holes provided at the ends of each pipe length of sufficient size to permit making up the particular type of joint being used. Adjust pipe to line and grade by scraping away or filling and tamping material under the body of the pipe for the entire pipe length and not by blocking or wedging. After final positioning, hold pipe in place in trench with backfill material placed equally on both sides of the pipe at as many locations as required to hold the pipe section in place.

- F. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. Use shorter lengths of pipe than the standard length if necessary to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.
- G. Closure: Close open ends of pipes and appurtenance at the end of each day's work or when work is not in progress.

3.2 SPECIAL PIPE COUPLINGS

- A. General: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
- B. Installation: Manufacturers' instructions

3.3 INSTALLATION OF CURB INLETS, CATCH BASINS, DROP INLETS, JUNCTION STRUCTURES, AREA DRAINS, ETC. AND MANHOLES

- A. Excavation, Bedding, Backfill, and Compaction: Section 31 21 00, Utility Trenching and Backfill
- B. Poured in Place Structures: Install as indicated and Caltrans Standard Specification Section 51.
 - 1. Shape bottoms to convey flows as indicated.
- C. Precast Structures: Install as indicated.
 - 1. Seal all joints and pipe entrances and exits.
 - 2. Place concrete in bottom and shape to convey flows as indicated.

3.4 POLYMER-CONCRETE TRENCH DRAIN INSTALLATION

- A. Excavation, Bedding, Backfill, and Compaction: Section 31 21 00, Utility Trenching and Backfill
- B. Install: As indicated and in accordance with the manufacturer's instructions.

3.5 SLOPE PROTECTION PLACEMENT

- A. Rock Slope Protection: Caltrans Standard Specification Section 72-2.03 and as indicated.
 - 1. Use Method B Placement unless otherwise indicated.
- B. Concrete/Shotcrete Slope Protection: Caltrans Standard Specification Section 72-5.03
- C. Concreted-Rock Slope Protection: Caltrans Standard Specification Section 72-3.03
 - 1. Use Method B Placement unless otherwise indicated.
- D. Sacked Concrete Slope Protection
 - 1. Detailed configuration: As indicated
 - 2. Use one cubic foot of concrete per sack.
 - 3. Locate headers and stretchers as indicated.
 - 4. Headers: Folded end to bank

5. Stretchers: Folded ends are not to be adjacent.
6. Place no more than four vertical courses until initial set has taken place in first course.

3.6 CONCRETE/SHOTCRETE DITCH LINING PLACEMENT

- A. Concrete/Shotcrete Slope Protection: Caltrans Standard Specification Section 72-5.03

3.7 POURED-IN-PLACE CONCRETE

- A. Concrete shall be mixed in accordance with applicable provisions of Section 90 of Caltrans Standard Specifications.
- B. Construction of concrete structures shall conform to applicable provisions of Section 51 of the Caltrans Standards Specifications. Unless otherwise noted herein or in the Plans, exposed surfaces of structures shall be Class 1 surface finish.
- C. Curing shall conform to applicable portions in Section 90 of Caltrans Standard Specifications. No pigment shall be used in curing compounds. All work shall be subject to inspection. No concrete shall be placed until the Project Manager has approved the forms and reinforcement.
- D. Concrete shall not be cropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.8 PIPELINE FLUSHING

- A. Newly constructed storm drain pipes shall be flushed with water to clean. A metal screen shall be used to collect and remove any rock, silt and other debris that is flushed out during cleaning.

3.9 DEFLECTION TESTING

- A. Upon completion of work, perform a deflection test on entire length of installed plastic pipeline. Completed work includes superimposed loads adjacent to and over the pipeline, such as compacted backfill and earthwork, and does not include paving, concrete curbs and gutters, sidewalks, walkways, and landscaping.
- B. Under external loads, deflection of pipe in the installed pipeline shall not exceed 4.5 percent of the average inside diameter of pipe.
- C. Determine whether the allowable deflection has been exceeded by use of a pull-through device or a deflection-measuring device.
- D. Pull-Through Device:
 1. Provide a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft.
 - a. Circular sections shall be so spaced on the shaft that distance from external faces of front and back sections will equal or exceed diameter of the circular section.

- b. Pull-through device may also be of a design approved by the Uni-Bell Plastic Pipe Association, provided that the device meets the applicable requirements specified in this paragraph, including those for diameter of the device.
- 2. Ball, cylinder, or circular sections shall conform to the following:
 - a. A diameter, or minor diameter as applicable, of 95 percent of the average inside diameter of the pipe; tolerance of plus 0.5 percent will be permitted.
 - b. A homogeneous material throughout, with a density greater than 1.0 as related to water at 39.2 degrees F, and a surface Brinell hardness of not less than 150.
 - c. Center bored and through bolted with a ¼ inch minimum diameter steel shaft having a yield strength of not less than 70,000 pounds per square inch, with eyes or loops at each end for attaching pulling cables.
 - d. Each eye or loop shall be suitably backed with a flange or heavy washer such that a pull exerted on opposite end of shaft will produce compression throughout remote end.
- 3. Pull-Through Device:
 - a. Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water.
 - b. If the device fails to pass freely through a pipe run, replace pipe which has the excessive deflection and completely retest in same manner and under same conditions as specified.
- E. Deflection measuring Device:
 - 1. Sensitive to 1.0 percent of the diameter of the pipe being tested and accurate to 1.0 percent of the indicated dimension.
 - 2. Obtain approval of deflection measuring device prior to use.
- F. Deflection Measuring Device Procedure:
 - 1. Measure deflections through each run of installed pipe.
 - 2. If deflection readings in excess of 4.5 percent of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction.
 - 3. If retest continues to show a deflection in excess of 4.5 percent of average inside diameter of pipe, remove pipe which has excessive deflections, replace with new pipe, and completely retest in same manner and under same conditions.
- G. Warranty Period Test: Pipe found to have a deflection of greater than 5 percent of average inside diameter when deflection test is performed just prior to end of 1 year warranty period shall be replaced with new pipe and tested as specified for leakage and deflection.

3.10 CLEANING

- A. Thoroughly clean storm drain lines, manholes, catch basins, field inlets, culverts, and similar structures, of dirt, debris, and obstructions of any kind.

3.11 TELEVISION INSPECTION

- A. After completion of the pipe installation, service connections, flushing and cleaning, and prior to placement of pavement, the drain line shall be televised with a color closed-circuit television with tilt-head camera recorded in DVD format. The original disc and log sheets shall be provided to the Owner for review.

- B. The following observations from television inspections will be considered defects in the construction of sewer pipelines and will require correction prior to placement of pavement:
 - 1. Low spot (1 inch or greater - mainlines only)
 - 2. Joint separations (3/4 inch or greater opening between pipe sections)
 - 3. Cocked joints present in straight runs or on the wrong side of pipe curves.
 - 4. Chips in pipe ends
 - 5. Cracked or damaged pipe
 - 6. Dropped joints
 - 7. Infiltration
 - 8. Debris or other foreign objects
 - 9. Other obvious deficiencies
 - 10. Irregular condition without logical explanation

END OF SECTION

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SECTION 33 46 00 – SUBDRAINAGE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Subdrains in trenches and subdrains or prefabricated composite drainage panels at walls or foundations
- B. Bioretention and biofiltration areas for storm water treatment

1.2 RELATED SECTIONS

- A. Section 31 23 33, Utility Trenching and Backfill
- B. Section 33 41 00, Storm Utility Drainage Piping

1.3 RELATED DOCUMENTS

- A. Geotechnical Report: Geotechnical Investigation report titled “Geotechnical Investigation, Burlingame Community Center, 850 Burlingame Avenue, Burlingame, California” prepared by Murray Engineers, Inc. dated July 2018.
- B. AASHTO
 - 1. M288: Standard Specification for Geotextiles Used for Subsurface Drainage Purposes
- C. ASTM
 - 1. C1173: Standard Specification for Flexible Transition Couplings for Underground Piping Systems
 - 2. D448: Standard Classification for Sizes of Aggregate for Road and Bridge Construction
 - 3. D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 - 4. D1785: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
 - 5. D2321: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
 - 6. D2564: Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems
 - 7. D2729: Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - 8. D3034: Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - 9. D4716: Standard Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
 - 10. F477: Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - 11. F656: Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

12. F1336: Standard Specification for Poly(Vinyl Chloride) (PVC) Gasket Sewer Fittings

- D. Caltrans Standard Specifications, 2015
1. Section 68-Subsurface Drains
 2. Section 96-Geosynthetics

1.4 DEFINITIONS

- A. AASHTO: American Association of State Highway and Transportation Officials
- B. ASTM: American Society for Testing and Materials
- C. PVC: Polyvinyl Chloride

1.5 SUBMITTALS

- A. Follow submittal procedure in accordance with Section 01 10 00, Supplemental General Requirements.
- B. Product data for the following:
1. Perforated pipe and fittings
 2. Solid pipe and fittings
 3. Prefabricated composite drainage panels
 4. Geotextile fabrics
 5. Cleanout plugs or caps
 6. Precast clean out boxes and box covers
 7. Drainage bubblers
 8. Biofiltration soil material
- C. Samples:
1. Drainage Fill

1.6 DELIVERY, STORAGE AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe-fittings, and seals from dirt and damage.
- C. Protect permeable material from contamination by other materials.

PART 2 - PRODUCTS

2.1 PERFORATED WALL AND SOLID WALL PIPE

- A. PVC pipe and Fittings Smaller than 4-inch:
1. Pipe: ASTM D1785, Schedule 40. Solvent cement joints
 2. Solvent Cement: ASTM D2564. Include primer according to ASTM F656.
 3. Perforation Size, Location, and Spacing: ASTM D2729
- B. PVC Pipe and Fittings 4-inch through 15-inch:

1. Pipe: ASTMD3034, SDR 26. Bell and spigot joints
2. Perforation Size, Location, and Spacing: ASTM D2729
3. Fittings: ASTM F1336
4. Joint Gasket: Elastomeric seal, ASTM F477

2.2 SPECIAL PIPE COUPLINGS

- A. Description: ASTM C1173. Rubber or elastomeric sleeve and stainless steel band assembly fabricated to match outside diameters of pipes to be joined.

2.3 CLEANOUTS

- A. Piping: Same as subdrain pipe without perforations.
- B. Top Plug or Cap: Same material as piping if possible. Plug or cap to be secure but removable, threaded or non-threaded.
 1. Size box to provide access and allow easy removal and reinstallation of plug or cap.
 2. Types:
 - a. Non-Traffic Areas: Portland cement concrete box and box cover, light duty.
 - b. Traffic Areas: Portland cement concrete box and box cover or steel or cast iron cover, heavy duty, both box and cover to be rated for AASHTO H20 loading.
- C. Cover Markings: "STORM DRAIN" unless otherwise specified.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
 - a. Associated Concrete Products, Inc.,
 - b. Brooks Products Inc.,
 - c. Christy Concrete Products, Inc., or approved equal

2.4 PREFABRICATED COMPOSITE DRAINAGE PANELS

- A. Description: Prefabricated composite panels, 36 to 60 inches wide and manufactured with geotextile facing laminated to molded drainage core
- B. Drainage Core: Three-dimensional, non-biodegradable, molded Polypropylene or Polystyrene
 1. Minimum Compressive Strength: 10,000-lbf./sq. ft. when tested according to ASTM D1621
 2. Minimum Flow Rate: 2.8 gpm per foot at hydraulic gradient of 0.05 and compressive stress of 25 psig when tested according to ASTM D4716
- C. Geotextile: Non-woven needle-punched geotextile, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with the following properties determined according to AASHTO M288
 1. Survivability Class: 1
 2. Apparent Opening Size: No. 70 sieve maximum
 3. Permittivity: 0.5 per second, minimum

- D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
1. American Wick Drain Corporation
 2. Tencate Geosynthetics/Mirafi Inc.
 3. Multi-Flow (Prinsburg, MN) (Tel. 800-978-8007)
 4. Phillips Fibers Corporation, or approved equal

2.5 BIORETENTION OR BIOFILTRATION TREATMENT SOIL

- A. Soil specification shall meet requirements of local agency having authority or sustainability requirements for projects achieving environmental goals.
1. For projects located within the jurisdiction of the Municipal Regional Stormwater Permit (MRP), treatment soil shall conform to requirements in Appendix L of the MRP. Contractor shall provide submittal information verifying conformance to MRP standard.

2.6 DRAINAGE FILL MATERIAL

- A. Permeable Material: Conform to Section 68-2.02F(3) of Caltrans Standard Specifications, Class 2.
- B. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Sieve No. 57, with 100 percent passing 1-1/2-inch sieve and not more than 5 percent passing No. 8 sieve

2.7 GEOSYNTHETICS

- A. When required, use filter fabric for encasing permeable material around subdrains.
1. Caltrans Filter Fabric: Section 96-1.02B of Caltrans Standard Specifications,
 2. Mirafi 140N (by Tencate Geosynthetics/Mirafi Inc.), or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.
- B. Install only after unsatisfactory conditions have been corrected.

3.2 PIPING APPLICATIONS

- A. Refer to Plans for location, size, and material designation for individual subdrains.

3.3 INSTALLATION OF PERFORATED PORTIONS OF SUBDRAINS

- A. Excavation: Section 6 of ASTM D2321 and as indicated.

- B. Subdrain Bedding: Place supporting layer of drainage fill over compacted subgrade to compacted depth indicated. If drainage fill requires encasement in filter fabric, lay filter fabric in trench and overlap trench sides before installing drainage fill.
- C. Piping Installation: Install pipe in accordance with Section 7 of ASTM D2321. Install piping beginning at low point of system, true to grades and alignment indicated, with unbroken continuity of invert. Excavate recesses for bottoms of bell ends of pipe. Lay pipe with bells facing upslope and with spigot end centered fully into adjacent bell. Bed piping with full pipe bearing in drainage fill material. Lay perforated pipe with perforations down. Install gaskets, seals, sleeves, and couplings in accordance with manufacturers written instructions. Use increasers, reducers, and couplings made for different sizes of materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- D. Initial Subdrain Backfill: After installing drainage piping, add drainage fill up to top of pipe to perform tests.
- E. Testing Subdrain: After installing drainage fill to top of pipe, test drain piping with water to ensure free flow before backfilling with drainage fill. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
- F. Subsequent Subdrain Backfill: After satisfactory testing, cover piping with drainage fill to width and height indicated. Place drainage fill in layers not exceeding 3 inches in loose depth; compact each layer placed. If filter fabric is required complete the filter fabric encasement by bringing fabric to top and closing the encasement.
- G. Fill to Grade: Place native fill material over compacted drainage fill to thickness indicated. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish elevations.

3.4 INSTALLATION OF NON-PERFORATED PORTIONS OF SUBDRAINS

- A. Conform to Sections 31 23 33, Utility Trenching and Backfill and 33 41 00, Storm Utility Drainage Pipe.

3.5 INSTALLATION OF RAIN GARDENS, BIORETENTION OR BIOFILTRATION TREATMENT AREAS

- A. The Contractor shall excavate rain gardens / treatment areas to the elevations and dimensions specified on the plans. Level surface of area of top of treatment soil shown on the plans shall govern actual length and width dimensions if shown on the plans. In-situ soils shall not be further compacted.
- B. Direct the use of heavy equipment and construction traffic around rain gardens so as to avoid compaction, to the extent possible.
- C. After initial site grading, the Contractor shall provide temporary protection from curb cuts and other potential inflow entrances so that runoff drainage does not enter the rain gardens during construction and installation.
 - 1. Treatment areas / rain gardens may be used as sediment settling facilities during mass excavation and commensurate construction activities.

2. Prior to commencing work in rain gardens, the Contractor shall remove and properly dispose of all accumulated sediments.
- D. Excavated soils shall be placed with stockpiled fill and properly disposed and stabilized by the Contractor.
- E. Subdrain installation:
1. Subdrain shall be installed as indicated on the plans at an elevation within the drain rock layer shown on the construction details and connected to the overflow or outfall structure at the invert elevation shown on the plans.
 2. For connections of the perforated drain pipes to storm drainage structures, appropriately sized holes shall be cut in the structures at the correct invert elevation specified by the Project Designer or authorized representative. The connections shall be sealed sediment-tight and secured in place with mortar or other approved joint sealant compatible with subdrain pipe materials.
 3. Drain rock layer shall be approved Class II Permeable Material. Crushed rock or aggregate base cannot be used within the treatment area, in, around or under the drain rock layer.
 4. Care shall be exercised to prevent natural or fill soils from intermixing with the drain rock surrounding the underdrain. All contaminated drain rock shall be removed and replaced with uncontaminated Class II permeable material.
 5. Attach subdrain piping to overflow structure.
 6. Install cleanouts at the ends of the subdrains. Install screw-on end caps set flush with the finished top of treatment soil.
- F. Overflow drain structure:
1. Install overflow structure at the elevation and location specified on the plans. Attach subdrain piping to overflow structure. Attach solid pipe from overflow structure outfall storm drain system at elevation and slope indicated on the plans.
 2. Rim elevation of overflow structure must be set above the elevation of the top of treatment soil by the amount indicated on the plans, typically 6 inches. Contractor shall verify that the rim elevation of the overflow structure is also a minimum of 2 inches below the lowest elevation of the treatment area perimeter so that storm flows will reach the overflow rim before the top of the treatment area perimeter.
 3. The overflow structure shall have an open bottom filled with drain rock if indicated on the plans. This should be installed where the overflow structure has a sump condition (subdrains lower than the outfall invert elevation). The overflow structure shall be installed such that the bottom of the structure is set a minimum of 6-inches below the undisturbed bottom of the treatment area. Drain rock in the overflow sump shall be installed up to the invert of the lowest pipe connected to the structure.
- G. Filter media soil backfill
1. Filter soil of the approved specification shall be installed to the elevation indicated on the plans. Care should be taken to ensure that the soil is not compacted and that no equipment is driven on the backfill. Walking on the backfill should be limited to what is absolutely necessary.

- H. Planting soil, plantings, and mulch shall be installed per the plans. Non-floating bark / mulch shall be used, if indicated, to prevent removal of material and clogging of the overflow.
- I. Testing of the treatment area should be conducted once the filter media is installed and all storm drain piping is connected. The area should allow an infiltration rate well above 5 inches/ hour to ensure that the treatment area will continue to function at 5 inches/ hour over the lifetime of the treatment area.

3.6 PREFABRICATED COMPOSITE DRAINAGE PANELS

- A. Coordinate placement with other drainage materials.
- B. Install prefabricated drainage panels in accordance with manufacturer's instructions.
- C. Place perforated drainage pipe at base of footing and attach to composite drainage panels in accordance with the manufacturer's instructions.

3.7 JOINING PIPE

- A. Join PVC pipe and fittings with elastomeric seals according to ASTM D2321 or solvent cement.
- B. Special pipe couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and that fit both pipe materials and dimensions.

3.8 CLEANOUT INSTALLATION

- A. Cleanout piping to be the same size as the subdrain piping to which it is attached.
- B. Install cleanouts from subdrainage piping to grade. Locate cleanouts at beginning of piping run, at changes in direction, and other locations indicated.
- C. Do not allow cleanout box to bear on cleanout riser.

3.9 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

3.10 RETAINING WALL DRAINAGE

- A. Unless otherwise specified, drain system should consist of a minimum of 12 inches thick free-draining granular materials containing less than five percent fines passing a No. 200 sieve placed adjacent to the wall. Free-draining granular material should be graded to prevent the intrusion of fines or encapsulated in a suitable filter fabric. As an alternative, a prefabricated drainage structure, such as geo-composite, or approved equivalent, may be used as a substitute for the granular backfill adjacent to the wall.
- B. Drainage system consisting of either weep holes or perforated drain lines (minimum 4 inch diameter placed near the base of the wall) should be used to intercept and discharge water

which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance.

- C. An impervious soil should be used in the upper one foot layer of backfill to reduce the potential for water infiltration.

END OF SECTION

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