The City of

SANTA CLARA

California

STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION

Prepared by

Public Works Department

Rajeev Batra

Director of Public Works/City Engineer

City of Santa Clara
Standard Specifications for Public Works Construction

Foreword

The latest version of City of Santa Clara's Standard Specifications for Public Works construction has been completed and is available for use by engineers and contractors working on public works projects in the City of Santa Clara. This version has been patterned after the Caltrans Standard Specifications and Construction Specifications Institute (CSI) formats with slight modifications to suit the needs of the City of Santa Clara. For example, the specifications are divided into Divisions and not Sections. Division 0 (General Provisions), Division 1 (General Requirements), and Division 2 (Technical Provisions) have been standardized. Some parts of Division 2 and additional Divisions will be used on a project specific basis. These standard specifications will be updated periodically to address legal changes, industry standard changes, or specific issues.

Significant effort has gone into developing these specifications. My sincere thanks to staff from Public Works, Water and Sewer, and Street Departments for their thorough review and comments. I would like to give a special acknowledgement to Gustavo Gomez, Principal Engineer, for taking the lead and his hard work in bringing this effort to closure. Special thanks also to Julia Hill, Assistant City Attorney, and other staff of the City Attorney's office for their invaluable input and advice.

Rajeev Batra
Director of Public Works / City Engineer

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DOCUMENT 00001

TITLE PAGE

GENERAL AND TECHNICAL PROVISIONS

CITY OF SANTA CLARA, CALIFORNIA

1500 WARBURTON AVENUE
SANTA CLARA, CALIFORNIA 95050

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DOCUMENT 00010

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Note: For the purpose of assisting users of the Technical Provisions in making cross-references to the Caltrans Standard Specifications when necessary, the City has maintained a degree of consistency and continuity in the numbering system of the Technical Provisions. The numbering sequence for the Technical Provisions is intended to include the corresponding Caltrans Standard Specifications Section numbers as the last two digits in each respective Section number of the Technical Provisions.

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REFERENCES AND DEFINITIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Reference standards, abbreviations, symbols, and definitions used in Contract Documents.

B. Full titles are given in this Section for standards cited in other Sections of Specifications.

C. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard, shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.

D. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor because manufacturers and trades involved are assumed to be familiar with their requirements.

1.2 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

B. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, report it in writing at once by submitting a RFI to City, and do not proceed with the Work affected thereby until consent to do so is given by City.

C. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, Construction Change Directive ("CCD"), or Supplemental Instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

2. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).

D. No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of City, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to City, Engineer, or any of their consultants, agents, representatives or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

E. Comply with the applicable portions of standards and specifications published by the technical societies, institutions, associations, and governmental agencies referred to in Specifications.

1. Comply with referenced standards and specifications; latest revision in effect at the time of opening of Bids, unless otherwise identified by date.
   a. Exception: Comply with issues in effect as listed in governing legal requirements.

F. Referenced Grades, Classes, and Types: Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Drawings or in Specifications, provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.

G. Jobsite Copies:

1. Obtain and maintain at the Site copies of reference standards identified on Drawings and in Specifications in order to properly execute the Work.

2. At a minimum, the following shall be readily available at the Site:
   a. Safety Codes: State of California, Division of Industrial Safety regulations.

H. Edition Date of References:

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Bids.

2. All amendments, changes, errata and supplements as of the effective date shall be included.

I. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

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1.3 ABBREVIATIONS

A. Listed hereinafter are the various organizations or references which may appear in the Contract Documents, along with their respective acronyms and/or abbreviations:

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AAP	Affirmative Action Program
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boiler Manufacturers Association
ABPA	American Board Products Association
ACI	American Concrete Institute
AED	Association of Equipment Distributors
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute (formerly American Standards Association)
APA	American Plywood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWCI	Association of the Wall and Ceiling Industries
AWPA	American Wood- Preservers Association
AWPB	American Wood Preservers Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BIL	Basic Insulation Level
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	State of California, Department of Transportation
CBC	California Building Code
CCD	Construction Change Directive
CCR	California Code of Regulations
CEC	California Electric Code
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLMFI	Chain Link Fence Manufacturers Institute
CMC	California Mechanical Code
CO	Change Order
CPC	California Plumbing Code
CPM	Critical Path Method
CPUC	California Public Utilities Commission
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSA	Canadian Standards Association
CTI	Ceramic Tile Institute

DHI	Door and Hardware Institute
DSA	Division of State Architect (formerly known as the Office of the State Architect)
EPA	Environmental Protection Agency
FGMA	Flat Glass Marketing Association
FM	Factory Mutual
FS	Federal Specifications
GA	Gypsum Association
HPMA	Hardwood Plywood Manufacturers Association
HVAC	Heating, Ventilating and Air Conditioning
I.D.	Identification
IACS	International Annealed Copper Standards
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers, Inc.
IES	Illuminating Engineering Society
ISA	Instrumentation Society of America
JATC	Joint Apprenticeship Training Committee
JV	Joint Venture
LBE	Local Business Enterprise
M.I.	Middle Initial
M/WBE	Minority and/or Woman-Owned Business Enterprise
MBE	Minority Business Enterprise
MIA	Masonry Institute of America
MIA	Marble Institute of America
MLSFA	Metal Lath/Steel Framing Association
MS	Military Specifications
MSDS	Material Safety Data Sheet
MSS	Manufacturers Standardization Society of the Valve & Fitting Industry
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electric Code
NEMA	National Electric Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Science and Technology (formerly the National Bureau of Standards)
NOFMA	National Oak Flooring Manufacturers Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NWWDA	National Wood Windows and Doors Association
OSHA	Occupational Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Department
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PG&E	Pacific Gas and Electric Company
PM	Preventive Maintenance

PR	Proposal Request
PS	Product Standard, U. S. Department of Commerce
RFI	Request for Information
RFP	Request for Proposals
RFS	Request for Substitution
RIS	Redwood Inspection Service
RWQCB	Regional Water Quality Control Board
SCVWD	Santa Clara Valley Water District
SDI	Steel Deck Institute
SFM	State of California, Office of State Fire Marshal
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joint Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPIB	Southern Pine Inspection Bureau
SSPC	Steel Structures Painting Council
SVP	Silicon Valley Power (City's Electric Utility Department)
SWI	Steel Window Institute
TCA	Tile Council of America
TIE	Time Impact Evaluation
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters' Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USA	Underground Service Alert
USC	United States Code
WCLIB	West Coast Lumber Inspection Bureau
WHI	Warnock Hersey International a testing lab
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

B. Abbreviations in Specifications:

AWG	American Wire Gauge
accord	Accordance
Co.	Company
Corp.	Corporation
cm.	centimeter (centimeters)
cu.	Cubic
Div.	Division
dia.	diameter
ft.	foot (feet)
g./gr.	gram (grams)
gal.	gallon (gallons)
gpd	gallons per day
gpm	gallons per minute
hr.	hour
kg.	kilogram (kilograms)
in.	inch (inches)
Inc.	Incorporated
km.	kilometer (kilometers)
Kw	Kilowatt
l.	liter (liters)

lbs.	pounds
m	meter (meters)
Mfg.	manufacturing
Mg.	milligram (milligrams)
ml./mls.	milliliter (milliliters)
mm.	millimeter (millimeters)
No.	number
o.c.	on centers
O.D.	outside diameter
psi	pounds per square inch
psf	pounds per square foot
sq.	square
T & G	tongue and groove
U.S.	United States
yd.	yard (yards)

C. Abbreviations on Drawings:

Additional abbreviations, used only on Drawings, are indicated thereon.

1.4 SYMBOLS

A. Symbols in Specifications:

:	“shall be” or “shall” - where used within sentences or paragraphs
#1	Number
1#	Pound
&	And
%	Percent
C	Centigrade
F	Fahrenheit
°	Degree
/	per, except where used to combine words; example: power/fuel, and in that case it means and
“	inch (inches)
‘	foot (feet)
@	At

B. Symbols on Drawings:

Symbols, used only on Drawings, are indicated thereon.

1.5 DEFINITIONS

A. Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. In the Contract Documents, the neuter gender includes the feminine and masculine, and the singular number includes the plural. While City has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:

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1. Addenda: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-Bid Conference and/or Site Visit.

2. Agreement (Document 00520): Agreement is the basic contract document that binds the parties to construction Work. Agreement defines relationships and obligations between City and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract Documents.

3. Alternate: Work added to or deducted from the Base Bid, if accepted by City.

4. Application for Payment: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.

5. Approved Equal: Approved in writing by City as being of equivalent quality, utility and appearance.

6. Asbestos: Any material that contains more than one percent asbestosis and is friable or is releasing asbestos fibers into the air above current action levels established by OSHA or Cal/OSHA.

7. Bid: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.

8. Bidder: One who submits a Bid.

9. Bidding Documents: All documents comprising the Project Manual (including all documents and specification sections listed on Document 00010 [Table of Contents]), including documents supplied for bidding purposes only and Contract Documents.

10. By City: Work that will be performed by City or its agents at the City's expense.

11. By Others: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by City, other contractors, or other means.

12. Calendar Day: <u>See</u> Day.

13. Cement: When not otherwise qualified, shall mean Portland Cement.

14. Change Order: A written instrument prepared by City and signed by City and Contractor, stating their agreement upon all of the following:
    a. a change in the Work;
    b. the amount of the adjustment in the Contract Sum, if any; and
    c. the amount of the adjustment in the Contract Time, if any.

15. City: The City of Santa Clara, a Municipal Corporation of the State of California.

16. City Council: The City Council of the City of Santa Clara, California, or its duly authorized agent.

17. City-Furnished, Contractor-Installed: Items furnished by City at its cost for installation by Contractor at its cost under Contract Documents.

18. City's Representative(s): See Document 00520, Agreement.

19. Code Inspector: A local or state agency responsible for the enforcement of applicable codes and regulations.

20. Concealed: Work not exposed to view in the finished Work, including within or behind various construction elements.

21. Concrete: When not otherwise qualified, shall mean Portland Cement Concrete.

22. Construction Change Directive: A written order prepared and signed by City, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both.

23. Consultant: See Document 00520, Agreement (if this term is used).

24. Consulting Engineer: See Document 00520, Agreement (if this term is used).

25. Construction Manager: See Document 00520, Agreement, (if this term is used).

26. Contract: See Contract Documents.

27. Contract Conditions: Consists of two parts: General Conditions and Supplemental Conditions.
    a. General Conditions are general clauses that are common to the City Contracts, including Document 00700.
    b. Supplemental conditions modify or supplement General Conditions to meet specific requirements for this Contract, including Document 00800 and Document 00810 (if included).

28. Contract Documents and Contract: Contract Documents and Contract shall consist of the Plans, Division 0, GENERAL PROVISIONS, Division 1, GENERAL REQUIREMENTS, Division 2, TECHNICAL PROVISIONS, Divisions 3 and above, SPECIAL PROVISIONS, plus all changes, addenda, and modifications thereto.

29. Contract Modification: Either:
    a. a written amendment to Contract signed by Contractor and City; or
    b. a Change Order; or
    c. a Construction Change Directive; or
    d. a written directive for a minor change in the Work issued by City.

30. Contract Sum: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by City to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.

31. Contract Time: The number or numbers of Days or the dates stated in the Agreement:

a. to achieve Substantial Completion of the Work or designated milestones; and/or
b. to achieve Final Completion of the Work so that it is ready for final payment and acceptance.

32. Contractor: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neutral in gender. The term "Contractor" means the Contractor or its authorized representative.

33. Contractor's Employees: Persons engaged in execution of Work under Contract as direct employees of Contractor, as Subcontractors, or as employees of Subcontractors.

34. Day: One calendar day of 24 hours measured from midnight to the next midnight, unless the word "day" is specifically modified to the contrary.

35. Defective: An adjective which, when modifying the word "Work," refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of samples and "or equal" items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by City). City is the judge of whether Work is defective.

36. Drawings: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

37. Engineer: The City Engineer and/or his representative or other duly authorized representative of City appointed by the City for the special purpose of directing and having charge of the construction of the Work for the City. Said representative may act either directly or through properly authorized agents. Said representatives and agents may act only within the scope of the particular duties entrusted to them.

38. Equal: Equal in opinion of City. Burden of proof of equality is responsibility of Contractor.

39. Exposed: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

40. Final Acceptance: <u>See</u> Final Completion.

41. Final Completion: City's acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Completion /Final Acceptance include, but are not limited to:
a. All systems having been tested and accepted as having met requirements of Contract Documents.
b. All required instructions and training sessions having been given by Contractor.
c. All Project Record Documents having been submitted by Contractor, reviewed by City and Engineer, and accepted by City.

d. All punch list work, as directed by City, having been completed by Contractor.

e. Generally all Work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of City.

42. Force Account: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.

43. Furnish: Supply only, do not install.

44. Indicated: Shown or noted on the Drawings.

45. Install: Install or apply only, do not furnish.

46. Latent: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.

47. Law: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions

48. Material: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.

49. Milestone: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.

50. Modification: Same as Contract Modification.

51. Not in Contract: Work that is outside the scope of Work to be performed by Contractor under Contract Documents.

52. Notice of Completion: Shall have the meaning provided in California Civil Code Section 3093, and any successor statute.

53. Off Site: Outside geographical location of the Project.

54. Owner: The City.

55. Partial Utilization: Use by City of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all of the Work.

56. PCBs: Polyclorinated byphenyls.

57. Phase: A specified portion of the Work (if any) specifically identified as a Phase in Document 00520, Agreement, or Document 01100, Summary.

58. Plans: See Drawings.

59. Product Data: That information (including brochures, catalogue cuts, MSDS, etc.) supplied by the vendor describing the technical and commercial characteristics of the supplier equipment or materials, and accompanying commercial terms such as warranties, instructions and manuals.

60. Progress Report: A periodic report submitted by Contractor to City with progress payment invoices accompanying actual work accomplished to the Progress Schedule. See Section 01320, Progress Schedules and Reports, and Document 00700, General Conditions.

61. Project: Total construction of which Work performed under Contract Documents may be whole or part.

62. Project Float: As defined in Section 01320, paragraph 1.2.B.3.

63. Project Inspector: A person engaged by City to provide general observation of the Work, scheduling requested inspections by Contractor and reporting to City.

64. Project Manager: The person or persons assigned by City to be the City's agent(s) at the Site. See Document 00520, Agreement.

65. Project Manual: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, and Specifications.

66. Project Record Documents: All Project deliverables required under Sections 01700 et seq., including without limitation, as-built drawings, operations and maintenance manuals Installation, Operation, and Maintenance Manuals, and Machine Inventory Sheets.

67. Provide: Furnish and install.

68. Request for Information ("RFI"): A document prepared by Contractor requesting information regarding the Project or Contract Documents as provided in Document 01250, Modification Procedures. The RFI system is also a means for City to submit Contract Document clarifications or supplements to Contractor.

69. Request for Proposals ("RFP"): A document issued by City to Contractor whereby City may initiate changes in the Work or Contract Time as provided in Contract Documents. See Document 01250, Modification Procedures.

70. Request for Substitution ("RFS"): A document prepared by Contractor requesting substitution of materials as permitted and to the extent permitted in Contract Documents. See Section 01600, Product Requirements.

71. RFI-Reply: A document consisting of supplementary details, instructions, or information issued by City that clarifies or supplements Contract Documents, and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by City.

72. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

73. Shop Drawings: All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

74. Shown: As indicated on Drawings.

75. Site: The particular geographical location of Work performed pursuant to Contract Documents.

76. Special Provisions: Division 3 of the Specifications.

77. Specifications: The written portion of the Contract Documents as specified in Document 00520, Agreement.

78. Specified: As written in Specifications.

79. Standard Details: The latest revision of the City of Santa Clara Standard Details, effective at the date of the award of the Contract.

80. Standard Plans: The latest revision of the State of California Department of Transportation Standard Plans, effective at the date of the award of the Contract.

81. Standard Specifications: The latest revision of the State of California Department of Transportation Standard Specifications, effective at the date of the award of the Contract. However, when a reference is made to the Standard Specifications and said reference is no longer specified in the latest revision of the Standard Specifications, said reference shall be to the 2006 Edition of the Standard Specifications. Whenever the following terms are used in the Standard Specifications, they shall be understood to mean and refer to the following:
    a. Department of Transportation or Division of Highways: The City's Public Works Department or, when applicable, the designated Department.
    b. The Director of Public Works: The City's Director of Public Works.
    c. Engineer: Engineer as defined above.
    d. The State: The City.
    e. Laboratory: The City's Materials Testing Laboratory, or the designated laboratory authorized by the City.
    f. Other terms appearing in the Standard Specifications, the General Provisions, General Requirements, Technical Provisions, or the Special Provisions, shall have the intent and meaning specified in Section 1, "Definitions and Terms" of the Standard Specifications. In case of conflict between the Standard Specifications and these definitions, these definitions shall take precedence over and be used in lieu of such conflicting portions of the Standard Specifications.
    g. The pay provisions in the Standard Specifications shall not be applicable to City Contractors.

82. Subcontractor: A person or entity that has a direct contract with Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

83. Substantial Completion: The Work (or a specified part thereof) has progressed to the point where, in the opinion of City as evidenced by a Certificate of Substantial Completion, the Work is sufficiently complete, in accordance with Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work (or specified part) is complete and ready for final payment as evidenced by written recommendation of City for final payment. The terms "Substantially Complete" and "Substantially Completed" as applied to all or part of the Work refer to Substantial Completion thereof.

84. Supplemental Instruction: A written directive from City to Contractor ordering alterations or modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications. See Document 01250, Modification Procedures.

85. Technical Provisions: Division 2 of the Specifications.

86. Testing and Special Inspection Agency: An independent entity engaged by City to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.

87. Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials: Electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.

88. Unit Price Work: Shall be the portions of the Work for which a unit price is provided in Document 00520, Agreement, or Section 01100, Summary.

89. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents including everything shown in the Drawings and set forth in the Specifications. Wherever the word "work" is used, rather than the word "Work," it shall be understood to have its ordinary and customary meaning.

90. Working Day: Any Day other than Saturday, Sunday, City furlough days, and the following days that have been designated as holidays by City. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday.
    a. New Year's Day, January 1;
    b. Martin Luther King Jr.'s Birthday, third Monday in January;
    c. Presidents' Day, third Monday in February;
    d. Spring Holiday, the Friday before Easter Sunday
    e. Memorial Day, last Monday in May;
    f. Independence Day, July 4;
    g. Labor Day, first Monday in September;
    h. Admission Day, September 9th;

i. Columbus Day, second Monday in October
j. Veterans' Day, November 11;
k. Thanksgiving Day, as designated by the President;
l. The Day following Thanksgiving Day;
m. Christmas Day, December 25; and
n. Each day appointed by the Governor of California and formally recognized by the City Council as a day of mourning, thanksgiving, or special observance.

B. Wherever words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood that direction, requirements, or permission of City is intended. Words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in judgment of City. Words "approved," "acceptable," "satisfactory," "favorably reviewed," or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by City.

C. Wherever the word "may" or "ought" is used, the action to which it refers is discretionary. Wherever the word "shall" or "will" is used, the action to which it refers is mandatory.

END OF SECTION

DOCUMENT 00320

GEOTECHNICAL DATA AND EXISTING CONDITIONS

1. SUMMARY

This Document 00320 sets forth the terms and conditions under which Bidder may review, study, use, or rely upon geotechnical data at or contiguous to the Site, and existing conditions information concerning existing conditions at or contiguous to the Site. This Document 00320, the available geotechnical data, and the supplied existing conditions information are not Contract Documents.

2. REPORTS AND INFORMATION

A. City, its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding Underground Facilities. These reports, documents and other information are not part of the Contract Documents.

B. Bidders may inspect geotechnical reports and information regarding existing conditions available at the City's Office, and may obtain copies at cost of reproduction and handling upon Bidder's payment for the costs. These reports, documents and other information, are not part of the Contract Documents. Nevertheless, by submitting a Bid, Bidder accepts full responsibility for reviewing, knowing and understanding the contents of all of these materials.

C. Geotechnical reports may be included in the Project Manual and information regarding existing conditions may also be included in the Project Manual, but neither shall be considered part of the Contract Documents.

D. The geotechnical reports and data, and information regarding existing conditions and Underground Facilities at or contiguous to the Site, if any, are listed in the Special Provisions and are available for review through the City.

3. USE OF INFORMATION ON EXISTING CONDITIONS

A. Aboveground Existing Conditions. Under no circumstances shall City be deemed to make a warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by City regarding existing conditions. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding existing conditions supplied by City.

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B. Underground Facilities. Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to City by others (e.g., the owners or builders of such Underground Facilities or others). Except as expressly set forth in this Document 00320, City does not assume responsibility for the accuracy, completeness or thoroughness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information. Except as expressly set forth in this Document 00320, City will be responsible only for the general accuracy of information regarding Underground Facilities, and only for those Underground Facilities that are owned by City. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

4. LIMITED RELIANCE PERMITTED ON CERTAIN INFORMATION

A. Geotechnical Data. Except as expressly set forth in this Document 00320, City does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by City, except as specifically set forth herein.

B. Bidder may rely upon the general accuracy of the "technical data" contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent. The term "technical data" in the referenced reports and drawings shall be limited as follows:

1. The term "technical data" shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface exploration.

2. The term "technical data" does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures.

3. The term "technical data" shall not include the location of Underground Facilities.

4. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the "technical data" contained in such reports or drawings.

5. Bidder is solely responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information contained in supplied geotechnical data.

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5. INVESTIGATIONS

A. Before submitting a Bid, each Bidder shall be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of Contract Documents. Bidders shall advise City in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for City's review and response.

B. City has provided time in the period prior to bidding for Bidder to perform these investigations.

6. ACCESS TO SITE

Subject to reasonable scheduling, City will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests, and studies. Such investigations may be performed only under the provisions of Document 00200, Instructions to Bidders, and Document 00700, General Conditions, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such investigation work. Each Bidder shall supply all equipment required to perform any investigations, as each Bidder deems necessary. City has the right to limit the number of pieces of machinery operating at one time due to safety concerns.

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DOCUMENT 00340

HAZARDOUS MATERIALS SURVEYS

1. SUMMARY

This Document 00340 describes hazardous material surveys included with the Contract Documents and use of data therein.

2. REPORTS AND INFORMATION

City, its consultants, contractors, and tenants may have prepared documents providing a general description of the Site and locations of hazardous materials which are the subject of the work. The document consists of surveys included in or within this Project Manual, or made available for review and copying. The title(s) of the survey(s), if any, are listed in the Special Provisions.

3. INVESTIGATIONS

A. Before submitting a Bid, each Bidder shall be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise that may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs or projects incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

B. City has provided time in the period prior to bidding for Bidder to perform these investigations.

C. On request of Bidder and execution of Document 00210, Indemnification and Release Agreement, and providing an insurance certificate as described therein, City will provide each Bidder access to Site to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of a Bid. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Any investigation performed by Bidder to verify hazardous materials/waste conditions must comply with the provisions of Document 00810, Supplementary Conditions – Hazardous Materials, including but not limited to the requirements regarding compliance with all laws, permits, giving of all notices, and indemnification. Bidders shall also present proof of insurance satisfactory to City.

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DOCUMENT 00441

ETHICAL STANDARDS FOR CONTRACTORS

Termination of Contract for Certain Acts.

A. City may, at its sole discretion, terminate any contract with Contractor if any one or more of the following occurs:

1. If Contractor[1] does any of the following:

   a. Is convicted[2] of operating a business in violation of any Federal, State or local law or regulation;

   b. Is convicted of a crime punishable as a felony involving dishonesty;[3]

   c. Is convicted of an offense involving dishonesty or is convicted of fraud or a criminal offense in connection with: (1) obtaining; (2) attempting to obtain; or (3) performing a public contract or subcontract;

   d. Is convicted of any offense which indicates a lack of business integrity or business honesty which seriously and directly affects the present responsibility of a City contractor or subcontractor; or

   e. Made (or makes) any false statement(s) or representation(s) with respect to the contract; or

2. If fraudulent, criminal, or other seriously improper conduct of any officer, director, shareholder, partner, employee, or other individual associated with Contractor can be imputed to Contractor when the conduct occurred in connection with the individual's performance of duties for or on behalf of Contractor, with Contractor's knowledge, approval or acquiescence, Contractor's acceptance of the benefits derived from the conduct shall be evidence of such knowledge, approval, or acquiescence.

B. City may also terminate any contract with Contractor if any one or more of the following occurs:

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[1] For purposes of this Document 00441, the term "Contractor" (whether a person or a legal entity) means any of the following: an owner or co-owner of a sole proprietorship; a person who controls or who has the power to control a business entity; a general partner of a partnership; a principal in a joint venture; or a person who owns more than ten percent (10%) of the outstanding stock of a corporation and who is active in the day to day operations of that corporation.

[2] For purposes of this Document 00441, the terms "convicted" or "conviction" mean a judgment or conviction of a criminal offense by any court of competent jurisdiction, whether entered upon a verdict or a plea, and includes a conviction entered upon a plea of nolo contendere within the past five (5) years.

[3] For purposes of this Document 00441, the term "dishonesty" includes, without limitation, embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, failure to pay tax obligations, receiving stolen property, collusion or conspiracy.

1. If Contractor becomes “insolvent”;[4]

2. If City determines that Contractor no longer has the financial capability or business experience (including without limitation loss of personnel deemed essential by City) to perform successfully the terms of, or operate under, any contract with City; or

3. If City determines that Contractor fails to submit information, or submits false information, which is required to perform or be awarded a contract with City, including, but not limited to, Contractor’s failure to maintain a required state issued license, failure to obtain a City business license (if applicable), or failure to purchase and maintain bonds and/or insurance policies required under any contract with City.

C. In the event a prospective Contractor (or bidder) is ruled ineligible (debarred) to participate in a contract award process, or a contract is terminated pursuant to the these provisions, Contractor may appeal City’s action to the City Council by filing a written request with the City Clerk to have the matter heard within ten (10) days of the notice given by City. The matter will be heard within thirty (30) days of the filing of the appeal request with the City Clerk. Contractor shall have the burden of proof on the appeal. Contractor shall have the opportunity to present evidence, both oral and documentary, and argument.

END OF DOCUMENT

[4] For purposes of this Document 00441, Contractor is “insolvent” if it is unable to pay its debts as they become due, transfers assets in fraud of creditors, makes an assignment for the benefit of creditors, files a petition under any section or chapter of the federal Bankruptcy Code (11 U.S.C.), as amended, or under any similar law or statute of the United States or any state thereof, is adjudged bankrupt or insolvent in proceedings under such laws, or a receiver or trustee is appointed for all or substantially all of Contractor’s assets.

DOCUMENT 00670

ESCROW BID DOCUMENTS

1. Requirements for Escrow Bid Documents.

   a. Within the time period established in Document 00510, Notice of Award, Contractor shall submit to City a set of Escrow Bid Documents as defined in paragraph 2, below. Escrow Bid Documents will be used only in the manner and for the purposes described in this Document 00670.

   b. The submission of the Escrow Bid Documents, as with the bonds and insurance documents required under Document 00200, Instructions to Bidders, is considered an essential part of the Contract award. Should Contractor fail to make the submission within the allowed time specified, Contractor may be deemed to have failed to enter into the Contract, Contractor shall forfeit the amount of its Bid security accompanying Contractor's Bid, and City may award the Contract to the next lowest responsive responsible Bidder.

   c. NO PAYMENTS WILL BE MADE, NOR WILL CITY ACCEPT CHANGE ORDER REQUESTS UNTIL THE ABOVE REQUIRED INFORMATION IS SUBMITTED AND APPROVED. ALTERNATIVELY, CITY MAY DECLARE THE BID NON-RESPONSIVE.

   d. Contractor shall submit the Escrow Bid Documents, in person by an authorized representative of the Contractor, to:

      City of Santa Clara
      Office of the City Clerk
      1500 Warburton Avenue
      Santa Clara, CA 95050

2. Scope of Escrow Bid Documents.

   a. Within the time period established in Document 00510, Notice of Award, Contractor shall submit one copy of all documentary information received or generated by Contractor in preparation of Bid prices for the Contract Documents, as specified in paragraphs 5 and 6, below. This material is referred to in this Document 00670 as the "Escrow Bid Documents". Contractor's Escrow Bid Documents will be held in escrow as provided in this Document 00670.

   b. Contractor represents and agrees, as a condition of award of the Contract, that the Escrow Bid Documents constitute all written information used in the preparation of its Bid, and that no other written bid preparation information shall be considered in resolving disputes or claims or may be considered in legal proceedings. Contractor also agrees that nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract Documents. Contractor is advised that the Escrow Bid Documents will only be used as a guide in the resolution of disputes and claims.

3. Ownership of Escrow Bid Documents.

   a. The Escrow Bid Documents are, and shall always remain, the property of Contractor, subject to joint review by City and Contractor, as provided in this Document 00670.

b. City stipulates and expressly acknowledges that the Escrow Bid Documents constitute trade secrets. This acknowledgement is based on City's express understanding that the information contained in the Escrow Bid Documents is not known outside Contractor's business, is known only to a limited extent and only by a limited number of Contractor's employees, is safeguarded while in Contractor's possession, is extremely valuable to Contractor, and could be extremely valuable to Contractor's competitors by virtue of it reflecting Contractor's contemplated construction techniques. City further acknowledges that the Escrow Bid Documents and the information contained in them are made available to City only because such action is an express pre-requisite to award of the Contract. City agrees to safeguard the Escrow Bid Documents, and all information contained in them, against disclosure to the fullest extent permitted by law, consistent with paragraph 4, below.

4. Escrow Bid Documents may be used in the determination of price adjustments and change orders and in the settlement of disputes and claims. If used in legal proceedings, Escrow Bid Documents shall be subject to an appropriate protective order limiting their disclosure.

5. Format and Contents of Escrow Bid Documents.

a. Contractor may submit Escrow Bid Documents in their usual cost-estimating format; a standard format is not required. Contractor shall prepare and submit the Escrow Bid Documents in English.

b. City requires Contractor to itemize clearly in the Escrow Bid Documents the estimated costs of performing the work of each Bid item contained in Contractor's Bid. Contractor shall separate Bid items into sub-items as required to present a detailed cost estimate and allow a detailed cost review. The Escrow Bid Documents shall include all subcontractor bids or quotes, supplier bids or quotes, quantity take-offs, crews, equipment, calculations of rates of production and progress, copies of quotes from Subcontractors and suppliers, and memoranda, narratives, add/deduct sheets, and all other information used by Contractor to arrive at the prices contained in the Bid. Escrow Bid Documents shall include costs of scheduled maintenance, depreciation, fleet rental expense discounts and incentives, and similar cost adjustments if used by Contractor to calculate its Bid prices. Estimated costs shall be broken down into Contractor's usual estimate categories such as direct labor, repair labor, equipment ownership and operation, expendable materials, permanent materials and subcontract costs as appropriate. Plant and equipment and indirect costs should be detailed in Contractor's usual format. Contractor shall identify its allocation of indirect costs, contingencies, markup and other items to each Bid item.

c. Contractor shall identify all costs. For bid items amounting to less than Ten Thousand Dollars ($10,000), Contractor may estimate costs without a detailed cost estimate, provided that Contractor includes applicable labor, equipment, materials and subcontracts, and allocates applicable indirect costs, contingencies and markup.

d. Bid documents provided by City should not be included in the Escrow Bid Documents unless needed to comply with these requirements.

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6. Submittal of Escrow Bid Documents.

a. Contractor shall submit the Escrow Bid Documents within the time period established in Document 00510, Notice of Award. The container shall be clearly marked on the outside with Contractor's name, date of submittal, project name and the words "Escrow Bid Documents - Open only in the presence of Authorized Representatives of both City and Contractor". City will review the Escrow Bid Documents for initial compliance. City has three (3) days after receipt of Bidder's Escrow Bid Documents to demand additional information.

b. By submitting Escrow Bid Documents, Contractor represents that the material in the Escrow Bid Documents constitutes all the documentary information used in preparation of the Bid and that Contractor has personally examined the contents of the Escrow Bid Documents container and has found that the documents in the container are complete. Contractor agrees that it will not introduce or rely on any other documents to prove how it prepared its Bid.

c. If Contractor's proposal is based upon subcontracting any part of the Work, each Subcontractor whose total subcontract price exceeds five percent (5%) of the total contract price proposed by Contractor, shall provide separate Escrow Documents to be included with those of Contractor. Such documents shall be opened and examined in the same manner and at the same time as the examination described above for Contractor.

d. If Contractor wishes to subcontract any portion of the Work after award, City retains the right to require Contractor to submit Escrow Documents for the subcontractor before approval of the subcontract.

7. Storage, Examination, and Final Disposition of Escrow Bid Documents.

a. The Escrow Bid Documents will be placed in escrow until Final Completion of Work on the Project, in a mutually agreeable institution. Contractor shall pay the cost of storage for the Escrow Bid Documents until that time. The storage facilities shall be the appropriate size for all the Escrow Bid Documents and located conveniently to both City's and, to the extent reasonably possible, Contractor's offices, but in no event outside Santa Clara County.

b. Both City and Contractor shall examine the Escrow Bid Documents, at any time deemed necessary by either City or Contractor, to assist in the negotiation of price adjustments and change orders or the settlement of disputes and claims. Examination of the Escrow Bid Documents is subject to the following conditions:

i. As trade secrets, the Escrow Bid Documents are proprietary and confidential under section 3.b. above.

ii. City and Contractor (and any Subcontractor, to the extent Escrow Bid Documents are required by a Subcontractor) shall each designate in writing to the other party and seven (7) Days prior to any examination, representatives who are authorized to examine the Escrow Bid Documents. Except as otherwise provided in a court order, no other person shall have access to the Escrow Documents.

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iii. Except as otherwise provided in a court order, access to the documents may take place only in the presence of duly designated representatives of both City and Contractor. If Contractor fails to designate a representative or appear for joint examination on seven (7) Days notice, then City representative may examine the Escrow Bid Documents upon an additional three (3) Days notice.

c. Following Final Completion of Work on the Project and achievement of final settlement, City shall direct the escrow agent holding the Escrow Bid Documents in writing to return those documents to Contractor.

END OF DOCUMENT

DOCUMENT 00700

GENERAL CONDITIONS

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GENERAL CONDITIONS

1. GENERAL

1.1. Documents

Contract Documents are complementary; what is called for by one is as binding as if called for by all. Contract Documents shall not be construed to create a contractual relationship of any kind between (1) Engineer or any City's Representative and Contractor; (2) City and/or its representatives and (except as provided in paragraph 13.9 below) a Subcontractor, sub-Subcontractor, or supplier of any Project labor, materials, or equipment; or (3) between any persons or entities other than City and Contractor. City shall be deemed to be an intended third-party beneficiary of each agreement referenced in clause (2) above, and each such agreement shall so provide. Contractor is fully responsible for Contractor's own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect contract with Contractor.

1.2. Exercise of Contract Responsibilities

In exercising its responsibilities and authorities under the Contract Documents, City does not assume any duties or responsibilities to any Subcontractor or supplier and does not assume any duty of care to Contractor, Contractor's Subcontractors or suppliers. Except as expressly set forth in the Contract Documents, in exercising their respective responsibilities and authorities under the Contract Documents, neither Engineer nor any City's Representative assume any duties or responsibilities to any Subcontractor, sub-Subcontractor or supplier nor assume any duty of care to Contractor or any Subcontractor, sub-Subcontractor or suppliers.

1.3. Defined Terms

All abbreviations and definitions of terms used and not otherwise defined in this Document 00700 are set forth in Section 00050, References and Definitions. This Document 00700 subdivides at first level into Articles, and then into paragraphs.

2. BIDDING

2.1. Investigation Prior To Bidding

A. Prior to bidding, Bidders shall perform the work, investigations, research and analysis required by Article 5 of Document 00520, Agreement. Under the Contract Documents, Contractor is charged with all information and knowledge that a reasonable Bidder would ascertain from having performed the required work, investigations, research, and analysis. Bid prices shall include entire cost of all "incidental work" to complete of the Work, as that term is defined in Article 5 of this Document 00700.

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B. Conditions Shown on Contract Documents: Information as to underground conditions, as-built conditions, or other conditions or obstructions indicated in the Contract Documents, *e.g.*, on Drawings/Plans or in Specifications, has been obtained with reasonable care, and has been recorded in good faith. City warrants, and Contractor may rely on, the accuracy of only limited types of information as discussed below.

1. Aboveground and as-built conditions: There is no express or implied warranty and no express or implied representation that any information as to aboveground conditions or as-built conditions indicated in the Contract Documents is correctly shown, or indicated, or complete. As a condition to bidding, Contractor shall verify by independent investigation all aboveground and as-built conditions. In submitting its Bid, Contractor shall rely on the results of its own independent investigation and shall not rely on City-supplied information regarding aboveground conditions and as-built conditions.

2. Subsurface conditions: Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the Contract Documents. City is not responsible for (1) the completeness of any subsurface condition information for bidding or construction, (2) Contractor's conclusions or opinions drawn from any subsurface condition information, or (3) subsurface conditions that are not specifically shown. (For example, City is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

3. Conditions Shown in Reports and Drawings/Plans Supplied for Informational Purposes: Reference is made to Document 00320, Geotechnical Data and Existing Conditions, for identification of geotechnical reports, "as built" information, and other drawings or other documents describing physical conditions in or relating to existing surface or subsurface conditions or structures at or contiguous to the Site. These materials are not Contract Documents and, except for any "technical data" regarding subsurface conditions specifically identified in Document 00320, Geotechnical Data and Existing Conditions, and "Underground Facilities" data, as limited in Document 00320, Geotechnical Data and Existing Conditions, Contractor shall not in any manner rely on the information in these materials. Subject to the foregoing, Contractor shall make its own independent investigation of all conditions affecting the Work and must not rely on information provided by City.

2.2. Subcontractors

A. Consistent with Public Contract Code Sections 4101 *et seq*., Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the Bid. Subcontractors shall not assign or transfer their subcontracts or permit them to be performed by any other contractor without City's written approval. At City's request, Contractor shall provide City with a complete copy of all executed subcontracts or final commercial agreements with Subcontractors and/or suppliers.

B. Subcontract agreements shall preserve and protect the rights of City under the Contract Documents so that subcontracting will not prejudice such rights. To the extent of the Work to be performed by a Subcontractor, Contractor shall require the Subcontractor's written agreement (1) to be bound to the terms of Contract Documents and (2) to assume vis-à-vis Contractor all the obligations and responsibilities that Contractor assumes toward City under the Contract Documents. (These agreements include for example, and not by way of limitation, all warranties, claims procedures and rules governing submittals of all types to which Contractor is subject under the Contract Documents.)

C. Contractor shall provide for the assignment to City of all rights any Subcontractor may have against any manufacturer, supplier, or distributor for breach of warranties and guarantees relating to the Work performed by the Subcontractor under the Contract Documents.

3. CONTRACT AWARD AND COMMENCEMENT OF THE WORK

3.1. Award of Contract

City will make the Award of Contract by issuing a Notice of Award. As a condition to City signing Document 00520, Agreement, however, Contractor shall deliver to City the executed agreements, forms, bonds, and insurance documents required by Document 00200, Instructions to Bidders in the required quantities and within the required times. Pursuant to Section 6109 (a) and (b) of the Public Contract Code, a public entity is prohibited from awarding a public works contract to a contractor or subcontractor that has been debarred by the Labor Commissioner.

> "A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract, and any public money that may have been paid to a debarred subcontractor by a contractor on the project shall be returned to the awarding body. 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." Cal. Public Contract Code Section 6109(b).

3.2. Commencement of Work

The Contract Time will commence to run on the 30th Day after the issuance of the Notice of Award or, if a Notice to Proceed is given, on the date indicated in the Notice to Proceed. City may give a Notice to Proceed at any time within 30 Days after the Notice of Award. Contractor shall not do any Work at the Site prior to the date on which the Contract Time commences to run. Contractor shall not do any Work until all the required documents listed in Document 00510, Notice of Award, have been approved by the City.

4. BONDS AND INSURANCE

4.1. Bonds

A. At or before the date indicated in Document 00510, Notice of Award, Contractor shall file with City the following bonds:

1. Corporate surety bond, in the form of Document 00610, Construction Performance Bond, in the penal sum of 100% of the Contractor's Bid as accepted, to guarantee faithful performance of the Work; and

2. Corporate surety bond, in the form of Document 00620, Construction Labor and Material Payment Bond, in the penal sum of 100% of the Contractor's Bid as accepted, to guarantee payment of wages for services engaged and of bills contracted for materials, supplies, and equipment used in performance of the Work.

3. Before the labor and materials bond may be released, Contractor shall submit satisfactory evidence that Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into Work. This specifically includes, without limitation, conditional lien release forms for the current progress payment and unconditional release forms for past progress payments (Document 00650, Agreement and Release of Any and All Claims). City also may elect in its sole discretion to pay progress payments by joint check to Contractor and each Subcontractor having an interest in that progress payment in such amount.

B. All corporate sureties must be acceptable and satisfactory to City. Corporate sureties on all bonds required under this Contract must be duly licensed to do business in the State of California and must have an A.M. Best Company financial rating of A-VI or better.

4.2. Insurance

See Document 00820, Insurance Requirements, incorporated herein by this reference.

5. DRAWINGS/PLANS AND SPECIFICATIONS

5.1. Intent

A. Drawings/Plans and Specifications are intended to describe a functionally complete and operable Project (and all parts thereof) to be constructed in accordance with the requirements of Contract Documents. Contractor shall perform any work, provide services and furnish any materials or equipment that may reasonably be inferred from the requirements of Contract Documents or from prevailing custom or trade usage as being required to produce this intended result. Contractor shall interpret words or phrases used to describe work (including services), materials or equipment that have well-known technical or construction industry or trade meaning in accordance with that meaning. Drawings/Plans' intent specifically includes the intent to depict construction that complies with all applicable laws, codes and standards.

B. As part of the "Work," Contractor shall provide all labor, materials, equipment, machinery, tools, facilities, services, employee training and testing, hoisting facilities, shop drawings, storage, testing, security, transportation, disposal, the securing of all necessary or required field dimensions, the cutting or patching of existing materials, notices, permits, documents, reports, agreements and any other items required or necessary to timely and fully complete Work described and the results intended by Contract Documents and, in particular, Drawings/Plans and Specifications. Divisions and Specification Sections and the identification on any Drawings/Plans shall not control Contractor in dividing Work among Subcontractors or suppliers or delineating the Work to be performed by any specific trade.

C. Contractor shall perform reasonably implied parts of Work as “incidental work” although absent from Drawings/Plans and Specifications. Incidental work includes any work not shown on Drawings/Plans or described in Specifications that is necessary or normally or customarily required as a part of the Work shown on Drawings/Plans or described in Specifications. Incidental work includes any Work necessary or required to make each installation satisfactory, legally operable, functional, and consistent with the intent of Drawings/Plans and Specifications or the requirements of Contract Documents including required tasks to be performed under Division 1 of Specifications. Contractor shall perform incidental work without extra cost to City. Incidental work shall be treated as if fully described in Specifications and shown on Drawings/Plans, and the expense of incidental work shall be included in price Bid and Contract Sum.

5.2. Drawing Details

A typical or representative detail on Drawings/Plans shall constitute the standard for workmanship and material throughout corresponding parts of Work. Where necessary, and where reasonably inferable from Drawings/Plans, Contractor shall adapt such representative detail for application to such corresponding parts of Work. The details of such adaptation shall be subject to prior approval by City. Repetitive features shown in outline on Drawings/Plans shall be in exact accordance with corresponding features completely shown.

5.3. Interpretation of Drawings/Plans and Specifications

Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Drawings/Plans and Specifications, or should Contractor have any questions or requests relating to Drawings/Plans or Specifications, Contractor shall refer the matter to City, in writing. City will issue with reasonable promptness written responses, clarifications or interpretations as City may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the Contract Sum or Contract Time, Contractor shall give City prompt written notice as provided in Section 01250, Modification Procedures. If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the Work in conformance with City’s response, clarification, or interpretation and may make a written claim for the adjustment as provided in Article 12 of this Document 00700.

5.4. Checking of Drawings/Plans

Before undertaking each part of Work, Contractor shall carefully study and compare Contract Documents and check and verify pertinent figures shown in the Contract Documents and all applicable field measurements. Contractor shall be responsible for any errors that might have been avoided by such comparison. Figures shown on Drawings/Plans shall be followed; Contractor shall not scale measurements. Contractor shall promptly report to City, in writing, any conflict, error, ambiguity or discrepancy that Contractor may discover. Contractor shall obtain a written interpretation or clarification from City before proceeding with any Work affected thereby. Contractor shall provide City with a follow-up correspondence every five days until it receives a satisfactory interpretation or clarification.

5.5. Standards To Apply Where Specifications Are Not Furnished

The following general specifications shall apply wherever in the Specifications, or in any directions given by City in accordance with or supplementing Specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are shown. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation. If not ordinarily carried in stock, the materials or manufactured articles shall conform to industry standards for first-class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work shall conform to the usual standards or codes, such as those cited in Section 00050, References and Definitions, for first-class work of the kind required. Contractor shall specify in writing to City the materials to be used or Work to be performed under this paragraph 5.5 ten Business Days prior to furnishing such materials or performing such Work.

5.6. Deviation From Specifications and Drawings/Plans

A. Contractor shall perform Work in accordance with Drawings/Plans and Specifications. Contractor may deviate from Drawings/Plans or the dimensions given in the Drawings/Plans, and may deviate from the Specifications, only upon City's advance written approval of the proposed deviation.

B. City may order that locations, lines and grades for Work vary from those shown on Drawings/Plans. Changes may be made in locations, lines or grades for Work under any item of Contract Documents. No payment in addition to unit price fixed in the Contract Documents for Work under respective items will be allowed on account of variations from Drawings/Plans in unit price items. In lump sum contracts, or where there are no unit price items covering Work affected by variations of locations, lines or grades, all changes in the Contract Documents will be made as set forth in Article 14 of this Document 00700.

5.7. Precedence of Documents

A. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:

1. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying;
2. Document 00520, Agreement, and terms and conditions referenced therein;
3. Document 00800, Supplementary Conditions;
4. Document 00700, General Conditions;
5. Division 1 - General Requirements;
6. Division 3 and above - Special Provisions;
7. Drawings/Plans;
8. Division 2 - Technical Provisions;
9. Standard Details
10. Written numbers over figures, unless obviously incorrect;
11. Figured dimensions over scaled dimensions, unless obviously incorrect;
12. Large-scale drawings over small-scale drawings, unless obviously incorrect.

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B. Any conflict between Drawings/Plans and Division 2 and 3 Specifications will be resolved in favor of the document of the latest date (i.e., the most recent document), and if the dates are the same or not determinable, then in favor of Specifications.

C. Any conflict between a bill or list of materials shown in the Contract Documents and the actual quantities required to complete Work required by Contract Documents, will be resolved in favor of the actual quantities.

D. In the event the Specifications include divisions above Division 3 (e.g., Division 4 and above), then such divisions shall be included within the Contract Documents unless identified otherwise.

5.8. Ownership and Use of Drawings/Plans, Specifications and Contract Documents

Drawings/Plans, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of City. Any unauthorized use of Contract Documents is prohibited and at the sole liability of the user.

6. CONSTRUCTION BY CITY OR BY SEPARATE CONTRACTORS

6.1. City's Right To Perform Construction and To Award Separate Contracts

City may perform with its own forces, construction or operations related to the Project. City may also award separate contracts in connection with other portions of the Project or other construction or operations, on the Site or areas contiguous to the Site, under conditions similar to these Contract Documents, or may have utility owners perform other work. When separate contracts are awarded for different portions of the Project or other construction or operations on the Site, the term "Contractor" in these Contract Documents shall mean the Contractor herein.

6.2. Mutual Responsibility

A. Contractor shall afford all other contractors, utility owners and City (if City is performing work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others' work, and shall cooperate with them to facilitate the progress of the Work.

B. Contractor shall coordinate its Work with the work of other separate contractors, City, and utility owners. Contractor shall hold coordination meetings with other contractors, City and its representatives, and utility owners as required by Section 01315, Project Meetings.

C. Unless otherwise provided in the Contract Documents, Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of other separate contractors, City or utility owners by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of City and the others whose work will be affected.

D. Contractor's duties and responsibilities under this Document 00700 are for the benefit of City and also for the benefit of such other contractors and utility owners working at the Site to the extent that there are comparable provisions for the benefit of Contractor in the direct contracts between City and such other contractors and utility owners.

E. To the extent that any part of Contractor's Work is to interface with work performed or installed by other contractors or utility owners, Contractor shall inspect and measure the in-place work. Contractor shall promptly report to City in writing any defect in in-place work that will impede or increase the cost of Contractor's interface unless corrected. City will require the Contractor responsible for the Defective Work to make corrections so as to conform to its contract requirements, or, if the defect is the result of an error or omission in the Contract Documents, issue a Change Order. If Contractor fails to measure, inspect and/or report to City in writing defects that are reasonably discoverable, Contractor shall bear all costs of accomplishing the interface acceptable to City. This provision shall be included in any and all other contracts or subcontracts for Work to be performed where such a conflict could exist.

6.3. City Authority Over Coordination

A. City will have authority over coordination of the activities of multiple contractors in cases where City performs work with its own forces or contracts with others for the performance of other work on the Project, or utilities work on the Site. City may at any time and in its sole discretion, designate a person or entity other than City to have authority over the coordination of the activities among the various contractors. City's authority with respect to coordination of the activities of multiple contractors and utility owners shall not relieve Contractor of its obligation to other contractors and utility owners to coordinate its Work with other contractors and utility owners as specified in paragraph 6.2 of this Document 00700. Contractor shall promptly notify City in writing when another contractor on the Project fails to coordinate its work with the Work of Contract Documents.

B. Contractor shall suspend any part of the Work or carry on the same in such manner as directed by City when such suspension or prosecution is necessary to facilitate the work of other contractors or workers. No damages or claims by Contractor will be allowed if the suspension or Work change is due in whole or in part to Contractor's failure to perform its obligation to coordinate its Work with other contractors and utility owners. Damages or claims will be allowed only to the extent of fault by City if the suspension or Work change is due in whole or in part to another contractor's failure to coordinate its work with Contractor, other contractors, and utility owners. City reserves the right to back charge Contractor for any damages or claims incurred by other contractors as a result of Contractor's failure to perform its obligations to coordinate with other contractors and utility owners. City may deposit the funds retained with a Court of competent jurisdiction pursuant to applicable interpleader procedures and Contractor releases City of further liability regarding such funds.

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7. CITY AND PAYMENT

7.1. City's Representative(s)

City's Representative(s) will have limited authority to act on behalf of City as set forth in the Contract Documents. Except as otherwise provided in these Contract Documents or subsequently identified in writing by City, City will issue all communications to Contractor through City's Representative, and Contractor shall issue all communications to City through City's Representative in a written document delivered to City. Should any direct communications between Contractor and City's consultants, architects or engineers not identified in Article 2 of Document 00520, Agreement occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to City.

7.2. Means and Methods of Construction

Subject to those rights specifically reserved in the Contract Documents, City will not supervise, or direct, or have control over, or be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or Contractor's failure to comply with laws and regulations applicable to the furnishing or performance of Work. City will not be responsible for Contractor's failure to perform or furnish the Work in accordance with Contract Documents.

7.3. Receipt and Processing of Applications for Payment

As required by Section 01200, Measurement and Payment, Contractor shall prepare the schedules, submit Applications for Payment and warrant title to all Work covered by each Application for Payment. City will review Contractor's Applications for Payment and make payment thereon, and Contractor shall make payments to Subcontractors, suppliers and others, as required by Section 01200, Measurement and Payment.

8. CONTROL OF THE WORK

8.1. Supervision of Work by Contractor

A. Contractor shall supervise, inspect, and direct Work competently and efficiently, devoting the attention and applying such personal skills and expertise as may be required and necessary to perform Work in accordance with Contract Documents. Contractor shall be solely responsible for and have control and charge of construction means, methods, techniques, sequences and procedures, safety precautions and programs in connection with the Work. Contractor shall be responsible to see that the completed Work complies accurately with Contract Documents.

B. Contractor shall keep on the Site at all times during Work progress a competent resident Superintendent, who shall not be replaced without City's express written consent. The Superintendent shall be Contractor's representative at the Site and shall have complete authority to act on behalf of Contractor. All communications to and from the Superintendent shall be as binding as if given to or by Contractor.

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8.2. Observation of Work by City and Consultant

A. Work shall be performed under City's general observation and administration. Contractor shall comply with City's directions and instructions in accordance with the terms of Contract Documents, but nothing contained in these General Conditions shall be taken to relieve Contractor of any obligations or liabilities under the Contract Documents. City's failure to review or, upon review, failure to object to any aspect of Work reviewed, shall not be deemed a waiver or approval of any non-conforming aspect of Work.

B. City may engage an independent consultant or engineer (collectively for purposes of this paragraph 8.2, "Engineer") to assist in administering the Work. If so engaged, Engineer will advise and consult with City, but will have authority to act on behalf of City only to extent provided in the Contract Documents or as set forth in writing by City. Engineer will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with Work. Engineer will not be responsible for or have control over the acts or omissions of Contractor, Subcontractors or their agents or employees, or any other persons performing Work.

C. Engineer may review Contractor's submittals, such as Shop Drawings, Product Data, and Samples, but only for conformance with design concept of Work and with information given in the Contract Documents.

D. Engineer may visit the Site at intervals appropriate to stage of construction to become familiar generally with the progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. Based on its observations, Engineer may recommend to City that it disapprove or reject Work that Engineer believes to be defective or will not produce a complete Project that conforms to Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by Contract Documents. City will also have authority to require special inspection or testing of Work, whether or not the Work is fabricated, installed or completed.

E. Engineer may conduct inspections to recommend to City the dates that Contractor has achieved Substantial Completion and Final Acceptance, and will receive and forward to City for review written warranties and related documents required by Contract Documents.

8.3. Access to Work

During performance of Work, City and its agents, consultants, and employees may at any time enter upon Work, shops or studios where any part of the Work may be in preparation, or factories where any materials for use in Work are being or are to be manufactured, and Contractor shall provide proper and safe facilities for this purpose, and shall make arrangements with manufacturers to facilitate inspection of their processes and products to such extent as City's interests may require. Other contractors performing work for City may also enter upon Work for all purposes required by their respective contracts. Subject to the rights reserved in the Contract Documents, Contractor shall have sole care, custody, and control of the Site and its Work areas.

8.4. Existing Utilities

Drawings/Plans may indicate above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities, and additional information may be on file at the regional notification center, "Underground Service Alert" ("USA"). Contractor shall locate these known existing installations before proceeding with trenching or other operations that may cause damage, shall maintain them in service where appropriate, and shall repair any damage to them caused by the Work, at no increase in Contract Sum. Additional utilities whose locations are unknown to City are suspected to exist. Contractor shall be alert to their existence; if they are encountered, Contractor shall immediately report to City for disposition of the same. In addition to reporting if any utility is damaged, Contractor shall take appropriate action as provided in this Document 00700. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor's attention, including reasonable action taken to protect or repair damage, shall be determined as provided in this Document 00700.

A. At no additional cost to City, Contractor shall incorporate into the Work main or trunk line utilities identified in the Contract Documents and other utilities or underground structures known or reasonably discernible and that will remain in service, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take immediate action to restore any in service installations damaged by Contractor's operations. Should City determine that Contractor has not responded in a timely manner or not diligently pursued completion of the Work, City may restore service and deduct the costs of such action by City from the amounts due under the Contract.

B. Consistent with Government Code Section 4215, as between City and Contractor, City will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the Contract Documents or Document 00320, Geotechnical Data and Existing Conditions. City will compensate for the cost of locating and repairing damage not due to Contractor's failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the Contract Documents or Document 00320, Geotechnical Data and Existing Conditions, with reasonable accuracy, and equipment on the Project necessarily idled during such work.

C. Prior to performing Work at the Site, Contractor shall lay out the locations of known underground utilities that are to remain in service and other significant known underground installations. At no additional cost to City, prior to commencing other Work in proximity to such known underground utilities or installations that can be readily inferred from adjacent surface improvements, Contractor shall further locate, by carefully excavating with small equipment, potholing and principally by hand, such utilities or installations that are to remain and that are subject to damage. This obligation applies to all utilities (including, but not limited to, those referenced above).

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D. Nothing in this Document 00700 shall be deemed to require City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred by Contractor from the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site. Contractor shall immediately secure all available information and notify City and utility, in writing, of its discovery, while performing Work under the Contract Documents, of any utility facilities not identified in the Drawings/Plans and Specifications.

8.5. Underground Facilities

A. Before commencing work of digging trenches or excavation, Contractor shall review all information available regarding subsurface conditions, including but not limited to information supplied in Document 00320, Geotechnical Data and Existing Conditions, and subject to the terms and conditions of these documents, Contractor shall also comply with Government Code Sections 4216 to 4216.9, and in particular Section 4216.2 which provides, in part:

> "Except in an emergency, any person planning to conduct any excavation shall contact the appropriate regional notification center, at least two working days, but no more than 14 calendar days, prior to commencing that excavation, if the excavation will be conducted in an area that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated….The regional notification center shall provide an inquiry identification number to the person who contacts the center pursuant to this section and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation."

B. Contractor shall contact USA, and schedule the Work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in USA records. Prior to commencing excavation or trenching work, Contractor shall provide City with copies of all USA records secured by Contractor. Contractor shall advise City of any conflict between information provided in Document 00320, Geotechnical Data and Existing Conditions, the Drawings/Plans and that provided by USA records. Contractor's excavation shall be subject to and comply with the Contract Documents, including without limitation Paragraphs 2.1 and 8.4 of this Document 00700.

C. The cost of all of the following will be included in the Contract Sum and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, but not limited to, Document 00320, Geotechnical Data and Existing Conditions and information on file at USA; (b) locating all Underground Facilities shown or indicated in the Contract Documents, available information, or indicated by visual observation including, but not limited to, and by way of example only, engaging qualified locating services and all necessary backhoeing and potholing; (c) coordination of the Work with the owners of such Underground Facilities during construction; and (d) the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

D. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by City or in information on file at USA or is otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven Days), and prior to performing any Work in connection therewith (except in an emergency as required by Article 16 of this Document 00700), identify the owner of such Underground Facility and give written notice to that owner and to City. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

E. Contractor shall be allowed an increase in the Contract Sum or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that is owned and was built by City only where the Underground Facility:

1. Was not shown or indicated in the Contract Documents or in the information supplied pursuant to Document 00320, Geotechnical Data and Existing Conditions, or in information on file at USA;

2. Contractor did not know of it; and

3. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an Underground Facility, then an increase in the Contract Price or an extension of the Contract Time will not be due, even if the Underground Facility was not indicated in the Contract Documents, in the information supplied to Contractor pursuant to Document 00320, Geotechnical Data and Existing Conditions, in information on file at USA, or otherwise reasonably available to Contractor.)

F. Contractor shall bear the risk that Underground Facilities not owned or built by City may differ in nature or locations shown in information made available by City pursuant to Document 00320, Geotechnical Data and Existing Conditions, in information on file at USA, or otherwise reasonably available to Contractor. Underground Facilities are inherent in construction involving digging of trenches or other excavations and Contractor is to apply its skill and industry to verify the information available.

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9. WARRANTY, GUARANTY, AND INSPECTION OF WORK

9.1. Warranty and Guaranty

A. General Representations and Warranties: Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every Phase of the Work and to complete Work in accordance with the terms of Contract Documents. Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices and all requirements of Contract Documents. Contractor warrants that Work, including but not limited to each item of materials and equipment incorporated therein, shall be new, of suitable grade of its respective kind for its intended use, and free from defects in design, engineering, materials, construction and workmanship. Contractor warrants that Work shall conform in all respects with all applicable requirements of federal, state and local laws, applicable construction codes and standards, licenses, and permits, Drawings/Plans and Specifications and all descriptions set forth therein, and all other requirements of Contract Documents. Contractor shall not be responsible, however, for the negligence of others in the specification of specific equipment, materials, design parameters and means or methods of construction where that is specifically shown and expressly required by Contract Documents.

B. Extended Guarantees: Any guarantee exceeding one year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials for a period of one (1) year from date of Final Acceptance, unless a longer period is specified elsewhere in the Contract Documents, and shall supply City with all warranty and guarantee documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.

C. Environmental and Toxics Warranty: The covenants, warranties and representations contained in this paragraph 9.1.C are effective continuously during Contractor's Work on the Project and following cessation of labor for any reason including, but not limited to, Project completion. Contractor covenants, warrants and represents to City that:

1. To Contractor's knowledge after due inquiry, no lead or asbestos-containing materials were installed or discovered in the Project at any time during Contractor's construction thereof. If any lead or asbestos-containing materials were discovered, Contractor made immediate written disclosure to City.

2. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor's construction thereof.

3. To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to City.

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4. Contractor's operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide City with copies thereof.

9.2. Inspection of Work

A. All materials, equipment, and workmanship used in Work shall be subject to inspection and testing at all times during construction and/or manufacture in accordance with the terms of Contract Documents. Work and materials, and manufacture and preparation of materials, from beginning of construction until final completion and acceptance of Work, shall be subject to inspection and rejection by City, its agents, representatives or independent contractors retained by City to perform inspection services, or governmental agencies with jurisdictional interests. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and program so that they may comply therewith as applicable. Upon request or where specified, City shall be afforded access for inspection at the source of supply, manufacture or assembly of any item of material or equipment, with reasonable accommodations supplied for making such inspections.

B. Contractor shall give City at least one full working day notice of readiness of Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

C. If applicable laws or regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, and furnish City with the required certificates of inspection, or approval. City will pay the cost of initial testing and Contractor shall pay all costs in connection with any follow-up or additional testing. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for the acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

D. If Contractor covers any Work, or the work of others, prior to any required inspection, test or approval without written approval of City, Contractor shall uncover the Work at City's request. Contractor shall bear the expense of uncovering Work and replacing Work.

E. In any case where Contractor covers Work contrary to City's request, Contractor shall uncover Work for City's observation or inspection at City's request. Contractor shall bear the cost of uncovering and replacing Work.

F. Whenever required by City, Contractor shall furnish tools, labor and materials necessary to make examination of Work that may be completed or in progress, even to extent of uncovering or taking down portions of finished Work. Should Work be found unsatisfactory, cost of making examination and of reconstruction shall be borne by Contractor. If Work is found to be satisfactory, City, in manner herein prescribed for paying for alterations, modifications, and extra Work, except as otherwise herein specified, will pay for examination.

G. Inspection of the Work by or on behalf of City, or City's failure to do so, shall not under any circumstances be deemed a waiver or approval of any non-conforming aspect of the Work. Contractor shall have an absolute duty, in the absence of a written Change Order signed by City, to perform Work in conformance with the Contract Documents.

H. Any inspection, evaluation, or test performed by or on behalf of City relating to the Work is solely for the benefit of City, and shall not be relied upon by Contractor. Contractor shall not be relieved of the obligation to perform Work in accordance with the Contract Documents, nor relieved of any guaranty, warranty, or other obligation, as a result of any inspections, evaluations, or tests performed by City, whether or not such inspections, evaluations, or tests are permitted or required under the Contract Documents. Contractor shall be solely responsible for testing and inspecting Work already performed to determine whether such Work is in compliance with the requirements of the Contract Documents and is in proper condition to receive later Work.

9.3. Correction of Defective Work

A. If Contractor fails to supply sufficient skilled workers, suitable materials or equipment, or to furnish or perform the Work in such a way that the completed Work will conform to Contract Documents, City may order Contractor to replace any Defective Work, or stop any portion of Work to permit City (at Contractor's expense) to replace such Defective Work. These City rights are entirely discretionary on the part of the City, and shall not give rise to any duty on the part of City to exercise the rights for the benefit of Contractor or any other party.

B. City may direct Contractor to correct any Defective Work or remove it from the Site and replace it with Work that is not defective and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting from the correction or removal. Contractor shall be responsible for any and all claims, costs, losses and damages caused by or resulting from such correction or removal. A Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, City may decide the proper amount or, in its discretion may elect to leave the Contract Sum unchanged and deduct from moneys due Contractor, all such claims, costs, losses and damaged caused by or resulting from the correction or removal. If Contractor disagrees with City's calculations, it may make a claim as provided in Article 12 of this Document 00700. City's rights under this paragraph 9.3.B shall be in addition to any other rights it may have under the Contract Documents or by law.

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C. Correction Period: If within one year after the date of Final Acceptance, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to City and in accordance with City's written instructions, correct such Defective Work. Contractor shall remove any Defective Work rejected by City and replace it with Work that is not defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, City may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, City shall have all rights and remedies granted by law.

D. In special circumstances where a part of the Work is occupied or a particular item of equipment is placed in continuous service before Final Acceptance of all the Work, the correction period for that part of Work or that item may start to run from an earlier date if so provided by Change Order.

E. Where Defective Work or rejected Work (and damage to other Work resulting therefrom) has been corrected, removed, or replaced under this provision after the commencement of the correction period, the correction period hereunder with respect to such Work shall be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

9.4. Acceptance and Correction of Defective Work by City

A. City may accept Defective Work. Contractor shall pay all claims, costs, losses and damages attributable to City's evaluation of and determination to accept such Defective Work. If City accepts any Defective Work prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, City may deduct from moneys due Contractor, all claims, costs, losses, damages, expenses and liabilities attributable to the Defective Work. If Contractor disagrees with City's calculations, Contractor may make a claim as provided in Article 12 of this Document 00700. If City accepts any Defective Work after final payment, Contractor shall pay to City, an appropriate amount as determined by City.

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B. City may correct and remedy deficiency if, after five Days' written notice to Contractor, Contractor fails to correct Defective Work or to remove and replace rejected Work in accordance with paragraph 9.3.B of this Document 00700; or provide a plan for correction of Defective Work acceptable to City; or perform Work in accordance with Contract Documents. In connection with such corrective and remedial action, City may exclude Contractor from all or part of the Site; take possession of all or part of Work and suspend Contractor's Work related thereto; take possession of all or part of Contractor's tools, appliances, construction equipment and machinery at the Site; and incorporate in Work any materials and equipment stored at the Site or for which City has paid Contractor but which are stored elsewhere. Contractor shall allow City, its representatives, agents, employees, and other contractors and Engineer's consultants access to the Site to enable City to exercise the rights and remedies under this paragraph 9.4.B. Contractor shall be responsible for all claims, costs, losses, damages, expenses and liabilities incurred or sustained by City in exercising such rights and remedies. A Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, City may deduct from moneys due Contractor, all claims, costs, losses and damages caused by or resulting from the correction or removal. If Contractor disagrees with City's calculations, Contractor may make a claim as provided in Article 12 of this Document 00700.

9.5. Rights Upon Inspection or Correction

A. Contractor shall not be allowed an extension of Contract Time because of any delay in the performance of Work attributable to the exercise by City of its rights and remedies under this Article 9. Where City exercises its rights under this Article 9, it retains all other rights it has by law or under the Contract Documents including, but not limited to, the right to terminate Contractor's right to proceed with the Work under the Contract Documents and/or make a claim or back charge where a Change Order cannot be agreed upon.

B. Inspection by City shall not relieve Contractor of its obligation to have furnished material and workmanship in accordance with Contract Documents. Payment for Work completed through periodic progress payments or otherwise shall not operate to waive City's right to require full compliance with Contract Documents and shall in no way be deemed as acceptance of the Work paid therefore. Contractor's obligation to complete the Work in accordance with Contract Documents shall be absolute, unless City agrees otherwise in writing.

9.6. Samples and Tests of Materials and Work

Contractor shall furnish, in such quantities and sizes as may be required for proper examination and tests, samples or test specimens of all materials to be used or offered for use in connection with Work. Contractor shall prepare samples or test specimens at its expense and furnish them to City. Contractor shall submit all samples in ample time to enable City to make any necessary tests, examinations, or analyses before the time it is desired to incorporate the material into the Work.

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9.7. Proof of Compliance of Contract Provisions

In order that City may determine whether Contractor has complied or is complying with requirements of Contract Documents not readily enforceable through inspection and tests of Work and materials, Contractor shall at any time, when requested, submit to City properly authenticated documents or other satisfactory proofs of compliance with all applicable requirements.

9.8. Acceptance

Inspection by City or its authorized agents or representatives, any order or certificate for the payment of money, any payment, acceptance of the whole or any part of Work by City, any extension of time, any verbal statements on behalf of City or its authorized agents or representatives shall not operate as a waiver or modification of any provision of the Contract Documents, or of any power reserved to City herein or therein or any right to damages provided in the Contract Documents. Any waiver of any breach of the Contract Documents shall not be held to be a waiver of any other subsequent breach.

10. CONTRACTOR'S ORGANIZATION AND EQUIPMENT

10.1. Contractor's Legal Address

Address and facsimile number given in Contractor's Bid are hereby designated as Contractor's legal address and facsimile number. Contractor may change its legal address and facsimile number by notice in writing, delivered to City, which in conspicuous language advises City of a change in legal address or facsimile number, and which City accepts in writing. Delivery to Contractor's legal address or depositing in any post office or post office box regularly maintained by the United States Postal Service, in a wrapper with postage affixed, directed to Contractor at legal address, or of any drawings, notice, letter or other communication, shall be deemed legal and sufficient service thereof upon Contractor. Facsimile to Contractor's designated facsimile number of any letter, memorandum, or other communication on standard or legal sized paper, with proof of facsimile transmission, shall be deemed legal and sufficient service thereof upon Contractor.

10.2. Contractor's Office at the Work Site

As specified in the Contract Documents, Contractor may be required to maintain an office at the Site, which office shall be headquarters of a Contractor representative authorized to transmit to and receive from City, communications, instructions or Drawings/Plans. Communications, instructions, or Drawings/Plans given to Contractor's representative or delivered at the Site office in representative's absence shall be deemed to have been given to Contractor.

10.3. Contractor's Superintendents or Forepersons

Contractor shall at all times be represented on Site by one or more superintendents or forepersons authorized and competent to receive and carry out any instructions that City may give, and shall be liable for faithful observance of instructions delivered to Contractor or to authorized representative or representatives on Site.

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10.4. Proficiency in English

Supervisors, security guards, safety personnel and employees who have unescorted access to the Site shall possess proficiency in the English language in order to understand, receive and carry out oral and written communications or instructions relating to their job functions, including safety and security requirements.

10.5. Contractor's and Subcontractor's Employees

Contractor shall employ, and shall permit its Subcontractors to employ, only competent and skillful personnel to do Work. If City notifies Contractor that any of its employees, or any of its Subcontractors' employees on Work is incompetent, unfaithful, disorderly or profane, or fails to observe customary standards of conduct or refuses to carry out any provision of the Contract Documents, or uses threatening or abusive language to any person on Work representing City, or violates sanitary rules, or is otherwise unsatisfactory, and if City requests that such person be discharged from Work, then Contractor or its Subcontractor shall immediately discharge such person from Work and the discharged person shall not be re-employed on the Work except with consent of City.

10.6. Contractor to Supply Sufficient Workers and Materials

A. Unless otherwise required by City under the terms of Contract Documents, Contractor shall at all times keep on the Site materials and employ qualified workers sufficient to prosecute Work at a rate and in a sequence and manner necessary to complete Work within the Contract Time. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.

B. At any time during progress of Work should Contractor directly or indirectly (through Subcontractors) refuse, neglect, or be unable to supply sufficient materials or employ qualified workers to prosecute the Work as required, then City may require Contractor to accelerate the Work and/or furnish additional qualified workers or materials as City may consider necessary, at no cost to City. If Contractor does not comply with the notice within three Business Days of date of service thereof, City shall have the right (but not a duty) to provide materials and qualified workers to finish the Work or any affected portion of Work, as City may elect. City may, at its discretion, exclude Contractor from the Site, or portions of the Site or separate work elements during the time period that City exercises this right. City will deduct from moneys due or which may thereafter become due under the Contract Documents, the sums necessary to meet expenses thereby incurred and paid to persons supplying materials and doing Work. City will deduct from funds or appropriations set aside for purposes of Contract Documents the amount of such payments and charge them to Contractor as if paid to Contractor. Contractor shall remain liable for resulting delay, including liquidated damages and indemnification of City from claims of others.

C. Exercise by City of the rights conferred upon City in paragraph 10.6.B of this Document 00700, is entirely discretionary on the part of City. City shall have no duty or obligation to exercise the rights referred to in paragraph 10.6.B of this Document 00700 and its failure to exercise such rights shall not be deemed an approval of existing Work progress or a waiver or limitation of City's right to exercise such rights in other concurrent or future similar circumstances. The rights conferred upon City under paragraph 10.6.B of this Document 00700 are cumulative to City's other rights under any provision of the Contract Documents.

10.7. Contractor to List Trades Working

Contractor shall, on a daily basis, list the number of workers by trade, equipment, and description of the work actually performed, and provide a copy of that list to the City.

10.8. Contractor's Use of the Site

Contractor shall not make any arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the Work, for any purpose whatsoever, either with or without compensation, in conflict with any agreement between City and any owner, former owner or tenant of such land, structure or buildings. Contractor may not occupy City-owned property outside the limit of the Work as indicated on the Drawings/Plans unless it obtains prior approval from City.

11. PROSECUTION AND PROGRESS OF THE WORK

11.1. Schedules and Examinations of Contract Documents

A. Contractor shall submit schedules and reports, Shop Drawings and Submittals in the appropriate quantity and within the required time, arrange conferences and meetings and proceed with the Work in accordance with Contract Documents, including Sections 01315, Project Meetings, 01320, Progress Schedules and Reports, and 01330, Submittal Procedures.

B. Contractor shall submit the following documents to the City for review and discussion at the Preconstruction Conference described in Section 01315, Project Meetings, if one is held, or within 14 Days after the Notice of Award is issued, whichever occurs first:

1. Progress schedules and reports as required by Sections 01320, Progress Schedules and Reports, and 01330, Submittal Procedures. Contractor shall utilize Progress Schedule in planning, scheduling, coordinating, performing and controlling Work (including all activities of Subcontractors, assigned contractors, equipment vendors and suppliers). Contractor shall update Progress Schedule on a monthly basis to depict accurately the actual progress of Work and for evaluating and preparing Contractor's monthly progress payments. Contractor's failure to submit and maintain an acceptable progress schedule may, in City's discretion, and without limiting the materiality of Contractor's other obligations under the Contract Documents, constitute grounds to declare Contractor in material breach of the Contract Documents

2. A preliminary schedule of Shop Drawing and Sample submittals that shall list each required submittal and the times for submitting, reviewing and processing such submittal, as required by Section 01330, Submittal Procedures. If no such schedule is agreed upon, then all Shop Drawings, Samples and product data submittals shall be completed and submitted within 21 Days after receipt of Notice of Award from City.

3. A preliminary Schedule of Values for all the Work which shall include quantities and prices of items aggregating the Contract Sum and shall subdivide each Schedule of Values into component activities in sufficient detail to serve as the basis for progress payments during construction. Such Schedule of Values shall include an appropriate amount of overhead and profit applicable to each item of Work, a line item for Project Record Documents, and a line item for Project scheduling, and shall conform to Section 01200, Measurement and Payment.

C. Unless otherwise provided in the Contract Documents, at least 15 Days before submission of the first application for payment, a conference attended by Contractor, City, and others as appropriate, will be held to review for acceptability the schedules submitted in accordance with paragraph 11.1.B of this Document 00700. Contractor shall have an additional seven Days to make corrections and adjustments and to complete and resubmit the schedules. Schedules shall be updated and completed as required by Sections 01200, Measurement and Payment, 01320, Progress Schedules and Reports, and 01330, Submittal Procedures. No progress payment shall be due or owing to Contractor until the schedules are submitted to and acceptable to City and/or Engineer as meeting the requirements of the Contract Documents, including Sections 01200, Measurement and Payment, 01320, Progress Schedules and Reports, and 01330, Submittal Procedures. City's acceptance of Contractor's schedules will not create any duty of care or impose on City any responsibility for the sequencing, scheduling or progress of Work nor will it interfere with or relieve Contractor from Contractor's full responsibility therefore.

D. Before commencing any portion of Work, Contractor shall inform City in writing as to time and place at which Contractor wishes to commence Work, and nature of Work to be done, in order that proper provision for inspection of Work may occur, and to assure measurements necessary for record and payment. Information shall be given to City a reasonable time in advance of time at which Contractor proposes to begin Work, so that City may complete necessary preliminary work without inconvenience or delay to Contractor.

E. Contractor shall submit submittals and Shop Drawings to City (or Engineer if City so designates) for review in strict accordance with Section 01330, Submittal Procedures. Submission of a Shop Drawing shall constitute Contractor's representation that all requirements of Section 01330, Submittal Procedures, have been complied with. All submittals will be identified as City may require and in the number of copies specified in Section 01330, Submittal Procedures.

F. Contractor shall not perform Work that requires submission of a Shop Drawing or Sample or other submittal prior to submission and favorable review of the Shop Drawing or Sample or submittal. Where a Shop Drawing or Sample or other submittal is required by Contract Documents or the final Schedule of Shop Drawing and Sample Submittals accepted by City, any related Work performed prior to City's approval of the pertinent submittal shall be at the sole expense, responsibility and risk of Contractor.

11.2. Cost Data

A. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in the form of certified payrolls, the cost to Contractor of each class of materials, tools, and appliances used by Contractor in the Work, and the amount of each class of materials used in each subdivision of Work. Contractor shall, upon City's request, produce copies of the certified payrolls. If Contractor maintains or is capable of generating summaries or reports comparing actual Project costs with Bid estimates or budgets, Contractor shall provide City with a copy of such report upon City's request and whenever it is generated. Any and all information provided to the City shall be at no cost to the City. Contractor and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).

B. Contractor shall maintain daily job reports recording all significant activity on the job, including the number of workers on Site, Work activities, problems encountered and delays. Contractor shall provide City with copies for each Day Contractor works on the Project, to be delivered to City either the same Day or the following morning before starting work at the Site. Contractor shall take monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.

C. City shall have the right to audit and copy Contractor's books and records of any type, nature or description relating to the Project (including but not limited to financial records reflecting in any way costs claimed on the Project), and to inspect the Site, including Contractor's trailer, or other job Site office, and this requirement shall be contained in the subcontracts of Subcontractors working on Site. By way of example, City shall have the right to inspect and obtain copies of all Contract Documents, planning and design documents, Bid proposal and negotiation documents (subject to Document 00670, Escrow Bid Documents), cost records and job cost variance reports, design modification proposals, value engineering or other cost reduction proposals, revisions made to the original design, job progress reports, photographs, and as-built drawings maintained by Contractor. City and any other applicable governmental entity shall have the right to inspect all information and documents maintained under this paragraph 11.2 at any time during the Project and for a period of five years following Substantial Completion. This right of inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. This right of inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

D. Contractor shall maintain in a safe place at the Site one record copy of all Drawings/Plans, Specifications, Addenda, Contract Modifications, Change Orders, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all changes made during construction. These Project Record Documents, together with all approved Samples and a counterpart of all approved Shop Drawings, shall be maintained and available to City for reference. Upon completion of the Work, Contractor shall deliver to City, the Project Record Documents, Samples and Shop Drawings and as-built drawings. All documents shall be neat, clear, readable, and organized in binders, or files with table of contents acceptable to the City.

12. CLAIMS BY CONTRACTOR

12.1. General

A. Contract Interpretation Disputes: Should it appear to Contractor that Work to be performed or any of the matters relative to Contract Documents (including without limitation Drawings/Plans or Specifications) are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of Contract Documents (including without limitation Drawings/Plans or Specifications), Contractor shall give written notice to City. Contractor shall bear all costs incurred in giving notice. City will render a determination regarding the issue, which shall be final. If Contractor disagrees with City's decision, Contractor's sole and exclusive remedy is to file a claim in accordance with this Article 12. Contractor shall diligently prosecute the Disputed Work (as defined below) to Final Completion pending resolution of any claim.

B. Work Disputes: Contractor shall give written notice to City of any dispute arising under the Contract Documents respecting the true value of any Work performed, the implementation of Work required by Contract Documents, any Work omitted, any extra Work that Contractor may be required to perform or time extensions, respecting the size of any payment to Contractor during the performance of Contract Documents, or of compliance with Contract Documents procedures. City will render a determination regarding the issue, which shall be final. If Contractor disagrees with City's decision, Contractor's sole and exclusive remedy is to file a claim in accordance with this Article 12. Pending the resolution of any claim, Contractor shall diligently prosecute the Disputed Work to Final Completion.

C. The claim notice and documentation procedure described in this Article 12 applies to all claims and disputes arising under the Contract Documents, including without limitation any claim or dispute by any Subcontractor or material supplier. All Subcontractor and supplier claims of any type shall be brought only through Contractor as provided in this Article 12. Under no circumstances shall any Subcontractor or supplier make any direct claim against City.

D. "Claim" means a written demand or written assertion by Contractor seeking, as a matter of right, the payment of money, the adjustment or interpretation of Contract Documents terms, or other relief arising under or relating to Contract Documents. In order to qualify as a "claim," the written demand must state that it is a claim submitted under this Article 12.

E. A voucher, invoice, proposed change, Application for Payment, cost proposal, RFI, change order request, or other routine or authorized form of request for payment is not a claim under the Contract Documents. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a claim under the Contract Documents by submitting a separate claim in compliance with claim submission requirements.

F. The provisions of this Article 12 apply under the California Government Code, Title 1, Division 3.6, Part 3, Chapter 5 and survive termination, breach or completion of the Contract Documents. Contractor shall bear all costs incurred in the preparation and submission of a claim.

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12.2. Procedure

A. Should any clarification, determination, action or inaction by City or Engineer, Work, or any other event, in the opinion of Contractor, exceed the requirements of or not comply with Contract Documents, or otherwise result in Contractor seeking additional compensation in time or money or damages for any reason (collectively "Disputed Work"), then Contractor and City will make good faith attempts to resolve informally any and all such issues, claims and/or disputes. Before commencing the Disputed Work, or within seven Days after Contractor's first knowledge of the Disputed Work, whichever is earlier, Contractor shall file a written notice and cost proposal for the Disputed Work with City stating clearly and in detail its objection and reasons for contending the Work or interpretation is outside the requirements of Contract Documents. If a written notice and cost proposal for Disputed Work is not issued within this time period, or if Contractor proceeds with the Disputed Work without first having given the notice required by this paragraph 12.2.A, Contractor shall waive its rights to further claim on the specific issue.

B. City will review Contractor's timely notice and cost proposal for Disputed Work and provide a decision. If, after receiving the decision, Contractor disagrees with it or still considers the Work required of it to be outside of the requirements of Contract Documents, it shall so notify City, in writing, within seven Days after receiving the decision, by submitting a notice of potential claim, stating that a formal claim will be issued. Within 30 Days of receiving the decision, Contractor shall submit its claim in the form specified herein and all arguments, justification, cost or estimates, schedule analysis, and detailed documentation supporting its position. Contractor's failure to furnish notification within seven Days and all justifying documentation within 30 Days will result in Contractor waiving its right to the subject claim. If Disputed Work persists longer than 30 Days, then Contractor shall, every 30 Days until the Disputed Work ceases, submit to City a document titled "Claim Update" that shall update and quantify all elements of the claim as completely as possible. Contractor's failure to submit a Claim Update or to quantify costs every 30 Days shall result in waiver of the claim for that 30-Day period. Claims or Claim Updates stating that damages, total damages (direct and indirect), schedule input and/or any time extension will be determined at a later date shall not comply with this paragraph 12.2.B and shall result in Contractor waiving its claim(s).

C. Upon receipt of Contractor's formal claim including all arguments, justifications, cost or estimates, schedule analysis, and documentation supporting its position as previously stipulated, City or its designee will review the issue and render a final determination. If Contractor's claims submitted in accordance with this Article 12 at Project completion total less than $375,000, then claims resolution shall proceed in the manner prescribed by Article 1.5, Chapter 1, Part 3 of Division 2 of the California Public Contract Code.

D. Claims shall be calculated in the same manner as Change Orders per Section 01250, Modification Procedures. EXCEPT WHERE PROVIDED BY LAW, OR ELSEWHERE IN THESE CONTRACT DOCUMENTS (IF APPLICABLE), CITY SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES, AND CONTRACTOR SHALL NOT INCLUDE THEM IN ITS CLAIMS. CONTRACTOR SHALL BE LIMITED IN ITS RECOVERY ON CLAIMS TO THE CHANGE ORDER CALCULATIONS SET FORTH IN SECTION 01250, MODIFICATION PROCEDURES.

12.3. Claim Format

A. Contractor shall submit the claim justification in the following format:

1. Cover letter and certification;
2. Summary of claim, including underlying facts, entitlement, schedule analysis, quantum calculations, contract provisions supporting relief;
3. List of documents relating to claim including Specifications, Drawings/Plans clarifications/requests for information, schedules, notices of delay, cost calculations and any others;
4. Chronology of events and correspondence;
5. Analysis of claim merit;
6. Analysis of claim cost; and
7. Attach supporting documents referenced in paragraph 12.3.A.3.

12.4. Exclusive Remedy

Contractor's performance of its duties and obligations specified in this Article 12 and submission of a claim as provided in this Article 12 is Contractor's sole and exclusive remedy for disputes of all types pertaining to the payment of money, extension of time, the adjustment or interpretation of Contract Documents terms or other contractual or tort relief arising from Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout Contract Documents) apply notwithstanding the completion, termination, suspension, cancellation, breach or rescission of the Work or Contract Documents, negligence or strict liability by City, its representatives, consultants or agents, or the transfer of Work or the Project to City for any reason whatsoever. Contractor waives all claims of waiver, estoppel, release, bar, or any other type of excuse for non-compliance with the claim submission requirements. Compliance with the notice and claim submission procedures described in Article 12 is a condition precedent to the right to commence litigation, file a Government Code Claim, or commence any other legal action. Claim(s) or issue(s) not raised in a timely protest and timely claim submitted under this Article 12 may not be asserted in any Government Code Claim, subsequent litigation, or legal action. City shall not have deemed to waive any provision under this Article 12, if at City's sole discretion, a claim is accepted in a manner not in accord with this Article 12.

12.5. Mediation

All Contractor claims not subject to the claim resolution procedures set forth in Section 01410, Regulatory Requirements, shall, as a condition precedent to litigation (or if otherwise permitted by the Contract Documents, arbitration) thereon, first be mediated. Mediation shall be non-binding and utilize the services of a mediator mutually acceptable to the parties and, if the parties cannot agree, a mediator selected by the American Arbitration Association from its panel of approved mediators trained in construction industry mediation. All statutes of limitation shall be tolled from the date of the demand for mediation until a date two weeks following the mediation's conclusion. All unresolved Contractor claims shall be submitted to the same mediator. The cost of mediation shall be equally shared.

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12.6. Subcontractor Claims

Contractor shall present as its claims all Subcontractor, sub-Subcontractor and supplier claims of any type, and prove them under the terms of the Contract Documents. City shall not be directly liable to any Subcontractor, any supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages or extra costs of any type arising out of or resulting from the Project.

13. LEGAL AND MISCELLANEOUS

13.1. Laws and Regulations

A. Contractor shall keep fully informed of and shall comply with all laws, ordinances, regulations and orders of any properly constituted authority affecting the Contract Documents, Work and persons connected with Work, and shall protect and indemnify City and its officers, employees, consultants and agents against any claim or liability, including attorney's fees, arising from or based on violation of law, ordinance, regulation or order, whether by Contractor or by Subcontractors, employees or agents. Authorized persons may at any time enter upon any part of Work to ascertain compliance of all applicable laws, ordinances, regulations and orders.

B. Whenever Drawings/Plans and Specifications require larger sizes or higher standards than are required by any applicable law, ordinance, regulation or order, Drawings/Plans and Specifications shall govern. Whenever Drawings/Plans and Specifications require something that will violate such laws, ordinances, regulations or orders, then such laws, ordinances, regulations or orders shall govern.

13.2. Permits and Taxes

Contractor shall procure all permits and licenses applicable to the Work (including environmental matters to the extent applicable), pay all charges and fees, including fees for encroachment permits, comply with, implement and acknowledge effectiveness of all permits, initiate and cooperate in securing all required notifications or approvals therefore, and give all notices necessary and incident to due and lawful prosecution of the Work, unless otherwise provided herein. City will pay applicable building permits, school, sanitary sewer, electric, and water development fees, except as otherwise provided in the Contract Documents. Contractor shall pay all sales and/or use taxes levied on materials, supplies, or equipment purchased and used on or incorporated into Work, and all other taxes properly assessed against equipment or other property used in connection with the Work, without any increase in the Contract Sum. Contractor shall make necessary arrangements with proper authorities having jurisdiction over roads, streets, pipelines, navigable waterways, railroads, and other works in advance of operations, even where City may have already obtained permits for the Work.

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13.3. Responsibility of Contractor and Indemnification

A. City and each of its officers, employees, consultants and agents including, but not limited to the City Council, Engineer and each City's Representative, shall not be liable or accountable in any manner for loss or damage that may happen to any part of the Work; loss or damage to materials or other things used or employed in performing the Work; injury, sickness, disease, or death of any person; or damage to property resulting from any cause whatsoever except their sole negligence, willful misconduct or active negligence, attributable to performance or character of the Work, and Contractor releases all of the foregoing persons and entities from any and all such claims.

B. To the furthest extent permitted by law (including without limitation California Civil Code Section 2782), Contractor shall assume defense of, and indemnify and hold harmless, City and each of its officers, employees, consultants (including without limitation Consulting Engineer) and agents, including but not limited to the City Council, Engineer and each City's Representative, from claims, suits, actions, losses and liability of every kind, nature and description, including but not limited to claims and fines of regulatory agencies and attorney's fees and consultant's fees, directly or indirectly arising out of, connected with or resulting from performance of the Work, failure to perform the Work, or condition of the Work which is caused in whole or part by any act or omission of Contractor, Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether it is caused in part by the negligence of City or by any person or entity required to be indemnified hereunder.

C. With respect to third-party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity against City and each of its officers, employees, consultants and agents including, but not limited to City, the City Council, Engineer and each City's Representative.

D. Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of Contractor, its Subcontractors of any tier, or the officers or agents of any of them.

E. To the furthest extent permitted by law (including, without limitation, Civil Code Section 2782), the indemnities, releases of liability and limitations of liability, claims procedures, and limitations of remedy expressed throughout Contract Documents shall apply even in the event of breach of contract, negligence (active or passive), fault or strict liability of the party(ies) indemnified, released, or limited in liability, and shall survive the termination, rescission, breach, abandonment, or completion of the Work or the terms of the Contract Documents. If Contractor fails to perform any of these defense or indemnity obligations, City may in its discretion back charge Contractor for City's costs and damages resulting therefrom and withhold such sums from progress payments or other contract moneys which may become due.

F. The indemnities in the Contract Documents shall not apply to any indemnified party to the extent of its sole negligence or willful misconduct; nor shall they apply to City or other indemnified party to the extent of its active negligence.

13.4. Concealed or Unknown Conditions

A. If either of the following conditions is encountered at Site when digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to City promptly before conditions are disturbed, except in an emergency as required by paragraph 16.5 of this Document 00700, and in no event later than seven Days after first observance of:

1. Subsurface or Latent physical conditions which differ materially from those indicated in the Contract Documents; or

2. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

In response to Contractor's Notice of Differing Site Conditions under this paragraph 13.4.A, City will investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, City will issue either a Request for Proposal or a Construction Change Directive under the procedures described in the Contract Documents, including without limitation Section 01250, Modification Procedures. If City determines that physical conditions at the Site are not Latent or are not materially different from those indicated in Contract Documents or that no change in terms of the Contract Documents is justified, City will so notify Contractor in writing, stating reasons

B. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed Latent or materially different Site conditions (whether above or below grade) if:

1. Contractor knew of the existence of such conditions at the time Contractor submitted its Bid; or

2. Contractor should have known of the existence of such conditions as a result of having complied with the requirements of Contract Documents, including without limitation paragraphs 2.1 and 8.4 of this Document 00700; or

3. The information or conditions claimed by Contractor to be Latent or materially different consist of information, conclusions, opinions or deductions of the kind that paragraph 2.1 of this Document 00700 precludes reliance upon; or

4. Contractor was required to give written Notice of Differing Site Conditions and failed to do so within the time required.

C. If City and Contractor are unable to agree on entitlement to or as to the amount or length of any adjustment in the Contract Sum or Contract Time required under this paragraph 13.4, Contractor shall proceed with the Work as directed by City and may make a claim as provided in Article 12 of this Document 00700.

13.5. Notice of Hazardous Waste or Materials Conditions

A. Contractor shall give a written Notice of Hazardous Materials Condition to City promptly, before any of the following conditions are disturbed (except in an emergency as required by paragraph 16.5 of this Document 00700), and in no event later than 24 hours after first observance of any:

1. Material that Contractor believes may be hazardous waste or hazardous material, as defined in Section 25117 of the Health and Safety Code (including, without limitation, asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material) that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law ("hazardous material"); or

2. Other material that may present an imminent substantial danger to persons or property exposed thereto in connection with Work at the Site ("other materials").

B. Except as otherwise provided in the Contract Documents or as provided by applicable law, Contractor shall not be required to give any notice for the disturbance or observation of any such hazardous materials or other materials where such matter is disturbed or observed as part of the scope of Work under the Contract Documents (such as hazardous waste or hazardous material investigation, remediation or disposal activities which are identified as the subject of Work under the Contract Documents), where Contractor complies with all requirements in the Contract Documents and applicable law respecting such materials.

C. Contractor's Notice of Hazardous Materials Condition shall indicate whether the hazardous materials or other materials were shown or indicated in the Contract Documents to be within the scope of Work, and whether the hazardous materials or other materials were brought to the Site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible.

D. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed hazardous waste or materials if:

1. Contractor knew of the existence of such hazardous materials or other materials at the time Contractor submitted its Bid; or

2. Contractor should have known of the existence of such hazardous material or other materials as a result of its having the responsibility to obtain additional or supplementary examinations, investigation, explorations, tests, studies, and data concerning the conditions at or contiguous to the Site prior to submitting its Bid; or

3. Contractor failed to give the written notice within the time required by paragraph 13.5.A of this Document 00700.

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E. If City determines that conditions involve hazardous materials or other materials and that a change in Contract Document terms is justified, City will issue either a Request for Proposal or Construction Change Directive under the procedures described in the Contract Documents, including without limitation Section 01250, Modification Procedures. If City determines that conditions do not involve hazardous materials or other materials or that no change in Contract Document terms is justified, City will notify Contractor in writing, stating the reasons for its determination.

F. If City and Contractor are unable to agree on entitlement to or as to the amount or length of any adjustment in the Contract Sum or Contract Time required under this paragraph 13.5, Contractor shall proceed with the Work as directed by City and may make a claim as provided in Article 12 of this Document 00700.

G. In addition to the parties' other rights under paragraph 13.5.E of this Document 00700, if Contractor does not agree to resume Work based on a reasonable belief that it is unsafe, or does not agree to resume Work under special conditions, City may order the disputed portion of Work deleted from the Work, or performed by others, or City may invoke its right to terminate Contractor's right to proceed under the Contract Documents in whole or in part, for convenience or for cause as the facts may warrant. If Contractor does not agree with City's determination of any adjustment in the Contract Sum or Contract Time as a result, Contractor may make a claim as provided in Article 12 of this Document 00700.

13.6. Suspension of Work

A. City may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as City may determine. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in Section 01250, Modification Procedures. No adjustment shall be made to extent that:

1. Performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or

2. An equitable adjustment is made or denied under any other provision of Contract Documents; or

3. The suspension of Work was the direct or indirect result of Contractor's failure to perform any of its obligations hereunder. Adjustments made in cost of performance may have a mutually agreed fixed or percentage fee; if the parties cannot agree, Contractor may file a claim under Article 12 of this Document 00700.

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13.7. Termination of Contract for Cause

A. City may declare Contractor in default of Contract Documents and City may terminate Contractor's right to proceed under the Contract Documents for cause:

1. Should Contractor make an assignment for the benefit of creditors; admit in writing its inability to pay its debts as they become due; file a voluntary petition in bankruptcy; be adjudged a bankrupt or insolvent; be the subject of an involuntary petition in bankruptcy which is not dismissed within 60 Days; file a petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief under any present or future statute, law, or regulation; file any answer admitting or not contesting the material allegations of a petition filed against Contractor in any such proceeding; or seek, consent to, or acquiesce in, the appointment of any trustee, receiver, custodian or liquidator of Contractor or of all or any substantial part of its properties or if Contractor, its directors or shareholders, take action to dissolve or liquidate Contractor; or

2. Should Contractor commit a material breach of the Contract Documents; If City declares Contractor in default due to material breach, however, City must allow Contractor an opportunity to cure such breach within ten Days of the date of notice from City to Contractor providing notice of the default; or, if such breach is curable but not curable within such ten-Day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten Days, Contractor must provide City within the ten-Day period with a written plan acceptable to City to cure said breach which includes, for example, evidence of necessary resources, Subcontractor commitments, schedules and recovery schedules meeting Contract Document requirements and showing a realistic and achievable plan to cure the breach. Contractor must then diligently commence and continue such cure according to the written plan); or

3. Should Contractor violate or allow (by a Subcontractor or other person or entity for which Contractor is responsible) a violation of any valid law, statute, regulation, rule, ordinance, permit, license or order of any governmental agency applicable to the Project or Work and does not cure (or cause to be cured) such violation within ten Days of the date of the notice from City to Contractor demanding such cure; or, if such violation is curable but not curable within such ten-Day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten Days, Contractor shall provide City within the ten-Day period with a written plan to cure said violation acceptable to City, and then diligently commence and continue performance of such cure according to the written plan.)

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B. If City at any time reasonably believes that Contractor is or may be in default under the Contract Documents as provided in paragraph 13.7.A of this Document 00700, City may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of Contract Documents and a written plan from Contractor to remedy any default under the terms of Contract Documents which City may advise Contractor of in writing. Contractor shall, within 10 Days of City's request, deliver a written cure plan which meets the requirements of the written plan deliverable under paragraph 13.7.A.2 of this Document 00700. Failure of Contractor to provide such written assurances of performance and the required written plan, within ten Days of request, will constitute a material breach of Contract Documents sufficient to justify termination for cause.

C. In event of termination for cause, City will immediately serve written notice thereof upon Surety and Contractor. Surety shall have the rights and obligations set forth in Document 00610, Construction Performance Bond. Subject to the Surety's rights under the Performance Bond (which rights are waived upon a default thereunder), City may take over the Work and prosecute it to completion by contract or by any other methods it may deem advisable.

D. In the event of termination by City as provided in paragraph 13.7.A of this Document 00700 for cause:

1. City will compensate Contractor for the value of the Work delivered to City upon termination as determined in accordance with the Contract Documents, subject to all rights of offset and back charges, and provided that Contractor provides City with updated as-builts and Project Record Documents showing the Work performed up to the date of termination. However, City will not compensate Contractor for its costs in terminating the Work or any cancellation charges owed to third parties.

2. Contractor shall deliver to City possession of the Work in its then condition including, but not limited to, all designs, engineering, Project records, Project Record Documents, cost data of all types, Drawings/Plans and Specifications and contracts with vendors and Subcontractors, all other documentation associated with the Project, and all construction supplies and aids dedicated solely to performing the Work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period. Contractor shall remain fully liable for the failure of any Work completed and materials and equipment provided through the date of such termination to comply with the provisions of the Contract Documents. The provisions of this paragraph 13.7.D shall not be interpreted to diminish any right which City may have to claim and recover damages for any breach of Contract Documents or otherwise, but rather, Contractor shall compensate City for all loss, cost, damage, expense, and/or liability suffered by City as a result of such termination and failure to comply with Contract Documents.

3. City's rights under paragraph 13.7.D.2 shall be specifically enforceable to the greatest extent permitted by law. City shall, to the extent applicable, have all other rights and remedies set forth in any Bidding Document.

E. City may terminate portions or parts of the Work for cause, provided these portions or parts (1) have separate geographic areas from parts or portions of the Work not terminated or (2) are limited to the work of one or more specific trades or Subcontractors. In such case, Contractor shall cooperate with a completing contractor as required under Article 6 of this Document 00700.

F. In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and Contractor shall have the recovery rights specified in paragraph 13.8. Any Contractor claim arising out of a termination for cause, however, shall be made in accordance with Article 12 of this Document 00700. No other loss cost, damage, expense or liability may be claimed, requested or recovered by Contractor.

13.8. Termination of Contract for Convenience

A. City may terminate performance of the Work under the Contract Documents in accordance with this clause in whole, or from time to time in part, whenever City shall determine that termination is in City's best interest. Termination shall be effected by City delivering to Contractor notice of termination specifying the extent to which performance of the Work under the Contract Documents is terminated and the effective date of the termination.

B. After receiving a notice of termination under paragraph 13.8.A of this Document 00700, and except as otherwise directed by City, Contractor shall:

1. Stop Work under the Contract Documents on date and to extent specified in notice of termination;

2. Place no further orders or subcontracts for materials, services, or facilities except as necessary to complete portion of Work under the Contract Documents which is not terminated;

3. Terminate all orders and subcontracts to extent that they relate to performance of Work terminated by the notice of termination;

4. Assign to City in manner, at times, and to extent directed by City, all right, title, and interest of Contractor under orders and subcontracts so terminated. City shall have the right, in its sole discretion, to settle or pay any or all claims arising out of termination of orders and subcontracts;

5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with approval or ratification of City to extent City may require. City's approval or ratification shall be final for purposes of this paragraph 13.8;

6. Transfer title to City, and deliver in the manner, at the times, and to the extent, if any, directed by City, all fabricated or unfabricated parts, Work in process, completed Work, supplies, and all other material produced as part of, or acquired in connection with performance of, Work terminated by the notice of termination, and completed or partially completed drawings, drawings, specifications, information, and other property which, if the Project had been completed, would have been required to be furnished to City;

7. Use its best efforts to sell, in manner, at times, to extent, and at price or prices that City directs or authorizes, any property of types referred to in paragraph 13.8.B.6 of this Document 00700, but Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under conditions prescribed and at price or prices approved by City. Proceeds of transfer or disposition shall be applied to reduce payments to be made by City to Contractor under the Contract Documents or shall otherwise be credited to the price or cost of Work covered by Contract Documents or paid in such other manner as City may direct;

8. Complete performance of the part of the Work which was not terminated by the notice of termination; and

9. Take such action as may be necessary, or as City may direct, to protect and preserve all property related to Contract Documents which is in Contractor's possession and in which City has or may acquire interest.

C. After receipt of a notice of termination under paragraph 13.8A of this Document 00700, Contractor shall submit to City its termination claim, in form and with all certifications required by Article 12 of this Document 00700. Contractor's termination claim shall be submitted promptly, but in no event later than 6 months from effective date of the termination. Contractor and City may agree upon the whole or part of the amount or amounts to be paid to Contractor because of a total or partial termination of Work under this paragraph 13.8. If Contractor and City fail to agree on the whole amount to be paid to Contractor because of the termination of the Work under this paragraph 13.8, City's total liability to Contractor by reason of the termination shall be the total (without duplication of any items) of:

1. The reasonable cost to Contractor, without profit, for all Work performed prior to the effective date of the termination, including Work done to secure the Project for termination. Reasonable cost may not exceed the applicable percentage completion values derived from the progress schedule and the schedule of values. Deductions shall be made for cost of materials to be retained by Contractor, cost of Work defectively performed, amounts realized by sale of materials, and for other appropriate credits against cost of Work. Reasonable cost will include reasonable allowance for Project overhead and general administrative overhead not to exceed a total of ten percent of direct costs of such Work. When, in City's opinion, the cost of any item of Work is excessively high due to costs incurred to remedy or replace defective or rejected Work, reasonable cost to be allowed will be the estimated reasonable cost of performing the Work in compliance with requirements of Contract Documents and excessive actual cost shall be disallowed.

2. A reasonable allowance for profit on cost of Work performed as determined under paragraph 13.8.C.1 of this Document 00700, provided that Contractor establishes to City's satisfaction that Contractor would have made a profit had the Project been completed, and provided further that the profit allowed shall not exceed 5 percent of cost.

3. Reasonable costs to Contractor of handling material returned to vendors, delivered to City or otherwise disposed of as directed by City.

4. A reasonable allowance for Contractor's internal administrative costs in preparing termination claim.

5. Except as provided in this paragraph 13.8.C of this Document 00700, City shall not be liable for costs incurred by Contractor or Subcontractors after receipt of a notice of termination. Such non-recoverable costs include, but are not limited to, anticipated profits on Work not performed as of the date of termination, post-termination employee salaries, post-termination general administrative expenses, post-termination overhead or unabsorbed overhead, costs of preparing and submitting Contractor's Bid, attorney's fees of any type, and all costs relating to prosecution of claim or lawsuit.

6. City shall have no obligation to pay Contractor under this paragraph 13.8 unless and until Contractor provides City with updated and acceptable as-builts and Project Record Documents for Work completed prior to termination.

D. In arriving at the amount due Contractor under this clause, there shall be deducted in whole (or in the appropriate part[s] if the termination is partial):

1. All unliquidated advances or other payments on account previously made to Contractor, including without limitation all payments applicable to the terminated portion of Contract Documents;

2. Any claim which City may have against Contractor in connection with Contract Documents; and

3. The agreed price for, or proceeds of sale of, any materials, supplies, or other things kept by Contractor or sold under provisions of this paragraph 13.8, and not otherwise recovered by or credited to City.

13.9. Contingent Assignment of Subcontracts

A. Contractor hereby assigns to City each Subcontract for a portion of the Work, provided that:

1. The assignment is effective only after City's termination of Contractor's right to proceed under the Contract Documents (or portion thereof relating to that Subcontract) pursuant to paragraphs 13.7 or 13.8 of this Document 00700.

2. The Assignment is effective only for the Subcontracts which City expressly accepts by notifying the Subcontractor in writing;

3. The assignment is subject to the prior rights, if any, of the Surety, obligated by Document 00610, Construction Performance Bond, provided under the Contract Documents, where the Surety exercises its rights to complete the Contract;

4. After the effectiveness of an assignment, Contractor shall, at its sole cost and expense (except as otherwise provided in paragraphs 13.7 or 13.8 of this Document 00700), sign all instruments and take all actions reasonably requested by City to evidence and confirm the effectiveness of the assignment in City; and

5. Nothing in this paragraph 13.9 shall modify or limit any of Contractor's obligations to City arising from acts or omissions occurring before the effectiveness of any Subcontract assignment, including but not limited to all defense, indemnity and hold-harmless obligations arising from or related to the assigned Subcontract.

13.10. Remedies and Contract Integration

A. Subject to Contract Documents provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, the exclusive jurisdiction and venue for resolving all claims, counter-claims, disputes and other matters in question between City and Contractor arising out of or relating to Contract Documents, any breach thereof or the Project shall be the applicable court of competent jurisdiction located in the State of California, County of Santa Clara. All City remedies provided in the Contract Documents shall be taken and construed as cumulative and not exclusive; that is, in addition to each and every other remedy herein provided; and in all instances City shall have any and all other equitable and legal rights and remedies which it would have according to law.

B. The Contract Documents, any Contract Modifications and Change Orders shall represent the entire and integrated agreement between City and Contractor regarding the subject matters hereof and thereof and shall constitute the exclusive statement of the terms of the parties' agreement. The Contract Documents, and any Contract Modifications and Change Orders, shall supersede any and all prior negotiations, representations or agreements, written or oral, express or implied, that relate in any way to the subject matter of the Contract Documents or written modifications. City and Contractor represent and agree that, except as otherwise expressly provided in the Contract Documents, they are entering into the Contract Documents and any subsequent written modification in sole reliance upon the information set forth or referenced in the Contract Documents or Contract Modifications and the parties are not and will not rely on any other information.

C. In any proceeding to enforce the Contract Documents, Contractor and City agree that the finder of fact shall receive detailed instructions on the meaning and operation of the Contract Documents, including their conditions, limitations of liability and remedies clauses, claims procedures and any other provisions impacting major defenses and theories of liability of the parties. Detailed findings of fact shall be requested, to verify Contract enforcement.

D. Either party's waiver of any breach or failure to enforce any of the terms, covenants, conditions or other provisions of the Contract Documents at any time shall not in any way affect, limit, modify or waive that party's right thereafter to enforce or compel strict compliance with every term, covenant, condition or other provision hereof, any course of dealing or custom of the trade or oral representations notwithstanding.

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13.11. Patents

Fees or claims for any patented invention, article or arrangement that may be used upon or in any manner connected with performance of the Work or any part thereof shall be included in the Bid price for doing the Work. Contractor shall defend, indemnify and hold harmless City and each of its officers, employees, consultants (including without limitation Consulting Engineer) and agents, including, but not limited to, the Board and each City's Representative, from all damages, claims for damages, costs or expenses in law or equity, including attorney's fees, arising from or relating to any claim that any article supplied or to be supplied under the Contract Documents infringes on the patent rights, copyright, trade name, trademark, service mark, trade secret or other intellectual property right of any person or persons or that the person or entity supplying the article does not have a lawful right to sell the same. Such costs or expenses for which Contractor agrees to indemnify and hold harmless the above indemnities include but are not limited to any and all license fees, whether such fees are agreed by any indemnitee or ordered by a court or administrative body of any competent jurisdiction.

13.12. Substitution for Patented and Specified Articles

Except as noted specifically in Specifications, whenever in Specifications, material or process is designated by patent or proprietary name or by name of manufacturer, such designation shall be deemed to be used for purpose of facilitating description of material and process desired, and shall be deemed to be followed by the words "or equal" and Contractor may offer any substitute material or process that Contractor considers equal in every respect to that so designated and if material or process offered by Contractor is, in opinion of City, equal in every respect to that so designated, its use will be approved. However, Contractor may utilize this right only by timely submitting Document 00660, Substitution Request Form, as provided in Document 00200, Instructions to Bidders. A substitution will be approved only if it is a true "equal" item in every aspect of its design and quality, including but not limited to its dimensions, weights, service requirements, durability, functioning, impact on contiguous construction elements, overall schedule and design.

13.13. Interest of Public Officers

No representative, officer, or employee of City, no member of the governing body of the locality in which the Project is situated, no member of the locality in which City was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the Project, during the tenure of the official or for one year thereafter, shall, as principal, agent, attorney or otherwise, be directly or indirectly interested, in the Contract Documents or the proceeds thereof.

13.14. Limit of Liability

CITY, AND EACH OF ITS OFFICERS, BOARD MEMBERS, EMPLOYEES, CONSULTANTS (INCLUDING WITHOUT LIMITATION CONSULTING ENGINEER) AND AGENTS INCLUDING, BUT NOT LIMITED TO, ENGINEER EACH OTHER CITY REPRESENTATIVE SHALL HAVE NO LIABILITY TO CONTRACTOR FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, EXCEPT TO THE LIMITED EXTENT THAT THESE CONTRACT DOCUMENTS OR APPLICABLE PUBLIC CONTRACTING STATUTES MAY SPECIFY THEIR RECOVERY.

13.15. Severability

Any provisions or portions thereof of Contract Documents that are prohibited by, unlawful, or unenforceable under any applicable law of any jurisdiction shall as to such jurisdiction be ineffective without affecting other provisions or portions thereof in the Contract Documents.

14. MODIFICATIONS OF CONTRACT DOCUMENTS

14.1. Alterations, Modifications and Force Account Work

A. No modification or deviation from the Drawings/Plans and Specifications will be permitted except by written Contract Modification.

B. City may, without notice to the sureties, make alterations, deviations, additions to, or deletions from Contract Documents; increase or decrease the quantity of any item or portion of the Work; expand, contract or otherwise change the Contract Time; delete any item or portion of the Work; and require extra Work. Contractor shall perform such Work under applicable provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered. In the case of any ordered extra Work, Owner reserves the right to furnish all or portions of associated labor, material, and equipment, which Contractor shall accept and use without payment for costs, markup, profit, or otherwise for such City-furnished labor, materials, and equipment.

C. Changes affecting the Contract Time or Contract Sum of the Work shall be set forth in a written Change Order that shall specify:

1. The Work performed in connection with the change to be made;

2. The amount of the adjustment of the Contract Sum, if any, and the basis for compensation for the Work ordered; and

3. The extent of the adjustment in the Contract Time, if any.

D. A Change Order will become effective when signed by City. If City exercises its right to decide disputed issues pertaining to changed Work as set forth in Articles 12 and 14 of this Document 00700, then the resulting Change Order shall be effective when signed by City, notwithstanding that Contractor has not signed it.

E. Changes not affecting the Contract Time or Contract Sum of the Work, in City's discretion, may be set forth in a written RFI-Reply executed by City. Execution of such an RFI-Reply constitutes Contractor's agreement to make the specified change without change to the Contract Sum or the Contract Time.

F. Changes or deviations from Contract Documents affecting the Contract Time or Contract Sum of the Work shall not be made without the authority of an effective Change Order or Construction Change Directive as provided in Section 01250, Modification Procedures, except in cases of emergency discussed in Article 16 of this Document 00700.

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G. If changes ordered in design, workmanship or materials are of such a nature as to increase or decrease the cost of any part of the Work, the price fixed in the Contract Documents shall be increased or decreased by the amount that Contractor and City may agree upon as a reasonable and proper allowance for the cost increase or decrease. If an agreement cannot be reached, then City will reach a determination, which shall be final, subject to Contractor's rights under Article 12 of this Document 00700. In all cases Contractor shall perform the changed Work as directed by City subject to Contractor's rights under Article 12 of this Document 00700.

H. Contractor shall, upon City's request, permit inspection of the original unaltered Bid estimate, subcontract agreements, purchase orders relating to the change, and documents substantiating all costs associated with its cost proposal or claims arising from changes in the Work.

I. Changes in the Work made pursuant to this Article 14 and extensions of Contract Time necessary by reason thereof shall not in any way release the guarantees and warranties given by Contractor pursuant to provisions of the Contract Documents, nor shall such changes in the Work relieve or release the Sureties of bonds executed pursuant to said provisions. The Sureties, in executing such bonds, shall be deemed to have expressly agreed to any such change in the Work and to any extension of time made by reason thereof.

J. Procedures for Modifications of Contract Documents and for calculating the cost of extra Work are given in Section 01250, Modification Procedures. Regarding delay and impact costs of any nature, Contractor may not seek delay compensation for on-Site or off-Site costs based on formulas, e.g., "Eichlay" or other formula. Rather, Contractor shall prove actual costs resulting from such delays. If Contractor requests compensation for delay to the construction, then Contractor shall prove and document actual costs plus markup per the cost categories and procedures in Section 01250, Modification Procedures, in order to request, claim or prove compensation for delay.

K. Change Orders in excess of City's approved limit must be approved by the City Council and a performance bond rider covering the changed Work executed before proceeding with the changed Work. Contractor is charged with knowledge of City's approved Change Order limits and procedures in effect at the applicable time.

15. TIME ALLOWANCES

15.1. Time Allowances for Performance of Contract Documents

A. When Contractor and City have signed the Contract Documents, City may serve a Notice to Proceed upon Contractor to that effect, either by depositing notice in a post office or post office box regularly maintained by United States Postal Service in a pre-paid wrapper directed to Contractor at legal address or (at City's option) by delivery by other means at legal address.

B. The start date for Contract Time shall be as provided in paragraph 3.2 of this Document 00700, General Conditions. The total number of Days for completion of the Work under the Contract Documents shall be as provided in Document 00520, Agreement.

15.2. Change of Contract Time

A. The Contract Time may only be changed by Change Order or by Contract Modification, and all time limits stated in the Contract Documents are of the essence of Contract Documents.

B. The Contract Time will be adjusted in an amount equal to the time lost due to:

1. Changes in the Work ordered by City;

2. Acts or neglect by City, Engineer, any City's Representative, utility owners or other contractors performing other work, provided that Contractor has fully and completely performed its responsibilities under the Contract Documents; or

3. Fires, floods, epidemics, abnormal weather conditions beyond the parameters otherwise set forth in this paragraph 15.2, earthquakes, civil or labor disturbances, strikes or acts of God, provided damages resulting therefrom are not the result of Contractor's failure to protect the Work as required by Contract Documents.

C. The Contract Time shall not be extended for any cause identified in paragraph 15.2.B above, however, unless:

1. Contractor actually has been prevented from completing any part of the Work within the Contract Time due to delay that is beyond Contractor's control and due to reasons for which Contractor is not responsible (delays attributable to and within the control of a Subcontractor, or its subcontractors, or supplier shall be deemed to be delays within the control of Contractor);

2. A claim for delay is made as provided herein; and

3. Contractor submits a Time Impact Evaluation as required under Section 01320, Progress Schedules and Reports, that demonstrates actual delay to critical Work activities that actually delay the progress of the Work in the amount of time requested.

D. Where Contractor is prevented from completing any part of the Work within the Contract Time due to delay beyond the control of both City and Contractor (including, but not limited to, adverse weather of all types and acts of other contractors or utilities), an extension of Contract Time, in an amount equal to the time lost due to such delay (without compensation), shall be Contractor's sole and exclusive remedy for such delay.

E. Contractor must present as its claims, all subcontractor and supplier claims of any type, and prove them under the terms of the Contract Documents. City shall not be directly liable to any Subcontractor, any supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages or extra costs of any type arising out of or resulting from the Project, including without limitation:

1. delays caused by or within the control of Contractor;

2. changes in the Work ordered by City or any City representative;

3. acts or neglect by City, Utility Owners or other Contractors performing other work;

4. fires, floods, abnormal weather conditions, earthquakes, civil or labor disturbances, strikes or acts of God;

5. other Contractors performing other work as contemplated by Paragraph 6 of this Document 00700; or

6. claimed deficiencies in Project design.

F. Delays due to abnormal or adverse weather conditions shall not be allowed for weather conditions, which fall within the parameters listed herein. Adverse weather delays may be allowed only if the number of workdays of adverse weather exceeds these parameters on a monthly basis and Contractor proves that adverse weather actually caused critical project delays. Contractor shall provide written notice of intent to claim an adverse weather day within one day of the adverse weather day occurring. Rain parameters are as follows, pro-rated in the individual month Contractor starts and finishes work:

> Rain Workdays: January, [6]; February, [6]; March, [5]; April, [3]; May, [1]; June, [0]; July, [0]; August, [0]; September, [0]; October, [2]; November, [4]; December, [6]. The Contractor shall anticipate a total of 33 workdays of abnormal/adverse weather for each complete year and include said workdays in accordance with these General Conditions and Section 01320, Progress Schedule and Reports. Any adverse weather days remaining shall be considered Project float.

In order to qualify as a rain day with respect to the foregoing parameters, daily rainfall must exceed 0.10 of an inch or more at the City of San Jose, California, station, as measured by the National Oceanic & Atmospheric Administration, and Contractor must prove that the rain actually caused critical project delay as set forth above and below.

G. Delays due to abnormal or adverse weather conditions shall not be a prima facie reason for an extension of Contract Times. Contractor shall make every effort to continue Work under prevailing conditions. Delays due to abnormal or adverse weather conditions will be allowed provided that Contractor can prove abnormal or adverse weather conditions at the Site prevented the Contractor from proceeding with seventy five percent (75%) of the schedule crew labor and equipment resources engaged on critical path activities identified on the accepted and most current Critical Path Method (CPM) progress schedule update at the time of the abnormal or adverse weather condition, and 75% o the crew did not work more than three (3) hours. Abnormal or adverse weather delays meeting the criteria in this paragraph are deemed beyond the control of both City and Contractor, and an extension of Contract Times (or milestones) due to such a delay shall be the Contractor's sole and exclusive remedy for such a delay.

H. Adverse weather delay shall be recognized for the actual period of time Contractor proves it was delayed by rain in accordance with the above parameters and requirements. For example, and not by way of limitation, if rain exceeding the specified parameters does not in fact delay Contractor's progress on the critical path, then no time extension shall be recognized; and conversely, if Contractor proves that rain exceeding the specified parameters causes delay to Contractor for a period longer than one day, then Contractor shall be entitled to a time extension equal to the actual period of such delay.

I. Contractor shall take reasonable steps to mitigate potential weather delays, such as dewatering the Site, providing access roads un-impacted by abnormal or adverse weather and covering work and material that could be affected adversely by weather. Failure to do so shall be cause for City to not grant a time extension due to abnormal or adverse weather, where Contractor could have avoided or mitigated the potential delay by exercising reasonable care.

J. Contractor's attention is directed to Section 01100, Summary of Work, paragraph 1.7, Work Days and Hours, for certain limitations on Contractor's rights under this Paragraph 15.2, Change of Contract Time.

15.3. Notice of Delay

Within seven (7) Days of the beginning of any delay, Contractor shall notify City in writing, by submitting a notice of potential claim, of all anticipated delays resulting from the delay event in question. Any request for extension of time shall be accompanied by Contractor's written statement that the adjustment claimed is the entire adjustment to which the claimant is entitled as a result of the occurrence of said event, and shall include a written schedule document that demonstrates delay to the critical path using a Time Impact Evaluation as specified in Section 01320, Progress Schedules. City will determine all claims and adjustments in the Contract Time. No claim for an adjustment in the Contract Time will be valid and such claim will be waived if not submitted in accordance with the requirements of this paragraph.

15.4. Time Extensions and/or Damages Entitlements for Delays

A. Contractor may receive a time extension and be compensated for delays caused directly and solely by City.

B. Contractor may receive a time extension without compensation for delays resulting in whole or in part from causes beyond the reasonable control of Contractor and City, e.g. adverse weather conditions exceeding Contract Documents parameters, earthquakes, Acts of God and epidemics. In such cases, a time extension without compensation shall constitute Contractor's sole and exclusive remedy for such delays.

C. Contractor shall not be entitled to any time extension or compensation including, but not limited to, extended field or home office overhead, field supervision, costs of capital, interest, escalation charges, acceleration costs or other impacts for any delays caused in whole or in part by Contractor's failure to perform its obligations under the Contract Documents, or during periods of delay concurrently caused by Contractor and either City or others.

D. Contractor shall not be entitled to damages for delay to the Work caused by the following reasons:

1. City's right to sequence the Work in a manner which would avoid disruption to City's tenants and their contractors or other prime contractors and their respective subcontractors, exercised as a result of Contractor's failure to perform its cooperation and coordination responsibilities required by Contract Documents; City's enforcement of any government act or regulation; or the provisions of the Contract Documents;

2. For changed Site conditions that are beyond the parties' contemplation, except that City may approve direct costs associated with unknown conditions (but not costs or damages which result from such delays); and

3. Extensive requests for clarifications to Contract Documents or Contract Modifications thereto, provided such clarifications or Contract Modifications are processed by City or its consultants in a reasonable time commensurate with Contract Documents requirements.

15.5. Liquidated Damages

A. Time is of the essence. Execution of Contract Documents by Contractor shall constitute acknowledgement by Contractor that Contractor understands, has ascertained and agrees that City will actually sustain damages in the amount fixed in the Contract Documents for each and every Day during which completion of Work required is delayed beyond expiration of time fixed for completion or extensions of time allowed pursuant to provisions hereof. Contractor and City agree that specified measures of liquidated damages shall be presumed to be the damages actually sustained by City as defined below, and that because of the nature of the Project, it would be impracticable or extremely difficult to fix the actual damages.

B. Liquidated damages shall be considered not as a penalty but as agreed monetary damage sustained by City for increased Project administration expenses, including extra inspection, construction management and architectural and engineering expenses related to the Project and Contract Documents because Contractor failed to perform and complete Work within time fixed for completion or extensions of time allowed pursuant to provisions hereof. Liquidated damages shall not be deemed to include within their scope additional damages or administrative costs arising from Defective Work, lost revenues, interest expenses, cost of completion of the Work, cost of substitute facilities, claims and fines of regulatory agencies, damages suffered by others or other forms of liability claimed against City as a result of delay (e.g., delay or delay related claims of other contractors, subcontractors or tenants), and defense costs thereof. Contractor shall be fully responsible for the actual amount of any such damages it causes, in addition to the liquidated damages otherwise due City.

C. City may deduct from any money due or to become due to Contractor subsequent to time for completion of entire Work and extensions of time allowed pursuant to provisions hereof, a sum representing then-accrued liquidated damages. Should Contractor fall behind the approved Progress Schedule, City may deduct liquidated damages based on its estimated period of late completion. City need not wait until Final Completion to withhold liquidated damages from Contractor's progress payments. Should money due or to become due to Contractor be insufficient to cover aggregate liquidated damages due, then Contractor forthwith shall pay the remainder of the assessed liquidated damages to City.

16. WORKING CONDITIONS AND PREVAILING WAGES

16.1. Hours of Work

Unless specified otherwise in the Contract Documents, Work shall be performed in 8-hour shifts between 7:00 AM and 5:00 PM on Working Days, except to protect the public's health, safety, and welfare or to protect the Work. For any Work planned to be performed by the Contractor outside normal City work hours, Contractor shall submit a written request at least two (2) Working Days in advance for City's approval in its sole discretion. All extra costs incurred by the City for this purpose shall be paid by the Contractor, unless written authorization to waive such charges is given by the Engineer or it is specified otherwise in the Contract Documents. Such costs may be withheld from any succeeding monthly progress payment.

16.2. Use of Site/Sanitary Rules

A. All portions of the Work shall be maintained at all times in neat, clean and sanitary condition. Contractor shall furnish toilets for use of Contractor's and Subcontractors' employees on the Site where needed, and their use shall be strictly enforced. All toilets shall be properly secluded from public observation, and shall be located, constructed and maintained subject to City's approval.

B. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Site and land areas identified in and permitted by Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements or as designated by City, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, any improvement located thereon, or to the owner or occupant thereof resulting from the performance of Work.

C. During the progress of the Work, Contractor shall keep the Site and the Project free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall remove all waste materials, rubbish and debris from and about the Site as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the premises clean and ready for occupancy by City at Substantial Completion of Work. Contractor shall restore to original condition all property not designated for alteration by Contract Documents.

D. Contractor shall not load nor permit any part of any structure or pavement to be loaded in any manner that will endanger the structure or pavement, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that will endanger it. Contractor shall conduct all necessary existing conditions investigation regarding structural, mechanical, electrical or any other system existing, shall perform Work consistent with such existing conditions, and shall have full responsibility for insufficiencies or damage resulting from insufficiencies of existing systems, equipment or structures to accommodate performing the Work.

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16.3. Protection of Work, Persons, Property, and Operations

A. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with Work. Contractor shall comply with all safety requirements specified in any safety program established by City, or required by state, federal or local laws and ordinances. Contractor shall be responsible for all damage to Work, property or structures, all injuries to persons, and all damage and interruptions to City's operations, arising from the performance of Work of the Contract Documents. Except as otherwise expressly approved by City in writing, Contractor shall at all times perform all Work in a manner which does not interrupt, damage or otherwise adversely impact any existing City facilities or operations.

B. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.

C. Contractor shall remedy all damage, injury, loss or interruption to any property or operations referred to in paragraph 16.3.A of this Document 00700, caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, supplier, or any other person or organization directly or indirectly employed by any of them to perform or furnish any Work or anyone for whose acts any of them may be liable. Contractor's duties and responsibility for safety and for protection of Work shall continue until such time as all the Work is completed and Final Acceptance of the Work. City and its agents do not assume any responsibility for collecting any indemnity from any person or persons causing damage to Contractor's Work.

D. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

E. City may, at its option, retain such moneys due under the Contract Documents as City deems necessary until any and all suits or claims against Contractor for injury to persons, property or operations shall be settled and City receives satisfactory evidence to that effect.

16.4. Responsibility for Safety and Health

A. Contractor shall ensure that its and each tier of Subcontractors' employees, agents and invitees comply with applicable health and safety laws while at the Site. These laws include the Occupational Safety and Health Act of 1970 and rules and regulations issued pursuant thereto, and City's safety regulations as amended from time to time. Contractor shall comply with all City directions regarding protective clothing and gear.

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B. Contractor shall be fully responsible for the safety of its and its Subcontractors' employees, agents and invitees on the Site. Contractor shall notify City, in writing, of the existence of hazardous conditions, property or equipment at the Site that are not under Contractor's control. Contractor shall be responsible for taking all the necessary precautions against injury to persons or damage to the property of Contractor, Subcontractors or persons from recognized hazards until the responsible party corrects the hazard.

C. Contractor shall confine all persons acting on its or its Subcontractors' behalf to that portion of the Site where Work under the Contract Documents is to be performed: City designated routes for ingress and egress thereto and any other City designated area. Except those routes for ingress and egress over which Contractor has no right of control, within such areas, Contractor shall provide safe means of access to all places at which persons may at any time have occasion to be present.

16.5. Emergencies

In emergencies affecting the safety or protection of persons or Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from City, is obligated to act to prevent threat and damage, injury or loss, until directed otherwise by City. Contractor shall give City prompt written notice if Contractor believes that any significant changes in Work or variations from Contract Documents have been caused thereby. If City determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order or Construction Change Directive will be issued to document the consequences of such action.

16.6. Use of Roadways and Walkways

Contractor shall not interfere with use of any roadway, walkway, or other facility for vehicular or pedestrian traffic without written approval of the Engineer. Before beginning any interference and only with Engineer's prior concurrence, Contractor may provide detour or temporary bridge for traffic to pass around or over the interference, which Contractor shall maintain in satisfactory condition as long as interference continues. Unless otherwise provided in the Contract Documents, Contractor shall bear the cost of these temporary facilities.

16.7. Nondiscrimination

No person or entity shall discriminate in the employment of persons upon public works because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sexual preference, or gender of such persons, except as provided in Section 12940 of the Government Code. Every contractor for public works violating the provisions of Section 1735 of the Labor Code is subject to all the penalties imposed for a violation of Division 2, Part 7, Chapter 1 of the Labor Code.

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16.8. Prevailing Wages

A. Contractor shall pay to persons performing labor in and about Work provided for in the Contract Documents an amount equal to or more than the general prevailing rate of per diem wages for (1) work of a similar character in the locality in which the Work is performed and (2) legal holiday and overtime work in said locality. The per diem wages shall be an amount equal to or more than the stipulated rates contained in a schedule that has been ascertained and determined by the Director of the State Department of Industrial Relations and City to be the general prevailing rate of per diem wages for each craft or type of workman or mechanic needed to execute this Contract. Contractor shall also cause a copy of this determination of the prevailing rate of per diem wages to be posted at each Site.

B. Contractor shall forfeit, as a penalty to City, Fifty Dollars ($50.00) for each laborer, workman, or mechanic employed in performing labor in and about the Work provided for in the Contract Documents for each Day, or portion thereof, that such laborer, workman or mechanic is paid less than the said stipulated rates for any work done under the Contract Documents by him or her or by any Subcontractor under him or her, in violation of Articles 1 and 2 of Chapter 1 of Part 7 of Division II of the California Labor Code. The sums and amounts which shall be forfeited pursuant to this paragraph 16.8.B and the terms of the Labor Code shall be withheld and retained from payments due to Contractor under the Contract Documents, pursuant to this Document 00700 and the Labor Code, but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the State Department of Industrial Relations or by City. The Labor Commissioner pursuant to Labor Code Section 1775 shall determine the final amount of forfeiture.

C. Contractor shall insert in every subcontract or other arrangement which Contractor may make for performance of work or labor on Work provided for in the Contract, provision that Subcontractor shall pay persons performing labor or rendering service under subcontract or other arrangement not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the Work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed in the Labor Code.

D. Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation Labor Code Section 1813.

16.9. Environmental Controls

Contractor shall comply with all rules, regulations, ordinances, and statutes that apply to any work performed under the Contract Documents including, without limitation, any toxic, water and soil pollution controls and air pollution controls specified in Government Code, Section 11017. Contractor shall be responsible for insuring that Contractor's employees, Subcontractors and the public are protected from exposure to airborne hazards or contaminated water, soil or other toxic materials used during or generated by activities on the Site or associated with the Project.

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16.10. Shoring Safety Plan

A. At least five Days in advance of excavating any trench five feet or more in depth, Contractor shall submit to City a detailed plan showing the shoring, bracing and sloping design and other provisions to be made for worker protection from the hazard of caving ground during the excavation, as required by Labor Code Section 6705. A civil or structural engineer registered in California shall prepare and sign any plan that varies from the shoring system standards established by the State Construction Safety Orders.

B. During the course of Work, Contractor shall be responsible for determining where sloping, shoring, and/or bracing is necessary and the adequacy of the design, installation, and maintenance of all shoring and bracing for all excavation, including any excavation less than five feet in depth. Contractor will be solely responsible for any damage or injuries that may result from excavating or trenching. City's acceptance of any drawings showing the shoring or bracing design or work schedule shall not relieve Contractor of its responsibilities under this paragraph 16.10.

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DOCUMENT 00810

SUPPLEMENTARY CONDITIONS – HAZARDOUS MATERIALS

1. SUMMARY

This Document 00810 includes requirements that supplement the paragraphs of Document 00700, General Conditions, as they apply to location, removal, remediation, disposal, and abatement of hazardous materials and hazardous waste.

2. SUPPLEMENTS

A. Supplement to paragraph 2.1, Investigation Prior to Bidding:

1. Add to the end of paragraph 2.1.B a new paragraph that reads:

"4. Matters Shown in Hazardous Materials Surveys for Informational Purposes: Reference is made to Document 00340, Hazardous Materials Surveys, for hazardous materials surveys included with the Contract Documents and use of data therein. These materials are not Contract Documents and, except for any "technical data" regarding the location of hazardous materials, as limited in Document 00340, Hazardous Materials Surveys, Contractor shall not in any manner rely on the information in these materials. Subject to the foregoing, Contractor shall make its own independent investigation of all conditions affecting the Work and shall not rely on information provided by City."

B. Supplement to paragraph 5.7, Precedence of Documents:

1. Add to the end of paragraph 5.7 a new paragraph that reads:

"5.7.E. Should any provision or requirement of any Contract Document conflict with another provision or requirement in the Contract Documents on subject matters of hazardous waste abatement, clean up, disposal, or required safety standards or methods, then the most stringent provision or requirement shall control."

C. Supplement to paragraph 7.2, Means and Methods of Construction:

1. Number the current paragraph 7.2.A and add to the end of paragraph 7.2 a new paragraph that reads:

"7.2.B Nothing contained in these Contract Documents or inferable therefrom shall be deemed or construed to:
1) Make Contractor the agent, servant, or employee of City; or
2) Create any partnership, joint venture, or other association between City and Contractor."

D. Supplement to paragraph 8, Control of the Work:

1. Add to the end of paragraph 8.2 new paragraphs that read:

"8.2.F City shall exercise administration on Contract Documents. City has employed a consultant to assist in the preparation of the hazardous materials abatement contract specifications. City reserves the right to assign or delegate to this consultant, or any other consultant ("Consultant") any or all Engineer's responsibilities under Contract Documents or alternatively to act as City's representative. Contractor will be notified in writing of any such delegation.

8.2.G Cooperate with Consultant as directed by City. Consultant's duties may include observing Contractor's health and safety program and practices, observing the abatement construction activities, observing the extent of material removed from each job site, reviewing payment requests, reviewing reports required by governmental or quasi-governmental agencies or Contract Documents, and providing clearance tests after abatement is completed. No action, omission to act, approval, or failure to advise Contractor as to any matter by Consultant shall in any way relieve Contractor from its responsibility for the performance of Work in accordance with Contract Documents and applicable law. Unless directed otherwise in writing by City, do not communicate directly with Consultant and shall direct all communications to City."

E. Supplement to paragraph 9, Warranty, Guaranty, and Inspection of Work:

1. Add to the end of paragraph 9.1 a new paragraph that reads:

"9.1.D Additional Warranties and Representations:

1) Contractor represents and warrants that it, its employees and its Subcontractors and their employees, shall at all times have the required levels of familiarity with the Site and the Work, training and ability to comply fully with all applicable law and Contract Documents requirements for safe and expeditious performance of the Work, including whatever training is or may be required regarding the activities to be performed (including, but not limited to, all training required to adequately address the actual or potential dangers of Contract performance).

2) Contractor represents and warrants that it, its employees and its subcontractors and their employees, shall at all times have and maintain in good standing any and all certifications and licenses required by applicable federal, state, and other governmental and quasi-governmental requirements applicable to the Work.

3) Contractor represents and warrants that it has studied carefully all requirements of the Contract Documents regarding procedures for demolition, hazardous waste abatement, or safety practices, specified in the Contract Documents, and prior to submitting its Bid, has either:

(a) Verified to its satisfaction that the specified procedures are adequate and sufficient to achieve the results intended by Contract Documents; or

(b) By way of approved "or equal" request or request for clarification and written Addenda, secured changes to the specified procedures sufficient to achieve the results intended by Contract Documents.

4) Contractor accepts the risk that any specified procedure will result in a completed Project in full compliance with all Contract Documents requirements."

2. Number the current paragraph 9.6.A and add to the end of paragraph 9.6 a new paragraph that reads:

"9.6.B City reserves the right, in its sole discretion, to conduct air monitoring, earth monitoring, work monitoring, and any other tests (in addition to testing required under Document 00520, Agreement, or applicable Law), to monitor Contract requirements of safe and statutory compliant work methods and (where applicable) safe re-entry level air standards under state and federal Law upon completion of the Work, and compliance of the Work with periodic and final inspection of public and quasi-public entities having jurisdiction.

1) Contractor acknowledges that City also has the right to perform, or cause to be performed, various activities and tests including, but not limited to, pre-abatement, during abatement and post-abatement air monitoring, provided that City shall have no obligation to perform said activities and tests, and that a portion of said activities and tests may take place prior to the completion of Work by Contractor. In the event City elects to perform these activities and tests, afford City ample access to the Site and all areas of the Work as may be necessary for the performance of these activities and tests. Include the potential impact of these activities for tests by City in the Contract Sum and the scheduled completion date.

2) Notwithstanding City's rights granted by this paragraph 9, Contractor may be required to retain its own industrial hygiene consultant and shall have primary responsibility for collecting samples and performing all applicable, relevant, or appropriate activities and tests including, but not limited to, pre-abatement, during abatement, and post-abatement air monitoring, required by Contract Documents, applicable Law, or both, and City reserves the right to request documentation of all such activities and tests performed by Contractor relating to Work."

F. Supplement to paragraph 11.2, Cost Data:

1. Add to the end of paragraph 11.2 new paragraphs that read:

"11.2.E Obtain and maintain and shall furnish to City on completion of Work or at any other time requested by City, all necessary, permits, licenses, approvals, authorizations, notifications, training certificates, respirator certificates, reports, correspondence, tests results, air monitoring certificates, forms, medical records, medical certificates, notes and photographs of Work conditions, approved shipping and disposal facility receipts, manifests, and all other documentation required by Contract Documents or applicable Law, or both.

11.2.F Provide City with copies of each such document as it is generated and shall, as a condition to final payment, provide City with a complete set of such documents (bound, organized, and indexed) at the conclusion of Work. Keep and maintain in retrievable files true and correct copies of all such documents for a period of not less than 30 years after Final Completion of the Work. City shall have the right to inspect or photocopy these records and, if Contractor should cease business operations, then it shall furnish these records to City."

G. Supplement to paragraph 13, Legal and Miscellaneous:

1. Add to the end of paragraph 13.1 new paragraphs that read:

"13.1.C Compliance with Laws. Contractor represents that it is familiar with and shall comply with all Laws applicable to the Work or completed Work including, but not limited to all Laws relating to:

1) Protection of the public health, welfare, and environment;

2) Generation, processing, treatment, handling, storage, transport, disposal, destruction, or other management of asbestos, PCB, lead, petroleum-based products, or other hazardous materials of any kind; or

3) Protection of environmentally sensitive areas such as wetlands.

13.1.D Disposal. Contractor has the sole responsibility for determining current waste storage, handling, and transportation and disposal regulations for the Site and for each waste disposal facility. Contractor shall comply fully at Contractor's sole cost and expense with these regulations and any applicable Law. City may, but is not obligated to, require submittals with this information for it to review consistent with Contract Documents.

13.1.E Tracking. Contractor shall develop and implement a system acceptable to City to track hazardous waste from the Site to disposal, including appropriate "Hazardous Waste Manifests" on the applicable EPA form , so that City may track the volume of waste Contractor puts in each landfill and receive from each landfill a certificate of receipt.

13.1.F Facilities. Contractor shall provide City with the name and address of each waste disposal facility prior to any disposal, and City shall have the express right to reject any proposed disposal facility. Contractor may not use any disposal facility to which City has objected. Contractor shall document actual disposal or destruction of waste at a designated facility by completing a disposal certificate or certificate of destruction and forwarding the original to the Contractor (with a copy to City)."

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2. Number the text of current paragraph 13.2 paragraph 13.2.A and add to the end of paragraph 13.2 new paragraphs that read:

"13.2.B Before performing any of the Work, and at such other times as may be required by applicable Law, deliver all requisite notices and obtain the approval of all governmental and quasi-governmental authorities having jurisdiction over the Work. Submit evidence satisfactory to City that Contractor and any disposal facility (a) have obtained all required permits, approvals and the like in a timely manner both prior to commencement of the Work and thereafter as and when required by applicable Law, and (b) are in compliance with all such permits, approvals and the like. For example, before commencing any work in connection with the Work involving asbestos-containing materials or PCB subject to regulation, Contractor shall provide the required notice of intent to renovate or demolish to the appropriate state or federal agency having jurisdiction, by certified mail, return receipt required, or by some other method of transmittal for which a return receipt is obtained, and to send a copy of that notice to City. Contractor shall not conduct any Work involving asbestos-containing materials or PCB unless Contractor has first confirmed that the appropriate agency having jurisdiction is in receipt of the required notification. All permits, licenses, and bonds required by governmental or quasi-governmental authorities, fees, deposits, tap fees, offsite easements, and asbestos and PCB disposal facilities necessary for the prosecution of the Work shall be procured and paid for by Contractor. Contractor shall give all notices and comply with the Law bearing on the conduct of the Work as drawn and specified. If Contractor observes or reasonably should have observed that Drawings and Specifications and other Contract Documents are at variance therewith, it shall be responsible for promptly notifying City in writing of such fact. If Contractor performs any Work contrary to Law without such notice to City, Contractor shall bear all costs arising therefrom.

In the case of any permits or notices held in City's name or of necessity to be made in City's name, City will cooperate with Contractor in securing the permit or giving the notice, but Contractor shall prepare for City's review and execution upon approval, all necessary applications, notices, and other materials."

3. Add to the end of paragraph 13.3 a new paragraph that reads:

"13.3.G To the greatest extent permitted by Law, the indemnities and limitation of liability expressed throughout the Contract Documents apply with equal force and effect to any claims or liabilities imposed or existing by virtue of the removal, abatement, and disposal of hazardous waste. This includes liabilities connected to the selection and use of a waste disposal facility, personal injury, property damage, loss of use of property, damage to the environment or natural resources, or "disposal" and "release" of materials associated with the Work (as defined in 42 U.S.C. Section 9601 *et seq*)."

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4. Add to the end of paragraph 13.7 a new paragraph that reads:

"13.7.G Notwithstanding anything in paragraph 13.7 to the contrary, City shall have an absolute right to terminate for default immediately without notice and without an opportunity to cure should Contractor knowingly or recklessly commit a material breach of the terms of the Contract Documents or the Law on any matter involving the exposure of persons or property to hazardous waste. If the breach exposing persons or property to hazardous waste is due solely to an ordinary, unintentional and non-reckless failure to exercise reasonable care, then the procedures in paragraph 13.7 for termination for default shall apply without modification."

H. Supplement to paragraph 16.2, Protection of Work, Persons, and Property:

1. Add to the end of paragraph 16.2 a new paragraph that reads:

"16.2.F Contractor shall perform safe, expeditious, and orderly work in accordance with the best practices and the highest standards in the hazardous waste abatement, removal, and disposal industry, the Law (as herein defined), and the Contract Documents including, but not limited to, all responsibilities relating to the preparation and return of waste shipment records, all requirements of the Law, delivering of all requisite notices, and obtaining all necessary governmental and quasi-governmental approvals."

END OF DOCUMENT

DOCUMENT 00830

APPRENTICESHIP PROGRAM

1. Contractor and Subcontractors shall comply with the requirements of California Labor Code Sections 1776, 1777.5, and 1777.6 concerning the employment of apprentices by Contractor or Subcontractors. Willful failure to comply may result in penalties, including loss of the right to Bid on or receive Public Works contracts.

2. Section 1777.5, as amended, requires a Contractor or Subcontractor employing tradespersons in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of a public works project and which administers the apprenticeship program in that trade for a certification of approval. The certificate shall also fix the ratio of apprentices to journeypersons that will be used in performance of the Contract. The ratio of work performed by apprentices to journeypersons in such cases shall not be less than one hour of apprentices work for every five hours of labor performed by journeypersons (the minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeypersons), except:

   A. When unemployment for the previous three-month period in the area exceeds an average of 15 percent;

   B. When the number of apprentices in training in the area exceeds a ratio of one to five;

   C. When a trade can show that it is replacing at least 1/30 of its membership through apprenticeship training on an annual basis state-wide or locally; or

   D. Assignment of an apprentice to any work performed under a public works contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyperson.

3. Contractor is required to make contributions to funds established for administration of apprenticeship programs if Contractor employs registered apprentices or journeypersons in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

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

END OF DOCUMENT

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SECTION 01100

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. This section includes Summary of Work including:

1. Work Covered By Contract Documents
2. Bid Items, Allowances, and Alternates
3. Work Under Other Contracts
4. Future Work
5. Work Sequence
6. Work Days and Hours
7. Cooperation of Contractor and Coordination with Other Work
8. Maintenance, Product Handling, and Protection
9. Partial Occupancy/Utilization Requirements
10. Contractor Use of Premises
11. Lines and Grades
12. Protection of Existing Structures and Utilities
13. Damage to Existing Property
14. Dust Control
15. Parking
16. Laydown/Staging Area
17. Permits
18. Punch List Verification
19. Actual Damages for Violations
20. Unfavorable Construction Conditions
21. Construction Site Access
22. Specification Data Sheets and Schedules
23. Site Administration
24. Circularizing Business and Residences

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Reference Document 00100, Notice Inviting Bids, for a brief description of the Work.

B. Furnish all labor, materials, equipment, services, permits, temporary controls and construction facilities, and all general conditions, seismic requirements, general requirements and incidentals required to complete the Work in its entirety as described in the Contract Documents.

C. The Work of this Contract includes work covered by unit prices and/or lump sum.

D. The Work of this Contract comprises construction of all the Work indicated, described, and shown in the Contract Documents.

E. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Acceptance of the Work.

F. Contractor's use of the premises for Work and storage is limited to the area indicated on the plans.

G. Contractor shall be solely responsible for all utilities (including without limitation electric, cable TV, water, gas, telephone, storm drain, sanitary sewer, etc.) at the Site.

H. Connections to Existing Facilities. Unless otherwise specified or indicated, Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, Contractor shall receive permission from City or the owning utility prior to undertaking connections.

I. Existing materials and equipment removed and not reused as a part of the Work shall be returned to the City. Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of City. Contractor shall store and protect salvaged items specified or indicated to be reused in the Work. Salvaged items not to be reused in the Work, but to remain City's property shall be delivered by Contractor in good condition to City at:

City of Santa Clara
Street Corporation Yard
1700 Walsh Avenue
Santa Clara, CA 95050

J. Any items specified or indicated to be salvaged which are damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items. Contractor may furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor's property. Existing materials and equipment removed by Contractor shall not be reused in the Work, except where so specified or indicated.

1.3 BID ITEMS, ALLOWANCES, AND ALTERNATES

A. Any Bid Item may be deleted from the Work and Contract Sum, in total or in part, prior to or after award of Contract without compensation in any form or adjustment of other Bid Items or prices therefore. Should such deletions occur, it shall not impact the basis of award, as publicly announced immediately prior to bid opening.

B. Payment of all items is subject to provisions of Contract Documents, including without limitation Section 01200, Measurement and Payment.

C. For all Bid Items, furnish and install all work indicated and described in Specifications and all other Contract Documents, including connections to existing systems. Work and requirements applicable to each individual Bid Item, or unit of Work, shall be deemed incorporated into the description of each Bid Item (whether Lump Sum, or Unit Price).

D. Bid Items are not intended to be exclusive descriptions of work categories and Bidder shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item as shown and specified. Reference the Special Provisions for description of Bid Items.

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E. Allowances:

1. Allowance work shall be done as change order work and as specified in Section 01250, Modification Procedures. Contractor shall identify Allowance Items (See Document 00400, Bid) work on the Progress Schedules and on Requests for Payment.

2. The Amount given on Document 00400, Bid Form, under each Allowance Item is the sum of money set aside for each Allowance. These amounts shall be included in the Contract Price on the Bid Form.

3. If the cost of work done under any Allowance Item is less than the amount given on the Bid Form under that Allowance Item, the Contract Sum shall be reduced by the difference between the amount given in the Bid Form and the cost of work actually done.

F. Alternates

1. Per Section 01130, Alternates, the lump sum or unit price paid for Alternate items shall be full payment for full Alternate scope; including: cleaning and testing, submittals, and all other Contract Document requirements.

2. Notwithstanding any inclusion of any of the Alternate items in the Award of Contract or the Contract Documents, Contractor shall not proceed with Alternate item work without receiving a written notice to proceed from the City.

1.4 WORK UNDER OTHER CONTRACTS

Reference Special Provisions.

1.5 FUTURE WORK

Reference Special Provisions.

1.6 WORK SEQUENCE

A. Construct Work in stages as outlined in the Contract Documents; coordinate construction schedule and operations with City.

B. Contractor shall schedule Work accordingly.

C. Contractor acknowledges that shoring may be required to maintain a safe excavation and protect facilities or pipelines, including both existing and recently constructed under this Contract. All expenses for shoring of excavations for construction of required improvements shall be included in the appropriate bid items.

1.7 WORK DAYS AND HOURS

Reference Subsection 16.1, Hours of Work, of Document 00700, General Conditions, (page 00700-45).

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1.8 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

A. Coordinate with City and any City forces, or other contractors and forces, as required by Document 00700, General Conditions, paragraph 6.

B. Employ a full time coordinator to constantly review Contract Documents, submittals, changes, and prepare overlay drawings as necessary to avoid conflicts, errors, omissions and untimely construction.

1.9 MAINTENANCE, PRODUCT HANDLING, AND PROTECTION

A. Transport, deliver, handle, and store materials and equipment at the Site in such a manner as to prevent the breakage, damage or intrusions of foreign matter or moisture, and otherwise to prevent damage.

B. Hazardous substance compliance: Provide City with copies of the OSHA Material Safety Data Sheets (MSDS) for all products containing a hazardous substance, examples: Adhesives, paints, sealants, and the like.

C. Packaging: Provide packaged material in manufacturer's original containers with seals unbroken and labels intact until incorporated into the Work.

D. Remove all damaged or otherwise unsuitable material and equipment promptly from the Site.

E. Protection: Protect all finished surfaces.

F. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.10 PARTIAL OCCUPANCY/UTILIZATION REQUIREMENTS

A. Contractor shall allow City to take possession of and use any completed or partially completed portion of the Project during the progress of the Work as soon as is possible without interference to the Work.

B. Possession, use of Project or work, and placing and installation of equipment by City shall not in any way signify the completion of the Work or any part of it.

C. Contractor shall not be held responsible for damage to the occupied part of the Work resulting from City occupancy.

D. Use and occupancy by City prior to acceptance of the Work does not relieve Contractor of its responsibility to maintain insurance and bonds required under the Contract until entire Work is completed and accepted by City.

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E. Prior to date of Final Acceptance of the Work by City, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in Document 00700, General Conditions.

F. Use by City of Work or part thereof as contemplated by this section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by City of any of the conditions thereof.

G. City may specify in the Contract Documents that portions of the Work shall be substantially completed on milestone dates prior to substantial completion of all of the Work. Contractor shall notify City and City's Construction Manager in writing when Contractor considers any such part of the Work ready for its intended use and substantially complete and request City to issue a Certificate of Substantial Completion for that part of the Work.

1.11 CONTRACTOR USE OF PREMISES

A. Confine operations at Site to areas permitted by Contract Documents, permits, ordinances, and laws.

B. Do not unreasonably encumber Project Site with materials or equipment.

C. Assume full responsibility for protection and safekeeping of products stored on premises.

D. Move any stored products that interfere with operations of City or other contractor.

E. Parking, storage, staging, and work areas shall be coordinated with the City, and comply with all other Contract Documents requirements.

1.12 LINES AND GRADES

A. Contractor shall be responsible for the accuracy of the Work. All Work shall be done to the lines, grades, and elevations indicated on the Plans. Contractor shall verify the levels shown on the Plans with existing levels and notify the City of any discrepancies before proceeding with the Work.

B. City shall provide basic horizontal and vertical control points, as shown on the plans, to be used as datums for the Work. All additional survey, layout, and measurement work shall be performed by Contractor.

C. Contractor shall provide at its cost a licensed Civil Engineer or Land Surveyor, competent assistants, and such instruments, tools, stakes and other materials required to complete and maintain the survey, layout, and measurement work. In addition, Contractor shall furnish at its cost said competent persons and such tools, stakes, and other materials as City (and/or the Engineer) may require in establishing or designating control points, or in checking survey, layout, and measurement work performed by Contractor.

D. Contractor shall keep City informed, a reasonable time in advance, of the times and places at which it wishes to do Work, so that any checking deemed necessary by City may be done with minimum inconvenience to City and minimum delay to Contractor.

E. Contractor shall remove and reconstruct Work which is improperly located.

F. No direct payment will be made for Contractor's cost of any Work or delay occasioned by establishing, maintaining, or checking lines and grades or making other measurements, or by inspection, and no extension of time will be allowed for such delays.

1.13 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The Plans may indicate existing above- and below-grade structures, drainage lines, storm drains, sanitary sewers, water, gas, electric, hot water, and other similar items and utilities that are known to City. Contractor shall protect facilities against damage and deleterious substances.

B. Contractor shall locate these known existing installations before proceeding with trenching or other operations which may cause damage, shall maintain them in service where appropriate, and shall repair any damage to them caused by the Work, at no increase in Contract Sum.

C. Additional utilities whose locations are unknown to City are suspected to exist. Contractor must be alert to their existence. If additional utilities are encountered, Contractor must immediately report to City for disposition.

D. In addition to reporting, if a utility is damaged, Contractor must take appropriate action as provided in Document 00700, General Conditions.

E. Additional compensation or extension of time on account of utilities not indicated or otherwise brought to Contractor's attention including reasonable action taken to protect or repair damage shall be determined as provided in Document 00700, General Conditions.

1.14 DAMAGE TO EXISTING PROPERTY

A. Contractor will be responsible for any damage to existing structures, Work, materials, or equipment because of its operations and shall repair or replace any damaged structures, Work, materials, or equipment to the satisfaction of, and at no additional cost to the City.

B. Contractor shall protect all existing structures and property from damage and shall provide bracing, shoring, or other work necessary for such protection.

C. Contractor shall be responsible for all damage to streets, roads, curbs, gutters, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, or other public or private property, which may be caused by transporting equipment, materials, or workers to or from the Work. Contractor shall make satisfactory and acceptable arrangements with the agency having jurisdiction over the damaged property concerning its repair or replacement.

1.15 DUST CONTROL

A. Contractor shall take reasonable measures to prevent unnecessary dust. The following items shall be specifically implemented to control dust:

1. All construction locations with active excavation shall be watered at least twice daily.

2. Cover all trucks hauling soil, sand, and other loose materials.

3. Pave, apply water daily, or apply non-toxic soil stabilizers on all un-paved access roads, parking areas, and staging areas at construction site.

4. Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites during earthwork activities.

5. Cover all stockpiles.

6. Limit the speed of all construction vehicles to 5 miles per hour while on un-paved roads at the Site.

B. Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing and new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens

1.16 PARKING

Contractor shall provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, City's operations, or construction activities.

1.17 LAYDOWN/STAGING AREA

Reference Special Provisions.

1.18 PERMITS

A. Applicable permits: Permits, agreements, or written authorizations that are known by the City to apply to this project are listed in the Special Provisions.

1. Cal/OSHA Permit. The Contractor shall obtain, as applicable, a permit as required by Cal/OSHA for each of the following:
   a. Construction of trenches or excavations that are five feet or more in depth and into which a person is required to descend.
   b. Construction or demolition of any building, structure, or scaffolding for falsework more than three stories high, or the equivalent height (36 feet).
   c. Erection or dismantling of vertical shoring systems more than three stories high, or the equivalent height (36 feet).

B. For Traffic Signal Projects, Contractor shall obtain a no-cost electrical permit from the Building Inspection Division prior to the start of Work and shall comply with all inspection requirements of said permit. Contractor shall be responsible for scheduling any required electrical inspections and shall notify the Public Works Inspector of the time of such inspections. The Building Inspection Division Electrical Inspector shall inspect all work from the Tesco Panel to the point of connection to the City power supply for Code compliance.

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C. Permits that may be required, such as electrical, mechanical, fire prevention, irrigation, grading, slope protection, tree cutting, etc., have not been applied for and shall be obtained by Contractor. Applicable City permit fees will be paid by the City to the extent specified in Document 00700, General Conditions.

1.19 PUNCH LIST VERIFICATION

A punch list examination will be performed upon Substantial Completion of Work. One follow-up review of punch list items for each discipline will be provided. If further Site visits are required to review punch list items due to incompleteness of the Work by Contractor, Contractor shall reimburse City for these visits.

1.20 ACTUAL DAMAGES FOR VIOLATIONS

A. In addition to damages which are impracticable or extremely difficult to determine, for which liquidated damages will be assessed as described in paragraph 15.5 of Document 00700, General Conditions, City may incur actual damages resulting from loss of use of any permit described in this Section 01100, or from use in violation of legal or regulatory requirements where the violations result from Contractor's activities. Violations or threatened violations may subject the City to fines and/or other costs or civil liabilities.

B. Contractor shall be liable for and shall pay City the amount of any actual losses in addition to liquidated damages or other remedies provided by the Contract Documents.

C. The amount of liquidated damages provided in paragraph 15.5 of Document 00700, General Conditions, is not intended to include, nor does the amount include, any damages incurred by City for reasons other those listed in that paragraph. Any money due or to become due to Contractor may be retained by City to cover both the liquidated and the actual damages described above and, should such money not be sufficient to cover such damages, City shall have the right to recover the balance from Contractor or its sureties.

1.21 UNFAVORABLE CONSTRUCTION CONDITIONS

During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine its operations to Work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the Work in a proper and satisfactory manner.

1.22 CONSTRUCTION SITE ACCESS

Contractor shall at all times limit access to the Site to necessary personnel only. All personnel associated with construction of the Project shall enter the site through Contractor's access gate, at the location indicated on the Drawings. Access for construction personnel shall be limited to 7:00 a.m. to 5:00 p.m. local time. All mail and deliveries (Federal Express, equipment, etc.) shall be sent to a separate address (at Contractor's gate), specifically arranged by Contractor for the Project. Contractor is responsible for providing adequate signage to alert delivery persons to the new address.

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1.23 SPECIFICATION DATA SHEETS AND SCHEDULES

A. Specifications may have data sheets and schedules as part of specific specification sections. Locations for data entries on the data sheets and schedules may be left blank intentionally. Each line where data may be entered on the data sheet has a selection box in the column “Chk”. When the box for a line is checked and no data is entered in the respective line, this indicates that no data is required for that line of the data sheet.

B. Other standard codes which apply to the Work are designated in the Specifications.

1.24 SITE ADMINISTRATION

Contractor shall be responsible for all areas of the Site used by it and by all Subcontractors in the performance of the Work. Contractor shall exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to City or others. Contractor shall have the right to exclude from the Site all persons who have no purpose related to the Work or its inspection, and may require all persons on the Site (except City’s employees) to observe the same regulations, as Contractor requires of its employees.

1.25 CIRCULARIZING BUSINESS AND RESIDENCES

Prior to any work, the Contractor shall notify, by circular, all businesses and residents with street frontage or property affected by the proposed construction. Notification shall be done forty-eight (48) hours in advance of starting the work affecting businesses and residents. The circular shall state the name, address and telephone of the Contractor, starting time and date, nature and extent of the proposed work, and the approximate date upon which the Contractor expects to complete the pertinent construction activity. The circular must be approved by the Engineer or Inspector prior to distribution. Submit circular for approval at least two (2) full working days prior to date of intended distribution.

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SECTION 01130

ALTERNATES

1.1 SUMMARY

A. Section Includes:
   1.2 Procedures
   1.3 Selection and Award of Alternates

B. Related Sections and Documents:
   1. Bid: Document 00400
   2. Agreement: Document 00520
   3. Summary of Work: Section 01100
   4. Submittals Procedure: Section 01330
   5. Applicable Sections in Division 2 and above

C. Definition: An Alternate Bid is an amount proposed by Bidder and stated on its Bid to be added to or deducted from the Base Bid amount if City decides to accept a corresponding change, either in scope of Work or in products, materials, equipment, systems, or installation methods described in the Contract Documents.

D. The cost for each add Alternate is the net addition to the Base Bid to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

E. The cost for each deduct Alternate is the net deduction to the Base Bid to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

F. Coordination of related Work is required to ensure that Work affected by each selected Alternate is completed and properly interfaced with Work of Alternates and the overall construction schedule.

1.2 PROCEDURES

A. Submit Alternates with full descriptions of the proposed Alternate and the effect on adjacent or related components.

B. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not mentioned as part of the Alternate. Modify affected adjacent Work as necessary to fully integrate that Work into the Project.

C. Execute accepted Alternates under the same conditions as other Work of this Contract.

D. Specifications Sections contain many of the requirements for materials necessary to achieve the Work described under each Alternate.

E. Coordinate related Work, and modify surrounding Work to integrate the Work of each Alternate in accordance with the Contract Documents.

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1.3 SELECTION AND AWARD OF ALTERNATES

A. The apparent low Bid will be determined by comparing the sum of each Bidder's Total Base Bid plus the selected Alternate Bid Items which are within the announced construction budget. If the construction budget is less than all the Base Bids, the apparent low Bid will be the lowest Base Bid. The construction budget and the order of priority in which the Alternate Bid Items will be considered will be announced by the City immediately before the initial Bid package is opened.

B. Accepted Alternates will be identified in the City-Contractor Agreement.

END OF SECTION

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

Section includes description of requirements and procedures for determining amount of Work performed and for obtaining payment for Work performed.

1.2 REFERENCES

A. California Public Contract Code

B. California Code of Civil Procedure

C. California Government Code

1.3 SCOPE OF WORK

Work under Contract Documents, or under any Bid Item, allowance, or alternate, shall include all labor, materials, taxes, transport, handling, storage, supervision, administration, and all other items necessary for the satisfactory completion of Work, whether or not expressly specified or indicated.

1.4 DETERMINATION OF QUANTITIES

Quantity of work to be paid for under any item for which a unit price is fixed in Contract Documents shall be number, as determined by City, of units of work satisfactorily completed in accordance with Contract Documents or as directed by City. Unless otherwise provided, determination of number of units of work so completed will be based, so far as practicable, on actual measurement or count within prescribed or ordered limits, and no payment will be made for work done outside of limits. Measurements and computations will be made by methods set forth in Contract Documents, including without limitation this Section 01200. If methods are not so set forth, measurements shall be made in any manner which City considers appropriate for class of Work measured (e.g., pre-assigned values, percentage completion, units completed or incremental milestones). Contractor must immediately inform City of any disputes regarding quantity measurements and shall immediately supply City with any documentation supporting the disputed measurements.

1.5 SCOPE OF PAYMENT

A. Except as otherwise expressly stated in Section 01100, Summary of Work, payment to Contractor at the unit price or other price fixed in Contract Documents for performing Work required under any item, or (if the Contract is on a single lump sum price basis) at the lump sum price fixed in the Contract Documents for performing all Work required under Contract Documents, and as either may be adjusted pursuant to any approved Change Order or Construction Change Directive, shall be full compensation for completing, in accordance with Contract Documents, all Work required under the item or under Contract Documents, and for all expense incurred by Contractor for any purpose in connection with the performance and completion of said Work, including all incidental work necessary for completion of the Work.

B. The Contract Sum, whether lump sum, unit price or otherwise, shall be deemed to include all costs necessary to complete required Work, all costs (if any) for loss or damage arising from nature of Work or prosecution of the Work, and from action of elements. Unless Contract Documents expressly provide otherwise, the Contract Sum shall be deemed to include:

1. Any and all costs arising from any unforeseen difficulties which may be encountered during, and all risks of any description connected with, prosecution of Work or prosecution of Bid Item (whether lump sum or unit price) until acceptance by City;

2. All expenses incurred due to suspension, or discontinuance of Work or discontinuance of Bid Item (whether lump sum or unit price) as provided in Contract Documents;

3. Escalation to allow for cost increases between time of Contract Award and completion of Work or completion of Bid Item (whether lump sum or unit price).

4. All incidentals including, but not limited to, required bonds, insurance, traffic controls, and permits.

C. Whenever it is specified herein that Contractor is to do work or furnish materials of any class for which no price is fixed in Contract Documents, it shall be understood that Contractor is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that cost of doing work or furnishing materials is to be included in price Bid, unless it is expressly specified herein, in particular cases, that work or material is to be paid for as extra work.

D. Unit Prices shall apply to work by unit prices if at least one of the following conditions applies:

1. The actual quantities performed on the Project are not less than 75 percent or greater than 125 percent of the estimated quantities contained in Document 00400, Bid.

2. The actual total dollar amount, using the Bid unit price, for work performed on the Project does not vary by more than $10,000 above or below the total Bid item amount contained in Document 00400, Bid.

If actual quantities or amounts exceed these parameters, then the unit price may be adjusted by an amount to reflect the Contractor's incremental cost differential resulting from increased or decreased economies of scale.

Should the City and Contractor be unable to agree on an incremental unit price cost differential, the adjusted cost shall be determined per Section 4-1.03B of the Standard Specifications, with the following exceptions:

1. In the event of increases above the limits described in this Section, the adjusted unit price shall not exceed the Bid unit price, and

2. In the event of decreases below the limits described in this Section, the effected Bid item's revised total Bid item amount shall not exceed the original total Bid item amount.

E. No payment shall be made for materials or equipment not yet incorporated into the Work, except as specified in Section 01100, Summary of Work.

F. The City may, in its discretion, where Contractor requests payment on the basis of materials and equipment not incorporated in the Work, Contractor must satisfy the following conditions:

1. The materials and/or equipment shall be delivered and suitably stored at the Site or at another local location agreed to in writing, for example, a mutually acceptable warehouse;

2. Full title to the materials and/or equipment shall vest in City at the time of delivery to the Site, warehouse or other storage location;

3. Obtain a negotiable warehouse receipt, endorsed over to City for materials and/or equipment stored in an off-site warehouse. No payment will be made until such endorsed receipts are delivered to City;

4. Stockpiled materials and/or equipment shall be available for City inspection, but City shall have no obligation to inspect them and its inspection or failure to inspect shall not relieve Contractor of any obligations under the Contract Documents. Materials and/or equipment shall be segregated and labeled or tagged to identify these specific Contract Documents;

5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor's expense;

6. At Contractor's expense, ensure the materials and/or equipment against theft, fire, flood, vandalism, and malicious mischief, as well as any other coverage required under the Contract Documents;

7. Contractor's Application for Payment shall be accompanied by a bill of sale, invoice or other documentation warranting that City has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect City's interest therein, all of which must be satisfactory to City. This documentation shall include, but not be limited to, conditional releases of mechanics' liens and stop notices from all those providing materials and equipment as to which the Application for Payment relates, as well as unconditional releases of the same from the same as to the previous Application for Payment for which they have not already been provided.

G. Amounts previously paid for materials and equipment prior to incorporation into the Work shall be deducted from amounts otherwise due Contractor as they are incorporated.

1.6 BASIS OF PAYMENT

A. Unit Price Quantities: When estimated quantity for specific portions of Work is listed in the Bid, quantity of Work to be paid for shall be actual number of units satisfactorily completed, as determined by City and agreed to by Contractor, in accordance with Contract Documents.

B. Lump Sum: When estimated quantity for specific portion of Work is not indicated and unit is designated as lump sum, payment will be on a lump sum basis for Work satisfactorily completed in accordance with Contract Documents.

C. Allowances: Allowance items (if any) will be paid for as provided in Section 01100, Summary of Work. Funds authorized for Allowance work will not be released for Contract payments unless City has authorized Allowance work in writing.

D. City does not expressly, or by implication, agree, warrant, or represent in any manner, that actual amount of Work will correspond with amount shown or estimated and reserves right to increase or decrease amount of any class or portion of Work, to leave out entire Bid Item or Items, or to add work not originally included in Bid or Contract Documents, when in its judgment such change is in best interest of City. No change in Work shall be considered a waiver of any other condition of Contract Documents. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as otherwise expressly provided for in Contract Documents, because of any differences between amount of work actually done and estimated amount as set forth herein, or for elimination of Bid Item.

1.7 PROGRESS PAYMENTS

A. If requested by Contractor, progress payments will be made monthly.

B. Schedule of Values:

1. Within ten (10) Days from issuance of Notice of Award and prior to the Contractor's first Application for Payment, submit a detailed breakdown of its Bid by scheduled Work items and/or activities, including coordination responsibilities and Project Record Documents responsibilities. Where more than one Subcontractor comprises the work of a Work item or activity, the Schedule of Values shall show a separate line item for each subcontract. Furnish such breakdown of the total Contract Sum by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. The format and detail of the breakdown shall be as directed by City to facilitate and clarify future progress payments to Contractor for direct Work under Contract Documents. This breakdown shall be referred to as the Schedule of Values.

2. Contractor's overhead, profit, insurance, cost of bonds (except to the extent expressly identified in a Bid Item) and/or other financing, as well as "general conditions costs," (e.g., Site cleanup and maintenance, temporary roads and access, off-Site access roads, temporary power and lighting, security, and the like), shall be prorated through all activities so that the sum of all the Schedule of Values line items equals Contractor's total Contract Sum, less any allowances designated by City. Scheduling, record documents and quality assurance control shall be separate line items.

3. City will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, fair market cost allocations for the Work items listed. Upon favorable review by City, City will accept this Schedule of Values for use. City shall be the sole judge of fair market cost allocations.

4. City will reject any attempt to increase the cost of early activities, i.e., “front loading,” resulting in a complete reallocation of moneys until such “front loading” is corrected. Repeated attempts at “front loading” may result in suspension or termination of the Work for default, or refusal to process progress payments until such time as the Schedule of Values is acceptable to City.

C. Applications for Payment: Contractor shall establish and maintain records of cost of the Work in accordance with generally accepted accounting practices. In addition:

1. On or before the 20th Day of each month, but after receipt of City’s approval of the updated Schedule as required by Section 01320, Progress Schedules and Reports, Contractor shall submit to City two (2) copies of an Application for Payment for the cost of the Work put in place during the period from the 15th Day of the previous month to the 15th Day of the current month. Such Applications for Payment shall be for the total value of activities completed or partially completed, including approved activity costs, based upon Schedule of Values prices (or Bid item prices if unit price) of all labor and materials incorporated in the Work up until midnight of the last Day of that one month period, less the aggregate of previous payments. Accumulated retainage shall be shown as separate item in payment summary. Contractor shall submit in a form acceptable to City an itemized cost breakdown of Contractor’s record of Cost of the Work together with supporting data and any certification required by City. If Contractor is late submitting its Application for Payment, that Application may be processed at any time during the succeeding one-month period, resulting in processing of Contractor’s Application for Payment being delayed for more than a Day for Day basis.

2. Applications for Payment may include, but are not necessarily limited to the following:

   a. Material, equipment, and labor incorporated into the Work, less any previous payments for the same;

   b. Up to 75 percent of the cost of equipment identified in paragraph 1.5F of this Section 01200 (if any), if purchased and delivered to the Site or stored off Site, as may be approved by City.

   c. Up to 50 percent of the cost of materials identified in paragraph 1.5F of this Section 01200 (if any), specifically fabricated for the Project that are not yet incorporated into the Work.

3. At the time any Application for Payment is submitted, certify in writing the accuracy of the Application and that Contractor has fulfilled all scheduling requirements of Document 00700, General Conditions, and Section 01320, Progress Schedules and Reports, including updates and revisions. A responsible officer of Contractor shall execute the certification.

4. No progress payment will be processed prior to City receiving all requested, acceptable schedule update information. Failure to submit a schedule update complying with Section 01320, Progress Schedules and Reports, justifies denying the entire Application for Payment.

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5. Each Application for Payment shall list each Change Order and Construction Change Directive ("CCD") executed prior to date of submission, including the Change Order/CCD Number, and a description of the work activities, consistent with the descriptions of original work activities. Submit a monthly Change Order/CCD status log to City.

6. If City requires substantiating data, submit information requested by City, with cover letter identifying Project, Application for Payment number and date, and detailed list of enclosures. Submit one copy of substantiating data and cover letter for each copy of Application for Payment submitted.

7. If Contractor fails or refuses to participate in work reconciliations or other construction progress evaluation with City, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information to City.

D. Progress Payments:

1. City will not process payment requests prior to the Contractor presenting the City with evidence that the Project Record Documents have been updated to show all changes up to and including the month for which the payment request is being made (See Section 01780, Project Record Documents).

2. City will review Contractor's Application for Payment following receipt. If adjustments need to be made to percent of completion of each activity, City will make appropriate notations and return to Contractor. Contractor shall revise and resubmit. All parties shall update percentage of completion values in the same manner, i.e., express value of an accumulated percentage of completion to date.

3. Each Application for Payment may be reviewed by City and/or inspectors to determine whether the Application for Payment is proper, and shall be rejected, revised, or approved by City pursuant to the Schedule of Values prepared in accordance with paragraph 1.7B of this Section 01200.

4. If it is determined that the Application for Payment is not proper and suitable for payment, City will return it to the Contractor as soon as practicable, but no later than seven Days after receipt, together with a document setting forth in writing the reasons why the Application for Payment is not proper. If City determines that portions of the Application for Payment are not proper or not due under the Contract Documents, then City may approve the other portions of the Application for Payment, and in the case of disputed items or defective Work not remedied, may withhold up to 150 percent of the disputed amount from the progress payment.

5. Pursuant to Public Contract Code Section 20104.50, if City fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted Application for Payment from Contractor, City shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. The 30-Day period shall be reduced by the number of Days by which City exceeds the seven-Day return requirement set forth herein.

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6. As soon as practicable after approval of each Application for Payment for progress payments, City will pay to Contractor in manner provided by law, an amount equal to 95 percent of the amounts otherwise due as provided in the Contract Documents (City will retain the remaining 5 percent as retention), or a lesser amount if so provided in the Contract Documents, provided that payments may at any time be withheld if, in judgment of City, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract, or to comply with stop notices or to offset liquidated damages accruing or expected.

7. Before any progress payment or final payment is due or made, Contractor shall submit satisfactory evidence that Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into Work. This specifically includes, without limitation, conditional lien release forms for the current progress payment and unconditional release forms for past progress payments. City also may elect in its sole discretion to pay progress payments by joint check to Contractor and each Subcontractor having an interest in that progress payment in such amount.

8. City reserves and shall have the right to withhold payment for any equipment and/or specifically fabricated materials that, in the sole judgment of City, are not adequately and properly protected against weather and/or damage prior to or following incorporation into the Work.

9. Granting of progress payment or payments by City, or receipt thereof by Contractor, shall not be understood as constituting in any sense acceptance of Work or of any portion thereof, and shall in no way lessen liability of Contractor to replace unsatisfactory work or material, though unsatisfactory character of work or material may have been apparent or detected at time payment was made.

10. When City shall charge sum of money against Contractor under any provision of Contract Documents, amount of charge shall be deducted and retained by City from amount of next succeeding progress payment or from any other moneys due or that may become due Contractor under Contract. If, on completion or termination of Contract, such moneys due Contractor are found insufficient to cover City's charges against it, City shall have right to recover balance from Contractor or Sureties.

11. The City will not contemplate reducing the retention until the City issues the Certificate of Substantial Completion in accordance with Paragraph 1.3 of Section 01770, Contract Closeout. The City reserves the right to maintain the full retention after the Certificate of Substantial Completion is issued if the Contractor is not complying with the requirements of the Contract, to comply with stop notices, to offset liquidated damages accruing or expected, or for any other reason.

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1.8 SUBSTITUTION OF SECURITIES IN LIEU OF RETENTION

A. In accordance with the provisions of Public Contract Code Section 22300, substitution of securities for any moneys withheld under Contract Documents to ensure performance is permitted under following conditions:

1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and City which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such moneys to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.

2. Alternatively, Contractor may request and City shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and receive the interest earned on the investments upon the same terms provided for in this Section 01200 for securities deposited by Contractor. Upon satisfactory completion of Contract Documents, Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from City, pursuant to the terms of this Section 01200. Pay to each Subcontractor, not later than 20 Days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to ensure the performance of Contractor.

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

4. Enter into escrow agreement with Controller according to Document 00680 (Escrow Agreement for Security Deposits in Lieu of Retention), as authorized under Public Contract Code Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract Documents.

5. Public Contract Code Section 22300 is hereby incorporated in full by this reference.

1.9 FINAL PAYMENT

A. As soon as practicable after all required Work is completed in accordance with Contract Documents, including punchlist, testing, record documents and Contractor maintenance after Final Acceptance, City will pay to Contractor, in manner provided by law, unpaid balance of Contract Sum of Work (including without limitation retentions), or whole Contract Sum of Work if no progress payment has been made, determined in accordance with terms of Contract Documents, less sums as may be lawfully retained under any provisions of Contract Documents or by law.

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B. Prior progress payments shall be subject to correction in the final payment. City's determination of amount due as final payment shall be final and conclusive evidence of amount of Work performed by Contractor under Contract Documents and shall be full measure of compensation to be received by Contractor.

C. Contractor and each assignee under an assignment in effect at time of final payment shall execute and deliver at time of final payment, and as a condition precedent to final payment, Document 00650, Agreement and Release of Any and All Claims, discharging City, its officers, agents, employees, and consultants of and from liabilities, obligations, and claims arising under Contract Documents.

1.10 EFFECT OF PAYMENT

A. Payment will be made by City, based on City's observations at the Site and the data comprising the Application for Payment. Payment will not be a representation that City has:

1. Made exhaustive or continuous on-Site inspections to check the quality or quantity of Work;

2. Reviewed construction means, methods, techniques, sequences, or procedures;

3. Reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by City to substantiate Contractor's right to payment; or

4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

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SECTION 01250

MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Description of general procedural requirements for alterations, modifications, and extras.

1.2 GENERAL

A. Any change in scope of Work or deviation from Contract Documents including, without limitation, extra work, or alterations or additions to or deductions from the original Work, shall not invalidate the original Contract, and shall be performed under the terms of the Contract Documents.

B. Only Contractor or City may initiate changes in scope of Work or deviation from Contract Documents.

1. Contractor may initiate changes by submitting Requests for Information ("RFIs"), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.

   a. RFIs shall be submitted to seek clarification of or request changes in the Contract Documents.
   b. Notices of Concealed or Unknown Conditions shall be submitted in accordance with Document 00700, General Conditions.
   c. Notices of Hazardous Waste Conditions shall be submitted in accordance with Document 00700, General Conditions.

2. Contractor shall be responsible for its costs to implement and administer RFIs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor shall not be entitled to additional compensation. Contractor shall be responsible for both City and its Engineer's administrative costs for answering RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by City; at City's discretion, such costs may be deducted from progress payments or final payment.

3. City may issue a Supplemental Instruction to clarify the Contract Documents.

4. City may initiate changes in the Work or Contract Time by issuing Requests for Proposals ("RFPs") to Contractor. Such RFPs will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Time from Contractor.

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5. City may also, by Construction Change Directive ("CCD"), order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly. A CCD shall be used in the absence of total agreement on the terms of a Change Order and may, upon notice, consist of a Change Order executed by City only.

1.3 PROCEDURES

A. Cost Proposal and Procedures: Whenever Contractor is required in this Section 01250 to prepare a Cost Proposal, and whenever Contractor is entitled to submit a Cost Proposal and elects to do so, Contractor shall prepare and submit to City for consideration a Cost Proposal using a form acceptable to the City. All Cost Proposals must contain a complete breakdown of costs of credits, deducts and extras; itemizing materials, labor, taxes, overhead and profit. All Subcontractor Work shall be so indicated. Individual entries on the Cost Proposal form shall be determined as provided in paragraphs 1.4 and 1.5 of this Section 01250. After receipt of a Cost Proposal with a detailed breakdown, City will act promptly thereon.

1. If City accepts a Cost Proposal, City will prepare Change Order for Contractor and City signatures.

2. If Cost Proposal is not acceptable to City because it does not agree with cost and/or time included in Cost Proposal, City will submit in a response what it believes to be a reasonable cost and/or adjustment, if any. Except as otherwise provided in this Section 01250, Contractor shall have seven Days in which to respond to City with a revised Cost Proposal.

3. When necessity to proceed with a change does not allow the City sufficient time to conduct a proper check of a Cost Proposal (or revised Cost Proposal), City may order Contractor to proceed on basis to be determined at earliest practical date. In this event, value of change, with corresponding equitable adjustment to Contract, shall not be more than increase or less than decrease proposed.

B. Request for Information ("RFI"): Whenever Contractor requires information regarding the Project or Contract Documents, or receives a request for information from a Subcontractor, Contractor may prepare and deliver an RFI to City. Contractor shall use an RFI form acceptable to the City. Contractor must submit time critical RFIs at least 30 Days before scheduled start date of the affected Work activity. Contractor shall reference each RFI to an activity of Progress Schedule and shall note time criticality of the RFI, indicating time within which a response is required. Contractor's failure to reference RFI to an activity on the Progress Schedule and note time criticality on the RFI shall constitute Contractor's waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI.

1. City will respond to the RFI with a written response to Contractor. Contractor shall distribute response to all appropriate Subcontractors.

2. If Contractor is satisfied with the response and does not request change in Contract Sum or Contract Time, then the response shall be executed without a change.

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3. If Contractor believes the response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter "A" indicating if it is a follow-up RFI) to City clarifying original RFI. Additionally, City may return RFI requesting additional information should original RFI be inadequate in describing condition.

4. If Contractor believes that the response results in change in Contract Sum or Contract Time, Contractor shall notify City in writing within seven Days after receiving the response. If City disagrees with Contractor, then Contractor may give notice of intent to submit a Claim as described in Article 12 of Document 00700 (General Conditions), and submit its Claim within 30 Days of receiving the City's decision. If City agrees with Contractor, then Contractor must submit a Cost Proposal within 14 Days of receiving the City's decision. Contractor's failure to deliver either the foregoing notice and Claim or Cost Proposal by the respective deadlines stated in the foregoing sentences shall result in waiver of the right to file a Cost Proposal or Claim.

C. Supplemental Instruction: City may issue Supplemental Instruction to Contractor.

1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Time, then Supplemental Instruction shall be executed without a Change Order.

2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Time, then Contractor must submit a Cost Proposal to City within 14 Days of receiving the Supplemental Instruction.

D. Construction Change Directives ("CCD"): If at any time City believes in good faith that a timely Change Order will not be agreed upon using the foregoing procedures, City may issue a CCD with its recommended cost and/or time adjustment. Upon receipt of CCD, Contractor shall promptly proceed with the change of Work involved and concurrently respond to City's CCD within 10 Days.

1. Contractor's response must be any one of following:

a. Return CCD signed, thereby accepting City's response, time and cost.
b. Submit a (revised if applicable) Cost Proposal with supporting documentation (if applicable, reference original Cost Proposal number followed by letter A, B, etc. for each revision), if City so requests.
c. Give notice of intent to submit a Claim as described in Article 12 of Document 00700, General Conditions, and submit its Claim with 30 Days of receiving the CCD.

2. If the CCD provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
b. Unit prices stated in the Contract Documents or subsequently agreed upon.
c. Cost to be determined in a manner agreed.

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3. CCD signed by Contractor indicates the agreement of Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

4. If Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by City on the basis of reasonable expenditures and savings of those performing the Work attributable to the change including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. If the parties still do not agree on the price for a CCD, Contractor may file a Claim per Article 12 of Document 00700, General Conditions. Contractor shall keep and present, in such form as City may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this paragraph shall be limited to those provided in paragraphs 1.4 and 1.5 of this Section 01250.

5. Pending final determination of cost to City, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by Contractor to City for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by City. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

E. City Requested RFP: Contractor shall furnish a Cost Proposal within 14 Days of receiving the City's RFP. Upon approval of RFP, City will issue a Change Order directing Contractor to proceed with extra Work. If the parties do not agree on the price for an RFP, City may either issue a CCD or decide the issue per Article 12 of Document 00700, General Conditions. Contractor shall perform the changed Work notwithstanding any claims or disagreements of any nature.

F. Differing Site Conditions: Contractor shall submit Notices of Differing Site Conditions to resolve problems regarding differing underground Site conditions encountered in the execution of the Work pursuant to paragraph 13.4 of Document 00700, General Conditions, which shall govern. If City determines that a change in Contract Sum or Contract Time is justified, City will issue RFP or CCD.

G. Hazardous Waste Conditions: Contractor shall submit Notices of Hazardous Waste Conditions to resolve problems regarding hazardous materials encountered in the execution of the Work pursuant to paragraph 13.5 of Document 00700, General Conditions, which shall govern. If City determines that a change in Contract Sum or Contract Time is justified, City will issue RFP or CCD.

H. All Changes:

1. Documentation of Change in Contract Sum and Contract Time:

a. Contractor shall maintain detailed records of Work performed on a time-and-material basis.
b. Contractor shall document each proposal for a change in cost or time with sufficient data to allow evaluation of the proposal.

c. Contractor shall, on request, provide additional data to support computations for:
   1) Quantities of products, materials, labor and equipment.
   2) Taxes, insurance, and bonds.
   3) Overhead and profit.
   4) Justification for any change in Contract Time and new Progress Schedule showing revision due, if any.
   5) Credit for deletions from Contract, similarly documented.

d. Contractor shall support each claim for additional costs, and for Work performed on a cost-and-percentage basis, with additional information including:
   1) Credit for deletions from Contract, similarly documented.
   2) Origin and date of claim.
   3) Dates and times Work was performed and by whom.
   4) Time records and wage rates paid.
   5) Invoices and receipts for products, materials, equipment and subcontracts, similarly documented.

I. Correlation of Other Items:

1. Contractor shall revise Schedule of Values and Application for Payment forms to record each authorized Change Order or CCD as a separate line item and adjust the Contract Sum as shown thereon prior to the next monthly pay period.

2. Contractor shall revise the Progress Schedules prior to the next monthly pay period.

3. Contractor shall enter changes in Project Record Documents prior to the next monthly pay period.

J. Responses: For all responses for which the Contract Documents, including without limitation this Section 1250, do not provide a specific time period, recipients shall respond within a reasonable time.

1.4 COST DETERMINATION

A. Total cost of extra Work or of Work omitted shall be the sum of labor costs, material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra Work, whether calculating Cost Proposals, Change Orders or CCDs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. Contractor may recover no other costs arising out of or connected with the performance of extra Work, of any nature. No special, incidental or consequential damages may be claimed or recovered against City, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

B. Overhead and Profit: (Overhead shall be as defined in paragraph 1.8 of this Section 01250)

1. Overhead and profit on labor for extra Work shall be 15 percent (15%).

2. Overhead and profit on materials for extra Work shall be 15 percent (15%).

3. Overhead and profit on equipment rental for extra Work shall be 10 percent (10%).

4. When extra Work is performed by a Subcontractor, Contractor shall receive a 5 percent (5%) markup on Subcontractor's total costs of extra Work. Subcontractor's overhead and profit on its Work shall not exceed 10 percent (10%).

5. When extra Work is performed by a lower tier Subcontractor, Contractor shall receive a maximum total markup of 5 percent (5%) and the Subcontractor shall receive a maximum total markup of five percent (5%) on the lower tier Subcontractor's total costs of extra Work. The total sum of overhead, profit, and markup for all lower tier Subcontractors shall not exceed 10 percent (10%).

6. Notwithstanding the foregoing, in no case shall the total overhead, profit, and markup on any extra Work exceed 20 percent (20%) of the direct cost, notwithstanding the actual number of contract tiers.

7. On proposals covering both increases and decreases in Contract Sum, overhead, profit, and markup shall be allowed on the net increase only as determined in paragraph 1.4 above. When the net difference is a deletion, no percentage for overhead, profit, and markup shall be allowed, but rather a deduction shall issue.

8. The markup shall include profit, small tools, cleanup, engineering, supervision, warranties, cost of preparing the cost proposal, jobsite overhead, and home office overhead. No markup will be allowed on taxes, insurance, and bonds.

C. Taxes, Bonds, and Insurance:

1. All State sales and use taxes, Santa Clara County and applicable City sales taxes, shall be included.

2. Federal and Excise tax shall not be included.

3. The Contractor's Bond and Insurance costs on Subcontractors shall be shown separately and applied to the work by Subcontractors and is not included in the 5 percent (5%) markup limitations, nor included in the 15 percent (15%) limitation for the Contractor. The Contractor must provide written support documentation to justify any bond and insurance costs, but the sum of the bond and insurance costs shall not exceed 1.75 percent (1.75%) for the Contractor. Bond and Insurance costs for Subcontractor and any lower tier Subcontractor are included in the limitations for overhead, profit, and markup.

D. Owner-Operated Equipment: When owner-operated equipment is used to perform extra Work, Contractor will be paid for operator as follows:

1. Payment for equipment will be made in accordance with paragraph 1.5C of this Section 01250.

2. Payment for cost of labor will be made at no more than rates of such labor established by collective bargaining agreements for type of worker and location of Work, whether or not owner-operator is actually covered by such an agreement.

E. Accord and Satisfaction: Every Change Order and accepted CCD shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim. Contractor may elect to reserve its rights to disputed claims arising from or relating to the changed Work at the time it signs a Change Order or approves a CCD, but must do so expressly in a writing delivered concurrently with the executed Change Order or approved CCD, and must also submit a Claim for the reserved disputed items pursuant to Article 12 of Document 00700 no later than 30 days of Contractor's first written notice of its intent to reserve rights.

1.5 COST BREAKDOWN

A. Labor: Contractor will be paid cost of labor for workers (including forepersons when authorized by City) used in actual and direct performance of extra Work. Labor rate, whether employer is Contractor, Subcontractor or other forces, will be sum of following:

1. Actual Wages: Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation, and similar purposes.

2. Labor surcharge: Payments imposed by local, county, state, and federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined in paragraph 1.5A.1 of this Section 01250, such as taxes and worker's compensation insurance. Such labor surcharge shall not exceed that set forth in California Department of Transportation official labor surcharges schedule which is in effect on date upon which extra Work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein.

B. Material: Only materials furnished by Contractor and necessarily used in performance of extra Work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, Subcontractor or other forces) from supplier thereof, except as the following are applicable:

1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to City notwithstanding fact that such discount may not have been taken.

2. For materials salvaged upon completion of extra Work, salvage value of materials shall be deducted from cost, less discounts, of materials.

3. If cost of a material is, in opinion of City, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in paragraph 1.5B.1 of this Section 01250.

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C. Equipment Rental: For Contractor- or Subcontractor-owned equipment, payment will be made at rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra Work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. If there is no applicable rate for an item of equipment, then payment shall be made for Contractor- or Subcontractor-owned equipment at rental rate listed in the most recent edition of the Association of Equipment Distributors (AED) book. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra Work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type, as determined by City. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of $200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra Work being performed or on standby as approved by City. The following shall be used in computing rental time of equipment:
   a. When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.
   b. When daily rates are listed, less than four hours of operation shall be considered to be ½ day of operation.

2. For equipment that must be brought to Site to be used exclusively on extra Work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
   a. City will pay for costs of loading and unloading equipment.
   b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
   c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
   d. City will not make any payment for transporting and loading and unloading equipment if equipment is used on Work in any other way than upon extra Work.

3. Rental period may begin at time equipment is unloaded at Site of extra Work and terminate at end of the performance of the extra Work or Day on which City directs Contractor to discontinue use of equipment, whichever first occurs. Excluding Saturdays, Sundays, City's furlough days, and City's legal holidays, unless equipment is used to perform extra Work on such days, rental time to be paid per day shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment that is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

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D. Work Performed by Special Forces or Other Special Services: When City and Contractor, by agreement, determine that special service or item of extra Work cannot be performed by forces of Contractor or those of any Subcontractors, service or extra Work item may be performed by specialist. Invoices for service or item of extra Work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances wherein Contractor is required to perform extra Work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra Work performed in such facility may, by agreement, be accepted as a specialist billing. City must be notified in advance of all off-Site Work. In lieu of overhead and profit provided in paragraph 1.4B of this Section 01250, 15 percent (15%) will be added to specialist invoice price, after deduction of any cash or trade discount offered or available, whether or not such discount may have been taken.

1.6 FORCE-ACCOUNT WORK

A. If it is impracticable because of nature of Work, or for any other reason, to fix an increase or decrease in price definitely in advance, the Contractor may be directed to proceed at a not-to-exceed (NTE) maximum price which shall not under any circumstances be exceeded. Subject to such limitation, such extra Work shall be paid for at actual necessary cost for Force-Account Work or at the negotiated cost, as determined by City. The cost for Force-Account Work shall be determined pursuant to paragraphs 1.4 and 1.5 of this Section 01250.

B. Force-Account Work shall be used when it is not possible or practical to price out the changed Work prior to the start of that Work. In these cases, Force-Account Work will be utilized during the pricing and negotiation phase of the change. Once negotiations have been concluded and a bilateral agreement has been reached, the tracking of the Work under Force-Account is no longer necessary. Force-Account Work shall also be used when negotiations between City and Contractor have broken apart and a bilateral agreement on the value of the changed Work cannot be reached. City may approve other uses of Force-Account Work.

C. Whenever any Force-Account Work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to City each Day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account Work on preceding Day, by using a Cost Proposal form acceptable to the City. No claim for compensation for Force-Account Work will be allowed unless a report has been made.

D. Whenever Force-Account Work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to City when 75 percent (75%) of the NTE amount has been expended.

E. Force-Account Work shall be paid as extra Work under this Section 01250. Methods of determining payment for Work and materials provided in this paragraph 1.6 shall not apply to performance of Work or furnishings of material that, in judgment of City, may properly be classified under items for which prices are otherwise established in Contract Documents.

1.7 CITY-FURNISHED MATERIALS

City reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.8 OVERHEAD DEFINED

A. The following non-exclusive list constitutes charges that are deemed included in overhead for all Contract Modifications, including Force-Account Work or CCD Work, whether incurred by Contractor, Subcontractors, or suppliers, and Contractor shall not invoice or receive payment for these costs separately:

1. Cartage and Vetical transportation (Elevators, Vertical Resource Lifts, etc.)

2. Cleanup as a result of change order work

3. Computer services
   a. De-bugging
   b. Patching
   c. Programming
   d. Protecting (i.e., anti-virus and firewall applications)

4. Consumables and attrition

5. Drawings: field drawings, Shop Drawings, sketches, etc., including submissions of drawings

6. Employee vehicle and gas expenses

7. Estimating

8. Final cleanup

9. General administration and preparation of cost proposals, schedule analysis, change orders and other supporting documentation as necessary

10. General Superintendence

11. Handling and disposal fees

12. Home office expenses

13. Janitorial services

14. Parking expenses of any field labor, foreman, office personnel, and superintendents

15. Procurement and use of vehicles and fuel used coincidentally in base bid Work.

16. Protection of work

17. Reproduction services

18. Routine field inspection of Work proposed

19. Salaries of project engineer, superintendent, timekeeper, storekeeper, administrative assistants, and secretaries

20. Small tools and equipment valued at less than $200

21. Insurance and Bond Premiums/Costs

22. Surveying

23. Temporary on-Site facilities:
    a. Electrical: Power, lighting
    b. Fencing, etc.
    c. Offices
    d. Platforms
    e. Plumbing
    f. Telephones, etc.
    g. Water

24. Testing

25. Traveling expenses

26. Trucking within 50 miles of the Project Site

27. Other incidental work

1.9 RECORDS AND CERTIFICATION

A. Force-Account (cost reimbursement) charges shall be recorded daily and summarized in a form acceptable to the City. Contractor or authorized representative shall complete and sign the form each day. Contractor shall also provide with the form: the names and classifications of workers and hours worked by each; an itemization of all materials used; a list by size type and identification number of equipment and hours operated; and an indication of all Work performed by specialists.

B. No payment for Force-Account Work shall be made until Contractor submits original invoices substantiating materials and specialists charges.

C. City shall have the right to audit all records in possession of Contractor, Subcontractors, and lower tier Subcontractors relating to activities covered by Contractor's claims for modification of Contract, including Force-Account Work and CCD Work, as set forth in Document 00700, General Conditions.

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D. Further, City will have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, the Contract. If Contractor is a joint venture, right of City shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member. This right shall be specifically enforceable, and any failure of Contractor to voluntarily comply shall be deemed an irrevocable waiver and release of all claims then pending that were or could have been subject to the Article 12 of Document 00700.

END OF SECTION

SECTION 01315

PROJECT MEETINGS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes descriptions of the required Project meetings for the Work. These meetings include:

1.2 Preconstruction Conference.
1.3 Schedule Review Meetings
1.4 Weekly Progress Meetings.
1.5 Progress Schedule and Billing Meetings.
1.6 Special Meetings.
1.7 Safety Meetings.
1.8 Utility Coordination Meetings.

1.2 PRECONSTRUCTION CONFERENCE

A. City may call for and administer the Preconstruction Conference at a time and place to be announced (usually the week prior to start of Work).

B. Contractor, all major Subcontractors, and major suppliers shall attend the Preconstruction Conference.

C. Agenda may include, but not be limited to, the following items:

1. Schedules

2. Personnel and vehicle permit procedures

3. Use of premises

4. Location of the Contractor's on-Site facilities

5. Security

6. Housekeeping

7. Submittal and RFI procedures

8. Inspection and testing procedures

9. Utility shutdown procedures

10. Control and reference point survey procedures

11. Injury and Illness Prevention Program

12. Contractor's Initial Schedule, showing all significant Work tasks, including the Critical Path

13 Contractor's Schedule of Values

14. Contractor's Schedule of Submittals

D. If a Preconstruction Conference is held, the City may produce minutes. If minutes are produced, the City may distribute copies of the minutes to attendees. Attendees shall have 7 Days to submit comments or additions to the minutes. Minutes, if produced by the City, shall constitute final memorialization of results of the Preconstruction Conference.

1.3 SCHEDULE REVIEW MEETINGS

A. If called by the City, Contractor shall meet with City prior to Start Date of the Work under Contract Documents and conduct initial review of Contractor's draft Shop Drawing and Sample Submittal Schedule, draft Schedule of Values, and Initial Schedule.

B. Authorized representative in Contractor's organization, designated in writing, who will be responsible for working and coordinating with City relative to preparation and maintenance of Progress Schedule shall attend the initial schedule review meeting .

C. Contractor shall meet with City to review the Progress Schedule and construction schedule submittals.

1. Contractor shall have its manager, superintendent, scheduler, and key Subcontractor representatives, as required by City, in attendance. The meeting will take place over a continuous one-Day period.

2. City's review will be limited to submittal's conformance to Contract Documents requirements including, but not limited to, coordination requirements. City's review may also include:
   a. Clarifications of Contract Requirements.
   b. Directions to include activities and information missing from submittal.
   c. Requests to Contractor to clarify its schedule.

3. Within 5 Days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by City at the meeting.

D. City will administer Schedule Review Meetings and shall distribute minutes of Schedule Review Meetings to attendees. Attendees shall have 5 Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of Schedule Review Meetings.

E. City may combine the Schedule Review Meeting with the Preconstruction Conference.

1.4 WEEKLY PROGRESS MEETINGS

A. City has the option to schedule and administer weekly progress meetings throughout duration of Work. Progress meetings will be held weekly unless otherwise directed by City.

1. Meetings shall be held at Contractor's on-Site office unless otherwise directed by City.

2. City or Contractor, if directed by City, will prepare an agenda and meeting minutes.

3. City or Contractor, if directed by City, will distribute minutes of the meeting to all attendees, who will distribute to those affected by decisions made at meeting. Attendees can either submit comments or additions to minutes prior to the next progress meeting, or may attend the next progress meeting and submit comments or additions there. Minutes will constitute final memorialization of results of meeting.

B. Progress meetings shall be attended by Contractor's job superintendent, major Subcontractors and suppliers, City, and others as appropriate to agenda topics for each meeting.

C. Agenda may contain, but is not limited to, the following items, as appropriate:

1. Review, revise as necessary, and approve previous meeting minutes

2. Review of Work progress since last meeting

3. Status of Construction Work Schedule, delivery schedules, adjustments

4. Submittal, RFI, and Change Order status

5. Review of the Contractor's safety program activities and results, including report on all serious injury and/or damage accidents

6. Other items affecting progress of Work

1.5 PROGRESS SCHEDULE AND BILLING MEETINGS

A. A meeting will be held on approximately the 25th of each month to review the schedule update submittal and progress payment application.

1. At this meeting, at a minimum, the following items will be reviewed:
   a. Percent complete of each activity;
   b. Time impact evaluations for Change Orders and Time Extension Request;
   c. Actual and anticipated activity sequence changes;
   d. Actual and anticipated duration changes; and
   e. Actual and anticipated Contractor delays.
   f. Status of Project Record Drawings, see Section 01780, Project Record Documents.

2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, Contractor's General Superintendent and Scheduler shall attend these meetings.

3. Contractor shall plan on the meeting taking no less than four hours.

1.6 SPECIAL MEETINGS

A. Any party may call special meetings by notifying all desired participants and City 5 Days in advance, giving reason for meeting. Special meetings may be held without advance notice in emergency situations.

B. At any time during the progress of Work, City shall have authority to require Contractor attend meeting of any or all of the Subcontractors engaged in Work or in other work, and notice of such meeting shall be duly observed and complied with by Contractor.

C. Contractor shall schedule and conduct coordination meetings as necessary to discharge coordination responsibilities in Document 00700, General Conditions. Contractor shall give City 5 Days written notice of coordination meetings. Contractor shall maintain minutes of coordination meetings. Attendees shall have 7 Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of coordination meetings.

1.7 SAFETY MEETINGS

A. Conduct monthly Contractor Safety Committee meetings.

B. Conduct weekly toolbox safety talks.

1.8 UTILITY COORDINATION MEETINGS

A. Contractor shall plan, coordinate and schedule meetings with all utility companies and City forces installing utilities. The City's Construction Manager and the Engineer shall be invited to attend these meetings and the Contractor shall be responsible for presiding at these meetings, as well as preparing and distributing meeting minutes within 3 work days of each meeting. Additional requirements regarding the coordination and scheduling of utility work by others is included, but not limited to, Section 01100, Summary of Work, Document 00700, General Conditions, and the Contract Drawings.

END OF SECTION

SECTION 01320

PROGRESS SCHEDULES AND REPORTS

PART 1 GENERAL

1.1 SUMMARY

A. Perform scheduling of Work under this Contract in accordance with requirements of this Section 01320.

1. Development of schedule, cost, and resource loading of the Progress Schedule, monthly payment requests, and project status reporting requirements of the Contract Documents shall employ scheduling as required in this Section 01320.

2. The Schedule shall be cost-loaded based on Schedule of Values as approved by City.

3. Submit schedules and reports as specified in 00700, General Conditions.

B. Upon Award of Contract, immediately commence development of Initial Schedule to ensure compliance with schedule submittal requirements.

C. Contractor's obligations under this Section 01320 are hereby deemed material obligations justifying City's remedies for default if Contractor fails to perform. Nothing in this paragraph 1.1.C of this Section 01320 or the lack of an express statement that any other Contract Documents provision is or is not material shall be considered in determining whether any such other provision is material.

D. Employ competent scheduling personnel or a schedule consultant with experience performing scheduling required herein on two prior similar projects.

1.2 GENERAL

A. Progress Schedule shall be based on and incorporate milestone and completion dates specified in Contract Documents.

B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in Document 00520, Agreement, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by City. A Change Order shall formalize any such agreement.

1. City is not required to accept an earlier (advanced) schedule (i.e., one that shows early completion date(s) for the Contract Time).

2. Contractor is not entitled to extra compensation in event agreement is reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in earlier (advanced) schedule but within the Contract Time.

3. A schedule showing the Work completed in less than the Contract Time, which has been accepted by City, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the Work and Contract Substantial Completion. Project Float is a resource available to both City and Contractor.

4. Float Ownership: Neither City nor Contractor owns float. The Project owns the float. As such, liability for delay of any Substantial Completion or Final Completion date rests with the party whose actions, last in time, actually cause delay to a Substantial Completion or Final Completion date.
   a. For example, in the event of unexcused delay by Party A and Party B, and if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion date.
   b. Under this scenario, Party A would not be responsible for the time since it did not consume all of the float and additional float remained; therefore, the Substantial Completion Date was unaffected.

C. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

D. Failure of Progress Schedule to include any element of the Work or any inaccuracy in Progress Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. City's acceptance of Schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests, and shall not, in any manner, impose a duty of care upon City, or act to relieve Contractor of its responsibility for means and methods of construction.

E. Transmit each item under form approved by City or following Section 01330.

1. Identify Project with the City Contract number, and name of Contractor.

2. Provide space for Contractor's approval stamp and City's review stamps.

3. Submittals received from sources other than Contractor will be returned to Contractor without City's review.

1.3 INITIAL AND ORIGINAL PROGRESS SCHEDULE

A. Initial Schedule submitted in accordance with paragraph 11.1.B of Document 00700, General Conditions, shall serve as Contractor's schedule for up to 30 Days after the Notice to Proceed.

B. Initial Schedule must indicate detailed plan for the Work to be completed in first 30 Days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Show Work beyond 30 Days in summary form.

C. Contractor shall submit its Original Schedule for review no later than first progress payment. Original Schedule and all updates shall comply with all standards herein.

D. All Schedules shall be time-scaled.

E. All Schedules shall be cost- and resource-loaded. Accepted cost- and resource-loaded Schedule will be used as basis for monthly progress payments. Use of Initial Schedule for progress payments shall not exceed 30 Days.

F. Except as otherwise expressly provided in this Section 01320, Contractor shall meet with City to review and discuss each Schedule (i.e., Initial, Original, and monthly updates) within seven Days after each Schedule has been submitted to City.

1. City's review and comment on any Schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).

2. Contractor shall make corrections to Schedule necessary to comply with Contract requirements and shall adjust Schedule to incorporate any missing information requested by City. Resubmit Initial Schedule if requested by City.

G. If Contractor is of the opinion that any of the Work included on its Schedule has been impacted, submit to City a written Time Impact Evaluation ("TIE") in accordance with paragraph 1.8 of this Section 01320. The TIE shall be based on the most current update of the Initial Schedule.

1.4 SCHEDULE FORMAT AND LEVEL OF DETAIL

A. Each Schedule (Initial, Original, and updates) shall indicate all separate fabrication, procurement and field construction activities required for completion of the Work, including but not limited to the following:

1. All Contractor, Subcontractor, and assigned Contractor work shall be shown in a logical work sequence that demonstrates a coordinated plan of work for all contractors. The intent is to provide a common basis of acceptance, understanding, and communication, as well as interface with other contractors.

2. Activities related to the delivery of Contractor and City-furnished equipment to be Contractor-installed per Contract shall be shown.

3. All activities shall be identified through codes or other identification to indicate the building (i.e., buildings, Site work) and Contractor/Subcontractor responsibility to which they pertain.

4. Break up the Work schedule into activities of durations of approximately 21 Days or less each, except for non-field construction activities or as otherwise deemed acceptable by City.

5. Show the critical path in red. For each activity, show early start, late start, early finish, late finish, durations measured in Days, float, resources, predecessor and successor activities, planned workday/week for the activity, man power loading, and scheduled/actual progress payments.

B. Seasonal weather conditions (which do not constitute a delay as defined herein) shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures or presence of high moisture for the completion of the Work within the allotted Contract Time.

C. Failure by Contractor to include any element of Work required for performance of the Work on the detailed construction schedule shall not excuse Contractor from completing all Work required within the Contract Time.

D. A two-week “look ahead,” detailed daily bar chart schedule shall be updated and issued weekly.

E. Utilize computer-scheduling software, such as Microsoft Project software or approved equivalent, for all scheduling including schedule updates.

1.5 MONTHLY SCHEDULE UPDATE SUBMITTALS

A. Following acceptance of Contractor’s Initial Schedule, monitor progress of Work and adjust Schedule each month to reflect actual progress and any anticipated changes to planned activities.

1. Each Schedule update submitted shall be complete, including all information requested for the Initial Schedule and Original Schedule submittal.

2. Each update shall continue to show all Work activities including those already completed. These completed activities shall accurately reflect “as built” information by indicating when activities were actually started and completed, and Contractor warrants the accuracy of as-built information as shown.

B. A meeting will be held on approximately the 25th of each month to review the Schedule update submittal and progress payment application.

1. At this meeting, at a minimum, the following items will be reviewed: Percent complete of each activity; TIEs for Change Orders and Time Extension Request; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated Contractor delays.

2. These meetings are considered a critical component of overall monthly schedule update submittal; have appropriate personnel attend. At a minimum, Contractor’s General Superintendent and Scheduler shall attend these meetings.

3. Plan on the meeting taking no less than four hours.

C. Within five Days after monthly Schedule update meeting, submit the updated Schedule.

D. City will either accept or reject monthly schedule update submittal.

1. If accepted, percent complete shown in monthly update will be basis for Application for Payment by Contractor. The schedule update shall be submitted as part of Contractor’s Application for Payment.

2. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

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E. Updating, changing or revising of any report, curve, schedule or narrative submitted to City by Contractor under this Contract, nor City's review or acceptance of any such report, curve, schedule or narrative shall not have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, Contractor's obligations under this Contract.

1.6 SCHEDULE REVISIONS

A. Updating the Schedule (Initial and Original) to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, however, revisions to activity durations and sequences are expected on a monthly basis.

B. To reflect revisions to the Schedule, provide City with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of Work, provide a schedule diagram that compares the original sequence to the revised sequence of Work. Provide the written narrative and schedule diagram for revisions three Days in advance of the monthly schedule update meeting. Clearly show and discuss any changes in the critical path.

C. Schedule revisions shall not be incorporated into any schedule update until City has reviewed the revisions. City may request further information and justification for schedule revisions and, within three Days, provide City with a complete written narrative response to City's request.

D. If City does not accept Contractor's revision, and Contractor disagrees with City's position, Contractor has seven Days from receipt of City's letter rejecting the revision, to provide a written narrative providing full justification and explanation for the revision. Contractor's failure to respond in writing within seven Days of City's written rejection of a schedule revision shall be contractually interpreted as acceptance of City's position, and Contractor waives its rights to subsequently dispute or file a claim regarding City's position. If Contractor files a timely response as provided in this paragraph, and the parties are still unable to agree, Contractor's sole right shall be to file a claim as provided in Document 00700, General Conditions, Article 12.

E. At City's discretion, Contractor can be required to provide Subcontractor certifications of performance regarding proposed schedule revisions affecting said Subcontractors.

1.7 RECOVERY SCHEDULE

A. If a Schedule update shows a substantial completion date 21 Days beyond any Contract Substantial Completion date, or individual Milestone completion dates, submit to City within seven Days the proposed revisions to recover the lost time. As part of this submittal, provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, provide a schedule diagram comparing the original sequence to the revised sequence of Work. If City requests, show the intended critical path; secure appropriate Subcontractor and supplier consent to the recovery Schedule; submit a narrative explaining trade flow and construction flow changes, duration changes, added/deleted activities, critical path changes and identify all near critical paths and man hour loading assumptions for major Subcontractors.

B. The revisions shall not be incorporated into any Schedule update until City has reviewed the revisions.

C. If City does not accept Contractor's revisions, City and Contractor shall follow the procedures in paragraphs 1.6C, 1.6D, and 1.6E of this Section 01320.

D. At City's discretion, Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.

1.8 TIME IMPACT EVALUATION FOR CHANGE ORDERS AND OTHER DELAYS

A. When Contractor is directed to proceed with changed work, prepare and submit, within 14 Days from the direction to proceed, a TIE that includes both a written narrative and a schedule diagram depicting how the changed work affects other schedule activities. The schedule diagram shall show how Contractor proposes to incorporate the changed work in the schedule, and how it impacts the current Schedule update critical path or otherwise. Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram shall be tied to the main sequence of scheduled activities to enable City to evaluate the impact of changed work to the scheduled critical path.

B. Comply with the requirements of paragraph 1.8A of this Section 01320 for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.

C. Contractor is responsible for all costs associated with the preparation of TIEs, and the process of incorporating TIEs into the current schedule update. Provide City with four copies of each TIE.

D. Once agreement has been reached on a TIE, the Contract Time will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Time may be extended in an amount City allows, and Contractor may submit a claim for additional time claimed by Contractor as provided in Document 00700, General Conditions.

1.9 TIME EXTENSIONS

A. Contractor is responsible for requesting time extensions for time impacts that, in the opinion of Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accordance with Document 00700, General Conditions.

B. Where an event for which City is responsible impacts the projected Substantial Completion date, provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. Also include a detailed cost breakdown of the labor, equipment, and material Contractor would expend to mitigate City-caused time impact. Submit mitigation plan to City within 14 Days from the date of discovery of said impact. Contractor is responsible for the cost to prepare the mitigation plan.

C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.

D. No time will be granted under the Contract Documents for cumulative effect of changes.

E. City will not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.

F. Failure of Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.

G. Notwithstanding any other provision of this Section 01320, if Contractor does not submit a TIE within the required 14 Days for any issue, Contractor hereby agrees that Contractor does not require a time extension for that issue.

1.10 PROJECT STATUS REPORTING

A. In addition to submittal requirements for scheduling identified in this Section 01320, provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each Schedule as specified herein. Status reporting shall be in form specified in this paragraph 1.10 below.

B. Prepare monthly written narrative reports of status of Project for submission to City. Written status reports shall include:

1. Status of major Project components (percent complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.

2. Progress made on critical activities indicated on each Schedule, including inspections.

3. Explanations for any lack of work on critical path activities planned to be performed during last month.

4. Explanations for any schedule changes, including changes to logic or to activity durations.

5. List of critical activities scheduled to be performed during the next month.

6. Status of major material and equipment procurement.

7. Any delays encountered during reporting period.

8. Provide printed report indicating actual versus planned resource (labor, materials and equipment) loading for each trade and each activity. This report shall be provided on weekly and monthly basis.
   a. Actual resource shall be accumulated in field by Contractor, and shall be as noted on Contractor's daily reports. These reports will be basis for information provided in monthly and weekly printed reports.
   b. Explain all variances and mitigation measures.

9. Contractor may include any other information pertinent to status of Project. Include additional status information requested by City at no additional cost.

10. Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

C. At the close of each workday, Contractor shall provide City with report of Contractor and its Subcontractors' work activities for that day, including trades, equipment, work activities worked on, staff levels, and equipment deliveries.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Submittals are intended to assist the Contractor in the performance of the Work. A review of a submittal shall not transfer any responsibility for complying with the requirements of the Contract Documents from the Contractor to the City.

B. Section includes description of general requirements for Submittals for the Work:

1.2 Procedures
1.3 Schedule of Shop Drawing and Sample Submittals
1.4 Safety Program
1.5 Progress Schedule
1.6 Product Data
1.7 Shop Drawings
1.8 Samples
1.9 Coordination Drawings
1.10 Quality Assurance/Control Submittals
  a. Test Reports
  b. Certificates
  c. Manufacturers' Instructions
  d. Material Safety Data Sheets
1.11 Installation, Operations, and Maintenance Manuals
1.12 Computer Programs
1.13 Project Record Documents
1.14 Delay of Submittals
1.15 Optional Review Meeting

1.2 PROCEDURES

A. Submit at Contractor's expense, in duplicate sets, the following items ("Submittals") required by the Contract Documents:

1. Schedule of Shop Drawing and Sample Submittals

2. Safety Plans

3. Progress Schedule

4. Product Data; Shop Drawings

5. Samples

6. Coordination Drawings

7. Quality Assurance Control Data

8. Machine Inventory Sheets

9. Installation, Operation, and Maintenance Manuals

10. Computer Programs

11. Project Record Documents

B. Submit these Submittals to City for review and approval in accordance with accepted Schedule of Shop Drawings and Samples Submittals. If no such schedule is agreed upon, then all Shop Drawing, Samples, and product data Submittals shall be submitted within 21 Days after receipt of Notice of Award from City.

C. Transmit each item with the appropriate Submittal transmittal form (attached to this Section 01330 as Exhibits A and B) or a form approved by the City. Identify Project, Contractor, Subcontractor, major supplier, pertinent Drawing sheet and detail number, and Specification Section number as appropriate. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly to show those portions of the data that are applicable to this Project. Inapplicable portions shall be marked out. Submittals shall be submitted based on each Specification Section. Submittals containing information about more than one Specification Section will be returned for resubmittal. Submittals shall include all information requested by each Specification Section. (No partial Submittals.) Incomplete Submittals will not be reviewed by the City and will be returned to the Contractor.

D. The data shown on the Submittals shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show City the materials and equipment Contractor proposes to provide and to enable City to review the information for the limited purposes specified in this Section 01330. Submittals shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as City may require to enable City to review the Submittal. The quantity of each Submittal to be submitted will be as required by individual Specification Sections or this Section 01330.

E. At the time of each submission, give City specific written notice of all variations, if any, that the submitted Submittal may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication attached to the Submittal transmittal form. In addition, cause a specific notation to be made on each Submittal submitted to City for review and approval of each such variation. If City accepts deviation, City will note its acceptance on the returned Submittal transmittal form and, if necessary, issue appropriate Contract Modification.

F. Submittal coordination and verification is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to Subcontractors or suppliers. Before submitting each Submittal, review and coordinate each Submittal with other Submittals and with the requirements of the Work and the Contract Documents, and determine and verify:

1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;

2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and

3. All information relative to Contractor's sole responsibilities and of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

G. Contractor's submission to City of a Submittal shall constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above in this paragraph 1.2 of Section 01330, with respect to Contractor's review and approval of that Submittal.

H. Designation of work "by others," if shown in Submittals, shall mean that work will be responsibility of Contractor rather than Subcontractor or supplier who has prepared Submittals.

I. After review by City of each of Contractor's Submittals, one set of material will be returned to Contractor with actions defined in the following categories:

1. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with future Submittals and additional partial Submittals for portions of the Work not covered in this Submittal. Does not constitute approval or deletion of specified or required items not shown on the Submittal.

2. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as item 1 above, except that minor corrections as noted shall be made by Contractor.

3. REVISE AS NOTED AND RESUBMIT - Rejected because of major inconsistencies or errors that shall be resolved or corrected by Contractor prior to subsequent review by City.

4. REJECTED - RESUBMIT - Submitted material does not conform to Drawings and/or Specifications in major respect (i.e., wrong size, model, capacity, or material).

J. Make a complete and acceptable Submittal at least by second submission. City reserves the right to deduct monies from payments due Contractor to cover additional costs of review beyond the second submission as required by paragraph 1.2.T.1 of this Section 01330. Illegible Submittals will be rejected and returned to Contractor for resubmission. Contractor shall be in breach of the Contract if Contractor's first resubmittal, following a Submittal which City determines falls within categories 3 or 4 of paragraph 1.2.I. above, does not fall within categories 1 or 2 of paragraph 1.2.I. above.

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K. Favorable review will not constitute acceptance by City of any responsibility for the accuracy, coordination and completeness of the Submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to back-check comments, corrections, and modifications from City's review before fabrication. Contractor, Subcontractors, or suppliers may prepare Submittals, but Contractor shall ascertain that Submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. City's review will be only to assess if the items covered by the Submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as indicated by the Contract Documents. Favorable review of Submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by City, or any officer or employee thereof, and Contractor shall have no claim under Contract Documents on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that City has no objection to Contractor using, upon Contractor's own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

L. City's review will not extend the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

M. Submit complete initial Submittal for those items where required by individual Specification Sections. Complete Submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in Specification Sections, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial Submittal when complete Submittal is required, Submittal may be returned to Contractor without review.

N. Copy, conform, and distribute reviewed Submittals in sufficient numbers for Contractor's files, Subcontractors, and vendors.

O. After City's review of Submittal, revise as noted and resubmit as required. Identify changes made since previous Submittal.

1. Begin no fabrication or work that requires Submittals until return of Submittals not requiring resubmittal. Do not extrapolate from Submittals covering similar work.

2. Normally, Submittals will be processed and returned to Contractor within 21 Days of receipt.

P. Distribute copies of reviewed Submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

Q. All Submittals shall be number-identified by Contractor, prior to submission to City, in accordance with the following:

1. Number each Submittal according to the Specification Section covering the item(s) being submitted. If possible, all items associated with any Specification Section shall be submitted together. If not, each individual Submittal shall be identified by the Specification Section number followed by "-1, "-2", "-3", etc.

2. Affix the Submittal number under which each Submittal is made on every copy of each Shop Drawing, product data, sample, certification, etc.

3. Number Installation, Operation, and Maintenance Manuals with original root number of the approved Submittal for the item.

4. If the Submittal is a resubmittal (including without limitation after an initial Submittal is rejected, returned without review or marked 'Revise as Noted and Resubmit'), add the suffix designation "A" (i.e., a resubmittal of Submittal 1 would be numbered 1A). Subsequent resubmittals would be identified by the Submittal number and sequential letters (i.e., "B", "C", "D", etc.).

5. All Submittals shall include all information requested by each Specification Section. No partial Submittals will be accepted unless previously authorized by City. In the event a partial Submittal is authorized, each subsequent different Submittal (as opposed to resubmittal) is given a new number.

R. Submission Requirements:

1. Deliver Submittals to the City for review at least 30 Days before reviewed Submittals will be needed.

2. Initial Submittal of Installation, Operation, and Maintenance Manuals shall be submitted 45 Days after the date the Submittals that pertain to the applicable portion of the Installation, Operation, and Maintenance Manual are satisfactorily reviewed.

3. The following table lists the number of initial Submittals required from Contractor for each type of submission, to whom Contractor shall distribute the information, and City's distribution of reviewed submissions. If Contractor needs more copies of reviewed Submittals returned to it, then either submit additional copies or make copies from the returned transparency Submittal. Submittals requiring resubmission will require the same quantity and distribution as an initial Submittal.

	Contractor Initial Submittal		**City Submittal Review Return**	
SUBMITTAL	# of Original Transparencies	# of Copies/ Prints/ Samples	# of Original Transparencies	# of Copies/ Prints/ Samples
	City	City	Contractor	Contractor
Shop Drawings	2	7	1	1
Product Data	0	7	0	1
Samples	0	4	0	1
Materials Safety Data Sheets	0	5	0	1
Installation, Operation, and Maintenance Manuals	1	5	0	1
Other Documents	2	9	1	1

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4. Accompany Submittals with Submittal transmittal form, in duplicate, containing:
   a. Date, revision date, and Submittal log number.
   b. Project name and City's Contract number.
   c. Contractor's name, address, and job number.
   d. Specification Section number clearly identified.
   e. The quantity of Shop Drawings, Product Data, or Samples submitted.
   f. Notification of deviations from Contract Documents.
   g. Materials Safety Data Sheet (MSDS) for each item complying with OSHA's Hazard Communication Standard 29 CFR 1910.1200.
   h. Other pertinent data.

5. Submittal shall include:
   a. Date and revision dates.
   b. Revisions, if any, identified.
   c. Project Name and Contract number.
   d. The names of:
      1) Contractor, Subcontractor, Supplier, Manufacturer, and separate detailer, when pertinent.
   e. Identification of product material by location within the Project.
   f. Relation to adjacent structure or materials.
   g. Field dimensions, clearly identified as such.
   h. Specification Section number and applicable detail reference number on the Drawings.
   i. Applicable reference standards, such as ASTM, ANSI, FS, NEMA, SMACNA or ACI.
   j. A blank space, on each Drawing or data sheet, 5" x 4" for the City's stamp.
   k. Identification of deviations from Contract Documents.
   l. Contractor's stamp, initialed or signed, with language certifying the review of Submittals, verification of field measurements, construction criteria and technical standards in compliance with Contract Documents.

S. Resubmission requirements:

1. Shop Drawings:
   a. Revise initial Shop Drawings as required and resubmit as specified for initial Submittals.
   b. Indicate on Shop Drawings any changes that have been made other than those requested by City.

2. Product Data and Samples:
   a. Submit new Product Data and Samples as required for initial Submittals.

3. Installation, Operation, and Maintenance Manuals:
   a. Revise initial Installation, Operation, and Maintenance Manual(s) as required and resubmit as specified for initial Submittals.

T. Number of resubmissions:

1. One re-examination of Contractor's Submittals that have been returned for correction or replacement will be included in City's budget. Any additional re-examination of Contractor's Submittals will be considered additional scope services to be paid by Contractor to the City. Contractor shall pay City (or City may deduct from any progress or final payment), for engineering personnel, on an hourly basis at 2.5 times direct payroll expenses, and for consultant personnel time at 1.25 times the amount billed City.

1.3 SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS

A. Submit preliminary Schedule of Shop Drawing and Sample Submittals as required by Document 00700, General Conditions. Submit two copies of final and accepted Schedule of Shop Drawings and Sample Submittals as required by paragraph 1.2A.1 of this Section 01330.

B. Schedule of Shop Drawing and Sample Submittals will be used by City to schedule its activities relating to review of Submittals. Schedule of Submittals shall indicate the timing of Submittals and the early Submittals of long-lead-time items and of items that require extensive review.

C. Schedule of Shop Drawing and Sample Submittals will be reviewed by City and shall be revised and resubmitted until accepted by City.

D. Unless otherwise specified, submit Submittals in groups containing all associated items to ensure that related information is available for checking each item when Submittals are received. Identify on the Submittal which Submittals should be reviewed together.

1.4 SAFETY PROGRAM

A. Submit three copies of Safety Program specific to these Contract Documents to City within the time set forth in Section 01540, Site Security and Safety, paragraph 1.5.

1.5 PROGRESS SCHEDULE

A. See Section 01320, Progress Schedules and Reports, for schedule and report requirements. Section 01320 shall control in any conflict with Section 01330.

B. Submit one electronic copy and three print copies of schedule at each of the following times:

1. Initial Progress Schedule submitted in accordance with paragraph 11.1.B of Document 00700, General Conditions.

2. Original Schedule within 20 Days of the Notice to Proceed date.

3. Adjustments to the Schedule as required.

4. Monthly Schedule Updates, seven Days prior to monthly progress meeting.

C. Submit four full color paper copies of sufficient size for easy reading of the reports listed in Section 01320, Progress Schedules and Reports, with:

1. Initial Schedule

2. Original Schedule

3. Each Monthly Schedule Update

D. An electronic copy of the schedules and reports listed in this paragraph 1.5 shall be submitted on CD-ROM or other City-approved electronic media, using City-approved software, including software described in paragraph 1.4E. of Section 01320 in addition to the hard copies specified in this paragraph 1.5. Electronic files shall be complete copies, including all programs and electronic coding.

1.6 PRODUCT DATA

A. Within five (5) Days after the start date of the Contract Time, submit two copies of complete list of major products proposed for use, with name of manufacturer, telephone number, trade name, and model number of each product. Tabulate product data by Specification Section.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Product or Catalog Data:

1. Manufacturer's standard drawings shall be modified to delete non-applicable data or include applicable data.

2. Manufacturer's catalog sheets, brochures, diagrams, schedules, charts, illustrations and other standard descriptive data:
   a. Mark each copy to identify pertinent materials, products, or models.
   b. Show dimensions and clearances required, performance characteristics and capacities, wiring diagrams and controls.
   c. Include applicable MSDS.

D. Supplemental Data:

1. Submit number of copies that Contractor requires, plus two copies that will be retained by City.

2. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to Project.

E. Provide copies for Project Record Documents described in Section 01770, Contract Closeout.

1.7 SHOP DRAWINGS

A. Minimum Sheet Size: 8½ inches by 11 inches. Other Sheet Sizes: Multiples of 8½ inches by 11 inches. Maximum Sheet Size: 30 inches by 42 inches.

B. Original sheet will be marked with City's review comments and returned to Contractor.

C. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.

D. Include manufacturers' installation instructions when required by Specification Section.

E. If Contractor submits Shop Drawings for items that Shop Drawings are not specified, City will not be obliged to review them.

F. Contractor is responsible for procuring copies of Shop Drawings for its own use as it may require for the progress of the Work.

G. Shop Drawings shall be drawn to scale and completely dimensioned, giving plan view together with such sectional views as are necessary to clearly show construction detail and methods.

1.8 SAMPLES

A. Submit full range of manufacturers' standard colors, textures, and patterns for City's selection.

B. Submit samples to illustrate functional and aesthetic characteristics of product, with integral parts and attachment devices. Coordinate Submittal of different categories for interfacing work.

C. Include identification on each sample, giving full information.

D. Sizes: Unless otherwise specified, provide the following:

1. Paint Chips: Manufacturers' standard

2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square

3. Linear Products: Minimum 6 inches, maximum 12 inches long

4. Bulk Products: Minimum 1 pint, maximum 1 gallon

E. Full size samples may be used in Work upon approval by City.

F. Field Samples and Mock-ups (if applicable):

1. Erect field samples and mock-ups at Site in accordance with requirements of Specification Sections. If testing is conducted, record and certify results and full Contract compliance.

2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by City.

3. Approved field samples and mock-ups may be used in Work upon approval by City.

4. Construct or prepare as many additional Samples as may be required, as directed by the City, until desired textures, finishes, and/or colors are obtained.

5. Accepted Samples and mock-up shall serve as the standard of quality for the various units of work.

G. No review of a Sample shall be taken in itself to change or modify the requirements in the Contract Documents.

H. Finishes, materials, and workmanship in the completed Work shall match accepted Samples.

1.9 COORDINATION DRAWINGS (NOT USED)

1.10 QUALITY ASSURANCE/CONTROL SUBMITTALS

A. Test Reports:

1. Submit three copies; One copy will be marked with City's review comments and returned to Contractor.

2. Indicate that material or product conforms to or exceeds specified requirements.

3. Reports may be from recent or previous tests on material or product, but shall be acceptable to City. Comply with requirements of each individual Specification Section.

B. Certificates:

1. Submit five copies; One copy will be marked with City's review comments and returned to Contractor.

2. Indicate that material or product conforms to or exceeds specified requirements.

3. Submit supporting reference data, affidavits, and certifications as appropriate.

4. Certificates may be recent or from previous test results on material or product, but shall be acceptable to City.

C. Manufacturers' Instructions:

1. Submit three copies; One copy will be marked with City's review comments and returned to Contractor.

2. Include manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.

3. Identify conflicts between manufacturers' instructions and Contract Documents.

D. Material Safety Data Sheets:

1. In addition to Material Safety Data Sheets (MSDS) otherwise required by the Contract Documents, submit five copies for any paints, solvents, thinners, varnish, lacquer, glues and adhesives, mastics, or other materials needed for the Project as required by the individual Specification Sections or as otherwise specified in the Contract Documents.

2. MSDS required for a Submittal shall be submitted with product data in order for the Submittal to be reviewed.

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1.11 INSTALLATION, OPERATIONS, AND MAINTENANCE MANUALS

See Special Provisions

1.12 COMPUTER PROGRAMS

See Special Provisions

1.13 PROJECT RECORD DOCUMENTS

Submit one copy of each of the Project Record Documents listed in Section 01770, Contract Closeout.

1.14 DELAY OF SUBMITTALS

Delay of Submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late Submittals will be assessed to Contractor.

1.15 OPTIONAL REVIEW MEETING

A. At the Contractor's request, in order to facilitate the timeliness of the review process, the City may schedule a meeting to review the materials submitted. If this option is exercised, the following requirements apply:

1. Request a meeting date with the City at least 10 Business Days in advance.

2. Provide the complete package of Submittal information at least 5 Business Days in advance of the meeting.

3. The meeting shall take place at City's office. City will provide the authorized staff to review and respond on the Submittal information during the meeting.

4. Make available for this meeting the job superintendent and/or foreman, Contractor's safety officer, and someone knowledgeable of all the items submitted and authorized to make substitutions or changes**.**

END OF SECTION

[TRANSMITTAL SHEET FOLLOWS THIS PAGE]

EXHIBIT A

SUBMITTAL NO. _____

Project Name: **[_____] PROJECT**			Date Received:	
City of Santa Clara, a Municipal Corporation of the State of California 1500 Warburton Avenue Santa Clara, CA 95050			Checked By:	
Contractor:			Log Page:	
Address:	Address:			
			Specification Section Number:	
Attention:	Attention:		1st Submittal ☐	Resubmittal ☐
Date Transmitted:	Previous Transmittal Date:			
No. Copies	Description	Manufacturer	Dwg. or Data No.	Action Taken*

Remarks _____

_____

_____

* The action designated above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted (No Resubmission Required)
C. Make Corrections Noted and Resubmit
D. Not Approved – This submittal is deficient in the following area(s):
   1. Not enough information for review
   2. No reproducibles submitted
   3. Copies illegible
   4. Not enough copies submitted
   5. Wrong sequence number
   6. Wrong resubmittal number
   7. Wrong Specification section number
   8. Wrong form used
   9. See comments
E. City's review not required
   1. Submittal not required
   2. Supplemental information. Submittal retained for informational purposes only
   3. Information reviewed and approved prior to Submittal
   4. See comments

Comments _____

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_____
By Date

Distribution: Contractor ☐ File ☐ Field ☐ City ☐ Other ☐

EXHIBIT B

MANUAL SUBMITTAL NO. _____

Project Name: **[_____] PROJECT**			Date Received:	
City of Santa Clara, a Municipal Corporation of the State of California 1500 Warburton Avenue Santa Clara, CA 95050			Checked By:	
Contractor:			Log Page:	
Address: Attention:	Address: Attention:			
			Specification Section Number:	
			1st Submittal ☐	Resubmittal ☐
Date Transmitted:	Previous Transmittal Date:			
No. Copies	Description	Manufacturer	Dwg. or Data No.	Action Taken*

Remarks

* The action designated above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted (No Resubmission Required)
C. Make Corrections Noted and Resubmit
D. Not Approved – This manual Submittal is deficient in the following area(s):
   1. Equipment record sheets
   2. Functional description
   3. Assembly, disassembly, installation, alignment, adjustment, and checkout instructions
   4. Operating instructions
   5. Lubrication and maintenance instructions
   6. Troubleshooting guide
   7. Parts list and ordering instructions
   8. Organization (indexing and tabbing)
   9. Wiring diagrams and schematics specific to installation
   10. Outline, cross section, and assembly diagrams
   11. Test data and performance curves
   12. Tag or equipment identification numbers
   13. See comments

Comments

By Date

Distribution: Contractor ☐ File ☐ Field ☐ City ☐ Other ☐

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SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes: regulatory requirements applicable to Contract Documents.

B. Specific reference in the Specifications to codes and regulations or requirements of regulatory agencies shall mean the latest printed edition of each adopted by the regulatory agency in effect at the time of the opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

C. Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a change order detailing and specifying the required Work shall be submitted to and approved by City before proceeding with the Work.

1.2 REFERENCES TO REGULATORY REQUIREMENTS

A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these Specifications. Code, laws, ordinances, rules and regulations are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements. The listing of applicable codes, laws, and regulations for hazardous waste abatement Work in the Contract Documents is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable laws, regulations or ordinances having application to the Work. Where conflict among the requirements or with these Specifications occurs, the most stringent requirements shall be used.

B. Conform to referenced codes, laws, ordinances, rules and regulations.

C. Precedence:

1. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.

2. Where Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, Drawings and Specifications shall take precedence so long as such increase is legal.

3. Where no requirements are identified on Drawings or in Specifications, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.

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1.3 CODES

A. Codes that apply to Contract Documents include, but are not limited to, the following:

1. CBC (Part 2, Title 24, CCR, including, but not limited to, Sections 16A, 102A.23, 308, 420A, 504-506, 904.2.6, 1019 and 1604)

2. CEC (Part 3, Title 24, CCR)

3. CMC (Part 4, Title 24, CCR)

4. CPC (Part 5, Title 24, CCR),

5. State Elevator Safety Regulations (Part 7, Title 24, CCR)

1.4 LAWS, ORDINANCES, RULES, AND REGULATIONS

A. During prosecution of Work to be done under Contract Documents, comply with applicable laws, ordinances, rules and regulations, including, but not limited to, the following:

1. Federal
   a. Americans With Disabilities Act of 1990
   b. 29 CFR, Section 1910.1001, Asbestos
   c. 40 CFR, Subpart M, National Emission Standards for Asbestos
   d. Executive Order 11246
   e. Federal Endangered Species Act
   f. Clean Water Act

2. State of California
   a. California Code of Regulations, Titles 5, 8, 19, 21, 22, 24 and 25
   b. California Public Contract Code
   c. California Health and Safety Code
   d. California Government Code
   e. California Labor Code
   f. California Civil Code
   g. California Code of Civil Procedure
   h. CPUC General Order 95, Rules for Overhead Electric Line Construction
   i. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
   j. Cal/OSHA
   k. OSHA: Hazard Communications Standards
   l. California Endangered Species Act
   m. California Water Code
   n. California Fish and Game Code

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3. State of California Agencies
   a. State and Consumer Services Agency
   b. Office of the State Fire Marshall
   c. Office of Statewide Health Planning and Development
   d. Department of Fish and Game
   e. Bay Area Air Quality Management District
   f. San Francisco Bay Regional Water Quality Control Board

4. Local Agencies:
   a. City of Santa Clara
   b. County of Santa Clara
   c. Santa Clara County Fire Department

5. Other Requirements:
   a. National Fire Protection Association (NFPA): Pamphlet 101, Life Safety.
   b. References on Drawings or in Specifications to “code” or “building code” not otherwise identified shall mean the codes specified in this Section 01410, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction.

B. Have access to all of the above documents within 24 hours.

C. Other Applicable Laws, Ordinances and Regulations:

1. Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of federal, state, and local governmental agencies and jurisdictions having authority over the Project.

2. Work shall be accomplished in conformance with all rules and regulations of public utilities and utility districts.

3. Where such laws, ordinances rules, and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the time of opening of the bids.

D. Under California Government Code Section 930.2 et. seq. and Public Contract Code Section 7105(d)(2), neither the Contract Claims Procedure (Document 00700, Article 12) nor the Change Order Procedure (Section 01250) may be modified, waived, or otherwise not complied with, absent a written change order that explicitly and expressly makes such modifications.

1.5 CONFLICTS

A. Between referenced regulatory requirements: Comply with the one establishing the more stringent requirement.

B. Between referenced regulatory requirements and Contract Documents: Comply with the one establishing the more stringent requirement.

1.6 REQUIRED PROVISIONS ON CONTRACT CLAIM RESOLUTION

A. The California Public Contract Code specifies required provisions on resolving contract claims less than $375,000, which are set forth below, and constitute a part of this Contract.

1. For the purposes of this section, "Claim" means a separate demand by Contractor of $375,000 or less for (1) a time extension, (2) payment or money or damages arising from Work done by or on behalf of Contractor arising under the Contract Documents and payment of which is not otherwise expressly provided for or the Claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by City. In order to qualify as a Claim, the written demand must state that it is a Claim submitted under paragraph 12 of Document 00700, General Conditions, and be submitted in compliance with all requirements of Document 00700, General Conditions, paragraph 12. Separate Claims which total more than $375,000 do not qualify as a "separate demand of $375,000 or less," as referenced above, and are not subject to this section.

2. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim for purposes of this section. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a Claim under this section by submitting a separate claim in claim in compliance with Contract Documents claim submission requirements.

3. Caution. This section does not apply to tort claims and nothing in this section is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 and Chapter 2 of Part 3 of Division 3.6 of Title 1 of the California Government Code.

B. Procedure:

1. The Claim must be in writing, submitted in compliance with all requirements of Document 00700, General Conditions, paragraph 12, including, but not limited to, the time prescribed by and including the documents necessary to substantiate the Claim, pursuant to Document 00700, General Conditions, paragraph 12.3. Claims must be filed on or before the day of final payment. Nothing in this section is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in Document 00700, General Conditions, paragraph 12 or elsewhere in the Contract Documents.

2. For Claims of fifty thousand dollars ($50,000) or less:
   a. City shall respond in writing within 45 days of receipt of the Claim, or
   b. City may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims City may have against Claimant.
      1) If additional information is thereafter required, it shall be requested and provided in accordance with this section upon mutual agreement of City and Claimant.
      2) City's written response to the Claim, as further documented, shall be submitted to Claimant within 15 days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.

3. For Claims over Fifty Thousand Dollars ($50,000) and less than or equal to $375,000:
   a. City shall respond in writing within 60 days of receipt of the Claim, or
   b. City may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims City may have against Claimant.
      1) If additional information is thereafter required, it shall be requested and provided in accordance with this section, upon mutual agreement of City and Claimant;
      2) City's written response to the Claim, as further documented, shall be submitted to Claimant within 30 days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.

4. Meet and Confer:
   a. If Claimant disputes City's written response, or City fails to respond within the time prescribed above, Claimant shall notify City, in writing, either within 15 days of receipt of City's response or within 15 days of City's failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand City will schedule a meet and confer conference within 30 days for settlement of the dispute.
   b. Following the meet and confer conference, if the Claim or any portion remains in dispute, Claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the California Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time Claimant submits its written claim as set forth in paragraph 12.2.B of Document 00700 (General Conditions), until the time that Claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

1.7 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns shall constitute a material breach of the Contract Documents.

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SECTION 01411

REGULATORY REQUIREMENTS - HAZARDOUS MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Regulatory requirements applicable to Work in connection with hazardous waste abatement and disposal including, but not limited to, organochlorine pesticide, arsenic, lead, and mercury contaminated soils and materials, construction and demolition debris and any other hazardous substance or hazardous waste.

B. This Section supplements Section 01410, Regulatory Requirements, and the Work-specific listings of applicable regulatory requirements elsewhere in the Specifications.

1.2 REFERENCES TO REGULATORY REQUIREMENTS

A. Codes, laws, ordinances, rules, and regulations applicable to the Work shall have full force and effect as though printed in full in Contract Documents. Codes, laws, ordinances, rules, and regulations are not furnished to Contractor, because Contractor is assumed to be familiar with their requirements. The listing herein of applicable codes, laws, and regulations for hazardous waste abatement work is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable laws, regulations, or ordinances having application to the Work. Where conflict among the requirements or with these Specifications exists, the most stringent requirements shall be used.

B. Conform to all applicable codes, laws, ordinances, rules, and regulations that are in effect on date of contracting.

1.3 LAWS, ORDINANCES, RULES, AND REGULATIONS

A. During prosecution of Work under Contract Documents, Contractor shall comply with applicable laws, ordinances, rules and regulations including, but not limited to, those listed below.

B. Federal:

1. Statutory Requirements:
   a. Resource Conservation and Recovery Act, 42 U.S.C. Sections 6901 *et seq*.
   b. Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. Sections 9601 *et seq*.
   c. Toxic Substances Control Act of 1976, 15 U.S.C., Sections 2601 *et seq*.
   d. Hazardous Materials Transportation Act of 1975, 49 U.S.C. Sections 1801 *et seq.*
   e. Clean Water Act, 33 U.S.C. Sections 1251 *et seq.*
   f. Safe Drinking Water Act, 42 U.S.C., Sections 3001 *et seq.*
   g. Clean Air Act, Section 112, 42 U.S.C., Section 7412

h. Occupational Safety and Health Act of 1970, 29 U.S.C., Sections 651 *et seq.*
i. Underground Storage Tank Law, 42 U.S.C., Sections 6991 *et seq.*
j. The Emergency Planning and Community Right to Know Act of 1986, 42 U.S.C., Sections 11011 *et seq.*

2. Environmental Protection Agency (EPA):
   a. 40 C.F.R. Parts 260, 264, 265, 268, 270
   b. 40 C.F.R. Parts 258 *et seq.*
   c. 40 C.F.R. Part 761
   d. 40 C.F.R. Parts 122-124
   e. 40 C.F.R. 61.150(d), 61.152

3. Occupational Safety and Health Administration (OSHA):
   a. OSHA Worker Protection Standards, 29 C.F.R. Part 1926.58, Construction Standards and 29 C.F.R. 1910.1001 General Industry Standard
   b. OSHA, 29 C.F.R. Part 1926.1101, Construction Standards for Asbestos
   c. OSHA, Lead Exposure in Construction: Interim Final Rule, 29 C.F.R. 1926.62
   d. National Emission Standard for Hazardous Air Pollutants, 40 C.F.R. Part 61
   e. Asbestos Hazardous Emergency Response Act, 40 C.F.R. 763, 29 C.F.R. 1910.134, 1910.1000, 1910.1025, Appendix D, 1910.1200, 1926.58(f) (7), (k), (m), and (n), 1926.103
   f. 29, C.F.R. 1910.120

4. Department of Transportation:
   a. 49 C.F.R. 173.1090
   b. 49 C.F.R. 172
   c. 49 C.F.R. 173
   d. DOT, HM 181 and MH126f

C. State of California Requirements:

1. Statutory Law:
   a. The Carpenter-Presley-Tanner Hazardous Substance Account Act, Health & Safety Code, Sections 25300 *et seq.*
   b. Health and Safety Code, Section 25359.4
   c. Hazardous Waste Control Law, Health & Safety Code, Sections 25100 *et seq.*
   d. Porter-Cologne Water Quality Control Act, Water Code, Sections 13000 *et seq.*
   e. Health and Safety Code, Sections 25249.5, 25915-25924
   f. California Labor Code Chapter 6, including, without limitation, Sections 6360 *et seq.,* 6382, 6408, 6501.5-6501.9, 6503.5, 9021.5, 9030, 9080
   g. Business and Professions Code, including without limitation, Sections 7058.5, 7065.01, 7118.5
   h. Underground Storage of Hazardous Substance Act, Health and Safety Code, Sections 25280 *et seq.*
   i. Petroleum Underground Storage Tank Cleanup, Health and Safety Code, Sections 25299.10 *et seq.*
   j. Safe Drinking Water and Toxic Enforcement Act of 1986, Health & Safety Code, Sections 25249.5 *et seq.* (Proposition 65)

k. Above Ground Petroleum Storage Act, Health and Safety Code, Sections 25270 *et seq.*

l. Hazardous Materials Release Response Plans and Inventory, Health and Safety Code, Chapter 6.95

2. Administrative Code and Regulations:
   a. 22 CCR Division 4.5, Environmental Health Standards for the Management of Hazardous Waste, Sections 6600 *et seq.*
   b. Cal/OSHA Worker Protection Standards, 8 CCR, Sections 1529, 5208
   c. 23 CCR, Sections 2610 *et seq.*
   d. 8 CCR, Sections 340, 341.10, 1529, 1531, 5144, 5194, 5208, and 5216, Appendix D
   e. 22 CCR, Sections 12100 *et seq.,* 66504, 67740(a) (2) (A), 77702

3. Local Agency Requirements:
   a. Bay Area Air Quality Management District, Fugitive Dust Rules
   b. Bay Area Air Quality Management District Regulation 11-2-303
   c. State Water Resource Control Board, General Construction Activity Stormwater Permit Requirements (Order 92-OS DWQ)

4. Local Agency Requirements:
   a. Santa Clara Fire Department.
   b. City of Santa Clara Ordinances.
   c. County of Santa Clara Ordinances

D. [see document 00700, ¶13.2A]

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SECTION 01450

TESTING AND INSPECTION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes descriptions of requirements and procedures for Testing and Inspection, included in:

1.2 Contractor's Quality Control
1.3 Quality of the Work
1.4 Inspections and Tests by Governing Authorities
1.5 Inspections and Tests by Serving Utilities
1.6 Inspections and Tests by Manufacturer's Representatives
1.7 Testing
1.8 Additional Testing and Inspection

1.2 CONTRACTOR'S QUALITY CONTROL

A. Contractor's Quality Control: Ensure that products, services, workmanship and Site conditions comply with requirements of the Contract Documents by coordinating, supervising, testing, and inspecting the Work and by utilizing only suitably qualified and appropriately audited, licensed or trained, personnel.

B. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Contract Documents, including, by reference, all codes, laws, rules, regulations, and standards. When no quality basis is prescribed, the quality and testing procedures shall be in accordance with the best-accepted practices of the construction industry for the locale of the Project, for projects of this type, or standards set by engineering or technical societies (e.g., ASTM or ASHRAE), whichever is more stringent.

C. Quality Control Personnel: Employ and assign knowledgeable and skilled personnel as necessary to perform quality control functions to ensure that the Work is provided as required.

1.3 QUALITY OF THE WORK

A. Quality of Products: Unless otherwise Indicated or Specified, all products shall be new, free of defects, and fit for the intended use.

B. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements, as shown on or required by Contract Documents.

C. Protection of Completed Work: Take all measures necessary to preserve completed Work free from damage, deterioration, soiling, and staining, until acceptance by City.

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D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting, and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Secure City's advanced written consent. Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.

F. Verification of Quality: Work shall be subject to verification of quality by City in accordance with provisions of the Contract Documents.

1. Cooperate by making Work available for inspection.
2. Such verification may include mill, plant, shop, or field inspection as required.
3. Provide access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.
4. Provide all information and assistance as required, including that by and from subcontractors, fabricators, materials suppliers and manufacturers, for verification of quality by City.
5. Applicable provisions of the Contract Documents shall govern Contract Modifications, if any, resulting from such verification activities.

G. Observations by City's Consultants: Periodic and occasional observations of Work in progress will be made by City and City's Consultants as deemed necessary to review progress of Work and general conformance with design intent.

H. Limitations on Inspection, Test and Observation: Neither employment of independent testing and inspection agency nor observations or tests by City and City's Consultants shall in any manner relieve Contractor of obligation to perform Work in full conformance to all requirements of Contract Documents.

I. City's Acceptance and Rejection of Work: City reserves the right to reject all Work not in conformance to the requirements of the Contract Documents, or otherwise defective.

J. Correction of Defective Work: Defective Work shall be modified, replaced, repaired or redone by the Contractor at no change in Contract Sum or Contract Time.

K. Acceptance of Defective Work: Acceptance of defective Work, without specific written acknowledgement and approval of City, shall not relieve the Contractor of the obligation to correct such Work.

L. Contract Adjustment for Defective Work: Should City determine that it is not feasible or in City's interest to require defective Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between City and Contractor. If equitable amount cannot be agreed upon, a Construction Change Directive will be issued and the amount in dispute resolved in accordance with applicable provisions of Document 00700, General Conditions.

M. Non-Responsibility for Defective Work: City and City's Consultants disclaim any and all responsibility for Work produced not in conformance with the Contract Documents.

N. Responsibility for Defective Work: Contractor shall have full responsibility for all consequences resulting from defective work, including without limitation all delays, disruptions, extra inspection and correction costs by Contractor and City and re-Work, and extra time and costs of all types. Contractor waives excuses for defective work relating to City's prior review of Submittals and/or prior failure to notice defective work in place on inspection.

1.4 INSPECTIONS AND TESTS BY GOVERNING AUTHORITIES

A. Regulatory Requirements for Testing and Inspection: Comply with California Building Code (CBC) requirements and all other requirements of governing authorities having jurisdiction.

B. Inspections and Tests by Governing Authorities: Cause all tests and inspections required by governing authorities having jurisdiction to be made for Work under this Contract.

1. Such authorities may include, but are not limited to, City of Santa Clara Building Department, Office of Statewide Health Planning Department (OSHPD), Public Works Department, Fire Department, and similar agencies.
2. Except as specifically noted, scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.

1.5 INSPECTIONS AND TESTS BY SERVING UTILITIES

Cause all tests and inspections required by serving utilities to be made for Work under this Contract. Scheduling conducting and paying for such inspections shall be solely the Contractor's responsibility.

1.6 INSPECTIONS AND TESTS BY MANUFACTURER'S REPRESENTATIVES

Cause all tests and inspections specified to be conducted by materials or systems manufacturers to be made. Additionally, all tests and inspections required by materials or systems manufacturers as conditions of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum.

1.7 TESTING

A. City may select an independent testing and inspection agency or agencies to conduct tests and inspections as indicated in the Contract Documents.

B. All time and costs for Contractor's service related to such tests and inspections shall be included in Contract Time and Contract Sum.

C. Contractor shall notify City in writing (and, if provided, on inspection request form provided by City) and, if directed by City, testing and inspection agency, when Work is ready for specified tests and inspections. Deliver this written notification at least three (3) Working Days before the requested inspection date.

D. Contractor shall pay for all additional charges by testing and inspection agencies and governing authorities having jurisdiction due to the following:

1. Contractor's failure to properly schedule or notify testing and inspection agency or authorities having jurisdiction.

2. Changes in sources, lots, or suppliers of products after original tests or inspections.

3. Changes in means, methods, techniques, sequences, and procedures of construction that necessitate additional testing, inspection, and related services.

4. Changes in mix designs for concrete and mortar after review and acceptance of submitted mix design.

5. Contractor submitted requests to change materials or products, which are accepted, but require testing and/or re-inspection beyond original design.

6. Costs to travel and per diem to perform factory testing off-sites over 50 miles from the jobsite.

7. Cost of re-testing work due to failure of the original test.

E. Tests and special inspections to be paid by City may, where required, include the following:

MATERIAL TESTS

Soil compaction testing

F. Contractor Responsibilities in Inspections and Tests:

1. Unless specified otherwise, notify City and testing agency three (3) Working Days in advance of expected time of each test and inspection, and for all other operations requiring inspection and testing services, by submitting Contractor's inspection request in writing (or, if City provides a specific form, on that form).

   a. When tests or inspections cannot be performed after such notice, reimburse City for testing and inspection agency personnel and travel expenses incurred due to Contractor's negligence.

2. Deliver to laboratory or designated location, adequate samples of materials proposed to be used that require advance testing, together with proposed mix designs.

3. Cooperate with testing and inspection agency personnel, City, and City's Consultants. Provide access to Work areas and off-Site fabrication and assembly locations, including during weekends and after normal Work hours.

4. Provide incidental labor and facilities to provide safe access to Work to be tested and inspected, to obtain and handle samples at the Site or at source of products to be tested, and to store and cure test samples.

5. Provide, at least fifteen (15) Days in advance of first test or inspection of each type, a schedule of tests or inspections indicating types of tests or inspections and their scheduled dates.

G. Testing by the City is done to verify, to the City's satisfaction, that the Work is proceeding properly. It is not to replace the Contractor's quality control/quality assurance program. It is the Contractor's responsibility to perform any testing needed to ensure the Work complies with the Contract Documents, it is safe, and it is performed in an efficient manner.

1.8 ADDITIONAL TESTING AND INSPECTION

A. If initial tests or inspections made by the City or the Testing and Inspection Agency reveal that materials do not comply with Contract Documents, or if City has reasonable doubt that materials do not comply with Contract Documents, additional tests and inspections shall be made as directed.

1. If additional tests and inspections establish that materials comply with Contract Documents, City shall pay all costs for such tests and inspections.

2. If additional tests and inspections establish that materials do not comply with Contract Documents, all costs of such tests and inspections shall be deducted from Contract Sum.

3. If Work requiring inspection is covered by follow-on or follow-up Work before it is inspected, uncover Work so proper inspections can be performed. All costs of such tests and inspections shall be deducted from Contract Sum.

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SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1.2 Temporary Electricity
1.3 Temporary Communications
1.4 Temporary Water
1.5 Fences
1.6 Protection of Public and Private Property
1.7 Tree and Plant Protection
1.8 Temporary Sanitary Facilities
1.9 Temporary Barriers and Enclosures
1.10 Construction Aids
1.11 Water Control
1.12 Pollution Control
1.13 Dust Control
1.14 Erosion Control
1.15 Noise Control
1.16 Traffic Control
1.17 Security
1.18 Solid Waste Services
1.19 Removal of Temporary Facilities and Controls

1.2 TEMPORARY ELECTRICITY

Contractor shall provide, maintain, and pay for electrical power at the Site for construction purposes and for Contractor's trailer(s). Power may be obtained from City, but Contractor must provide all necessary wiring and appurtenances for connection to City's system. Contractor must meter all connections to City's system to determine usage rates.

1.3 TEMPORARY COMMUNICATIONS (NOT USED)

1.4 TEMPORARY WATER

A. Provide, maintain, and pay for suitable quality water service required for construction operations.

B. All water required for and in connection with the Work, including without limitation for dust control, shall be furnished by and at the expense of Contractor. Contractor may be allowed to utilize water from the City, with City's approval. However, City does not guarantee availability of this water. Contractor shall furnish necessary pipe, hose, nozzles, meter, and tools and perform all necessary labor. Unnecessary waste of water will not be permitted. Special hydrant wrenches shall be used for opening and closing fire hydrants; in no case shall pipe wrenches be used for this purpose.

1.5 FENCES

A. All existing fences affected by the Work shall be maintained by Contractor until Final Completion. Fences which interfere with construction operations shall not be relocated or dismantled until City gives written permission to do so, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

B. On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original locations.

1.6 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

A. Contractor shall protect, shore, brace, support, and maintain all landscape areas (sod, groundcover, shrubs, trees, etc.), underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by its construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all landscape areas in yards, parkways, and medians, shall be restored to their original condition, whether within or outside the Site. All replacements shall be made with new materials.

B. Contractor shall be responsible for all damage to landscape areas, streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work, Site or any part thereof, whether by Contractor or Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the City, or the agency or authority having jurisdiction over the damaged property, concerning its repair or replacement or payment of costs incurred in connection with the damage.

C. All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

1.7 TREE AND PLANT PROTECTION

A. Preserve and protect existing trees and plants at site, which are designated to remain and those adjacent to the Site. Contractor's attention is directed to Contract Documents for additional requirements and restrictions as it pertains to the protection of existing trees and plants.

1.8 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required temporary buildings with sanitary toilets for use of all workers. At a minimum, sanitary facilities shall be located at trailer site, staging area, and adjacent to Work area.

B. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. Contractor shall enforce the use of such sanitary facilities by all personnel at the Site.

C. Comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

1.9 TEMPORARY BARRIERS AND ENCLOSURES

A. Provide barriers to prevent unauthorized entry to construction areas, and to protect existing facilities and adjacent properties from damage.

B. Provide barricades required by governing authorities for public access to existing buildings.

C. Protect vehicular traffic, stored materials, Site, and structures from damage.

D. Provide barricades and covered walkways as required by governing authorities for public rights-of-way.

E. Provide barriers around trees and plants designated to remain.

F. Shield all welding operations from public view with solid barrier.

G. Remove barriers and enclosures only after acceptance of that portion of the Work area.

H. See Subsection 1.16, Traffic Control, for additional requirements.

1.10 CONSTRUCTION AIDS

Contractor shall furnish, install, maintain, and operate all construction aids required by it and its Subcontractors in the performance of the Work, except as otherwise provided herein. Such construction aids shall include elevators and hoists, cranes, temporary enclosures, swing staging, scaffolding and temporary stairs. Construction aids shall be furnished without charge to the Subcontractors, and all necessary erection, maintenance, and operating personnel shall be included. In the event of conflict, the contractor furnishing the equipment shall determine priorities in the best interest of the Project.

1.11 WATER CONTROL

A. Grade Site to drain.

B. Maintain excavations free of water.

C. Protect Site from puddling or running water.

D. Provide water barriers as required to protect Site from soil erosion.

E. Provide for drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

F. Clean, enlarge and/or supplement existing drainage channels and conduit as necessary to carry all increased runoff attributable to Contractor's operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect City's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.

1.12 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations.

B. Provide systems for control of atmospheric pollutants.

1. Prevent toxic concentrations of chemicals.

2. Prevent harmful dispersal of pollutants into the atmosphere.

3. Direct pollutants such as diesel exhaust away from building air intakes.

C. The Contractor shall implement BMPs during construction activities as specified in Section 02007, Storm Water Pollution Prevention. 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.

D. In the event that dewatering of excavations is required, Contractor shall obtain the necessary 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.

1.13 DUST CONTROL

A. Provide positive methods and apply dust control material to minimize raising dust from the construction operations, equipment, and provide positive means to prevent airborne dust from dispersing into the atmosphere.

B. SEE SECTION 01590, CITY MITIGATION MEASURES, FOR ADDITIONAL REQUIREMENTS FOR CONTROLLING DUST AT AND AROUND THE SITE.

1.14 EROSION CONTROL

A. Contractor shall prevent soil erosion on the Site and adjacent property resulting from its construction activities to the maximum extent practical. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operations that will disturb the natural protection.

B. Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved 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.

C. See Section 02007, Storm Water Pollution Prevention, for additional requirements.

1.15 NOISE CONTROL

A. Conform to OSHA and City noise ordinance requirements unless a more stringent requirement is otherwise specified in the Contract Documents.

B. City has limited hours of certain types of construction operations. Coordinate work with City's Construction Manager.

C. See Section 01590, City Mitigation Measures, for additional requirements and limitations regarding noise generated by the Contractor.

D. Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work. During construction activities on or adjacent to occupied buildings, and when appropriate, Contractor shall erect screens or barriers effective in reducing noise in the buildings and shall conduct its operations to avoid unnecessary noise which might interfere with the activities of building occupants.

E. Ensure and provide certification to City that all construction equipment and vehicles used for the Work are:

1. Maintained in good mechanical condition

2. Equipped with properly installed engine mufflers

1.16 TRAFFIC CONTROL

A. The City restricts routing of construction traffic and construction vehicles and equipment parking. The Contractor's attention is directed to Section 12, CONSTRUCTION AREA TRAFFIC CONTROL DEVICES, of the Standard Specifications. The Contractor shall supply and install all traffic control devices (including all warning, regulatory, and guide signs) required for the Project. The City will not furnish signs nor any other traffic control devices for the Project.

Prior to start of Work, the Contractor shall submit for City review and approval its Traffic Control and Detour Plan. Submit said plan a minimum of two (2) full Working Days prior to the Preconstruction Conference. If there is no Preconstruction Conference, submit said plan at least two (2) weeks prior to starting the Work The plan shall include (where necessary) lane closures, detours, no parking areas, signing program for construction, access to private property and business establishments, pedestrian traffic, railroad crossings, transit routes, loading areas, the proposed routing of the construction vehicles, hours required for access and the safe guards and procedures necessary to carry out the Work, as well as where Contractor plans to park construction vehicles and equipment, and other matters which might be important to the safe movement of traffic. The plan shall also indicate placement and type of warning signs, lights, devices, flag persons; and have a schedule for implementation.

B. The plan shall be in a minimum 11" x 17" CAD format. Prove eight (8) copies after approval. Update Traffic Control and Detour Plan with each revision, and once a month.

C. It is imperative that field traffic control be handled in such a manner as to adequately and safely direct all traffic movements in the Project area. The Contractor shall not be allowed to proceed with construction at any time that, in the opinion of the Engineer, traffic control is inadequate to meet the field conditions. Traffic control measures, in addition to those indicated on the approved traffic control plans, may be required as field conditions dictate.

D. The Contractor shall not be allowed to restrict vehicle access to any of the properties in the Project area at all times during construction if practical.

E. Areas to be posted with “No Parking” signs must be verified as correct by the City Police Department. Signs must be verified by the Police Department and posted a minimum of forty-eight (48) hours prior to the start of construction in each area requiring parking restrictions. The Santa Clara Police Department’s verification number is 1+(408) 615-4760. A limited number of temporary “No Parking” signs may, at the sole discretion of the Engineer, be furnished to the Contractor by the City.

F. The Contractor shall conduct his operations as to cause the least possible obstruction and inconvenience to both vehicular and pedestrian traffic.

G. Specific City Traffic Routing and Parking Restrictions: Below are specific City traffic and parking restrictions:

1. Construction Traffic and Vehicles: All inbound and outbound construction related traffic to and from the Site is restricted to public street(s) immediately adjacent to the Site.

2. Construction Parking: Construction vehicles and equipment parking is restricted to areas within the Site and other areas as determined by the City.

3. Alternative Parking: The Contractor can negotiate with any other entity to accommodate parking by its workers. However, the City does not make any guarantee that such parking is available to the Contractor.

H. Street Lane and Sidewalk Closures: Below are specific lane and sidewalk closure requirements and restrictions which shall apply unless specifically modified by an approved Traffic Control Plan. Said Plan may be reviewed or modified by the Engineer at any time when, in the opinion of the Engineer, changes are necessary to provide for the safety, health, welfare, or convenience of the public.

1. Street Lane Closures: Contractor shall provide continuous pedestrian traffic access. All traffic lanes shall remain open between the hours of 6:00-9:00 a.m. and 3:30-7:00 p.m. Lanes may individually be closed between 9:00 a.m. and 3:30 p.m. Maintain two-way traffic (one lane for each direction or movement) at all times in a condition satisfactory to the Engineer. The full width of the traveled way shall be open for use by public traffic beginning at 3:00 p.m. Fridays, and all day on Saturdays, Sundays, designated City holidays, and when construction operation are not actively in progress on Working Days.

   Residents along the road or street shall be provided passage. Convenient access to driveways, houses, and buildings along the road or street shall be maintained. Temporary crossings shall be provided and maintained in good condition.

   The blocking of industrial, commercial, or institutional driveways shall not be allowed. Access shall be provided to permit the movement of vehicles to and from the grounds of such establishments. Contractor shall provide vehicular access to all other types of driveways at all times except during actual construction. Actual construction times, however, shall be limited to the hours of 8:00 a.m. and 5:00 p.m. on authorized Working Days.

   Wherever it is necessary that trenches and excavation be bridged, these bridges shall permit unobstructed flow of traffic or pedestrians (ADA compliant) and shall meet the following criteria:

a. Bridging shall be secured against displacement by using adjustable cleats, angles, bolts, or other devices.

b. Bridging shall be installed to operate with minimum noise.

c. The trench shall be adequately shored, to support the bridging and traffic.

d. Only steel plates shall be used for bridging. Steel plates used for bridging shall extend one foot (minimum) beyond the edges of the trench (See "Steel Plate Benching" Standard Detail).

2. Sidewalk Closures: Contractor must obtain all necessary permits and comply with all City regulations before closing sidewalks.

a. Where walks, pathways, or access ways are closed by the Work , an ADA complaint, alternate walkway shall be provided, preferably within the immediate location of the pathway or access to be closed. Where it is necessary to divert pedestrians into a major detour and/or into a parking lane or traffic area, at no time shall pedestrians be diverted into a portion of a street used for vehicular traffic. Any deviation from the above must have prior approval of the Engineer.

b. At locations where adjacent alternate walkways cannot be provided (i.e., where no pathway or access is available within the immediate location of the interruption) ADA compliant detours shall be clearly planned, marked, and constructed. Appropriate signs and barricades must be installed at the limits of construction and in advance of the closure (or detour) in order to divert pedestrians to the appropriate walkway or detour.

c. Contractor shall provide sufficient signage, indicating by way of arrows and text, pedestrian route closures, and new pathways and detours required for alternate pedestrian routes around the construction. Alternate pedestrian routes, the final sign configuration, the exact wording of the base sign and all mounting locations shall be approved by the City.

3. The Contractor shall pay for all street and sidewalk closures, including but not limited to, the appropriate street closure and temporary directional signage, crosswalks, flag persons as required to control construction traffic and implement the Traffic Control and Detour Plan. The City has waived the Encroachment Permit fees for street closures or diversions, but the Contractor must plan, schedule, apply for, coordinate and implement all necessary street closures or diversions. Contractor shall take all necessary precautions to protect the public from construction activities. Minimum requirements for the directional signage and related signage must comply with City traffic regulations. Contact the City Traffic Engineer at 1+(408) 615-3000 for more information regarding traffic regulations and requirements.

4. The Contractor shall observe all posted traffic signage on and in adjacent neighborhoods.

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5. The Contractor shall not be relieved from responsibility for public safety by City's direction, lack of same, or approval of the Traffic Control and Detour Plan with respect to signs, lights, and/or protective devices.

1.17 SECURITY

A. Provide adequate security for equipment and construction materials for the Work that are either erected or stored at the Site.

B. Contractor is responsible for the security and protection of the Contractor's Work and work area.

C. Coordinate with local law enforcement and cooperate at all times with them.

D. If the Contractor fails to adequately secure the Site in the opinion of the City, qualified forces may be employed and costs for the services shall be charged to the Contractor.

E. Maintain fencing at all times.

F. Review and comply with all local ordinances related to emergency response requirements.

G. Develop, submit, update, and maintain an emergency response program for this Project specific to the needs of the Project.

H. Provide list of emergency contact numbers for the Project, including all personnel work and home phone numbers. The Contractor must provide twenty-four hour contact phone numbers for Contractor personnel.

1.18 SOLID WASTE SERVICES

A. Solid waste services consist of garbage, green waste, organic waste, and/or recyclable materials collection by the City's franchise haulers.

B. Mission Trails Waste Systems, Inc. (408-727-5365) is the exclusive franchise hauler for all residential, commercial, and institutional establishments located within the City limits. Contact the City's Streets and Automotive Services Department at (408) 615-3080 for a list of the non-exclusive franchise haulers that provide solid waste services in the industrial use areas within the City limits.

C. Building construction and/or demolition contractors may self-haul the solid waste produced by such business activities in compliance with the City's solid waste services franchise agreements.

1.19 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Maintain all temporary facilities, staging area, and controls as long as needed for the safe and proper completion of the Work; and remove all such temporary facilities. Promptly clean and repair damage caused by installation or use of temporary facilities. Restore site including staging area(s) to condition equal to or better than the condition prior to the installation of the temporary facility(s). If the Contractor fails or refused to repair the damage promptly, the City may have the necessary work performed and charge the cost to the Contractor or deduct the expense from any amounts due or to become due to the Contractor.

END OF SECTION

SECTION 01540

SITE SECURITY AND SAFETY

PART 1 GENERAL

1.1 SUBMITTALS

A. See Section 01330, Submittal Procedures.

B. Site Security

C. Safety Program

1.2 PROTECTION

A. Continuously maintain protection as necessary to protect the Work, as a whole and in part, and adjacent property and improvements from accidents, injuries, or damage.

B. Properly protect the Work:

1. With lights, guardrails, temporary covers, and barricades.

2. Enclose excavations with proper barricades.

3. Brace and secure all parts of the Work against storm and accident.

4. Provide such additional forms of protection that may be necessary under existing circumstances.

C. Provide and maintain in good condition all protective measures required to adequately protect the public from hazards resulting from the Work and to exclude unauthorized persons from the Work. When regulated by Building Code, Cal OSHA, or other authority, such legal requirements for protection shall be considered as minimum requirements. Be responsible for the protection in excess of such minimum requirements as required.

1.3 CONTROL OF SITE

Ensure that no alcohol, firearms, weapons, or controlled substance enters or is used at the Site. Immediately remove from the Site and terminate the employment of any employee found in violation of this provision.

1.4 SITE SECURITY

A. As part of the Work included within the Contract Price, Contractor shall take and be fully responsible for all reasonably required measures to protect and maintain the security of persons, existing facilities and property at the Site, including without limitation preventing theft, loss, vandalism, graffiti, and improper concealment of personal property of the City and all persons lawfully present on the Site, and including times where workers are not present on the Site. Contractor's measures shall include, at a minimum, installing a temporary chain-link fence with locking gate surrounding the Site if so instructed by the Engineer.

B. No claim shall be made against City by reason of any act of an employee or trespasser, and Contractor shall repair all damage to City's property resulting from Contractor's failure to provide adequate security measures.

C. Contractor shall maintain a lock on the Construction access gate at all times.

D. Contractor shall supply additional security fencing, barricades, lighting, and other security measures as required to protect and control the Site.

1.5 SAFETY PROGRAM

A. Fifteen (15) Days prior to the start of the Work, Contractor shall submit a Safety Program. Comply with the Safety Program and all applicable federal, state, and local regulation codes, rules, law and ordinances.

B. Receipt and/or review of the Safety Program by City, Engineer, or City's representative shall not relieve Contractor of any responsibility for complying with all applicable safety regulations.

C. It is essential that Contractor and each Subcontractor implement an effective and vigorous Safety and Health Program to cover their respective portions of the Work. Subject to Contractor's overall responsibility for Project safety, it shall be understood that the full responsibility for providing a safe place to work with respect to their respective portions of the Work rests with each individual Contractor and Subcontractor.

D. Safety Program components:

1. Injury and Illness Prevention Program (IIPP): Conforming to the General Industrial Safety Orders (CCR Title 8, Division 1, Chapter 4, Subchapter 7, Section 3203), and the California Labor Code (Section 6401.7).

2. Site-Specific Health and Safety Plan (HSP): Describing health and safety procedures that shall be implemented during the Work in order to ensure safety of the public and those performing the Work. Follow the guidelines for a HSP listed in f29 C.F.R. 1910.120.

E. The wearing of hard hats shall be mandatory at all times for personnel on Site. Supply sufficient hard hats to equip properly all employees and visitors.

F. Whenever an exposure exists, appropriate personal protective equipment (PPE) shall be used by all affected personnel. Supply PPE to all personnel under Contractor's direction.

1.6 SAFETY REQUIREMENTS

A. Standards: Maintain the Project in accordance with state and local safety and insurance standards.

B. Hazards Control:

1. Store volatile wastes in covered metal containers and remove from premises daily.

2. Prevent accumulation of wastes that create hazardous conditions.

3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish or waste material on the Site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Do not dispose of wastes into streams or waterways.

D. Provide accident information on the forms provided by Contractor. This information shall be provided on the same day as the occurrence of said incident.

1.7 SITE SAFETY OFFICER

A. Designate one of Contractor's staff as "Site Safety Officer" whose duties shall include the responsibility for enforcing the environmental protection provisions of the Contract Documents including safety and health, the requirements of the Occupational Safety and Health Act, and other applicable federal, state, and local standards. Submit for review by City Contractor's intended traffic flow plan, security plan, program for temporary structures, housecleaning plan, demolition program, and environmental safety and health plan. After review by City, the implementation and enforcement of these plans shall become the responsibility of the Site Safety Officer. Any changes in the plans shall be requested by Contractor through the Site Safety Officer for written concurrence by City.

B. City's risk management representative(s) shall be allowed access to accident/injury and illness reports, inspection reports, scheduling and construction meetings, and safety meetings.

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SECTION 01580

PROJECT IDENTIFICATION SIGNS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project identification sign.
2. Project informational signs.
3. Maintenance.
4. Turnover.

B. Related Sections

1. Section 01100, Summary of Work
2. Section 01500, Temporary Construction

1.02 QUALITY ASSURANCE

A. Design sign and structure to withstand 50-miles/hr winds.

B. Sign Printer: Experienced as a professional sign printer for a minimum of five years.

C. Finishes & Painting: Must use materials that can withstand weathering, fading, and chipping for duration of two years.

1.03 SUBMITTALS

A. See Section 01330, Submittal Procedures, for general shop drawing and product data requirements.

B. Provide submittals 14 Days prior to the start of the Work showing content, layout, lettering, color, structure, sizes, and proposed location of sign, as well as product data for proposed materials.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: New wood, and structurally adequate for required duration.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum ¾-inch thick, Grade A-C plywood, and standard large sizes to minimize joints.

C. Rough Hardware: Galvanized.

D. Paint and Primers: Exterior quality, two coats of both primer and paint; sign background of color as selected and approved by City.

2.02 PROJECT IDENTIFICATION SIGN

A. One digitally plotted sign, laminated, backed and mounted. 48 square feet, and bottom of sign a minimum of 6 feet above ground.

B. Content:

1. To be provided by the City.

C. Specific Requirements:

1. Plotted Image
   4 color Bubble Jet Digital output on one piece 5 mil vinyl sheet
   UV safe or solvent based inks suitable for color retention in outdoor setting for 2 years

2. Image Lamination
   5 mil pressure sensitive lamination film clear mat finish. Lamination must be suitable for outdoor setting for 2 years.

3. Image Backing
   Image shall be permanently backed on Alumalite® or equal Corrugated Plastic Core, Aluminum Surface rigid composite.
   Surface is .016-inch high-gloss painted aluminum on both sides for rigidity and to minimize warping
   Specifications Core: Corrugated PolyAllomer (CPA) sizes up to 5’ x 10’
   Thickness: 6mm & 10mm
   Lengths and Width Tolerances: ±1/2"
   Square Tolerance: Diagonals within 1/8"
   Wind Load: 6mm 120+ mph, 10mm 140+ mph
   when properly supported on four edges
   Bond Test: ASTM C481-A (Cyclic aging): PASS
   Fire Test: ASTM E84 "Class A" Flame Spread

2.03 PROJECT INFORMATION SIGN (NOT USED)

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install project identification sign within forty-five (45) days after date of Notice to Proceed.

B. Erect the project identification sign(s) as specified and shown on the Contract Documents. Final location(s) shall be reviewed and approved by the Engineer before installation by Contractor.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Paint exposed surfaces of sign supports and framing with standard colors selected by the City.

3.02 MAINTENANCE

A. Maintain signs and supports, keep clean and repair deterioration and damage.

3.03 TURNOVER (NOT USED)

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SECTION 01590

CITY MITIGATION MEASURES

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes description of requirements and procedures for Mitigation Measures, included in:

1.04 Cultural Resources & Human Remains
1.05 Air Quality

1.02 RELATED SECTIONS

Section 01000-Summary of Work

1.03 GENERAL

The Contractor shall comply with and implement the mitigation measures listed in this Section, as well as other City mitigation measures listed in the Contract Documents.

1.04 CULTURAL RESOURCES & HUMAN REMAINS

A. If it is determined by the City or discovered during the performance of the Work that the Site contains archaeological resources, the City and Planning Division shall be notified and all work within the proximity of the find shall temporarily halt so that the City-approved archaeologist can examine the find and document its provenience and nature (through drawings, photographs, written description, etc., as necessary).

B. If human remains are encountered during Project construction, the Contractor shall notify the Santa Clara County Coroner's Office immediately. The coroner will determine if the remains are those of a Native American, and if they are, will notify the Native American Heritage Commission.

C. The Contractor shall receive a non-compensable time extension for delays resulting from the discovery of cultural resources or human remains beyond the Contractor's control as defined in Paragraph 15.2B of Document 00700, General Conditions.

D. Archaeological And Paleontological Rights:

1. When working within the archaeologically sensitive area(s) identified by the City or as specified in the Contract Documents, the Contractor shall notify the City at least five (5) full Working Days in advance of performing any earth-moving activities to enable the City to provide archaeological monitoring of the work. The City has retained the services of a qualified archaeologist to monitor earthmoving activities of the Project.

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2. Monitoring shall consist of coordinating subsurface work to allow for the careful examination of vertical and horizontal soil relationships for the purpose of defining positive archaeological finds (prehistoric and/or historic). In the event that cultural resources are encountered, all work within the proximity of the find shall temporarily halt so that the archaeologist can examine the find and document its provenience and nature (through drawings, photographs, written description, etc., as necessary). The monitor will then direct the work to either proceed if the find is deemed to be insignificant or is adequately documented and resolved, or continue elsewhere, as appropriate, until adequate mitigation measures are adopted or the matter is otherwise resolved to the satisfaction of the City.

3. The Contractor shall notify the City a minimum of two (2) full working days in advance of canceling scheduled subsurface construction work including grading or similar work to provide the City with sufficient notice to cancel archaeological monitoring services.

4. The City may suffer damages in the event that the Contractor failed to comply with the required notification. The parties hereto agree that it is and will be extremely difficult to determine the actual damage that the City will sustain in the event that the City does not receive the required notification; and it is therefore agreed that the Contractor will pay to the City the sum of $1,000 for each occurrence of the Contractor's failure to provide the required notification. The Contractor agrees to pay said liquidated damages herein provided for, and further agrees that the City may deduct the amount thereof from any moneys due or that may become due to the Contractor under the Contract. In addition, in the event that the Contractor fails to comply with the required notification, the Contractor shall cease all construction operations, including non- surface constructions, until the required notification is provided in accordance with the Provisions of this Section.

1.05 AIR QUALITY

A. Water all active construction areas at least twice daily or as needed to prevent dust.

B. Cover all trucks hauling soils, sand, and other loose materials, or all trucks shall maintain at least 2 feet of freeboard.

C. Pave, or apply water three times daily, or apply nontoxic soil stabilizers on all unpaved roads, parking areas, and construction staging areas.

D. Sweep daily with water weepers all paved access roads, parking area, and staging areas at construction sites as needed to prevent dust.

E. Sweep streets daily with water sweepers, if visible soil material is carried onto adjacent public streets.

F. Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

G. Enclose, cover, water twice daily, or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.).

H. Traffic speeds on unpaved roads shall be limited to 15 miles per hour.

I. Install sandbags or other erosion-control measures to prevent silt runoff to public roadways during rainy season construction (November through April).

J. Other related requirements by the City:

1. Dust-proof chutes shall be used for loading construction debris onto trucks. Alternative means of loading construction debris may be permitted if approved by the City.

2. Contractor shall suspend dust-producing activities during periods of high winds when dust control measures are unable to avoid visible dust plumes.

3. During the dry season (May to October) provide equipment and staffing for watering of all exposed or disturbed soil surfaces at least twice daily. See Section 02007, Storm Water Pollution Prevention.

4. Any fine materials transported by truck will be covered or wetted down to control dust.

5. Demolition of pre-1980 buildings shall comply with BAAQMD Regulation 11, Rule 2: Hazardous Materials, Asbestos Demolition, Renovation and Manufacturing.

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SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1.2 Products
1.3 Product Options and Substitutions
1.4 Product Delivery Requirements
1.5 Shipping Requirements
1.6 Product Storage and Handling Requirements

1.2 PRODUCTS

A. Products: New material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. For similar components, provide interchangeable components of the same manufacturer.

1.3 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Summary: This paragraph 1.3 describes procedures for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the Specifications or approved for use in Addenda that were not already the subject of a Document 00660, Substitution Request Form, submittal as provided in Document 00200, Instructions to Bidders.

B. Contractor's Options:

1. For products specified only by reference standard: Select any product meeting that standard.

2. For products specified by naming one or more products or manufacturers:

a. Select products of any named manufacturer meeting specifications.
b. If product becomes unavailable due to no fault of Contractor, submit Request for Substitution (RFS), including all information contained in this Section 01600 and a fully executed Document 00660, Request for Substitution, but using the term "Contractor" each place the term "Bidder" appears in that form.

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C. Substitutions:

1. Except as provided in Document 00200, Instructions to Bidders, with respect to "or equal" items, City will consider Contractor's substitution requests only when product becomes unavailable due to no fault of Contractor. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS shall state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, and whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with City for work on the Project).

2. Submit separate RFS (and four copies) for each product and support each request with:

   a. Product identification.
   b. Manufacturer's literature.
   c. Samples, as applicable.
   d. Name and address of similar projects on which product has been used, and dates of installation.
   e. Name, address, and telephone number of manufacturer's representative or sales engineer.
   f. For construction methods: Detailed description of proposed method; drawings illustrating methods.

3. Where required, itemize a comparison of the proposed substitution with product specified and list significant variations including, but not limited to dimensions, weights, service requirements, and functional differences. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed. Identify all variations of the proposed substitute from that specified in the RFS and indicate available maintenance, repair, and replacement service.

4. State whether the substitute will require a change in any of the Contract Documents (or provisions of any other direct contract with City for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.

5. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract Sum including, but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by City in evaluating the proposed substitute. City may require Contractor to furnish additional data about the proposed substitute.

6. City will not consider substitutions for acceptance (or, in City's sole discretion, City may make Contractor solely responsible for all resulting costs, expenses and other consequences) when a substitution:

   a. Results in delay meeting construction Milestones or completion dates.

b. Is indicated or implied on submittals without formal request from Contractor.
c. Is requested directly by Subcontractor or supplier.
d. Acceptance will require substantial revision of Contract Documents.
e. Disrupts Contractor's job rhythm or ability to perform efficiently.

7. Substitute products shall not be ordered without written acceptance of City.

8. City will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.

9. Accepted substitutions will be evidenced by a Change Order.

10. All Contract Documents requirements apply to Work involving substitutions.

D. Contractor's Representation and Warranty:

1. Contractor's RFS constitute a representation and warranty that Contractor:

a. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
b. Will provide the same warranty for substitution as for specified product.
c. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
d. Waives claims for additional costs which may subsequently become apparent.
e. Will compensate City for additional redesign costs associated with substitution.
f. Will be responsible for Construction Schedule slippage due to substitution.
g. Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution that are subsequently rejected by City.
h. Will compensate City for all costs; including extra costs of performing Work under Contract Documents, extra cost to other contractors, and any claims brought against City, caused by late requests for substitutions or late ordering of products.

E. City's Duties:

1. Review Contractor's RFS with reasonable promptness.

2. Notify Contractor in writing of decision to accept or reject requested substitution.

F. Administrative Requirements:

1. Specified products, materials, or systems for Project may include engineering or on-file standards required by the regulatory agency. Contractor's substitution of products, materials or systems may require additional engineering, testing, reviews, approvals, assurances, or other information for compliance with regulatory agency requirements or both. Provide all agency approvals or other additional information required and pay additional costs for required City services made necessary by the substitution at no increase in Contract Sum or Contract Time, and as a part of substitution proposal.

1.4 PRODUCT DELIVERY REQUIREMENTS

A. Deliver products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.5 SHIPPING REQUIREMENTS

A. Preparation for Shipment. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

1. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of City.

2. Grease and lubricating oil shall be applied to all bearings and similar items.

B. Shipping. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

1.6 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store products only in staging area or other safe area per provisions of Section 01100, Summary of Work.

B. Handle, store, and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.

C. For exterior storage of fabricated products, place on appropriate supports, above ground.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

H. Without limiting the foregoing:

1. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the Site and shall comply with the requirements specified herein and provide required information concerning the shipment and delivery of the materials specified in Contract Documents. These requirements also apply to any subsuppliers making direct shipments to the Site. Acceptance of the equipment shall be made only after it is installed, tested, placed in operation and found to comply with all the specified requirements.

2. All items shall be checked against packing lists immediately on delivery to the Site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.

3. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe fittings and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.

4. Pumps, motors, electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above 60°F. Electrical equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.

5. Equipment having moving parts such as gears, bearings, and seals, shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer. Manufacturer's storage instructions shall be carefully followed by Contractor.

6. When required by the equipment manufacturer, moving parts shall be rotated a minimum of twice a month to ensure proper lubrication and to avoid metal to metal "welding". Upon installation of the equipment, Contractor shall, at the discretion of City, start the equipment at one-half load for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.

7. When required by the equipment manufacturer, lubricant shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment by Contractor at the time of acceptance.

8. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

9. In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

10. Handling. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner than does not damage the equipment.

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SECTION 01715

EXISTING UNDERGROUND FACILITIES

PART 1 GENERAL

1.1 PUBLIC FACILITIES AFFECTED

It is the Contractor's responsibility to verify the location of all existing utilities with the appropriate utility agencies prior to the commencement of construction. Contractor shall notify all utility owners 48-hours prior to the commencement of work adjacent to the utility. Contact Underground Services Alert (USA) at 1 (800) 227-2600.

1.2 PRIVATE FACILITIES AFFECTED

No attempt has been made to locate private utilities on private property such as sprinkler irrigation systems or electrical conduits. Contact the property owners prior to construction.

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SECTION 01740

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 Progress Cleaning

1.3 Final Cleaning

1.2 PROGRESS CLEANING

A. Contractor shall perform periodic cleaning to ensure that any streets and other City and public properties are maintained free from accumulation of waste materials, dust, mud, and debris.

B. Where required, Contractor shall wet down surfaces to lay dust and prevent the blowing of dust to nearby residences, businesses, or public properties.

C. Contractor shall keep all streets clean and free of dust, mud, and debris resulting from Contractor's operations. Daily cleanup throughout the job will be necessary as Contractor progresses with its Work, but extra attention to cleanup shall be made prior to weekends and holidays. Without limiting the foregoing, Contractor shall remove trench spoil along traveled ways daily; grade and vacuum broom surfaces. No water flushing into storm drains or other waterways will be allowed.

D. All dust, mud, spoils, and construction debris shall be removed at least daily from all roadways, ditches, shoulders, and private property (fills or spoils placed on private property at private property owner's written request excepted).

E. Disposal of Materials:

1. As part of the scope of Work included within the Contract Sum, Contractor shall be fully responsible for disposing of all construction debris, dirt, and spoils resulting from the Work.

2. All waste materials, debris, dirt, and rubbish shall be disposed of at sites to be chosen by Contractor in accordance with applicable local, state, and federal regulations.

3. Contractor is cautioned that the County of Santa Clara and cities within the county have regulations governing the disposal of rubble, broken pavement, and similar materials.

4. Contractor shall become familiarized with the requirements of the agency having jurisdiction over any contemplated disposal site and shall comply with all such requirements.

F. All excess soil from performance of Work shall be disposed at a Class I, II, or III landfill at sites to be chosen by Contractor in accordance with applicable local, state, and federal regulations.

G. If Contractor does not maintain the Site, any affected streets, sidewalks, or other public or private facilities in a clean and safe condition, in the opinion of City, then City shall have the option of using outside equipment to perform the cleanup and such cost will be withheld from the Contract Sum.

1.3 FINAL CLEANING

A. Contractor shall execute final cleaning prior to final inspection, using only properly skilled workers.

B. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.

C. Clean Site; mechanically sweep paved areas.

D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 01770

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SUMMARY

A. Section includes description of contract closeout procedures including:

1.2 Removal of Temporary Construction Facilities
1.3 Substantial Completion
1.4 Final Completion
1.5 Final Cleaning
1.6 Project Record Documents
1.7 Material, Equipment, and Finish Data
1.8 Project Guarantee
1.9 Warranties
1.10 Turn-In
1.11 Release of Claims
1.12 Building Inspection Coordination
1.13 Liquidated Damages

1.2 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Restore permanent facilities used during construction to specified condition.

D. Comply with paragraph 1.18 of Section 01500, Removal of Temporary Facilities and Controls.

1.3 SUBSTANTIAL COMPLETION

A. Substantial Completion is defined in Document 00050, References and Definitions. When Contractor considers Work or designated portion of the Work as Substantially Complete, submit written notice to City, with list of items remaining to be completed or corrected.

B. Within reasonable time, City will inspect to determine status of completion.

C. Should City determine that Work is not Substantially Complete, City will notify Contractor in writing, listing all defects and omissions.

D. Contractor shall remedy deficiencies and send a second written notice of Substantial Completion to the City. Upon receipt of proper notice, the City will reinspect the Work. If deficiencies previously noted are not corrected on reinspection, then Contractor shall pay City's cost of the reinspection.

E. When City concurs that Work is Substantially Complete, City will issue a Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified by City.

F. Manufactured units, equipment and systems that require startup must have been started up and run for periods prescribed by City and all associated training completed and all spare parts and "Operation and Maintenance" manuals turned over to the City before a Certificate of Substantial Completion will be issued.

G. A punch list examination will be performed upon Substantial Completion. One follow-up review of punch list items for each discipline will be provided. If further Site visits are required to review punch list items due to incompleteness of the Work by Contractor, Contractor will reimburse City for costs associated with these visits.

1.4 FINAL COMPLETION

A. Final Completion is defined in Document 00050, References and Definitions. Final Completion occurs when Work meets requirements for City's Final Acceptance. When Contractor considers Work is Finally Complete, submit written certification that:

1. Contractor has inspected Work for compliance with Contract Documents, and all requirements for Final Acceptance have been met.

2. Except for Contractor maintenance after Final Acceptance, Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected. Equipment and systems have been tested in the presence of City, and are operative. All user manuals and warranties have been submitted and accepted by the City.

3. Work is complete and ready for final inspection.

B. In addition to submittals required by the Contract Documents, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

C. When City finds Work is acceptable and final closeout submittals are complete, City may, if needed, issue final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order. Should City determine that Work is incomplete or defective:

1. City will notify Contractor, in writing, listing the incomplete or defective items.

2. Contractor shall promptly remedy the deficiencies and notify the City when it is ready for reinspection.

3. When City determines that the Work is acceptable under the Contract Documents, City will request Contractor to make closeout submittals.

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D. Final adjustments of accounts:

1. Submit a final statement of accounting to City, showing all adjustments to the Contract Sum and complete and execute Document 00650, Agreement and Release of Any and All Claims.

2. If so required, City shall prepare a final Change Order for submittal to Contractor, showing adjustments to the Contract Sum that were not previously made into a Contract Modification.

1.5 FINAL CLEANING

Contractor shall comply with all applicable requirements in Section 01740, Cleaning.

1.6 PROJECT RECORD DOCUMENTS

Contractor shall comply with all applicable requirements in Section 01780, Project Record Documents.

1.7 MATERIAL, EQUIPMENT, AND FINISH DATA

Contractor shall submit two sets of data for primary materials, equipment, and finishes as required under each Specification Section prior to final inspection, bound in 8-½ inches by 11 inches three-ring binders with durable plastic covers to City for City's records.

1.8 PROJECT GUARANTEE

A. Requirements for Contractor's guarantee of completed Work are included in Article 9 of Document 00700, General Conditions. Contractor shall guarantee Work done under Contract against failures, leaks, or breaks or other unsatisfactory conditions due to defective equipment, materials, or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of one (1) year from date of Final Acceptance, unless a longer period is specified elsewhere in the Contract Documents.

B. Neither recordation of Final Acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by City shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

C. City may make repairs to defective Work as set forth in paragraph 9.3 of Document 00700, General Conditions, if, within five (5) Working Days after mailing of written notice of defective work to Contractor or authorized agent, Contractor neglects to make or undertake repair with due diligence; provided, however, that in case of leak or emergency where, in opinion of City, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.

D. If, after installation, operation, or use of materials or equipment to be provided under Contract proves to be unsatisfactory to City, City shall have right to operate and use materials or equipment until said materials and equipment can, without damage to City, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

E. Nothing in this Section shall be construed to limit, relieve, or release Contractor's, Subcontractors', and equipment suppliers' liability to City for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees, or Subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by City of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.9 WARRANTIES

A. Execute Contractor's submittals and assemble warranty documents, and installation, operations and maintenance manuals described in Section 01330, Submittals, executed or supplied by Subcontractors, suppliers, and manufacturers.

1. Provide table of contents and assemble in 8½ inches by 11 inches three-ring binder with durable plastic cover, appropriately separated and organized.

2. Include contact names and phone numbers for City personnel to call during warranty period.

3. Assemble in Specification Section order.

B. Submit material prior to final application for payment.

1. For equipment put into use with City's permission during construction, submit within 14 Days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within 14 Days after acceptance, listing date of acceptance as start of warranty period.

C. Warranties are intended to protect City against failure of Work and against deficient, defective and faulty materials and workmanship, regardless of sources.

D. Limitations: Warranties are not intended to cover failures that result from the following:

1. Unusual or abnormal phenomena of the elements

2. Vandalism after Substantial Completion

3. Insurrection or acts of aggression including war

E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.

F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than one year after corrected Work was done, whichever is later.

G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

H. Warranty Forms: Submit drafts to City for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.

1. Warranty shall be countersigned by manufacturers.

2. Where specified, warranty shall be countersigned by Subcontractors and installers.

I. Rejection of Warranties: City reserves right to reject unsolicited and coincidental product warranties that detract from or confuse requirements or interpretations of Contract Documents.

J. Term of Warranties: For materials, equipment, systems, and workmanship, warranty period shall be one (1) year minimum from date of Final Completion of entire Work except where:

1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.

2. Materials, equipment, or systems are put into beneficial use of City prior to Final Completion as agreed to in writing by City.

K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to City free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of City.

1.10 TURN-IN

Contract Documents will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits, keys issued to Contractor during prosecution of Work, and letters from property owners pursuant to paragraph 1.2 of Document 01740, Cleaning, are turned in to City.

1.11 RELEASE OF CLAIMS

Contract Documents will not be closed out and final payment will not be made until Document 00650, Agreement and Release of Any and All Claims, is completed and executed by Contractor and City.

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1.12 BUILDING INSPECTION COORDINATION

When required, Contractor shall coordinate with City Building Inspectors a final inspection as part of the process for obtaining the Substantial Completion certificate.

1.13 LIQUIDATED DAMAGES

If assessment of Liquidated Damages as provided by the Contract Documents occurs during the Project, such assessment shall stop at the date the Contractor achieves Substantial Completion. Contractor shall then have a period as specified in sub-article 3.1 of Document 00520, Agreement, and sub-section 1.6 of Section 01100, Summary of Work, to complete all activities to achieve Final Completion. If Final Completion is not achieved in this period, Liquidated Damages shall resume at the daily rates specified in Document 00520, Agreement, until such time as Final Completion is achieved by the Contractor.

END OF SECTION

SECTION 01780

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for Project Record Documents.

B. Project Record Documents required include:

1. Marked-up copies of Drawings

2. Mark-up copies of Shop Drawings

3. Newly prepared Drawings (e.g., Change Orders).

4. Marked-up copies of Specifications, Addenda, Change Orders, and other Contract Modifications

5. Marked-up Project Data submittals

6. Record Samples

7. Field records for variable and concealed conditions

8. Record information on Work that is recorded only schematically

9. Other Project Record Documents as specified in other Sections of the Contract Documents.

C. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of the Specifications.

D. General Project closeout requirements are included in Section 01770, Contract Closeout.

E. Maintenance of Documents and Samples.

Contractor shall:

1. Store Project Record Documents and Samples in the field office apart from Contract Documents used for construction.

2. Do not permit Project Record Documents to be used for construction purposes.

3. Maintain Project Record Documents in good order and in a clean, dry, legible condition.

4. Make documents and samples available at all times for inspection by the Engineer.

F. The Engineer will provide one full size set of the Drawings and one project manual for Contractor's use for recording as-built conditions.

G. The Engineer will make no progress or final payment if the Project Record Documents are not current at the time the Contractor submits its Application for Payment.

1.2 PROJECT RECORD DRAWINGS

Contractor shall perform the following:

A. Mark-up Procedure: During the construction period, maintain a set of Contract Drawings and Shop Drawings for Project Record Documents purposes. Label each document (on first sheet or page) "PROJECT RECORD" in 2-inch high printed letters. Keep record documents current. Note: A reference by number to a Change Order, Construction Change Directive, RFI, RFP, Field Instructions, or other such document is not acceptable as sufficient record information on any record document. Do not permanently conceal any Work until required information has been recorded.

1. Mark all Project Record Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

   a. Dimensional changes to the Drawings.
   b. Revisions to details shown on the Drawings.
   c. Depths of various elements of foundation in relation to main floor level or survey datum.
   d. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
   e. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
   f. Establish locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stub outs, invert elevations, and similar items.
   g. Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stub outs, invert elevations, and similar items.
   h. Actual numbering of each electrical circuit.
   i. Field changes of dimension and detail.
   j. Revisions to routing of piping and conduits.
   k. Revisions to electrical circuitry.
   l. Actual equipment locations.
   m. Duct size and routing.
   n. Changes made by Change Order, Construction Change Directive, or Field Instruction..
   o. Details not on original Contract Drawings.

2. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

3. Mark Project Record Drawing sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.

4. Mark important additional information that was either shown schematically or omitted from original Drawings.

5. Note Construction Change Directive numbers; Field Instruction numbers; alternate numbers, Change Order numbers, and similar identification.

6. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, Subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.

   a. Accurately record information in an understandable and legible drawing technique.
   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

B. Preparation of Record Drawings: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with the Engineer; furnish a full set of corrected Shop Drawings to the Engineer; make corrections on the mark-up Project Record Drawings from hand-drawn drawings; and provide to the Engineer the Contractor's mark-up Project Record Drawings and all other information to start the process to prepare a full set of AutoCAD Project Record Drawings.

1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.

2. Refer instances of uncertainty to the Engineer for resolution.

3. Distribution: Whether or not changes and additional information were recorded, organize and bind original marked-up set of prints that were maintained during the construction period into manageable sets. Bind the set with durable paper cover sheets, with appropriate identification, including titles, dates, and other information on cover sheets.

C. Shop Drawings and Samples: Maintain as record documents; legibly annotate Shop Drawings and Samples to record changes made after review.

D. Distribution of Marked-Up Drawings: Submit the marked-up Project Record Drawings set to the Engineer for City's records.

1.3 PROJECT RECORD SPECIFICATIONS

Contractor shall perform the following:

A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

B. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, Change Order, Construction Change Directive, and Field Instruction work, and information on concealed installation that would be difficult to identify or measure and record later. Provide to the Engineer the Contractor's mark-up Project Record Specifications and all other information to start the process to prepare a full set of Microsoft Word Project Record Specifications.

1. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

2. Record the name of the manufacturer, catalog number, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.

3. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.

C. Upon completion of mark-up, submit Project Record Specifications to City for City's records.

1.4 ADDITIONAL REQUIREMENTS FOR FINAL PROJECT RECORD DOCUMENTS

A. Subsequent work is highly dependent on the accuracy of the as-built site conditions, including the actual rough grade elevations. Contractor shall take particular care to provide complete and accurate as-built information of the rough grade elevations on the mark-up Project Record Drawings for the City's use for subsequent work.

B. After Substantial Completion and before Final Completion, the Engineer will carefully transfer all data shown on the Contractor's mark-up Project Record Drawings to the corresponding computer files, coordinating the information as required.

C. Contractor shall clearly indicate at each affected detail and other drawings a full description of changes made during construction, and the actual location of items as previously specified.

D. Contractor shall "cloud" all affected areas.

E. Contractor shall stamp each Record Drawing with the following information:

1. Project Record Document.

2. Prepared by: Contractor's name, permanent address.

3. Date prepared.

4. Contractor's signature.

5. City Project number.

1.5 PROJECT RECORD PRODUCT DATA

Contractor shall perform the following:

A. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.

1. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.

4. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.

5. The Contractor is responsible for mark-up and submittal of Project Record Product Data for the Work.

6. Upon completion of mark-up, submit a complete set of Project Record Product Data to the Engineer for City's records.

B. Material, Equipment, and Finish Data

1. Provide data for primary materials, equipment and finishes as required under each Specification Section.

2. Submit two sets prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.

3. Arrange by Specification division and give names, addresses, and telephone numbers of Subcontractors and suppliers.

List:

a. Trade names.
b. Model or type numbers.
c. Assembly diagrams.
d. Operating instructions.
e. Cleaning instructions.
f. Maintenance instructions.
g. Recommended spare parts.
h. Product data.

1.6 MISCELLANEOUS PROJECT RECORD SUBMITTALS

Contractor shall perform the following:

A. Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Engineer for City's records.

B. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:

1. Field records on excavations and foundations
2. Field records on underground construction and similar work
3. Survey showing locations and elevations of underground lines
4. Invert elevations of drainage piping
5. Surveys establishing building lines and levels
6. Authorized measurements utilizing unit prices or allowances
7. Records of plant treatment
8. Ambient and substrate condition tests
9. Certifications received in lieu of labels on bulk products
10. Batch mixing and bulk delivery records
11. Testing and qualification of tradespersons
12. Documented qualification of installation firms
13. Load and performance testing
14. Inspections and certifications by governing authorities
15. Leakage and water-penetration tests
16. Fire resistance and flame spread test results
17. Final inspection and correction procedures

1.7 RECORDING

Contractor shall post changes and modifications to the Contract Documents as they occur. Do not wait until the end of the Project. The Engineer may periodically review Project Record Documents to assure compliance with this requirement.

1.8 SUBMITTAL

Contractor shall perform the following:

A. At completion of Project, deliver Project Record Documents to the Engineer.

B. Accompany submittal with transmittal letter containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Number and title of each Project Record Document
5. Certification that each document as submitted is complete and accurate
6. Contractor's signature

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TECHNICAL PROVISIONS
(DIVISION 2)

TABLE OF CONTENTS

Note: For the purpose of assisting users of the Technical Provisions in making cross-references to the Caltrans Standard Specifications when necessary, the City has maintained a degree of consistency and continuity in the numbering system of the Technical Provisions. The numbering sequence for the Technical Provisions is intended to include the corresponding Caltrans Standard Specifications Section numbers as the last two digits in each respective Section number of the Technical Provisions.

Division	Section	Title
2		**TECHNICAL PROVISIONS**
	02005	Trench and Excavation Safety
	02007	Storm Water Pollution Prevention
	02010	Site Conditions and Dust Control
	02016	Clearing and Grubbing
	02019	Earthwork
	02020	Landscaping and Irrigation
	02024	Lime Stabilization
	02026	Aggregate Base
	02027	Cement Stabilization
	02037	Bituminous Seals
	02039	Asphaltic Concrete Pavement, Resurfacing, and Berms
	02040	Portland Cement Concrete Pavement
	02062	Furnishing and Installing Pipe
	02070	Storm and Sanitary Sewer Manholes, Drainage Structures, and Miscellaneous Structures
	02071	Water Mains and Services
	02073	Portland Cement Concrete Curb, Gutter, Sidewalk, Walkway, Curb Ramp, and Driveway
	02083	Redwood Headers and Barricades
	02084	Traffic Stripes, Pavement Marking, and Pavement Markers
	02086	Signals, Lighting, and Electrical Systems

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SECTION 02005

TRENCH AND EXCAVATION SAFETY

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing all labor, equipment, materials and incidentals required to design, construct, maintain and remove all shoring, sheeting, bracing, lagging, cribbing, piling, or other types of support for the walls of open excavations and trenches required for the construction of the project in accordance with all applicable laws, including Section 6705 of the Labor Code of the State of California, concerning trench excavation safety plans.

2.0 SAFETY PLAN

2.1 TRENCH AND EXCAVATION SAFETY PLAN

Before beginning excavation for a trench five (5') feet or more in depth, or of any excavation that requires shoring, the Contractor shall submit to the Engineer for review of a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazards of caving ground due to excavation. Such plan shall be submitted at least five (5) days before the Contractor intends to begin work on the excavation. If such plan varies from the shoring system standards established by the Construction Safety Orders of the State Division of Occupational Safety and Health, the plan shall be prepared by a California Registered Civil or Structural Engineer and shall be submitted along with calculations and other supporting documentation to the Engineer at least ten days prior to the start of trench excavation.

Nothing herein shall be deemed to allow the use of shoring, sloping, or protective systems less effective than that required by the Construction Safety Orders of the Division of Occupational Safety and Health.

2.2 PERMITS REQUIRED

Contractor shall obtain the necessary permits from the State of California Division of Occupational Safety and Health prior to performance of any work requiring such permits.

3.0 CONSTRUCTION

3.1 INSTALLATION

The Contractor shall furnish and install all sheet piling, shoring, bracing, lagging or other devices as a precaution against caving in or sloughing in of the sides of any excavation in conformance with the rules of the State Division of Occupational Safety and Health. The protection of adjacent structures and existing facilities from ground movement due to excavation and the elimination of the element of danger to life, property, or to existing improvements is the intent of these requirements. Additional supports requested by the Engineer shall in no way relieve the Contractor of his responsibility for the sufficiency of its precautions.

Unless specifically allowed by the Engineer, sloping of a trench wall will not be approved for any trench made within or adjacent to a paved surface; shoring, bracing, or other means of positive support shall be required.

3.2 REMOVAL

All trench and excavation support materials shall, unless specifically allowed by the Engineer, be removed during backfilling. In addition, they shall be removed in such a manner as to prevent any movement of the ground or damage to the piping or other structures.

4.0 MEASUREMENT AND PAYMENT

All work involved in providing plans, for obtaining permits, for furnishing, installing and removing the Trench Excavation and Safety work in accordance with the requirements of this Section will be paid for at a lump sum price, unless otherwise specified in the Contract Documents.

When the Contract Documents do not include a contract pay item for Trench Excavation and Safety, full compensation for any necessary Trench Excavation and Safety required to perform the construction operations specified shall be considered as included in the price paid for the other bid items of work involved and no additional compensation will be allowed therefore.

Payment, whether by separate bid item or as included in other bid items, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in performing the Trench Excavation and Safety work as required by the Contract Documents and as directed by the Engineer.

END OF SECTION

SECTION 02007

STORM WATER POLLUTION PREVENTION

1.0 GENERAL

1.1 GENERAL

Storm water pollution is a major source of water pollution. To help combat the problems of storm water pollution, federal, state, and city governments have developed a program for monitoring and permitting discharges to municipal storm drain systems, creeks, rivers, and the San Francisco Bay.

1.2 DEFINITIONS

ABAG – Association of Bay Area Governments

Adequate BMPs – Best Management Practices effective for minimizing erosion, controlling sediment onsite, containing materials and wastes, and preventing storm water pollution, such as those described in the latest revisions of the Regional Board's Erosion and Sediment Control Field Manual, the California Stormwater Quality Association's Stormwater Management Practices Handbook for Construction, the ABAG Manual of Standards for Erosion & Sediment Control Measures, or other appropriate references.

BASMAA – Bay Area Stormwater Management Agencies Association

BMP – Best Management Practices.

CASQA – California Stormwater Quality Association.

Erosion Controls - Practices designed to prevent the process by which soil particles are removed from the land surface by wind, water, and/or gravity.

Illicit Discharge – Any non-storm water discharge to a storm drain or watercourse, except for conditionally exempted discharges allowed under the Program's NPDES permit.

NOI – Notice of Intent.

NOI Site – A construction site of a size or nature to require coverage under the State's Construction Activity General Permit.

NPDES – National Pollution Discharge Elimination System.

RWQCB-SFBR – Regional Water Quality Control Board – San Francisco Bay Region.

SCVURPPP - Santa Clara Valley Urban Runoff Pollution Prevention Program

Sediment Controls - Practices designed to remove sediments (soil particles, clays, sands, and other minerals) from stormwater before they are transported off-site or reach a storm drain inlet, creek, river, or other waterways.

Significant Erosion Potential – Conditions created by land disturbance activities that require a grading permit, as defined by local ordinance, or by discharges of storm water runoff over areas with erodable soils.

Site Design Measures - Methods of laying out a proposed development so as to reduce impervious surface area, especially directly-connected impervious area, maximize permeability, maximize choices for mobility, use drainage as a design element, and protect sensitive natural areas.

Source Control Measures – Structural controls or operational practices designed to prevent or limit pollution generation where it is created so that pollutants do not contact stormwater. Structural or operational measures designed to infiltrate or detain runoff prior to its entering the storm drain system to reduce the volume and velocity of runoff as well as provide some natural treatment.

SWPPP – Storm Water Pollution Prevention Plan.

SWRCB – State of California Water Resources Control Board.

Treatment Controls - Landscape or structural controls designed to treat or reduce the amount of pollutants in stormwater or to reduce the amount or rate of stormwater. Treatment controls include detention basins, water quality wetlands, biofilters, vertical filters, solid separators, and manufactured inserts.

Wet Season – As defined by local ordinance (typically October 15 to April 15), or as determined by current conditions.

1.3 CONSTRUCTION GENERAL REQUIREMENTS

Construction activities can significantly alter natural drainage patterns and pollute storm water runoff. Runoff picks up pollutants as it flows over the ground or paved areas and carries these pollutants into the storm drain system. Common sources of illicit discharge from construction sites include: sediments from soil erosion; construction materials and waste (e.g., paint, solvents, concrete, drywall); landscaping runoff containing fertilizers and pesticides; and spilled oil, fuel, and other fluids from construction vehicles and heavy equipment.

The City has developed storm water management programs that include requirements for construction activities. Construction projects within the City will need to comply with these requirements. If a project construction activity disturbs one acre or more, the Responsible Party (Contractor) must file a Notice of Intent (NOI) to obtain coverage under the General Construction Activity Permit issued by the State Water Resources Control Board, and prepare a Storm water Pollution Prevention Plan (SWPPP). Projects, both private and municipal, with less than one acre disturbed are required to follow appropriate storm water pollution prevention measures.

The SWPPP must identify appropriate storm water pollution prevention measures or best management practices (BMPs), to reduce pollutants in storm water discharges from the construction site both during and after construction is completed. A best management practice or BMP is defined as any program, technology, process, practice, operating method, measure, or device that controls, prevents, removes, or reduces pollution. BMPs, for construction activities, shall be used for all size construction projects, adequate for the season and site conditions.

For more information on the General Permit, designing storm water quality controls, or producing a Storm water Pollution Prevention Plan, please refer to the California Stormwater Quality Association's Stormwater Best Management Practice Handbook for Construction Activity, the RWQCB-SFBR's Erosion and Sediment Control Field Manual and its Guidelines for Construction Projects, or the Santa Clara Valley Urban Runoff Pollution Prevention Program.

The requirements in this Section incorporate those described in the latest revision of the brochure "Blueprint for a Clean Bay – Best Management Practices to Prevent Stormwater Pollution from Construction-Related Activities" prepared by the Bay Area Stormwater Management Agencies Association (BASMAA) and the Santa Clara Valley Urban Runoff Pollution Prevention Program, based on the RWQCB-SFBR Erosion and Sediment Control Manual, CASQA's California Storm Water Best Management Practice Handbook for Construction Activity, and the Association of Bay Area Governments (ABAG) Manual of Standards for Erosion & Sediment Control Measures.

1.4 POST-CONSTRUCTION GENERAL REQUIREMENTS

New and redevelopment projects can significantly alter natural drainage patterns and pollute storm water runoff by increasing the amount of impervious surface area and amounts and types of pollutants entering the runoff. Runoff picks up pollutants as it flows over the ground or paved areas and carries these pollutants into the storm drain system. Because impervious areas do not allow for infiltration of water, the amount and flow rate of runoff increases when development occurs, which may be detrimental to the receiving waters due to resulting erosion and stream scour.

The City has developed storm water management programs that include requirements for post-construction activities to ensure compliance with Provision C.3. of the SCVURPPP NPDES permit. The General Construction permit also contains requirements for permanent stormwater quality controls. The Responsible Party (Contractor) must comply with both the General Construction permit requirements and with Provision C.3. of the SCVURPPP NPDES permit. Public and private new development and redevelopment projects within the City will need to comply with these requirements.

All developments should consider the inclusion of site design and source control measures. Depending on the amount of impervious surface coverage the proposed project will have, the project may need to meet the additional treatment control requirements of the SCVURPPP NPDES permit. Furthermore, maintenance programs shall be set up to ensure proper maintenance and operation of the treatment controls over the life of the project. The City must also manage increases in peak runoff flow volume of certain project where such increased flow and/or volume can cause increased erosion of creek beds and banks, silt pollution generation, or other impacts to beneficial uses. Contact the City for more information on the definition and requirements related to Provision C.3.

For more information on Provision C.3 of the SCVURPPP NPDES Permit or designing storm water quality controls please refer to the latest revision of the Santa Clara Valley Urban Runoff Pollution Prevention Program C.3. Handbook, BASMAA's Start at the Source manual and the CASQA's BMP Handbooks New Development and Redevelopment.

2.0 GENERAL PRACTICES

2.1 GENERAL PRACTICES

In the following subsections are some general principles which are to be followed that can significantly reduce Illicit Discharge from construction activity and help make compliance with storm water regulations easier.

2.2 EMPLOYEE AND SUBCONTRACTOR TRAINING AND AWARENESS

The Contractor shall train all employees/subcontractors on the storm water pollution prevention requirements contained in this Section. The Contractor shall further inform subcontractors of the storm water pollution prevention contract requirements and include appropriate subcontract provisions to ensure that these requirements are met.

2.3 EMERGENCY RESPONSE PLAN

Contractor shall have an Emergency Response Plan, including 24-hour contact phone numbers, and file a copy with the City.

2.4 IDENTIFICATION AND PROTECTION OF STORM DRAINAGE FACILITIES

Identify all storm drains, drainage swales, creeks, and rivers located near the construction site and make sure all subcontractors are aware of their locations to prevent pollutants from entering them.

Protect all storm drain inlets using filter fabric cloth or other best management practices to prevent sediments from entering the storm drainage system during construction activities.

For any new storm drain inlets constructed as part of the project, City will provide and install “No Dumping Flows to Bay” plaques near each catch basin.

2.5 SITE AND MATERIAL PROTECTION

Avoid contaminating clean runoff from areas adjacent to construction site by using berms and/or temporary or permanent drainage ditches to divert water flow around the site. Reduce storm water runoff velocities by constructing temporary check dams and/or berms where appropriate.

Keep materials out of the rain – prevent runoff pollution at the source. Schedule clearing or heavy earth moving activities for periods of dry weather. Cover exposed piles of soil, construction materials and wastes with plastic sheeting or temporary roofs. Before it rains, sweep and remove materials from surfaces that drain to storm drains, creeks, rivers, or channels.

Store containers of paints, chemicals, solvents, and other hazardous materials in accordance with secondary containment regulations. It is recommended that these materials and wastes be covered, as needed, to avoid potential management of collected rainwater as a hazardous waste.

Do not over-apply pesticides or fertilizers and follow the manufacturers’ instructions for mixing and applying materials.

Keep an adequate (depending on season) supply of erosion and sediment control materials on-site throughout the year.

Be sure that trailers carrying your materials are covered during transit. If not, the hauler may be cited and fined.

2.6 MATERIAL WASTE MANAGEMENT

Keep pollutants off exposed surfaces. Place trash cans around the site to reduce litter. Dispose of all non-hazardous construction wastes in covered dumpsters or recycling receptacles by the end of each working day. Dumpsters and recycling receptacles shall be emptied frequently enough to prevent overflowing. Only City approved solid waste hauling companies shall be used by Contractor. Contractor is responsible for keeping site clean every day.

Practice source reduction – reduce waste by ordering only the amount you need to finish the job.

Recycle leftover materials to the maximum extent practicable. Materials such as concrete, asphalt, scrap metal, solvents, degreasers, cleared vegetation, paper, rock, and vehicle maintenance materials such as used oil, antifreeze, batteries, and tires are recyclable. Any current City requirements for construction and demolition recycling shall be followed.

Dispose of all wastes properly. Materials that cannot be reused or recycled must be taken to an appropriate landfill or disposed of as hazardous waste. Never throw debris into channels, rivers, creeks, or into wetland areas. Never store or leave debris in the street or near a waterway where it may contact runoff.

Illegal dumping is a violation subject to a fine and/or time in jail. Be sure that trailers carrying materials to and from the site are covered during transit. If not, the hauler may be cited and fined.

2.7 SPILL PREVENTION AND CONTROL

Clean up leaks, drips, and other spills immediately so they do not contact storm water. A stockpile of spill cleanup materials, such as filter fabric, sand/gravel bags, rags and/or absorbents shall be readily accessible on-site. Ensure that all employees know where these materials are and how to use them. The Contractor shall immediately contain and prevent leaks and spills from entering storm drains, and properly clean up and dispose of the waste and cleanup materials. Any spill of material that has entered the storm drainage system shall be immediately reported by calling “911.”

Refuel vehicles and heavy equipment in one designated location on the site following Best Management Practices and take care to clean up spills immediately.

Wash vehicles at an appropriate off-site facility. If equipment must be washed on-site, do not use soaps, solvents, degreasers, or steam cleaning equipment, and prevent wash water from entering the storm drain. Direct wash water to a containment point where it can evaporate and/or infiltrate, if appropriate.

Never wash down pavement or surfaces where materials have spilled. Use dry cleanup methods whenever possible.

2.8 DUST CONTROL AND STREET SWEEPING

If recycled water is used on-site to control dust, it shall not be allowed to enter the storm drainage system.

Clean and sweep roadways and on-site paved areas, at least daily and as often as necessary to remove all materials attributed to the work. When cleaning sediments from streets, driveways and paved areas on construction sites, use dry sweeping methods where possible. If potable water must be used to flush pavement, collect runoff to settle out sediments and protect storm drain inlets. In no event shall the cleaning and sweeping be less than at the end of each working day. Storm Water Pollution Prevention personnel may order more frequent sweeping and cleaning.

3.0 EROSION PREVENTION AND SEDIMENT CONTROL

3.1 PREVENT EROSION AND CONTROL SEDIMENT

The RWQCB-SFBR Erosion and Sediment Control Field Manual, the CASQA California Storm Water Best Management Practices Handbook for Construction Activity and the Association of Bay Area Governments Manual of Standards for Erosion and Sediment Control provide specific details and design criteria for erosion and sediment control plans, which the Contractor shall use.

Protect storm drain inlets from sediment-laden runoff. Storm drain inlet protection devices include sand/gravel bag barriers, filter fabric fences, block and gravel filters, and excavated drop inlet sediment traps or a combination of these.

Delineate clearing limits, easements, setbacks, sensitive or critical areas, trees, drainage courses, and buffer zones to prevent excessive or unnecessary disturbances and exposure. Remove existing vegetation only when absolutely necessary. Use protective fencing and erosion control blankets (e.g., jute or straw matting, glass fiber or excelsior matting, mulch netting) where necessary.

Prevent construction vehicle tires from tracking soil onto adjacent streets by constructing a temporary stone pad with a filter fabric under liner near the site exit where dirt and mud can be removed.

Phase grading operations to reduce disturbed areas and time of exposure. Excavation and grading during wet weather should be avoided.

Collect and detain sediment-laden runoff and water-generated by de-watering in sediment traps (and excavated or bermed area or constructed device) to allow sediments to settle out prior to discharge.

Performance of erosion and sediment controls is dependent on proper installation, routine inspections and maintenance of the controls. Most of the BMP's are temporary and if left alone can quickly fall into disrepair and/or become ineffective. Routine inspections and maintenance, particularly before and after a storm event, shall be part of any erosion and sediment control plan, regardless of the size of project/improvement.

4.0 SAW CUTTING PROCEDURES

4.1 GENERAL

When making saw-cuts in pavement, use as little water as possible. During saw cutting, cover catch basins using control measures, such as filter fabric, sand/gravel bags, and fine gravel dams, to keep slurry out of the storm drain system. When protecting a catch basin, the entire opening should be covered with filter fabric.

All liquid used to facilitate saw-cutting shall be vacuumed immediately and not allowed to dry in place. Disposal of collected liquids/solids shall be according to Best Management Practices.

5.0 ASPHALTIC MATERIAL CONSTRUCTION

5.1 GENERAL

Road paving, surfacing, and asphalt removal present numerous opportunities for storm water pollution from the asphalt mix, seal coats, or excavated material to enter the storm drain.

5.2 ASPHALTIC MATERIALS PRACTICES AND WASTE MANAGEMENT

Apply concrete asphalt, and seal coat during dry weather to prevent contaminants from contacting storm water runoff.

Cover storm drain inlets and manholes when paving or applying seal coat, slurry seal, fog seal, etc.

Always park paving machines over drip pans or absorbent materials.

Excess sand (placed as part of a sand seal or to absorb excess oil) shall not be swept or washed into gutters, storm drains, or creeks. Instead, the Contractor shall either collect the sand and return it to the stockpile, or dispose of it appropriately.

The Contractor shall not use water to wash down asphalt or concrete pavement.

Marking paint shall be removed from paving using dry methods such as a wire brush and vacuum. If water is used, all wastewater shall be vacuumed and disposed of according to Best Management Practices.

6.0 CONCRETE, GROUT, AND MORTAR WASTE MANAGEMENT

6.1 CONCRETE MATERIALS STORAGE AND MIXING

Store dry and wet materials under cover, protected from rainfall and runoff.

Avoid mixing excess amounts of fresh concrete or cement mortar on-site.

6.2 CONCRETE TRUCK/EQUIPMENT WASH OUT

Never wash out concrete trucks or equipment into streets, gutters, storm drains, or creeks.

Wash out concrete transit mixers only in designated washout areas where the water will flow into settling ponds or onto dirt or stockpiles of aggregate base or sand. Pump water from settling ponds and remove off-site. Whenever possible, recycle washout by pumping back into mixers for reuse. Dispose of hardened concrete in recycling and disposal dumpsters.

6.3 EXPOSED AGGREGATE CONCRETE WASH WATER

Wash down exposed aggregate concrete only when the wash water can: (1) flow onto a dirt area; or (2) drain onto a bermed surface from which it can be vacuumed from a catchment created and be properly disposed. If necessary, divert runoff with temporary berms. Make sure runoff does not reach gutters or storm drains.

Never wash sweepings from exposed aggregate concrete into a street or storm drain. Collect and return to aggregate base stockpile, or dispose with trash.

7.0 PAINT MATERIALS WASTE MANAGEMENT

7.1 PAINTING MATERIALS AND WASTE MANAGEMENT

Paint, solvents, chemicals, and waste materials shall be stored in compliance with all applicable local, State and Federal regulations. The storage of these materials will be in a designated area that will not allow run-on of storm water or runoff of spills.

Disposal of excess thinners, solvents, oil-based paint shall be as hazardous waste. When they are thoroughly dry, empty paint cans, used brushes, rags, absorbent materials, and drop cloths are no longer hazardous and may be disposed of as garbage.

7.2 PAINTING CLEANUP

Never clean brushes or rinse paint containers into a street, gutter, storm drain, or creek.

For water-based paints, paint out brushes to the extent possible and rinse to a drain leading to the sanitary sewer (i.e. indoor plumbing).

For oil-based paints, paint out brushes to the extent possible, and filter and reuse thinners and solvents. Dispose of unusable thinners and residue as hazardous waste.

Recycle, return to supplier or donate unwanted water-based (latex) paint. You may be able to recycle clean empty dry paint cans as metal.

Dried latex paint may be disposed of in the garbage.

Unwanted paint (that is not recycled), thinners, and sludge must be disposed of as hazardous waste.

8.0 POST-CONSTRUCTION CONTROL

8.1 General Practices

The Responsible Party shall meet the requirements for permanent controls as described in the General Construction Activity permit, as applicable; and the requirements indicated in Provision C.3. of the SCVURPPP NPDES permit.

8.2 Site Design and Source Controls

The Responsible Party will consider inclusion of site design and source controls for all projects. Responsible Parties are directed to the City's "Guidance on Stormwater BMP Selection" for a list of preferred measures. The CASQA California Storm Water Best Management Practices Handbook for New and Redevelopment and the Bay Area Stormwater Management Agencies Association's Start at the Source provide specific details and design criteria for post-construction controls, including source controls, and site design measures, which the Responsible Party may use to comply with Provision C.3 of the SCVURPPP NPDES permit. Responsible Parties are also directed to the City's "Guidance on Stormwater BMP Selection" for a list of preferred measures.

8.3 Treatment Controls

The CASQA California Storm Water Best Management Practices Handbook for New and Redevelopment and the Bay Area Stormwater Management Agencies Association's Start at the Source provide specific details and design criteria for post-construction controls, including treatment controls, which the Responsible Party shall use to comply with Provision C.3 of the SCVURPPP NPDES permit and the permanent control requirements of the General Construction Activity permit.

8.4 Maintenance Program for Post-Construction Controls

Performance of treatment and source controls is dependent on proper installation, routine inspections and maintenance of the controls. Most permanent BMPs, if left alone, can quickly fall into disrepair and/or become ineffective. Routine inspections and maintenance shall be part of the BMP, regardless of the size of project/improvement. The maintenance and inspection program for post-construction controls shall meet the requirements of Provision C.3 of the SCVURPPP NPDES permit.

9.0 ENFORCEMENT POLICIES

Failure to follow storm water pollution prevention regulations and requirements, and to provide adequate BMP's will result in enforcement actions by appropriate agencies. Enforcement actions that could result include issuance of Notice of Violation of City Codes, Administrative Citations with fines, billing of costs for cleanup, issuance of stop work order for the subject project, referral to the appropriate State and Federal enforcement agencies, and filing criminal complaints. Contractor is reminded that they are responsible for their sub-contractors' actions.

10.0 MEASUREMENT AND PAYMENT

All work involved in providing plans, obtaining permits and otherwise complying with Storm Water Pollution Requirements in accordance with the requirements of this Section will not be paid for as a separate item but is considered paid for under the various items of work provided in the Contract Documents and no additional compensation will be allowed therefore.

Payment included in other bid items, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in performing Storm Water Pollution Requirements as required by the Contract Documents and as directed by the Engineer.

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SECTION 02010

SITE CONDITONS AND DUST CONTROL

1.0 GENERAL

1.1 DESCRIPTION

The work shall consist of keeping the site clean and free from rubbish and debris during all phases of construction, including when work is suspended and until final acceptance. The contractor shall also abate dust nuisance by cleaning, sweeping and sprinkling with water or other means as necessary. All work shall comply with the requirements of Section 02007, Storm Water Pollution Prevention.

2.0 MATERIALS

2.1 WATER

Water for dust control and general cleaning shall be from the City's potable water system, the recycled water system, or another approved source. Prior to use of the City's potable water from a hydrant or recycled water, the contractor must obtain a water meter from the City Water and Sewer Utility and arrange payment for water used.

3.0 CONSTRUCTION

3.1 SITE CONDITIONS

Materials and equipment that are delivered to the jobsite shall be stored in a neat and safe manner to minimize impacts to pedestrian and vehicle traffic and private property, to the satisfaction of the Engineer. Driveways, sidewalks, all traffic lanes, pedestrian and bicycle access, and wheelchair ramps shall be kept open at all times unless specific, written permission is granted by the Engineer to close them. When required by the Engineer, alternative facilities or detours shall be installed prior to closure. Materials and equipment shall be removed from the jobsite as soon as they are no longer needed. Care shall be taken to prevent spillage on the jobsite and haul routes. Any such spillage shall be immediately removed and the area cleaned-up.

Materials and equipment shall be stored in such a manner as to not prevent the normal drainage flows, unless an approved alternative is provided. Runoff from construction activities including but not limited to saw cutting, washing of areas, sweeping, dust control, compaction activities, etc. shall be done so that no dirt, silt and other non-acceptable materials are discharged into flood control channels in accordance with Section 02007, Storm Water Pollution Prevention.

Upon completion, and before the Work can be considered acceptable, the Contractor shall clean all areas occupied by him in connection with the work, and remove all debris, excess materials and waste materials. Contractor's temporary structures and equipment shall be removed from the jobsite unless otherwise required by the Contract Documents. The entire project shall be left in a neat, clean, and presentable condition, acceptable to the Engineer.

The Contractor shall immediately remove spillage or tracking resulting from hauling operations along or across any private or public traveled way.

Fences, mail boxes, signs, backfill behind curbs and sidewalks, replacement of landscaping and irrigation systems, and other pre-existing facilities to remain which were damaged, destroyed or moved during construction, shall be restored or replace to equal or better condition than that which existed at the start of the work. "Equal or better" shall be determined by the Engineer. Effected building surfaces, including window glass, shall be left in a clean condition.

3.2 DUST CONTROL

The Contractor shall control dust, resulting from the Contractor's performance of the work either inside or outside the right-of-way. It shall be the Contractor's responsibility to insure that dirt, dust or mud originating from any of the Contractor's operations either inside or outside of the work area is controlled in such a manner that it does not create a nuisance to private property or the public. The Engineer shall be the final authority on determining if dust is a nuisance.

3.3 PERFORMANCE

The Contractor shall be responsible for dust control. If the Engineer determines that the Contractor's work is creating a nuisance he may specifically order dust control measures be implemented. When ordered by the Engineer, the Contractor shall clean up and/or provide dust control for the work site as soon as possible but in no case shall it take more than one (1) day. If the lack of cleanup is causing safety problems, the 1-day provision is void and the problem shall be resolved immediately. If the Contractor fails to clean up and/or provide dust control for the work site within one (1) day after receiving notice, or immediately as in the case of safety concerns, the City, at its own option, may clean up the site and charge the Contractor the full cost of the cleanup. The cost shall be paid for by the Contractor separately or may be deducted from the progress/final payments to the Contractor as the City incurs such costs.

4.0 PAYMENT

All work involved in providing Cleanup and Dust Control work in accordance with the requirements of this Section will not be paid for as a separate item but is considered paid for under the various items of work provided in the Contract Documents and no additional compensation will be allowed therefore.

Payment included in other bid items, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in performing Cleanup and Dust Control as required by the Contract Documents and as directed by the Engineer.

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SECTION 02016

CLEARING AND GRUBBING

1.0 GENERAL

1.1 DESCRIPTION

This work shall conform to Section 16 of the Standard Specifications, where applicable, and shall consist of removing all objectionable material from within the area of the work including, but not limited to, the street right-of-way, bridge construction areas, road approaches, material sites within the right-of-way, areas through which ditches and channels are to be excavated and such other areas as may be indicated in the Contract Documents. Section 16-1.03D, Disposal of Materials, of the Standard Specifications shall not apply. All materials removed under this Section 02016 shall become the property of the Contractor and shall be disposed of offsite by the Contractor. Should the Contractor produce evidence, acceptable to the Engineer, that any part of the material is suitable, the suitable material may be disposed of on the Work Site in a method and location acceptable to the Engineer. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 MEASUREMENT AND PAYMENT

Clearing and Grubbing shall be paid for at a lump sum price unless otherwise provided for in the Contract Documents.

When the Contract Documents do not include a contract pay item for clearing and grubbing, full compensation for any necessary clearing and grubbing to be performed shall be considered as included in the prices paid for the various items of work involved and no additional compensation shall be allowed therefore.

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SECTION 02019

EARTHWORK

1.0 GENERAL

1.1 DESCRIPTION

Earthwork shall comply with Section 19 of the Standard Specifications except as provide for in this Section 02019 or elsewhere in the Contract Documents. Specifically excluded from this Section is trench excavation that is covered in Section 02062, Furnishing and Installing Pipe. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 GRADING

2.1 GRADE

The grading plane shall be as indicated in the Contract Documents. The subgrade, immediately prior to placing subsequent material thereon, shall be free of loose, deleterious and/or segregated material and shall be smooth and true to the required grade and cross sections.

2.2 GRADE TOLERANCE

The subgrade surface immediately prior to placing subsequent layers shall not vary more than 0.04 feet from the design elevation.

3.0 EXCAVATION

3.1 DESCRIPTION

Excavation shall comply with Section 19-2 of the Standard Specification as far as it is applicable. Pipeline excavation is provided for in Section 02062, Furnishing and Installing Pipe. Blasting will not be allowed unless specifically provided for in the Contract Documents.

3.2 MEASUREMENT AND PAYMENT

Unless otherwise specified in the Contract Documents, Earthwork will be paid by the square foot and the limit of measurement shall be from right-of-way line to right-of-way line or to the limits shown on the Contract Documents.

The price per square foot shall include excavating, sloping, rounding tops and ends of excavation and/or embankment, loading, hauling, overhaul, depositing, spreading and compacting the material complete in place; preparing subgrade; importing, placing, and compacting approved material where unsuitable material has been removed; filling and compacting holes, pits, and other depressions; importing approved suitable material, if required, when backfilling excavations resulting from the removal of structures and other facilities; placing selected material where required; furnishing and applying water; and grading and filling to conform the work to adjacent property.

The above price and payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, complete in place, as shown in the Contract Documents, and as directed by the Engineer.

When the Contract Documents do not include a contract pay item for Earthwork as above specified, full compensation for any necessary Earthwork required to perform the construction operations specified shall be considered as included in the prices paid for the other items of work involved and no additional compensation will be allowed.

4.0 EMBANKMENT CONSTRUCTION

4.1 DESCRIPTION

Embankment construction shall consist of constructing embankments or other areas of fill including preparation of the areas upon which embankment materials are to be placed. Material selection, compaction and slope preparation shall be as indicated in the Contract Documents.

4.2 CONSTRUCTION

Embankments shall be constructed in layers. The loose thickness of each layer of embankment material before compaction shall not exceed eight inches (8”).

At the time of compaction, the moisture content of embankment material shall be such that the specified relative compaction will be obtained and the embankment will be in a firm and stable condition. Embankment material, which contains excessive moisture, shall not be compacted until the material is dry enough to obtain the required compaction. Embankment material shall not have a moisture content greater than 2% above optimum. Work necessary to dry overly wet material shall be considered incidental and is included in the prices paid for other items of work involved and no additional compensation will be allowed.

All areas to receive embankment construction shall have the existing surface excavated to a minimum depth of six inches (6”) to remove all vegetable matter and/or other unsatisfactory material. Refer to Section 02016, Clearing and Grubbing.

Embankment material shall be of a quality suitable for the purpose intended, free of vegetable matter or other unsatisfactory material. Clods or hard lumps of earth over six inches (6”) in greatest dimension shall be broken up before compacting the material in embankment. Rocks over six inches (6”) in greatest dimension shall be removed from embankment material.

When embankment is to be made and compacted against existing embankments, or where embankment is built 1/2 width at a time, the slope of old or new embankments shall be cut into a minimum of 6 feet horizontally as the work is brought up in layers.

The flat surfaces of all fill, placed under this Section 02019, shall not vary more than half an inch (1/2”) from the design elevations.

4.3 SLOPES

Excavation and embankment slopes shall be finished in conformance with the lines and grades shown in the Contract Documents or as established by the Engineer. All debris and loose material shall be removed. When completed, the average plane of the slopes shall conform to the slopes indicated in the Contract Documents and no point on the completed slopes shall vary from the designated grade by more than two and a half inches (2.5”).

The tops of excavation slopes and the ends of excavations shall be rounded as shown in the Contract Documents or as directed by the Engineer.

4.4 UNSUITABLE MATERIAL

Material below the original ground surface in Earthwork areas that is judged unsuitable for the planned use by the Engineer, shall be excavated and disposed of as directed by the Engineer. Material that is overly wet but otherwise suitable shall not be considered unsuitable for the planned use (see subsection 4.2 above).

When unsuitable material is removed and disposed of, the resulting space shall be filled with material suitable for the planned use as determined by the Engineer. Such suitable material shall be placed and compacted in layers as noted in this Section 02019.

Payment for removal and replacement of unsuitable material shall be paid at the rates approved by the City.

4.5 HAZARDOUS MATERIAL

Pursuant to Section 7104 of the Public Contract Code, the Contractor shall immediately give written notification to the City if any of the following conditions are encountered on the project site.

A. Material that the Contractor believes may be hazardous waste. Hazardous waste is defined as any material that is required to be removed to a Class I, Class II, or Class III disposal site by Section 25117 of the State Health and Safety Code.

B. Subsurface or latent physical conditions differing substantially from those indicated on the plans, specifications and/or any available soil reports, or differing substantially from conditions apparent from field operations.

C. Unknown physical conditions of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work required by the Contract.

The Contractor shall cease all work in the vicinity of the conditions encountered as described above, such that the existing conditions are not disturbed. The Contractor shall protect such site from public access or exposure.

Upon receipt of the above-described written notification, the City shall promptly investigate the field conditions. If the City determines that, due to the nature of the conditions identified in the written notification, the scope of the project has changed, the Contractor shall be directed as to any additional project requirements.

A corresponding change, either an increase or decrease, shall be made in the amount of payment due to the Contractor in accordance with these specifications. If additional work is required of the Contractor, and the additional work is deemed to be a controlling item of work for the project, the City Engineer shall have authority to grant an appropriate number of additional working days to the project.

If the City determines that the condition of the material encountered does not differ from the expected conditions, and is not hazardous waste, as described above, the Contractor shall proceed with the project work as provide by the contract.

4.6 MEASUREMENTS AND PAYMENT

Measurement and payment for constructing embankments shall be as provided in Section 19-6.03 of the Standard Specifications, however, grade tolerance shall be as provided in this Section 02019 and measurement shall be by the cubic yard compacted in place.

5.0 COMPACTION

5.1 GENERAL

Earthwork compaction for the work consists of obtaining the required compaction in all earthwork described in the Contract Documents.

5.2 RELATIVE COMPACTION

The loose thickness of each layer of material before compaction shall not exceed eight inches (8”) unless otherwise noted in the Contract Documents. The relative compaction of each layer shall not be less than 95%.

A. SUBGRADE TRUCK LOAD TEST

The subgrade shall be subjected to a “Truck Load Test” unless waived by the Engineer. The Contractor shall be required to furnish a loaded truck for the purpose of testing the load bearing capacity of the finished subgrade. Total gross load per rear axle shall be 16,000 pounds. Tire pressure must be over 65 psi. If the tested surface shows a visible deflection extending more than 6 inches from the wheel track at the time of loading, or a visible crack remains after loading, the Contractor shall take measures to correct the defective subgrade as approved by the Engineer.

In no case shall the relative compaction of the subgrade be less than required in this Section 02019.

5.3 MEASUREMENTS AND PAYMENT

Full compensation for complying with this section 5.0 shall be considered as included in the prices paid for the work and therefore no additional compensation shall be allowed.

6.0 STRUCTURE EXCAVATION AND BACKFILL, IMPORTED BORROW, AND TRENCH BACKFILL

6.1 DESCRIPTION

Structure excavation and backfill shall comply with Section 19-3 of the Standard Specifications as far as they are applicable and as provided in the Contract Documents. Trench backfill shall be for the backfill of pipe trenches as required in Section 02062, Furnishing and Installing Pipe, and shall be imported material. Sand and pea gravel backfill will not be allowed unless specifically required in the Contract Documents. Consolidating of structure backfill or pipe trench backfill by jetting or ponding is not allowed unless specifically provided for in the Contract Documents.

6.2 TRENCH BACKFILL MATERIAL AND IMPORTED BORROW

Trench backfill material shall consist of Class 2 Aggregate Base in accordance with Section 02026, Aggregate Base.

Imported borrow shall consist of a durable granular material, well graded from coarse to fine. The combined mineral aggregate shall conform to the following gradation when determined by Test Method No. Calif. 202:

Sieve Size	Percent of Passing
1.5"	100
No. 4	40 - 70
No. 200	0 - 30

Imported borrow shall conform to the following quality requirements:

Test	Test Method	Requirements
Resistance (R-value) at 300 psi exudation	301	30 (minimum)
Sand Equivalent	217	20 (minimum)

The Engineer, prior to use, shall approve all imported trench backfill material and imported borrow.

6.3 SAND BACKFILL MATERIAL

Sand backfill will not be allowed for structure backfill or pipe trench backfill unless provided for in the Contract Documents or required by the Engineer. When sand backfill is to be used, it shall be clean and free from clay and organics. It shall be a clean, hard, durable material resulting from natural disintegration and abrasion of granite, quartz, or similar hard rock or by the processing of completely friable sandstone. It shall have a sand equivalent value of not less than 35. The percentage composition by weight as determined by laboratory sieves shall conform to the following grading limits:

Sieve Size	Percent Passing
No. 4	100
No. 10	95 - 100
No. 40	20 - 65
No. 100	5 - 30
No. 200	0 - 5

6.4 COMPACTION-IMPORTED BORROW AND TRENCH BACKFILL

Compaction of trench backfill shall be in accordance with Section 02062, Furnishing and Installing Pipe.

Imported borrow shall be compacted to 95% relative compaction unless otherwise noted in the Contract Documents.

6.5 COMPACTION-SAND BACKFILL

Structural sand backfill shall be placed in loose horizontal, uniform layers not to exceed 1 foot in thickness unless otherwise specified. Method of compaction shall be by vibratory compactors, unless otherwise specified in the Contract Documents. Each layer of sand backfill shall be compacted to a relative compaction of not less than 95 percent of maximum, as determined by Test Method No. ASTM 2922.

Compaction equipment and methods that produce horizontal or vertical earth pressures, which may cause excessive displacement or may damage structures, will not be allowed.

6.6 STRUCTURAL SAND BACKFILL

Structural sand backfill will be measured and paid by the cubic yard in place. Unless otherwise shown in the Contract Documents. The limits for computing pay quantities for structural sand backfill shall be as follows:

A. Horizontal limits will be vertical planes 1 foot outside of the neat lines of footings or structures without footings.

B. The upper limit shall be the finished grading plane.

C. The lower limit shall be a plane at the bottom of completed footings of structures.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

6.7 SAND TRENCH BACKFILL

Payment for sand trench backfill is included in the unit price of the pipe as provided in Section 02062, Furnishing and Installing Pipe.

Where separate payment is provided for sand trench backfill, measurement shall be by the cubic yard, in place, and is computed by using the outside diameter of pipe plus 12 inches as the trench width. The depth of the trench shall be the distance from the subgrade of the covering structural material, or ground surface, whichever is applicable, to the outside bottom of the pipe less the volume occupied by the pipe. The length shall be the length of pipe actually placed. The volume of sand trench backfill thus calculated in cubic yards shall be the volume used for payment purposes.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

6.8 MEASUREMENTS AND PAYMENT

All work involved in performing Structural Excavation and Backfill will be measured and paid for by the cubic yard of material, essentially as provided in Sections 19-3.07 and 19-3.08 of the Standard Specifications. Payment for Pipe Trench Backfill is as provided in this Section 02019, Earthwork, and Section 02062, Furnishing and Installing Pipe.

Measurement for imported borrow, not used in pipe trenches, shall be by cubic yard of material in place. Payment shall be at the bid price per unit of measure and shall include all costs and incidentals involved.

7.0 SURPLUS MATERIAL

7.1 DESCRIPTION

Surplus material from excavation shall become the property of the Contractor and be disposed of outside the limits of the Work unless otherwise shown in the Contract Documents or as directed by the Engineer.

Surplus material from pipe trench excavation shall become the property of the Contractor to be disposed of off the site unless the Contract Documents provide otherwise or as directed by the Engineer.

If the quantity of surplus material is provided in the Contract Documents, the quantity shown or specified is approximate only.

The Contractor shall satisfy itself that there is sufficient material available for the completion of the Work before disposing of any material. Any shortage of material caused by premature disposal of material by the Contractor, shall be replaced by the Contractor and no compensation will be allowed for such replacement.

7.2 MEASUREMENT AND PAYMENT

Payment for handling and/or disposing of surplus material shall be as provided in the Contract Documents. If not addressed in the Contract Documents, disposal of surplus material shall be considered as incidental and included in the various bid items. Payment for disposing of surplus material from pipe trench excavation shall be included in the price paid per lineal feet of pipe in place as provided in Section 02062, Furnishing and Installing Pipe.

8.0 TESTING

8.1 TEST METHODS

In connection with earthwork, tests shall be made in conformance with the following:

TESTS	TEST METHOD
Relative Compaction	ASTM 2922
Maximum Density (Curve)	ASTM 1557
In-place Moisture Content	ASTM 2216
Sand Equivalent	California 217
Resistance Value (R-Value)	California 301
Sieve Analysis	California 202

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SECTION 02020

LANDSCAPING AND IRRIGATION

1.0 GENERAL

1.1 DESCRIPTION

Landscaping shall include but is not limited to: all work involved with demolition, clearing and grading of the areas to be landscaped or otherwise affected by work covered under this Section, installation of drainage systems, installation of irrigation systems for potable and/or reclaimed water, providing electrical, preparation of soil and installing plants, performing work for plant establishment, and post-installation maintenance and any other work shown and noted in the Contract Documents. Landscaping shall be in accordance with Section 20 of the Standard Specifications except as modified herein. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 CLEARING AND GRUBBING

2.1 DESCRIPTION

Contractor shall provide all labor, materials, tools, equipment, and incidentals for clearing and grubbing operations. Clearing and Grubbing for Landscaping shall be coordinated with Section 02016, Clearing and Grubbing, where applicable. This work shall be performed in advance of landscape grading operations in accordance with the requirements of the Contract Documents.

Clearing and grubbing of any area to receive planting shall consist of removing natural and artificial objectionable materials from the top twelve inches (12”) below finish grade of the entire area covered under this Section, unless otherwise indicated in the Contract Documents, and shall include but not be limited to rubbish, debris, such as concrete, masonry, and abandoned utilities, vegetative growth, such as trees, stumps, individual roots one inch (1”) in diameter or larger, roots occupying more than 1% of a given volume of soil, buried logs, brush, grass, weeds, or other items indicated in the Contract Documents.

All areas to receive sod, hydro-seeding, or groundcover shall have the top twelve inches (12”) below finish grade removed and replaced with Topsoil. See Subsection 6.0, Planting.

Clearing and grubbing of any area to receive hardscape (paving, walloways, or similar) shall be cleared and grubbed per Section 02016, Clearing and Grubbing.

2.2 PRESERVATION OF PROPERTY

Existing improvements, plant materials, improvements on the construction site or on adjacent property, utilities, and other facilities indicated in the Contract Documents and noted “to be protected” or “to remain” shall be protected from injury or damage resulting from Contractor’s operations in accordance with Subsection 1.6, Protection of Public and Private Property, of Section 01500, Temporary Facilities and Controls.

2.3 REMOVAL AND DISPOSAL

Material collected during clearing and grubbing, existing culverts, drains, pipes, curbs, gutters, sidewalks, pavement, conduits and other facilities to be removed shall be at the expense of the Contractor, unless otherwise indicated in the Contract Documents. Materials removed shall not be incorporated into the project by the Contractor except as indicated in the Contract Documents or with the permission of the Engineer.

All materials removed shall be the property of the Contractor. Burning shall not be permitted. No accumulation of flammable material shall remain on or adjacent to the project site. The site and adjacent areas shall be left with a neat, safe, and finished appearance.

Trenches, holes, and depressions caused by the removal of facilities or objectionable materials shall be backfilled with materials equal to or better than the surrounding soil to the satisfaction of the Engineer. Backfill areas shall be compacted to the same density as existing conditions. Backfill shall be considered incidental and no additional compensation shall be allowed.

2.4 CONCRETE REMOVAL

Concrete indicated on the Contract Documents and specified herein for removal shall be cut to a true line with neatly sawed edges cut a minimum of four inches (4”) deep or the thickness of the concrete. If a sawcut is within three feet (3’) of an existing expansion or control joint, or score mark, concrete shall be removed to that score mark, joint, or edge. The Contractor shall insure that the final edge of the existing concrete is smooth, vertical, and free of divots, gouges, etc. Refer to Section 02007, Storm Water Pollution Prevention.

2.5 ASPHALTIC CONCRETE REMOVAL

Asphaltic concrete indicated on the Contract Documents and specified herein for removal shall be removed to clean, straight lines. Edges shall be sawcut through the full depth of pavement or to a depth of five inches (5”). Edges of pavement shall be trimmed to neat and straight lines before any adjacent work is performed.

3.0 DRAINAGE SYSTEM

3.1 DESCRIPTION

Contractor shall provide all labor, materials, tools, equipment, and incidentals to furnish and install drainage systems as indicated on the Contract Documents and in accordance with Section 02062, Furnishing and Installing Pipe, and Section 02070, Storm and Sanitary Sewer Manholes, Drainage Structures, and Miscellaneous Structures, unless otherwise modified herein.

Contractor shall maintain project site throughout the progress of the work in a reasonable, dry, workable condition, free of surface water.

3.2 NOTIFICATIONS

Before laying new pipe, expose the existing pipe at the proposed point of connection. The Engineer shall be notified a minimum of two (2) full Working Days prior to connection for inspection of existing conditions and to control shut downs and make any adjustments necessary to accomplish the intent of the Contract Documents.

3.3 MATERIAL

A. PLASTIC PIPE

All pipe shall be rigid unplasticized polyvinyl chloride (PVC) pipe having plain ends in all sizes. All PVC drain pipe shall conform to Section 02062 unless a thicker, stronger material is specifically noted in the Contract Documents.

B. DRAIN BOXES/CATCH BASINS

Except in the street, where City Standard catch basins are required or where specific details are provided, drain boxes shall be precast concrete with extenders as needed. Boxes shall be from the manufacturer indicated in the Contract Documents or an approved equal, and installed as detailed in the Contract Documents. Unless precise locations are indicated on the Drawings, locations are approximate, and shall be as directed by the Engineer.

Drain box covers shall be galvanized steel unless otherwise indicated in the Contract Documents. Casting shall be true to pattern in form and dimension, free from defects. Covers shall bolt to concrete boxes in accordance with the manufacturer's recommendations.

C. DRAIN ROCK AND FILTER FABRIC

Drain rock shall conform to Class 1, Type A Permeable Material as specified in Section 68-2.02F of the Standard Specifications.

Filter fabric shall conform to Class A Filter Fabric as specified in Section 88-1.02B of the Standard Specifications.

3.4 PIPE INSTALLATION

Installation of pipe shall be done in accordance with the requirements of Section 02062, Furnishing and Installing Pipe, as far as they are applicable.

4.0 IRRIGATION SYSTEM - POTABLE WATER

4.1 DESCRIPTION

The work of furnishing and installing a manual and/or automatic irrigation system for potable water, complete in place, shall be as specified herein, as indicated in the Contract Documents and as specified in Section 20 of the Standard Specifications, as far as they are applicable. When provided for in the Contract Documents, the work shall include, but not be limited to, irrigation systems and related appurtenances, connection to water and electrical utilities, excavation and backfill of pipe trenches, record drawings, operation and maintenance manuals, guarantees, permits, licenses, testing, inspections, and clean-up operations.

The Contractor shall coordinate the installation of all irrigation materials with the construction of improvements, site amenities and planting, as indicated on the Contract Documents.

Drawings are diagrammatic and shall be adjusted as necessary to conform to actual field conditions. Costs incurred due to any adjustments for coverage, including those requested by the Engineer, relative to the location of irrigation heads as shown on the Contract Documents, shall be the responsibility of the Contractor. Unless otherwise specified, Contractor shall ensure one hundred percent (100%) coverage, with fifty percent (50%) overlap, without overspraying onto non-landscaped areas or hardscape.

Point of connection shall be as indicated on the Contract Documents. Contractor shall verify the location and size of water source and electrical supply prior to commencing installation. If field conditions differ from the Contract Documents, Contractor shall notify the Engineer immediately. Contractor shall contact the City Water and Sewer Department for the applicable average pressure in the specific area of the work.

Due to the scale of the Contract Documents, it is not possible to indicate all offsets, fittings, sleeves, and the like which may be required. Such items are incidental and shall be included in the various items of work. Contractor shall carefully investigate all conditions affecting the work and install a complete irrigation system in compliance with the Contract Documents.

4.2 QUALITY ASSURANCE

All local and state laws, rules and regulation governing or relating to any portion of the irrigation system are hereby incorporated into and made a part of the Contract Documents. Nothing contained in the Contract Documents shall be construed to conflict with any of the aforementioned rules, regulations or requirements. However, when the Contract Documents call for or describe materials, workmanship or construction of a better quality, higher standard or larger size than is required by the above rules, regulations or requirements, the Contract Documents shall take precedence.

In the event any equipment or methods indicated on the Contract Documents or specified herein conflict with applicable regulations, Contractor shall notify the Engineer in writing prior to installation. Costs for replacement of such work incurred due to the failure of the Contractor to provide the required notification, shall be the Contractor's responsibility.

When requested, Contractor shall furnish the Engineer with Certificates of Compliance indicating that the materials comply with the Contract Documents.

4.3 PRODUCT DELIVERY, STORAGE AND HANDLING

Contractor shall exercise care in handling, loading, unloading, and storing of irrigation materials and equipment. All pipe shall be transported in a vehicle which allows the length of pipe to lie flat so as not to be subject to undue bending or any concentrated external load at any point. Any section of pipe that has been dented or damaged shall be replaced with new pipe at the Contractor's expense.

4.4 MATERIALS

All materials shall be of stock and of brands and types noted on the Contract Documents and as specified herein, or approved equal. Approval of any items, alternates or substitutes indicates only that the product apparently meets the specifications as indicated on the Contract Documents and specified herein on the basis of the information or samples submitted.

Manufacturer's specifications and detailed drawings shall be followed in cases where the manufacturer's installation methods are not shown in the Contract Documents and specified herein. Manufacturer's warranties shall not relieve the Contractor of liability under the provisions for the guarantees. Such warranties shall only supplement the guarantees.

In accordance with Subsection 1.3, Product Options and Substitutions, of Section 01600, Product Requirements, the Contractor shall submit to the Engineer in triplicate a request for substitution of "as equal" materials. The request shall have full documentation attached including catalog cuts, descriptive literature, the manufacturer, model number, installation data and samples, when required by the Engineer. One (1) set will be returned to the Contractor. Equipment or materials installed or furnished without the prior approval of the Engineer may be rejected and such materials required to be removed at the Contractor's expense.

A. PVC PIPE (PLASTIC PIPE)

All PVC pipe shall be Schedule 40 unless a thicker and/or stronger pipe is specifically required. PVC pipe shall be resistant to ultra-violet light and shall conform to the requirements in ASTM Designation D1785.

B. BRASS PIPE

Brass pipe, where indicated on the Contract Documents, shall be eighty-six percent (86%) red brass, American National Standards Institute, Schedule 40 screwed pipe, conforming to Federal Specifications WW-P-351. Fittings shall be medium, brass, screwed 125-pound class, conforming to Federal Specifications WW-P-460.

C. GALVANIZED PIPE

Galvanized steel pipe, where indicated on the Contract Documents, shall be ASA Schedule 40 mild steel screwed pipe. Fittings shall be medium galvanized screwed beaded malleable iron. Galvanized pipe shall never be used without the specific approval of the Engineer.

D. MASTER AND ISOLATION BALL VALVES

All master and isolation valves shall be ball valves unless another type of valve is specifically noted in the Contract Documents.

Ball valves shall be bronze with screw-in bonnet, line-sized manufactured as Nibco, or approved equal, installed as indicated on the Contract Documents. Valves shall conform to American Water Works Standards. Valves shall be designated to permit dismantling to replace sealing components without removal of the valve body from the pipeline. The operating unit shall be line-sized as indicated on the Contract Documents and have an arrow cast in the metal indicating the direction of flow.

E. ANTI-DRAIN VALVES (CHECK VALVES)

Where indicated on the Contract Documents and/or as needed for field conditions, anti-drain valves shall be as indicated in the irrigation legend on the Contract Documents, or approved equal. Anti-drain valves shall be line-sized and installed on the riser directly under the irrigation heads in accordance with manufacturer's recommendations.

F. QUICK COUPLING VALVES

Quick coupling valves shall be as indicated in the irrigation legend on the Contract Documents, or approved equal. Quick coupling valves for potable water systems shall be constructed of brass with a molded vinyl or thermoplastic rubber locking yellow cover. Coupler keys and hose ells shall be of the same manufacturer as the valve.

G. REMOTE CONTROL VALVES

Remote control valves shall be solenoid activated, factory assembled, as indicated in the irrigation legend on the Contract Documents or approved equal, and installed according to the details on the Contract Documents and local codes.

H. VALVE BOXES

Valve boxes for ball valves shall be a ten inch (10") round plastic box with snap-lock tab cover manufactured as indicated on the Contract Documents, or an approved equal, installed in accordance with local standards and codes, permanently marked by indenting "VB" on the cover.

Valve boxes for automatic remote control valves shall be a square or rectangular plastic box with bolt-down cover manufactured as indicated on the Contract Documents, or an approved equal, installed in accordance with local standards and codes, permanently marked by indenting "RCV" and station number on the cover.

Valve boxes for quick couplers shall be Amotek, or approved equal.

Valve box lids shall be green in color.

I. BACKFLOW PREVENTION UNIT

Backflow prevention unit shall be factory assembled and shall be as indicated in the Contract Documents, or approved equal.

J. CONTROLLERS

Controllers shall be as indicated on the Contract Documents, or approved equal.

K. CONTROL WIRING

Connections between the controller and the solenoid activated remote control valves shall be made with direct burial copper wire, #14 AWG, Type U.F., 600 volt. Wire shall be PVC insulated of single conductor type, underground feed cable, U.L. approved.

L. IRRIGATION HEADS

Irrigation heads shall be of the manufacturer, size, type, and rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as specified in the irrigation legend and installed as shown in the details on the Contract Documents and in accordance with the manufacturer's recommendations.

Equipment of one type and flow characteristic shall be from the same manufacturer and all equipment shall bear the manufacturer's name and identification code in a position allowing identification in the installed position.

4.5 INSTALLATION

A. PIPE INSTALLATION/NOTIFICATION

Before laying new pipe, expose the existing pipe at the proposed point of connection. The Engineer shall be notified a minimum of two (2) full Working Days prior to connection for inspection of existing conditions and to control shut downs and make any adjustments necessary to accomplish the Work and protect existing facilities. Prior to installation, Contractor shall stake all supply lines, routing, and location of irrigation heads for inspection by the Engineer.

Trenches shall be of open vertical construction to appropriate depths as indicated on the Contract Documents and specified herein. Pipe shall be laid on a uniform compacted grade, free of rocks or sharp-edged objects, and snaked from side to side in the trench to allow for expansion and contraction.

All lines shall have a minimum horizontal clearance of six inches (6”) from each other and from lines of other trades. Parallel lines shall not be installed directly over one another. Provide the following minimum coverage (where lines occur under paved areas for vehicular traffic, these coverage depths shall be considered below subgrade) to:

- Pressure mainline — eighteen inches (18”)
- Non-pressure lateral lines — twelve inches (12”)
- Control Wiring — eighteen inches (18”)

Pipe shall be cut square and the ends reamed out to the full inside diameter for the pipe and thoroughly cleaned of dirt, dust, shavings and moisture before installation.

PVC pipe shall be protected from tool damage during assembly. PVC pipe which has been nicked, scarred or damaged shall be removed and replaced at Contractor’s expense. PVC solvent-weld joints shall be made in accordance with ASTM D-2855. Pipe shall not be exposed to water for twenty-four (24) hours after solvent-weld joints are completed. Teflon tape shall be used on all threaded PVC to PVC and on all threaded PVC to metal joints. Light wrench pressure is all that is required.

Constant pressure main line PVC piping carrying potable water shall be marked on the top of the pipe with a three inch (3”) wide warning tape running continuously for the entire length. The tape shall be located three inches (3”) above the top of the pipe. Tape color shall be yellow or the current standard in the industry.

Changes in pipe line size shall be accomplished with reducer fittings.

Brass pipe and fittings shall be assembled using Teflon tape dope, applied to the male threads only.

Galvanized pipe threads shall be cut with clean, sharp dies, conforming to American Standards Association Specification. Male pipe threads shall be coated with a non-toxic, non-hardening, non-corrosive joint compound. All galvanized pipe and fittings installed below grade shall be painted with two (2) coats of Koppers #50 Bitumastic, or approved equal. Pipes may be completely wrapped with an approved asphaltic tape in lieu of painting.

Pipe to be installed on grade shall be anchored to the ground at intervals not to exceed ten feet (10’), with a eighteen inch (18”) long #4 rebar, with a “J” hooked radius.

B. WATER METERS

Irrigation system shall be connected to water supply points as indicated in the Contract Documents. Water meters will be installed or provided by the City of Santa Clara Water Utility. The Contractor shall coordinate with the Water Utility and apply for service. The Contractor is required to pay for water used until the project is accepted by the City, including any landscape maintenance period, unless otherwise provided in the Contract Documents.

C. VALVES AND VALVE BOXES

Valve boxes shall be set flush with finish grade, with valves set at sufficient depth to provided clearance between the cover and the valve. Valves shall be installed with operating nuts.

Contractor shall install quick coupler valves as indicated in the details on the Contract Documents and in accordance with manufacturer's recommendations.

All remote control valves shall be marked with plastic tags and numbers to indicate controller and station number.

D. IRRIGATION CONTROLLER

Contractor shall install irrigation controller(s) in accordance with the Contract Documents and the manufacturer's recommendations. The electrical service shall be as indicated in the Contract Documents. The Contractor shall obtain the necessary permits and inspections for activation of the electrical service. The enclosure for the controller shall be as indicated in the Contract Documents. The Contractor is required to pay for electricity used until the project is accepted by the City, including any landscape maintenance period, unless otherwise provided in the Contract Documents.

E. CONTROL WIRING

Pilot wires shall be a different color for each valve. Common wires shall be white with a different color stripe for each automatic controller. Tagging each end is an acceptable alternative. Provide a separate ground wire for each controller. Install a spare control wire of a different color along entire mainline. Loop thirty-six inches (36") excess wire into each single box and into one valve box in each group of valves.

Wire shall be buried a minimum of eighteen inches (18”) in depth and whenever possible shall occupy the same trench and shall be bundled and secured to irrigation pipelines at ten foot (10’) intervals with plastic electrical tape, providing sufficient slack for expansion and contraction. Wire for slopes shall be installed in a UVR PVRC sleeve laid adjacent to on-grade water pipes.

An expansion curl shall be provided within three feet (3’) of each wire connection and change of direction, and at least every one hundred feet (100’) of wire length on longer runs. Expansion curls shall be formed by wrapping at least fifteen feet (15’) of wire around a one-half inch (½”) outside diameter pipe, then withdrawing the pipe.

All splices shall be made with Spears DS–400 connectors or approved equal. Use one (1) splice per connector sealing pack. Wire splices shall be located in pull boxes set flush with finish grade. Field splices between the controller and remote control valves will not be permitted, without prior approval of the Engineer.

F. SLEEVING

Irrigation lines and control wiring shall be installed under paving in separate PVC Schedule 40 sleeves. Sleeves shall be installed with minimum coverage depths of eighteen inches (18”) and shall extend twelve inches (12”) beyond the edge of the paved area. Unless otherwise indicated on the plans, a plastic valve box shall be placed over each end of every sleeve to facilitate locating and using the sleeve in the future.

Piping under existing pavement may be installed by jacking, boring, or hydraulic driving, except that no hydraulic driving will be permitted under asphaltic concrete pavement. Where cutting or breaking of existing pavement is necessary, obtain permission from the Engineer and make all necessary repairs and replacements to the satisfaction of the Engineer.

G. IRRIGATION HEADS

Spacing of heads shall not exceed the maximum shown in the Contract Documents and in no case exceed the maximum spacing recommended by the manufacturer. Riser units shall be oriented perpendicular to the finish grade, installed in compliance with the Contract Documents, with nipples of the same size as the riser opening in the irrigation head.

H. RUBBER RING SEAL JOINTS

Rubber ring seal joints shall be factory-made male end or prepared field-cut male end to exact specifications of factory made end. Carefully clean bell or coupling and insert rubber ring without lubricant. Position ring carefully, to manufacturer's recommendations. Lubricate male end according to manufacturer's recommendations and insert male end to specified depth. Use hands only when inserting PVC pipe. 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 one thousand (1,000) pounds per square foot. Form thrust blocks in such a manner that concrete comes in contact only with the fittings. Thrust blocks shall be between undisturbed or properly compacted soil and the fitting.

4.6 ADJUSTING AND TESTING THE SYSTEM

Contractor shall furnish all equipment, materials and labor to conduct pipeline pressure tests, coverage tests and operational tests. All tests shall be made in the presence of the Engineer, prior to weed abatement operations and soil preparation. Trenches shall not be backfilled until the pipeline pressure tests have been performed to the satisfaction of the Engineer.

After completion of pipeline assembly, prior to installation of terminal fittings, entire system shall be thoroughly flushed to remove dirt, scale or other deleterious material. Irrigation heads shall be installed only after flushing of the system has been accomplished to the complete satisfaction of the Engineer. With open ends capped, test pressure supply lines for six (6) hours at 125 PSI. Center load PVC pipe with a small amount of backfill to prevent arching and whipping under pressure.

Coverage test shall demonstrate that each station area is balanced to provide uniform and adequate coverage. Operational tests shall demonstrate the performance and operation of all components of the controller system. Remote control valves shall be properly balanced, heads adjusted for coverage and system shall be workable, clean and efficient. Coverage and operational tests will not be considered complete without as-built drawings.

Contractor shall be responsible for correcting any portions of the work that are not properly installed and retesting until installation has been accepted by the Engineer.

Contractor shall be responsible for notifying the Engineer a minimum of two (2) full Working Days in advance for the following inspections: System Layout; Pressure Pipeline Tests; Coverage Tests; Operational Test (prior to commencing planting operations).

4.7 BACKFILLING

Backfill shall be with clean dirt free from large rocks, stones, and other objectionable materials, exceeding one inch (1”) in diameter. Note: this backfill requirement shall not supersede requirements for Topsoil and/or Prepared Soil Mix.

Trenches located under areas where paving or concrete will be installed shall be backfilled with a six inch (6”) layer of sand below the pipe and three inches (3”) above the pipe.

4.8 CONTRACTOR FURNISHED TOOLS, EQUIPMENT, AND DRAWINGS

Contractor shall furnish the Engineer the following materials at the end of construction and prior to acceptance:

- Two (2) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on the project.
- Two (2) keys for each controller and enclosure.
- Five (5) spare irrigation heads of each type specified and installed on this project.
- Five percent (5%) of each type of drip system tubing.

4.9 AS-BUILTS AND RECORD DRAWINGS

On a daily basis, the Contractor shall maintain and keep up to date one (1) set of blueline drawings showing the “as-built” location of major features of the project and indicating changes that occurred during installation. Contractor shall comply with Section 01780, Project Record Documents.

Record Drawings shall include dimensions from two (2) permanent points of reference (i.e. buildings, monuments, sidewalks, curbs, pavement) of the location of the following items: point of connection to existing water lines; point of connection to existing electrical power; gate valves; routing of irrigation pressure lines (dimensions, maximum one hundred feet [100’] along route), remote control valves; routing of control valves; quick coupling valves; other related equipment as requested by the Engineer.

4.10 PHASING DIAGRAMS/CONTROLLER CHARTS

As-built/Record Drawings shall be approved by the Engineer before phasing diagrams are prepared. Contractor shall provide two (2) phasing diagrams for each controller supplied. The phasing diagrams shall show the areas controlled by each controller and shall be the maximum size which can fit through the controller door. The phasing diagrams shall be a photographic print with a different color indicating the area of coverage for each station. When completed and approved, the controller charts shall be hermetically sealed between two (2) pieces of transparent plastic, each being a minimum of twenty (20) mils thick.

4.11 OPERATION AND MAINTENANCE MANUALS

Prepare and deliver four (4) individually bound copies of the Operation and Maintenance Manual to the Engineer at least ten (10) calendar days prior to acceptance of the Work. The Manual shall include descriptive material of equipment installed and shall be in sufficient detail for the Agency maintenance personnel to understand, operate and maintain all equipment. Each complete, bound manual shall include, but not be limited to: index sheet stating Contractor's address and telephone number, list of equipment with names and addresses of local manufacturer's representatives; catalog and part sheets on all material and equipment installed; guarantee statement; complete operating and maintenance instructions.

4.12 GUARANTEE

Contractor shall guarantee all materials and equipment for one (1) year from the date of final acceptance of the Work (after the required maintenance period) in accordance with Subsection 9, Warranty, Guaranty and Inspection of Work, of Document 00700, General Conditions.

5.0 IRRIGATION SYSTEM SUPPLEMENT FOR RECYCLED WATER

5.1 DESCRIPTION

This section is supplemental to Section 4.0 and is to be used when installing recycled water systems. Where applicable, installation shall be in accordance with the requirements of Section 4.0.

City and/or State Department of Public Health regulations for recycled water systems shall take precedence over these Specifications where they are in conflict.

5.2 MATERIALS

Pipe shall be Class 315 purple-colored PVC pipe as manufactured by Alterline, or approved equal, marked continuously on two (2) sides of the pipe with the following: "CAUTION RECYCLED WATER." Plastic pipe for lateral lines shall conform to ASTM 2241 or ASTM D-1784. Fittings and couplings shall be purple-colored PVC.

5.3 INSTALLATION

A. PIPE INSTALLATION

Where recycled and potable water pressure main line piping cross, the recycled water piping shall be installed below the potable water piping in a Schedule 40 purple-colored PVC sleeve which extends a minimum of five feet (5') on either side of the potable water piping. Contractor shall provide a minimum vertical clearance of six inches (6"). Conventional (white) PVC pipe may be used for sleeving material if it is taped with a three inch (3") wide red warning tape which reads: "CAUTION RECYCLED WATER."

B. REMOTE CONTROL VALVES

Remote control valves shall be marked with three inch by four inch (3"x4") purple-colored waterproof tags marked in black on one side with the words: "WARNING – RECYCLED WATER – DO NOT DRINK" and on the reverse side with the words: "AVISA – AGUA IMPURA – NO TOMAR." Tags shall be as manufactured by T. Christy Enterprises or approved equal. Tags shall be attached to the valve stem or solenoid wire directly or with a plastic tie wrap or attached to the valve with existing valve cover bolt.

C. QUICK COUPLING VALVES

Quick coupling valves shall be constructed of brass with a purple rubber or vinyl cover with a permanently stamped or molded warning on the cover reading: "RECYCLED WATER – DO NOT DRINK" in English and Spanish and the international "do not drink" symbol. Tags shall be as manufactured by T. Christy Enterprises or approved equal.

D. VALVE BOXES

Warning labels on lockable valve boxes for recycled water systems shall be constructed of a purple waterproof material with the warning permanently stamped or molded in the cover reading: "RECYCLED WATER – DO NOT DRINK" in English and Spanish with the international "do not drink" symbol.

E. CONTROLLERS

Contractor shall post signs at each controller indicating the use of recycled water. At least one (1) purple sign shall be posted on the inside of the door, bearing the words "ATTENTION – CONTROLLER UNIT FOR RECYCLED WATER" in English and Spanish, as manufactured by T. Christy Enterprises or approved equal.

6.0 PLANTING

6.1 DESCRIPTION

This work shall consist of furnishing all labor, materials, equipment, facilities, transportation and services to complete all planning and related work as shown on the Drawings and/or specified herein.

The general extent of the planting is shown on the Drawings and includes, but is not necessarily limited to the following:

1. Nursery Grown Shrubs
2. Nursery Grown Trees
3. Contract Grown Shrubs
4. Contract Grown Trees
5. Mulch
6. Nursery Grown Ground Cover
7. Nursery Grown Vines
8. Hydro-seeding
9. Maintenance of the planting after installation through the beginning of the 180 Calendar Day Maintenance Period
10. 180 Calendar Day Maintenance Period (Landscape Maintenance Period or Maintenance Period)

Plant materials shall meet or exceed the American Nurserymen Association standards, as specified in the current edition of American Standard for Nursery Stock, published by the American Association of Nurserymen, Inc. Provide plant materials in accordance with applicable California Agricultural Codes.

The Contractor shall coordinate planting work with other site improvements. Unless otherwise specified, underground and surface improvements shall be installed prior to planting operations.

Contractor shall be responsible for locating and staking existing sewer, water, and utility lines above or below grade that might be damaged as a result of planting operations. The Contractor is to make utility notifications in accordance with Section 01715, Existing Underground Facilities. The Contractor shall assume sole responsibility for any cost incurred due to damage of aforementioned utilities.

All work on the irrigation system, including hydrostatic, coverage, and operational tests, and the backfilling and compaction of trenches shall be performed prior to planting operations.

The actual number of plants shall be governed by the spacing requirements and/or specific locations shown on the plans.

The Plant List is for the Contractor's convenience only. Any discrepancies between the plant list and the plans shall not entitle the Contractor to additional remuneration.

Planting and/or seeding shall be performed by personnel familiar with planting procedures and under the supervision of a qualified planting foreman. The planting foreman shall be on the job site whenever planting is in progress.

Obtain permission from City before shutting off water lines. Keep disruptions of existing systems to a minimum. Repair any damaged water lines caused by planting operations.

For identification purposes, flag or stake existing valve boxes and sleeves, cleanouts, junction boxes, and similar structures before beginning work under this section of the Specifications, and maintain such flags or stakes until final inspection.

All soil preparation and planting operations shall be conducted under favorable weather conditions only. Soil shall not be worked when excessively dry or wet.

6.2 REQUIREMENTS OF REGULATORY AGENCIES

Provide certificates of inspection of landscape materials with shipments as required by governmental authorities. Comply with all applicable Federal, State and County regulations governing landscape materials.

Comply with State of California Administrative Code, Title 8, Industrial Relations, Chapter 4, Subchapter 4, Construction Safety Orders, and with rules and regulations of all regulatory agencies having jurisdiction over the work.

Inspection by Federal or State governments at place of growth does not preclude rejection of plants at project site.

6.3 SUBMITTALS

The Contractor shall submit samples of topsoil, prepared soil mix, fertilizers, organic amendment, and soil conditioners, along with necessary documentation, to the Engineer for inspection two (2) full weeks prior to incorporation in the work.

At time of delivery to the site, Contractor shall furnish the Engineer with delivery receipt(s) and Certificate of Compliance, in accordance with Subsection 1.10, Quality Assurance Control Submittals, of Section 01330, Submittal Procedure, stating that material specified meets the Contract requirements.

Submit to the Engineer samples and certified analysis of mulch, fertilizer, pre-emergent herbicide, or other materials for approval before delivery to the site.

For standard products, submit the manufacturer’s analysis.

For all other materials submit an analysis made by a recognized laboratory in accordance with the current methods of the Association of Official Agricultural Chemists.

The Engineer reserves the right to take and analyze samples of materials for conformity to Specifications at any time. Furnish samples of materials to the Engineer upon request. Immediately remove rejected materials from the site.

Upon receipt of contract from the City, the Contractor is to immediately purchase all container grown plant material for the project and hold said material at the nursery until installation. Contractor to submit progress billings to City, showing evidence of purchase of plant material. Plant material shall be available at any time during the contract for inspection by the Engineer, if requested. Any material found unsatisfactory is to be replaced by approved equal material at the Contractor's expense.

6.4 CARE OF EXISTING PLANT MATERIAL

When specifically required by the Construction Documents or when necessary, as determined by the Engineer, to allow the Work to be performed or protect the public, an International Society of Arboriculture (ISA) certified arborist shall perform any necessary or required pruning work on existing plants in accordance with the International Society of Arboriculture Western Chapter's Pruning Standards and ANSI Z133.1. Dead wood larger than one-half inch (½") in diameter, branches extending over the paved areas that hang within twelve feet (12') of finished surface, and diseased branches shall be removed. Stubs, improper cuts, and broken limbs shall also be removed. Pruning efforts shall give the plant proper shape and a balanced appearance. "Heading Back" cuts at right angles to the line of growth shall not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off." Wounds shall be cleaned and left open to the elements to heal naturally. Cost for the care of existing plant material is considered incidental and is included in the various items of the Work.

6.5 SUBSTITUTIONS

If Contractor wishes to substitute plants for those indicated in the Drawings, Contractor shall submit a list of the proposed substitutions to the Engineer at least thirty (30) days before beginning Work covered by this Section 02020. Substitute plants will be acceptable only if specified plants are proven unavailable or unacceptable to the Engineer. When substitutions are allowed, all requirements of the plant shall be met, and in no case shall substitutions be made without the written approval of the Engineer.

6.6 INSPECTION

All reviews by the Engineer of planting work shall be requested by the Contractor at least two (2) full Working Days prior to anticipated review.

The Contractor shall request a review by the Engineer at the following points in the progress of the work:

- Upon delivery to the site.
- Upon completion of planting.
- Upon completion of the maintenance period.

The Engineer reserves the right to inspect all planting materials further for size and condition of root systems and for injuries and latent defects and to reject unsatisfactory or defective plant material at any time during the progress of the work. All plants shall have nursery name tags on each plant. Plants without nursery name tags may be rejected by the Engineer.

The Contractor shall schedule his work so that the Engineer review of the quality, size, variety, placement, and orientation of all plants can be accomplished in a single trip for each variety of plant.

No plant material shall be planted until the Engineer has approved its quality and placement.

The Contractor shall, upon demand, produce records to verify the ordering and delivery of specified quantities and types of materials for this job.

6.7 PROTECTIONS OF EXISTING TREES

A. GENERAL TREE PROTECTION

The objective of protecting trees during construction is to reduce the negative impact of construction on trees to a less than significant level.

B. ARBORIST NOTES FOR TREE PROTECTION

Contractor shall notify the Engineer three (3) full Working Days in advance of any work requiring digging around or within the drip-line of existing trees. No cutting of any part of any tree, including roots, shall be done without securing approval and direct supervision from the Engineer.

Contractor shall tag and identify existing trees which are to remain within or adjacent to the project limits prior to start of Work. Provide regular watering of existing landscaping affected by the project throughout the construction period.

Protect all existing trees at all times from damage by workers or equipment. A six-foot (6') high temporary chain link fencing acceptable to Engineer, shall be placed at the dripline of existing trees, or if possible, one and one-half (1.5) times the radius of the dripline out from the trunk of the tree. In addition, wrap all trees with straw waddles up to the first branches, then wrap "snow fencing" around the waddles on all trees in the construction zone to protect them from bark damage caused by construction equipment. If construction is to continue during winter months (December 1 through March 31), four (4) tree stakes are to be installed around each tree trunk. The required straw waddle is then to be wrapped around the stakes and the snow fencing around the waddle. This winter system is to prevent excessive moisture around the tree's trunk when rain tends to soak the waddle.

Place four inches (4") to six inches (6") of mulch around all existing trees (out to their drip-line) that are to be preserved prior to any construction. This will help maintain moisture content and prevent compaction if vehicle accidentally drives under the tree within the fencing area.

Grading shall not create drainage problems for trees by channeling water into them, or creating sunken areas.

No trenching will be done within the drip-line of existing trees without the approval of the Engineer.

1. Open trenching in the root zone of any public tree is prohibited except in cases where the trenching falls outside the drip-line of the tree involved.

2. Exceptions will be allowing if, in the opinion of the Engineer, the impact of trenching upon the tree will be negligible.

3. When trenching is allowed, the Contractor must first cut roots along both sides of the proposed trench, as directed by the Engineer, with a Vermeer root cutter prior to any trenching to avoid tugging or pulling of roots.

When construction occurs within drip-line of existing trees, and is approved by the Engineer, Contractor is to place excavated soil and other materials beyond the drip line. When this is not possible, with the approval of the Engineer, place soil on plywood, a tarp, or thick bed of mulch. This is to help prevent cutting into the soil surface when the backhoe or tractor blade refills the trench or removes any excess material.

If trenching is allowed and specifically approved by the Engineer within the root zone, refill open trenches quickly, within hours of excavation. If this is not possible and weather is hot, dry, or windy, Contractor must keep root ends moist by covering them with wet burlap. If temperature is eighty degrees Fahrenheit (80°F) or greater, the burlap must be inspected every hour and re-wet as necessary to maintain a constant cool moist condition. If temperature is below eighty degrees Fahrenheit (80°F), the burlap must be inspected every four (4) hours and re-wet as necessary to maintain a constant cool moist condition. Small roots can dry out and die in ten (10) to fifteen (15) minutes. Larger roots can succumb in an hour or less under unfavorable weather conditions.

When roots two inches (2”) or larger must be cut, shovel by hand near the roots and saw the roots. Accidentally broken roots should be sawed about two inches (2”) behind the ragged end. Crushed or torn roots are more likely to allow decay to begin; sharply cut roots produce a flush of new roots helping the tree to recover from its injury.

All grading within the drip-line of trees shall be done with light, approved equipment under the direct supervision of the Engineer. The original grade at base of existing trees is not to change. If necessary, dry wells are to be used if grade is to rise.

No cutting of any part of private trees, including roots, shall be done without direct supervision of a Certified Arborist (Certification of International Society of Arboriculture). The Certified Arborist is to be hired by the Contractor at no cost to the City. The Certified Arborist shall submit a written report of findings and recommendations to the Engineer. The Contractor shall replace any tree(s) that the Engineer directs to be removed, due to as a result of the construction. Engineer will determine species, size, and spacing.

No bore pits are allowed within the drip-line of any tree.

Materials, equipment, temporary buildings, fuels, paints, and other construction items are not to be placed within the drip-line of existing trees.

Contractor shall pay the owner (or the City in the case of trees on public right-of-way) the value of existing trees to remain that died or were damaged because of the Contractor's failure to provide adequate protection and maintenance. In accordance with the following schedule of values, using "Tree Caliper" 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 Architects:

Tree Caliper	Tree Value
7 inches	$2,400
8 inches	$3,400
9 inches	$4,400
10 inches	$5,200
11 inches	$6,200
12 inches	$7,200
13 inches	$8,200
14 inches	$9,200
15 inches	$10,000
16 inches	$11,000
17 inches	$12,000
18 inches and over add for each caliper inch	$1,200

C. TUNNELING

All trees with a trunk diameter in excess of five inches (5") as measured four and one-half feet (4.5') above natural grade (Diameter Breast Height) where there is insufficient space to bypass the drip-line by trenching, must be tunneled. The beginning/ending distance of the tunnel from the face of the tree in any direction and the depth of the tunnel are determined by the diameter of the tree as specified in the table below:

TUNNELING DISTANCE AND DEPTH

TREE TRUNK DIAMETER AT 4.5 FEET ABOVE NATURAL GRADE	TUNNELING DISTANCE FROM THE FACE OF THE TREE IN ANY DIRECTION (MINIMUM)	TUNNELING DEPTH (MINIMUM)
OVER 5 inches - 9 inches	5 feet	2.5 feet
10 - 14 inches	10 feet	3.0 feet
15 - 19 inches	12 feet	3.5 feet
OVER 19 inches	15 feet	4.0 feet

6.8 MATERIALS

A. TOP SOIL AND PREPARD SOIL MIX

Prepared soil mix shall be "CK Mix" with a pH of 6.8 to 7.4 as manufactured by Ciardella's Garden Supply, 1001 San Antonio Avenue, Palo Alto, CA (telephone: 650-321-5913), or approved equal.

Topsoil shall be Curtner Sandy Loam with a pH of 6.8 to 7.4 as supplied by TMT Enterprises, Inc., 1996 Oakland Road, San Jose, CA (telephone: 1-408-432-9040), or approved equal.

B. NURSERY GROWN STOCK

Nursery grown stock shall be in accordance with the Plans, these Specifications, and Section 20-2.13, Plants, of the Standard Specifications.

Plant material shall be guaranteed to be in good, healthy, flourishing condition of active growth at the end of one year from the date of acceptance of planting work.

Plants shall be free of insects, dead branches, dead branch tips, and shall have foliage of normal density, size and color, in order to be considered vigorous and thriving. Root bound conditions, including circling or girdling roots, will not be acceptable.

C. SEED

Seed shall be in accordance with the Plans, these Specifications, and Section 20-2.10, Seed, of the Standard Specifications.

D. WOOD CELLULOSE FIBER FOR HYDRO-SEEDING

Wood cellulose fiber for hydro-seeding shall be in accordance with the Contract Documents and Section 20-2.07, Fiber, of the Standard Specifications.

E. SOD

Specific sod variety shall be as indicated in the Contract Documents.

Sod shall be grown from high quality propagative material, free from weeds, diseases, and insects, and shall meet the standards of regulation for nursery inspection of the State. Sod shall be machine cut at a uniform thickness of five-eighth inch (5/8") (excluding top growth and thatch). Individual pieces shall be cut to the supplier's standard width and length with an allowable deviation of two percent (2%). Broken rolls or uneven ends will not be acceptable. Sod shall be harvested, delivered and installed within a twenty-four (24) hour period.

F. FERTILIZER

Planting tablet fertilizer shall be Agriform (N21-P10-K5), weighing twenty-one grams each, or approved equal. Before filling each planting hole with backfill mix, place tablets in holes per manufacturer's written recommendations at the rates shown on the plans.

Fertilizer shall be commercially processed and conform to the requirements of the Agricultural Code of the State of California. Fertilizer shall be controlled-release, homogeneous resin-coated with an analysis of N16-P7-K12+iron. Iron sulfate shall be a standard commercial brand.

Fertilizers shall comply with applicable requirements of the State Agriculture Code and shall be prepackaged, first grade, commercial quality products identified as to source, type of material, weight and manufacturer's guaranteed analysis. Fertilizers shall not contain toxic ingredients in quantities harmful to human, animal, or plant life.

Commercial fertilizer shall be in pellet form or a granular product having the chemical analysis specified herein and shall be free-flowing material delivered in original unopened containers. Use of material which becomes caked or otherwise damaged shall not be permitted.

Organic base fertilizer shall be comprised of decomposed animal, fish and vegetable matter with humic acids and a bacterial stimulant.

G. BACKFILL FOR PALMS

Backfill for palms shall be one hundred percent (100%) coarse, washed plaster sand.

H. MULCH

Mulch shall be redwood bark chips, medium grind (3/8" to 3/4"). Mulch shall be applied over the entire planting area for trees, bushes, and shrubs. Mulch shall also be applied to the watering basin, inside the bermed area. Mulch shall be applied at a minimum depth of three (3) inches and be level with the top of the adjacent platform, concrete flatwork, or asphaltic concrete, as shown on the plans, unless directed otherwise.

6.9 MATERIAL DELIVERY AND INSPECTION

Plant names used in the Contract Documents conform to Standardized Plant Names, by the Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally to names accepted in the nursery trade.

All plant materials shall be delivered with legible identification labels. See Subsection 6.6, Inspection.

Plants shall have been grown in a nursery under climatic conditions similar to those in the locality of the project for at least one (1) year prior to delivery to the site. Boxed trees shall be well established in boxes before delivery to the site. Balled stock shall be freshly dug. The boxed or balled stock shall have the original soil in which it was grown, without addition, and the balls shall be whole and intact, and not broken on arrival at the site. Burlap used shall be of sufficient size to enclose the complete dirt ball and shall be tied securely with stout twine. Balled stock or bare rootstock may be furnished where canned containers are specified only with approval by the Engineer.

The Engineer reserves the right to tag certain plant materials at the Nursery to be purchased by Contractor for use in this project. Conditions of these Specifications, including guarantee, apply to such plants.

Container stock shall be delivered to the site in first class condition. Plants requiring support shall have small stakes in containers. Plants shall be handled and stored to maintain a healthy condition and shall be protected from drying out, windburn, or any other injury. Container plants shall not be picked up by the stems or trunks.

Inspection of plant materials required by City, County, State or Federal authorities, shall be the responsibility of the Contractor. Secure permits or certificates prior to delivery of plants to the project site.

Plants may be inspected and approved by Engineer at the Contractor's source prior to delivery to the project site and until acceptance of the work, for size, variety, condition, latent defects and injuries.

6.10 WEED ABATEMENT OPERATIONS

The irrigation system and finish grade shall be approved by the Engineer after weed abatement operations.

Prior to clearing and grubbing any area to receive landscaping, Contractor shall spray all visible weeds with an approved non-selective, post emergent herbicide. Particular care shall be paid to noxious weeds, such as puncture vine, Bermuda Grass, Saint Augustine's Grass, and ivy. Application rate and method shall be as recommended by the manufacturer. After spraying, planting areas shall remain un-watered for a minimum of forty-eight (48) hours. After seven (7) calendar days from the chemical application, clearing and grubbing may begin.

Contractor shall apply spray chemicals when air currents are still or less than five (5) miles per hour; preventing drifting onto adjoining property and preventing any toxic exposure to persons whether or not they are in or near the project.

After weed abatement operations, and as determined by the Engineer, planting areas shall be scarified to a depth not to exceed one inch (1"). Engineer shall approve weed abatement operations prior to starting planting operations.

6.11 SOIL PREPARATION

A. All planting areas that are to receive trees, shrubs, or groundcover shall receive an application of pre-emergent herbicide such as Rhonestar G or Surflan. The application shall take place after planting but before mulch is applied. Application shall be at the manufacturer's recommended rate. Immediately apply the required amount of water to activate the herbicide. NOTE: DO NOT APPLY PRE-EMERGENT HERBICIDE TO ANNUAL COLOR BEDS, SOD AREAS, OR HYDRO-SEED AREAS.

   Application of pre-emergent herbicide must be witnessed by the Engineer.

B. AREAS TO RECEIVE GROUNDCOVER, HYDRO-SEEDING, OR SOD

   All areas to receive groundcover, hydro-seeding, or sod shall have the existing soil removed to a depth of twelve inches (12") below finish grade and replaced with Prepared soil mix. See Subsection 6.8, Materials.

6.12 INSTALLATION

A. NURSERY GROWN STOCK

In all areas to receive groundcover, remove existing soil to a depth of twelve inches (12”) below finish grade and replace with Prepared soil mix. See Subsection 6.8, Materials.

Protect and maintain according to good horticultural practices, all plant material delivered to the site. Proper maintenance between delivery and planting shall include watering and feeding as necessary and providing protection from animals, wind, excessive sun, and vandals. Store shade plants in the shade and sun plants in the sun.

Plants shall not be handled by stems, trunks or tops, but only by the container. No plant shall be bound with wire or rope so as to damage the bark or break the branches.

Contractor shall exercise caution and provide necessary safeguards to prevent damage to existing site improvements, including planting.

Plants shall be vigorous and of normal habit of growth and shall be free of girdling roots, disease, insect eggs and larvae. Trees shall have straight trunks with the leader intact, unless otherwise specified. All abrasions and cuts shall be completely callused over. Plants shall be of standard size for container and species, unless specified otherwise in the Contract Documents. Any undersized material will be rejected. The heights of plants and of branching shall be measured when the branches are in normal positions. Plants shall not be pruned prior to delivery, except on special approval.

Gal.= gallon can (plant)

G.C.= gallon can (plant)

O.C.= on center (spacing)

The Engineer reserves the right to stop any work taking place during a period when conditions are considered detrimental to soil structure or plant growth. Contractor’s attention is directed to Document 00700, Subsection 13.6, Suspension of Work.

Plant locations shown on the Planting Plan are relative and the Engineer may make adjustments in the location of the plants to achieve the intended results.

Plant holes shall be dimensioned as shown in the Drawings, or at least twice the width and one times the depth of the root ball, whichever is greater. Plant holes shall be roughly cylindrical. The walls and bottoms of plant holes shall be scarified.

If plants do not have young feeder roots showing at the edge of the container, loosen their roots and cut in a few places to encourage new feeder root development along the perimeter of the root ball.

Shrubs and trees shall be set true and plumb with the top of the plant ball, as grown in the nursery can container. The top of the plant ball shall be set approximately three-quarter inch (¾") above the finish grade of the planting area. The Contractor shall be responsible for any settling and shall raise and replant any plants whose crown settles below the finish grade.

Place backfill in bottom of plant hole after making sure base of hole is loose enough for good drainage. After placing plant ball as detailed, firm backfill around ball or roots of plant and water thoroughly.

Form a four inch (4") high berm or ridge of soil in a neat circle at the drip-line of each tree and shrub, to facilitate watering and hold top mulch.

After planting, prune back trees and shrubs as directed by the Engineer. No pruning shall be done without inspection and approval by the Engineer.

B. PLANT PIT PERCOLATION TESTS

Proper drainage of plant pits is necessary. Contractor shall perform percolation tests as following:

Test for percolation shall be done prior to plant material installation to determine positive drainage of plant pits. Engineer shall be notified of all soil and drainage conditions detrimental to growth and plant material. Contractor shall submit proposal for correcting the condition.

Test the completed installation with a minimum of one (1) percolation test per shrub planting pit if shrub is of 15-gallon size or greater and one (1) random percolation test per 300 square feet of area. In addition, all tree pits shall be tested with percolation pits with one (1) pit per tree up to and including twenty-four inches (24”) box size and three (3) pits per tree over twenty four inches (24”) box size. Additional pits may be indicated in the Contract Documents. Dig a hole in the soil ten inches (10”) in diameter and ten inches (10”) deep. Fill with water and let it drain completely. Immediately refill with water and time the rate of fall of the water in the hole. The water shall recede at a minimum rate of three-quarter inch (3/4”) per hour. All testing shall be done in the presence of the Engineer.

If it is determined by the Engineer that the soil in the area of the percolation test is very dry clay or other material that may skew the test results, the Engineer shall have the option of directing the Contractor to fill the test hole with water as many as four (4) times prior to the timed test.

Soil that does not meet the drainage requirements shall be removed, replaced, and/or modified to meet the minimum percolation required, as directed by the Engineer. Removal, replacement, and/or modification, when directed by the Engineer, shall be considered extra work.

C. TREE STAKING AND GUYING

Stake or guy trees according to the details as shown on the Contract Documents and as specified herein. Install trees before lawns are planted, when applicable. Place each tie as shown in details, in a figure eight pattern with a loop large enough to allow for two (2) years growth.

D. HYDRO-SEEDING

Remove existing soil over the entire area to receive hydro-seeding and place twelve inches (12”) of Topsoil. See Subsection 6.8, Materials.

Hydro-seed mix shall be Pacific Coast Seed Native Ornamental Fine Fescue Mix or approved equal. Pacific Coast Seed (925) 373-4417. Unless otherwise noted, mix shall be applied in the following quantities:

#/Ac.	Species/Common Name - 70 Total Lbs.
30	Festuca rubra "Molate Blue"/Molate Blue Fescue
20	Festuca occidentalis/Western Fescue
20	Festuca idahoensis/Native Idaho Fescue

Contractor shall provide adequate water by hand or by temporary sprinkler system to ensure hydro-seed establishment.

An agricultural suitability report that has been prepared for the specific site shall take precedent over the following materials. If such report is not available, the following materials shall be of such a character that when dispersed in a uniform slurry shall form an absorbent porous mat:

3000 gallons per acre	Fresh Water
2000 gallons per acre	Wood Cellulose Fiber
80 gallons per acre	Organic Stabilizer
600 gallons per acre	Tri-C 6-2-4, or approved equal

Water shall be fresh and free of impurities, excess chlorine, and salts.

Fiber shall be clean, weed-free mulch of wood cellulose containing no germination or growth-inhibiting factors. Fiber shall contain a harmless, temporary green dye.

Mixing shall be performed in a tank, with a built-in continuous agitation and recirculation system, of sufficient operating capacity to produce a homogeneous slurry and a discharge system which will apply the slurry to the designated areas at a continuous and uniform rate.

The slurry preparation shall take place at the project site and shall begin by adding water to the tank when the engine is at halt throttle. When the water level has reached the height of the agitator shaft, good recirculation shall be established, and at this time the seed shall be added. Fertilization shall then be added followed by the wood cellulose fiber, when the tank is at least one-third (1/3) filled with water. Spraying shall commence immediately when the tank is full.

Contractor shall spray designated areas with the slurry in a sweeping motion, in an arched stream, until a uniform coat is achieved and the material is spread at the required rate per acre.

A slurry mixture which has not been applied within four (4) hours after mixing shall be rejected and replaced at the Contractor's expense.

Hydro-seed only after weed abatement operations and planting of trees and shrubs.

Costs incurred for repair or replacement of bare, sparse or damaged areas shall be the responsibility of the Contractor.

The Contractor is directed to Subsection 7.3, Maintenance of Hydro-seeded Areas, which requires installation of a temporary irrigation system or the use of hand watering to provide water to insure germination and growth to maturity should there be insufficient rainfall.

E. SOD

Remove existing soil over the entire area to receive sod and place twelve inches (12”) of Topsoil (see Subsection 6.8, Materials) to the grades indicated. Grade, rake, and roll until areas to receive sod are smooth and free of any rocks, soil clods, roots, or any undesirable materials as determined by the Engineer. Prior to laying sod, soil shall be moist, but not saturated, to a minimum depth of six inches (6”). Area to be sodded shall receive sulphate of ammonia at a rate of one pound per 200 square feet.

Sod shall be laid and tamped with butt joints in a staggered “running bond” pattern. After installation, sod shall be rolled with a landscape hand roller filled with water.

F. PALMS

Palm trunk condition shall be free of any scarring or blemishes. “Pineapple” shall be formed to the satisfaction of the Engineer. Wrap fronds in burlap and keep moist. De-fronding and tying work shall be completed prior to digging the root ball.

Contractor shall remove dead fronds and skin the entire trunk clean to the height of the green fronds. Majority of green fronds shall be removed, leaving ten (10) to fifteen (15) at the apex. Remaining fronds shall have thirty percent (30%) to fifty percent (50%) of the length cut off and shall be lifted up and tied together in two (2) locations in an upright position with cotton rope or cord of not less than one-quarter inch (1/4”). Wire will not be permitted.

Pruning shall be done with sterilized reciprocal saws. Chainsaws will not be allowed. Saw blades shall be sterilized before and between pruning each frond by immersing the blade in a solution of fifty percent (50%) household bleach and fifty percent (50%) domestic water for five (5) minutes. Solution shall be kept up to strength by the regular addition of more bleach.

Root-ball size shall be based upon a 5:1 ratio of brown trunk height to root-ball diameter. Root-ball shall be wrapped in burlap and kept moist. Root-ball shall not be left exposed to direct sunlight or air. No excavation shall be done closer than twenty-four inches (24”) to the trunk at ground level.

Excavation shall extend below the major root system to minimum depth of four feet (4'). The bottom of the root-ball shall be cut off square and perpendicular to the trunk below the major root system.

Contractor shall not free-fall, drag, roll, or abuse the palm or put a strain on the crown at any time. A protective device shall be used around the trunk of the palm while lifting.

Should palms not be planted the day they arrive at the site, Contractor shall protect the crowns and root-balls from the sun and reflected heat from the ground. Palms shall be laid in a single layer on a flat surface. Avoid storing on a concrete or asphaltic concrete surface. Covering material shall be equivalent to a ninety percent (90%) shade cloth or burlap. Plastic or rubberized tarpaulins shall not be permitted. In no case shall palms be stored for more than forty-eight (48) hours.

Palms shall be planted when weather and soil conditions are suitable in accordance with accepted arboricultural practice, preferably between mid April and mid September. The top of the root-ball shall have the same dimension to adjacent grades that it had in the original growing field.

Root growth stimulant shall be equally distributed around the root-ball and water jetted into the backfill when the backfilling is between one-half (1/2) to two-thirds (2/3) up the root-ball. Stimulant shall be Vitamin B-1 as manufactured by Cal-liquid, Crooke, Chican, Ortho, or approved equal. Application rate shall be as recommended by the manufacturer.

The strings tying the palm fronds shall be cut forty-five (45) to sixty (60) calendar days after planting during the summer months and after ninety (90) calendar days during the winter months.

Contractor shall not trim palms for thirty (30) calendar days after untying.

6.13 GUARANTEE AND REPLACEMENT

Contractor shall guarantee the irrigation system and the landscape planting for defects in materials or workmanship for one year from the completion of the 180 Landscape Maintenance Period.

Replacement plant material shall be of the same species, variety, and size as originally planted. Replacement material shall be covered by a one full year guarantee from the date of replanting.

7.0 LANDSCAPE MAINTENANCE PERIOD

7.1 GENERAL DESCRIPTION

Contractor shall provide all labor, materials, equipment, and incidentals to perform work during the Plant Establishment and Post-Installation Maintenance Periods Landscape Maintenance Period, as specified herein, including but not limited to; litter removal, graffiti removal, drain cleaning, hardscape sweeping, adequate watering of plant materials, mowing, fertilizing, replacing unsuitable plant material and controlling weeds, rodents, and other pests.

The landscape maintenance period shall be 180 calendar days from the date that the City determines that all planting is completed and in conformance with the Contract Documents. Said determination shall be in writing.

The landscape maintenance period shall begin upon approval by the Engineer of the planting work. The Engineer shall give such approval if, upon review, the Engineer finds the work complete and in compliance with the Contract Documents. No additional planting inspection trips will be made, or shall any extensions of contract time be allowed, due to rejected materials or the failure of the Contractor to schedule his work properly or to comply with the requirement of this Section. Engineer must review replacement material prior to installation.

7.2 GENERAL REQUIREMENTS

The Contractor shall provide maintenance of all plants and planted areas until satisfactory completion of the landscape maintenance period as determined by the Engineer. Maintenance operations shall include, at a minimum, weekly watering, weeding, trash pick-up, graffiti removal, replanting, fertilizing, mowing, and any other operations necessary to maintain plant health and vigor, including treatment for fungus, diseases, insect pests, or rodents and a clean, neat appearance of the landscape area, to the satisfaction of the Engineer.

Following planting and initial watering, water all plants and planted areas as necessary to keep the ground moist from the surface to well below the root systems. Hand water planted areas not covered by the sprinkler system. Do not wet the foliage of trees, shrubs, or ground cover when it is exposed to hot sun. The entire irrigation system shall be covered under the landscape maintenance period.

Contractor shall be responsible for removal of any graffiti within the project per City graffiti removal policy. Graffiti must be removed within twenty-four (24) hours of notification of existence.

The Contractor shall protect all plants and planted areas against trespassing and damage at all times. If any plants are injured, they shall be treated or replaced as required by the Engineer. Any damage to, or failure of, the irrigation system shall be immediately corrected. No work shall be executed in, over, or adjacent to planted areas without proper safeguards and protection.

Any plant indicating weakness or probability of dying shall be replaced immediately by the Contractor at his expense.

Plant basins shall be kept in good condition.

Any plants blown over, and not permanently damaged, shall be replanted and re-staked.

Any plants which settle below the specified level of planting shall be taken up and replanted at the proper level.

Any tree ties that are too tight or too loose shall be adjusted. Broken ties shall be immediately replaced.

All planted areas shall be watered, cleared of weeds and debris, and presented in neat and orderly condition for final inspection.

All clippings, trimmings, cuttings, trash, rubbish, and debris shall be promptly removed from the site.

All planted areas, adjacent paved areas, and areas next to buildings, fences, benches, or other structures and site furnishings shall be kept free of weeds, litter, rocks, glass and debris.

Bark, sand, and gravel areas shall be raked as required to keep them free of foreign material.

Paved areas shall be swept and cleared a minimum of once per week and as necessary, as determined by the Engineer, to remove any bark, sand, gravel, soil, or dirt that might be washed onto such areas from adjacent planted areas.

Ten (10) Working Days prior to the anticipated start of the 180-day maintenance period, the Contractor shall request the Engineer to perform a “Pre-maintenance Inspection” of the planting portion of the contract. The Engineer will verify that the planting portions of the Work are complete, the plant material is in good, healthy condition, that all landscape areas are weed-free and in a neat, orderly condition, and that the irrigation system is complete and operational in all respects. The Engineer shall prepare a “Pre-maintenance Punch List” of items to be completed before the 180 Calendar Day Maintenance portion of the Contract can begin.

Upon receipt of the "Pre-maintenance Punch List," the Contractor shall expeditiously correct those deficiencies noted by the Engineer, and provide a letter stating that all of the items on the pre-maintenance punch list have been completed. Once the completion of the Pre-maintenance Punch List has been verified, the Engineer will issue a letter to the Contractor indicating the specific date upon which the 180-day maintenance portion of the contract may commence.

Ten (10) Working Days prior to the end of the 180-day maintenance period, the Contractor shall request in writing a "Final Inspection" of the Work by the Engineer. The final inspection shall be held within the final eight (8) days of the 180-day maintenance period.

The 180-day maintenance period shall not end until all turf areas have solid coverage of the underlying soil with bare spots no longer than four inches (4") across and with bare areas not exceeding two percent (2%) of total sod area.

If the Engineer finds the plant material to be in good, healthy condition of active growth, and all landscape areas to be weed-free and in neat and orderly condition, then final acceptance of the planting portion of the Contract shall be given effective at the end of the 180-day maintenance period.

If approval for the 180-day maintenance period is not given, the Engineer shall prepare a "Final Punch List" of items to be completed before final acceptance of the planting portion of the Contract. Final acceptance shall then be given upon verification by the Engineer that the Final Punch List items have been completed.

Providing and paying for irrigation water shall be the responsibility of the Contractor until the end of the landscape maintenance period.

7.3 MAINTENANCE PERIOD HYDRO-SEEDED AREAS

If hydro-seeding is not applied in a period where it shall be exposed to sufficient rainfall to germinate and grow to maturity, Contractor shall hand-water or install, at his cost, a temporary irrigation system to provide sufficient water.

Prior to completion of the Maintenance Period, hydro-seeded areas shall be established with a uniform eighty percent (80%) coverage of healthy vigorous growth. Costs incurred for repair and replacement of bare, sparse or damaged areas shall be the responsibility of the Contractor. Seed for replacement shall be of the same type and quantity ration as specified in the Contract Documents. Fertilizer shall be as recommended by an approved soil analysis.

7.4 IRRIGATION SYSTEM

Contractor shall operate the irrigation system in the automatic mode and shall properly and completely maintain all parts of the irrigation system during the landscape maintenance period.

7.5 TYPICAL REQUIREMENTS – 180 CALENDAR DAY LANDSCAPE MAINTENANCE PERIOD

The following is a list of the typical requirements common to most projects. They are some of the minimum requirements necessary to properly maintain the landscape Work.

Watering: Water deeply and slowly to establish moisture to the full depth of the root zone. Watering shall be done in a manner to avoid erosion, excessive runoff, ponding, or water-logging of soil. Hoses and sprinklers shall be used to supplement the sprinkler system where necessary to ensure complete coverage of planted areas.

Weeding: Weed and cultivate planted areas as necessary to keep them free of weeds.

Fertilizer: If during the 180-day maintenance period, there arises a question as to the need for application of fertilizer or minerals or the formulation of a fertilizer, soil samples shall be taken from locations specified by the Engineer, and shall be analyzed by a licensed soil analyst at the Contractor's expense.

The results and recommendations for the formulation and rate of application of fertilizer and minerals shall be submitted to the City and the Contractor shall formulate and apply the fertilizer and minerals as per the recommendations of the Soil Analyst and approved by the Engineer.

Disease and Pest Control: Check for the presence of insects or disease. Address such issues immediately. Spraying for insect and disease control shall be done only in accordance with Department of Agriculture rules and regulations for the application of pesticides.

The spraying shall be done with extreme care to avoid any property damage and any hazard to any person or pet in the area or adjacent areas.

Notification shall be given to the Engineer two (2) full Working Days prior to the Contractor performing "specialty-type" operations, including but not limited to; fertilization, chemical weed abatement, turf aerification, dethatching and fungicide applications. Application of fertilizer or pre-emergent herbicide without notification shall be considered not done.

Contractor shall apply spray chemicals when air currents are still or less than five (5) miles per hour; preventing drifting onto adjoining property or traveled way and preventing any exposure to person whether or not they are in, or near, the Project.

Chemicals to be applied must be approved by the Engineer before they are applied. In no case will extremely toxic materials such as arsenicals, parathion, Tepp, or dieldrin, be permitted. Snails and slugs shall be controlled by the use of an approved non-arsenical methaldehyde bait.

Pruning: Pruning of trees shall be done in accordance with ISA (International Society of Arboriculture) standards.

Staking and Guying: Maintain and replace stakes and guys with equal material. Maintain and replace plant ties to provide support without chafing of bark. Re-tie between old ties.

Replacement of Plant Material: Remove dead and damaged plants and replant with material of equivalent size, condition and variety, subject to approval by the owner.

Trash Pick-up: Remove any trash, papers, litter, debris, or other unsightly materials from the landscape area and dispose of off-site.

The site shall be in a neat and orderly condition for final review.

Graffiti Removal: The Contractor is responsible for graffiti removal and shall comply with the City graffiti removal policies. All graffiti must be removed within twenty-four (24) hours after notification, including during the maintenance period.

Before weeds exceed two inches (2”) in height, they shall be removed and disposed of off-site. Noxious weeds (i.e., blackberry, nut sedge, bind weed, etc.) shall be sprayed with an approved non-selective, post-emergent herbicide and left in place for seven (7) calendar days. Application rate and method shall be as recommended by the manufacturer. As determined by the Engineer, a second application shall be made seven (7) days after the first application. With both applications, areas sprayed shall remain un-watered for a minimum of forty-eight (48) hours. Dead weeds shall be removed seven (7) calendar days after second application and disposed of off-site.

If the Engineer notifies the Contractor of failure to control weeds as specified herein, the Contractor shall kill all weeds within ten (10) calendar days of such notification. The 180 Day Maintenance Period will be extended for each day, after ten (10) calendar days, until such weeds have been killed.

Trees planted shall be pruned or headed back, as requested by the Engineer, to eliminate diseased or damaged growth, reduce the risk of toppling or wind damage, maintain growth within space limitations, maintain natural appearance, and to balance the crown with the root structure.

Contractor shall provide vertical clearance of not less than eight (8) feet over walks, slabs and active play areas, and not less than twelve (12) feet over roadways.

Turf Maintenance: First mowing of turf shall be performed when the grass is two and one-half inches (2 ½") in height. In no case shall the turf be cut lower than one and one-half inches (1 ½") in height. After initial mowing, turf shall be cut as often as necessary to maintain the turf at a height of two inches (2"). In not case shall the turf be cut lower than one and one-half inches (1 ½") in height.

Fertilizing shall be as recommended by a project agricultural suitability report.

Contractor shall trim around irrigation heads, not in excess of two inches (2"), to allow for unimpeded spray and at borders along walks, mow-strips, curbs, and flatwork when necessary.

Turf areas shall consist of uniform cover and present a healthy vigorous growth. Costs incurred for repair or replacement of bare, sparse or damaged areas shall be the responsibility of the Contractor.

Contractor shall remove all grass clipping from project site.

Palm Trees: Maintenance shall include, but not be limited to, spraying to control or prevent disease and weekly water management including soil probing, observation of soil moisture sensing devices (where applicable), and palm tree pruning. Pruning shall be done with sterilized reciprocating saws. Chains saws will not be allowed. Saw blades shall be sterilized before and between pruning each frond by immersing the blade in a solution of fifty percent (50%) household bleach and fifty percent (50%) domestic water for five (5) minutes. Solution shall be kept up to strength by the regular addition of more bleach.

Site furniture and amenities: Shall be maintained in a safe condition without damage or broken parts and free of graffiti and debris. Costs incurred for repair or replacement shall be the responsibility of the Contractor.

7.6 PUBLIC AVAILABILITY

Project site will typically be open to use by the public during the landscape maintenance period, unless access is restricted as a safety issue due to construction of other aspects of the Work. Project site will typically be open to use by the public during the landscape maintenance period, unless access is restricted as a safety issue due to construction of other aspects of the Work. Project site may, at the option of the Engineer, be closed to the public during construction and post-installation maintenance. Contractor shall conduct operations so as to cause no danger or inconvenience to the public.

7.7 PROTECTION

At the City's discretion, Contractor shall be responsible for fencing and maintaining adequate protection at the site during construction and post-installation maintenance. Costs incurred due to damage or replacement shall be the responsibility of the Contractor. Costs for fencing and maintenance of such fencing and site protection shall be included in the various bid items of work and no additional payment shall be made to the Contractor.

Contractor shall apply spray chemicals when air currents are still or less than five (5) miles per hour; preventing drifting onto adjoining property or traveled way and preventing any exposure to persons whether or not they are in, or near, the Project.

7.8 SUBSURFACE DRAINS

Subsurface drains and catch basin grates shall be kept clear of leaves, litter and debris to ensure unimpeded passage of water. Drain-lines shall be periodically flushed with clear water to avoid build-up of silt and debris.

7.9 IRRIGATION SYSTEM

Contractor shall operate the irrigation system in the automatic mode and shall properly and completely maintain all parts of the irrigation system during both the 180-Day Plant Establishment Period. and Post-Installation Maintenance Periods.

The Contractor shall deliver water in sufficient quantities to properly irrigate the plant material and make adjustments to the water application rates to compensate for seasonal conditions. Irrigation system is designed for watering five (5) days a week, between the hours of 10 P.M. and 6 A.M., with even water distribution.

Costs incurred due to repair or replacement of equipment shall be the responsibility of the Contractor. Replacement parts shall be identical to the parts being replaced.

7.10 SITE FURNITURE

Site furniture and amenities shall be maintained in a safe condition without damage or broken parts and free of graffiti and debris.

8.0 SITE ELECTRICAL

8.1 DESCRIPTION

Contractor shall provide all labor, materials, tools, equipment, and incidentals to furnish and install electrical hookups and fixtures for an operable electrical system as indicated in the Contract Documents.

Contractor shall apply and pay for all permits, inspections and examinations, and shall include in Bid.

8.2 MATERIALS

Equipment and materials shall be new, complying with the requirements of the codes and regulations of the City and be approved and identified by the Underwriter's Laboratory, Inc. (U.L.).

The regulation and code requirements of Section 86-1.02, Regulations and Codes, of the Standard Specifications shall apply unless superseded or otherwise modified by the code and regulations of the City including the California Electrical Code and the regulations of the City Electric Department.

Contractor shall submit to the Engineer, within fifteen (15) calendar days prior to installation, shop drawings and material list. Catalog cuts and full descriptive literature must be submitted whenever the use of items differs from those specified.

A. RIGID CONDUIT

Conduit and conduit fittings shall be galvanized, conforming to standards of rigid steel conduit as specified by Underwriter's Laboratory Inc., and shall bear the U.L. label on each length. Interior of conduit shall be zinc or enamel. Rigid conduit shall be of the size as indicated on the Contract Documents and used when installed in or under concrete or roadways, in masonry walls, or exposed on buildings. No reducing fittings will be permitted.

The ends of conduits shall be free of burrs and rough edges. Ends of rigid steel conduit shall be properly coupled. Running threads, thread-less connectors and couplings will not be permitted. Rigid conduit in contact with earth shall be wrapped with Hunts Wrap Process #3, or approved equal.

Maximum bend of any conduit shall be ninety degrees (90°) and the minimum radius of a factory bend shall be twelve inches (12").

All threads shall be treated with approved joint compound before fittings are placed thereon.

B. FLEXIBLE METAL CONDUIT

Flexible metal conduit, where indicated on the Contract Documents, shall be liquid-tight with U.L. label and may be used where permitted by code. Fittings shall be “jake” and “squeeze” type. Seal-tight flexible conduit shall be used for all final connections.

C. PVC CONDUIT

PVC Schedule 40 conduit, where indicated on the Contract Documents or permitted by code, may be used in lieu of rigid steel conduit for conduits below grade. Install a code sized insulated (green) copper conductor ground wire in conduit for continuity of equipment ground. Conduits shall be separated by a minimum of three inches (3”) between identical systems and twelve inches (12”) between power or telephone systems. All elbows and risers shall be rigid galvanized steel, wrapped with Hunts Wrap Process #3, or approved equal.

D. CONDUCTORS

Copper wire shall conform to the applicable portions of ASTM B-3 and B-8. Wire sizes shall be based on American Wire Gauge (AWG).

Conductor shall be solid copper, minimum #12 AWG, unless specifically noted otherwise on Contract Documents. Conductors #8 AWG and larger shall be stranded copper wire. Type of wire shall be as follows.

Type THWN, 600 volt insulation shall be used for wet or damp locations.

Type THHN, 600 volt insulation shall be used for dry locations.

Low voltage controller conductors for the irrigation system shall be Type UF, sized in accordance with the controller equipment manufacturer’s recommendation and shall be U.L. approved for direct burial installation as specified in the Irrigation System Section herein.

E. PULL BOXES

Pull boxes, covers and extensions shall be precast reinforced concrete or of a fire-resistant plastic material. Materials shall be dense and free of voids or porosity. Extensions shall be of the same material as the pull box. Covers/lids shall be bolt-on, tamper-proof type.

F. JUNCTION BOXES AND OUTLETS

Junction boxes and outlets shall be cast aluminum as manufactured by Course-Hinds, Type “FS,” or approved equal, with conduit hubs as required.

G. FIXTURES AND LAMPS

Lighting fixtures and lamps shall be as indicated on the Contract Documents, or approved equal.

8.3 INSTALLATION

Provide junction or pull boxes for pulling conductors, where required due to excessive number of bends or on long runs, at intervals not to exceed one hundred feet (100’).

Bury underground conduit to a depth of not less than twenty-four inches (24”) below finish grade.

Provide expansion couplings where conduits cross expansion joints or for continuous runs in excess of one hundred feet (100’) except when embedded in concrete.

For runs in excess of one hundred feet (100’) in underground service conduits, install long radius bends (nine [9] times the diameter of conduit).

Cut and patch concrete as required for proper installation of electrical work. All work shall be in accordance with this Section 02020.

Ground all equipment and services in accordance with applicable codes and as indicated on the Contract Documents.

Conductors shall be continuous between outlets or junction boxes and no splices shall be made except in outlet boxes, pull boxes or hand-holes.

All joints, splices, and taps #10 and smaller (including fixture pig-tales) shall be connected with “Ideal” wing nuts or Scotch-Lok Connector Sealing Packs #8, or approved equal. No. 8 and larger shall be connected with solderless connectors or one hundred percent (100%) electrolytic copper.

Use only approved cable lubricants when pulling conductors.

Install a polyvinyl rope pull wire in all empty conduits.

8.4 INSPECTION AND TESTS

Perform all tests as requested by the Engineer.

8.5 GUARANTEE

Contractor shall guarantee all materials and equipment for one (1) year from the date of acceptance of work as in accordance with Subsection 9, Warranty, Guaranty, and Inspection of Work, of Section 00700, General Conditions.

9.0 MEASUREMENT AND PAYMENT

Planting shall be measured and paid for on a lump sum basis. The contract lump sum price paid shall include full compensation for furnishing all labor, tools, equipment, soil, landscape irrigation, clearing and grubbing, grading, soil amendments, fertilizer, furnishing and installation of new plant materials, complete in place (except for hydro-seeding), Site furniture and amenities, and all incidentals thereto.

Hydro-seeding shall be measured and paid for by the square foot. The contract price paid shall include full compensation for furnishing all labor, tools, equipment, soil excavation, installation of topsoil, soil preparation, soil amendments, fertilizer, furnishing and installation of hydro-seeding, any required hand watering, and installation, operation, and removal of a temporary irrigation system, complete in place, and all incidentals thereto.

180 Day Maintenance Period shall be paid for on a lump sum basis. The contract lump sum price paid for 180 Day Maintenance Period shall include full compensation for furnishing all labor, tools, equipment, watering, and materials, water and electrical utility costs, including furnishing and replacement of plant material and mulch, for the entire 180 calendar day maintenance period and all incidentals thereto.

Site Electrical will be paid for on a lump sum basis unless otherwise specified in the Contract Documents. Payment shall include all work including materials, installation, training, and all incidentals thereto.

All other Work performed under this Section shall be considered as included under Planting and no further payment shall be allowed therefore.

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SECTION 02024

LIME STABILIZATION

1.0 GENERAL

1.1 DESCRIPTION

Lime Stabilization work shall consist of preparing the native material, mixing the native material with specified percentages of hydrated lime or quick lime and water and spreading and compacting the mixture to the lines, grades and dimensions shown in the Contract Documents. This item shall conform to Section 24 of the Standard Specifications except as indicated below or in the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls. When working in developed areas, extreme caution shall be exercised to control the dust from the operation. Refer to Section 02007, Storm Water Pollution Prevention.

2.0 MATERIALS

2.1 SOIL

In-place material in the roadbed shall be the native material, to be mixed with the specified lime.

2.2 LIME

Lime shall be dolomitic quicklime conforming to the definitions in ASTM Designation C51 and C977. The use of alternative lime products that are of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the Contractor complying with Subsection 1.3, Product Options and Substitutions, of Section 01600, Product Requirements.

The lime shall be protected from moisture until used in the project and be sufficiently dry to flow freely when handled.

A Certificate of Compliance meeting the requirements of Subsection 1.10, Quality Assurance Control Submittals, of Section 01330, Submittal Procedure, shall be furnished with each delivery of lime and shall be submitted to the Engineer with a certified copy of the weight of each delivery of lime to the jobsite.

2.3 WATER

General Use

Water for dust control and general cleaning shall be from the City's potable water system, the recycled water system, or another approved source. Prior to use of the City's potable water, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used. Recycled water may be available through the City Water and Sewer Utility subject to their requirements and fees.

Water for Mixing

Water for use in mixing the lime and soil shall comply with Section 24-1.02 of the Standard Specifications. The source shall be approved by the Engineer. If water from the City's potable water supply is used, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used. The Contractor is responsible for verifying at no additional cost to the City that reclaimed water is suitable for use.

3.0 PREPARING MATERIAL AND FINISH GRADE

Preparation of material and finish grade shall conform to Sections 24-1.04 and 24-1.08 of the Standard Specifications, except that the grade shall not vary more than 0.04 foot above or below the grade established by the Contract Documents. The material to be treated shall contain no solids larger than 2-1/2 inches in any dimension. Removing and disposing of solids larger than 2-1/2 inches shall be considered incidental and is included in the price paid for lime stabilization.

4.0 SPREADING

The percentage of lime to be added to the native material shall be the percentage provided in the Contract Documents or as directed by the Engineer. The amount of lime is a percentage by dry weight of the treated materials in pounds per cubic foot unless otherwise noted.

The depth of treatment shall be as required in the Contract Documents, or as determined by the Engineer. Lime shall be spread by equipment capable of uniformly distributing the required amount of lime for the full depth and width of treatment. The rate of spread shall not vary by more than 10% of the required amount of lime.

The lime shall be prevented from blowing by suitable means selected by the Contractor and approved by the Engineer. The spreading operations shall be conducted in such a manner that a hazard is not present for construction personnel or the public. All lime spread shall be thoroughly mixed into the soil the same day lime spreading operations are performed.

5.0 MIXING

Mixing equipment shall be of the type that can mix the full depth of the thickness to be treated and leave a relatively smooth bottom of the treated section. Mixing and re-mixing, regardless of equipment used, will continue until the material is uniformly mixed, free of streaks or pockets of lime. Moisture content is to be at approximately 3-5% over optimum and all material shall comply with the following requirements:

Sieve Size	Percent Passing
1”	98 Min.
No. 4	60 Min.

When the stabilized material, exclusive of 1 inch or larger clods, is sprayed with a phenolphthalein alcohol indicator solution, areas showing no color reaction will be considered evidence of inadequate mixing.

Mixing equipment shall be equipped with a visible depth indicator showing mixing depth, an odometer or foot-meter to indicate travel speed and a controllable water additive system for regulating water added to the mixture.

Lime treated material shall not be mixed or spread while the atmospheric temperature is below 35 degrees Fahrenheit.

When granulated dry lime is used, the material shall be mixed at least twice. The first mixing shall not occur on the same day as the last mix. The entire mixing operation shall be completed within 4 days of the initial spreading of lime, unless otherwise permitted by the Engineer.

The depth of mixing of the lime-stabilized material shall not vary more than 0.05 feet from the planned depth at any point. Mixing to a depth that exceeds the planned depth by 10% or more shall be considered evidence of an inadequate amount of lime and additional lime shall be added at the Contractor’s expense.

No traffic other than the mixing equipment or other related construction equipment will be allowed to pass over the spread lime until after completion of mixing.

6.0 COMPACTION

The treated mixture shall be spread to the required width, grade and cross section. The maximum compacted thickness of a single layer shall not exceed 6 inches in thickness. Where the thickness exceeds six inches (6”), the mixture shall be compacted in two or more layers of approximately equal thickness. Where the Contractor demonstrates to the Engineer that the equipment and method of operation will provide uniform distribution of the lime and the required compacted density throughout a single layer, the thickness of the layer may be increased with the Engineer’s approval.

Final compaction shall begin as soon as possible and must be completed within 24 hours of final mixing.

Maximum density will be determined on a composite of material from approximately 5 samples (the Engineer shall determine the exact number and location of tests) taken at random locations from the area to be tested and obtained after all mixing operations have been completed, but prior to initial compaction. The Contractor shall be responsible for coordination of sampling and testing and shall allocate sufficient time to sample and test the work.

The finished thickness of the lime treated material shall not vary more that 0.1 feet from the required thickness at any point.

Initial compaction shall be performed by means of a sheepsfoot or segmented wheel roller. Final rolling shall be by means of steel drum roller or a pneumatic tired roller. Vibratory rollers are not to be used.

Areas inaccessible to rollers shall be compacted to the required compaction by other means satisfactory to the engineer.

The lime-stabilized soil shall be compacted to a relative compaction of not less that 95 percent calculated on a dry mass basis. ASTM 1557 and 2922 will determine in-place density of the compacted lime stabilized material. A composite of material from the randomly selected sites, taken at the time in-place density is determined, will be used to determine the in-place moisture content, by ASTM 2216.

7.0 FINISH ROLLING AND GRADING

The surface of the finished lime-treated material shall be the grading plane and at any point shall not vary more than 0.04 feet above or below the grade required in the Contract Documents.

Before finish compaction, if the lime-treated material is above the grade tolerance specified in this section, uncompacted excess material may be removed and used in areas inaccessible to mixing equipment. After finish compaction and trimming, excess material will be removed and disposed of. The trimmed and completed surface shall be rolled with steel or pneumatic tired rollers. Minor indentations may remain in the surface of the finished material as long as no loose material remains in the indentations. Vibratory rollers are not allowed.

At the end of each day’s work, a construction joint shall be made in thoroughly compacted material normal to the centerline of the roadbed and with a vertical face.

If a part-width section is left at the end of the day, the longitudinal joint against which additional material is to be placed shall be trimmed approximately 3 inches into treated material along a neat and straight line having a vertical edge. The material so trimmed shall be removed from the jobsite and disposed of and is considered incidental to the work unless otherwise provided in the Contract Documents.

Should the Contractor choose to perform the mixing with a cross-shaft rotary mixer, the creation of the above construction joint(s) is not required if the Contractor extends the mixer three inches (3”) into the previous day’s work to assure a good bond with the previous work.

8.0 CURING

The surface of each compacted layer of lime treated material shall be kept continually moist until covered by a subsequent layer of lime treated or other material or by applying a curing seal immediately following final trimming and rolling of the lime treated layer. The curing seal shall consist of SS or CSS grade asphaltic emulsion and shall be furnished and applied to the surface of the top layer of lime stabilized material in conformance of Section 94 of the Standard Specifications.

Curing seal shall be applied at a rate between 0.10 and 0.2 gallon per square yard of surface with the exact rate to be determined by the Engineer. The curing seal shall be applied as soon as possible after the completion of final rolling and before the temperature falls below 35 degrees Fahrenheit (35º F).

No construction equipment or traffic shall be permitted on the lime-treated material during the first 3 days after applying the cure seal, unless otherwise permitted by the Engineer.

Damage to the curing seal shall be promptly repaired by the Contractor at the Contractor’s expense, as directed by the Engineer.

9.0 TESTING

9.1 TEST CONTROL

Lime shall conform to the requirements of ASTM C 977 with the exception that when a 250 g test sample of quicklime is dry sieved in a mechanical sieve shaker for 10 minutes, +/- 30 seconds, it shall conform to the following grading requirements:

Sieve Size	Percentage Passing
3/8”	98-100
No. 100	0-25
No. 200	1-15

10.0 AIR MONITORING

The City of Santa Clara may retain an Industrial Hygienist to monitor the air quality during the mixing and curing Operation. The Contractor will be required to be within the required air quality standards.

Permissible exposure limits (PELS) are legally enforceable time-weighted (TWA) exposure limits for air contaminants, which an employee may be exposed to over a normal 8-hour workday. These limits have been adopted and are enforced by Cal OSHA. Current Cal OSHA PEL's are based on standards promulgated by the Cal OSHA Standards Board and are revised periodically based upon scientific information.

Threshold limit values (TLVs) are exposure guidelines that have been established for airborne concentrations by the American Conference of Governmental Industrial Hygienists (ACGIH) and are believed to represent conditions under which nearly all workers may be repeatedly exposed, day after day, without adverse affect. TLVs are also 8-hour TWAs and are based on available information from industrial experience; from experimental human and animal studies; and when possible, a combination of the three.

Recommended exposure levels (RELs) are exposure guidelines that have been established for airborne concentrations by the National Institute for Occupational Safety and Health (NIOSH). Like the TLVs, RELs are based on available information from industrial experience; experimental human and animal studies. RELs are not enforceable under OSHA. Unless otherwise noted RELs are TWA concentrations based on 10-hour workdays during a 40-hour workweek.

All established exposure limits including PELs, TLVs and RELs are used as guides in the control of health hazards and should not be used as fine lines between safe and hazardous concentrations. The best practice is to maintain the lowest practical concentrations of all atmospheric contaminants.

The current Cal OSHA PELs and TLVs for the contaminants for which sampling was conducted are as follows:

Contaminant	PEL mg/cubic meter	TLV mg/cubic meter	Critical Effect(s)
Silica, as quartz *	0.05	0.025	siliconsis/puliminary function/pulmonary fibrosis/cancer/ lung irritation
Respirable dust	5.0	3.0	
Calcium oxide as calcium	2	2	

*American Conference of Governmental Industrial Hygienists (ACGIH): Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 2000, Cincinnati, Ohio: ACGIH 2000.

Cal OSHA's PELs vary from compound to compound and are based on 8-hour Time Weighted Averages (TWAs) with some having Short Term Exposure Limits (STEL) of higher concentrations allowed for fifteen minute periods and ceiling levels not to be exceeded at any time. The ACGIH TLVs and the NIOSH RELs, while not enforceable by law, are typically found to be more conservative. The TLVs and the RELs both specify TWAs for a variety of chemicals along with STELs and ceiling limits.

11.0 SAFETY PROGRAM

The Contractor shall provide to the Engineer a detailed safety program for the protection of all workers and the public, covering precautions to be exercised and emergency treatment to be available on the jobsite. The program shall include protective equipment for eye, mouth, nose, and skin protection and a first-aid kit with eyewash. Said protective equipment shall be available on the jobsite during all lime stabilization operations. This program shall be submitted for review and agreed upon before any material containing lime is brought to the job site. The Contractor shall actively enforce said program for the protection of its work force and others in the construction area.

12.0 REJECTED WORK

All work not conforming to the requirements of the Contract, shall be made to conform to all such requirements to the satisfaction of the Engineer and at the Contractor's expense, or said work shall be rejected. All rejected materials shall be removed from the site and shall be replaced with materials meeting the Contract requirements. No further compensation shall be allowed.

13.0 MEASUREMENT AND PAYMENT

All work involved in preparing the existing material, furnishing and applying water, mixing, spreading, and compacting the lime treated material, furnishing and applying the curing seal and other related work will be measured and paid by the square yard for lime stabilization.

The above contract prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in constructing the lime treatment, complete in place, as required by the Contract Documents and as directed by the Engineer.

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SECTION 02026

AGGREGATE BASE

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing, spreading, and compacting aggregate base as specified in the Contract Documents. The work shall conform to Section 26 of the Standard Specifications except as indicated in the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 MATERIALS

Unless otherwise specified in the Contract Documents, aggregate base shall be Class 2 (3/4-inch maximum size material) aggregate base conforming to Section 26 of the Standard Specifications.

2.1 WATER

Water for dust control, general cleaning, moistening and compaction shall be from the City's potable water system, the recycled water system, or another approved source. Prior to use of the City's potable water, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used. Recycled water may be available through the City Water and Sewer Utility subject to their requirements and fees.

3.0 GRADE TOLERANCE

3.1 SUBGRADE

The subgrade to receive aggregate base, immediately prior to spreading, shall meet the requirements of Section 02019, Earthwork. Specific attention is directed to the relative compaction and subgrade "Truck Load Test" requirements.

3.2 FINISHED GRADE OF AGGREGATE BASE

The surface of the finished aggregate base at any point shall meet the design grade indicated in the Contract Documents or as established by the Engineer with an allowed tolerance of not more than 0.04 feet above or below the above indicated grade.

4.0 SPREADING AND COMPACTING

Spreading and compacting shall conform to Sections 26-1.03C and 26-1.03D of the Standard Specifications, except the grade tolerance of the finish grade of the aggregate base shall be as specified above.

5.0 TESTING

5.1 TEST METHODS

The relative compaction of compacted aggregate base shall not be less than 95%, as determined by Test Method ASTM 2922.

A Certificate shall be furnished to the Engineer, indicating conformance to the requirements as outlined in Section 26 of the Standard Specifications, for the purpose of qualifying the aggregate base at the quarry. However, acceptance of the aggregate base by the Engineer will be determined solely by tests of samples taken at the job site.

The Contractor shall perform a “Truck Load Test,” as provided in Section 02019, Earthwork, on the finished grade of the aggregate base prior to covering with the next layer of material. The Contractor shall correct any failure of the aggregate base to pass the “Truck Load Test.” Corrective measures are to be approved by the Engineer.

The number of tests will be determined by the Engineer in order to assure compliance with the Contract Documents. The Contractor shall pay for retesting of material that fails any compliance test.

5.2 REJECTED WORK

Any and all materials and/or workmanship not conforming to the Contract Documents shall be made to conform to said requirements to the satisfaction of the Engineer, at the expense of the Contractor, or shall be rejected. All rejected materials shall be removed from the site and shall be replaced with materials meeting the above requirements. No further compensation shall be allowed.

6.0 MEASUREMENT AND PAYMENT

All work involved in furnishing and constructing the aggregate base will be measured and paid for by the ton of material, complete in place, unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the aggregate base, complete in place, as required by the Contract Documents and as directed by the Engineer.

END OF SECTION

SECTION 02027

CEMENT STABILIZATION

1.0 DESCRIPTION

Cement Stabilization consist of reconstructing an existing pavement section by in-place recycling of some of the pavement, base, and subgrade materials and chemically treating to enhance the structural properties of the recycled materials. This work consists of pulverizing existing roadway materials and uniformly mixing with Portland cement and water. The mixture shall then be compacted, finished, and cured in such a manner that the in-place cement-treated mixture forms a dense, uniform mass conforming to the lines, grades, and cross sections shown on the Plans.

2.0 GENERAL

2.1 MATERIALS

Recycled Materials – Material to be treated with Portland cement shall consist of pulverized asphaltic concrete, existing aggregate base, and underlying native subgrade soils. Existing materials shall be pulverized so that 100 percent will pass a 2-inch (50-mm) sieve and a minimum of 85 percent will pass a 1-inch (25-mm) sieve.

Portland Cement – All cement to be used or furnished shall conform to ASTM C150. The cement shall be protected from moisture until used and be sufficiently dry to flow freely when handled. Cement shall be furnished in bulk and not exposed until applied to prepared grade.

Water – Water shall be free from oils, acids, organic matter, and other substances deleterious to the cement treatment of materials. The water shall not contain more than 1,000 parts per million of chlorides nor more than 1,000 parts per million of sulfates as SO4. Water shall be clean and potable and shall be added as needed during mixing, compacting, and finishing operations and during the curing period, as required.

2.2 CEMENT APPLICATION RATE

Contractor shall use a Portland cement application rate of five percent (5%) at a soil weight of 120 pounds per cubic foot or at a different rate as specified in Division 3, Special Provisions.

2.3 CONTRACTORS QUALIFICATION

The Contractor performing cement stabilization shall document a minimum of five years of experience performing similar cement stabilization work. The Contractor shall submit a list of equipment to be utilized in performance of the cement stabilization work. The Contractor shall submit a detailed description of work procedures for approval by the Engineer prior to beginning cement stabilization work. The Contractor performing cement stabilization shall have a representative on site with a minimum of 5 years of experience in cement stabilization. Their function should include coordinating with other contractors and site representatives. All personnel should be properly trained in the cement stabilization process, including quality control and safety procedures.

2.4 PROTECTION OF EXISTING UTILITIES

Where existing underground utilities or utility services lie within the cement-treated section, the Contractor shall verify, by potholing or other means acceptable to and approved by the Engineer, that there is sufficient cover over the utilities to provide clearance for the mixing process without damage to the existing utility facilities. This verification shall be carried out where each utility crosses the boundary of the cement-treated section, and at a minimum of one location in between. This shall not relieve the Contractor of conforming with all utility protection requirements contained elsewhere in the Contract Documents.

The Contractor shall be responsible for the protection of existing pipelines, manholes, catch basins, valve boxes, and other utility structures that are to remain within the work area. Any such utility facilities that are damaged from roadway excavation work performed by the Contractor shall be either repaired or replaced to the satisfaction of the Engineer at no cost to the City.

2.5 EQUIPMENT

The cement-treated section shall be constructed utilizing a combination of equipment that will produce results that meet all the requirements herein. The Engineer, prior to use, shall approve such machines.

Cement Spreader: The cement spreader shall be equipped with such instrumentation and control equipment to control spread rates over variable travel speeds. The operator shall demonstrate that the instrumentation and control equipment is calibrated and capable of controlling the spread rates within specifications.

Mixer: The mixing equipment shall be capable of mixing the full specified depth of cement treatment, leaving a relatively smooth plane at the bottom of the cement-treated section. Mixing equipment shall be equipped with a visible depth indicator showing the mixing depth, and odometer or footmeter to indicate travel speed, and a controllable water additive system for regulating water added to the mixture.

Compactors: When compacting cement treated sections greater than eight inches (8”), a sheepsfoot type compactor capable of compacting the entire section in conformance with the Contract Documents shall be used.

3.0 CONSTRUCTION

3.1 PREPARATION OF EXISTING ROADWAY

The existing asphalt concrete (AC) surfacing and the underlying base material shall be pulverized to a depth twice the thickness of the existing AC section or other depth as specified in Division 3, Special Provisions. When the thickness of the existing base section is less then the thickness of the existing AC section, the pulverized depth may be reduced per Engineer’s approval.

The pulverized materials shall be graded to conform to the lines and grade shown on the Plans prior to application of the cement. Grading operations will require some movement of material along the grade and/or off-hauled to conform to the lines and elevations shown on the Plans and to allow for the new asphalt concrete section.

At the contractor’s option, the existing AC section may be removed by other means, if contractor can demonstrate to the Engineer that preremoval of AC will still allow for new grade requirements to be met with remaining materials.

No more of the existing roadway sections shall be pulverized or removed in any Working Day than can be relayed as specified above in that Working Day. Pulverized material shall be temporarily compacted at the end of each day with a smooth drum roller, to allow for traffic.

3.2 PORTLAND CEMENT APPLICATION

The Portland cement shall be applied in one operation to the required width, grade, and cross section. Cement shall be evenly spread at the designated rate and shall not vary more than five percent (5%) on any area. Only a calibrated spreader able to provide a uniform distribution of the cement throughout the treatment area shall spread cement. The cement shall be added in a dry state and every precaution shall be taken to prevent dusting. Tailgate spreading of the cement will not be permitted. Tailgating is defined as having manual control of the spread rate, instead of automatic. The spreader truck shall demonstrate the ability to maintain a consistent spread rate over variable travel speeds. The Contractor will demonstrate the consistency of the spread rate by conducting a pan test. The pan test consists of placing a 3-square-foot pan on the grade in front of the spreader truck. After cement has been spread, the cement is weighed to determine the rate of spread in pounds per square foot. Truck tags will be used to verify amount of cement delivered to project. No traffic other than the mixing equipment or other related construction equipment will be allowed to pass over the exposed cement until after the mixing is complete.

Cement shall not be spread, mixed, or hydrated while the atmospheric temperature is below 35°F (1.67°C). At the Engineers discretion, processing will be allowed if temperature is rising.

3.3 MIXING AND HYDRATING

The depth of the cement treatment will be ten inches (10”) or other depths as specified in Division 3, Special Provisions. In areas where mixer can not access, such as around manholes or curbs, Contractor shall process the same day by pulling the material away from obstacles immediately after cement application and initial mixing. Material and cement shall be relayed to an area accessible to mixing equipment. Cement treatment can be conducted in one lift provided the Contractor can demonstrate that the spread rate, particle size, and compaction can be achieved. The mixer shall be capable of automatically adjusting itself to maintain a constant depth. On the initial mix, the water truck must have a solid connection to the mixer. The water shall be injected directly into the mixing chamber and shall produce a homogenous blend free from streaks or pockets of dry cement. Leakage of water from equipment will not be permitted. Care shall be exercised to avoid the addition of any excessive water.

When mixed material, exclusive of one inch or larger clods, is sprayed with phenolphthalein alcohol indicator solution and shows no color reaction it will be considered evidence of inadequate mixing.

Contractor is required to complete mixing and perform the initial compaction of the cement-treated section within 2 hours of initial hydration of cement.

3.4 COMPACTION

Maintain moisture above the optimum moisture content, but within allowable range as determined by the moisture/density relationship of the compaction curve. The cement-treated section shall be compacted to 95 percent of the maximum density as determined by ASTM 1557.

The maximum compacted thickness of a single layer may be any thickness the Contractor can demonstrate to the Engineer that its equipment and method of operation will provide the required compacted density throughout the cement-treated layer.

3.4.1 Initial Compaction

Contractor shall achieve the projects minimum compaction requirement during initial compaction operation. Lift thickness of 4 to 8 inches shall be by means of a steel-tired or pneumatic-tired roller. Lift thickness of 8 to 12 inches shall be compacted by means of a sheepsfoot compactor. Lift thickness greater than 12 inches shall be compacted by a sheepsfoot compactor with an open ring design to prevent bridging of the lower half of the cement-treated section. Areas inaccessible to rollers shall be compacted to the required compaction by other means satisfactory to the Engineer.

3.4.2 Surface Compaction

Surface compaction is defined as the upper 3 inches of the cement-treated section. Surface compaction shall be by means of steel-tired or pneumatic-tired roller. Areas inaccessible to rollers shall be compacted to the required compaction requirement by other means satisfactory to the Engineer.

3.5 FINAL GRADING

Surface compaction and finish grading shall proceed in such a manner as to produce, within 2 hours from initial compaction, a smooth, closely knit surface conforming to the crown, grade, and line indicated in the Contract Documents and without cracks, ridges, or loose material. Maintain moisture content on surface within allowable range during all grading procedures.

All excess material above the grade tolerance specified in the Contract Documents should be removed from the grade prior to final surface compaction of the cement-treated section. This excess material can be used in areas inaccessible to treatment equipment, provided the cement-treated material is used within the allotted time constraints.

The trimmed and completed surface shall be rolled with steel or pneumatic tired rollers. Minor indentations, as determined by the Engineer, may remain in the surface of the finished material as long as no loose material remains in the indentations.

3.6 CURING

After placement and compaction of the cement-treated section is completed, it shall be protected against drying and traffic for three (3) days. The Engineer, based on factors such as degree of traffic, temperature, and stability, may reduce the three (3) day cure period. Curing shall be moist (water fogging), bituminous seal, or other method approved by the Engineer. If moist curing is used, exposed surfaces of the cement-treated section shall be kept moist until covered. If a bituminous curing is used, it shall consist of liquid asphalt or emulsified asphalt meeting the requirements of Section 02037, Bituminous Seals.

The bituminous curing seal shall be applied in sufficient quantity to provide a continuous membrane over the soil at a rate of 0.45 to 0.90 L/m^2 (0.10 to 0.20 gallon per square yard) with the exact rate determined by the Engineer. It shall be applied as soon as possible after the completion of final rolling. The surface shall be kept moist until the seal is applied. At the time the bituminous material is applied, the soil surface shall be dense, free of all loose and extraneous material, and shall contain sufficient moisture to prevent excessive penetration of the bituminous material.

3.7 REPAIR

If the cement-treated section is damaged, it shall be repaired by removing and replacing the entire depth of affected layers in the damaged area. Feathering will not be permitted for repair of low areas.

4.0 MEASUREMENT AND PAYMENT

All work involved in preparing the existing material, furnishing and applying water, mixing, spreading, and compacting the cement-treated material, furnishing and applying the curing seal and other related work will be measured and paid by the square yard for Cement Stabilization.

The Contract price and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in constructing the cement-treated section, complete in place, as required by the Contract Documents and as directed by the Engineer.

END OF SECTION

SECTION 02037

BITUMINOUS SEALS

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing and applying Bituminous Seals on roadways, parking lots, and other surfaces in accordance with Section 37 of the Standard Specifications, except as indicated in the Contract Documents. The type of bituminous seal will be indicated in the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 SLURRY SEAL

2.1 SCOPE

Slurry Seal shall consist of a mixture of Black Sand aggregate, latex emulsified asphalt, mineral filler and water properly proportioned, mixed and spread on a thoroughly cleaned surface or pavement as required in the Contract Documents or as directed by the Engineer. This item shall conform to Sections 37 and 94 of the Standard Specifications, insofar as they are applicable.

2.2 MATERIALS

A. ASPHALTIC EMULSION

Emulsified asphalt shall be a Polymer Modified Quick Setting Asphalt Emulsion (PMCQS1h), homogeneous, and show no separation after thorough mixing. Emulsified asphalt shall spread and set on the aggregate within five (5) minutes and be ready for cross-traffic within five (5) to thirty (30) minutes.

Asphaltic emulsion shall conform to the following requirements:

Test on Emulsion	Requirements	
	Min.	Max.
Viscosity, SSF @ 122º F	15	90
Storage Stability 1 day		1%
Sieve Test, % retained on No. 20 sieve		0.30
Particle Charge Test Positive: must meet pH requirement of 6.7 maximum (ASTM E70) if Particle Charge Test result is inconclusive.		
Residue by Distillation Test	57%	

Test on Residue from Distillation Test	Requirements	
	Min.	Max.
Penetration @ 25º C (77º F)	40	90
Ductility @ 25º C (77º F) mm		400
Solubility in trichloroethylene		97%
Polymer Content, % Calif. Test 401 (by weight)		2.5%

B. AGGREGATE

Aggregates shall be one hundred percent (100%) crushed with no rounded particles, volcanic in origin and black in color. The use of gray or light colored aggregates will not be allowed. The material shall be tough, durable, sound, and free from vegetable matter and other deleterious substances.

The percentage composition by weight of the aggregate shall conform to the following grading when determined by Test Method No. Calif. 202.

Percent Passing	
Sieve Size	Type II
3/8"	100
No. 4	90 -100
No. 8	65 - 90
No. 16	40 - 70
No. 30	25 - 50
No. 50	24 - 45
No. 200	5 – 15

C. MINERAL FILLER

The mineral filler shall be either Portland cement or other approved mineral fillers, if required. Portland cement (if used) shall be commercially available Type I-II and free of lumps and clods.

D. WATER

Water for use in asphaltic emulsions shall conform to Section 37-2.02B of the Standard Specifications. The source shall be approved by the Engineer. If water from the City's potable water supply is used, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used.

2.3 MIX DESIGN

The Contractor shall submit a mix design prepared and tested by a testing laboratory to the Engineer for review. The mix design and test results shall be submitted directly to the Engineer by the testing laboratory at least five (5) working days prior to the Contractor starting work. Once the Engineer reviews the mix design, the Engineer must approve any deviations.

Preliminary tests by the testing laboratory and tests made on samples as the slurry is placed shall have a Wet Track Abrasion test value of fifty (50) grams per square foot or less.

2.4 PREPARATION

Prior to the application of slurry seal, the traffic stripes and pavement markings shall be removed and the pavement shall be thoroughly cleaned using power sweepers and other cleaning methods necessary to remove all dirt, dust, leaves, weeds, grasses and other foreign material from the pavement. As part of this process, the area to receive slurry seal shall be cleaned thoroughly. The surface shall be inspected and approved by the Engineer prior to applying the slurry seal.

Following the application of slurry seal, any surface that is not to receive slurry seal shall be thoroughly cleaned if slurry seal has been tracked or over sprayed onto its surface.

The Contractor shall cover all grates, manholes, cleanouts, water and gas valve covers, monuments, electrical and communications hardware and other facilities located on or in the areas to receive the slurry seal prior to its application. After the slurry is applied, the contractor shall uncover all of the above facilities, breaking loose the covers and cleaning the facilities where the covers did not provide adequate protection.

Existing raised pavement markers shall be covered and protected prior to placing slurry. Raised pavement markers shall be covered only as far in advance of applying the slurry seal as is approved by the Engineer. The Contractor shall provide the Engineer with a list of streets with raised pavement markers and the approximate date of slurry prior to starting work. The schedule shall be updated as the work progresses. Covering the raised pavement markers with duct tape is acceptable. However, the Contractor shall remove any duct tape adhesive that remains on the raised pavement markers after the duct tape is removed. The Contractor shall expose the markers as soon as the slurry seal has set. The Contractor shall clean any raised pavement markers that have been coated with slurry.

2.5 MIXING, SPREADING AND PLACEMENT

The slurry seal shall be mixed in a continuous pug mill mixer. Rotating drum truck mixers shall not be used. Trucks shall be field calibrated during the first day's operation. Demonstration or calibration areas are to be determined by the Engineer.

The mixing machine shall be equipped with an approved fines feeder that provides an accurate metering device or method to introduce a pre-determined amount of mineral filler into the mixer at the same time and location that the aggregate is fed.

The type and amount of mineral filler and the final mix design shall be approved by the Engineer. The final mix design shall result in a mix that will set and can be opened to traffic in approximately four (4) hours from the time it is placed.

The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when applied to the surface. Total time of mixing shall not exceed four (4) minutes. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that complete coverage is obtained. No lumping, balling, or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate shall be permitted. If coarse aggregate settles to the bottom of the mix, the slurry shall be removed from the pavement. No excessive breaking of the emulsion shall be allowed in the spreader box. No streaks such as caused by oversize aggregate shall be left on the finished pavement.

The slurry seal shall be placed at a rate to produce fifteen (15) pounds of aggregate per square yard.

The entire pavement, including the area around curb returns, shall be covered from lip of gutter to lip of gutter.

Excessive buildup and unsightly appearance shall not be permitted on longitudinal or transverse joint. Burlap drags shall be used. Approved squeegees shall be used to spread slurry in areas non-accessible to the slurry mixer. Care shall be exercised in not leaving unsightly appearance from handwork.

The Contractor shall finish roll the slurry seal surface that has an area over 1,000 square feet with pneumatic tired rollers prior to opening to traffic. The entire surface shall be given one complete coverage roll, which shall begin as soon as possible after the setting and curing of the slurry seal. The Contractor shall control the speed of traffic with signage and other methods approved by the Engineer.

2.6 SWEEPING

All areas coated with new slurry seal shall be thoroughly swept one week after application. All loose material shall be collected and disposed of off-site. Cost for sweeping, collecting, and disposing of said material shall be included in the various items of work.

2.7 WEATHER LIMITATIONS

The slurry seal shall not be applied when either atmospheric or pavement temperature is 55º F and falling but may be applied when either the atmospheric or pavement temperature is 45º F and rising.

2.8 MEASUREMENT AND PAYMENT

All work involved in furnishing and installing Slurry Seal will be measured and paid for by the square yard of surface area on which Slurry Seal is applied unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying and finishing the slurry seal, complete in place. Payment shall include cleaning, protecting all street hardware and appurtenances, protecting raised pavement markers, sweeping one week after application, and protecting the seal until it has set, including the furnishing, placement, and removal of signs, barricades and providing other methods of protection as may be required.

3.0 FOG SEAL

3.1 SCOPE

Fog Seal shall consist of an application of a mixture of slow curing asphaltic emulsion and water. It shall be spread on a thoroughly clean surface or pavement as required in the Contract Documents or as directed by the Engineer. This item shall conform to Section 37 of the Standard Specifications, insofar as it is applicable.

3.2 MATERIALS

A. LIQUID ASPHALTS

Liquid asphalts shall be SC-70 or approved equal, in accordance with Section 93 of the Standard Specifications, diluted with water as required or as directed by the Engineer.

B. WATER

General Use

Water for cleaning shall be from the City's potable water system, the recycled water system, or another approved source. Prior to use of the City's potable water from hydrant or recycled water, the contractor must obtain a water meter from the City Water and Sewer Utility and arrange payment for water used.

Asphalt Emulsion

Water for use in asphaltic emulsions shall conform to Section 37-2.02B of the Standard Specifications. The source shall be approved by the Engineer.

3.3 CLEANING

Prior to the application of fog seal, the pavement shall be thoroughly cleaned using power sweepers and other cleaning methods necessary to remove all dirt, dust, leaves, weeds, grasses and other foreign material from the pavement. As part of this process, the streets shall be swept from curb to curb. The surface shall be inspected and approved by the Engineer prior to applying the fog seal.

Following the application of fog seal, any surface that is not to receive fog seal shall be thoroughly cleaned if fog seal has been tracked or over sprayed onto its surface.

3.4 APPLICATION

Application of the fog seal shall be 0.05 to 0.10 gallons per square yard of surface to be treated as directed by the Engineer, unless otherwise indicated in the Special Provisions.

The fog seal shall be applied so as to avoid raised pavement markers and traffic striping unless otherwise directed by the Engineer.

In no case shall a fog seal be applied when the atmospheric temperature is below forty degrees (40º) Fahrenheit.

3.5 MEASUREMENT AND PAYMENT

All work involved in furnishing and installing Fog Seal will be measured and paid for by the square yard of surface area on which Slurry Seal is applied unless otherwise specified in the bid proposal or in the Special Provisions.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the Fog Seal, complete in place. Payment shall include cleaning the street, preparation of the surface, furnishing and applying the asphaltic emulsion, protecting the newly sealed surface, providing traffic control and other incidental work as required.

4.0 CHIP SEAL

4.1 SCOPE

Chip Seal shall consist of an application of bituminous binder and a cover of mineral aggregate screenings, or if a double seal coat, two successive coats of binder and screenings shall be applied in accordance with the Contract Documents or as directed by the Engineer. This item shall conform to Section 37 of the Standard Specifications, unless otherwise indicated below.

4.2 MINERAL AGGREGATE

The percentage composition by mass of mineral aggregate screenings shall conform to one of the following gradings when determined by Test Method No. Calif. 202:

Percentage Passing				
Sieve Size	Coarse	Medium	Medium Fine	Fine
3/4”	100	---	---	---
1/2”	95-100	100	---	---
3/8”	50-80	90-100	100	100
No. 4	0-15	5-30	30-60	60-85
No. 8	0-5	0-10	0-15	0-25
No. 16	---	0-5	0-5	0-5
No. 30	---	---	0-3	0-3
No. 200	0-2	0-2	0-2	0-2

The other provisions in Section 37-1.02 of the Standard Specifications shall apply except as follows: Should the results of aggregate screening not meet the gradation specified, the chip seal represented by such test shall be removed. The penalty payment under section 37-1.02 shall not apply.

4.3 MAINTAINING TRAFFIC

In lieu of Section 37-1.03 of the Standard Specifications, Traffic Control shall be in accordance with Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and other provisions of the Contract Documents.

4.4 APPLYING ASPHALT EMULSION

Applying asphaltic emulsion shall comply with Section 37-1.05 of the Standard Specifications except as provided below.

The application rate for asphaltic emulsion except for fog seal shall be as follows:

Seal Coat Types	Range
Fine	3.2 to 6.4
Medium Fine	5.0 to 7.2
Medium	5.0 to 8.1
Coarse	6.4 to 8.1
Double	
1st Application	4.1 to 7.2
2nd Application	4.1 to 6.4

Asphaltic emulsion at the time of application shall be between 130 and 175 degrees Fahrenheit.

Asphaltic emulsion shall not be applied when weather conditions are unsuitable. Seal coats requiring screenings shall not be applied until atmospheric temperature is below 68 degrees Fahrenheit or above 105 degrees Fahrenheit or when the pavement temperature is below 77 degrees Fahrenheit.

That portion of section 37-1.05 dealing with Engineer notification of the Contractor concerning the suitability of the next working day for work shall not apply.

4.5 SPREADING SCREENINGS

Spreading screenings shall comply with Section 37-1.06 of the Standard Specifications except as provided below.

The spread rate of screenings for the various types of seal coats shall be within the following ranges in pounds per square yard.

Seal Coat Types	Range
Fine	12 to 20
Medium Fine	16 to 25
Medium	20 to 30
Coarse	23 to 30
Double	
1st Application	23 to 30
2nd Application	12 to 20

4.6 FINISHING

Finishing shall comply with Section 37-1.07 of the Standard Specifications except that excess screenings shall be the property of the Contractor and shall be removed and disposed of at Contractor's expense and at a location of Contractor's choosing in compliance with all applicable laws and requirements. The provisions of 7-1.13 of the Standard Specifications shall not apply.

5.0 MEASUREMENT AND PAYMENT

In lieu of Sections 37-1.08 and 37-1.09, the following shall apply for Measurement and Payment. All work involved in furnishing and installing Chip Seal will be measured and paid for by the square yard of surface area on which Chip Seal is applied unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the Chip Seal, complete in place. Payment shall include cleaning, furnishing and mixing water with asphaltic emulsion, furnishing and placing prime coat, applying the asphaltic emulsion and the screenings, rolling the screenings, removing all excess materials and curing and protecting the ship seal until it has set, including furnishing traffic control and the furnishing, placement, and removal of signage and barricades as may be required.

END OF SECTION

SECTION 02039

ASPHALTIC CONCRETE PAVEMENT, RESURFACING, AND BERMS

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing and placing asphaltic concrete pavement for use in pavement, resurfacing of existing pavement, pavement repair and the construction of berms. The work includes mixing aggregate and asphalt binder at a central mixing plant, spreading and compacting the mixture, and furnishing and applying prime coat, tack coat and, when required, pavement reinforcing fabric, upon a prepared roadbed, base or over existing pavement, to the lines, grades, and dimensions shown in the Contract Documents. This item shall conform to Section 39 of the Standard Specifications, insofar as it is applicable. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 MATERIALS

2.1 PRIME COAT

The prime coat shall consist of liquid asphalt SC-70 conforming to Section 93 of the Standard Specifications, and spread at the rate of 0.25 gallons per square yard of surface. Prior to placement of asphaltic concrete, the prime coat shall have attained a minimum penetration of one-quarter (1/4") inch. Paving over areas where puddling of excess un-penetrated prime coat exists shall not be allowed. Immediately in advance of placing asphaltic concrete, additional prime coat shall be applied as directed by the Engineer to areas where the prime coat has been destroyed and no additional compensation shall be allowed for this work. A sand blotter shall be applied in specific locations to the prime coat as directed by the Engineer in order to maintain vehicular and/or pedestrian traffic.

2.2 PAINT BINDER (TACK COAT)

Paint Binder (Tack Coat) shall be asphaltic emulsion RS1 conforming to Section 94 of the Standard Specifications and its application shall conform to Subsection 39-4.02 of the Standard Specifications.

2.3 MINERAL AGGREGATE

Course aggregate shall be clean, hard, tough, durable and sound. It shall be of a uniform nature and free from organic impurities or other deleterious substances. Fine aggregate shall consist of hard, durable, and sound sand. Separation of the natural material passing the No. 4 sieve from the crushed material passing the No. 4 sieve is NOT required.

When the combined grading of the course and fine aggregates is deficient in material passing the No. 200 sieve, a commercial filler may be added in conformance with Subsection 39-3.03 of the Standard Specifications.

The combined mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, shall conform to the following gradation when determined by Test Method No. Calif. 202:

Sieve Size	Base Course 3/4" Maximum	Surface Course 1/2" Maximum
1"	100	- - -
3/4"	95 - 100	100
1/2"	75 - 90	95 - 100
3/8"	65 - 80	80 - 95
No. 4	45 - 60	55 - 72
No. 8	30 - 45	38 - 55
No. 30	20 - 30	20 - 35
No. 200	3 - 7	4 - 9

2.4 ASPHALT

Bituminous binder shall be Performance Grade PG 70-10 asphalt conforming to Section 92 of the Standard Specifications. Certification of the above shall be furnished to the Engineer.

The exact amount of asphalt binder shall be determined as provided in Section 39-2.01 of the Standard Specifications except that the Contractor shall determine the quantity of asphalt binder per Calf. 367 and submit the mix design to the Engineer for approval.

2.5 PAVEMENT REINFORCING FABRIC AND ASPHALT BINDER

Pavement Reinforcing Fabric shall be placed at locations required by the Contract Documents and as required by the Engineer. Pavement reinforcing fabric shall be non-woven, bonded polypropylene-nylon, needle punched, thermally bonded on one side materials conforming to the following when tested in conformance with the listed ASTM Designation or AASHTO M288-96:

Specification	Requirement
Weight, Oz./S.Y., ASTM D3776	4.1 Min.
Grab tensile strength in pounds, ASTM D4632	101 Min.
Elongation at break in percent, ASTM D4632	50 Min.
Fabric Thickness in mils, ASTM D461	30 to 100
Mullen burst strength in psi, ASTM D3786	200
Asphalt retention of fabric in gal/sy	0.25
ASTM D6140, oz./sy	26.9

The Contractor shall submit material certificate for pavement reinforcing fabric at the Preconstruction Conference for approval. If there is no Preconstruction Conference, the Contractor shall submit certification at least three (3) working days before initial placement of this material.

The fabric shall be protected from exposure to ultraviolet rays until placed.

2.6 PAVEMENT REINFORCING GRID

Pavement reinforcing grid shall be furnished and placed at all locations required by the Contract Documents and as directed by the Engineer. Pavement reinforcing grid shall be a self adhesive, grid and conform to the following:

Specification	Requirement
Tensile strength, pounds per square inch, width and length.	1000 lbs./inch (minimum)
Elongation at break, percent maximum.	5%
Melting point, degrees Fahrenheit	425
Adhesive Backing	Pressure Sensitive
Grid Size	1 inch x 1 inch

The Contractor shall submit material certificate and manufacturer's instructions for pavement reinforcing grid at the Preconstruction Conference to the Engineer for approval. If there is no Preconstruction Conference, submit required documents at least three (3) working days prior to initial placements.

2.7 BITUMINOUS SEALS

Bituminous Seals shall conform to Section 02037, Bituminous Seals, and shall be of the type designated in the Contract Documents.

2.8 MISCELLANEOUS PORTLAND CEMENT CONCRETE

Miscellaneous Portland cement concrete is used for adjusting manholes and monuments where necessary. Miscellaneous Portland cement concrete shall be as provided in Subsection 2.2, Sanitary Sewer Structures, of Section 02070, Storm Sanitary Sewer Manholes, Drainage Structures, and Miscellaneous Structures, except that combined aggregate grading of 1 inch maximum shall be used.

2.9 MORTAR

Cement Mortar used in raising manholes and similar structures shall be composed of one part Portland cement and two (2) parts sand by volume. Sand shall be well graded and sized to all pass a #8 sieve. The materials shall be mixed to a consistency suitable for the purpose intended. Mortar shall be used within thirty (30) minutes after the mixing water has been added. Cement mortar shall achieve a minimum compressive strength of 2,000 psi in twenty-eight (28) days. The design of the cement mortar mix is subject to the approval of the Engineer.

2.10 WATER

Water for use in asphaltic emulsions shall conform to Section 37-2.02B of the Standard Specifications. The source shall be approved by the Engineer. If water from the City's potable water supply is used, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used.

Water for use in concrete and mortar mixes shall conform to Section 90-2.03 of the Standard Specifications. To use the City's potable water, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used.

3.0 ASPHALTIC CONCRETE PAVEMENT

3.1 SPREADING AND COMPACTING

Spreading and compacting of all mixtures shall conform to Subsection 39-6 of the Standard Specifications, except as indicated below or in the Contract Documents.

A. SPREADING

All Asphaltic Pavement shall be placed with self-propelled mechanical spreading asphalt paving machines with a screed and finishing equipment. The paving machine shall be of the type in which asphalt is delivered from trucks into the paving machine. Pick-up machines shall not be allowed without written approval of the Engineer. Truck drawn portable asphalt spreaders may be used in certain areas providing prior approval is granted by the Engineer.

All asphaltic paving materials delivered for paving streets, drives, alleys and other public ways shall be accompanied with an official weight tag from the asphalt plant, with each load. All costs for furnishing weight tags shall be included in the cost of Asphaltic Pavement.

Asphaltic Pavement shall be spread and compacted in layers not to exceed two (2) inches on any surface course and shall not exceed three (3) inches on any non-surface course unless provided for in the Contract Documents. Asphaltic Pavement shall be placed to the minimum thickness required by the Contract Documents in as many lifts as required to meet the above thickness requirements. All mixtures, except open graded mixture, shall be spread at a temperature of not less than 225 degrees Fahrenheit and all initial rolling and tamping shall be performed when the temperature of the mixture is such that the sum of the air temperature plus the temperature of the mixture is between 280 degrees Fahrenheit and 375 degrees Fahrenheit. Open graded mixture shall be spread at a temperature suitable for workability. Edges shall be feathered when directed by the Engineer. A feathered edge is considered incidental and therefore no extra payment will be made.

All mixtures shall be placed only when the atmospheric temperature is above 50 degrees Fahrenheit.

No extra pay shall be allowed for cooling the asphaltic concrete with water.

The Contractor shall seal and sand all conforms and edges where pavement is feathered to meet grade.

B. COMPACTING

Pneumatic-tire rolling shall be required only when so stated in the Special Provisions.

Initial or breakdown rolling shall consists of one complete coverage of asphalt mixtures and shall be performed with a tandem or a three-wheel roller. Such roller shall weigh not less than 12 tons, unless otherwise permitted by the Engineer.

In all other respects, spreading and compacting of all mixtures shall conform to Sub-section 39-6, Spreading and Compacting, of the Standard Specifications.

3.2 ADJUSTMENT OF WATER VALVE BOXES

On new street construction or multiple course overlay of an existing street: Prior to the placement of the surface course of asphaltic pavement, water valve boxes will be raised to the elevation of the top of the base course. After the base course has been completed and before work on the surface course is commenced, the Contractor shall supply and place pre-cast rings on the valve boxes before starting the surface course. The rings will be of the proper thickness to raise the valve box to finished grade. The boxes shall be raised prior to priming. The Contractor shall be required to make any adjustments necessary for proper elevation of valve boxes. On single course overlay only: Buried water valves or those deemed by the engineer to be noticeably out of plain with the future finish grade shall have the box adjusted. All shall have adjustment rings installed per this section 3.2.

3.3 ADJUSTMENT OF MANHOLES

A. DESCRIPTION

Storm drain and sanitary sewer manholes shall be constructed to the taper (cone) section. The manholes shall be covered with a temporary steel plate that is safe for traffic and does not allow dirt and debris to enter the pipe system. After the placement of the final lift of pavement, the manholes shall be brought to finish grade, installing the manhole frame and cover in accordance with the Standard Details and the Contract Documents. Comply with the provisions of Subsection 5.10 of this Section 02039 for Manhole Alteration insofar as they are applicable.

B. OTHER UTILITY MANHOLES

Manholes for other utilities such as Silicon Valley Power, PG&E, AT&T, Pacific Bell, etc., shall be raised after the final lift of pavement, by others. The Contractor shall locate and tie-out these facilities prior to paving. The Contractor shall pave over these facilities and remove a five (5”) inch diameter plug of asphaltic concrete from each manhole in order that the utility can locate the manhole later.

C. TOLERANCE

The grade tolerance for adjusting all manholes and other facilities in the road shall be a maximum of 1/8 inch above to ¼ inch below the finished grade of the final lift of asphaltic concrete. The adjusted manhole frame shall be firmly and uniformly supported using solid, durable material so that no rocking of the assembly occurs.

3.4 TESTING

A. TESTING AND CORING

Testing shall conform to the requirements of Sections 39 and 92 of the Standard Specifications.

B. FINISHED SURFACE

The smoothness of the finished pavement surface shall meet the requirements of Section 39-6.03 of the Standard Specifications.

C. REJECTION

Any and all materials and work not conforming to the above requirements shall be corrected in a manner satisfactory to the Engineer or shall be removed from the job site at the expense of the Contractor, said material to be replaced with new material, at no cost to the City, conforming to the above requirements to the satisfaction of the Engineer.

3.5 MEASUREMENT AND PAYMENT

Section 39-8, Measurement and Payment of the Standard Specifications shall not apply. All work involved in furnishing and constructing asphaltic concrete, including asphaltic concrete, prime coat and paint binder (tack coat), adjusting manholes, flush inlets, water valve boxes, and incidentals will be measured and paid for by the ton of asphaltic concrete, complete in place, unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the asphaltic concrete pavement and placing the pavement reinforcing fabric or pavement reinforcing grid, complete in place, as required by the Contract Documents and as directed by the Engineer.

4.0 ASPHALTIC CONCRETE PAVEMENT REPAIR

4.1 REPAIR OF POTHOLES

Wherever potholes appear in the area to be resurfaced or otherwise repaired, the loose material shall be removed, the asphalt pavement cut, and the sub-grade compacted so as to result in a neat, rectangular shaped area. The hole is to be painted with a paint binder (tack coat) of Grade AR 4000 paving asphalt immediately prior to placing the asphaltic concrete plug. The plug of asphaltic concrete material shall be compacted thoroughly in place, in a manner approved by the Engineer.

4.2 MEASUREMENT AND PAYMENT

Payment for Repair of Potholes will be per ton of asphalt concrete placed and shall include full compensation for all work involved in repairing the pothole and for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, complete in place, as required by the Contract Documents and as directed by the Engineer.

5.0 ASPHALTIC CONCRETE PAVEMENT RESURFACING

5.1 GENERAL

Asphaltic concrete pavement resurfacing shall consist of placing an overlay of asphaltic concrete of a specified thickness over existing pavement. The work may include repair of failed pavement; application of an asphaltic concrete leveling course; cold milling of existing pavement; application of pavement reinforcing fabric or grid; adjusting of water valve boxes, manholes and monuments; applying a layer of asphaltic concrete; applying seal coat; pre-marking and striping the street for traffic, bicyclists and pedestrians; and performing all cleanup before and after paving including removal of pavement markers, weeds and other deleterious material; and other work necessary to provide a quality finished pavement.

5.2 MATERIALS

Asphaltic concrete pavement materials shall be as specified in Subsection 2.0, Materials, of this Section 02039 and Section 39 of the Standard Specifications, as applicable. Asphaltic concrete pavement for the leveling course shall be: base course using one-half (1/2”) or three-fourths (3/4”) inch maximum size aggregate as directed by the Engineer. The final resurfacing course shall be one-half (1/2”) inch maximum aggregate.

5.3 COLD MILLING PAVEMENT

Cold milling of pavement shall be performed where designated in the Contract Documents. Cold milling shall remove variable depths of pavement, as indicated, to provide an overlay key at joints, adjacent to gutters and over the width of the area to be cold milled. The surface of pavement after milling shall be uniformly rough grooved or ridged as directed by the Engineer. The Contractor shall remove existing asphalt concrete overlay from gutters adjacent to any area to be cold milled, as directed by the Engineer.

A. EQUIPMENT

The machine used for milling shall be specially designed and built for milling of bituminous pavements without the addition of heat, with the ability to plane Portland concrete areas. The cutting drum shall be a minimum of sixty (60”) inches wide and shall be equipped with carbide-tipped cutting teeth placed in a variable lacing pattern to produce the desired finish. The machine shall be capable of being operated at speeds from 0 to 40 feet per minute. It shall be self-propelled and have the capability of spraying water at the cutting drum to minimize dust. The machine shall be capable of removing the material next to the gutter of the pavement being reconditioned and be designed so that the operator can at all times observe the milling operation without leaving the controls. The machine shall be adjustable for slope and depth and shall deep cut in one pass a maximum of three (3”) inches without producing fumes or smoke.

B. REMOVAL AND DISPOSAL OF MATERIAL

During the milling operation, the contractor shall remove loosened material from the project site, using mechanical equipment and thoroughly sweeping the street to remove any remaining material and dust. The removal crew shall follow within fifty (50’) feet of the milling machine unless otherwise directed by the Engineer. The Contractor shall take all necessary measures to avoid dispersion of dust. All material removed shall be considered the property of the Contractor and shall be disposed of by the Contractor at its expense.

C. TRAFFIC SIGNAL LOOP DETECTORS

Before cold milling pavement within three hundred (300’) feet of a traffic signal, the Contractor shall notify the City at least seven (7) working days prior to commencing work within said area. Upon notification, the City will mark the location of all existing loop detectors. The Contractor shall not cold mill within twelve (12”) inches of loop detector conductors or advanced loop detectors.

Damage to existing loops caused by the Contractor's operation will require replacement of the loops in their entirety by qualified workers at the Contractor's expense within seven (7) days of when the damage occurred.

D. TRANSITIONS

Milled joints that are transverse to traffic and in excess of one-half (1/2") inch in height shall be ramped with temporary asphalt concrete pavement. The ramp shall be configured so that the slope is approximately 1:12. Temporary asphaltic concrete ramps shall be placed adjacent to curb ramps for the disabled. Temporary asphaltic concrete ramps shall be installed the same day as cold milling and removed the same day as permanent paving. The Engineer shall approve transition asphaltic concrete ramp dimensions.

5.4 ASPHALTIC CONCRETE LEVELING COURSE

An Asphalt Concrete Leveling Course shall be applied where indicated on the plans or where directed by the Engineer. The purpose of the leveling course is to build up the pavement thickness so that the final lift of pavement will be of uniform thickness resulting in a finished surface that is smooth, has good ride-ability and is well draining and free from ruts, humps, depressions and irregularities. Asphaltic concrete for the leveling course shall be: base course using one-half (1/2") or three-fourths (3/4") inch maximum size aggregate, as directed by the Engineer and as provided in Subsection 2.0, Materials, of this Section 02039. Paint binder (tack coat) shall be applied to areas to receive the leveling course. Application of the leveling course shall be as shown in the Contract Documents or as directed by the Engineer.

5.5 ADJUSTING WATER VALVE BOXES

On existing pavements where resurfacing is to be constructed, water valve boxes shall be adjusted by the Contractor. Prior to paving, the Contractor shall install one or more adjusting rings on the valve box to bring it to the finished pavement grade and tie-out each water valve box as specified in Subsection 5.10 of this Section 02039. Because of localized deflections in the pavement, the adjustment ring or rings may not be the same height as the nominal pavement thickness.

Where the resurfacing or capping is done in two lifts, rings shall be placed on valve boxes to the proper elevation in advance of the construction for each lift.

It is important that City crews have access to water valves at all times in case of an emergency.

The City will furnish the adjusting rings for Contractor to install. Contractor shall coordinate with the Engineer when Contractor is ready to pick-up the adjusting rings. Payment for handling and installing adjusting rings is included in the payment for Pavement Resurfacing.

5.6 PREPARATION

Prior to installing asphaltic concrete leveling course, pavement reinforcing fabric, pavement reinforcing grid or resurfacing, all raised pavement markers and thermo plastic pavement markings shall be removed and the surface shall be thoroughly cleaned of dirt, debris, sand, gravel, leaves and other deleterious material. Any weeds or vegetation existing in cracks in the pavement or at the edges of gutters or other surfaces shall be removed.

Whenever asphaltic paving material is being placed on existing pavement, a tack coat of asphaltic emulsion shall be applied to all surfaces prior to resurfacing work, in the manner prescribed in Subsection 39-4.02 of the Standard Specifications.

5.7 PAVEMENT REINFORCING FABRIC

Asphalt binder for pavement reinforcing fabric shall conform to Section 92 of the Standard Specifications and shall be Performance Grade PG 70-10. Asphalt binder for pavement reinforcing fabric shall be applied at an approximate rate of 0.25 gallon minimum per square yard of surface covered. The exact rate of application shall be determined by the Engineer. The width of the asphalt binder spread shall be the width of the fabric mat plus three (3) inches on each side. Area of wedge cut shall be sprayed at a rate of 0.05 gallon per square yard first, followed by the full width spraying or 0.25 gallon per square yard, or as directed by the Engineer.

The fabric shall be stretched, aligned, and placed on the pavement surface with the smooth thermally bonded side up, and with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is one-half (1/2”) inch or more, the fabric shall be cut to remove the wrinkle, then lapped in the direction of paving. Should the height of the doubled portion exceed two (2) inches, it shall be cut back to two (2) inches, then lapped in the direction of paving. For straight sections of roadway, no more than one fabric cut in thirty (30) linear feet of fabric laid will be allowed. For curved sections, the interval shall be ten (10) feet.

All areas that will receive asphaltic concrete will also have fabric installed when required by the Construction Documents or by the Engineer. These areas will include all conform areas, such as wedges at intersections and at lip of concrete gutters. Manual lay down methods shall be used only for irregular areas that are to be paved. The fabric shall be unrolled, stretched, aligned, and placed in increments of approximately thirty (30) feet.

Adjacent borders of the fabric shall be lapped two (2”) to four (4”) inches. The preceding roll shall lap two (2”) to four (4”) inches over the following roll in the direction of paving at ends of rolls or at any break. At fabric overlays, both the binder and the fabric shall overlap the previously placed fabric by the same amount.

Seating of the fabric with rolling equipment after placing shall be permitted. Turning of the paving machine and other vehicles shall be gradual and kept to a minimum to avoid damage.

A small quantity of asphalt concrete, to be determined by the Engineer, may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent fabric from being picked up by construction equipment. If bleeding of asphalt binder through reinforcing fabric occurs, the Contractor shall spread a thin layer of asphalt concrete on all reinforcing fabric in place.

Public traffic shall not be allowed on the bare reinforcing fabric, except that public cross traffic shall be allowed to cross the fabric, under traffic control, after the Contractor has taken every effort to prevent the fabric from being displaced.

Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary, exposed binder material shall be covered lightly with sand.

5.8 PAVEMENT REINFORCING GRID

After cleaning and drying the surface, a tack coat of Performance Grade PG 70-10 asphalt conforming with Section 92 of the Standard Specifications followed by a leveling course of asphalt concrete shall be placed as required. Asphalt concrete leveling course shall conform to Subsection 5.4, Asphalt Concrete Leveling Course, of this Section 02039.

Pavement reinforcing grid shall be placed on the leveling course to the width determined by the Engineer. Placement of the pavement reinforcing grid, including longitudinal and transverse overlap limits, shall be in accordance with the manufacturers recommendations. The pavement surface temperature shall not be greater than 140 degrees Fahrenheit when placing the pavement reinforcing grid unless approved by the Engineer. The grid shall be laid by mechanical means or by hand with sufficient tension to eliminate wrinkles.

The pavement reinforcing grid and asphaltic binder may be rubber tire rolled sufficiently to activate the adhesive and to adhere the grid to the pavement surface. The reinforcing grid shall be paved with asphalt concrete on the same day it is installed.

All work shall be done in accordance with the manufacturer’s specification.

5.9 SPREADING AND COMPACTING

Spreading and Compacting shall be in accordance with Subsection 3.1, Spreading and Compacting, of this Section 02039. The Contractor shall seal and sand all conforms and edges where pavement is feathered to meet grade.

5.10 MANHOLE ALTERATION

The Contractor shall raise or lower manholes, flushing inlets, and catch basins not at finished grade in conformance with the Standard Details and the Contract Documents. Unless otherwise indicated in the Contract Documents, the Contractor shall properly locate and tied off to a minimum of two (2) locations for triangulation all manholes, flushing inlets, and catch basins within the project area in advance of paving operations to the satisfaction of the Engineer. Markings shall be done by semi-permanent marks of paint/ink on the concrete gutter surface nearest to the manhole, flushing inlet, or catch basin being marked. Where concrete gutter does not exist, markings shall be done as directed by the Engineer.

Openings of these facilities shall be covered and made safe for the public use of the roadway.

Where the existing frame base, frame and/or cover is judged unserviceable by the Engineer or where adjustable grade extension rings are discovered, replacement units will be provided to the Contractor by the City, at the City Corporation Yard, 1507 Martin Avenue. The handling of these units shall be considered incidental work and included in the payment for other items of work involved and no additional compensation will be allowed.

On pre-cast manholes, the Contractor shall raise or lower the manhole frame and cover by adding or removing pre-cast concrete grade rings and grouting the manhole frame to proper grade.

On brick manholes, the Contractor shall raise or lower the manhole frame and cover by adding or removing the proper courses of brick and grouting the manhole frame to the proper grade. Care shall be exercised when lowering a manhole that the top of the manhole is finished to the proper diameter so that the frame shall have sufficient bearing. Blocking the frame up with wood or similar material shall not be allowed. All work shall be done as directed by the Engineer.

Because of the damage to vehicles using public streets and the inconvenience to the public caused by incomplete street work, the City will not tolerate procrastination between adjustment stages in adjusting units to grade. Once the pavement is cut and work begun, the work must be properly scheduled and diligently prosecuted so that each unit is complete to its new grade, paving in place and barricades removed (no barricading overnight), all within a two (2) Working Day period from the commencement of work in the vicinity of each unit to be adjusted. At no time shall there be a drop off greater than 0.1' (one-tenth of a foot) in the pavement overnight.

As a matter of public safety, the Contractor shall ensure that manhole, valve box, flush inlet, and other covers are installed on their rings anytime the opening is left unattended.

5.11 ADJUSTMENT OF SURVEY MONUMENT BOXES

Survey monument boxes shall be adjusted to grade prior to resurfacing if the monument has a standard box and cover and adjustment can be made with an adjustment ring. Where a monument does not have a box or where an old style square box exists, a box shall be installed after the paving operation in accordance with the Standard Drawings. Care shall be used in working with survey monuments since they are controlled by the State of California Land Surveyor's Act. Damaged monuments that need to be replaced will need to be resurveyed by a Licensed Land Surveyor and appropriate documentation filed with the County Recorder at the expense of the contractor.

5.12 MEASUREMENT AND PAYMENT

All work involved in furnishing and constructing Asphaltic Pavement Resurfacing will be measured and paid for by the ton of material, complete in place and includes preparation, adjustment of water valves and cleanup, unless otherwise specified in the contract Documents.

Cold milling of pavement will be measured by the linear foot along the edge of milled joint or by the square foot as provided for in the Contract Documents.

Asphaltic Leveling Course will be paid for by the ton of material in place and includes all preparation work and the application of paint binder (tack coat).

All work involved in furnishing and constructing pavement reinforcing fabric, will be measured and paid for by the square yard with the asphaltic binder measured and paid for by the actual pounds of binder applied (8.51 pounds per gallon at 60 degrees Fahrenheit). All work involved in furnishing and constructing pavement reinforcing grid, including the grid and binder will be measured and paid for by the square yard.

Manhole Alteration and Adjustment of Survey Monuments Boxes will be measured and paid for by the unit, unless otherwise specified in the Contract Documents. In all other cases, the above will be considered incidental and will be considered as included in the other items of work.

Payment made at the bid prices per unit of measure for the above shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, complete in place, as required by the Contract Documents and as directed by the Engineer.

6.0 ASPHALTIC CONCRETE DIKES

Asphaltic Concrete dikes shall be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required lines, grades and cross section.

6.1 MATERIAL

The combined aggregate grading for asphaltic concrete for use in dikes shall be Surface Course, one-half (1/2”) inch maximum size aggregate, as specified in Subsection 2.0, Materials, of this Section 02039 . The amount of asphalt binder used for asphaltic concrete berms shall not be less than eight percent (8%) by weight of the aggregate unless otherwise indicated in the Contract Documents.

6.2 MEASUREMENT AND PAYMENT

Payment for Asphaltic Concrete Dikes shall be per lineal foot in place and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, complete in place, as required by the Contract Documents and as directed by the Engineer.

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SECTION 02040

PORTLAND CEMENT CONCRETE PAVEMENT

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of constructing Portland cement concrete pavement on a prepared subgrade as required in the Contract Documents.

This work shall conform to Section 40 of the Standard Specifications except as specifically modified by the Contract Documents.

2.0 JOINTS

A contact joint (per City Standard Details) shall be placed at the lip of gutter, two (2') feet from the face of curb or to match the existing lip of gutter as determined by the Engineer, unless otherwise indicated and at such other points between the lips of gutters as shall be required in the Contract Documents or as determined by the Engineer.

Transverse weakened plane joints shall be placed as required in the Contract Documents or as determined by the Engineer.

3.0 PAVEMENT THICKNESS

Thickness of Portland Cement Concrete Pavement shall be as shown in the Contract Documents.

4.0 MEASUREMENT AND PAYMENT

Payment for this item shall be per square foot installed complete and in place. Full compensation for transverse weakened plane joints and contact joints will be considered as included in the contract price paid per square foot for Portland Cement Concrete Pavement and no additional compensation will be allowed therefore.

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SECTION 02062

FURNISHING AND INSTALLING PIPE

1.0 GENERAL

1.1 DESCRIPTION

This item shall consist of furnishing all labor, materials, tools, and equipment to construct complete in place sanitary sewers, storm drains, and miscellaneous pipelines in accordance with the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, Section 02007, Storm Water Pollution Prevention, and Section 02005, Trench and Excavation Safety

2.0 MATERIAL

2.1 VITRIFIED CLAY PIPE

Vitrified clay pipe shall be "extra strength" conforming to ASTM C700. All vitrified clay pipe shall be first quality bell and spigot type, unless otherwise noted in the Special Provisions.

Vitrified clay pipe joints shall be either "Wedge-Lock" or "Speed Seal" or an approved equal, conforming to the requirements of ASTM C425. In non-reactive soil areas and only when allowed in writing by the Engineer, Compression Joint ("Band Seal" or approved equal) with adjustable stainless steel shear ring, conforming to the requirements of ASTM C425, may be used.

2.2 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall conform to the requirements for the specified class and to the general requirements of ASTM C76 for "Reinforced Concrete Culvert, Storm Drain Pipe, and Sewer Pipe." All pipe shall be Class III, unless otherwise specified in the Special Provisions or shown on the Plans.

A. REINFORCED CONCRETE PIPE - SANITARY SEWERS

Portland cement used in the manufacture of reinforced concrete pipe for sanitary sewers shall conform to the requirements of the specifications for Type V Portland Cement, ASTM C150, unless otherwise specified in the Contract Documents.

Reinforced concrete pipe for sanitary sewers shall be fully lined with high-density polyethlene (HDPE), polyvinyl chloride (PVC), or other material as approved by the Engineer and shall have a rubber gasket joint, conforming to ASTM C443. Neoprene compound gaskets shall be used. Storage and use of gaskets and lubricant shall conform to the above standards. HDPE and PVC joints shall be fully sealed to form a continuous lining as approved by the Engineer.

B. REINFORCED CONCRETE PIPE - STORM DRAINS

Portland cement used in the manufacture of reinforced concrete pipe for storm drains and culverts shall conform to the requirements of the specifications for Type II Portland Cement, ASTM Designation C150, unless otherwise specified in the Contract Documents.

Reinforced concrete pipe shall be of the bell and spigot type with rubber gaskets. Rubber gasket shall conform to the requirements of ASTM Designation C443. Storage and use of gaskets and lubricant shall conform to the above standards.

2.3 POLYVINYL CHLORIDE (PVC) PIPE

Polyvinyl chloride (PVC) solid wall pipe for sanitary sewer use shall be at least SDR 26 cell classification 12454-B, conforming to ASTM Designation D3034. All PVC pipe shall be first quality bell and spigot type. PVC pipe shall have factory installed elastomeric gaskets and push-on joints, providing a watertight seal, conforming to the requirements of ASTM Designation D3212. PVC pipe larger than twelve inches (12”) in diameter may be used upon approval by the City Engineer.

2.4 CAST IRON PIPE

Cast iron pipe for sanitary sewers and storm drain use shall meet and be in accordance with those standards referenced in ASTM A74. Cast iron pipe shall only be used when specifically noted on the plans or with written consent of the Engineer.

2.5 DUCTILE IRON PIPE

Ductile iron pipe for sanitary sewer and storm drain use shall conform to the requirement of ANSI A 21.50, 1976. Ductile iron pipe shall only be used when specifically noted on the plans or with written consent of the Engineer.

2.6 CORRUGATED STEEL PIPE

Corrugated steel pipe for storm drain use shall conform to AASHTO M36/M36M and ASTM A 760 except as modified in Section 66-1.02 of the Standard Specifications. Corrugated steel pipe shall only be used when specifically noted on the plans or with written consent of the Engineer.

2.7 WATER

Water for dust control, general cleaning, flushing of pipe lines and structures, moistening and compaction shall be from the City's potable water system, the recycled water system, or another approved source. Prior to use of the City's potable water from a fire hydrant, the contractor must obtain a portable water meter from the City Water and Sewer Utility and arrange payment for water used.

3.0 QUALITY AND TESTING OF PIPE

3.1 DESCRIPTION

Pipe shall be of the highest quality meeting the requirements of the designated testing standards. Care shall be taken during shipping to not damage the pipe and shall be properly stored and protected on the job site per manufacturer's recommendations. All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer, the location of the plant, date of manufacture, the class of pipe and/or strength designation.

3.2 QUALITY

The quality of vitrified clay pipe, reinforced concrete pipe, ductile iron pipe, PVC pipe, corrugated steel pipe, and any other pipe specified in the contract documents, as delivered to the job, shall be in conformance with their respective standards.

All pipe and fittings shall be subject to the examination and approval of the Engineer. Any defects in the pipe including chips, cracks, blisters, out of round, etc. that are not within the limits of the designated standards will be rejected. If the quality of the pipe is such that more than five percent (5%) of any lot delivered to the job site becomes subject to rejection, then the entire lot shall be rejected and removed from the job site at the sole expense of the Contractor. In addition, should more than five percent (5%) of the pipe delivered to the site on any given day be rejected, the Engineer retains the right to reject all pipe produced on the day or days of the rejected pipe.

3.3 TESTING OF PIPE

All pipe shall be subject to testing in accordance with the designated test standard. Shipment of all pipe and fittings shall be accompanied by a Certificate of Compliance meeting the requirements of Subsection 1.10, Quality Assurance Control Submittals, of Section 01330, Submittal Procedure.

Tests on reinforced concrete pipe shall be required to determine conformance with "D" load and reinforcing requirements of ASTM C76. Copies of test reports shall be furnished to the Engineer in duplicate prior to use of the pipe in the job.

One section of pipe from each lot to be used shall be tested in accordance with the procedures outlined in ASTM C76. Lots tested shall be marked with the date of test as well as by lot number for shipment to the specific project for which that lot was tested.

Pipe samples for testing shall be furnished without charge by the Contractor a minimum of one week in advance of construction. The cost of testing the pipe shall be borne by the Contractor.

4.0 EXCAVATION

4.1 DESCRIPTION

The Contractor shall perform the necessary excavation for the construction of sanitary sewers, storm drains, manholes, clean outs, catch basins and other appurtenances, disposing of surplus excavated material and shall perform all auxiliary work that may be required thereto. The City will supply horizontal and vertical control. This shall usually consist of one point for vertical control and two for horizontal as shown on the drawings. The Contractor shall be responsible for layout of the work from these control points. The Contractor shall be responsible for the accuracy of his work and shall use all necessary safe guards to protect the control supplied by the City. The Contractor shall reimburse the City should it be necessary to reset the control due to negligence of the Contractor. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, Section 02007, Storm Water Pollution Prevention, and Section 02005, Trench and Excavation Safety.

4.2 CUTTING OF PAVEMENT

Pavement shall be initially cut along the edge limits of the trench using a method which does not cause damage to surrounding pavement and so that any impact does not cause damage and stress to surrounding improvements including those on private property. Prior to paving the trench with permanent pavement, but after the trench is backfilled and the trench has been approved for paving by the Engineer, the existing pavement shall be saw cut 6 inches beyond the edge of the trench in order to key the replacement pavement into the existing pavement. Where pavement has been damaged during trenching beyond the above saw cut or where a pavement crack caused the removal to go outside the pavement removal area, the edge of pavement shall be prepared so it is straight and vertical.

Saw cuts in asphalt and Portland cement concrete pavements shall be to a depth of at least three inches (3”), unless otherwise shown in the Contract Documents. The Engineer may determine that additional saw depth is required in order to cause a straight line and to leave a sound edge of pavement. Concrete curbs, walks, gutters, cross gutters and driveways shall be removed to neatly sawed edges with saw cuts made completely through the concrete along the nearest score mark. The limits of removal shall be approved by the Engineer. All work during its progress and after its completion shall conform to lines and grades given by the Engineer.

4.3 TRENCHING

The width of the trench shall not be less than twelve inches (12”), nor more than twenty-four inches (24”) greater than the outside diameter of the barrel of the pipe to be laid therein. Where trench shoring is required, this width shall be increased by the thickness of the shoring when appropriate.

Should the trench be excavated to a greater depth than that given by the Engineer, the Contractor shall, at his own expense, bring such excavation to the required grade with such material as the Engineer may designate, notwithstanding that it may be necessary to import suitable material, as directed by the Engineer.

In no case shall more than three hundred feet (300’) of trench be opened in advance of the pipe laying, and no more than three hundred feet (300’) left unfilled in the rear thereof, unless permission is obtained in advance from the Engineer. In the active public right of way, no more than one hundred feet (100’) of trench shall be opened in advance of pipe laying and no more than one hundred feet (100’) unfilled in the rear, thereof, unless permission is obtained in advance from the Engineer. The above distances may be reduced by the Engineer, whenever it is determined that the public safety or convenience is potentially impacted. Excavated material shall be promptly removed from the jobsite.

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

All supports shall be removed after construction is completed, unless otherwise directed by the Engineer, and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled in accordance with Section 02019, Earthwork.

Tunneling may be permitted in certain instances with the length of any tunnel not to exceed eight feet (8') only after obtaining written approval from the Engineer. Before backfilling trenches, the backfill in the tunnel shall be thoroughly compacted to the satisfaction of the Engineer.

Special care shall be taken to have all fire hydrants and water valves kept accessible at all times. The Contractor shall not obstruct the gutter of any street or alley, but shall use acceptable methods to allow for the free passage of surface water along the gutters into storm water inlets as approved by the Engineer. Flood control channels and storm drains shall be protected from the discharge of dirt, silt, and other non-acceptable materials in accordance with Section 02007, Storm Water Pollution Prevention.

The Contractor shall cooperate with the owners and tenants of the private property through which right-of-way may extend. The Contractor shall be liable for all damages suffered by all owners or tenants resulting from his negligence or lack of cooperation.

5.0 IMPORTED BEDDING MATERIAL

5.1 DESCRIPTION

Imported pipe bedding material is required. Where the specified depth of pipe bedding material is not sufficient due to groundwater or soft, yielding, or otherwise unsuitable material in the bottom of the trench, which in the opinion of the Engineer is an unsuitable foundation for the pipe, such material shall be excavated from the full width of the trench, to a depth satisfactory to the Engineer and replaced with additional pipe bedding material.

5.2 BEDDING MATERIAL REQUIREMENTS

Imported Bedding Material shall conform to Class 1, Type B Permeable Material as defined in Section 68-2.02F of the Standard Specifications and shall consist entirely of crushed, angular rock with no pea gravel., pea gravel. Bedding material shall be to the depth specified in the Contract Documents in order to provide a firm and stable support for the pipe. If no depth is specified, backfill shall be per the City of Santa Clara Standard Details. The bedding zone shall be defined as the envelope around the pipe extending underneath and above the pipe as indicated in the Contract Documents.

The bedding material shall be shaped to fit the bottom of the pipe providing uniform support throughout the length of the pipe. After the pipe has been placed on the bedding material, the next step is providing effective support of the pipe in the haunch area. The bedding material shall be carefully worked under the haunches of the pipe to provide adequate lateral support. Care must be taken during placing of the bedding material to prevent movement of the pipe. Imported Bedding Material shall be mechanically densified to give the required pipe support.

5.3 IMPORTED BEDDING FOR PVC PIPE

Bedding material for PVC pipe shall be tamped with vibratory compactor under the haunches to the springline of the pipe in eight-inch (8”) maximum lifts filling both sides of the pipe at the same time conforming to ASTM Designation D2321. Special care shall be taken to prevent movement of the pipe during placing of the bedding material under the pipe haunch. Bedding material above the springline of the pipe shall not be placed until the placed pipe has been inspected and accredited for grade and alignment by the Engineer and approved for backfilling. Once approved for backfilling by the Engineer, the placement and tamping with vibratory compactor of bedding material shall continue in eight-inch (8”) maximum lifts.

6.0 PIPE INSTALLATION

6.1 DESCRIPTION

All pipes and fittings shall be laid accurately to the lines and grades as shown on the plans and as provided by the Engineer. Joints shall be properly made up with pipes properly inserted into hubs and gaskets shall be fully seated. Special care shall be taken that there is no sagging of the spigot end in the hub and that a true surface is given to the invert throughout the entire length of the reach being laid. The pipe shall be centered in the trench. A uniform surface shall be provided in the trench, with full bearing under the entire length of the pipe.

The pipe shall be laid continuously upgrade, starting at the low end of the system, with the hub or socket end being upgrade unless otherwise permitted by the Engineer.

When it is necessary to cut PVC pipe for placement of fittings, damaged pipe, etc., it is essential that a square cut be made to ensure proper assembly. The cut ends shall be beveled to manufacturer's specifications.

The interior of all pipe shall be kept free from dirt, mortar, and other foreign material as the pipe laying progresses and left in a clean condition at the completion of the work.

Suitable excavation shall be made in the bottom of the trench to receive the socket or collar in order to relieve the load on the joint and to provide ample space for making the joints. Care should be taken not to disturb the joints already laid. If any previous length of pipe is moved or disturbed so as to adversely effect any joint, the joint shall be corrected.

The pipe shall be securely closed with a tight fitting plug or cover at the end of each work day, or when work ceases, to prevent unwanted material from entering the pipe. During the pipe laying process, the pipe shall be protected from damage due to any work over the pipe prior to the placement of sufficient protective backfill.

When removing manhole base concrete to connect a pipe to an existing manhole, special care shall be taken not to damage (crack) the concrete manhole base. If the concrete base is damaged, as determined by the Engineer, it shall be removed and discarded and a new concrete base formed in accordance with Section 02070, Storm and Sanitary Sewer Manholes, Drainage Structures, and Miscellaneous Structures.

6.2 PIPE GRADE

Grade and alignment of the trench and pipe shall be controlled by a laser beam system, which complies with OSHA requirements. The laser system shall have good visibility when used with a suitable target. The laser system must be of the self-leveling type so that the laser beam automatically compensates for minute disturbances. The laser system setup must be checked frequently to verify that it is functioning properly and has not been disturbed. The method of control is to provide a true line and grade, conforming to the plans.

The laser system must also have a warning system that instantly warns the pipe layer when the laser is off grade. The laser system is to be provided by the Contractor and shall have a minimum accuracy for line and grade of +/_ 0.01 foot per 100 feet and a minimum visible range of 1,000 feet.

All adjustments to the pipe to meet line or grade during the pipe laying process shall be accomplished by filling under the entire length of the pipe and not by wedging or blocking.

6.3 SANITARY SEWER LATERALS

Sanitary sewer laterals shall be made of the same material as the sanitary sewer main it connects to, unless otherwise indicated in the Contract Documents. Sanitary sewer laterals shall be installed from the sanitary sewer main to the property or easement line, terminating at a sanitary sewer cleanout. Refer to Section 02070, Storm and Sanitary Sewer Manholes, Drainage Structures, and Miscellaneous Structures, for sanitary sewer cleanout requirements. Sanitary sewer laterals shall be connected to the main with a factory fabricated wye. The configuration of the sanitary sewer lateral shall conform to the detail shown in the Standard Details. The same backfill provisions for the sanitary sewer main shall apply for sanitary sewer laterals.

Full compensation for sewer laterals shall be the contract price paid per linear foot for the size and kind of sewer pipe involved.

7.0 TRENCH BACKFILL

7.1 DESCRIPTION

Unless otherwise noted in the Contract Documents, trench backfill shall comply with the Standard Details. Imported backfill shall conform to the requirements of Section 02019, Earthwork. Trench backfill shall be placed to provide a uniformly compacted backfill in a way that does not disturb or otherwise damage the pipe and minimizes settlement in the surface of the trench. Care shall be exercised so as to not damage the edge of pavement of the trench. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500,Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

Where the pipe is in fill, the fill shall be compacted before laying the pipe so as to attain a minimum relative compaction of not less than ninety-five percent (95%).

7.2 COMPACTION

Trench backfill material shall be compacted using mechanical compaction methods approved by the Engineer. No jetting of material will be allowed. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The contractor will make his own determination in this regard.

Material shall be backfilled in even horizontal eight inch (8”) thick, maximum uncompacted, lifts or as directed by the Engineer. Material shall be compacted to ninety-five percent (95%) relative compaction. Relative compaction test shall be in accordance with Test Method No. ASTM 2922. Contractor shall excavate backfilled trench to provide access for soil compaction tests to the depth required by the Engineer. Said excavation and the required backfill shall be considered incidental and no additional compensation will be made therefore.

7.3 PAYMENT FOR IMPORTED BACKFILL

Payment for imported backfill shall be included in the item for furnishing and laying pipe, and no further compensation shall be allowed.

7.4 DRAINAGE AND WATER

If it is necessary in the prosecution of the work to interrupt or obstruct the existing drainage of the lands, making necessary any temporary drains or ditches, the Contractor shall provide and maintain the same during the progress of the work in such manner that no damage shall result to either public or private property. In case of any neglect to provide for either natural or artificial drainage that may have been interrupted, the Contractor shall be held liable for all damages that may result.

The Contractor shall provide and maintain at his own expense satisfactory drainage from all pumps or trenches. He shall remove from the trench whatever amounts of ground water, infiltration, surface or storm water necessary for proper placement of the pipe. Flood control channels and storm drains shall be protected from the discharge of dirt, silt and other non-acceptable materials in accordance with Section 02007, Storm Water Pollution Prevention.

8.0 PAVEMENT REPLACEMENT

8.1 DESCRIPTION

Trench pavement replacement shall conform to Section 02026, Aggregate Base, Section 02039, Asphaltic Concrete Pavement, Section 02040, Portland Cement Concrete Pavement, and to the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

Where pavement sections are not shown on the plans, pavement replacement shall conform in kind to the pavement removed. Where asphalt pavement existed, the replacement pavement section thickness shall match the existing section but in no case shall it be less than three inches (3”) of asphaltic concrete over twelve inches (12”) of aggregate base or eight inches (8”) of full depth asphaltic concrete as directed by the Engineer. Where Portland cement concrete surfacing exists, pavement replacement shall match the existing but not be less than six inches (6”) of Portland cement concrete over six inches (6”) of aggregate base.

Unless otherwise specified in the Contract Documents, pavement replacement shall immediately follow trench backfill. Should the Contractor's operation be such that final pavement restoration does not follow immediately after trench backfill, the Contractor, at his expense, shall install temporary pavement to cover the trench and make it safe for the public to use the roadway. Temporary pavement shall not be less than two inches (2”) of plant mix asphalt over four inches (4") of aggregate base. On heavily traveled roadways, a thicker pavement section shall be provided as determined by the Engineer.

Contractor shall perform all repair and maintenance of the temporary pavement to keep the roadway, including sidewalks, smooth and safe for pedestrians, bicyclists, and vehicles and free of dust and debris. All traffic control devices shall be maintained as provided in the approved traffic control plan per Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and as directed by the Engineer. If there is no Traffic Control Plan or if it is not addressed in the Traffic Control Plan, the Contractor shall install temporary lane markers such that the traffic lanes, crosswalks, and similar lane markings are clear to the satisfaction of the Engineer.

9.0 CLEANING, FLUSHING AND PLUGGING

9.1 DESCRIPTION

It shall be the Contractor's responsibility to keep dirt and debris from entering existing pipelines. The contractor is responsible for cleaning pipelines and structures.

9.2 SANITARY SEWER LINES

Upon completion of the work, including on-site work, the Contractor shall flush the sanitary sewer lines, including sanitary sewer laterals from the clean-out to the main, with water until all dirt and debris are removed. The dirt and debris shall be removed from the newly constructed lines and shall not be allowed to flow down the City sanitary sewer system. A screen or other device shall be used by the contractor in the manhole immediately down stream of the section being cleaned to catch any foreign material. Sanitary sewer main flushing shall be done with a Wayne sewer ball and sanitary sewer lateral flushing shall be done with a rotary cleaning tool or approved equal and the pressure of the water during flushing shall be sufficient to provide a minimum cleansing velocity of five feet (5') per second. The equipment used for flushing and the pressure of the water shall be adequate to remove all material from within the sanitary sewer lines as determined by the Engineer. When a new sewer is connected to an existing line at a point between existing manholes, cleaning and flushing with an approved sewer ball shall be carried out to the first existing manhole downstream from the point of connection.

The sanitary sewer lines shall be plugged off at all manholes. Plugs shall be removed by the Contractor upon final acceptance of the work by the City or upon approval from the Engineer for operation of the sanitary sewers before acceptance. The procedure for the latter shall be as follows:

When deemed necessary by the Engineer, the City may run sewage from dwellings or other buildings into a sanitary sewer system, prior to acceptance of improvements by the City. In such case, the following procedure shall be followed:

A. The newly constructed sanitary sewer system, including sanitary sewer laterals, is thoroughly cleaned and flushed as noted above.

B. All repairs are completed in the sanitary sewers and manholes below the castings.

C. All castings are grouted in place to grade on manholes.

D. In lieu of C. above, a steel plate may be set over the manhole in place of the standard manhole casting providing it is secured and made safe for traffic.

E. A wooden protective cover shall be constructed at the bottom of the manhole directly over the sanitary sewer line, on top of the "shelf," to prevent debris from entering the sanitary sewer line.

9.3 STORM DRAIN PIPES

Storm drain pipes shall be cleaned of all dirt and debris prior to being put into use and/or prior to acceptance. No foreign material shall be allowed to enter the City's storm drain system or flood control channels. A screen or other device shall be installed by the contractor in the manhole immediately down stream of the section of pipe being cleaned to catch any debris.

10.0 PIPE LINE LEAKS

10.1 DESCRIPTION

Pipelines shall be constructed to be free from leaks due to exfiltration and infiltration. Prior to acceptance, the pipelines shall be tested and/or inspected to determine if any leaks exist due to faulty joints or broken or cracked sections. If leaks are found, the pipeline shall be permanently repaired at the Contractor's expense in a manner acceptable to the Engineer.

10.2 SANITARY SEWER PIPES

A low pressure air test shall be performed by the Contractor prior to the acceptance of sanitary sewer lines. Contractor shall furnish all necessary test equipment acceptable to the Engineer. Test shall be performed after the trench is backfilled and compacted and prior to placement of pavement. The test shall be done in the presence of the Engineer, or his authorized agent, in accordance with the following procedure:

A. Immediately prior to testing, the sanitary sewer line shall be cleaned and test plugs properly installed at each end of the section of line to be tested.

B. When all necessary test equipment is in place, a compressed air supply shall be attached to the air fitting on the test equipment and the air pressure within the line increased to four (4) pound per square inch gage (psig).

C. After an internal pressure of four (4) psig is obtained, Contractor shall allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain the specified pressure.

D. After the two (2) minute period, the Contractor shall disconnect the air supply.

E. The Engineer, or his authorized agent, shall observe the pressure gauge connected to the sewer line being tested and start a stop watch when the pressure decreases to 3.5 psig and stop the stop watch when the pressure gauge reaches 2.5 psig for VCP or to 3.0 psig for PVC pipe.

F. The pipe section being tested shall pass the air test when the time required for the pressure to decrease from 3.5 psig to 2.5 psig for VCP or to 3.0 psig for PVC pipe is not less than the minimum holding time shown on the following tables for VCP and PVC pipe for the respective size and length of pipe.

G. If the pipe section fails to meet the test requirements, the Contractor shall determine at his own expense the source or sources of leakage, and shall either make suitable repairs or replace the defective materials. The repaired pipe installation shall be retested and meet the requirements of this test.

H. The Contractor shall correct, stop, or otherwise remedy individual leaks in the section of the sewer line being tested even though such leakage might come within the allowable maximum.

I. The test shall include sewer laterals between the sewer cleanout near the right-of-way line and the sewer main.

AIR TEST TABLES

VCP SANITARY SEWER

DIAMETER OF PIPE (INCHES)	LENGTH OF LINE (FEET)	MINIMUM HOLDING TIME (MINUTES)
4	All Lengths	2
6	0 to 300	2
6	300 to 370	2.5
6	370 and greater	3
8	0 to 170	2
8	170 to 210	2.5
8	210 to 250	3
8	250 to 290	3.5
8	290 and greater	3.75
10	0 to 110	2
10	110 to 165	3
10	165 to 215	4
10	215 and greater	4.75
12	0 to 115	3
12	115 to 155	4
12	155 to 190	5
12	190 and greater	6
15	0 to 120	5
15	120 to 165	7
15	165 and greater	8
18	All Lengths	8.5
21	All Lengths	10
24	All Lengths	12.5
27	All Lengths	14.5

NOTE:
IF THE SECTION OF SANITARY SEWER TO BE TESTED IS COMPOSED OF BOTH A MAIN LINE AND MORE THAN 100 FEET ACCUMULATIVE OF SANITARY SEWER LATERALS, ADD 2 MINUTES TO THE LENGTH OF TEST REQUIRED FOR THE MAIN.

PVC PIPE SANITARY SEWER

DIAMETER OF PIPE (INCHES)	LENGTH OF LINE (FEET)	MINIMUM HOLDING TIME (MINUTES)	TIME FOR LONGER LENGTH (L IN FEET) (SECONDS)
4	All Lengths	2.8	N/A
6	0 to 398	2.8	(0.427)L
8	0 to 298	3.5	(0.760)L
10	0 to 239	4.4	(1.187)L
12	0 to 199	5.7	(1.709)L

NOTE:
IF THE SECTION OF LINE TO BE TESTED INCLUDES MORE THAN ONE PIPE SIZE (e.g., SEWER LATERALS), CALCULATE THE TEST TIME FOR EACH SIZE AND ADD THE TEST TIMES TO ARRIVE AT THE TOTAL TEST TIME FOR THE SECTION.

10.3 STORM DRAINS

The contractor shall observe the flow of water from the completed storm drain after backfilling the trench but prior to paving and after all possible connections to the pipe line including catch basins, laterals, intersecting lines, etc. have been plugged or blocked. Any flow from the pipe at the downstream end indicates infiltration into the pipeline and such leak is required to be located and repaired by the Contractor at his expense in a manner satisfactory to the Engineer.

11. FLEXIBLE PIPE TEST FOR PVC PIPE

Two 5% deflection gauge tests shall be performed by the Contractor, prior to the acceptance of PVC sanitary sewer lines. The Contractor shall furnish all necessary test equipment acceptable to the Engineer. The first test shall be performed immediately after the trench is backfilled and compacted, and prior to placement of the structural pavement section, if applicable. The second test shall be performed no less than thirty (30) days following completion of the pipe installation, including the structural pavement section, if applicable. The tests shall be done in the presence of the Engineer in accordance with the manufacturer's procedure.

Prior to testing, the sewer line shall be cleaned and flushed in accordance with this Section 02062.

The pipe test section shall be considered to pass the gauge test if the 5% gauge mandrel or deflectometer is passed through the pipe section without stopping and without applying more force than would be required to pull the same mandrel through a non-deflected equal length pipe section. Pulling of the gauge is usually done by hand. The pulling motion should be smooth and easy to avoid jamming the gauge if an obstruction is encountered in the line. The gauge should have a line on each end to facilitate removal should the gauge become obstructed in the direction of pull. If the gauge stops lightly, pull on it to see if it will clear the obstruction. When it appears that the gauge will not go forward, record the distance from the manhole at which the gauge is stuck and then pull the gauge back out. Do not use mechanical equipment to force the gauge through.

If the pipe installation fails to pass, the Contractor shall determine the source or sources of deflection, and the Contractor shall repair or replace, at his own expense, all defective materials or workmanship. The repaired pipe installation shall meet the requirements of this test.

Full compensation for performing the flexible pipe gauge test shall be considered as included in the contract price paid per linear foot for the size of PVC sanitary sewer pipe involved, and no separate payment will be made therefore.

12.0 VIDEO INSPECTION

After new lines have been thoroughly cleaned and tested as described in this Section 02026, the Contractor shall provide state of the art video inspection equipment and services to perform the video inspection, using DVD format or other format as approved by the Engineer, of all sanitary sewer lines prior to acceptance. The video inspection report shall include, but is not limited to, the video and written log with the date, location, project name, pipe material and size, and all pipe deficiencies with location of video footage. The video inspection report shall be furnished to the City for its permanent records. Upon written notice by the Engineer, the Contractor shall correct all deficiencies revealed in the video inspection report.

13.0 MEASUREMENT AND PAYMENT

13.1 PIPE

Measurement for mainline pipe, complete in place, shall be per lineal foot measured from center of manhole to center of manhole following a line parallel to the grade of the sewer. Measurement for lateral pipe, complete in place, shall be per linear foot measured from center of the clean-out, manhole, or catch basin to the center of the manhole at the main or to the center of the main, as appropriate.

Payment shall include the furnishing of all labor, materials, tools, and equipment required to construct and complete in an efficient and workmanlike manner the installation of the pipe in accordance with the Contract Documents. The price paid per lineal foot shall include all pipe, fittings, trenching, disposing of surplus excavated material, imported bedding, imported trench backfill, temporary trench pavement, sanitary sewer clean-outs, testing, and pavement replacement. No additional compensation shall be allowed other than for permanent trench pavement, manholes, catch basins, junction structures, sanitary sewer cleanouts, etc. if specified in the Contract Documents.

Should additional depth of imported bedding material be required from that indicated in the Contract Documents due to unforeseen conditions in the trench, a price shall be established and approved by the Engineer. For the purposes of measurement, the theoretical volume of material removed and replaced in cubic yards shall be computed using the outside diameter of pipe plus twenty-four (24") inches as the width and the depth shall be the distance from the bottom of the required bedding plane to the elevation the Engineer requires the excavation to be taken.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

13.2 PAVEMENT REPLACEMENT

Payment for temporary and final pavement is included in the price paid for pipe in place.

END OF SECTION

SECTION 02070

STORM AND SANITARY MANHOLES, DRAINAGE STRUCTURES, AND MISCELLANEOUS STRUCTURES

1.0 GENERAL

1.1 DESCRIPTION

This section consists of manholes for storm drain and sanitary sewer systems, drainage structures, including pipe headwalls, drop inlets, catchbasins, junction boxes, sewer clean-outs, flushing inlets and other miscellaneous structures identified in the Contract Documents. These structures shall conform to first, the Standard Details and second, Sections 51, 52, and 75 of the Standard Specifications and ASTM C47, insofar as they are applicable.

2.0 MATERIALS

2.1 DRAINAGE STRUCTURES

Portland cement concrete for drainage structures shall contain at least six (6) sacks (564 pounds) of Type II Portland cement per cubic yard conforming to Section 90 of the Standard Specifications with combined aggregate grading of 1-1/2" inch maximum. Reinforcing steel shall conform to Section 52 of the Standard Specifications.

Frames, grates, hoods, and other miscellaneous metal shall conform to first, the Standard Details and second, Section 75 of the Standard Specifications, insofar as they are applicable.

2.2 SANITARY SEWER STRUCTURES

Portland cement concrete for sanitary sewer structures shall contain at least six (6) sacks (564 pounds) of Type V Portland cement per cubic yard conforming to Section 90 of the Standard Specifications with combined aggregate grading of 1-1/2" maximum. Reinforcing steel shall conform to Section 52 of the Standard Specifications.

2.3 PRE-CAST CONCRETE MANHOLE SECTIONS

Pre-cast reinforced concrete manhole sections shall conform to the requirements of ASTM C478, except that manhole steps and ladders shall not be provided unless specifically required in the Contract Documents.

2.4 IRON CASTINGS

Iron castings for manhole frames and covers and for cleanouts, etc. shall conform to the Standard Details, ASTM A48, and shall have a minimum tensile strength of 20,000 psi. Iron castings shall be given a hot asphalt dip. Other protective treatment may be substituted as equivalent protection upon approval of the Engineer.

2.5 JOINT SEALER

Sealant for all joint surfaces of precast manhole sections and the manhole base shall be preformed plastic sealing gasket, which meets or exceeds Federal Specification SS-S-00210.

2.6 SEWER CLEANOUTS

Sanitary sewer cleanout pipe assemblies shall conform to the Standard Details unless specified otherwise in the Contract Documents.

3.0 CONSTRUCTION

3.1 DRAINAGE STRUCTURE

Concrete drainage structures will be cast in place unless otherwise indicated in the Contract Documents. Forms shall be inspected and approved by the Engineer prior to placement of concrete. Expansion and contraction joints shall be placed as required by the Contract Documents and as directed by the Engineer. Drainage structures shall be poured monolithically unless otherwise indicated. Not more than thirty (30) minutes shall elapse between successive pours for an individual structure. All concrete shall be used while fresh and before it has taken an initial set. Re-tempering any partially hardened concrete with additional water or by vibrating shall not be permitted. Concrete additives require the written approval of the Engineer. The contractor shall submit a concrete mix design for review and approval to the Engineer a minimum of one (1) week in advance of making any pours. A smooth trowel finish shall be applied to all exposed portions of the structure. The floor of the structure shall have slope from inlet to outlet and shall be free of “birdbaths” over .04 feet in depth.

Excavation and backfill shall conform to Section 02005, Trench and Excavation and Safety, and Section 002062, Furnishing and Installing Pipe, the Standard Details, Section 19 of the Standard Specifications, unless otherwise indicated, and to the Contract Documents. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention. The Contractor is to coordinate with the City who will install “No Dumping Flows to Bay” plaques near newly constructed catch basins.

3.2 MANHOLE

Manhole construction shall meet the requirements of the plans and City of Santa Clara Standard Details. The excavation for the manhole shall have a flat bottom on firm and undisturbed earth. The excavation shall be of sufficient depth to ensure a minimum of six inches (6") of concrete below the lowest pipe in the manhole.

The concrete for base construction shall be placed in a continuous pour, care being taken that segregation of materials does not occur. Consolidation shall be by tamping and working to achieve a dense watertight mass. The depth of concrete shall be sufficient to provide three (3”) inches of concrete above the top of the highest pipe in the base. No reinforcement is required unless otherwise required by the Contract Documents.

An approved metal impression ring shall be used to produce a level keyed slot to receive the barrel section. The concrete shall be worked under and around the impression ring so that a continuous smooth impression results.

Where possible, the main pipe shall be laid through the manhole so that the pipe can serve as the channel. After the concrete has set, at a time approved by the Engineer, the top one-half of the pipe shall be removed to the inside wall of the manhole and the cuts made smooth with mortar.

In manholes where it is not practical to lay the pipe through the manhole (such as at angle points and at intersections), the pipes shall end at the inside wall of the manhole base. Channels will be formed in the concrete base joining the pipes with smooth curves of maximum radius, directing the flow downstream. The bottoms of channels so formed shall conform to the bottom halves of the pipes being joined. The “shelves” on the base shall be troweled smooth with a slope of approximately one percent (1%) toward the main channel.

When a change in elevation or slope is called for across the manhole, the bottoms of the channels shall be warped to achieve a smooth curve resulting in an even flow without turbulence.

Joints between pre-cast reinforced concrete sections and between the base and the first pre-cast section shall be sealed with the joint sealer specified above in Subsection 2.5, Joint Sealer, such as "Ram Nek" or approved equal, installed according to the manufacturer's recommendations, to insure a watertight joint. Grade rings from the top of the last pre-cast section to the surface shall be installed on a continuous bed of mortar.

Particular care must be taken to protect the manhole from damage and to keep rock, dirt or debris from getting into the pipe system. A steel cover of adequate strength (safe to traffic), close fitting and well secured, shall be kept over the manhole opening until the frame and cover are permanently installed. A wooden cover shaped to completely cover the bottom of the manhole shall be installed and left in place until the frame and cover are installed.

The manhole frame and cover shall be permanently set when so authorized by the Engineer. The frame shall be centered on the grade rings and set on a layer of mortar to final grade. The mortar shall be neatly struck to make a smooth interior face in the manhole. A concrete collar, to securely anchor the frame to the manhole neck, shall be formed and poured around the outside of the manhole neck in accordance with the City of Santa Clara Standard Details. The frames of manholes in non-roadway areas shall be secured to the cone or grade ring with a continuous band of an approved waterproof epoxy cement. If any grade rings are exposed, they shall be secured to each other by the same epoxy cement.

When PVC pipes are being installed in a manhole base, a rubber "water-stop" of a type recommended by the manufacturer of the particular pipe shall be centered under the barrel of the manhole and set in the manhole base, as shown on the City of Santa Clara Standard Details. Said "water-stop" may consist of a manhole coupling with rubber sealing rings cast into the manhole base. The "water-stop" shall be firmly fitted around the pipe exterior.

When VCP pipes are being installed in a manhole base, the pipe shall be snapped off no more than twelve inches (12") from the outside edge of the base, and a flexible joint such as "Band-Seal" Coupling, installed to allow for possible differential settlement of the manhole base and the pipe.

3.3 CLEAN-OUT ASSEMBLY

A clean-out assembly, which includes the clean-out box, shall be installed at the right-of-way or easement line for each sewer lateral installed. Construction and installation of each cleanout assembly shall conform to the details shown in the Standard Details. The clean-out assembly, including the wye, bend, riser, plug, and box, shall be considered incidental to the installation of a sanitary sewer lateral and no additional payment will be made therefore.

4.0 MEASUREMENT AND PAYMENT

All work involved in furnishing and constructing storm and sanitary manholes, drainage structures and miscellaneous structures, except clean-out assemblies, will be measured and paid for per each, complete in place, unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing Storm and Sanitary Manholes, Drainage Structures and Miscellaneous Structures, including but not limited to the furnishing and placing of concrete, frames, grates, hoods, manhole frames and covers, reinforcing steel, excavation, backfill, traffic control and other work and material incidental thereto as required by the Contract Documents and as directed by the Engineer.

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SECTION 02071

WATER MAINS AND SERVICES

1.0 GENERAL

1.1 SCOPE OF WORK

The work shall include the furnishing of all labor, materials, tools, equipment, and incidentals required to construct and complete in an efficient and workmanlike manner the installation of public water mains and related facilities in accordance with the Plans and Specifications. Public water facilities include but are not limited to all those facilities including the water main, valves, fittings and appurtenances complete in-place to the back of meters and/or backflow prevention devices. All materials to be domestic made.

1.2 ADDITIONAL DEFINITIONS AND TERMS

Refer to Section 00050 of the General Provisions for definitions and terms. In addition, the following definitions and terms are used herein.

A. "A.S.T.M." shall mean the American Society for Testing and Materials.

B. "AWWA" shall mean the American Water Works Association, and it is intended that the current requirements of their standards shall govern throughout, unless otherwise herein specified. Such AWWA requirements shall be used in their entirety unless otherwise noted.

C. "DPH" shall mean California Department of Public Health.

D. "Engineer" shall mean the Director of Water & Sewer Utilities of the City of Santa Clara, or designee.

2.0 MATERIALS

2.1 DUCTILE IRON PIPE

Ductile iron pipe shall be Pressure Class 350 conforming to AWWA Standards C150 and C151.

Unless otherwise specified in the special provisions, ductile iron pipe shall receive an asphaltic coating as specified in AWWA Standard C151 and a cement lining conforming AWWA Standard C104. Ductile iron pipe and fittings shall be wrapped with an approved polyethylene encasement per AWWA Standard C105.

All ductile iron pipe joints shall be mechanically restrained. Mechanically restrained joints shall be “TR FLEX” Restrained Joint or Tyton pipe with Field-Lok gaskets by U.S. Pipe, Flex-Ring or Lok-Ring Restrained joints by American Ductile Iron Pipe, or equal. As an alternative, joints may be restrained with EBAA Iron Megalug restraints, Tyler MJ field loc restraints or equal.

Mechanical joint bell, flange, bolts, follower gland-sealing gasket and accessories shall conform to the requirements of AWWA Standard C-111. Bolts shall be Type 316 stainless steel, Class 2, conforming to ASTM A193 for bolts and ASTM A194 for nuts.

All rubber gaskets and rings shall be ethylene propylene diene monomer (EPDM).

2.2 POLYVINYLCHLORIDE PIPE

Polyvinylchloride pipe (PVC) shall conform to the requirements of the latest revision of the AWWA Standards C900 and C905, and shall be minimum of Pressure Class 200 psi and dimension ratio of 14, ductile iron pipe equivalent outside diameter and rubber ring mechanical joints. Recycled water pipes shall be purple or wrapped with purple polywrap.

2.3 DUCTILE IRON FITTINGS

Ductile iron compact mechanical joint fittings shall be used on all ductile iron and polyvinylchloride pipelines and shall conform to AWWA Standard C153, latest revision, in material, body thickness, and radii of curvature. Mechanical joint fittings shall be cement-lined in accordance with AWWA Standard C104, latest revision. Flange ends, except as required by the Plans or the Water Department Standard Drawings, may be substituted only after approval of the Engineer. Ductile iron fittings shall be wrapped with an approved polyethylene encasement per AWWA Standard C105.

2.4 GATE VALVES

Gate valves shall be interior and exterior epoxy-coated, resilient seat gate valves with 316 stainless steel fasteners and trim, non-rising stem, open left, two-inch (2") square wrench nut and with 316 stainless steel retainer nut inside, in accordance with AWWA Standards C509 and C550. All rubber material shall be EPDM. The valves shall have ends designed to join directly with the type of pipe or fitting being used or with ends called for on the Plans.

2.5 VALVE BOXES

Gate valve boxes shall be per the Water Department Standard Drawings. Covers shall be marked "Water" for potable water boxes or “CSC-RW” for recycled water boxes. Valve risers shall be a single length of eight-inch (8") diameter polyvinylchloride pipe - SDR 35.

2.6 BLOWOFF BOXES

Valve boxes for manual blowoff assemblies shall be the same as item number 2.5 VALVE BOXES. Covers shall be marked "Water" for potable water boxes or “CSC-RW” for recycled water boxes.

2.7 FIRE HYDRANTS

Fire hydrants shall be furnished with buries with inlets that shall be mechanical joint. All hydrants shall be fusion epoxy-lined interior and the exterior shall be coated pursuant to Water Department Standard Drawings and Specifications. All hydrants shall have National Standard hose threads on outlets and 1-1/8" pentagonal tips on caps and valve stems. Hydrant bury shall be 30" to 48" long with 6" inlet.

2.8 HYDRANT RISER (EXTENSION)

Hydrant risers or extension shall be with localized breakoff scoring on the exterior near each flanged end. Break-off bolts shall be hollow.

2.9 FLANGES

Steel pipe flanges shall conform to the requirements of AWWA Standard C207, Class D. Bolts shall be Type 316 stainless steel, Class 2, conforming to ASTM A193 for bolts and ASTM A194 for nuts. Flange and bolt coatings shall match adjacent pipe. Gaskets shall be full face rubber.

2.10 INSULATING FLANGED JOINTS

Each insulating flange set shall consist of a full-face central gasket, a full length sleeve for each flange bolt, and two insulating washers with two steel washers for each bolt. The ring type central gasket shall be 1/8" thick sheet packing, having a high dielectric constant. Bolt sleeves shall be plastic (polyethylene) and insulating washers shall be constructed of fabric reinforced phenolic resin. The complete assembly shall have an ANSI pressure rating equal to that of the flanges between which it is installed.

2.11 CASINGS FOR WATER MAINS

Steel casings utilized for boring and jacking for water mains shall be smooth steel pipe conforming to AWWA C200, fabricated in sections for welded field joints and be the size shown on the Plans. Field joints shall be full circumferencial welded butt joints.

2.12 CASING INSULATORS

Insulators utilized for electrical isolation shall be 12" wide, two-piece steel band type. Each insulator shall have an insulating liner with a thick retainer type edge to isolate the steel bands from the carrier pipe. Insulating runners shall be 1" wide steel capped with molded rubber or

polyester fiberglass. Insulator spacing shall be determined by the Contractor according to manufacturer's recommendations for each pipeline alternate and approved by the Engineer. The outside diameter of the casing insulator skids shall be sufficient height to isolate all portions of the carrier pipe from the casing.

2.13 CASING END SEALS

After installation of the carrier pipe and sand is blown to fill the annular space, the ends of the casing shall be sealed. End seals shall be pull-on type, S-shaped, constructed of 1/8" minimum highly flexible synthetic rubber. Each end seal shall be furnished with two 1/2", 14-gauge stainless steel bands for banding the seal to the casing and carrier pipe.

2.14 EPOXY COATINGS

Epoxy coatings for fittings when required in the project Plans and Specifications shall be 8 mils minimum thickness fusion epoxy and shall be subjected to thickness and discontinuity (holiday) testing at the discretion of the Engineer. The application of the coating and preparation of the substrate shall be in accordance with the manufacturer's recommendations.

2.15 PORTLAND CEMENT CONCRETE

Portland cement concrete for hydrant bases; thrust blocks and anchors shall conform to the requirements of Section 90, "Portland Cement Concrete," of the Standard Specifications and specified herein. The concrete shall be Class "B" containing six (6) sacks of Portland cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the requirements of three quarter inches (3/4") maximum. The addition of calcium chloride for high early strength concrete shall not be permitted. See Section 90, "Portland Cement Concrete," of the Standard Specifications for required slump.

2.16 BITUMASTIC

Bitumastic for coated couplings, rods, fittings and joints shall conform to the requirements of Bureau of Reclamation Specification CA-50.

2.17 TRACER WIRE

Tracer Wire for all pipes shall be RHW #12 AWG solid, taped to the top of the water main with 12” min. slack inside all valve boxes. For connection to existing trace wires, place wires in water-proof direct bury wire connector, 3M #9756 or bulk pack #dbr-6.

2.18 POLY WRAP

Poly Wrap shall be 8 mil low-density or 4 mil high-density polyethylene film installed per AWWA Standard C105. Purple poly wrap shall be used for recycled water pipes.

2.19 PIPE MARKING TAPE

3” width, 4 mil, non-detectable
- For potable water mains and services, use blue tape.
- For recycled water mains and services, use purple tape.

2.20 NUTS, BOLTS & WASHERS

Use 316 stainless steel bolts, nuts, and washers for all bolted connections. Bolts shall be Type 316 stainless steel, Class 2, conforming to ASTM A193 for bolts and ASTM A194 for nuts.

2.21 CHLORINE

Hypochlorite shall conform to AWWA Standard B300.

2.22 MISCELLANEOUS SERVICES

Material for water services shall comply with the Water Department Standard Drawings.

2.23 APPROVAL OF EQUIVALENTS

If materials other than those specified on the Plans or these Specifications are to be considered, a description, including manufacturer's specifications, shall be supplied to the Engineer or Water Department Inspector for evaluation. Only those materials which are compatible with the existing water system and have the City’s written approval will be allowed.

3.0 CONSTRUCTION METHODS

Trench excavation, backfill, imported bedding material, imported backfill, drainage and water, pavement replacement shall be as specified in Section 02062: FURNISHING AND INSTALLING PIPE of the Technical Provisions except that there shall be four inch minimum sand bedding in the bottom of the trench and a minimum of twelve inches of sand over the top of the water pipe.

The Contractor shall give two (2) working days' notice to the City's Water Department when making connections to existing water facilities. At all times, the manipulation of existing valves shall be done by City Water Department personnel.

3.1 HANDLING OF MATERIALS

Water pipe, fittings, hydrants and valves must be carefully handled at all times. Only suitable and proper equipment and appliances shall be used for the safe loading, hauling, unloading, handling and placing of materials. Special care shall be exercised so that the coating on pipe, valves and fittings will not be damaged. If such damage should occur, the coating

shall be repaired to the satisfaction of the Engineer or Water Department Inspector. Chain slings will not be permitted. Pipe loaded on trucks or stacked one upon another shall be supported on wooden blocking. Pipe handled on skidway shall not be skidded or rolled against pipe already on the ground.

3.2 PIPE LAYING

All pipes shall be laid to conform to AWWA Standards C600 and C603. All pipes shall be laid true to line and grade as shown on the Plans or as directed by the Engineer to pass existing obstructions. Before any length of pipe is laid, it shall be carefully inspected for defects. No pipe or other material which is cracked or shows other defects shall be installed.

Clearances

A. One foot minimum vertical clearance between water and recycled water mains and services and other facilities unless otherwise noted on the plans.

B. Ten feet minimum horizontal clearance between water and recycled water mains and services and sanitary mains and services and trees.

C. Five feet minimum horizontal clearance between water and storm mains and laterals and other general utilities or facilities.

All pipe valves and fittings must be carefully wiped out and cleaned, as they are being laid so that no earth or rubbish may become lodged inside. Every open end of installed pipe shall be capped or plugged with an approved fitting at all times when work is suspended, at the close of the workday and as directed by the Engineer or Water Department Inspector.

Pipe must be given a solid, uniform bearing in the bottom of the trench. Blocking or supporting pipe on earth mounds will not be permitted. Whenever it is necessary to use a short length of pipe at a fitting or valve, the minimum length shall be thirty-two inches (32"). If it is necessary to cut pipe, said cut shall be made with an approved pipe cutter.

No deflection will be permitted at joints where water pipe is joined to cast iron fittings or valves. In all other cases, deflections will be permitted up to the maximum allowed by the manufacturer's recommendation.

A minimum of type RHW insulated #12 AWG solid copper wire shall be installed in the trench with non-metallic pipe and spliced to any existing tracer wire. For connection to existing trace wires, place wires in water-proof direct bury wire connector, 3M #9756 or bulk pack #dbr-6. The wire shall be insulated and shall be laid along the top of the pipe. The wire shall be installed so that there is no direct contact between the copper and any other metal in the trench.

3.3 JOINTS

All joints shall be assembled to conform to AWWA Standards C600 and C603. All joints shall be water tight and shall be made by competent workers. Unless otherwise specified on the Plans or in these Specifications, joints may be of any of the types listed below which are consistent with the type of pipe being used, except that joints shall in no case be caulked with cement.

3.4 WORKING INVOLVING ASBESTOS-CEMENT PIPE

Field cutting and machining operations involving asbestos-cement pipe shall be in compliance with OSHA Asbestos Standards.

Power-driven saws and abrasive discs shall not be used for the dry cutting or beveling of asbestos-cement pipe.

Pressure or "wet" tapping of asbestos-cement pipe shall be positive purge, blowoff or other type that allows pipe cuttings to be flushed from the pipe.

3.5 MECHANICAL JOINTS

The last eight inches (8") of the outside of the spigot and inside of the bell of mechanical joints shall be thoroughly cleaned of all foreign material. Mechanical joints shall be installed according to the manufacturer specifications.

3.6 SETTING VALVES, FITTINGS AND HYDRANTS

Gate valves shall be set with stems in vertical position and provided with valve boxes. Gate valves shall be anchored as shown on the Plans or the Water Department Standard Drawings.

Fire hydrants and fire hydrant connections shall be installed where indicated on the Plans, except where the Engineer directs that they shall be relocated to avoid an obstruction. The Contractor shall make such relocations at the time of reconstruction and without additional compensation. Each hydrant shall be installed in accordance with the Water Department Standard Drawings for hydrants or as shown on the Plans.

3.7 CONNECTION TO EXISTING MAINS

The Contractor shall make connections to existing mains where indicated on the Plans. The newly installed facilities are to be kept isolated from the City system until bacteriologically acceptable. If isolation is provided by a closed gate valve, pressure testing for leakage in the new facilities shall only be conducted after bacteriological acceptance.

The Engineer shall designate method and sequence of connecting to existing mains to minimize contamination danger. Connections to existing valves prior to obtaining satisfactory leakage and pressure tests of the new facilities shall be at the Contractor's risk.

The City will assume no responsibility for the water tightness of existing valves.

Service in existing mains can be interrupted only upon authorization of the Engineer, who will specify time and duration of the outage. The Contractor shall notify all affected users in writing at least forty-eight (48) hours in advance of service interruption using printed forms provided by the City. The Contractor shall notify the City's Water Department personnel at least four (4) business days in advance to schedule valve closing for service interruption. Manipulation of new or existing valves shall only be done by City Water Department personnel.

3.8 AIR RELIEFS AND BLOWOFFS

Air relief and blowoff assemblies shall be located as shown on the Plans and installed in accordance with the Water Department Standard Drawings.

3.9 PAINTING

All metals anodic to ductile iron that are not adequately protected against corrosion by a suitable protective coating shall be carefully cleaned and given a suitable protective coating of a good quality bitumastic coating. This coating shall be allowed to cure before the material is covered with polyethylene wrap or backfill material.

All valves, flexible coupling adapters, and flexible couplings shall be fusion epoxy coated pursuant to Section 2.14 and shall be subjected to thickness and discontinuity (holiday) testing at the discretion of the Engineer.

Bolts, nuts, washers, and any other metallic elements exposed to the soil shall be coated with bitumastic in accordance with Paragraph C-20, entitled "Bitumastic", of these Standard Provisions.

3.10 THRUST BLOCKING OR JOINT THRUST RESTRAINTS

Thrust blocks and anchor blocks shall conform to the Water Department Standard Drawings or as directed by the Engineer or Water Department Inspector. The Contractor shall be required to install thrust blocking in addition to the use of joint thrust restraints.

3.11 INSULATING FLANGED JOINTS

All insulating components of the insulating flanged gasket set shall be cleaned of all dirt, grease, oil and other foreign materials immediately

prior to assembly. Bolt holes in mating flanges shall be properly aligned at the time bolts and insulating sleeves are inserted to prevent damage to the insulation. After flanged bolts have been tightened, each insulating washer shall be inspected for cracks or other damage. All damaged washers shall be replaced. After assembly, resistance between each bolt and flange shall be measured with an approved ohmmeter, and the minimum resistance shall be 50,000 ohms. Where the insulating joint is assembled in the shop and shipped as a unit, resistance shall be measured in the shop between the flanges and between each bolt and flange, and shall meet the above requirements. All insulating flanged joints shall be coated as shown on the Water Department Standard Drawings and specified herein.

3.12 PRESSURE TESTS

Each run of pipe between two (2) sectionalizing valves or between a valve and a cap or plug or as directed by the Engineer shall be tested for leakage. Only one (1) run of pipe shall be tested at a time, but the pressure may be applied through sections of pipe already tested. Services and fire hydrant runs may be tested individually or with the sections of water main. It is the intention of these tests to test the water tightness of the closed gate valves as well as the piping.

The Contractor shall furnish all necessary equipment and labor to perform the pressure tests.

The hydrostatic test pressure shall be two hundred (200) pounds per square inch, based on the elevation of the lowest point of the section under test and corrected to the elevation of the test gauge.

The test pressure shall be maintained for not less than two (2) hours. No pressure drop is permissible. The Contractor shall at his own expense take whatever steps are necessary to eliminate the leakage, after which the test shall be repeated as often as necessary until acceptable results are obtained.

3.13 DISINFECTING AND FLUSHING WATER LINES

Disinfecting of the completed work, including all pipelines, valves, and fittings, shall be performed by the Contractor, who will supply all materials, equipment, supplies and labor required for the operation. The required concentration of chlorine throughout the main is fifty (50) parts per million. The pipe line shall be disinfected in accordance with AWWA Standards B300 and C651, and as specified as follows:

A. LIQUID CHLORINE SOLUTION METHOD

Flush all foreign matter from mains, branch runs, hydrant runs and installed services. Introduce liquid chlorine solution at appropriate locations to assure uniform distribution through the facilities at the proper concentration. The sanitizing solution shall be retained in

the facilities for a period of twenty-four (24) hours, after which each service, hydrant run, branch run and dead end shall be flushed until the residual chlorine is less than one (1) part per million or is no greater than the concentration of chlorine in the water supplied for flushing.

B. HTH TABLET METHOD

Tablets are to be fastened to the inside top surface of each length of pipe using a food-grade adhesive at time of pipe laying. Tablets shall not be available at any time for casual pilferage by the general public or by children. The new facilities are to be slowly filled with water. Air is to be exhausted from each dead end, branch run, hydrant run and installed service. Retain water for a period of twenty-four (24) hours, after which each service, hydrant run, branch run and dead end shall be thoroughly flushed to clear foreign matter and until the residual chlorine concentration is less than one (1) part per million or is no greater than the concentration of chlorine in the water supplied for flushing.

It shall be unlawful to discharge any chlorinated water from the flushing operations into any storm drain or natural outlet or channel without a valid National Pollution Discharge Elimination System permit. The Contractor shall discharge the chlorinated water into a sanitary sewer manhole or other approved opening in a City sanitary sewer collection system. No person shall discharge any liquid having a pH lower than six (6) or more than twelve and one-half (12.5) into the sanitary sewer system.

3.14 BACTERIOLOGICAL TESTING

Samples shall be gathered and tests conducted by City. Samples shall be taken at representative points as required by the Engineer.

The new facilities shall remain isolated and out of service until satisfactory test results have been obtained which meet the requirement of the California Department of Public Health and the Engineer has accepted the results as indicative of the bacteriological condition of the facilities. If unsatisfactory or doubtful results are obtained from the initial sampling, the disinfection process shall be repeated until acceptable test results are reported. The follow-up sampling costs shall be borne by the Contractor.

END OF SECTION

SECTION 02073

PORTLAND CEMENT CONCRETE CURB, GUTTER, SIDEWALK, WALKWAY, CURB RAMP, AND DRIVEWAY

1.0 GENERAL

1.1 DESCRIPTION

This item shall consist of constructing Portland Cement Concrete Curbs, Gutters, Sidewalks, Walkways, Curb Ramps, Driveways and other miscellaneous work as required by the Contract Documents. The work shall conform to the Standard Details and Section 73 of the Standard Specifications, insofar as it is applicable.

Sidewalk, curb and gutter sections shall be poured monolithically unless otherwise provided for in the Contract Documents or allowed by the Engineer. All work shall utilize fixed forms except that curbs, curb and gutter, sidewalks and monolithic sidewalk, curb and gutter sections may be placed using slip forms or extrusion machines with the approval of the Engineer. Refer to Subsection 1.6, Protection of Public and Private Property, and Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, and Section 02007, Storm Water Pollution Prevention.

2.0 MATERIALS

2.1 PORTLAND CEMENT

Unless otherwise specified in the Contract Documents, all cement used shall be of one brand, be Type II, and shall conform to ASTM C150. Results from certified tests, made by a recognized testing laboratory, shall be furnished by the cement manufacturer on request of the Engineer.

2.2 PORTLAND CEMENT CONCRETE

Concrete mix designs shall be submitted to the Engineer for approval a minimum of one week in advance of use. If the concrete supplier has a City approved mix design on file, the contractor must provide documentation indicating the supplier and the mix number at least twenty-four (24) hours in advance of use. Unless otherwise noted in the Contract Documents, Portland cement concrete shall contain at least six (6) sacks (564 pounds) of Type II Portland cement per cubic yard conforming to Section 90 of the Standard Specifications. All cementatious material shall be Portland cement. A mix design shall be submitted for approval whenever the slip form/extrusion processes is to be used.

A. POURED IN PLACE CONCRETE

The combined aggregate grading for poured in place Portland cement concrete shall be one inch (1”) maximum as noted in Section 90 of the Standard Specifications.

B. SLIP FORM/EXTRUDED CONCRETE

Concrete placed using either the slip form or extrusion methods shall have an air entraining agent added during mixing in an amount to produce from five percent (5%) to eight percent (8%) air by volume in the mixed concrete.

2.3 AGGREGATES

A. POURED IN PLACE CONCRETE

Aggregates for concrete shall conform to Section 90 of the Standard Specification. Combined aggregate grading shall conform to the one inch (1”) maximum requirements of Section 90-3.04 of the Standard Specifications.

B. SLIP FORM/EXTRUDED CONCRETE

The combined aggregate for concrete placed by either the slip form or extrusion method shall conform to the following gradation:

Sieve Size	3/8" Maximum (Pea Gravel) Percentage Passing
1/2"	100
3/8"	85 - 100
No. 4	60 - 80
No. 8	40 - 60
No. 16	25 - 40
No. 30	15 - 25
No. 50	6 - 16
No. 100	1 - 5
No. 200	0 - 2

The above grading limits shall be further restricted if necessary to produce concrete that after extrusion has well defined web marks of water on the surface and is free from surface pits larger than three-sixteenths inch (3/16”) in diameter.

2.4 REINFORCING STEEL

Reinforcing steel shall conform to Section 52 of the Standard Specifications.

2.5 WATER

Water for use in concrete mixes shall conform to Section 90-2.03 of the Standard Specifications. Water for sub-grade and cushion shall be from the City's potable water system, recycled water system, or another approved source. To use the City's potable/recycled water, the contractor must obtain a water meter from the City Water and Sewer Utility and arrange payment for water used. Recycled water may be available through the City Water and Sewer Utility.

2.6 ADMIXTURES

No admixtures, accelerators, or retarders shall be allowed without the express approval of the Engineer unless required in the Contract Documents. Submittals for use of admixtures, including a mix design incorporating the admixture, shall be made a minimum of one (1) week in advance of the actual use.

2.7 AGGREGATE BASE

Base material shall be Class 2 Aggregate Base in accordance with Section 02026, Aggregate Base.

2.8 EXPANSION JOINTS

Expansion joints shall consist of prepared strips of three-eighths inch (3/8") thick premolded joint filler conforming to the specifications of ASTM Designation D 1751.

3.0 CERTIFICATE OF COMPLIANCE

Contractor shall furnish to the Engineer a Certificate of Compliance signed by the supplier of the plant mix concrete. Certificate of Compliance shall state that the concrete furnished complies in all respects with the requirements of the Contract Documents. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the Certificate.

4.0 CONSTRUCTION METHODS

4.1 SUBGRADE PREPARATION

The existing material shall be excavated to the required depth per the Contract Documents. The finished sub-grade immediately prior to placing subsequent material thereon shall have a relative compaction of ninety percent (90%) for a depth of six inches (6”) as determined by ASTM Test Method No. 2922. The sub-grade shall be smooth and true to the required grade conforming to Section 02019, Earthwork. Immediately prior to the placement of aggregate base, the compacted sub-grade shall be thoroughly moistened with water to the satisfaction of the Engineer. Ponded water shall not be permitted.

4.2 AGGREGATE BASE CONSTRUCTION

Aggregate Base shall be spread on a prepared sub-grade in conformance with the lines, grades and dimensions required in the Contract Documents. Aggregate Base shall be installed to the depths indicated on the plans or if not specifically shown on the plans, to the depths indicated in the City of Santa Clara Standard Details. Aggregate Base shall be compacted to no less than ninety-five percent (95%) relative compaction. Immediately prior to placement of concrete, the Aggregate Base shall be thoroughly moistened to the satisfaction of the Engineer. Ponded water shall not be permitted.

Where existing concrete sections are to be replaced, the existing Aggregate Base may be reused subject to approval of the Engineer. Additional excavation and additional material may be required to bring the Aggregate Base to the required thickness.

4.3 FIXED FORMS

Forms shall be smooth on the side placed next to the concrete, and shall have a true smooth upper edge and shall be sufficiently rigid to withstand the pressure and tamping of fresh concrete without distortion. Timber forms shall be free from warping or deformation.

All forms shall be thoroughly cleaned and coated with form oil to prevent the concrete from adhering to them.

The depth of forms for back of curbs shall be equal to the depth of the curb. The depth of face forms for concrete curbs shall be equal to the full face height of the curb. Forms shall be set carefully to alignment and grade and shall be held rigidly in place by stakes, spreaders, or clamps, and shall be braced so that no displacement will occur during the working of the concrete. For other than short radius curves, timber forms shall be nominal two inch (2”) stock.

All concrete placements shall be confined and no neat (earth confined) concrete placement shall be allowed. Concrete placement against existing asphaltic concrete paving shall not be allowed unless approved by the Engineer.

4.4 PLACEMENT

All Portland Cement Concrete shall be used while fresh and before it has taken an initial set. Placement shall be in accordance with Section 90 of the Standard Specifications unless otherwise provided in the Contract Documents. Re-tempering any partially hardened concrete with additional water or by vibration, shall not be permitted.

Concrete shall be placed continuously between joints and brought to the required grade and section as the work progresses. Sidewalk and top of curb sections shall slope towards the street at a cross slope of 0.25 inch per foot (2% maximum slope) unless otherwise specified in the Contract Documents or directed by the Engineer. Sections not complying with said cross slope shall be removed and reconstructed as directed by the Engineer. Concrete shall be consolidated by vibrating and/or tamping.

4.5 JOINTS (CURB & GUTTER)

Expansion joints shall be installed at each side of structures, at the ends of curb returns, and at locations specified in the Contract Documents. Weakened plane joints shall be constructed at ten feet (10') maximum intervals. Weakened plane joints shall be cut to a minimum depth of one inch (1") with a tool that leaves corners rounded and insures free movement of drain water across the joint. Weakened plane joints shall have a minimum width of one-eighth inch (1/8") and shall not exceed three-eigths inch (3/8"). Weakened plane joints and score marks shall be installed when the concrete is still plastic. Saw cutting after the concrete sets will not be allowed unless specifically called for in the contract documents.

4.6 JOINTS (SIDEWALK)

Expansion joints shall be constructed at all returns and opposite expansion joints in adjacent curb. Where curb is not adjacent, expansion joints shall be constructed at intervals of sixty feet (60'), and at locations specified in the Contract Documents. Weakened plane joints shall be constructed at ten feet (10') maximum intervals and opposite weakened plane joints in adjacent curb. Joints shall be constructed at right angles to the line of the curb or radially on curves and curb returns and to the same depth and width as for curbs and gutter.

Score lines shall be constructed at five feet (5') intervals at right angles to the line of curb or radially for curves and curb returns. For sidewalk eight feet (8') or over in width, a score line parallel to the line of curb shall be constructed midway between back of curb and back of walk.

Score lines shall be made with a scoring tool that will make a rounded line of uniform maximum width and depth of three-eighths inch (3/8”). A score line parallel to the face of curb shall be constructed parallel to and six inches (6”) from the face of curb.

4.7 CONTACT JOINTS

Contact Joints shall be used where concrete is to be poured adjacent to existing concrete or where cold joints are created due to breaks in the concrete pouring sequence. Reinforcing steel dowels are to be imbedded in holes drilled into the existing concrete using epoxy. See City of Santa Clara Standard Details for additional requirements for Dowel Connections.

4.8 TOLERANCE

The top and face of curbs and gutter and the surface of sidewalks shall not vary more than one-fourth inch (1/4”) from the edge of an eight feet (8’) straight edge when placed against the surface, except at grade changes or curves. The flowline of gutters shall be built and finished to allow continuous flow of water and shall be tested with water prior to initial concrete set so that it does not stand more than one-fourth inch (1/4”) deep at any location prior to final finishing. In no case will standing water be allowed in the flow line of the landing of a curb ramp.

4.9 FINISH

Fresh concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. The surface shall be finished to grade and cross section with a float, troweled smooth with no rock pulls, and finished with a broom. The broom finish and texture of the concrete shall be a light to medium finish as approved by the Engineer. Concrete adjacent to expansion joints shall be finished with an edger tool. Brooming of sidewalk and top of curb shall be transverse to the line of traffic. Brooming of gutters shall be in the direction of flow. Finish of curb ramps shall be as indicated in the Contract Documents.

4.10 CURING

Curing of exposed concrete surfaces shall use curing compound in accordance with Section 90-7.07 of the Standard Specifications and shall be applied in accordance with manufacturer's specifications. Water curing will not be allowed except with the approval of the Engineer.

4.11 SIDEWALK AND CURB LETTERING

A. CONTRACTOR'S NAME

The Contractor shall stamp his name and the date of pour on the curb or sidewalk at intervals of approximately four hundred feet (400'), or as directed by the Engineer. The location is to be approved by the Engineer prior to stamping. The letters shall not be smaller than three-fourth inch (3/4") in height and sunk to a depth of not less than one-fourth inch (1/4").

B. SEWER LATERAL MARK

The Contractor shall stamp a block letter "S" on face of curb at all points along the work where sewer laterals intersect the face of curb. The block letter "S" shall not be smaller than two inches (2") of height and indented to a depth of not less than one-fourth inch (1/4"). The letter "S" shall be spaced carefully and evenly so that the center point of the letter shall be equidistant from top of curb and flow line of gutter.

4.12 DRIVEWAYS

Driveways shall be constructed at locations indicated in the Contract Documents or as directed by the Engineer. If new driveways are to be constructed in the public right-of-way where private driveways exist, the centerlines and width of both shall agree unless directed by the Engineer. Driveway construction shall comply with City Standards and regulations. The Contractor shall notify the Engineer before starting work.

4.13 SLIP FORM/EXTRUDED CURBS

Curb (Type B) and Curb and Gutter (Type A) sections of the Standard Detail (Concrete Median Curbs) may be placed using a slip form or an extrusion machine, except on structures, provided the finished curb is true to the required cross section, line and grade and the concrete is dense and has the required surface texture. Refer to Section 73-1.05B of the State Standard Specifications except as provided herein. The same requirements that are provided in this Subsection 4.0 above for subgrade preparation, joints, tolerance, finish, curing, lettering, etc. shall apply.

In advance of placing Type B curbs on existing pavement, steel dowels shall be inserted into holes drilled in the pavement and secured with epoxy as provided in the Contract Documents. If allowed by the Engineer, the curb may be attached to the pavement using epoxy conforming to 95-2.03 of the State Standard Specifications.

Extruded curbs to be constructed on epoxy shall be placed on the applied adhesive according to the manufacturers recommendation or not more than thirty (30) minutes after the start of mixing the two components, whichever is less, and shall be applied to the full width of the base of the curb and to the thickness recommended by the manufacturer or as directed by the Engineer.

4.14 SLIP FORM/EXTRUDED CURB, GUTTER AND SIDEWALK SECTIONS

Construction of sidewalk or curb and gutter or monolithic curb, gutter and sidewalk sections by either the slip form or extrusion method will only be permitted if provided in the Contract Documents or if allowed by the Engineer. The finished concrete must be true to the required cross section, line and grade and the concrete must be dense and have the required surface texture. The same requirements that are provided above in this Section 4.0 for subgrade preparation, joints, tolerance, finish, curing, lettering, etc., shall apply. Pours using the Slip Form/Extrusion processes shall stop at driveways, curb ramps, catchbasins, utility boxes, etc. and as directed by the Engineer. Concrete at these locations shall be placed using fixed forms. Where pours are not continuous, a contact joint shall be constructed as indicated in this Section 4.0.

5.0 REPAIR OF CRACKS

5.1 REPAIRS PRIOR TO ACCEPTANCE

Cracks developing in concrete work prior to it being accepted shall be repaired as directed by the Engineer, at the Contractor's expense, using the following method:

A. The sidewalk flag(s), curb, and gutter affected by cracking shall be sawed through along existing score marks, weakened plane or expansion joints surrounding the affected area, and as marked for replacement by the Engineer. On sidewalks with a centerline score mark, the sidewalk will be replaced to its full width (from back of walk to back of curb). The entire damaged sections shall be broken out and removed from the work. Prior to replacing the concrete, aggregate base shall be removed from under the edges of the adjacent concrete to provide space for the fresh concrete to "key" under them. Steel dowels, in the number and configuration acceptable to the Engineer, shall be placed using epoxy adhesive. The replacement concrete shall match the existing concrete in grade and texture and shall conform to this Section 5.0.

B. An alternative procedure may be used only if approved by the Engineer. In such cases, the cracks shall be filled with a concrete bonding agent, approved by the Engineer. The bonding agent shall be applied under pressure in order that full penetration of the crack is insured. After setting, the filled cracks shall be stoned smooth so as to present a smooth unbroken surface.

No neat (earth confined) pours shall be allowed. Pours against existing asphalt pavement will be allowed only upon approval of the Engineer.

5.2 REPAIRS DURING GUARANTY PERIOD

The following procedures shall be used for the repair of cracks developing in concrete during the one-year guarantee period as defined in Subsection 9, Warranty, Guaranty, and Inspection of Work, of Document 00700, General Conditions.

The Contractor shall meet with the Engineer at the jobsite to determine the repairs to be made and to determine if it is required to obtain a permit from the City. The Engineer shall be notified to inspect the proposed work at the following stages:

A. Prior to the sawing and removal of the affected sections.

B. Prior to placing aggregate base.

C. After installation of forms for grade and alignment and prior to replacing concrete.

D. Prior to replacement of concrete.

All repairs shall be made as those done prior to acceptance (per 5.1 above).

All work shall be done in accordance with the Contract Documents and at no cost to the City.

6.0 MEASUREMENT AND PAYMENT

All work involved in furnishing and constructing curbs, curb and gutter, sidewalks, driveways, curb ramps, etc. shall be at the units of measurement shown in the Contract Documents. Payment for concrete shall be made at the bid price per unit of measure for the item and includes all costs of furnishing, placing, curing of concrete, and all incidentals thereto. Unless otherwise provided, saw cutting, removal and replacement of existing facilities, dowel installation, reinforcing steel installation, sub-grade preparation, and furnishing and placing of aggregate base are included in the cost paid for the item. Curbs and curb and gutter sections shall be paid for by the lineal foot and sidewalks and driveways shall be paid for by the square foot unless otherwise provided in the Contract Documents. The payment for curb and gutter sections of driveways, curb ramps, and curb inlet catch basins shall be included in the unit price paid for driveways, curb ramps and curb inlet catch basins, respectively. Other miscellaneous concrete will be paid for as indicated in the Contract Documents.

If separate payment is provided for in the Contract Documents for aggregate base, it shall be at the bid price per ton in place and shall include all the costs of furnishing and placing aggregate base, sub-grade preparation, compaction of aggregate base and all incidentals thereto.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing concrete curbs, curb and gutter, sidewalks, walkways, driveways, curb ramps, etc. complete in place, as required by the Contract Documents and as directed by the Engineer.

END OF SECTION

SECTION 02083

REDWOOD HEADERS AND BARRICADES

1.0 GENERAL

1.1 DESCRIPTION

Redwood Headers shall be constructed where indicated in the Contract Documents or as directed by the Engineer. Headers are to be used in the ground adjacent to pavement, in landscape areas or other areas as required.

2.0 MATERIALS

2.1 REDWOOD HEADER

Lumber for headers shall be construction grade redwood, rough cut, from sound timber, and shall be straight and free from loose or unsound knots, shakes in excess of one-third (1/3) the thickness of the lumber, splits longer than the thickness of the lumber or other defects which would render the lumber structurally unfit for the purpose intended. Knots in all lumber shall be sound, tight well spaced and shall not exceed two inches (2”) in size on any face. Unless indicated otherwise on the plans, Headers for straight and long radius sections shall be two by six inch (2”x6”), rough cut nominal lumber size. Where curves are too tight for two inch (2”) nominal size lumber, three (3) layers of one-half inch (1/2”) redwood bender board shall be used.

Header board stakes shall be of the same material as the header and shall be free of loose or unsound knots with no knot exceed one-half inch (1/2”) in size. Unless indicated otherwise, stakes shall be two by two inch (2”x2”), rough-cut nominal lumber size and eighteen inches (18”) in length.

2.2 FASTENERS

All nails and bolts shall be hot-dip galvanized. Nails shall be a minimum of 12-penny, common hot-dip galvanized. Nails shall not be so large as to split either the stake or the header when being driven.

Bolts shall be hot-dipped galvanized lag bolts three-eighths by five inch (3/8”x5”) for barricade lumber and one-fourth by one and one-half inch (1/4”x1-1/2”) for attaching reflectorized signs. A hot-dipped galvanized washer shall be placed under each bolt head.

3.0 CONSTRUCTION

3.1 REDWOOD HEADERS

Boards shall be twelve feet (12') in length and shall be placed so they are flush with the pavement with a tolerance of +/- ¼ inch. In landscape areas the header shall be placed so it is one inch (1") above finished grade or as indicated in the Contract Documents. Where curves have to small a radius for two inch (2") nominal lumber, three (3) layers of one-half inch (1/2") bender board shall be used.

Stakes shall be attached with a minimum of two (2) nails per stake, driven flush with the top edge of the header board and beveled away from the header board at a forty-five degree (45°) angle. Stakes shall be placed at each end of the board and at four feet (4') on center. Where bender board is used, stake spacing shall be a minimum of three feet (3') on center but close enough to maintain a smooth curve.

4.0 MEASUREMENT AND PAYMENT

All work involved in furnishing and constructing Redwood Headers will be measured and paid for by the lineal foot complete in place, unless otherwise specified in the Contract Documents.

Payment made at the bid price per unit of measure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing Redwood Headers, complete in place, as required by the contract documents and as directed by the Engineer.

END OF SECTION

SECTION 02084

TRAFFIC STRIPES, PAVEMENT MARKINGS, AND PAVEMENT MARKERS

1.0 GENERAL

1.1 DESCRIPTION

This work shall consist of applying painted and thermoplastic traffic stripes and pavement markings, and furnishing and placing pavement markers at the locations shown on and in conformance with the Contract Documents or as designated by the Engineer.

2.0 PLANS AND SPECIFICATIONS

2.1 Unless otherwise specified, the work embraced herein shall conform to:

A. The Contract Documents.

B. The appropriate details of the Standard Details.

C. The appropriate specifications of the Standard Specifications insofar as the same may apply.

D. The appropriate plans of the Standard Plans.

2.2 In the event of apparent conflicts between the Standard Specifications, the Standard Plans, the Standard Details, or the Contract Documents, those requirements, as determined by the Engineer, which gives the greatest protection to the City or result in the best installation shall govern.

3.0 TRAFFIC STRIPING, PAVEMENT MARKING, AND PAVEMENT MARKERS

3.1 GENERAL

Traffic stripes and pavement markings shall conform to the applicable provisions of Section 84, Traffic Stripes and Pavement Markings, of the Standard Specifications, Standard Plans, the latest California Manual on Uniform Traffic Control Devices (California MUTCD), and the Contract Documents. Pavement markers shall conform to the provisions of Section 85, Pavement Markers, of the Standard Specifications, Standard Plans, the latest California MUTCD, and the Contract Documents.

All traffic stripes and pavement markings on existing surfacing shall be removed by grinding prior to placement of asphaltic concrete overlay, slurry seal, chip seal, or cape seal.

Attention is directed to the Subsection 1.16, Traffic Control, of Section 01500, Temporary Facilities and Controls, regarding the use of moving lane closures during placement of pavement markers with bituminous adhesive.

Locations indicated to receive thermoplastic or painted traffic stripes and pavement markings shall be pre-marked by the Contractor per the striping plans. Prior to placement of striping materials, the City Traffic Foreman will confirm pre-marking. The Contractor shall coordinate all efforts to insure that the striping installation conforms to the Contract Documents. Chip seal markers, if required for temporary delineation, shall be provided by the Contractor.

The Contractor is required to coordinate the painted or thermoplastic striping and pavement marker installation schedule through the City Inspector with the City Traffic Foreman. The City Inspector and the Contractor shall arrange for a member of the City Traffic Field Crew to be present at all times during the painting or thermoplastic application and installation of pavement markers.

Where new striping joins existing striping, as shown on the Plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Drips, overspray, improper markings, and paint and thermoplastic material tracked by traffic shall be immediately removed from the pavement surface by methods approved by the Engineer. All this removal work shall be at the Contractor's expense.

Newly placed traffic stripes and pavement markings shall be protected from damage by public traffic or any other causes until the thermoplastic material is thoroughly set or the paint is thoroughly dry.

Potential delays due to paving operation problems are the Contractor's responsibility. Any costs related to coordination problems are considered incidental and shall not be a justification for extra work reimbursements.

A. THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

1. Materials

Spreadable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in Standard Specification PTH-02ALKYD. Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in Standard Specification PTH-02SPRAY.

Glass beads shall conform to the State Specification No. 8010-004 (Type II).

2. Application

Thermoplastic pavement markings and traffic stripes for traffic lanes shall be applied at a minimum thickness of 2.0 mm and minimum application rate of 0.4 kg/m, based on a solid stripe of 100 mm width. Thermoplastic traffic stripes and pavement markings for bicycle facilities and shoulder stripes shall be spray-applied and shall be applied at a minimum thickness of 1.0 mm and a minimum rate of 0.2 kg/m, based on a solid stripe of 100 mm width.

Thermoplastic material shall be applied to the pavement at a temperature between 177°C and 205°C, unless a different temperature is recommended by the manufacturer.

Thermoplastic traffic stripes and pavement markings shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

B. PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS

1. Material

Paint shall be waterborne-based only. Acetone-based paint is not allowed. Thinning of paint will not be allowed.

Glass beads shall conform to the State Specification No. 8010-004 (Type II).

The Contractor shall furnish the Engineer certificates of compliance for the paint in conformance with the provisions in Section 6-1.07, Certificates of Compliance, of the Standard Specifications.

2. Application

Painted traffic stripes and pavement markings shall only be used in creek trails or parking lots, and as designated by the Engineer.

C. PREFORMED THERMOPLASTIC PAVEMENT MARKINGS

Preformed pavement markings must be a resilient white or yellow thermoplastic product with uniformly distributed glass beads throughout the entire cross sectional area. The markings must be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids, antifreeze, etc. Lines, legends and symbols are capable of being affixed to bituminous and/or Portland cement concrete pavements by the use of the normal heat of a propane torch.

The markings must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with the torch.

The markings shall not have minimum ambient and road temperature requirements for application, storage, or handling.

1. Material

The markings must be composed of an ester modified rosin resistant to degradation by motor fluids, lubricants etc. in conjunction with aggregates, pigments, binders and glass beads which have been factory produced as a finished product, and meets the requirements of the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. The thermoplastic material should conform to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state.

1.1 Graded Glass Beads

The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall be conforming to AASHTO designation M247, with minimum 80% true spheres and minimum refractive index of 1.50.

The material must have factory applied coated surface beads in addition to the intermixed beads a rate of 1 lb. (± 10%) per 10 sq. ft. These factory applied coated surface beads shall have a minimum of 90% true spheres, minimum refractive index of 1.50, and meet the following gradation.

Size Gradation			
US Mesh	µm	Retained, %	Passing, %
12	1700	0-2%	98-100%
14	1400	0-3.5%	96.5-100%
16	1180	2-25%	75-98%
18	1000	28-63%	37-72%
20	850	63-72%	28-37%
30	600	67-77%	23-33%
50	300	89-95%	5-11%
80	200	97-100%	0-3%

1.2 Pigments

1.2.1 White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.

1.2.2 Red, Blue, and Yellow: The material shall be manufactured with sufficient pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected. The yellow pigments must be organic and must be heavy-metal free.

1.2.3 Other Colors: The pigments must be heavy-metal free.

1.3 Heating indicators: The top surface of the material (same side as the factory applied surface beads) shall have regularly spaced indents. These indents shall act as a visual cue during application that the material has reached a molten state so satisfactory adhesion and proper bean embedment has been achieved and a post-application visual cue that the installation procedures have been followed.

1.4 Skid Resistance: The surface, with properly applied and embedded surface beads, must provide a minimum resistance value of 45 BPN when tested according to ASTM E 303.

1.5 Thickness: The material must be supplied at a minimum thickness of 90 mils (2.29 mm).

1.6 Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

1.7 Retroreflectivity: The material, when applied in accordance with manufacturer's guidelines, must demonstrate a uniform level of sufficient nighttime retroreflection when tested in accordance to ASTM E 1710. The applied material must have an initial minimum intensity reading of 500 mcd/(m^2·lx) for white and 300 mcd/(m^2·lx) for yellow.

2. Application

2.1 Asphalt: The materials shall be applied using the propane torch method recommended by the manufacturer or a City- approved infrared heater. The material must be able to be applied without minimum requirements for ambient and road temperatures and without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry and free of debris. Supplier must enclose application instructions in English and Spanish with each box/package.

2.2 Portland Cement Concrete: The same application procedure shall be used as described under Section 2.1. However, a compatible primer sealer shall be applied before application to assure proper adhesion.

3. Preformed pavement markings in bicycle lanes and paths

The thermoplastic material in preformed pavement markings for use in bicycle lanes and paths should conform to AASHTO designation M249-79 (98), with the exception of the relevant differences due to the material being supplied in a preformed state.

3.1 Graded Glass Beads

The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall be clear and transparent. Not more than twenty percent (20%) consists of irregular fused spheroids, or silica. The index of refraction shall not be less than 1.50.

The material must have factory applied coated surface beads and abrasives in addition to the intermixed beads at a rate of ½ lb. (± 20%) per 11 sq. ft. The surface beads and abrasives must be applied so that every other shaped portion contains glass beads, or abrasives with minimum hardness of 7 (Mohs scale). These factory applied coated surface beads shall have the following specification:

1) Minimum 80% rounds
2) Minimum refractive index of 1.5
3) Minimum SiO2 Content of 70%
4) Maximum iron content of 0.1%

Size Gradation			
US Mesh	µm	Retained, %	Passing, %
12	1700	0-2%	98-100%
14	1400	0-6%	94-100%
16	1180	1-21%	79-99%
18	1000	28-62%	38-72%
20	850	62-71%	29-38%
30	600	67-77%	23-33%
50	300	86-95%	5-14%
80	200	97-100%	0-3%

3.2 Skid Resistance: The surface of the preformed retroreflective marking materials, wherein every other shaped portion contains glass beads, or abrasives with a minimum hardness of 7 (Mohs scale), shall upon application provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.

3.3 Thickness: The material must be supplied at a minimum thickness of 90 mils (2.29 mm).

3.4 Retroreflectivity: The preformed retroreflective marking materials upon application shall exhibit adequate and uniform nighttime retroreflectivity. The marking materials shall have the following retroreflectivity:

White preformed reflective marking materials – minimum of 275 mcd/(m^2·lx).

3.4 Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt, and adverse weather conditions, and be impervious to oil and gasoline.

3.5 Abrasives: The material must have factory applied surface abrasives, wherein every other shaped portion contains glass beads, or abrasives with a minimum hardness of 7 (Mohs scale).

D. PAVEMENT MARKERS

1. Material

Raised pavement markers shall be retroreflective and shall be 3M type 290 series or approved equal and marked as abrasion resistant on the body of the markers.

The Contractor shall furnish the Engineer certificates of compliance for the pavement markers in conformance with the provisions in Section 6-1.07, Certificates of Compliance, of the Standard Specifications.

4.0 MEASUREMENT AND PAYMENT

Thermoplastic or painted traffic stripes will be measured by the linear foot along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 100-mm wide yellow stripes, will be measured as one traffic stripe. Pavement markings will be measured by the square foot for each marking. The quantity of pavement markers will be measured as units determined from actual counts in place.

The contract prices paid per linear foot for traffic stripes and by square foot for pavement markings shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying thermoplastic and painting traffic stripes and pavement markings (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) complete in place, including establishing alignment for stripes and layout work, as shown and specified in the Contract Documents, as specified in the Standard Specifications, and as directed by the Engineer.

The contract unit prices paid for raised pavement marker shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and placing pavement markers, complete in place, including adhesives, and establishing alignment for pavement markers, as shown and specified in the Contract Documents, as specified in the Standard Specifications, and as directed by the Engineer.

END OF SECTION

SECTION 02086

SIGNALS, LIGHTING, AND ELECTRICAL SYSTEMS

1.0 GENERAL

1.1. GENERAL DESCRIPTION OF WORK

This work shall consist of traffic signal installation as provided in the Contract Documents. The performance of a complete job in all respects as indicated by the Plans and the Specifications and as directed by the Engineer is required.

2.0. PLANS AND SPECIFICATIONS

2.1 Unless otherwise specified, the work embraced herein shall conform to:

A. The Contract Documents.

B. The appropriate details of the Standard Details.

C. The appropriate specifications of the Standard Specifications insofar as the same may apply.

D. The appropriate plans of the Standard Plans.

2.2 In the event of apparent conflicts between the Standard Specifications, the Standard Plans, the Standard Details, or the Contract Documents, those requirements, as determined by the Engineer, which gives the greatest protection to the City or result in the best installation shall govern.

3.0 ACCESS TO ACTIVE CONTROLLER CABINET

No access to an active traffic signal controller cabinet or associated equipment is allowed unless a Silicon Valley Power (SVP) technician or Traffic Division Engineer is present, at the intersection, to monitor the operation of the traffic signal.

4.0 MATERIALS

4.1 LOOP DETECTOR PROTECTION AND INSTALLATION

The Contractor shall take precautions to ensure that trenching operations to install conduit do not cut existing loop detector conductors embedded in pavement. Either of the following methods may be used by the Contractor to avoid loop conductors:

1. New conduit may be routed to pull boxes where loop conductors terminate. The existing loop termination pull boxes shall be replaced by No. 6 pull boxes.

2. New conduit may be routed under loop conductors if possible without disturbing the loop conductors.

If existing loop conductors are cut or damaged by the Contractor's operations, they shall be replaced to their original condition and original configuration at the Contractor's expense. Contact the SVP traffic personnel at least forty-eight (48) hours before trenching for exact location of existing loop conductors.

If existing loop conductors will be replaced by new loop conductors, contact SVP traffic personnel and Traffic Operations at least 48 hours prior to any trenching or sawcutting to allow for the deactivation of the existing loops and signal timing adjustments. All contact with the SVP traffic personnel and Traffic Operations and shall be made through the City's Public Works Inspector.

New loop installation shall be in accordance with Section 86 of the Standard Specifications. Type 1 loop wire shall be used along with Type B lead-in cable (86-5.01A (4)). Installation shall conform to Section 86-5.01A (5) of the Standard Specifications. Sealant shall be Hot-Melt Rubberized Asphalt.

No loops shall be installed until pre-marking has been verified by City Traffic Operations.

Detector loops shall be laid out by the Contractor. Location of detector loops will be verified and approved by City Traffic Operations prior to start of loop saw-cutting. A minimum of 2 Working Days notice is normally required for loop verification. Verification of loop location(s) must be scheduled through the City's Public Works Inspector.

Loops located in the vehicle lanes are to be cut in a modified 6x6 Quad configuration on the traffic lane center marks approved by City personnel unless otherwise noted. Loop wiring is to be wrapped in a 3-6-3 configuration. Each individual loop will have its wiring brought into the proper pull box for connection to Type B detector lead-in cable (DLC).

Loop wiring in street shall enter a detector hand hole box to be installed at lip of gutter at transition from street to conduit. When requested or needed temporarily, soft patch asphalt material is to be applied at lip of gutter street excavation where loop wiring enters conduit. Soft patch is to be tamped so no settling of material will occur and finished at street level.

The Contractor shall test each detector loop as they are installed. Acceptable testing results for each individual loop pair shall be 124 micro-henries inductance and infinite meg-ohms to ground. Values of the test results for loop inductance shall vary no more than ±5 percent (± 6 micro-henries). No loop wiring is to be connected to a DLC until tested and approved by SVP traffic personnel. Any detector loop that fails to meet acceptable testing results shall be replaced immediately at no additional cost to the City.

The Contractor shall provide the City with the detector loop test results in the form of a detector loop test report. The report shall include the readings for the loop detectors installed in the field. The following information shall be provided for every detector loop the Contractor installs.

1. Phase number the detector loop will service.

2. Lane Number the detector loop is in.

3. Type of detector loop (presence or advanced)

4. Location (in lane from stop bar).

5. Meg-ohms reading.

6. “L”: Inductance Reading

7. “R”: Resistance Reading

8. “Q”: Quality factor reading/calculation

9. Initials of Person performing Test.

10. Date test was made.

To aid in the clarification, of the location of the detector loop, being tested, the following guidelines shall be used: The lane closest to the center of the roadway is the #1 Lane. The loop closest to stop bar will be labeled “A” the second loop in the lane will be labeled “B” the third loop in the lane will be labeled “C” and the fourth loop in the lane will be labeled “D”. Loops shall be grouped on the test report first by phase number (1-8) then by lane (1-6) and then by location in the lane (A-D), or as directed by the Engineer.

A blank “Detector Loop Test Results” form is located at the end of this Section 02086.

The City may verify the test results submitted. If more than two loops fail to match the passing test results, submitted by the Contractor, the Contractor is required to retest all loop detectors. Any detector loop that fails to meet acceptable testing results shall be replaced immediately at no additional cost to the City. The City may charge up to $500 per unacceptable loop per occurrence for damages and retesting.

No loop wiring is to be connected to a DLC until tested and approved by SVP traffic personnel.

Any traffic loop wire connection(s) shall be “C” tapped, soldered, and covered with waterproof heat shrink. See Section 4.4, “CONDUCTORS AND WIRING”. Butt splices may be allowed with previous approval from the Traffic Engineer.

All DLC forked connectors to be laid down in signal cabinet shall be soldered. DLC shield conductors inside cabinet are **not** to be bonded to ground but wrapped around and secured to its respective owner. They are not to be shorter than six inches (6”).

For projects that include new asphalt concrete overlay at the intersection, all new detector loops shall be in place before final asphalt concrete paving surface is applied. Contractor shall not be allowed to cut into the final paving surface to install new detector loops. Contractor may be charged up to $1,000 per loop for cutting into the final paving surface.

4.2 PULL BOXES

Pull boxes shall conform to all applicable specifications in Section 86-2.06, Pull Boxes, of the Standard Specifications and this Section 02086.

Pull boxes shall be No. 6 unless otherwise directed by Engineer or noted in the Contract Documents. Pull boxes larger than No. 6 shall be equipped with lightweight polymer concrete covers. Covers shall not weigh more than 120 pounds. Covers may be constructed in two pieces to maintain a maximum weight per section of 120 pounds. Pull boxes shall be installed at the locations shown on the plans or as directed by the Engineer. Existing pull boxes, which are damaged, shall be replaced. Pull boxes shall be installed no closer than six inches (6”) to the nearest score mark on existing sidewalk. The bottoms of pull boxes shall be bedded in a minimum of six inches (6”) of crushed rock. A minimum of one inch (1”) of grout shall be placed on top of the crushed rock within the pull box and trowelled smooth prior to the installation of cable/wire. A layer of roofing paper shall be placed between the grout and the crushed rock sump. A one inch (1”) diameter drain hole shall be provided in the center of the pull box through the grout and the roofing paper. The grout shall be sloped to drain toward the drain hole in the center of the box.

Unless otherwise noted on the plans or directed by the Engineer all pull box covers on this job shall be marked “CSC Traffic Signal” or “CSC Interconnect”. Pull box covers are to be non-securing without holes for locking hardware. Pull box extensions will be installed as determined necessary in the field or as directed by the Engineer.

Conduits shall enter through the side of pull boxes from the direction of the run unless otherwise specified on plans. Conduit shall be sloped slightly toward the top of box to facilitate pulling of cable. Each conduit terminating in a pull box shall be grouted to the pull box prior to cable installation.

4.3 BONDING AND GROUNDING

Bonding and grounding shall conform to the specifications in Section 86-2.10, Bonding and Grounding, of the Standard Specifications and this Section 02086. Metal conduit shall be made electrically secure to form a continuous system, and shall be effectively grounded using ground rod and ground clamp at pull boxes at intervals of not more than 500 feet. Bonding and grounding jumpers shall be copper wire or copper braid. PVC/HDPE conduits shall have continuous bare #8 solid copper wire installed in conduit and grounded to ground rod. Grounding jumper shall be attached by a 3/16-inch or larger brass bolt in the standard or pedestal and shall be run to the conduit or a ground rod in adjacent pull box. Grounding rod for the controller cabinet shall be placed in the pull box next to the controller cabinet.

4.4 CONDUCTORS AND WIRING

Contractor shall not damage existing conductors or conductor insulation. With the exception of detector lead-in cable, if an existing conductor or any conductor insulation is damaged, Contractor shall install a new conductor from the existing controller cabinet to the new pull box and connect to the existing traffic control system. If a loop detector lead-in cable is damaged, Contractor shall install and connect a new detector lead-in cable from the existing controller cabinet to the terminus of the existing field loop wires.

Unless previously approved methods are approved by City Traffic Engineer all connections in pull boxes are to be “C” tapped, soldered, and covered with waterproof heat shrink. All heat shrink shall be Thomas & Betts Shrink-kon HS Series or City-approved equal.

All wiring shall be labeled as to their function in each and every pull box with Partex PK cable markers or City-approved equal.

Signal cabinet ground rod is to be installed inside first main pull box closest to cabinet, not in cabinet foundation.

Safety lighting on signal poles shall not have wiring fused in pull box nor require any additional electrical protection other than power panel circuit breaker.

No more than two (2) field wires are to be laid down on an empty terminal. All field wiring shall have soldered lugs.

A. Wiring

When new conductors are to be added to existing conductors in a conduit, all conductors shall be removed; the conduit shall be cleaned as provided in Section 86-2.05C of the Standard Specifications, and both old and new conductors shall be pulled into the conduit as a unit.

Cable shall be spliced and insulated to provide a watertight joint and to prevent absorption of moisture by the cable. A cast insulation of self-curing epoxy resin, which is compatible with wire insulation, shall be poured to form a moisture-resistant joint into molds of dimensions suitable for the splice. The resin shall be resistant to weather, aromatic and straight chain solvents and shall not sustain combustion.

All traffic signal field wiring shall be solid copper THW with 600 volt PVC 45 mil insulation thickness minimum. All traffic signal field wiring shall be meggared at 500 V by Contractor and results given to traffic engineering.

B. Disturbed Wiring

All disturbed wiring with existing splices shall be soldered and re-spliced. Splices shall be soldered with a soldering iron (no propane torches shall be used) and a resin-core solder acceptable to the Engineer.

4.5 INTERCONNECT CABLE

A minimum of three feet (3') of slack shall be provided for 25-pair interconnect cable in controller cabinets.

All new interconnect cable shall be fixed with identification bands in pull boxes and near termination points. Identification bands shall indicate that the cable is "INTERCONNECT" and the direction in which the cable is traveling (North-South or East-West).

Splices of interconnect cable shall be enclosed within PVC chambers. Splices to the interconnect cable shall be performed by the City, but Contractor is responsible for providing watertight seal on cable ends prior to cable splicing.

4.5.1 WIRING AND SPLICING

Wiring shall conform to the appropriate specifications in Section 86-2.09, Wiring, of the Standard Specifications and this Section 02086.

A minimum of eight feet of slack shall be provided for each 25-pair or 12-pair cable in pull boxes where splices occur. Where cable is looped through pullboxes (not spliced), the loop shall consist of a minimum of eight feet of cable.

4.5.2 CABLE TESTING

Cable testing shall be performed by the Contractor before final acceptance of the Project is given by the City. Individual pairs shall be tested for continuity within the system. All cable installed shall be tested in the presence of the Engineer. Any individual pair which is found to be electrically discontinuous within the system must be repaired before final acceptance is given by the City.

Cable testing shall conform to the following:

1. Each pair shall be tested for loop resistance and result recorded
2. Branching cable to be tested from one end to each outer branch and result recorded for each individual pair
3. A 500V megger shall be used to obtain megger reading of each pair to ground and result recorded
4. All recorded results shall be submitted to the Engineer before final acceptance is given.

4.6 VIDEO VEHICLE DETECTION SYSTEM

4.6.1. DESCRIPTION. This work shall consist of furnishing and installing video vehicle detection system(s) at the locations indicated in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and the Standard Specifications.

4.6.2. SYSTEM REQUIREMENTS. The video vehicle detection system shall include the camera with zoom lens and the integrated machine vision processor in one compact unit, with internal heater and integrated adjustable sunshield, all mounting hardware (video detector camera mounting bracket or video detector camera pole mount extension bracket), the communications interface panel, the detector port master, video detector cable, all associated equipment or miscellaneous fittings (cabinet wiring), and all labor, materials, and equipment required to complete the installation and make the video detection system fully operational. All of the video detection system components shall be current production equipment produced by the same manufacturer (for system operation compatibility purposes) unless otherwise noted herein or approved in advance by the Engineer.

The video vehicle detection system shall be an Econolite Autoscope Encore or previously approved equal.

4.6.3. SUBMITTALS.

(a) Fabrication Drawings. The Contractor shall submit Fabrication Drawings.

(b) Documentation Requirements. Three (3) advance copies of equipment manuals furnished by the manufacturer shall be submitted to the Engineer. The Engineer will verify the manufacturer's equipment manual as part of the test and integration process. The equipment manual incorporating the Engineer's corrections and comments shall be integrated by the Contractor into the operations and maintenance manual. The manual shall, as a minimum, include the following:

(1) Complete and accurate schematic diagrams.

(2) Complete installation and operation procedures.

(3) Complete performance specifications (functions, electrical, mechanical, and environmental) of the unit.

(4) Complete accurate troubleshooting, diagnostic, and maintenance procedures.

4.6.4. CONSTRUCTION REQUIREMENTS. All work associated with Video Vehicle Detection System shall be completed prior to activation of the video detection system.

The Contractor shall make the necessary changes to the signal equipment to integrate the video vehicle detection system into the signal control operation. The Contractor shall be responsible for furnishing all training, labor, materials, cables, connectors, tools, equipment, shipping, and incidental items necessary to complete the installation and make the video vehicle detection system fully operational.

Installation of the video vehicle detection system shall include the installation of any and all associated equipment, including, but not limited to, the following:

(a) Video Detector Camera Assembly with Integrated Machine Vision Processor (MVP). The Contractor shall furnish one (1) Integrated Machine Vision Processor module per approach and all associated enclosures and incidental work necessary to complete the installation and make the video vehicle detection system fully operational. This will also require providing the Integrated Machine Vision Processor Comm Server configuration software, all miscellaneous hardware, connectors, and documentation.

(b) Video Detector Communications Interface Panel (CIP). The Contractor shall furnish one (1) Video Detector Communications Interface Panel per cabinet and incidental work necessary to complete the installation and make the video vehicle detection system fully operational.

(c) Video Detector Port Master. The Contractor shall furnish one (1) Video Detector Port Master per cabinet and incidental work necessary to complete the installation and make the video vehicle detection system fully operational.

(d) Video Detector Cable. The Contractor shall furnish the specified cable type, all connectors, sealing tape, and incidental work necessary to compete the installation of the Video Detector Cable between the Video Detector Camera Assembly with Integrated Machine Vision Processor and the Video Detector Communications Interface Panel in the traffic control cabinet, and make the video vehicle detection system fully operational.

(e) Video Detector Camera Mounting Bracket. The Contractor shall furnish one (1) Video Detector Camera Mounting Bracket per Video Detector Camera and all associated equipment, labor, materials, tools, and incidental work necessary to attach the camera mounting bracket to a mast arm or camera extension bracket, complete the installation, and make the video vehicle detection system fully operational.

Video Detection System Hardware

	Qty	Hardware
Per Approach as specified	1	MVP camera
	1	Mounting brackets (model AMBKTM11S) std 10”
	FT	3 conductor, 18AWG Polyethylene Jacketed-CSA rated conduit rated power cable. Length to be determined homerun from controller cabinet to each camera with 10’ slack in each pullbox.
Per Intersection	1	Terra Interface Panel
	1	Cat5e network patch cable RJ45 Male to RJ45 Male Cat5 Length 3’
	1	Terra Access Panel
	1	ASTCBL10 – Terra Interface Panel cable
	1	SDLC cable (model ACBLP0E05 P/N 33550G5) for TS2 connection to the controller
	1	NTSC Monitor with BNC interfaces for signal cabinet
		Five (5) years System warranty from of date of acceptance

When Video Detection System is to be used in a NEMA TS1 cabinet, the following additional equipment shall be supplied.

	Qty	Hardware
Per Intersection	1	Model 33457G57 for logic inputs (33x)
	1	ASTCBL12 – Terra Interface Panel cable and I/O for 24 outputs in place of ASTCBL10 – Terra Interface Panel cable

Installation

Camera shall be placed to minimize occlusions of left turn lanes. Occlusions can be minimized by installing the camera on the signal mast arm, in line with the lane striping between the left turn lane and the through lanes. Cameras installed on signal mast arm shall use a manufacturer supplied (City pre-approved) 28" extended camera mount. At intersections where the left and through movements go together as standard operation and left turn movements are not protected, the camera can be mounted on a luminaire arm with standard camera mounting bracket.

Camera shall be aimed so that the area of detection is in the top half of the video image. Typically the farthest away detector shall be at the top of the image, and at least four (4) cars shall be visible behind the stop line, in the top half of the video image. No horizon shall be allowed in the video image.

Video detection system installed in traffic signal cabinets with network switches installed or scheduled to be installed shall use NEMA TS2 connections to controller. Contractor shall connect SDLC (model ACBLP0E05 P/N 33550G5 or approved equal) to connect TIP and the traffic signal controller. Contractor shall work with the Econolite Representative and the City of Santa Clara staff to insure that all channels are programmed and detection calls are being inputted into the controller.

Video detection system installed in traffic signal cabinets without network switches installed shall use NEMA TS1 and logic level connections to controller. Contractor shall wire in MVP Wiring Harness (model 33457G57 or approved equal) into traffic signal controller cabinet. Contractor shall work with the video detection camera system manufacturer's representative and the City of Santa Clara staff to insure that all channels are programmed and detection calls are being inputted into the controller.

The Contractor shall install the Camera/Integrated machine Vision Processor System (MVP) to achieve the desired field of detection as shown on the Plans or as directed by the Engineer. All equipment shall be installed and wired in a neat and orderly manner in conformance with the manufacturer's instructions. The camera shall be affixed to the support structure in accordance with the manufacturer's instructions to provide the optimal field of detection.

Video detection camera locations shown on the Plans are for illustration purposes only.

The Contractor shall perform a site survey with a representative of the manufacturer of the video vehicle detection system at all project locations. The purpose of the survey shall be to optimize the performance of the video vehicle detection equipment when it is installed at the various overhead and side-fired mounting locations and ensure that it will meet the accuracy requirements specified herein. The results of this survey shall be submitted to the Engineer in a report which lists all locations with any recommended location shifts, sensor mounting adjustments, camera angle lens adjustments, and desired detection zone locations. The cost of the site survey, including the use of a bucket truck or other method to obtain an elevated vantage point, shall be included in the cost for each intersection's respective video vehicle detection system pay item.

Cable to be installed in conduit shall be pulled with a minimum of dragging on the ground or pavement. This shall be accomplished by means of reels mounted on jacks or approved devices conveniently located for unreeling cable directly into the conduit. Powdered soapstone, talc, or other approved lubricants shall be used when inserting cable into the conduit. Cable shall be pulled through conduit by means of a cable or cables. Wiring within junction boxes and cabinets shall be neatly arranged.

When conductors and cables are pulled into conduits, all ends of conductors and cables shall be taped to exclude moisture, and shall be so kept until they are attached to the Camera/Integrated Machine Vision Processor (MVP) and the Video Detector Communications Interface Panel (CIP) in the traffic controller cabinet.

Conductors entering the traffic controller cabinet shall be neatly dressed and laced along the base and back of the traffic cabinet to the Video Detector Communications Interface Panel. Spare conductors (if any) shall be tied together with their ends taped. At least five feet (5') of slack shall be left for each conductor in the traffic controller cabinet at the Video Detector Communications Interface Panel.

Routing of the Video Detector Cable shall provide a drip loop for protection of the camera and connector.

4.7 SIGNAL FACES AND SIGNAL HEADS

Signal faces, signal heads, and auxiliary equipment as shown on the plans, and the installation thereof, shall be manufactured by Econolite Product Inc., Eagle Traffic Control Systems, or approved equal, and shall conform to the specifications in Sections 86-4.01 Vehicle Signal Faces, 86-4.01C Visors, 86-4.01D Light Emitting Diode Signal Module, 86-4.01E Backplates, 86-4.02 Programmed Visibility Vehicle Signal Faces, 86-4.03 Pedestrian Signal Faces, 86-4.03I Light Emitting Diode Pedestrian Signal Modules, and 86-4.04 Signal Mounting Assemblies of the Standard Specifications and this Section 02086. Vehicle signal heads shall be twelve inch (12") diameter and shall be IntelliLED Hi-Flux tinted lens, incandescent appearance, type LED's manufactured by Dialight Corporation or a City-approved equal meeting ITE specs. Vehicle signal housings shall be either die-cast or permanent mold-cast aluminum conforming to ANSI Standard D-10.1. Signal door fasteners shall be wing nuts with screw threads. Visors shall be of the full circle variety. Finish of signal heads and back plates shall be flat black.

Rubber gaskets are to be installed inside of head at top with metal flat washer between gasket and chase nipple.

Mast arm wiring for each signal head is to be brought into nearest at grade pull box for splicing/connection. No parallel electrical connections between heads.

Signal heads are to be installed vertically level in all directions except with special permission from the Traffic Engineer.

4.8 SIGNAL STANDARDS AND POSTS

Signal standards as shown on the plans, and the installation thereof, shall conform to the specifications in Section 86-2.04, Standards, Poles, Steel Pedestals and Posts, of the Standard Specifications and this Section 02086. Foundations for signal standards and posts shall conform to Section 86-2.03, Foundation, of the Standard Specifications, the Standard Plans, and this Section 02086. Excavation and backfilling for foundation shall conform to Section 86-2.01, Excavation and Backfilling, of the Standard Specifications. Final location shall be approved by the Engineer.

4.9 PEDESTRIAN SIGNALS AND PUSHBUTTONS

4.9.1 PEDESTRIAN PUSHBUTTONS

Pedestrian pushbuttons shall be Type B color black with large button model ADA compliant "Bulldog" type manufactured by Polara Engineering Inc., or a City-approved equal.

4.9.2 AUDIBLE PEDESTRIAN SIGNALS

Audible pedestrian signals shall be Novax DS-100 Series or approved equal. The audible pedestrian signals shall be installed per manufacturer specifications at locations noted on plan. The audible pedestrian signals shall be installed to emit "cuckoo" or "peep peep" as noted on plans.

4.9.3 PEDESTRIAN SIGNAL

Pedestrian signal shall be uniform appearance countdown signal manufactured by Dialight Corporation model 430-6479-001X or approved equal.

4.10 CONDUIT

Conduit shall conform to all applicable specifications in Section 86-2.05, Conduit, of the Standard Specifications and this Section 02086. All new conduits on this project shall be galvanized schedule 40 steel or schedule 80 HDPE unless otherwise specified in the Plans. All conduits inside pull boxes shall be bonded together with approved NEC methods. Insulating bonding bushings will be required on metal conduit. Each conduit terminating in a pull box shall be grouted to the pull box prior to conductor installation. After conductors have been installed, the ends of conduits terminating in controller cabinets shall be sealed with an approved type of sealing compound. All conduits shall have mule tape made of durable, non-rotting fiber, installed and tied securely in each pull box.

Conduit runs in roadway sections, where drilling or jacking is not specified, shall be in a trench approximately two inches (2”) wider than the outside diameter of the conduit(s). Trench width shall not exceed eight inches (8”) and a minimum depth of cover of eighteen inches (18"). The outline of all areas of pavement to be removed shall be cut with an abrasive-type saw or with a rock-cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter outside the removal area.

The conduit shall be placed two inches (2”) above the bottom of the trench on blocks made of material suitable for the purpose. The trench shall be backfilled on the same Working Day with either controlled density fill or commercial quality Portland Cement Concrete containing no less than 564 pounds of Portland cement per cubic yard of concrete. Backfilling shall be to the finished grade. Calcium chloride admixture shall not be used in concrete that will be in contact with metal conduit. The top two inches (2”) of trench shall be removed and backfilled with commercially produced asphaltic concrete within a period of 5 Working Days. Trench in Roadway should be per the Standard Details.

Conduit runs in other areas shall be provided with a minimum of eighteen inches (18”) coverage from finished grade. A minimum two inches (2”) of sand shall encase each conduit run.

Existing conduits to be re-used shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air. Conduit to be abandoned shall have all wiring removed then it shall be capped at each end.

Conduits between signal cabinet, AC power enclosure, and their respective first pull box shall be sealed on both ends with approved duct seal.

5.0 SALVAGE MATERIAL

All salvaged material shall be placed on pallets or as otherwise directed by the Engineer and returned to the City Corporation Yard, 1705 Martin Avenue, Santa Clara, CA 95050. Material shall be handled with care and be returned to the City in good condition.

6.0 SERVICE

Service shall conform to the specifications in Section 86-2.11, Service, of the State Specifications and the City Electrical Code. All applicable permits shall be obtained prior to construction.

The Contractor shall contact the City Building Department (1-408-615-2400) for a minimum of two electrical inspections: 1) The first inspection shall be scheduled so that the City Building Inspector may observe the installation of conduits. 2) Second inspection shall be scheduled after installation of cabinet and breaker enclosure, conduits, conductors, and splices. All electrical inspections shall be scheduled at least two working days prior to time of requested inspection.

7.0 COMMUNICATIONS BOXES

Communications Pull Box, cover and extension shall be made of reinforced monolithic polymer concrete material. The minimum dimensions for communications pull box shall be thirty inches by forty-eight inches by twenty-four inches (30” x 48” x 24”). Reinforced polymer concrete Pull Box shall have two (2) piece detachable covers that have skid-resistant surfaces. The cover shall have lift slots to aid in the removal of the lid.

Contractor shall install communications pull boxes unless otherwise directed by the Engineer. Pull boxes shall be installed at the locations shown on the plans; the locations may be changed to suit field conditions with permission from the Engineer. The bottoms of pull boxes shall be bedded in crushed rock and shall be grouted according to Section 86-2.06C, Installation and Use, of the Standard Specifications. Pull box extensions may be installed as determined necessary in the field with permission from the Engineer.

Conduits shall enter through the side of pull boxes from the direction of the run unless otherwise specified on plans. Conduit shall be sloped slightly toward the top of box to facilitate the pulling of cable. Each conduit terminating in a pull box shall be grouted to the pull box prior to cable installation.

8.0 TS2 – TYPE 1 CONTROLLER CABINET EQUIPMENT LIST AND DRAWINGS

GENERAL

Equipment list and drawings of electrical and material shall conform to the specifications in Section 86-1.04, Equipment List and Drawings, of the Standard Specifications and this Section 02086.

The supplier shall furnish a maintenance manual for all supplied equipment, including but not limited to, the following:

(a) Vehicle detector sensor control units and amplifiers.
(b) Malfunction Management Unit (MMU)

The maintenance manual shall be submitted at the time the cabinet(s) are delivered for testing or, if ordered by the Engineer, previous to purchase. The maintenance manual shall include, but need not be limited to, the following items:

(a) Specifications
(b) Function of all controls
(c) Trouble shooting procedure (Diagnostic routine)
(d) Block circuit diagram
(e) Geographical layout of components
(f) Schematic diagrams
(g) List of replaceable component parts with stock numbers and list of industry standard replacements

In addition to the five (5) sets of cabinet schematic wiring diagrams as specified in the second paragraph of Section 86-1.04, Equipment List and Drawings, of the Standard Specifications, the supplier shall furnish one reproducible wash-off-mylar or erasable vellum for each cabinet, which shall be easily readable, of each cabinet schematic wiring diagram. The supplier shall also provide a CD or DVD with an electronic AutoCAD 2009.dwg version of the cabinet drawing. All wiring on the drawings shall be double ended.

8.1 TS2 CABINET ASSEMBLY

8.1.1 This specification describes the minimum acceptable requirements for a TS2 cabinet assembly to house a TS2 Type 1 solid state fully-actuated controller unit. The manufacturer of the cabinet assembly shall have a minimum of two (2) years of cabinet manufacturing experience with TS2 Type 1 cabinets. The assembly shall include the cabinet, flasher, card rack(s), a MMU, five (5) BIU's, external power supply, six (6) flash transfer relays, Twelve (12) Reno A&E E/2 single width four channel detector amplifiers, Actelis ML688 copper over Ethernet unit, Actelis ML530 fiber switch. Cabinet assemblies shall be configuration 4 (16 position). The assembly shall include sixteen (16) load switches.

8.1.2 The cabinet assembly shall be tested and operated as a complete working unit prior to submittal to the City. This test shall consist of full operation under a full signal load for a minimum of two (2) hours.

8.2 Cabinet Design Requirements

8.2.1 The cabinet shall be constructed using unpainted sheet aluminum with a minimum thickness of 3.2 mm (0.125”). No wood, wood fiber products, or other flammable material shall be used in the cabinet. All welds shall be by GMAW process and shall be neat and of uniform consistency. No external rivets shall be present on the door or cabinet assembly. The surface of the aluminum shall be finished with Anodic coating as per Section 86-3.04A, Cabinet Construction, of the Standard Specifications. Coating shall have uniform appearance.

8.2.2 The profile of the cabinet shall be size 6 as defined by TS2 Clause 7.3 of the NEMA Standard Publication TS2 latest revision, as specified in the Plans. The load bay shall be configuration 4 (16 position) as defined by TS2 Clause 5.3, or as specified in the Plans.

Cabinet Option	Size of Cabinet	Backpanel Config	Size of Load Bay
Option 4	Base Mount TS2 Size 6	Configuration 4	16 position load bay

8.2.3 Vertical shelf support channels shall be provided to permit adjustment of shelf location in the field. The channels shall have a single continuous slot to allow shelves to be placed at any height within the cabinet. Channels with fixed notches or holes are not acceptable.

8.2.4 Each cabinet shall be equipped with an extra set of unistrut channels or a keyhole panel on either side of the front section of the cabinet to permit the purchaser to mount additional equipment as necessary.

8.2.5 Shelves shall be at least 330 mm (13”) deep and be located in the cabinet to provide a 12.5 mm (0.5”) clearance between the back of the shelf and the back of the cabinet. A 38mm (1.5”) document drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of storing documents and miscellaneous equipment. Provide a drawer with telescoping drawer guides to allow full extension from the shelf to provide storage space for cabinet documentation and standard laptop This drawer shall support up to 22.5 kg (50 lbs) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 600 mm (23.6”) wide. Provide a top for the storage compartment that has a non-slip plastic laminate attached covering 90% of the surface area.

8.2.6 Two shelves shall be provided in the cabinet and shall be at minimum 305 mm (12”) apart in height. There shall be sufficient shelf space to accommodate a controller unit 330 mm (13”) high, an MMU, two 8 position card racks and external power supply. An additional space at least 305 mm (12”) high, 325 mm (12.8”) wide, and 305 mm (12”) deep shall be provided. The controller unit, MMU, card racks, and power supply shall be placed on the shelves in such a manner that sufficient ventilation is provided to all components. Labels showing the proper placement of each component shall be provided along the shelves to ensure proper placement. Labels shall be permanent engraved and riveted to the shelf.

8.2.7 The cabinet shall be vented and cooled by 2 thermostatically controlled fans. The fans shall be a commercially available model with a capacity of at least 2.83 m^3/min. (100 ft^3/min.). The thermostats shall have an adjustable range of 32°C to 65°C (90°F to 150°F) . A press-to-test switch shall be provided to test the operation of the fans.

8.2.8 The cabinet shall be provided with a unique five digit serial number which shall be stamped directly on the cabinet or engraved on a metal or metalized mylar plate, epoxied or riveted with aluminum rivets to the cabinet. The digits shall be at least 5 mm (0.2”) in height and located on the upper right sidewall of the cabinet near the front.

8.3 Cabinet Door

8.3.1 The cabinet shall be provided with one door in front that will provide access to the cabinet. The door shall be provided with three stainless steel hinges with non-removable stainless steel pins, or a full-length stainless steel piano hinge with a stainless steel pin, spot welded at the top of the hinge. The hinges shall be mounted so that it is not possible to remove them from the door or cabinet without first opening the door. The bottom of the door opening shall extend at least to the bottom level of the back panel. The door and hinges shall be braced to withstand a 74 kg per vertical meter of door height load applied to the outer edge of the door standing open. There shall be no permanent deformation or impairment of any of the door or the cabinet body when the load is removed.

8.3.2 The cabinet door shall be fitted with a Corbin #2 lock and a stainless steel handle with a 16 mm (0.630”) minimum diameter shaft or the equivalent cross-sectional area for a square shaft, and a three point latch. The lock and latch design shall be such that the handle cannot be released until the lock is released. Two keys shall be provided for each cabinet. A gasket shall be provided to act as a permanent dust and weather resistant seal at the controller cabinet door facing. The gasket material shall be of a nonabsorbent material and shall maintain its resiliency after long term exposure to the outdoor environment. The gasket shall have a minimum thickness of 6.25 mm (0.25”). The gasket shall be located in a channel provided on the cabinet or on the door(s). An “L” bracket is acceptable in lieu of this channel if the gasket is fitted snugly against the bracket to insure a uniform dust and weather resistant seal around the entire door facing. Any other method is subject to prior approval by the Traffic Engineer during inspection of the sample order.

8.3.3 A locking auxiliary police door shall be provided in the door of the cabinet to provide access to a panel that shall contain a signal shutdown switch, and a signal flash switch, The police door shall be gasketed to prevent entry of moisture or dust and the lock shall be provided with two brass keys. The Police panel door latch shall be accessible from inside the cabinet.

8.3.4 A manual-automatic switch shall be mounted on the inside of the cabinet door and a manual advance push-button switch on a six foot (6’) retractable cord shall be supplied. The manual advance control of the controller unit shall override any external control (external logic, etc.) in effect when the manual-automatic switch is in the manual position. Each actuation of the manual advance push-button switch shall advance the controller to the next interval. Manual control shall not override any calls for preemption. The cord and button shall be coiled and stored on the inside of the cabinet door by a minimum one inch (1”) wide grommet mounting hook and loop tensioning buckle cable tie strap permanently mounted on the inside of the cabinet door.

8.3.5 The intake for the air vent system shall be filtered with an industry standard sized disposable pleated panel or 4 ply woven polypropylene air filter. The minimum filter dimensions shall be 406.4 mm (16”) wide by 304.8 mm (12”) high by 25 mm (1”) thick. The filter shall be securely mounted so that any air entering the cabinet must pass through the filter. The filter shall be easily removable without the use of tools. The cabinet opening for intake of air shall be large enough to use the entire filter. The air intake and exhaust vent shall be screened to prevent entry of insects. The screen shall have an opening no larger than 8.1 mm^2 (0.0125 in^2). The total free air opening of the exhaust vent shall be large enough to prevent excessive backpressure on the fan.

8.4 Wiring

8.4.1 All wiring within the cabinet shall be neat and routed such that opening and closing the door or raising or lowering the back panel will not twist or crimp the wiring. All wiring harnesses shall be either braided, sheathed in nylon mesh sleeving, or made of PVC or polyethylene insulated jacketed cable. Wiring shall be mounted to the cabinet using fastener mounted cable and wire holders. Wiring leading to the cabinet door shall be sheathed in nylon mesh sleeving or be PVC jacketed cable only. All SDLC cabling shall be Belden #7203A or equivalent.

8.4.2 Size

A. All conductors between the main power circuit breakers and the signal power bus shall be a minimum size 10 AWG stranded copper. All conductors carrying individual signal lamp current shall be a minimum size 16 AWG stranded copper. All AC service lines shall be of sufficient size to carry the maximum current of the circuit or circuits they are provided for. Minimum cabinet conductor wire size shall be 22 AWG stranded copper. All wiring and insulation shall be rated for 600 V or greater.

B. Conductors for AC common shall be white. Conductors for equipment grounding shall be green. All other conductors shall be a color coded different than the foregoing.

C. No P.C. boards will be allowed on the back panel of the cabinet. All wiring must be done from the BIUs to the Load Switches using standard 19-gauge wiring.

8.4.3 A barrier terminal block with a minimum of three compression fitting terminals designed to accept up to a #4 AWG stranded wire shall be provided for connection of the AC power lines. The block shall be rated at 50 Amperes.

8.4.4 All terminals shall be permanently identified in accordance with the cabinet wiring diagram using an anodized silk screening process on the aluminum panel. Where through-panel solder lugs or other suitable connectors are used, both sides of the panel shall have the terminals properly identified. Identification shall be placed as close to the terminal strip as possible.

A. Each controller input and output function shall be distinctly identified with no obstructions, at each terminal point in the cabinet, with both a number and the function designation. The same identification must be used consistently on the cabinet wiring diagrams.

B. Each load switch socket shall be identified by phase number, overlap number, and pedestrian phase number as applicable. No cabinet equipment, including the load switches themselves, may obstruct these identifications.

C. Each flash transfer base and power relay base shall be properly identified with no possible obstructions.

D. Each harness within the cabinet shall be distinctly identified by function on the connector end.

E. The flasher socket shall be distinctly identified with no possible obstruction.

F. All other sockets needed within the cabinet to fulfill the minimum requirements of the Invitation to Bid, or attachments thereof, shall be distinctly identified.

8.4.5 The controller unit harness (A plug) shall be long enough to reach any point 400 mm (16”) above the timer shelf. The MMU harness and any required auxiliary harness shall reach 600 mm (24”) from the MMU shelf.

8.4.6 An unused, spare terminal block providing ten terminals shall be provided. This block shall be double 8-32 X 5/16" binder head screw design with shorting bars. These terminal strips shall be located on the lower third of either side of the cabinet.

8.4.7 Copper ground buses shall be provided for both the power supply neutral (common) and chassis ground. Each bus bar must provide a minimum of ten unused terminals with 8-32 X 5/16" or larger screws with compression fitting style terminals. The AC neutral and chassis ground buses shall be jumpered together with a minimum #10 AWG wire.

8.4.8 A 20 Ampere and a 50 Ampere thermal type circuit breaker shall be mounted and wired in the cabinet. The 20 ampere breaker shall protect the base light, trouble light, ground fault circuit interruption (GFCI) receptacle, modem duplex receptacle, and fans. The 50 ampere breaker shall protect the signal load circuits, controller circuits, MMU, flasher, and card rack detector power supply. The breakers shall be Square "D" QUO 150 Series only.

8.4.9 The circuit breakers shall be equipped with solderless connectors and installed on the right side wall (facing the cabinet) or lower right hand side of the back panel inside the cabinet. The breakers shall be easily accessible. The breakers shall be positioned so that the rating markings are visible.

8.4.10 A GFCI type duplex receptacle shall be mounted and wired in the lower right side wall of the cabinet. An additional non-GFI duplex receptacle (for use with communications modems) shall be mounted and wired in the upper left side of the cabinet behind the preempt/interconnect panel. These receptacles shall be wired on the load side of the 20 Amp circuit breaker. A six (6) outlet (minimum) plug strip shall be mounted on an aluminum panel and the panel mounted to the shelf din rails. The housing of the plug strip shall be aluminum. The receptacles on the plug strip shall be oriented at 90 degrees to the length of the plug strip and the spacing of the receptacles shall allow wall transformers to be plugged into adjacent receptacles without blocking the adjacent receptacles.

8.4.11 The above breakers are in addition to any auxiliary fuses which may be furnished with the controller to protect component parts, such as transformers, etc.

8.4.12 The load side of the main circuit breaker shall be protected by a two stage lightning surge suppresser, equivalent to the EDCO APC340 (with LED indication along with a set dry contacts for alarm capabilities to indicate proper operation).

8.4.13 The suppresser ground connection shall be connected to the cabinet by means of a short, heavy copper ground strap. The strap shall be bonded to the cabinet.

8.4.14 The suppresser shall be connected to the line filter as recommended by the manufacturer. Number 10 AWG or larger wire shall be used for connections to the suppresser, line filter and load switch bus.

8.4.15 A fluorescent light, with switch and a rapid start, -18°C (0°F) ballast, shall be installed in the cabinet. This light shall be turned on when the cabinet door is opened, and turn off when the cabinet door is closed. A MOV or other such transient suppression device shall be placed across the AC power input to the light. The switch shall also provide a set of door open alarm contacts.

8.4.16 A radio frequency interference (RFI) suppresser shall be provided and installed on the load side of the signal circuit breaker and shall be protected by the surge protector. This filter shall be rated at 50 amperes and shall provide a minimum attenuation of 50 decibels over the frequency range of 200 Kilohertz to 75 Megahertz.

8.4.17 Transient suppression devices shall be placed on the coil side of all relays in the cabinet. DC relay coils shall have, as a minimum, a reversed biased diode across the coil. AC relays shall have MOV's or equivalent suppression across their coils. RC networks are acceptable. One suppression device shall be supplied for each relay.

8.4.18 Except where soldered, all wires shall be provided with lugs or other approved terminal fittings for attachment to binding posts. Insulation parts and wire insulation shall be insulated for a minimum of 600 volts.

8.4.19 The outgoing traffic control signal circuits shall be of the same polarity as the line side of the power source.

8.4.20 A switch shall be provided on the inside face of the cabinet door that shall be labeled Test-Normal. When the switch is in the Normal position, call for flashing operation shall remove the power from the controller unit. When the switch is in the Test position, the call for flashing operation shall permit the controller unit to continue to run so that its operation can be observed.

8.4.21 A switch shall be provided near the Test-Normal switch to cause the controller unit, and any auxiliary equipment, to stop timing. It shall be labeled "STOP TIMING".

8.4.22 The cabinet shall be wired so that activation of the MMU will cause the controller unit, and any auxiliary equipment, to stop timing.

8.4.23 Conflict and manual flash shall be wired for all red.

8.4.24 The cabinet shall be designed and equipped with enough transfer relays for the purchaser to change any “Main Street” indications (phase movements 2, 6, and/or 1, 5) to amber for the conflict and/or manual flash operation on the face of the back panel or a side panel, using only simple tools.

8.4.25 Transfer relays shall be the Model 430, 8 pin plug-in type manufactured by Reno A+E, Model TR-200 or approved equal. The relays shall have contacts a minimum of 3/8" diameter in size and shall be rated at a minimum of 30 Amps 102 / 240 VAC, 20 Amps 28 VDC.

8.4.26 The red enable and remote reset from the MMU shall be terminated on the face of the back panel.

8.4.27 A 75 Amp, solid state relay shall be wired between the RFI filter output and the load switch power bus. The relay shall be controlled by the signal shutdown switch and the flash switch. The relay shall be mounted to a heat sink designed to allow maximum current flow at 74°C (165°F) without damaging the relay.

8.4.28 All exposed AC wiring points, including the RFI filter, surge suppresser, and solid state relay shall be covered with a clear non-conductive plastic cover to prevent accidental contact. Unless otherwise noted in this specification, wiring at terminal strips is exempt from this requirement.

8.4.29 An input point shall be provided on the backpanel to allow external reset of the MMU.

8.4.30 The load switch outputs shall be brought out through posted 10-32 X 5/16" binder head screw terminals. Field wiring for the signal heads shall be connected at this terminal strip.

8.5 DETECTOR PANEL AND CARD RACK

8.5.1 The cabinet shall have a loop detector panel mounted on the left side of the cabinet. This panel shall provide for all connections between loops at the street and the detector amplifiers as described in the following sections.

8.6 DETECTOR CARD RACKS

8.6.1 Two card racks shall be provided for cabinet configuration four (16 position backpanel). The first card rack shall accommodate up to a total of eight (8) four (4) channel single space TS2 detector units. The second card rack shall provide an additional, up to 32 channels, of alternate technology detection for up to a total of 64 channels of detection. Each card rack shall include a single position for (1) BIU unit and (8) positions for detectors. The first rack shall have two additional integrated position slots for two (2) 2-channel Preemption phase discriminator cards labeled “EV1” and “EV2”. An auxiliary card rack may be used for the preemption if previously approved by the City Traffic Engineer.

8.6.2 The detector card rack shall have a rigid frame and shall be fabricated from aluminum and shall have slots set in a modular fashion such that the PCB edge connectors shall plug into the rear while sliding between top and bottom card guides for each module. Mounting flanges shall be provided and be turned outward for ease of access. The detector card rack shall be bolted to a cabinet shelf. It shall be possible to unbolt the rack using simple tools.

8.6.3 All wiring to the rack shall be labeled and neatly run to other parts of the cabinet and detector termination panel.

8.6.4 The slots shall be numbered 1 to 8 left to right when viewed from the front of the rack. A flange shall be provided on the top and the bottom of the rack to label each individual channel.

8.6.5 The Detector DC Supply shall be bussed to a common point and wired to the Intersection Detector Panel.

8.6.6 The Chassis Ground shall be bussed to a common point and wired to the Detector Panel.

8.6.7 The Logic Ground shall be bussed to a common point and wired to the Detector Panel.

8.6.8 The Data Address for the detector channels shall be according to TS2.

8.7 DETECTOR PANEL

8.7.1 The Detector Panel shall provide all connections between the detector loops and the detector amplifiers.

8.7.2 The panel shall be constructed of 3.2 mm (0.125 “) aluminum.

8.7.3 The panel shall contain a 76 mm (3”) horizontal slot in each corner to accommodate 6.3 mm (1/4”) mounting bolts.

8.7.4 All inputs from the loops shall be brought through posted 10-32 X 5/16 inch binder screw terminals or 8-32 X 5/16 inch binder screw terminals.

8.7.5 Each loop pair shall be protected by lightning surge suppressor. The suppressers must be mounted behind the panel using feed through screw terminals to attach the suppressors.

8.7.6 Each detector will have a test switch such that when the switch is closed, a call is placed upon that detector input. The test switch will have three positions; no effect, permanently on, and momentarily on.

8.7.7 The detector panel shall provide connection points for a minimum of 32 loop detectors.

CONNECTION POINT	**NO. OF CONNECTION POINTS**
EXTERNAL 24V POWER SUPPLY	1
LOOP INPUTS	64, 2 FOR EACH OF 32 LOOPS
LOGIC GROUND	1
SPARES	6
CHASSIS GROUND BUS	1 BUS

8.7.8 A chassis ground bus bar shall be provided on the panel and connected to the cabinet by an insulated braided copper ground strap. The strap shall be bonded to the cabinet.

8.8 PREEMPT / COMMUNICATION PANEL

8.8.1 A preempt / communication panel shall be provided that contains all interface circuits and wiring for preemption and communication functions. The panel shall be located on the left side of the cabinet interior.

8.8.2 Three input relay circuits, with 120 VAC coil and contacts rated for the application, shall be provided on the preempt panel. These circuits shall be used to isolate the incoming preempt commands from the controller unit logic circuitry. The circuits shall be programmable to operate with either a normally open or normally closed relay contact by jumpers on a terminal strip. A barrier strip protected from accidental contact by service personnel shall be supplied to connect the external input. It shall be possible to use either a neutral or hot 120 VAC input. Relays used shall be plug-in Potter Brumfield K10P series / Magnecraft W-78 series or interchangeable equivalent. The relays shall be mounted in relay sockets.

8.8.3 Adequate protection of the input relay circuits as well as the preemptor circuitry shall be provided to eliminate damage or false preemption commands caused by line transients or lightning surges. The devices shall have a minimum rating of 20 Joules.

8.8.4 Three momentary test switches, one for each preempt circuit, shall be provided on the preempt panel. The operator shall not be exposed to hazardous voltages during operation of the test switches.

8.8.5 All necessary interconnection cables and mounting hardware shall be provided.

8.8.6 There shall be a switch on the preempt/communication panel, which shall release the local controller to operate in an isolated, full-actuated manner, when necessary for maintenance purposes. The switch positions shall be labeled “SYSTEM” and “FREE”.

8.8.7 Terminal connections for 8 twisted pair communication lines and one telephone line shall also be provided. The protection will consist of series 25 ohm resistors, 15 volt transorbs, and other devices, which allow protection including primary overvoltage protection, resettable overcurrent protection, secondary clamping voltage protection, and fast transient filtering. The secondary overvoltage stage shall allow peak voltages of no more than 250 volts. The fast transient filtering stage shall provide no less than 40 dB/decade of attenuation to transients above the required pass band. The protection shall be provided in an integrated closure with eight (8) input/output terminations and ground connection.

8.9 POWER SUPPLY

8.9.1 The power supply shall be a shelf mounted, enclosed, 24 VDC power supply in accordance to Clause 5.3.5 of the NEMA Standards Publication TS2 latest revision.

8.9.2 One power supply cable per power supply shall be furnished and installed in each cabinet. The wires shall be terminated to bus bars, terminals on the front of the backpanel, detector panels, or connector as appropriate. The connections shall be with forked spade lugs or otherwise as needed. Each individual wire shall be cut to the length required to reach the point at which it is to be connected. Model shall be Reno A+E, TS-2 Cabinet Power Supply, or approved equal.

8.10 TWO CIRCUIT SOLID STATE FLASHER

8.10.1 The solid state, two circuit flasher shall meet the electrical and physical characteristics described in Clause 6.3 of the NEMA Standards Publication TS2 latest revision. The flasher shall be Type III (dual circuit rated at 15 Amps per circuit) unit and so constructed that each component may be readily replaced if needed.

8.10.2 The two circuit flasher shall be of solid state design and contain no electro-mechanical devices. Model shall be Reno A+E, Model FL-200, or approved equivalent.

8.11 LOAD SWITCH

8.11.1 The solid state load switches shall meet the requirements set forth in Clause 6.2 of the NEMA Standards Publication TS2 latest revision, and shall be "Triple-Signal Load Switch" I/O, dual indicating type. Model shall be Reno A+E, Model LS-200, or approved equivalent.

8.11.2 Two indicator lights (LED) for each circuit shall be provided in each load switch. The input indicator LED shall be on when a "Low Voltage Active" input to the load switch is present. The output indicator LED shall be on when the internal loadswitch triac triggers and AC output for the respective channel as the input indicator. Load switches shall be rated at 20 amps @ 70°C. All pedestrian yellows shall be wired to terminal block.

8.12 MALFUNCTION MANAGEMENT UNIT (MMU)

8.12.1 The MMU shall meet all requirements set forth in Section 4 of the NEMA Standards Publication TS2 latest revision, Type 16 style. In addition to the DB-15 port 1 (SDLC) connector defined in §4.3.1, the MMU shall have a DB-9 port 2 (RS-232) connector located adjacent to the port 1 connector and Ethernet Port to allow high speed external data transfer. Model shall be Reno A+E MMU-1600GE or approved equal.

8.12.2 The MMU shall be fully compatibility with the cabinet SDLC.

8.12.3 The MMU shall have three (3) output indicators for all 16 phases to indicate Red/Yellow/Green outputs.

8.12.4 The MMU shall have the ability to log event conflicting event history, power disturbances, and real-time RMS AC line voltage values in an internal non-volatile memory. This information shall be capable of being extracted via port 2 by both of the following methods:

a) Downloading via Procom or similar, generic, RS-232 compatible terminal software

b) Downloaded directly into ATMS software.

8.12.5 Minimum data reporting requirements available remotely from the MMU shall be:

a) Trace (real-time status) reports of all current front panel indications

b) History/event logs of recent faults

c) User defined Programming card and front panel switch positions of the MMU

8.13 BUS INTERFACE UNIT (BIU) NETWORK CARDS

8.13.1 The cabinet shall be equipped with a total of five (5) BIU cards, two (2) BIU cards for the load bay, plus three (3) BIU cards for the detector racks. The BIU shall meet, as a minimum, all applicable sections of the NEMA Standards Publication TS2 latest revision.

8.13.2 The BIU shall be rack-mountable and solid-state. The BIU unit shall be constructed with discrete component circuitry in order to allow repair and maintenance of the unit by use of standard tools. The BIU shall utilize machine tooled integrated circuit (IC) sockets for all IC's of 14 pins or greater, for ease of repair.

8.13.3 The BIU shall be proven to the satisfaction of the City Traffic Engineer to provide full compatibility with the cabinet SDLC data circuits. Model shall be Reno A+E, Model BIU/2, or approved equal.

8.14 PEDESTRIAN INPUTS

8.14.1 Pedestrian inputs shall be isolated from the controller input circuits by means of pedestrian isolators. Isolation shall be provided by a pedestrian isolation card or by pedestrian isolation units incorporated into the cabinet. Pedestrian isolation shall be approved by the City Traffic Engineer.

8.15 CABINET COMMUNICATIONS

8.15.1 The cabinet shall be supplied with an Actelis ML530 Fiber Switch, or other equal approved by the City Traffic Engineer.

8.15.2 The switch shall be mounted on slide mount brackets attached to the underside of the controller shelf or at another location approved by the City Traffic Engineer. The brackets will provide a slide mount that will lock the unit in place in the stored position and allow easy removal of the switch without the use of tools.

8.15.3 Four (4) - HESCO/RLS model HE624D Data Line Surge Suppressor with base sockets shall be provided and mounted on a aluminum plate. The plate shall be mounted on the upper left side of the cabinet and will be located to provide easy access to the terminals.

8.15.4 Fiber switch shall be hardened, dual single mode LC, 10/1000 optic ports, 4 managed 10/100 ethernet ports, hardened power supply, dim rail mount, Actelis model ML530, or other approved equal by the City Traffic Engineer.

8.15.5 All cables, conductors and auxiliary equipment required to provide connections within the cabinet from the MMU, Controller, and Video systems to the Actelis unit and CISCO switch will be provided by the cabinet supplier.

8.16 TESTING

8.16.1 Contractor shall provide all submittals to the City to determine that equipment to be tested will meet Project's specifications. Acceptance testing shall not be performed until all submittals are first approved by the City. Complete testing shall include visual inspection, electrical testing, and testing of all required controller assembly functions. A Contractor representative and City staff shall randomly be present at the testing facilities to observe testing.

8.16.2 Testing of fully wired cabinet(s) and auxiliary equipment as specified in Section 86-3, Controllers, of the Standard Specifications shall be the responsibility of the Contractor. This responsibility includes, but not limited to, all associated costs from entering into an agreement with a City-approved third-party testing facility for testing, and coordination for pick-up and delivery of the cabinet(s) and auxiliary equipment, to and from the testing facility and installation at the job site.

Testing shall be performed by a City-approved third-party testing facility. Contractor shall choose any of the following City-approved third-party testing facilities but contact Traffic Engineering Division at 1-408-615-3000 for the latest listing.

- Aegis ITS, 1810 Oakland Road, Suite E, San Jose CA 95131, (408) 577-1802

- Cal West Lighting & Signal, 530 Marburg Way, San Jose, CA 95133, (408) 923-1313

8.16.3 Testing shall start with a point-to-point circuit test for all hardwired cabinet circuits. Following the point-to-point testing, each controller assembly shall be tested continuously under signal load for a minimum of twenty-one (21) days. A copy of the City's standard Traffic Signal Cabinet Inspection/Test Report for each unit shall be submitted to the Traffic Engineer upon completion of testing. The Twenty-Eight (28) days Traffic Signal Cabinet Testing shall include, but not limited to, seven (7) days Point-to-Point Wire Testing, fourteen (14) consecutive days Burn Testing, and seven (7) days Site Functional Testing.

8.17 TEST FAILURE

If a unit fails its test, the testing staff shall report the failure to the Silicon Valley Power Senior City Electrician, the Project Inspector, and the Contractor within 48 hours of the finding. The conditions of failure shall be corrected, or if it is determined that major repair is required, the unit shall be replaced by the Contractor within 5 working days from notification. The Twenty-Eight (28) days testing period shall be suspended and the clock is restarted should the cabinets be found to be defective and/or in non-compliance with City's specifications at any time during the test period.

8.18 ADDITIONAL INCLUDED ITEMS

Each cabinet shall also include the following items:

a) Four (4) Anchor bolts

b) Sixteen (16) Load Bay Jumpers

9.0 2070-2NZ CONTROLLER SPECIFICATIONS FOR TS2

The controller shall be Model 2070L NEMA TS2 – Type 1 with Apogee Version 65 NTCIP based Intersection Control Software by Naztec, and conforming to the following specifications:

The controller shall be Model 2070L NEMA TS2 – Type 1 ATC traffic controller per Section 86-3, Controller Assemblies, of the Standard Specifications, shall conform to the latest Transportation Electrical Equipment Specifications (TEES), and shall be listed on the California Department of Transportation's Qualified Products List (QPL). The controller shall be equipped with the following modules:

2070-1B	8Mb-CPU with Ethernet Port
2070-2B	I/O Module for NEMA Cabinets
2070-2NZ	TS2 I/O Side Mount Module
2070-3B	8x40 Line Display
2070-4B	Power Supply
2070-7A	Dual Serial Port Card

- **2070-1B**

The 2070-1B shall be 8Mb and equipped with an Ethernet port. The controller software operating on the 2070-1B shall be capable of utilizing the Ethernet port for data transfers. The operating system shall allow the user FTP and Telnet access via the Ethernet port.

- **2070-2B**

The 2070-2B shall provide for NEMA I/O to interface for TS1 or TS2 operation. The 2B module shall provide a C12S serial communications port and SP3 operation. The SP3 shall have a disable switch.

- **2070-2NZ**

The 2070-2NZ module shall provide a front connection for the Port 1 SDLC port, the Type-1 connector, and two serial ports (C21S and C22S) from the 2070-7A serial card. The 2NZ shall provide Port 1 SDLC communications via the C12S and C13S ports. The 2NZ module shall be constructed of matching aluminum design to the 2070 chassis, and mount on the right side of the controller via the rack ear slots and provide access to all critical TS2 ports through the front of the controller.

- **2070-7A**

The 2070-7A shall conform to TEES specifications. The 2070-7A shall be optically isolated and capable of asynchronous serial communication for ports C215 and C225. On-board jumpers shall be provided to allow either DCE or DTE operation for each port.

- **Operating System**

The 2070 controller shall operate on the 2070-1B using Microware OS9 v3.2 or higher.

- **Intersection Software**

The controller software shall include the latest version of “Apogee” v65-Local NTCIP-based Intersection Control Software by Naztec Inc. The firmware shall come factory installed on the controller hardware.

- **Testing**

Prior to delivery, each controller assembly shall be configured and tested by the supplier. The controller shall be “plug and play” ready for the City’s existing cabinets.

- **Installation and Training**

A factory certified representative for the manufacturer shall be on-site during signal turn-on for support.

The supplier shall provide a maximum of two hours of technical training for City staff within four weeks after controller delivery.

- **Warranty**

The controller assembly shall be warranted by the manufacturer against mechanical and electrical defects for a period of 1 year.

The supplier shall correct any defects in design, workmanship or material during the warranty period at no cost to the City. All cost of labor, parts and transportation shall be borne by the supplier for the duration of the warranty period.

The vendor shall provide all standard revisions to any equipment furnished under this Section 02086, at no cost to the City.

10.0 FIBER OPTIC CABLE

Contractor shall furnish and install a 288 strand single mode fiber optic cable as shown on the plans unless otherwise indicated.

10.1 GENERAL

This item shall govern for the furnishing and installation of fiber optic cable in designated locations as shown on the plans and as detailed in accordance with this Section 02086.

10.2 REQUIREMENTS

Fiber optic cables shall be supplied in the configurations shown on the plans and specified in this Section 02086.

Each fiber optic cable shall be suitable for both underground conduit/duct placement and indoor application. The fiber optic cable shall be fire rated. Additionally, there will be ancillary drop and connecting (patching) optical fiber cables procured under this Section 02086, which are more precisely described elsewhere in this Section 02086.

All materials furnished, assembled, fabricated or installed under this item shall be new, corrosion resistant and in strict accordance with the details shown and specified in the Contract Documents. All fibers in the cables shall be usable fibers and free of surface imperfections and occlusions, in order to meet or exceed all of the optical, mechanical, and environmental requirements contained in this Section 02086.

All cables shall be free of material or manufacturing defects and dimensional non-uniformity that would:

- Interfere with the cable installation employing accepted cable installation practices.
- Degrade the transmission performance and environmental resistance after installation.
- Inhibit proper connection to interfacing elements.
- Otherwise yield an inferior product.
- Each fiber optic cable for this project shall be all-dielectric, dry water-blocking material, duct type, with loose buffer tubes, and shall conform to these Specifications.

The Contractor shall furnish, install, splice and test all the required fiber optic cable. All splicing kits, fiber optic cable caps, moisture/water sealants, terminators, splice trays, patch cords, connectors, pig tails and accessories to complete the fiber optic network shall be provided as incidentals. All equipment for installation, splicing and testing shall be provided by the Contractor.

All fiber optic glass/cable on this project shall be from the same qualified manufacturer regularly engaged in the production of optical fiber material.

The optical fibers shall be contained within buffer tubes. The buffer tubes shall be stranded around an all-dielectric central member. Aramid yarn and/or fiberglass shall be used as a primary strength member, and a medium or high-density polyethylene outside jacket shall provide overall protection.

The cable shall be qualified as compliant with Chapter XVII, of Title 7, Part 1755.900 of the Code of Federal Regulations, “RUS Specification for Filled Fiber Optic Cables.”

10.3 PACKAGING

1. The completed cable shall be packaged for shipment on non-returnable wooden reels. Required cable lengths shall be stated in the purchase order.

2. Top and bottom ends of the cable shall be available for testing.

3. Both ends of the cable shall be sealed to prevent the ingress of moisture.

4. Each reel shall have a weather resistant reel tag attached identifying the reel and cable.

10.4 CABLE MARKING

1. The optical fiber cable outer jacket shall be marked with manufacturer's name, the month and year of manufacture, the words "Optical Cable", telecommunications handset symbol as required by Section 350G of the National Electrical Safety Code® (NESC®), fiber count, fiber type, and sequential meter marks.

2. The markings shall be repeated every two feet (2’).

3. The actual length of the cable shall be within -0/+1% of the length marking.

4. The marking shall be in a contrasting color to the cable jacket.

5. The marking shall be approximately 0.1 inch in height and must be permanent and weatherproof.

10.5 QUALITY CONTROL

The manufacture of supplied optical cable, optical cable assemblies, and hardware shall be TL 9000 and/or ISO 9001 registered. All cabled optical fibers shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

10.6 GENERAL CONSIDERATIONS

Fiber Optic Outside Plant Cable

Fiber optic outside plant cable (FOOP) shall be dielectric, non-gel filled or water-blocking material, duct type, with loose buffer tubes. Cables with singlemode fibers shall contain 288 singlemode (SM) dual-window (1310 nm and 1550 nm) fibers. Optical fibers shall be contained within loose buffer tubes. Loose buffer tubes shall be stranded around a dielectric central member. Aramid yarn or fiberglass shall be used as a primary strength member, and a polyethylene outside jacket shall provide protection.

Fiber optic cable shall be from the same manufacturer who is regularly engaged in the production of fiber optic cables.

Cables shall be compliant with 7 CFR 1755.900 (RUS Bulletin 1753F-601), "RUS Specification for Filled Fiber Optic Cables."

Fiber Characteristics

Optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. Fibers in buffer tubes shall be usable fibers, and shall be sufficiently free of surface imperfections and occlusions to meet optical, mechanical, and environmental requirements of these specifications. Required fiber grade shall reflect the maximum individual fiber attenuation to guarantee required performance of fiber in cables.

Coating shall be dual layered, UV cured acrylate, mechanically or chemically strippable without damaging fibers.

Cable shall comply with optical and mechanical requirements over an operating temperature range of -40°C to +70°C. Cable shall be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." Change in attenuation at extreme operational temperatures (-40°C to +70°C) for singlemode fiber shall not be greater than 0.20 dB/km, with 80 percent of measured values no greater than 0.10 dB/km. Singlemode fiber measurement shall be made at 1550 nm.

Singlemode fibers within finished cables shall meet the following requirements:

Fiber Characteristics Table	
Parameters	Singlemode
Type	Step Index
Core diameter	9 µm (nominal)
Cladding diameter	125 µm ±0.7 µm
Core to Cladding Concentricity Error	≤ 0.5 µm
Cladding Non-Circularity	≤ 0.7 %
Coating Diameter	242 µm ±7 µm
Coating/Cladding Concentricity Error	≤ 12 µm
Coating Non-Circularity	≤ 0.5 %
Proof Test	Entire length subjected to tensile proof stress> 0.7 GPA (100 kpsi); 1% strain equivalent
Tensile Strength: Dynamic tensile strength (0.5 meter gauge length)	Aged* and unaged: median>3.8 GPa (550 kpsi) *Aging @85°C, 85% RH, 30 Days
Attenuation: (-40°C to +70°C) 1310 nm 1383 nm 1460 nm 1550 nm 1625 nm	 0.33 – 0.35 dB/km 0.32 – 0.35 dB/km 0.25 dB/km 0.19 – 0.21 dB/km 0.20 – 0.23 dB/km
Attenuation at the Water Peak	≤ 2.1 dB/km @ 1383 ±3 nm
Bandwidth:	
@1,300 nm (MM)/1310 nm (SM)	N/A
Chromatic Dispersion: 1285 – 1330 nm 1550 nm 1625 nm Zero Dispersion Wavelength (λ_0) Zero Dispersion Slope (S_0) @ λ_0	 ≤ |3| ps/(nm x km) ≤ 18.0 ps/(nm x km) ≤ 22.0 ps/(nm x km) 1300 – 1322 nm < 0.090 ps/(nm^2 x km)
Cut-Off Wavelength(λccf)	≤ 1260 nm
Numerical Aperture (measured in Accordance with EIA-455-47)	0.12
Mode Field Diameter 1310 nm 1550 nm	 8.8 – 9.6 µm 9.6 – 10.6 µm

In certain underground locations, Low Water Peak fiber cable can be installed to provide additional optimized use in the 1385 nm region.

Color Coding
In buffer tubes containing multiple fibers, length of fiber shall be distinguishable from others in the same tube by means of color-coding according to the following:

1. Blue (BL)	7. Red (RD)
2. Orange (OR)	8. Black (BK)
3. Green (GR)	9. Yellow (YL)
4. Brown (BR)	10. Violet (VL)
5. Slate (SL)	11. Rose (RS)
6. White (WT)	12. Aqua (AQ)

Buffer tubes containing fibers shall be color-coded with distinct and recognizable colors according to the table listed above for fibers.

Colors shall be in accordance with the Munsell color shades (ASTM d 1535-01) and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."

Color formulations shall be compatible with fiber coatings and buffer tube filling compounds, and be heat stable. Colors shall not fade or smear or be susceptible to migration and shall not affect transmission characteristics of optical fibers and shall not cause fibers to stick together.

Cable Construction
Fiber optic cable shall consist of, but not limited to, the following components:

1. Buffer tubes
2. Central member
3. Filler rods
4. Stranding
5. Core and cable flooding
6. Tensile strength member
7. Ripcord
8. Outer jacket

Buffer Tubes
Clearance shall be provided in loose buffer tubes between fibers and insides of tubes to allow for expansion without constraining fibers. Fibers shall be loose or suspended within tubes and shall not adhere to insides of buffer tubes. Buffer tubes shall contain a maximum of 12 fibers.

Loose buffer tubes shall be extruded from material having a coefficient of friction sufficiently low to allow free movement of fibers. Material shall be tough and abrasion resistant to provide mechanical and environmental protection of fibers and permit safe intentional "scoring" and breakout without damaging or degrading internal fibers.

Buffer tube filling compound shall be a homogeneous hydrocarbon-based gel with anti-oxidant additives used to prevent water intrusion and migration. Filling compound shall be non-toxic and dermatologically safe to exposed skin, chemically and mechanically compatible with cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. Filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.

Buffer tubes shall be stranded around a central member by a method, such as the reverse oscillation stranding process that will prevent stress on fibers when the cable jacket is placed under strain.

Central Member
The central member functions as an anti-buckling element and shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. A symmetrical linear overcoat of polyethylene may be applied to central members to achieve optimum diameter to ensure proper spacing between buffer tubes during stranding.

Filler Rods
Fillers may be included in cables to maintain symmetry of cable cross-sections. Filler rods shall be solid medium or high-density polyethylene. The diameter of filler rods shall be the same as the outer diameter of buffer tubes.

Stranding
Completed buffer tubes shall be stranded around the overcoated central member using stranding methods, lay lengths and positioning so cables meet mechanical, environmental and performance specifications. A polyester binding shall be applied over stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure buffer tubes to central members without crushing buffer tubes. Binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound) and dielectric with low shrinkage.

Core and Cable Flooding
Cable core interstices shall contain a water blocking material to prevent water ingress and migration. Water blocking material shall be a polyolefin based compound, which fills the cable core interstices, or an absorbent polymer, which fills voids and swells to block ingress of water. Flooding compound or material shall be homogeneous, non-hygroscopic, electrically non-conductive, non-nutritive to fungus, nontoxic, dermatologically safe, and compatible with other cable components.

Tensile Strength Member
Tensile strength shall be provided by high tensile strength Aramid yarns or fiberglass helically stranded evenly around cable cores and shall not adhere to other cable components.

Ripcord
Cables shall contain at least one ripcord under the jacket for easy sheath removal.

Outer Jacket
Jackets shall be free of holes, splits, and blisters and shall be medium or high-density polyethylene (PE), or medium density cross-linked polyethylene with minimum nominal jacket thickness of 1 mm ±0.076 mm. Jacketing material shall be applied directly over tensile strength members and water blocking materials and shall not adhere to Aramid strength materials. Polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote fungus growth.

Jackets or sheaths shall be marked with the manufacturer's name, the words "Optical Cable", the number of fibers, "SM", year of manufacture, and sequential measurement markings every meter. Actual cable lengths shall be within -0/+1 percent of length markings. Markings shall be a contrasting color to cable jackets. Heights of markings shall be 2.5 mm ±0.2 mm.

General Cable Performance Specifications
F/O cable shall withstand water penetration when tested with one meter static head or equivalent continuous pressure applied at one end of a one meter length of filled cable for one hour. No water shall leak through open cable ends. Testing shall be in accordance with EIA-455-82 (FOTP-82), "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable."

A representative sample of cable shall be tested in accordance with EIA/TIA-455-81 (FOTP-81), "Compound Flow (Drip) Test for Filled Fiber Optic Cable". No preconditioning period shall be conducted. Cables shall exhibit no flow (drip or leak) at 70°C as defined in the test method.

Crush resistance of finished F/O cables shall be 220 N/cm applied uniformly over the length of cables without showing evidence of cracking or splitting when tested in accordance with EIA-455-41 (FOTP-41), "Compressive Loading Resistance of Fiber Optic Cables". The average increase in attenuation for fibers shall be ≤0.10 dB at 1550 nm (singlemode) for a cable subjected to this load. Cables shall not exhibit measurable increase in attenuation after removal of load. Testing shall be in accordance with EIA-455-41 (FOTP-41), except that loads shall be applied at the rate of 3 mm to 20 mm per minute and maintained for 10 minutes.

Cables shall withstand 25 cycles of mechanical flexing at a rate of 30 ±1 cycles/minute. The average increase in attenuation for fibers shall be ≤0.20 dB at 1550 nm (singlemode) at the completion of testing. Outer cable jacket cracking or splitting observed under 10x magnification shall constitute failure. Testing shall be conducted in accordance with EIA-455-104 (FOTP-104), "Fiber Optic Cable Cyclic Flexing Test," with sheave diameters a maximum of 20 times the outside diameter of cables. Cables shall be tested in accordance with Test Conditions I and II of (FOTP-104).

Cables shall withstand 20 impact cycles, with a total impact energy of 5.9 N•m. Impact testing shall be conducted in accordance with TIA/EIA-455-25B (FOTP-25) "Impact Testing of Fiber Optic Cables and Cable Assemblies". The average increase in attenuation for fibers shall be <0.20 dB at 1550 nm for singlemode fiber. Cables shall not exhibit evidence of cracking or splitting.

Finished cable shall withstand a tensile load of 2700 N without exhibiting an average increase in attenuation of greater than 0.20 dB (singlemode). Testing shall be conducted in accordance with EIA-455-33 (FOTP-33), "Fiber Optic Cable Tensile Loading and Bending Test". Load shall be applied for 30 minutes in Test Condition II of the EIA-455-33 (FOTP-33) procedure.

Packaging and Shipping Requirements

Documentation of compliance to specifications shall be provided to the Engineer prior to ordering materials.

Attention is directed to "Fiber Optic Testing", of these special provisions.

Completed cables shall be packaged for shipment on reels. Cables shall be wrapped in weather and temperature resistant covering. Ends of cables shall be sealed to prevent ingress of moisture.

Ends of cables shall be securely fastened to reels to prevent cables from coming loose during transit. Four meters of cable on ends of cables shall be accessible for testing.

Cable reels shall have durable, weatherproof labels or tags showing the manufacturer's name, cable type, the actual length of cable on reels, the Contractor's name, the contract number, and the reel number. A shipping record shall be included in a weatherproof envelope showing the above information, including the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc.), factory test results, cable identification number and other pertinent information.

Minimum hub diameter of reels shall be at least 30 times the diameter of the cable. F/O cable shall be in one continuous length per reel with no factory splices in fibers. Reels shall be marked to indicate the direction reels should be rolled to prevent loosening of cables.

Installation procedures and technical support information shall be furnished at the time of delivery.

10.7 LABELING

General

The Contractor shall label fiber optic cabling in a permanent consistent manner. Tags shall be of a material designed for long term permanent labeling of fiber optic cables. Metal tags shall be stainless steel with embossed lettering. Non-metal label materials shall be approved by the Engineer and marked with permanent ink. Labels shall be affixed to cables per the manufacturer's recommendations and shall not be affixed in a manner, which will cause damage to fibers. Handwritten labels will not be allowed.

10.8 CABLE INSTALLATION

Cable installation shall be in conformance with the procedures specified by the cable manufacturer. The Contractor shall submit the manufacturer's recommended procedures for pulling fiber optic cable at least 20 Working Days prior to installing cable. Mechanical aids may be used provided that a tension measuring device, and break-away swivel are placed in tension to the end of cables. Tension in cables shall not exceed 2225 N or the manufacturer's recommended pulling tension, whichever is less.

During cable installation, the bend radius shall be a minimum of 20 times the outside diameter. Cable grips for installing fiber optic cables shall have a ball bearing swivel to prevent cables from twisting during installation.

F/O cable shall be installed using a cable pulling lubricant recommended by the F/O cable manufacturer and a pull rope conforming to the provisions in Section 4.10, "Conduit" of these special provisions. Personnel shall be stationed at splice vaults and pull boxes through which cables are pulled to lubricate and prevent kinking or other damage.

F/O cable shall be installed without splices except where allowed on the plans and shall be limited to one cable splice every 6 km if splice locations are not shown on the plans. Mid-span access splices or FDU terminations shall involve fibers being spliced as shown on the plans. Cable splices shall be located in splice closures installed in splice vaults or in No. 6(E) pull boxes. Slack shall be provided for F/O cables at the following splice enclosures:

Splice Enclosure Type	Minimum Slack (feet)
Splice Vault (N48)	**75**
Splice Vault (N48) with slice closure	**150**

The slack shall be divided equally on each side of splice closures.

10.9 SPLICING

Field splices shall be done in splice vaults, cabinets, and in splice trays housed in splice closures. Splices in cabinets shall be done in splice trays housed in FDU's.

Fiber splices shall be fusion type unless otherwise specified. Mean splice loss shall not exceed 0.07 dB per splice and shall be obtained by measuring loss through splices in both directions and averaging the resultant values.

Splices shall be protected with a metal reinforced thermal shrink sleeve. The mid-span access method shall be used to access individual fibers in cables for splicing to other cables. Cable manufacturers recommended procedures and approved tools shall be used for mid-span access. Only fibers to be spliced shall be cut. Buffer tubes and individual fibers not being used in mid-span access shall not be modified or damaged.

Individual fibers shall be looped one full turn within splice trays to avoid micro bending. A 45 mm minimum bend radius shall be maintained during installation and after final assembly in optical fiber splice trays. Bare fibers shall be individually restrained in splice trays. Optical fibers in buffer tubes and placement of bare optical fibers in splice trays shall not produce tensile force on optical fibers.

The Contractor will be allowed to splice a total of 30 percent of fibers to repair damage done during mid-span access splicing without penalty. The Engineer will assess a fine of $300.00 for each additional and unplanned splice. A single fiber may not have more than 3 unplanned splices within the 6km limitation. If a fiber requires more than 3 unplanned splices, the entire length of F/O cable shall be replaced at the Contractor's expense.

10.10 SPLICE CLOSURES

F/O field splices shall be enclosed in splice closures, complete with splice organizer trays, brackets, clips, cable ties, seals and sealant, as needed. Splice closures shall be suitable for direct burial or pull box applications. Manufacturer’s installation instructions shall be supplied to the Engineer prior to installation of splice closures. Location of splice closures shall be where a splice is required as shown on the plans, where designated by the Engineer, or described in these special provisions.

Splice closures shall conform to the following specifications:

A. Non-filled thermoplastic case.

B. Rodent proof, water proof, re-enterable and moisture proof.

C. Cable entry ports shall accommodate 10-mm to 25-mm diameter cables.

D. Multiple grounding straps.

E. Accommodate a minimum of 24 splice trays.

F. Suitable for "butt" or "through" cable entry configurations.

G. Place no stress on finished splices within splice trays.

The Contractor shall verify the quality of splices prior to sealing splice closures. Splice closures shall not be sealed until link testing is performed and is approved by the Engineer.

10.11 SPLICE TRAYS

Each splice tray shall accommodate a minimum of 12 fusion splices and shall allow a minimum bend radius of 45 mm. Individual fibers shall be looped one full turn within splice trays to allow for future splicing. Stress shall not be applied on fibers when located in final position. Buffer tubes shall be secured near entrances of splice trays. Splice tray covers may be transparent.

Splice trays shall conform to the following:

A. Accommodate up to 12 fusion splices.

B. Place no stress on completed splices within the tray.

C. Stackable with a snap-on hinge cover.

D. Buffer tubes securable with channel straps.

E. Accommodate a fusion splice with the addition of an alternative splice holder.

F. Be labeled after splicing is completed.

Only one splice tray may be secured by a bolt through the center of the tray in fiber termination units. Multiple trays shall be securely held in place per the manufacturer's recommendation.

10.12 PASSIVE CABLE ASSEMBLIES AND COMPONENTS

Fiber optic cable assemblies and components shall be compatible components, manufactured by a company regularly engaged in the production of material for the fiber optic industry. Components or assemblies shall be best quality, non-corroding, with a minimum design life of 20 years. The cable assemblies and components manufacturer shall be ISO 9001 registered.

10.13 FIBER OPTIC CABLE TERMINATIONS

10.13.1 GENERAL

Cables shall continue within conduit to the designated cable termination point. Components shall be the size and type required for the specified fiber. Fiber optic cable terminations may take place in several locations such as data node(s), video nodes, hubs, traffic signal (Adaptive Traffic Control Signal), and CCTV camera location(s).

10.13.2 CABLE TERMINATION

At the FDU, the cable jacket of outside plant cable, shall be removed exposing the Aramid yarn, filler rods, and buffer tubes. The exposed length of buffer tubes shall be at least the length recommended by the FDU manufacturer, which allows the tubes to be secured to the splice trays. Buffer tubes shall be secured to splice trays in which they are to be spliced. The remainder of the tubes shall be removed to expose sufficient length of fibers to properly install on splice trays, conforming to the requirements in "Splicing," of these special provisions.

When applicable, moisture-blocking gel shall be removed from exposed buffer tubes and fibers. The transition from the buffer tube to the bundle of jacketed fibers shall be treated by an accepted procedure for sleeve tubing, shrink tube and silicone blocking of the transition to prevent future gel leak. Manufacturer directions shall be followed to ensure gel will not flow from ends of buffer tubes throughout the specified temperature range. Individual fibers shall be stripped and prepared for splicing.

Factory terminated pigtails shall be spliced and placed in splice trays.

Fibers inside fiber optic cables entering Fiber Distribution Units (FDU) shall be terminated and labeled. Attention is directed to "Fiber Distribution Unit" of these special provisions.

10.13.3 DISTRIBUTION INTERCONNECT PACKAGE

Distribution involves connecting fibers to locations shown on the plans. The distribution interconnect package consists of FDUs with connector panels, couplers, splice trays, fiber optic pigtails and cable assemblies with connectors. The distribution interconnect package shall be assembled and tested by a company regularly engaged in the assembly of these packages. Attention is directed to "Fiber Optic Testing" of these special provisions. Distribution components shall be products of same manufacturers, regularly engaged in the production of these components with quality assurance programs.

10.13.4 FIBER OPTIC CABLE ASSEMBLIES AND PIGTAILS

Cables for cable assemblies shall be made of fiber meeting the performance requirements of these special provisions for the F/O cable being connected.

Pigtails shall be of simplex (one fiber) construction, in 900-μm tight buffer form, surrounded by Aramid yarn for strength, with a PVC jacket with manufacturer's identification information, and a nominal outer jacket diameter of 3 mm. Singlemode simplex cable jackets shall be yellow. Pigtails shall be factory terminated and tested and at least one meter in length.

Jumpers may be of simplex or duplex design. Duplex jumpers shall be duplex round cable construction and shall not have zipcord (Siamese) construction. Jumpers shall be at least 2 m in length.

Outer jackets of duplex jumpers shall be yellow. The 2 inner simplex jackets shall be contrasting colors to provide easy visual identification for polarity.

Connectors shall be ceramic ferrule ST or SC type for SMFO. Indoor or outdoor ST connector body housings shall be nickel-plated zinc or glass reinforced polymer construction. Indoor or outdoor SC connector body housings shall be glass reinforced polymer.

Associated couplers shall be the same material as connector housings.

Connectors shall be the 2.5 mm connector ferrule type with Zirconia Ceramic material with a PC (Physical Contact) pre-radiused tip.

All connectors shall have an operating temperature range from -40°C to +70°C. Insertion loss shall not exceed 0.4 dB for singlemode and return reflection loss on singlemode connectors shall be at least -35 dB. Connection durability shall be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21). Terminations shall provide a minimum 222 N pull out strength. Factory test results shall be documented and submitted to the Engineer prior to installing connectors. Singlemode connectors shall have a yellow color on the body and boot.

Field terminations shall be limited to splicing of adjoining cable ends and cables to ST or SC pigtails.

Connectors shall be factory-installed and tested.

Unmated connectors shall have protective caps installed.

10.14 FIBER OPTIC TESTING

10.14.1 GENERAL

Testing shall include tests on elements of passive fiber optic components at the factory, after delivery to the project site but prior to installation, and after installation but prior to connection to other portions of the systems. The Contractor shall provide personnel, equipment, instrumentation, and materials necessary to perform testing. The Engineer shall be notified at least two (2) Working Days prior to field tests. Notification shall include the exact location or portion of system to be tested.

Documentation of test results shall be provided to the Engineer within five (5) Working Days after testing.

A minimum of 15 working days prior to arrival of cable at the site, the Contractor shall provide detailed test procedures for field testing for the Engineer's review and approval. Procedures shall include tests involved and how tests are to be conducted. Test procedures shall include the model, manufacturer, configuration, calibration, and alignment procedures for proposed test equipment.

10.14.2 FACTORY TESTING

Documentation of compliance with fiber specifications as listed in the Fiber Characteristics Table shall be supplied by the original equipment manufacturer. Before shipment, but while on shipping reels, 100 percent of fibers shall be tested for attenuation. Copies of the results shall be maintained on file by the manufacturer with a file identification number for a minimum of 7 years, attached to cable reels in waterproof pouches, and submitted to the Contractor and to the Engineer.

10.14.3 ARRIVAL ON SITE

Cables and reels shall be physically inspected on delivery and 100 percent of fibers shall be attenuation tested to confirm that cable meets requirements. Failure of a fiber in the cable shall be cause for rejection of the entire reel. Test results shall be recorded, dated, compared and filed with copies accompanying shipping reels in weatherproof envelopes. Attenuation deviations from shipping records of greater than 5 percent shall be brought to the attention of the Engineer. Cables shall not be installed until completion of testing and written approval of the Engineer. Copies of traces and test results shall be submitted to the Engineer. If test results are unsatisfactory, the reel of F/O cable shall be considered unacceptable and records corresponding to that reel of cable shall be marked accordingly. Unsatisfactory reels of cable shall be replaced with new reels of cable at the Contractor's expense. New reels of cable shall be tested to demonstrate acceptability. Copies of test results shall be submitted to the Engineer.

10.14.4 AFTER CABLE INSTALLATION

Index matching gel will not be allowed in connectors during testing. After fiber optic cable has been pulled, but before breakout and termination, 100 percent of fibers shall be tested with an OTDR for attenuation. Test results shall be recorded, dated, compared, and filed with previous copies of these tests. Copies of traces and test results shall be submitted to the Engineer. If OTDR test results are unsatisfactory, the F/O cable segment of cable will be rejected. Unsatisfactory segments of cable shall be replaced with new segments, without additional splices, at the Contractor's expense. New cable segments shall be tested to demonstrate acceptability. Copies of test results shall be submitted to the Engineer.

10.14.5 SYSTEM CABLE VERIFICATION AT COMPLETION

Power Meter and Light Source

At the conclusion of OTDR testing, 100 percent of fiber links shall be tested end-to-end with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for OTDR tests. Tests shall be conducted in one direction as directed by the Engineer. The Insertion Loss (1C) shall be calculated. Test results shall be recorded, compared, and filed with the other recordings of the same links. Test results shall be submitted to the Engineer. These values shall be recorded and provided in summary table and submitted to the Engineer for review and approval within five (5) Working Days of completing the test.

OTDR Testing

After passive cabling systems have been installed and are ready for activation, 100 percent of fibers shall be tested with OTDR for attenuation at wavelengths of 1310 nm and 1550 nm. OTDR testing shall be performed in both directions (bi-directional) on fibers. Test results shall be generated from software of test equipment, recorded, dated, compared and filed with previous copies. A hard copy printout and an electronic copy on a CD of traces and test results shall be submitted to the Engineer. The average of the 2 losses shall be calculated and recorded in the Cable Verification Worksheet in Appendix D. The OTDR shall be capable of recording and displaying anomalies of at least 0.02 dB. Connector losses shall be displayed on OTDR traces.

Test Failures

If link loss, measured from the power meter and light source, exceeds the calculated link loss or the actual location of fiber ends does not agree with the expected location of fiber ends, fiber optic links will not be accepted. Unsatisfactory segments of cable or splices shall be replaced with new segments of cables or splices at the Contractor's expense. OTDR testing, power meter and light source testing, and Cable Verification Worksheet shall be completed for repaired links to determine acceptability. Copies of test results shall be submitted to the Engineer. Removal and replacement of segments of cable shall be considered as removal and replacement of a single contiguous length of cable connecting 2 splices and 2 connectors. Removal of a section containing a failure will not be allowed.

Passive Component Package Testing and Documentation

Components in the passive component package (FDUs, pigtails, jumpers, couplers, and splice trays) shall be from a manufacturer who is ISO 9001 registered.

Pigtails or jumpers shall be tested for insertion attenuation loss using optical power meters and light sources. Singlemode terminations shall be tested for return reflection loss. Values shall meet loss requirements specified and shall be recorded on tags attached to pigtails or jumpers.

After an assembly is complete, the manufacturer shall visually verify that tagging of loss values is complete. The manufacturer shall conduct an "end-to-end" optical power meter/light source test from pigtail ends to end of terminating points assuring continuity and overall attenuation loss values are acceptable.

Final test results shall be recorded with previous individual component values on forms assigned to individual FDU. Completed forms shall be dated and signed by the Manufacturer's Quality Control supervisor. One copy of the form shall be attached in a plastic envelope to the assembled FDU. Copies shall be provided separately to the Contractor and the Engineer, and shall be maintained on file by the manufacturer or supplier.

Assembled and completed FDU units shall be protectively packaged for shipment to the Contractor for installation.

Fiber Optic System Performance Margin Design Criteria

Installed system performance margin shall be at least 6 dB for links. If the design system performance margin is less than 6 dB, the Engineer shall be notified of the Contractor's plan to meet this requirement.

Active Component Testing

Transmitters and receivers shall be tested with power meters and light sources to record transmitter average output power (dBm) and receiver sensitivity (dBm).

All new fiber optic cable shall be fixed with identification bands in pull boxes and near termination points. Identification bands shall indicate that the cable is "INTERCONNECT" and the direction in which the cable is traveling (North-South or East-West).

11.0 TRAFFIC SIGNAL PRE TURN-ON REVIEW

The following steps should be followed for a typical traffic signal pre turn-on review:

A. Contractor completes all items relating to the operation of the signal. Striping and pavement markings must be complete. Contractor notifies Public Works Inspector once power equipment and wires are installed.

B. Contractor requests final electric permit inspection of service equipment. Once approved, Building Inspection will issue turn on request to Finance Department.

C. Contractor requests a pre-turn-on inspection through the Public Works Inspector. A one-week advance notice is required to schedule this inspection.

The pre turn-on inspection is not a final inspection. The Electric Technician will only inspect the signal for completeness. Contractor shall complete items as necessary and reschedule another pre-turn-on inspection through the Public Works Inspector.

D. Contractor requests a flashing pre-turn-on of the signal through the Public Works Inspector only after the Electric Technician finds the results of the pre-turn-on satisfactory. Contractor will flash the signal while the Electric Technician verifies the operation. Electric Technician also verifies cabinet wiring and auxiliary equipment in the traffic signal cabinet and the Tesco power cabinet. Depending on the workload of the Electric Technician, the inspection will take place within one week of the request. Deficient items will be noted and a list of deficient items will be supplied to the Contractor.

E. Contractor shall complete deficient items and request another flashing pre-turn-on through the Public Works Inspector. If an additional inspection is required due to non-compliance with the previous deficiency list, the Contractor will be charged the actual cost for the inspection.

F. If the flashing pre-turn-on is successful, the Contractor requests a final turn-on through the Public Works Inspector. Depending on the workload of the Electric Technician, Traffic Engineering, and the cabinet and video equipment manufacturers representatives, the turn-on will take place within one week of the request.

Signal turn-on shall only be performed on Tuesday, Wednesday, or Thursday. Turn-on shall start at 9:30 A.M. and shall be completed by 1:00 P.M.

G. After the final turn-on request and prior to the turn-on day, the following items will be performed:

1. Electric Technician installs the traffic signal controller, camera controller, detector amplifiers (if required) and the intersection is “run dark” for seven days prior to turn-on. Traffic Engineering will verify operation of detector and communications lines and equipment. Contractor shall repair any deficiencies found prior to turn-on.

2. Contractor to schedule cabinet manufacturer to be present on turn-on day.

3. Contractor will schedule the camera manufacturer to be present during the turn-on day.

12.0 TRAFFIC SIGNAL TURN-ON

The following items will be performed on the day of the turn-on:

A. Public Works Inspector and Traffic Engineering will walk the intersection and check all the signal heads and pedestrian heads for proper alignment including PV visors. Contractor will correct as required.

B. Electric Technician connects the traffic signal controller, camera controller, detector amplifiers (if required). Installs load switches, relays and any auxiliary equipment. Electric Technician will assist the camera manufacturer as necessary with the cable connections to the camera controller. Cabinet manufacturer will inspect the installation of items in the cabinet.

C. Traffic Engineering will check for the proper location of the cameras with the camera manufacturer. Contractor will provide the bucket truck and personnel to relocate the cameras as necessary to the requirements of Traffic Engineering.

D. Traffic Engineering will install the program card in the controller and verify against timing sheet.

E. Traffic Engineering and Electric Technician/Contractor/Cabinet manufacturer will place the signal in normal operation and Contractor will cover any stop signs.

F. Traffic Engineering and Electric Technician will verify operation of the signal and make any necessary changes to the timing. After the operation of the signal has been verified, the Public Works Inspector will notify Contractor to remove any existing stop signs.

The Engineer reserves the right to suspend the counting of working days, during the traffic signal turn-on, if unexpected or undue delays are encountered.

G. Contractor requests final inspection. Electric Technician, Traffic Engineering, and Public Works Inspector will inspect the traffic signal construction and prepare a deficiency list (compiled by the Public Works Inspector) to be delivered to the Contractor. Contractor will correct the work.

H. Once corrected, Contractor will request another inspection (if needed) through the Public Works Inspector. If a second inspection is required due to non-compliance with the previous deficiency list, the Contractor will be charged the actual cost for the second inspection.

Signal turn on shall be performed on Tuesday, Wednesday, or Thursday. Turn on shall start at 9:30 A.M. and shall be completed by 2:30 P.M.

13.0 WARRANTY

Contractor shall warrant all material and workmanship to be free from defects for a period of one year after acceptance. In the event that evidence of failure develops within one year, Contractor shall replace the faulty components at no cost to the City. A guaranty for this purpose is included as Document 00630, Guaranty.

14.0 PAYMENT

Any item of work not shown on the Bid but is required by the Contract Documents shall be considered as incidental and full compensation for same shall be considered included in the payment for the bid item(s) shown on the Bid.

Detector Loop Test Results

Intersection Location:

Contract No.: CE XX-XX-XX

Contractor:

Phase #	Lane #*	Type**	Loc.***	Meg	"L"	“R”	"Q"	By	Date

* Lane Closest To Center of Roadway is #1 Lane (1,2,3, etc.)
** P=Presence Detector, A= Advance Detector

***Head Loop (closest to stop bar)=A (A,B,C,D)

Meg = Megohms, “L” = Inductance,“R” = Resistance, “Q” = Quality Factor

END OF SECTION