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**RESOLUTION NO. 7001-88**

**RESOLUTION OF THE CITY COUNCIL OF THE CITY OF UNION CITY ADOPTING STANDARD SPECIFICATIONS AND DESIGN CRITERIA FOR USE IN CONNECTION WITH PUBLIC RIGHT-OF-WAY CONSTRUCTION ACCOMPLISHED AS PART OF SUBDIVISION IMPROVEMENT OR DEVELOPMENT OF SINGLE PARCELS OR PRIVATE PROPERTY NOT A PART OF A SUBDIVISION PROCEEDING**

WHEREAS, the Engineering Division of the Public Works Department has revised the City's Standard Specifications And Design Criteria for consistency with current development needs in the City of Union City; and

WHEREAS, the City Engineer has approved said Standard Specifications And Design Criteria; and

WHEREAS, said Standard Specifications And Design Criteria is needed to implement and supplement Title 12 and 1 of the Municipal Code of the City of Union City; and

WHEREAS, the City Manager is approving said Standard Specifications And Design Criteria;

NOW, THEREFORE, BE IT RESOLVED that in accordance with Chapter 17.36, Title 17 of the Union City Municipal Code, the "Standard Specifications And Design Criteria", maintained at the offices of the City Clerk and the City Engineer, is hereby approved and adopted by this governing body for application in connection with improvement of the public highways, thoroughfares, streets and right-of-way accomplished as part of a subdivision or the development of single parcels of private property not part of subdivision proceeding, and pursuant to Title 12 and 17 of the Union City Municipal Code and the Subdivision Map Act of the State of California.

BE IT FURTHER RESOLVED that the standards adopted hereby are not intended to be so rigidly applied that subdivider or developer who so desires is prevented from using an alternate design, material, or method of construction, provided any such alternate has been approved by the City Engineer as acceptable.

Upon application being made, the City Engineer may approved any such alternate provided the City Engineer finds that the proposed design is satisfactory from an engineering standpoint and is desirable for functional, aesthetic, or other reasons, and that the design, material, method, or work proposed is, for the purposed intended, at least the equivalent of that prescribed in the said adopted standards in quality, strength, effectiveness, durability, safety, engineering practicability, and will not result in increased future problems to the public in terms of maintenance, or for any other reason, after the said improvements are accepted by the City for maintenance.

The foregoing resolution was introduced and adopted at a regular meeting of the City Council held on October 3, 1988.

**OBTAINING COPIES OF DOCUMENT AND  
NOTIFYING CITY OF APPARENT ERROS**

This document is available at a cost of \$ 15.00 each. Copies may be obtained at

The Department of Public Works  
City of Union City  
34009 Alvarado-Niles Road  
Union City, CA 94587  
(510) 471-3232

The Public Works Department would appreciate your comments and suggestions for improving this document. Please use the form below to notifying us of any apparent errors, and for your suggestions and comments.

---

**STANDARD SPECIFICATIONS AND DESIGN CRITERIA ERROR FORM**

ERROR (S) FOUND: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Please describe error and specify the page number).

COMMENTS AND SUGGESTION:

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OFFICE USE ONLY (please do not write below dash line)

COMMENT: \_\_\_\_\_

\_\_\_\_\_

CORRECTION ACCEPTED FOR FUTURE REVISION? YES [  ] NO [  ]

STAFF REVIEWING ERROR FORM \_\_\_\_\_

(name and title)

Note: All error forms received should be filled in the Standard Specifications Review File.

**CITY OF UNION CITY**  
**STANDARD SPECIFICATION**

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**SECTION 1: GENERAL PROVISIONS**

**1.1. DEFINITIONS**

Where in these specifications and other contract documents the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows:

**1.1.1 ENGINEER** – “Engineer” shall mean City Engineer of the City of Union City, California, acting either directly or through properly authorized agents acting within the scope of the particular duties delegated to them.

**1.1.2 CITY** – The word “CITY” as used herein means the City of Union City, Alameda County, California.

**1.1.3 CITY COUNCIL** – “City Council”, means the City Council of the City of Union City, Alameda County, California.

**1.1.4 CONTRACTOR** – “Contractor” means the person or persons, co-partnership or, corporation, who have entered into a contract with the City of Union City as a party or parties of the Second Part or his or their legal representative. This shall include any individual, firm, association, syndicated, trust or any other legal entity affecting a subdivision of land or individual development within the City of Union City, Alameda County, California.

**1.1.5 STANDARD SPECIFICATIONS** – The Standard Specifications of the State of California, Department of Transportation (CALTRANS), May 2006 version.

**1.1.6 STANDARD DETAILS** – The City of Union City Standard Details as amended to date.

**1.1.7 STANDARD DETAILS** – The Standard Plans of the State of California, Department of Transportation (CALTRANS), May 2006 version.

**1.1.8 SUBDIVISION AGREEMENT** – an agreement entered into between Contractor and City, involving a final map or maps, or the division of land in the City of Union City, and the dedication of improved streets, highways, ways and/or easements and/or the dedication of other property to City for the public benefit. Said final map or division of land is done in accordance with Title 17 of the City of Union City Municipal Code and the Subdivision Map Act of the State of California.

**1.1.9 PUBLIC IMPROVEMENT AGREEMENT** – an agreement entered into between Contractor and City, involving such street work and/or utilities to be installed, or agreed to be installed, by Contractor on land to be used for public streets, highways, ways and/or easements without a final map.

**1.1.10. SPECIAL PROVISIONS** – specifications developed for particular projects and made part of contact documents for the project.

## **1.2 REFERENCE TO OTHER SPECIFICATIONS**

Where, in these specifications or non the plans, reference is made to the State of California Standard Specifications or to the Standard Specifications, it shall mean the STANDARD SPECIFICAIONS, State of California, Department of Transportation, January 1988 version.

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

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

**1.2.1 DEPARTMENT OF PUBLIC WORKS, or DIVISION OF HIGHWAYS** – the City of Union City, Public Works Department.

**1.2.2 DIRECTOR OF PUBLIC WORKS** – The City of Union City, Public Works Director.

**1.2.3 ENGINEER** – the City Engineer, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

**1.2.4 LABORATORY** – Any laboratory approved by the City of Union City to test materials and work involved in the contractor.

**1.2.5 STATE** – The City of Union City, Alameda County, California.

## **1.3 OTHER PROVISIONS & SUPPLEMENTS**

These provisions are to be used in conjunction with the City of Union City Standard Details and may be modified or supplemented by special provisions placed on the improvement plans or contract as approved by the City Engineer or as required by conditions imposed by the City Council at the time of project approval.

## **1.4 LEGAL RELATIONS AND RESPONSIBILITY**

The Contractor's attention is directed to the provisions of Section 7 of the Standard Specifications, all of which are applicable to this contract.

## **1.5 AGREEMENTS, BONDS, INSURANCE AND PERMITS**

Where the total construction cost for work within public right of way or right of way to be dedicated to City exceeds twenty thousand dollars (\$ 20,000), contractor shall be required to enter into a Public Improvement Agreement or Subdivision Agreement, whichever is applicable, with City. Such an agreement shall involve the following:

- a) Faithful Performance Bond, being one-hundred percent of total construction cost.

- b) Labor and Materials Bond, being fifty percent of total construction cost
- c) Maintenance Bond, being ten percent of total construction cost.
  
- d) Liability and property damage insurance in favor of City. Liability insurance shall be in an amount not less than one-million dollars (\$ 1,000,000) for injuries, including but not limited to death, to any one person and on account of one occurrence. Property damage insurance shall also be in an amount of not less than one-million dollars (\$ 1,000,000) for damage to the property of any one person and on account of any one occurrence.

Where total construction cost for work within public right of way or right of way to be dedicated to City is less than or equal to twenty-thousand dollars ( \$20,000), Contractor may not be required to enter into an agreement with City. Instead, Contractor shall apply for an encroachment permit for such work and provide City with an encroachment bond to be one-hundred percent of total construction cost.

City Engineer, in addition to the bond, may also required the liability and property damage insurance described above for any and all work within public right of way as part of the encroachment permit. Generally, an encroachment permit for public street improvement not exceeding \$ 20,000.00 and involving pavement, curb gutter, sidewalk and other facilities shall require liability and property damage insurance. Other encroachment permits involving minor installations such as driveways or storm drain pipes but no major improvements may only require bonds and not insurance, except where public liability is considered high.

In general, the above insurance and bonds shall be posted by the Contractor who has entered into contract with City, however, City Engineer may allow a legal representative or other entity hired to perform work to provide the required bonds and insurance.

## 1.6. NOTIFICATION

- 1.6.1 PUBLIC WORKS DEPARTMENT. The Contractor shall notify the City Engineer at least two (2) working days prior to commencing work. Contractor shall also notify Underground Service Alert prior to any excavation for location of utilities (800-642-244).
- 1.6.2 POLICE & FIRE DEPARTMENTS. The Contractor shall notify the City Police and Fire Departments daily, regarding excavations, barricades and detours.
- 1.6.3 EMERGENCY PHONE NUMBER. The Contractor shall leave an emergency telephone number with the City Police and Fire Departments and with the Public Works Department.
- 1.6.4 UTILITY AGENCIES & COMPANIES. Immediately after the award of the contract by the City, the Contractor shall notify Pacific Gas & Electric, AT&T and Comcast Cable TV of said award so that they may proceed immediately with the relocation of their respective facilities, if any relocation is required.

The Contractor shall notify the Union Sanitary District, the Alameda County Water District, and the Alameda County Flood Control and Water Conservation District, prior to beginning work adjacent to their respective facilities;

**Alameda County Flood Control & Water Conservation District**, 399 Elmhurst Street, Hayward, CA 94544. Phone 510-670-5480.

**Alameda County Water District**, 43885 South Grimmer Boulevard, Fremont, CA 94538. Phone 510-659-1970.

**Union Sanitary District**, 5072 Benson Road, Union City, CA 94587. Phone 510-477-7500.

**CITY OF UNION CITY**  
**STANDARD SPECIFICATIONS**

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**SECTION 2: MISCELLANEOUS**

2.1. EXISTING UTILITIES

2.1.1 THE LOCATION AND TYPES of existing utilities and services shown on the improvement plans are based on information furnished by the serving agencies. It shall be the sole responsibility of the Contractor to verify the exact locations, sizes, and depths of all utilities, shown on the plans. Every precaution shall be taken to avoid damage to any utilities encountered.

2.1.2 MAINTENANCE OF FACILITIES. Unless otherwise specified in the Special Provisions or indicated on the plans, or directed by the Engineer, the Contractor shall maintain all water, gas, or sewer services, lighting, power or communication conduits and other surface or sub-surface facilities. Should it be necessary in the performance of the work to disconnect or reroute any utility or should any utility be damaged during disconnection, rerouting, damage or replacement the contractor shall bear responsibility. The City reserves the right, if requested by a property owner, to permit the owner to move or maintain any utility creating an inconvenience as a result of the contractor's work, at the Contractor's expense.

2.1.3 RESERVATION OF RIGHTS. The right is reserved by the State, the County or the City and by the owners of public utilities and franchises, to enter upon any street, road, right of way, or easement for the purpose of maintaining their property and making necessary repair or changes caused by the work.

It shall be the Contractor's responsibility to delay and otherwise coordinate his work schedule to facilitate the work of these agencies. The City of Union City shall not be responsible for any damage to the Contractor because of delays or restrictions that may be caused by the work of other agencies, or the requirement thereof. No additional compensation or time will be allowed to the Contractor due to the extra work caused the Contractor by the requirements of these agencies, or by the City, during said period of relocation operations.

2.1.4 LIQUIDATED DAMAGES & UNSPECIFIED UTILITIES. In the event that utilities are located in the ground that are not indicated on the plans, the Contractor shall not be assessed liquidated damages for delay in completion of the project when such delay was caused by the failure of the utility owner to remove or relocate the existing facilities. If the Contractor while performing the contract discovers utility facilities not identified by the City in the plans or specifications, he shall immediately notify the City in writing. The contractor may then be eligible for additional payment as specified in Section 8-1.09 Right of Way Delays of the Standard Specifications.

2.2. RIGHTS OF WAY

2.3 PROVISIONS OF RIGHT OF WAY AND EASEMENT. Rights of way or easements for the work to be constructed will be provided by the City within a reasonable length of time after the ward of the contract. The Contractor shall make his own arrangements and pay any and all expenses for additional area required by him outside of the limits of rights of way or easements shown on the plans.

In the event of delay on the part of the City in obtaining the specified rights of way or easements for the work to be construction then the Contractor shall be allowed additional time for the completion of his contract for the period or periods caused by such delays.

2.3. INSPECTION AND STAKING

2.3.1. RESPONSIBILITY. Inspection, with the exception of utilities or facilities controlled by other agencies, shall be the responsibility of the City of Union City. Utilities or facilities controlled by other agencies shall be inspected by the agencies concerned.

2.3.2 CONSTRUCTION STAKING shall be provided as specified in the Special Provisions.

2.4. TRAFFIC CONTROL

2.4.1 ACCESS to properties along roads or streets shall be provided as far as practicable by the contractor. Temporary approaches to and crossings of intersecting streets shall also be provided by the contractor and maintained in good condition.

2.4.2 PROVISION AND MAINTENANCE OF FACILITIES. The Contractor shall provide and maintain such facilities as fences, barriers, signs, flags, lights, devices, watchmen and flagmen as may be necessary to control traffic and prevent avoidable accidents to the public. Where such facilities, or any of them are not provided or are out of service, an emergency exists that necessitates protective measures, the Engineer, or his representative may provide such facilities during the emergency, and the cost thereof shall be paid by the Contractor or deducted from monies due him on his contract.

The Engineer or his representative, before taking the aforementioned emergency action, shall take all reasonable steps to notify the Contractor to care for the same with his own crew, provided he acts promptly and expeditiously. Signs, flags, lights, and other warning and safety devices conform to the requirements set forth in the current “Manual of Warning Signs, Lights and Devices for Use in Performance of Work Upon Highways” of the State of California, Department of Public Works, Division of Highways.

The Contractor shall maintain one lane of traffic in each direction unless otherwise authorized by the Engineer.

2.5. WORK WITHIN RAILROAD RIGHT – OF – WAY

The contractor is responsible for making all arrangements to be able to work within any railroad right-of-way. Such work shall be conducted in accordance with any and all requirements of the railroad



company. The contractor is also responsible for matters regarding fees, bonds, permits, working conditions, etc. The City shall be furnished a copy of all papers and agreements entered into with the railroad company and no work shall be undertaken within the railroad right-of-way until the requirements of the railroad company are satisfied, copies of papers furnished the City, and approval by the City Engineer is given.

The contractor shall pay the cost of all fees, bonds, permits and other obligations that may be involved with the work within the right of way of the railroad company. No claims by the contractor other than for possible time extension, shall be made for delays due to the work of the railroad company or others within said right-of-way.

**CITY OF UNION CITY**  
**STANDARD SPECIFICATIONS**

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**SECTION 3: CLEARING AND GRUBBING**

3.1. DESCRIPTION

This work shall consist of removing all objectionable material from within the street right-of-way, construction sites, pipeline rights-of-way and easements and such other areas as may be specified in the Special Provisions, delineated on the plans, an/or as directed by the Engineer.

3.2. CONSTRUCTION

3.2.1 CLEARING AND GRUBBING shall conform to the requirements of Section 16 “Clearing and Grubbing” of the Standard Specifications except as modified herein.

Except where noted on the plans or directed by the Engineer, the entire street right of way, construction site and pipeline rights of way and easements shall be cleared.

3.2.2 WHERE DELINEATED ON THE PLANS or required by the Engineer, driveways, sidewalks, and parking areas within the right of way requiring reconstruction shall also be cleared. Clearing of driveways, sidewalks, and parking areas and other conform areas on private property (outside the right-of-way) as shown on the plans shall be required.

3.2.3 EXISTING SURFACE IMPROVEMENTS shall be removed, relocated, salvaged or reconstructed, all as delineated on the plans. The removal of the existing roadway paving, unless otherwise specified in the plans or special provisions, is not to be included in this item of work. Salvaged public improvements not reused shall be delivered to the City Corporation Yard unless specified otherwise.

3.2.4 REMOVAL OF BUILDINGS are not to be included in this item of work. The Contractor, however, shall remove, under this item, all remaining foundations, sidewalks, underground facilities within the right-of-way.

The Contractor shall protect from damage all improvements, buildings and appurtenances and facilities within the right of way which are to remain. He shall also protect from damage all improvements adjacent to, but outside the areas to be cleared. Any such improvements which are damaged as a result of the Contractor’s operations shall be replaced as directed by the Engineer, at the Contractor’s expense.

3.2.5 MATERIALS NOT DELINEATED ON PLANS. All materials not delineated on the plans to be salvaged shall become the property of the Contractor to be disposed of by him. The Contractor shall not dispose of any material by burning unless he has obtained the proper permits required by the Fire Department. The Contractor’s attention is directed to Section 7-1.13, “Disposal of Material Outside the Highway Right of Way”, of the Standard Specifications.

### 3.3. MEASUREMENT

Clearing and Grubbing will be paid for at the lump sum price specified in the Unit Price Schedule.

### 3.4. PAYMENT

The lump sum price, or the price per acre, paid for clearing and grubbing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in clearing and grubbing as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer, including the removal and disposal of all the resulting material.

When the contract does not include a contract pay item for clearing and grubbing as above specified, and unless otherwise specified in the special provisions, full compensation for any necessary clearing and grubbing required to perform the construction operations specified shall be considered as included in the prices paid for the earthwork involved and no additional compensation will be allowed.

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**SECTION 4: ROADWAY EXCAVATION AND GRADING**

4.1. DESCRIPTION

This work shall consist of performing all operations necessary to excavate all materials, regardless of character and subsurface conditions, from the roadway prism or jobsite, and placing all fill required for construction of embankments.

4.2. CONSTRUCTION

Excavation and grading shall conform to Section 19, "Earthwork", of the Standard Specifications, except as modified herein and on the plans.

4.2.1. **ALL ROCKS OR SOLID LUMPS** of material two and one-half inches (2-1/2") in the greatest dimension shall be removed from the upper six inches (6") of the grading plan and the resulting spaces filled with approved material.

Unless otherwise specified in the Special Provisions, shown on the plans or directed by the Engineer, the basement material shall be scarified to a depth of six inches (6") and re-compacted to 95% relative compaction, as determined by California Test No. 216 or 231 in place.

4.2.2 **ALL SURPLUS EXCAVATION** shall become the property of the Contractor and shall be disposed of outside the limits of the work at a location to be provided by the Contractor, and satisfactory to the Engineer.

4.2.3 **FULL COMPENSATION** for all haul and overhaul will be considered as included in the contract price paid for roadway excavation and grading and no additional compensation will be allowed therefore.

4.3. WATER AND WATERING

Water and Watering shall be as specified in Section 17, "Watering", of the Standard Specifications except that no separate payment will be allowed.

4.4 SUBGRADE PREPARATION

A "Class A" subgrade shall be prepared conforming to the applicable provisions of Section 19 of the Standard Specifications. Particular attention shall be given to obtaining the specified compaction over utility trenches.

#### 4.5. FINISHING ROADWAY

Upon completion of all construction operations, the entire project shall be finished as specified in the applicable portions of Section 22 of the Standard Specifications, and as shown on the plans. No separate payment will be made for finishing roadway.

#### 4.6. MEASUREMENT

Roadway excavation and grading shall be measured by the cubic yard unless specified as a final pay quantity. The cubic yardage shall be determined by taking cross sections prior to construction, plotting on these sections the theoretical finish subgrade section and computing the cubic yards by the Average-End-Area method.

If Roadway Excavation and Grading is specified in the Unit Price Schedule as a Final Pay Quantity, measurement will not be applicable.

#### 4.6. PAYMENT

The price paid per cubic yard for roadway excavation and grading shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work necessary and incidental including water and watering, subgrade preparation and finishing the roadway to prepare the grading plane and subgrade to the line and grade as shown on the plans and as specified herein.

If Roadway Excavation and Grading is specified in the Unit Price Schedule as a Final pay Quantity (F), payment shall be made in accordance with Section 9-1.015 "Final Pay Quantities" of the Standard Specifications.

All items of work which appear on the plans and for which no item of payment is included in the contract shall be considered as included in the price per square foot for roadway excavation and grading.

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**SECTION 5: DUST CONTROL**

5.1. DESCRIPTION

This work shall consist of applying either water or dust palliative, or both, for the alleviation or prevention of dust nuisance.

The application of either water or dust palliative shall be under the control of the Engineer at all times. The Engineer will determine whether water or dust palliative is to be used to alleviate or prevent dust nuisance, and the amounts of material to be used,

It is understood that the provisions in this specification will not prevent the Contractor from applying water or dust palliative for his convenience if he so desires.

5.2. CONSTRUCTION

Water shall be applied as provided in Section 17, "Watering", of the Standard Specifications and dust palliative shall conform to and be applied as provided in Section 18 "dust Palliative" of the Standard Specifications.

5.3. MEASUREMENT

Not applicable.

5.4. PAYMENT

Payment for dust control shall be considered as included in the various items specified in the Unit Price Schedule and no additional payment will be made therefore.

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**SECTION 6: AGGREGATE SUBBASE AND BASE**

6.1. DESCRIPTION

This work shall consist of furnishing, spreading and compacting aggregate subbase and bases to the thickness and at the location designated on the plans and specified in these specifications and the Special Provisions.

6.2. MATERIALS

Aggregate subbase and base shall conform to the applicable provisions of Section 25 and Section 26 of the Standard Specifications except as modified herein.

Aggregate subbase shall be Class 2 or Class 3, as shown on the plans or specified in the Special Provisions.

6.2.1 AGGREGATE BASE shall be Class 2.

6.2.2 THE REQUIRED R-VALVE will not be waived

6.2.3 ANY OVERSIZE MATERIAL shall be removed before delivery to the roadbed.

6.2.4 GRADATION. Aggregation base shall conform to the gradation requirements of Section 26-1.02B of the Standard Specifications.

6.2.5 SOURCE OF MATERIAL. The Contractor shall inform the Engineer in advance as to the source of the proposed materials to be used as subbase and base. Sufficient time shall be allowed to permit evaluation of the sources by testing. No material may be placed without prior approval and/or testing by the Engineer.

6.3. CONSTRUCTION

Construction shall be in accordance with the applicable provisions of Section 25 and Section 26 of the Standard Specifications.

6.3.1 WATERING shall be considered as included in the contract price paid for aggregate base or subbase and no additional payment will be made therefore.

6.4. MEASUREMENT

Aggregate subbase and aggregate base shall be measured by the ton in accordance with the provisions of Section 26-1.06 of the Standard Specifications.

## 6.5. PAYMENT

The contract unit price per ton of Aggregate Subbase or Aggregate Base of the designated compacted thickness shall include full compensation for furnishing all labor, materials, tools and equipment and for all work necessary and incidental including water and watering, to complete the aggregate subbase and aggregate base as shown on the plans and as specified herein.



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**SECTION 7: LIME-TREATED SUBBASE**

7.1. DESCRIPTION

This work consists of mixing in-place materials, lime and water, and spreading and compacting the mixture to the lines, grades and dimensions shown on the plans and as specified in these specifications and the Special Provisions.

7.2. GENERAL REQUIREMENTS

All work shall conform to the applicable provisions of Section 24, “Lime Treatment”, of the Standard Specifications except as modified herein.

The lime treatment of native materials shall be a continuous operation from initial application of the lime to placement of the next overlaying layer of the structural section taking into account any curing time necessary to make the treated materials friable.

Any structural deficiency of the treated material resulting from failure to process the lime treatment operation diligently resulting in loss of the cementing action of the lime treatment shall be the responsibility of the Contractor and corrective measures will be taken at no expense to the City of Union City.

7.2.1 R-VALUE AND COMPACTION. The R-Value of the lime treated material in accordance with State of California Test No. 301 shall be 50 minimum or as specified on the plans.

Relative compaction in accordance with State of California Test No. 216 shall be 955 minimum.

7.2.2 DUST CONTROL. Equipment used in the spreading and mixing operations shall be of such design that the lime dusting problem will be effectively controlled as approved by the City Engineer. Spreading and mixing operations will be suspended whenever wind conditions are such that dust control is a problem.

7.2.3 PLACEMENT OF SUSEQUENT LAYERS. No materials will be placed above any lime treated subbase which does not meet the R-Value and the compacting requirements stated above.

7.2. COMPACTION OF SUBGRADE. Compaction of original ground to a 95% minimum for a depth of six inches (6") will not be required.

### 7.3. MATERIALS

Lime shall contain not less than 85% Calcium Hydroxide, Ca(OH)<sub>2</sub> as determined by the State of California Test Method No. 414. A certificate of compliance with this specification shall be submitted with each delivery of lime to the Engineer along with a certified copy of the net weight of each delivery.

### 7.4. SCARIFICATION

Soil shall be scarified to the design depth and width prior to the application of lime.

### 7.5. SPREADING

Lime may be spread dry or slurried with water. Lime must be spread uniformly. Rate of lime application will be that required to obtain the minimum R-Value required as determined by laboratory testing of the soil characteristics.

### 7.6. MIXING

Mixing equipment shall be rotary in nature and capable of blending the lime, water and soil into a homogeneous mixture to a depth 2" greater than the thickness of the layer to be mixed.

### 7.7. COMPACTING

The maximum thickness of a compacted layer of material shall be 0.50 feet. If the required thickness is more than 0.50 feet, the lime treated subbase shall be compacted in two or more equal layers. The finished surface shall not vary more than 0.08 feet above or below the grade established by the Engineer; however, surface indentations such as those made by a sheep's foot roller will be permitted.

The lime treated soil shall be compacted to a relative compaction of not less than 95% as determined by Test Method No. California 216 or 231. The compaction requirement may be reduced as specified in Section 24-1.05 of the Standard Specifications.

### 7.8. CURING

The surface of the treated material shall be kept in a moist condition from the time of initial application of the lime until covered by the next layer by a method to be approved by the Engineer.

### 7.9. MEASUREMENT

Lime treated subbase shall be measured by the square foot to the neat lines as shown on the plans.

#### 7.10 PAYMENT

Payment for construction lime-treated subbase as specified will be made at the contract price per square foot of lime-treated subbase complete in place including all materials and water needed as specified.

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**SECTION 8: DEEP STRENGTH ASPHALT CONCRETE**

8.1. DESCRIPTION

This work shall consist of furnishing, spreading and compacting asphalt concrete over a prepared subgrade in conformance with Section 39, "Asphalt Concrete", of the Standard Specifications, as specified herein and as directed by the Engineer at the locations designated on the plans.

8.2. MATERIALS

Asphalt concrete shall be Type "B" and conform to the applicable provisions of Section 39 of the Standard Specifications except as modified herein.

Asphalt used in surface, base and subbase courses shall be steam refined conforming to Section 92, "Asphalts", of the Standard Specifications and have a penetration of 60-70, asphalt content to be 4% minimum, 6% maximum.

A tack coat of SS-1 shall be applied between asphalt concrete courses at the rate of approximately 0.05 gallons per square yard. All material shall conform to Section 94, "Asphaltic Emulsions", of the Standard Specifications.

Paint binder shall consist of penetration type asphaltic emulsion in conformance with Section 94, "Asphaltic Emulsions", of the Standard Specifications. Paint binder shall be applied to vertical surfaces of concrete gutter and existing surfacing that will come into contact with asphalt concrete.

8.3. CONSTRUCTION

Construction shall conform to the applicable provisions of Section 39, "Asphalt Concrete", of the Standard Specifications, except as modified herein, and as directed by the Engineer.

An 11-tired, 11-ton pneumatic roller shall be used for breakdown compaction on the subbase and base course followed by a 12-ton, 3 wheel steel tired roller with a compression on the rear wheels of not less than 325 pounds per linear inch of tire width. Tire pressure in pneumatic roller shall be 90 pounds per square inch. The temperature of the subbase and base during breakdown rolling shall be between 275 degrees and 290 degrees F.

For the surface course, a 12-ton tandem roller shall be used for breakdown compaction followed by a pneumatic roller as specified above and then finished with a steel roller. The temperature of the surface course for breakdown following shall be between 275 degrees and 290 degrees F.

Subbase shall be Type “B” asphalt concrete with 1” maximum size aggregate, course grading. Mix shall be placed at a temperature of 275 degrees to 300 degrees F. Optimum densification of 90% shall be reached prior to mix temperature reaching 200 degrees F. At the option of the Contractor, the entire subbase course may be placed in one lift, utilizing the rock spreader method or an approved equal. Rollers (pneumatic or steel) shall be kept 6” to 8” from the edges until the remainder of the mat is compacted in order to prevent lateral movement. Steel roller shall be used for finishing. In the event “pick-up” is encountered due to cool tires, roller-ease or an approved equal shall be used in lieu of water. The amount of asphalt in the subbase shall be approximately 5.2%.

Base material shall be Type “B” asphalt concrete with ¾” maximum size aggregate, medium grading. Mix shall be placed at a temperature of 275 degrees to 300 degrees f. Optimum densification of 95% shall be reached prior to mix temperature reaching 200 degrees F. A conventional paver shall be used for placing the base material. The amount of asphalt for the base material shall be approximately 5.5%.

Surface course shall be Type “B” asphalt concrete with ½” maximum size aggregate, medium grading. Mix shall be placed at the temperature of 275 degrees to 300 degrees F. Optimum densification of 95% shall be reached prior to mix temperature reaching 200 F. A conventional pave shall be used for the surface course lift. At the option of the contractor, the surface course may be placed in one lift, providing the compaction and temperature range requirements are strictly adhered to. The amount of asphalt used for the surface course shall be approximately 5.5%.

#### 8.4. MEASUREMENT

Asphalt concrete for subbase, base and surface course shall be measured by the ton in accordance with the provisions of Section 39-8.01 of the Standard Specifications.

#### 8.5. PAYMENT

Payment for Deep Lift Asphalt Concrete will be at the contract unit prices per ton and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the subbase, base, and surface course, including the prime coat and paint binder, complete in place, as shown on the plans and as specified herein.

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SECTION 9: ASPHALT CONCRETE

9.1. DESCRIPTION

This work shall consist of furnishing and installing asphalt concrete over a prepared subgrade to the thickness and at the locations designated on the plans.

9.2. MATERIALS

9.2.1 ASPHALT CONCRETE shall be Type “B” and conform to the applicable provisions of Section 39 of the Standard Specifications, except as modified herein.

9.2.2 ASPHALT BINDER shall paving asphalt having a rating of AR4000 conforming to Section 92, “Asphalts”, of the Standard Specifications.

9.2.3 AGGREGATE shall conform to the applicable provisions of Section 39-2.02, “Aggregate”, of the Standard Specifications for medium grading. Surface courses shall be of ½” maximum.

9.2.4 PRIME COAT shall be liquid asphalt (SC-70). The applicable rate for liquid asphalt prime coat shall be the maximum that will, under favorable weather conditions, be completely absorbed by the base material within 24 hours from the time of application.

9.2.5 PAINT BINDER shall consist of penetration type asphalt emulsion in conformance with Section 94 of the Standard Specifications. Paint binder shall be applied to vertical surfaces of concrete gutter and existing surfacing that will come into contact with asphalt concrete.

9.3. CONSTRUCTION

Construction shall conform to the applicable provisions of Section 39, “Asphalt Concrete”, of the Standard Specifications except as modified herein.

Unless otherwise specified in the special provisions or required by the Engineer, a pneumatic tired roller will not be required. One twelve-ton three-wheel steel-tired roller with a compression on the rear wheels are not less than 325 pounds per linear inch of tire width, and one eight-ton roller will be required for each asphalt paver at all times unless written permission is given by the Engineer to use only one roller. If only one roller is required, it may be either a twelve ton roller or an eight ton roller. When two or more lifts are required, the bottom lift shall be ¾” maximum grading.

The Contractor shall set or re-set all manhole frames and covers, valve boxes, and other appurtenances to the grade of the finished pavement prior to the placement of the last lift of the asphalt concrete surfacing.

9.3.1 MEASUREMENT. Asphalt concrete shall be measured by the ton in accordance with the provisions of Section 39-8.01, "Measurement", of the Standard Specifications.

9.3.2 PAYMENT. The contract unit price per ton for asphalt concrete, of the applicable thickness in place, shall include full compensation for furnishing all materials, labor, tools and equipment, and doing all work necessary and incidental, including the prime coat, pain binder, and setting or resetting new and existing manhole frames and covers, valve boxes and other appurtenances to grade to complete the asphalt concrete in place as shown on the plans and specified herein.

#### 9.4. BERMS

Asphalt concrete for berms shall be Type "B" of 3/8" maximum size aggregate and fine grading, conforming to Section 39, "Asphalt Concrete", of the Standard Specifications and these special provisions.

The asphalt binder for berms used shall be a paving asphalt of rating AR4000, regulated to produce a satisfactory mixture. The amount of paving asphalt for berms shall be increased 1-1/2% (by weight) over that required for surfacing.

Asphalt concrete berms shall be placed on top of asphalt concrete surfacing. Unless the surfacing is still tacky and free from dust, a light tack coat of emulsified asphalt shall be applied before placing the berm. The temperature range of the asphalt during placement shall be 225 to 300 degrees F, so adjusted to give the best results. All asphalt concrete for berms shall be machine placed by the extrusion method with compaction control.

9.4.1 MEASUREMENTS. Quantities of asphalt concrete berm to be paid for will be measured by the lineal foot, complete in place.

9.4.2 PAYMENT. Payment for asphalt concrete berm measured as specified above will be made at the contract unit price and shall include full compensating for furnishing all labor, materials, tools, equipment and incidentals necessary to install the berms complete in place as shown on the plans and as specified herein.

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SECTION 10: SLURRY SEAL

10.1. DESCRIPTION

This work shall consist of furnishing and spreading a slurry seal coat at the location designated on the plans.

All work shall be done in accordance with these specifications and Section 37-2, "Slurry Seal", of the Standard Specifications.

10.2 MATERIALS

10.2.1 MATERIALS. Materials shall be consistent with Section 37-1.02, "Materials", of the Standard Specifications except as modified herein.

10.2.2 ASPHALT EMULSION. Asphalt emulsion shall be an SS or CSS grade conforming to the provisions in Section 94, "Asphaltic Emulsion", of the Standard Specifications.

10.3 CONSTRUCTION

10.3.1. SLURRY SEAL. The slurry seal shall be mixed in continuous pugmill mixers. Truck mixers shall not be used.

10.3.2 CONTINUOUS TYPE PUGMILL mixers shall be equipped to measure and control the proper amount of emulsion, water and aggregate by volume. The emulsion and water shall be introduced into the mixer through an indicating meter by positive displacement type pumps. The displacement pumps shall be equipped with a ready means of varying the rate of delivery of emulsion and water. An approved means of weighing the delivery of emulsion and water to the mixer shall be provided in order that the accuracy of the displacement pumps can be checked at intervals determined by the Engineer. Aggregate feeders shall be directly connected with the drive on the emulsion pump. The drive shaft of the aggregate feeder shall be equipped with a revolution counter reading to 1/10 of a revolution. The contractor must provide a sufficient number of mixers on the job to produce a minimum of 20,000 square feet of slurry per day in order to maintain preset job schedules and to minimize inconvenience to the public.

The slurry seal shall be placed at a rate of not less than twelve (12) to fourteen (14) pounds of aggregate per square yard and at a thickness of 3/16" plus or minus 1/16".

The city will do preliminary sweeping where necessary

All incidental work such as surfacing of driveway aprons and returns shall be done concurrently with surfacing of the street proper and shall not be postponed for completion at a later date.



#### 10.4. MEASUREMENT

Slurry seal resurfacing shall be measured by the square foot, complete in place.

#### 10.5. PAYMENT

Payment for slurry seal resurfacing, measured as specified above, will be made at the contract unit price and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in construction the slurry seal resurfacing complete in place, including spreading, shaping, compacting, and clean up (including driveway aprons where necessary as shown on the plans and as specified herein.

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SECTION 11: SIGNS

11.1 STREET NAME SIGNS

Street name signs shall consist of an assembly of one, two, or three pairs of street name plates, as appropriate. Each pair shall be mounted back to back and held by approved hardware at the top of a two inch (2") standard galvanized pipe. There shall be at least one (1) street name sign assembly installed at each intersection and at least two (2) street name sign assemblies installed at each intersection where the pavement width of one of the intersecting streets is more than forty feet. See the Union City Standard Detail on street name signs.

Street name sign blanks shall be new sheet aluminum alloy 6061-T6, 0.063 inches thick and shall be Alodine #1200s treated. The corners shall be rounded with a one inch (1") radius and a hold shall be placed at each end. Signs with a horizontal measurement greater than 24" shall be fabricated using 6061T, .080" thick.

Signs shall be six inches (6") wide by twenty-four (24") minimum length and may be up to thirty-six inches (36") long when necessary to accommodate the sign legend.

Signs shall have reflective sheeting meeting State of California, Department of Transportation or Federal Specifications, (L. S. 300 B-Reflectivity I Specifications) for reflectivity and durability. Signs shall have blue-colored reflective sheeting with silver scotchlite letters. Main word letters shall be four inches (4") high of Series B or C. Smaller series may be used when necessary to accommodate the sign legend. Abbreviations shall be two inches (2") of Series C. Allowable abbreviations shall be as follows: AVENUE – Ave., COURT – Ct., BOULEVARD – Blvd., STREET – St., WAY – Wy.

11.1.1 MOUNTING HARDWARE. Mounting hardware shall be Bowman Style 306, Hawkins & Hawkins HS – 2C4 or approved equal.

11.2. STREET AND HIGHWAY SIGNS

11.2.1 STREET AND HIGHWAY SIGNS to be installed shall consist of a sign plate with appropriate face of reflective sheeting material, installed at the location shown on the plans and details. All signs shall be installed in accordance with the standards set forth in the Traffic Manual, State of California Department of Transportation.

11.2.2 ALL SIGN FACES shall be of reflective sheeting material and shall conform as to size, shape, color and legend to the current uniform sign chart as used by the State of California Department of Transportation.

11.2.3. STOP SIGNS shall be twenty-four inches (24") except thirty inches (30") stop signs shall be used for entry onto streets having pavement widths of greater than forty feet (40').

### 11.3. POSTS

Posts shall be two inch (2") standard weight galvanized iron pipe. The top end shall be finished to receive mounting cap and fittings. The bottom end shall be mashed flat and/or have a six inch (6") No.4 reinforcing bar welded to it three inches (3") from the end.

### 11.4. BASE

All signs posts shall be set in a base of Class C Concrete, eight inches (8") in diameter and twenty-six inches (26") deep. The post shall be centered in the base and two inches (2") above the bottom. The top of the base shall be flush with the sidewalk or curb. If there is no sidewalk or curb, the concrete base shall be left four inches (4") below grade and earth backfill placed to finish grade.

### 11.5. PAINT

11.5.1 POSTS shall be given a prime coat before erection. Priming shall be DuPont's "Kromite" Prime No. 67710 or W.P. Fuller's "Fultek" Prime No. 4550 or approved equal.

11.5.2 AFTER ERECTION, the exterior shall be cleaned and touched up with primer where needed. The finish coats shall consist of two coats of W.P. Fuller's "Myrate" white enamel or approved equal. The section up to twelve inches (12") above sidewalk or ground level shall be painted with W.P. Fuller's "Myratec" black enamel No. 1521 or approved equal.

### 11.6. MEASUREMENT

Signs shall be measured on a per unit basis. Each unit shall consist of one pole and as many signs to be installed on the pole as is designated on the plans, ie., tow or more signs on one pole counts as one unit.

### 11.7. PAYMENT

The contract price paid per unit sign, in place, shall include compensation in full for furnishing all material, labor, tools, and equipment and for doing all work necessary and incidental to install the sign, complete in place.

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SECTION 12: STREET LIGHTING

12.1. STREET LIGHTING SYSTEM

The street light system shall conform to the applicable provisions of the City of Union City Standard Details and Section 86, Paragraphs 86.1 and 86.2 of the Standard Specifications, with the following modifications:

12.2. ELECTRICAL MATERIAL

All electrical material shall be new, unless noted otherwise or indicated on the drawings and all new material shall be as recognized by the Underwriters' Laboratories, Inc., and shall bear that Underwriters' Laboratories, Inc.'s label and/or be listed by the Laboratories, whichever is applicable, and shall be in perfect condition after installation.

12.3. EXCAVATION

Excavations shall be backfilled in accordance with Section 4 of these specifications.

12.4. FOUNDATIONS

Foundations shall conform to the provisions of Section 86-2.03 of the Standard Specifications and the following:

12.4.1. CLASS. Foundations shall be Class B Portland cement concrete.

12.4.2. THE FINISHED FOUNDATION shall be level with the top of the curb, sidewalk or median surface. A construction joint shall be made four inches below the top of the finished foundations to enable the adjustment of leveling nuts on the anchor bolts which shall be placed in position before pouring concrete. Anchor bolts shall be a minimum of 36 inches long with a four inch right angle bend and shall be of diameter as specified by the manufacturer for the electroliers. All exposed portions of the anchor bolts, nuts and washers shall be hot-dip galvanized. The upper threaded portions of all anchor bolts shall be provided with two nuts and two washers each.

12.5. CONDUIT

All conductors shall be run in conduit, except for overhead and temporary installations and where conductors are run inside poles. Conduit and fittings to be installed underground shall be: (1) rigid metal type manufactured of mild steel, wrought iron or a silicon-bronze alloy containing at least 1.25% silicon and shall conform to UL Publication UL 6 for rigid non-metallic conduit (Publication UL 651) PVC schedule 40 Type II only.

All conduit installed on the surface of poles or structures or other exposed locations shall be unpainted zinc coated metal, or zinc coated metal painted to match the pole or structure.

The size of conduit used shall be as shown on the plans, but in no case shall it be less than one inch in diameter for No. 8 AWG (or smaller) or 1-1/2 inches in diameter for No. 6 AWG (or larger). In additions, the contractor may, at his option and expense, use conduit of a larger size than that shown or specified provided the larger size is used for the entire length of the run from outlet to outlet. Reducing coupling will not be permitted.

Where existing rigid metal conduit systems are to be modified or extended, rigid metal conduit only shall be installed.

All extensions above finish grade shall be rigid metal type.

The ends of all conduits, whether shop or field cut, shall be reamed to remove burrs and rough edges, cuts shall be made square and true so that the ends will butt or come together for the full circumference thereof. Slip joints or running threads will not be permitted. For coupling metal type conduit, an approved threaded union coupling shall be used. The threads on all ferrous metal conduit shall be painted with rust preventive paint before couplings are made up. All couplings for metal type conduit shall be tightened until the ends of the conduits are brought together, providing a good electrical connection throughout the entire length of the conduit run. Where the coating on ferrous metal conduit has been damaged in handling or installing, such damaged places shall be painted with rust preventive paint. Non-metallic type conduit shall be cut with a hacksaw or other approved tool. Non-metallic type conduit connections shall be of the solvent weld type.

All metal type conduit ends shall be threaded and shall be provided with conduit grounding bushings and shall be bonded with a jumper of woven copper strap, stranded copper wire, or solid copper wire all of which shall have a cross sectional area not less than No. 6 SWG. All conduit bends greater than 44 degrees shall be factory bends and shall have a radius of not less than eighteen inches (18"). Where factory bends are not used, conduit shall be bent, without crimping or flattening, using the longest radius practicable.

A No. 12 AWG, TW insulated copper pull wire shall be installed in all conduits which are to received future conductors. At least two feet of pull wire shall be doubled back into the conduit at each termination.

Conduit shall be laid to a depth of not less than 24 inches below the curb grade when placed beneath the curb or the curb and gutter, 18 inches below the sidewalk grade when placed beneath the sidewalk or driveways and 42 inches below the finish pavement grade when placed within the traveled way. Rigid metal conduit may be lain on top of the existing pavement within new curbed median strips being constructed on top of said pavement.

Rigid metal conduit shall be placed under existing pavement by jacking or drilling methods. Pavement shall not be disturbed without permission from the City Engineer. Excessive use of water, such that the pavement might be undermined, or subgrade softened, will not be permitted. Conduit stubs from electrolier foundations shall extend at least 6 inches below the top of the foundation. Conduit terminating in standards or pedestals shall extend approximately 2 inches vertically above the foundation and shall be sloped towards the handhole opening.

Conduit entering concrete pull boxes shall terminate 2 inches inside the wall box and not less than 2 inches above the bottom, and shall be sloped toward the top of the box to facilitate pulling of conductors. Conduit entering through the bottom of a pull box shall be located near the end walls to leave the major portion of the box clear. At all outlets, conduits shall enter from the direction of the run.

Conductors shall not be pulled into conduit until pull boxes are set to grade, crushed rock sumps installed, grout placed around conduit, and metallic conduit bonded.

## 12.6. PULL BOXES

Minimum pull box size shall be No. 3-1/2 unless otherwise noted on the plan. The contractor may use larger pull boxes at his option.

All pull box covers shall have cast brass hold-down lugs. Covers shall be inscribed "Street Lighting".

Pull boxes shall be installed at the locations shown on the plans or, when in long runs, they shall be spaced at 250 feet or less. A pull box, not smaller than a No. 3-1/2, shall be installed in the conduit run adjacent to, but not more than five feet away from every pole, pedestal, or structure.

The covers shall be reinforced concrete and shall be secured with two 3/8 inch brass hold down bolts with brass washers and nuts. Nuts shall be recessed below the surface of the cover.

When pull boxes are to be placed in areas subject to traffic loads, a steel or cast iron cover shall be used in lieu of the concrete cover. Such pull boxes shall be installed on a suitable concrete footing to withstand traffic loads. Cover shall be inscribed as specified above. Tops of pull boxes shall be flush with the surrounding grade or top of adjacent curb.

The bottom of pull boxes shall be bedded in crushed rock, as shown on the applicable City Standard Detail, to form a drain sump. The crushed rock shall be a permeable material consisting of hard, durable, clean sand, gravel, or crushed stone and shall be free from organic material, clay balls or other deleterious substances.

## 12.7. BONDING AND GROUNDING

Bonding and grounding shall conform to the provisions in Section 86-2.10 of the Standard Specifications and these special provisions:

12.7.1. **GROUND CONNECTION** shall be through a 5/8" X 10'0" copper-weld rod or equal, set vertically through and in the center of the base and extended above the finished base sufficiently to attach ground clamp and No. 6 bare copper wire. In lieu of the above, when permitted by the Engineer, the grounding connection may be a No. 6 bare copper wire extending through the base and coiled into four loops 15 inches in diameter buried 2 to 4 inches below the base. The underground conduit and all metal parts shall be continuously bonded and grounded according to the requirements set forth in the Standard Specifications, Section 86-2.10.

12.7.2. **A BONDING JUMPER** (AWG No. 6 or equivalent) shall be installed between ends of rigid metal conduit and from the conduit to the ground rod.

12.7.3. **THE GROUND WIRE** shall be connected to the electrolier by a stud or cap screw, but not be wrapping it around an anchor bolt so that the nut holding the electrolier in place also compresses the ground wire. The required stud or cap screw shall be stainless steel at least 3/8 inch diameter and equipped with one or two washers as needed to secure the ground wire conveniently.

## 12.8. CONDUCTORS AND WIRING

Conductors and wiring shall conform to the provisions of sections 86-2.08 and 86-2.09 of the Standard Specifications with the following modifications:

12.8.1. ALL CONDUCTORS shall conform to the latest requirements of the National Electrical Code and be labeled by Underwriters' Laboratories, Inc. Wire size, insulation type and manufacturer's name shall be permanently marked on the conductor jacket at regular intervals. All wire shall be delivered to the job site in complete coils containing manufacturer's name with an approval tag indicating wire size and type of insulation.

12.8.2. INSPECTION. The Inspector shall be present at all times when wire is installed in conduit. Any wire pulled without the presence of the Inspector will be rejected and shall be removed and replaced with new wire at the Contractor's expense.

12.8.3. SPLICES IN WIRE shall be soldered for all wire sizes #10 AWG and smaller. Wires larger than #10 AWG shall be spliced by approved solderless connectors of proper size. All splices shall be provided with insulation equal to or greater than the insulation of the wire.

12.8.4. MECHANICAL MEANS SHALL NOT be used to pull wires smaller than #1 AWG. Before any wire is pulled in, all conduits shall be clear of water, debris, etc., and dried out by an approved means, if necessary.

## 12.9. FUSED SPLICE CONNECTORS

Fused splice connectors shall conform to the provisions in Section 86-2.095 of the Standard Specifications.

## 12.10. HIGH PRESSURE SODIUM VAPOR LUMINARIES

High Pressure Sodium Vapor Luminaries shall conform to the provisions in Section 86-6.01 of the Standard Specifications and the Special Provisions.

12.10.1. **GLARE SHIELDS** are not required unless specified on the plans or the Special Provisions.

12.10.2. ALL LUMINARIES shall be complete with 120/240 volt primary regulator type built in HPF ballast capable of a regulated output (constant wattage) to within 2% limits with a 13% line voltage fluctuation. Type III distribution is to be provided unless otherwise indicated on the approved plans.

12.10.3. **INTEGRAL PHOTOELECTRIC** cells are to be provided unless switching and automatic control is provided by PG & E.

12.10.4. **ALL LAMPS** shall have a minimum rated lamp life of 24,000 hours at the wattage indicated on the plans. Only clear lamps as manufactured by General Electric, Westinghouse, Sylvania or approved equal shall be used.

12.11. ELECTROLIERS

Electroliers shall conform to the applicable provisions of the City Standard Details and the Standard Design Criteria.

12.11.1. **ONLY GALVANIZED STEEL** electroliers shall be used unless otherwise specified on the plans. For galvanized steel electroliers, the specifications shall be as follows:

**TABLE 12-1: Electrolier Specifications (\*)**

Height	Single 6' Arms	Double 6' Arms
	PACIFIC UNION METAL FB-11286-E6 Mod. 2C (hand hole)	PACIFIC UNION METAL FB-11286-EE6 Mod. 2C (hand hole)
30 ft.	AMERON PL-286-2  VALMONT DS-36-750A286-S-GV	AMERON PL-286D-2  VALMONT DS-36-750A286-D-GV

(\*) As specified or approved equal

12.12. COORDINATION WITH PACIFIC GAS & ELECTRIC COMPANY

Coordination of street lighting with Pacific Gas & Electric Company shall be done through the City. The contractor shall follow the procedure outlined in the Standard Design Criteria for coordinating work with PG & E.

Street lights may be designed by a licensed civil engineer where less than or equal to five electroliers are involved. For more than five electroliers, the street lights shall be designed by an electrical engineer.

12.13. MEASUREMENT

Street lights shall be measured by the unit complete in place.



#### 12.14. PAYMENT

The contract unit price paid per each standard city monument shall including full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing and installing the monument, complete in place, at the locations as shown on the plans, and in accordance with the City Standard Details.

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SECTION 13: MISCELLANEOUS STREET FACILITIES

13.1. DESCRIPTION

This work shall consist of applying painted and thermoplastic traffic stripes (traffic lines) and pavement markings at the locations shown on the plans. Work shall also include furnishing and installing street barricades, guardrails, header boards and survey monuments. All work shall be in accordance with the details shown on the plans or designated by the Engineer, and as specified in these specifications and the special provisions.

13.2. TRAFFIC STRIPES AND PAVEMENT MARKINGS

Traffic stripes and pavement markings shall conform to the details and dimensions shown on the plans, in accordance with the requirements of Section 84, "Traffic Stripes And Pavement Markings", of the Standard Specifications.

13.2.1. MEASUREMENT. Measurements shall be consistent with Sections 84-2.05 and 84-3.06 of the Standard Specifications.

13.2.4. PAYMENT. The contract price paid shall be in accordance with Sections 84-2.06 and 84-3.07 of the Standard Specifications.

13.3. STREET BARRICADES

Street barricades shall conform to the details and dimension shown on the plans and the standard details.

13.3.1. MATERIALS. The posts and cross members shall be constructed from redwood or Douglas fir at the option of the contractor. Redwood shall Heart Structural Redwood or Dense Structural Redwood. Douglas fir shall be construction grade, free from heart center.

13.3.2. MEASUREMENT. Street barricades shall be measured by the linear foot in place.

13.3.3. PAYMENT. The contract unit price paid per linear foot for street barricades shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing, painting and installing the street barricade, complete in place, as shown on the plans and standard details, as specified herein and as directed by the Engineer.

13.4. GUARD RAILS

Guard rails shall conform to the details and dimensions shown on the plans and the standard details.

13.4.1 MATERIALS. Guard rails shall conform to the requirements of Section 83-1.02B “Metal Beam Guard Railing” of the Standard Specifications.

13.4.2. MEASUREMENT. Guard rails shall be measured by the linear foot in place.

13.4.3 PAYMENT. The contract unit price paid per linear foot for guard rails shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing and installing the guard rail, complete in place, as shown on the plans and standard details, as specified herein and as directed by the Engineer.

### 13.5. HEADER BOARDS

Header boards shall conform to the details and dimensions shown on the plans.

13.5.1. MATERIALS. All header boards and stakes shall be of heart structural redwood or Dense Structural Redwood.

13.5.2. CONSTRUCTION. All header boards shall be held in place with 2” x 3” stakes of lengths necessary to extend a minimum of 12 inches into solid ground. All stakes shall be neatly pointed, driven vertically and securely nailed to the headerboards. Header boards shall have a continuous bearing on undisturbed earth or compacted base rock. The backfill on the unimproved side of the headerboard shall be compacted to the density of the undisturbed adjoining earth. When called for on the plans, asphalt concrete surfacing shall be placed back of the headerboard.

13.5.3 MEASUREMENT. Headerboards shall be measured by the linear foot in place.

13.5.4 PAYMENT. The contract unit price per linear foot for headerboards shall include a full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing the headerboard, complete in place, as shown on the plans, as specified in these specifications, the special provisions and as directed by the Engineer.

### 13.6. SURVEY MONUMENTS

Standard City Monuments shall be installed at the locations shown on the plans and shall conform to the details and dimensions shown on the plans and the City Standard Details.

13.6.1 MATERIALS. Castings shall be rough gray iron, free from cracks, holes and swells; shall be of workman like finish and shall conform to ASTM- A-48 Class 40.

13.6.2 CONSTRUCTION. Monuments shall be constructed after placing the asphalt concrete surfacing. The solid brass monument marker shall be set in the concrete before the concrete begins to set. The Engineer shall stamp and marker for the Contractor.

Forms for the tope of the post and the tapered circular opening shall be a stiff paper or cardboard of sufficient strength to retain the wet concrete without deflection and shall be removed after the concrete has set. The cast iron frame may be supported by brick, concrete blocks, or short length of steel rods driven into the earth.

No monument post shall be poured until the post hole has been inspected by the Engineer and his approval obtained. The monument post shall then be poured within 3 days after such inspection. Any monument post poured without such inspection and approval shall be completely removed and rebuilt as directed by the Engineer.

Monument posts shall be monolithic as shown on the drawing or standard detail. The top of the post shall be neatly struck off. All excess concrete shall be removed from the space between the post and the outer ring and the top of the post neatly finished to shed water.

13.6.3 MEASUREMENT. Monuments shall be measured by the unit complete in place.

13.6.4. PAYMENT. The contract unit price paid per each standard city monument shall including full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing and installing the monument, complete in place, at the locations as shown on the plans, and in confirmation with the standard details.

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SECTION 14: PORTLAND CEMENT CONCRETE

14.1. DESCRIPTION

Portland Cement Concrete to be used or furnished under these specifications shall conform to section 90, “Portland Cement Concrete”, of the Standard Specifications.

14.2. MATERIALS

14.2.1 WATER. Water for use in mixing concrete shall conform to Section 90-2.03 “Water” of the Standard Specifications.

14.2.2 PORTLAND CEMENT. Unless noted otherwise Portland cement shall be “Type II Modified” and conform to the applicable portions of Section 90-2.01 “Portland Cement” of the Standard Specifications.

14.2.3. COARSE AGGREGATE. Coarse aggregate shall conform to Section 90-2.02A of the Standard Specifications and shall be sound crushed rock, washed gravel, or a combination of both. It shall be free from oil, organic matter, and other deleterious substances.

Coarse aggregate, when tested, as hereinafter prescribed, shall meet the following requirements:

**Table 14-1: Coarse Aggregate Test Requirements**

<u>Tests</u>	<u>Test Method No.</u>	<u>Requires</u>
Loss in Los Angeles Rattler Test (500 Rev)	Calif. 211	45% Max.
Cleaness Value	Calif. 227	
Individual Test Result		71 Min.
Moving Average		76 Min.

14.2.4 FINE AGGREGATE. Fine aggregate shall conform to Section 90-2.02B of the Standard Specifications.

14.2.5 LAMPBLACK. Lampblack shall be of approved quality mixed at the rate of ½ pound per cubic yard of concrete.

#### 14.3. GRADING MATERIALS

Aggregate grading shall conform to Section 90-3 “Aggregate Grading” of the Standard Specifications.

#### 14.4. CONCRETE PROPORTIONS

Class A concrete shall contain not less than 564 pounds (6 sacks) of Portland cement per cubic yard.

Class B concrete shall contain not less than 470 pounds (5 sacks) of Portland cement per cubic yard.

Class C concrete shall contain not less than 376 pounds (4 sacks) of Portland cement per cubic yard.

Class D concrete shall contain not less than 658 pound (7 sacks) of Portland cement per cubic yard.

#### 14.5. MIXING AND TRANSPORTING

Mixing and Transporting shall conform to Section 90-6 “Mixing and Transporting” of the Standard Specifications.

#### 14.6. TESTS

A Certificate of Compliance shall be furnished to the Engineer for all ready-mixed commercial concrete, as provided in Section 6-1.07, “Certificate of Compliance”, of the Standard Specifications. All concrete mixed at the project site shall be subject to inspection by the Engineer.

Contractor shall perform tests showing that the concrete meets the provisions of these specifications and those of the Standard Specifications when asked to do so by the Engineer. Such tests, when requested shall be done under the direction and supervisions of the Engineer. The Contractor shall furnish all testing material and equipment as directed by the Engineer.

#### 14.7. PAYMENT

Payment for concrete shall be included in the payment made for the applicable item or work. Payment for testing shall be considered as included in the various items of work and no additional payment will be made therefore.

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SECTION 15: CONCRETE CURB, GUTTER, SIDEWALK, AND DRIVEWAY

15.1. DESCRIPTION

Concrete curb, gutter, sidewalk, driveways, valley gutters and island caps shall be constructed at the locations and to the dimensions shown on the plans and as directed by the Engineer and as specified herein. All work shall conform to the requirements of the applicable sections of the Standard Design Criteria and Section 73, “Concrete Curbs and Sidewalks”, of the Standard Specifications except as modified herein.

15.2. MATERIALS

15.2.1. CONCRETE. Construction shall be of Class B Concrete as specified under Section 14.4, “Concrete Proportions”, of these specifications, except that valley gutter shall be Class A concrete.

15.2.2. ADHESIVES. Adhesives used to bind new concrete to existing concrete or asphalt concrete surfaces shall be used only after approval of the Engineer. All adhesives shall conform to Section 95, “Epoxy”, of the Standard Specifications.

15.2.3. LAMPBLACK. Lampblack shall be of approved quality mixed at the rate of ½ pound per cubic yard of concrete.

15.2.4 JOIN FILLER. Pre-molded joint fillers shall be Type V, conforming to specifications of ASTM Designation: D 544, and shall be at least 3/8” wide.

15.2.5 DOWELS. Steel dowels shall conform to ASTM Designation: A-15.

15.2.6 CURING COMPOUND. Curing compound shall conform to Section 90-7.01B of the Standard Specifications. The use of any membrane material which would impart a slippery surface to the pavement or alter its natural color will not be permitted.

15.3. CONSTRUCTION

15.3.1 SUBGRADE CONSTRUCTION. Subgrade construction shall conform to Section 73-1.02, “Subgrade Preparation”, of the Standard Specifications and these specifications. The subgrade shall be constructed true to grade and cross section as shown on the plans. It shall be compacted to 90% relative compaction tested in conformance with California Test 216. The required thickness of aggregate subbase shall be placed in accordance with the Standard Details, and compacted to 90% relative compaction as tested in conformance with California Test 216.

15.3.2. EXISTING CONSTRUCTION. Where the plans provide for the reconstruction of a portion of an existing curb, gutter, sidewalk, or driveway, the existing section shall be cut to a minimum depth of 1-1/2" with an abrasive type saw at the first scoring line at or beyond the planned joint and the entire section to be reconstructed shall be removed. The new work shall join the old work at this line. If the old work is damaged beyond this line in removing the old concrete, a new line shall be cut beyond the line of damage and the damaged concrete shall be removed and replaced at no additional cost to City. All new work shall be connected to existing concrete by means of an approved adhesive.

15.3.3 FORMS. Forms shall be true and shall have a smooth, straight upper edge. Metal forms may be used upon approval by the Engineer.

Timber forms shall be surfaced on the side placed next to the concrete and shall be not less than 1 5/8" thick after being surfaced except on curb returns, horizontal curves and vertical curves where laminated timber forms, benders, or thin plank forms may be used.

The form boards of the exposed face of curb shall be milled to the proper radius at the lower inside corner.

Front face forms shall not be removed in less than one hour nor more than six hours after the concrete has been placed.

In no event shall forms be removed while the concrete is sufficiently plastic to slump. Side forms for sidewalks, island caps, valley gutters and driveways shall not be removed in less than twelve (12) hours after the concrete has been placed.

The depth of the forms shall be the full dimension of the concrete.

Forms shall be carefully set to alignment and grade and shall be held rigidly in place by stakes placed at intervals not to exceed four (4) feet. Clamps, spreaders and braces shall be used where, in the opinion of the Engineer, they are necessary to insure rigidity in the forms.

All re-used forms shall be thoroughly cleaned. Re-used and new forms shall be coated with form oil. This form oil should prevent the concrete from adhering to the forms and leave no film to be absorbed by the concrete.

15.3.4 PLACING CONCRETE. No concrete shall be placed until the forms have been checked by the Engineer and unless the Engineer is present. No concrete shall be placed when the air temperature is below forty (40) degrees F. During weather when frosts may be expected, the contractor shall carefully cover recently deposited concrete with burlap, straw, or earth.

The aggregate subbase and forms shall be watered immediately in advance of placing concrete.

After placement, the concrete shall be consolidated sufficiently to produce a dense mass, struck off, and floated. Final finishing operations shall not proceed until all bleed water has evaporated from the surface. Sprinkling of dry cement to absorb excessive surface moisture shall not be allowed.



The area around utility poles, electroliers, drop inlets and hydrants shall be blocked out during the initial placing of concrete.

15.3.5 EXPANSION JOINTS, CONTROL JOINTS, AND SCORE MARKS. Expansion joints shall be placed in the concrete curbs, gutters, sidewalks, at each side of driveways, at all returns, and at 20 foot intervals. Expansion joints shall be placed at right angles to the curb or sidewalk line and extend through the entire thickness of the concrete. Where side walk is constructed against concrete curbs, the joints shall be in line with joints through the curb.

Expansion joints shall be placed around utility poles, electroliers, drop inlets, and hydrants so that no concrete is in contact with the appurtenance.

Control joints, scored at least 1/5 depth of concrete being placed shall be constructed at intervals not to exceed 10 feet in concrete curbs, gutter, sidewalks, centerline of driveways, and island caps. Score marks shall be placed as directed by the Engineer. The width of the control joints shall not exceed 1/8" and the edges of control joints shall be finished with a "T" bar. All joints will be scored at right angles to the curb or sidewalk line.

Maximum delay between successive pours shall not exceed the time of initial set unless a construction joint is installed.

15.3.6 CURING. Curbs shall be cured as provided in Section 90-7, "Curing Concrete", except as modified herein.

As soon as the concrete is set, it shall be cured for a period of at least 72 hours by applying a suitable cover that will keep all exposed surface continually damp or by spraying with an approved impervious membrane curing compound.

The contractor shall protect from damage all completed work and in particular guard against damage to the edge of recently constructed concrete gutter. Repairs shall be made by removing and replacing the entire unit between scoring lines or joints. All discolored concrete shall be cleaned to a uniform color.

Repairs and cleaning of new concrete shall be at the expense of the contractor.

15.3.7 CURB AND GUTTER. Where new curb and new gutter are shown on the plans, they shall be constructed together as a unit. Prior to the removal of forms, the surface shall be finished true to grade by means of a straight edge float not less than 10 feet in length, operated longitudinally over the surface of the concrete.

Immediately after removing the front curb forms, the face of the curb shall be troweled smooth, and then finished with a steel trowel. The top shall be finished and the front and back edges rounded as shown on the Standard Details.

After the face of the curb has been troweled smooth, it shall be given a final fine brush finish with the brush strokes parallel to the line of the curb.

The top surfaces of the curb and gutter shall be troweled to a smooth surface. When a straight edge, 10 feet long, is laid on top of face of the curb or on the surface of gutters, the surface shall not vary more than 0.02 foot from the edge of the straight edge except at grade changes or curves.

Where the grade is flat, a water flow test will be required to detect depressions in the gutter.

Concrete curbs to be constructed directly over an existing pavement shall be anchored to the pavement by ¾" (minimum) round steel dowels ten inches (10") long on four foot (4') centers set in concrete grout in the existing pavement prior to construction the curb. In lieu of dowels and bar reinforcing steel and in advance of placing curbs on an existing pavement, the surface shall be thoroughly cleaned and a pressure sensitive adhesive shall be applied in strips 2" wide near the edges and inside the area on which the curb is to be placed. The adhesive shall be applied to the specified area at a rate directed by the Engineer.

The adhesive shall be of consistence suitable for heavy trowel application at atmospheric temperature and shall develop a tenacious bond on setting.

"S" and "W" shall be stamped on the face of curb where water services and sewer laterals pass under the curb.

15.3.8 EXTRUDED CURBS. Curbs, except on structures, may be placed by using an extrusion machine, if approved by the Engineer. All work shall conform to Section 73-1.05B of the Standard Specifications.

The completed subbase shall be tested for grade and cross section by methods approved by the Engineer.

The grade for the top of curb shall be indicated by an offset guideline set by the contractor from survey marks. The forming tube portion of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine to provide, when necessary, a variable height of curb conforming to the predetermined curb grade. A grade line gauge or pointer shall be attached to the machine in such a manner that a continual comparison can be made between the curb being placed and planned curb grades as indicated by the offset guideline.

In lieu of the above method for maintaining the curb grade, the extrusion machine may be operated on rails or forms set at a uniform depth below the predetermined finished top curb grade.

Concrete shall be uniformly fed to the machine and be of such consistency that after extrusion the concrete will maintain the shape of the curb section without support. If additional work is necessary to produce the required finish prior to brushing, the work shall be performed immediately after extrusion.

Expansion joints shall be constructed by sawing through the curb section to a width that will permit insertion of the required joint filler after which the joint filler shall be grouted in place.

15.3.9 SIDEWALKS, DRIVEWAYS, ISLAND CAPS & VALLEY GUTTERS. The 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 the proper grade and cross-section with a wood or aluminum float, troweled smooth and finished with a broom. The float shall be not less than 10 feet in length and not less than 6" in width. Brooming shall be transverse to the line of traffic and if water is necessary, it shall be applied to the surface immediately in advance of brooming.

The surface shall not vary more than 0.02 feet when measured with a 10 foot straight edge, except at grade changes, and the finished surface shall be free from blemishes.

Sidewalk constructed adjacent to existing curb, shall be joined to the curb by means of an approved adhesive or with #4 dowels at 2 foot on center.

Three #4 bars shall be placed as longitudinal re-enforcement in all valley gutters.

#### 15.4 MEASUREMENT

For the purpose of determining final pay quantities, sidewalks, driveways, island caps and valley gutters will be calculated to the nearest square foot, and curb and gutter to the nearest linear foot.

#### 15.5. PAYMENT

The price paid per linear foot of each type of concrete curb and gutter and per square foot of sidewalk, driveway, island cap, and valley gutter shall include full compensation for furnishing all labor, materials, tools equipment, and incidentals and for doing all the work including forming, furnishing and placing expansion joint filler, expansion joints, steel dowels where required, adhesives, and doing all the necessary work of construction the various items of work complete in place as specified. No additional payment will be made for dowels or adhesive.

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SECTION 16: STORM DRAINS

16.1. DESCRIPTION

This work shall consist of furnishing and installing reinforced concrete pipe storm drains, manholes, inlets, fittings and all other materials and appurtenances in accordance with the plans and these specifications, the end result being a completed project ready for use.

16.2 DEFINITIONS AND TERMS

Whenever in the body of these specifications the following abbreviations and terms, or pronouns in place of them are used, the intent and meaning shall be as follows:

ASTM	-	American Society for Testing Material
AI & SI	-	American Iron and Steel Institute

16.3 MATERIALS

All materials delivered to the job shall be new, best quality of their respective grades, and in conformance with the following specifications. In no case will a substitute be allowed without written approval of the Engineer.

16.3.1 REINFORCED CONCRETE PIPE. Reinforced concrete pipe shall conform to Section 65, "Reinforced Concrete Pipe" of the Standard Specifications except as modified herein. All pipes shall be Class III, unless otherwise shown n the plans or specified in the Special Provisions.

Reinforced concrete pipe shall be manufactured by either of the following processes:

- A. Centrifugally spinning an exterior steel plate form about its longitudinal axis.
- B. Vertically casting in forms of steel plate construction in such a manner as not to cause segregation of the ingredients and that when vibrated externally a dense pipe free from surface flaws is obtained.
- C. Vertically casting in steel forms in such a manner as not to cause segregation of the ingredients by roller packer head process.

The ends of the pipe shall perpendicular to the longitudinal axis of the pipe section. Pipe joints shall be of the tongue groove type, or an approved equal unless otherwise shown on the plans.

Pipe designated by D-Load shall be marked as described in the ASTM Specifications except that the D-Load shall be marked on the pipe. The D-Load shall be determined during tests as described in the ASTM Specifications.

In addition to the defects listed as cause for rejection under ASTM Specifications C-76, the pipe sections shall be subject to rejection on account of any of the following defects:

- A. Longitudinal cracks along more than one-half the length of the pipe and passing through more than one-half the shell.
- B. Occurrence of rock pockets, spall or blisters in excess of 120 square inches in area measured at the surface of the pipe, being greater than 30" in length; or a total area of rock pockets, etc., in a single eight foot section exceeding 180 square inches. Rock pockets, etc., of lesser area and depth may be repaired in the presence of, and in a manner approved by the Engineer.
- C. An extremely rough surface on the interior face of the pipe which in the opinion of the Engineer will effect the flow characteristics of the pipe.

16.3.2 PRECAST MANHOLE SECTIONS. Precast manhole sections shall conform to size, shape and details shown on the plans and to the requirement of ASTM Specification Serial Designation C-478 as amended to date.

16.3.3 CASTINGS. Castings for manhole frames, covers and other purposes shall conform accurately to the form and dimensions shown on the Standard Details. Castings must be of workmanlike finish, free from blow and sand holes or defects of any kind, and shall be made from a superior quality of tough even grained grey iron, and shall possess a tensile strength of not less than twenty thousand pounds per square inch (20,000 psi). The bottom rim of the cover and the seat of frames shall be machined to form a close fit, free from wobble. The combined weight of frame and cover shall exceed 330 pounds.

Before leaving the foundry, all castings shall be thoroughly cleaned and coated by dripping in asphalt applied at a temperature of 300 degrees Fahrenheit, in such a manner as to provide a firm, durable tenacious coating.

16.3.4 INLET FRAMES AND GRATES. Inlet frames and grates shall conform to size, shape, and details shown on the Standard Details. Rectangle frames shall be fabricated from structural steel conforming to the requirements of ASTM Specifications, Serial Designation A-36. The bar portion of the frames may be fabricated from special quality hot rolled steel bars conforming to the AI&SI Specification Designation No. C1021. Frames and grates shall be match-marked in pairs before delivery to the job site and the grates shall fit into their frames without rocking.

16.3.5 REINFORCING BARS. Reinforcing bars shall be of Intermediate Grade Billet Steel conforming to ASTM Specification Serial Designation A15 and shall be of the size shown on the Standard Details or on the plans. Bars shall be of round deformed type, free from injurious seams, flaws or cracks, and shall be cleaned of all rust, dirt, grease and loose scale.

16.3.6 MORTAR. Mortar shall conform to the requirements of Section 65 of the Standard Specifications.

## 16.4. CONSTRUCTION

16.4.1 HANDLING OF MATERIALS. Reinforced concrete pipe, precast concrete manhole sections, inlet frames and gratings, castings and fittings 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. Any material which is checked spoiled or damaged shall not be installed and such material must be permanently removed from the job site.

16.4.2 TRENCH EXCAVATION. Any existing pavement over the trench shall be cut, removed and hauled away from the job site except oil surfacing one inch (1") or less in thickness. Pavement shall be cut or sawed neatly along the edges of the trench. If a longitudinal pavement joint or edge of pavement is located within three feet (3') of the limits of the excavation, the Contractor shall removed all intervening pavement and replace it after completion of backfilling the trench.

All storm drains shall be laid in open trench or tunnels and open trench as indicated on the plans or as directed by the Engineer. The maximum clear width of trench at the top of the pipe shall not be more than the outside diameter of the barrel of the pipe plus two feet and such maximum width shall be inclusive of all trench shoring. Greater width of trench at the top of the pipe shall be permitted only on written approval by the Engineer. The minimum clear width shall be the outside diameter of the barrel of the pipe plus eighteen inches (18"). For clear widths exceeding the maximum the pipe shall be cradled or embedded in concrete as directed by the Engineer.

The trench shall be excavated a minimum of three inches (3") below the grade of the bottom of the pipe and sufficient bedding material shall be placed in the trench and tamped to bring the trench bottom up to grade of the pipe. The pipe bedding material shall be shaped by hand. It is the intention of these requirements to provide a firm, uniform bearing under the full length of pipe to a width of at least 60% of the external diameter.

Where the trench bottom is unstable due to a wet or spongy foundation, the trench bottom must be stabilized with gravel or crushed rock. If the unstable condition is caused by the operations of the Contractor, such gravel or crushed rock shall be furnished at the Contractor's expense. The Engineer shall be the sole judge of the suitability of the trench bottom and as to the amount of gravel or crushed rock needed to stabilize a soft foundation. The Contractor shall remove any soft material and replace it with gravel or crushed rock when ordered to do so by the Engineer.

At all street crossings, existing driveways, water gate valves and fire hydrants, the contractor shall make provisions for trench crossing for free access either by means of backfill or temporary bridges, as the Engineer may direct. Means shall also be provided whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

16.4.3 BRACING AND SHORING. Excavations shall be supported and excavation operations conducted in accordance with Article 4 "Excavations" of the State Division of Industrial Safety Construction Orders, as amended.

During backfilling the bottom of the shoring shall be kept above the level of the backfill at all times.

16.4.4 **CONTROL OF WASTE WATER.** The Contractor shall furnish, install and operate all necessary equipment to keep trenches reasonably free from water. All water removed from trenches or flushed from pipes shall be disposed of in a manner that will not cause injury to public or private property or cause a nuisance or menace to the public. Under no circumstances will the laying of pipe or the placing of concrete in water be permitted.

16.4.5 **LAYING CULVERT PIPE.** Reinforced concrete pipe used for drainage purposes and dry conduits shall be laid and joined in accordance Section 65, "Reinforced Concrete Pipe", of the Standard Specifications, except as modified herein with the goal of obtaining results for the purposes intended.

New reinforced concrete pipe shall be connected to existing drainage facilities as shown on the plans.

Necessary facilities shall be provided for lowering and properly placing the sections of pipe in the trench. Circular pipe with elliptical reinforcement shall be placed with the minor axis of the reinforcement in a vertical position.

The pipe shall be laid to the lines and grades with the sections closely jointed. All pipe shall be laid upgrade, unless otherwise permitted by the Engineer.

All joints shall be cleaned and then sealed in accordance with Section 65-1.06 of the Standard Specifications.

Voids occurring in the outer and inner annular sealing material shall be filled with the same type of sealing material and the inside of the joint finished smooth.

Jointing materials shall be sufficiently protected from the air and sun to prevent drying or deterioration.

Liquid types of sealing materials shall be retained by molds or runners. Liquid materials shall be poured or pumped into the joint space in a continuous operation and agitated until the joint is completely filled.

Every precaution shall be taken to prevent flooding the pipe trench before backfilling operations. Free water shall not be allowed to come in contact with the pipe line until Portland cement sealing materials have set at least 24 hours.

16.4.6 **JOINTS.** The joints shall be completely and compactly filled with mortar so as to make a strong joint. No mortar will be required in the outside joint recesses of self-centering pipe.

Unless otherwise approved by the Engineer, all joints shall be finished smooth on the inside of the pipe.

In pipe sizes twenty-four inches (24") and larger, inside joint recesses shall be hand-painted. In pipe sizes twenty-one inches (21") and smaller, inside joint recesses shall be buttered prior to closure be pointed inside the pipe and excess mortar removed by means of an inflate swab or squeeze.

16.4.7 **MANHOLES.** Manholes shall be located as shown on the plans and installed in accordance with the City Standard Details.

16.4.8 INLETS. Inlets shall be located as shown on the plans and installed in accordance with the Standard Details and the following specifications.

All inside and exposed surface of concrete shall be smooth and uniform when finished and the concrete shall be thoroughly compacted around all reinforcing bars. Inlets installed in curb returns shall have angle anchors curved to conform to the curb return radius.

16.4.9 UTILITY EASEMENTS. Whenever the trench lies within property controlled by agencies, such as the State of California, Alameda County, Southern Pacific Railroad, Western Pacific Railroad, Pacific Bell Company, Pacific Gas and Electric Company, the Contractor shall obtain such permits as may be required before entering these rights of way. The Contractor shall comply with the requirements of these agencies but these specifications shall be minimum requirements.

## 16.5 MEASUREMENT

16.5.1 REINFORCED CONCRETE PIPE. Reinforced concrete pipe shall be measured horizontally by the linear foot for the various strengths and sizes along the centerline of the pipe from centerline of manhole to centerline of manhole or end of pipe.

Pipe for inlet runs shall be measured horizontally by the linear foot along the centerline of pipe from the edge of inlet to the edge of manhole.

16.5.2 MANHOLES. Manholes shall be measured as one complete installed unit including base, precast sections, frame and cover.

16.5.3 INLETS. Inlets shall be measured as one complete installed unit including frame and grate.

16.5.4 TRENCH STABILIZATION. Trench stabilization shall be measured by the ton of gravel or crushed rock placed to stabilize the foundation.

## 16.6 PAYMENT

16.6.1 REINFORCED CONCRETE PIPE. The contract unit price paid per linear foot for reinforced concrete pipe shall constitute full compensation for furnishing all labor, materials, tools and equipment for doing all work; including excavation, backfill and compaction and resurfacing required to install the reinforced concrete pipe complete as shown on the plans and specified herein.

16.6.2 MANHOLES. The contract unit price paid for each manhole shall include full compensation for all labor, materials, tools and equipment and for doing all work; including excavation, backfill, compaction and resurfacing, all shown on the plans and specified herein.

16.6.3 INLETS. The contract unit price paid for each inlet shall include full compensation for all labor, materials, tools and equipment and for doing all work; including excavation, backfill, compaction and resurfacing, all as shown on the plans and as specified herein.

16.6.4 TRENCH STABILIZATION. The contract unit price paid per ton of gravel or crushed rock shall include full compensation for all labor, materials, tools and equipment and for doing all work; including excavation, backfill and compaction, all as shown on the plans and as specified herein.



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SECTION 17: TRENCH BACKFILL

17.1. GENERAL SCOPE

These specifications shall apply to underground conduits, mains and pipes installed within existing and proposed street right of ways and public utility easements.

17.2 DEFINITIONS

17.2.1 PIPE BEDDING shall refer to that portion of the trench from the bottom to 6” above the top of pipe.

17.2.2 INTERMEDIATE AREA shall refer to that portion of the trench from the pipe bedding up to the subgrade.

17.2.3 PAVEMENT REPLACEMENT shall refer to that portion of the trench from the subgrade to the top of pavement or existing grade.

17.2.4 SUBGRADE shall refer to that area within 2 ½ feet below finished grade.

17.3 MATERIAL

17.3.1 MATERIAL shall consist of unwashed creek or bank gravel, crushed gravel, crushed rock, bank run rock, sand or a mixture of these materials. It shall be free from roots, vegetable matter or other deleterious substances. It shall be of such nature and so graded that it will bind readily when watered and compacted to form a firm base.

17.3.2 TESTS shall be done in accordance with Section 6-3, “Testing”, of the Standard Specifications. The material shall conform to the following requirements:

- a) Sand equivalent = 20 min.
- b) Gradation Requirements:

Pipe Bedding Material (from the bottom of trench to six inches (6”) above the top of pipe) for:

Asbestos Cement Pipe, Vitrified Clay Pipe, Plastic Pipe, Tarred and Wrapped Steel Pipe, and copper services -

Passing the 1” sieve	100%
Passing the ¾” sieve	90 – 100%
Passing the No. 4 sieve	35 – 100%
Passing the No. 30 sieve	5 – 40%

Concrete Pipe and Rigid Steel Conduits – Use same gradation shown in paragraph below for upper portion of trench.

Material for Upper Portion of Trench (from the pipe bedding up to roadway subgrade):

Passing the 3” sieve	100%
Passing the 1” sieve	90 – 100%
Passing the No. 4 sieve	35 – 100%
Passing the No. 30 sieve	5 – 40%

17.3.3 AGGREGATE BASE shall be Class 2 as Specified in Section 26 of the Standard Specifications.

17.3.4 ASPHALT CONCRETE shall be Type B Asphalt Concrete of ½” maximum (Medium) grading, as specified in Section 39 of the Standard Specifications.

#### 17.4. COMPACTION

17.4.1 PIPE BEDDING and the intermediate area shall be compacted to a minimum of 90% relative compaction as determined by California Test Method No. 216 or 231.

17.4.2 SUBGRADE AND STREET SECTION shall be compacted to a minimum of 95% relative compaction as determined by California Test method No. 216 or 231.

17.4.3 MECHANICAL COMPACTION. Unless otherwise stated, mechanical compaction shall be used to obtain the required results. When mechanical compaction is used, no material shall be deposited in depths greater than that which will allow the minimum specified relative compaction in any portion of the lift. No subsequent lift shall be placed until the previously compacted lift has been approved by the Engineer.

17.4.4 JETTING will not be allowed in native materials, but will be allowed if imported backfill material is used. The maximum depth allowable for jetting material in one lift shall not exceed four feet.

#### 17.5 TRENCH SURFACING

17.5.1 GENERAL. In unimproved areas not in a traveled way, the trench shall be restored to its original surface.

Where the existing surface is gravel, surfacing shall be replaced over the width of the trench with Class 2 Aggregate Base to a depth of six inches (6”).

Where the existing surface is some type of paving, surfacing shall be restored with a temporary surface followed by a permanent surface as specified herein.

17.5.2 TEMPORARY SURFACING shall be two inches (2") of cut back asphalt on six inches (6") of Class 2 Aggregate Base. All temporary surfacing shall be laid within one day after backfilling or as specified on the plans. Before the trenching area is opened for traffic, all excess dirt, rock, debris, shall be removed and the street surface shall be swept clean. Temporary surfacing shall be maintained so that at no time will there be any mudholes, and the surface shall not be allowed to settle below one inch (1") or the raised more than one (1") from the existing grade.

17.5.3 PERMANENT SURFACING shall not be constructed until the compaction requirements are satisfied.

All trenches shall be permanently surfaced in not less than 30 nor more than 60 calendar days after compacting the backfill. This permanent surfacing may be accomplished after the contract working day limit has expired.

Prior to all excavation, the existing pavement shall be neatly cut along the limits of the excavation. If a longitudinal pavement joint, or edge of pavement is located within three feet of the trench line, the Contractor shall remove all intervening pavement surfacing and replace it after completion of backfilling the trench. In any case, the pavement will be removed to a line six inches (6") outside each side of the neat trench lines.

The base course for permanent surfacing shall be Class 2 Aggregate Base. The Aggregate Base shall be equal in depth to the existing pavement structural section but not less than twelve inches (12") in depth.

The wearing surface for permanent surfacing on improved streets shall be asphalt concrete equal in thickness to the existing pavement plus one inch (1") but not less than two inches (2") in depth. New pavement shall extend to neatly cut lines in the existing pavement. The permanent surfacing shall extend six inches (6") beyond the limits of the neat trench lines.

#### 17.6. MEASUREMENT

Trench backfill and trench surfacing shall not be measured for payment and shall be considered as paid for in the various items of work.

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SECTION 18: LANDSCAPING AND IRRIGATION DETAIL

18.1 GENERAL

18.1.1 DESCRIPTION. This work shall consist of site and soil preparation, installing irrigation systems and the planting and maintenance of plant material.

18.2. SOIL PREPARATION

18.2.1 DESCRIPTION. This work includes, but is not necessarily limited to, the furnishing of all material, equipment and labor to perform all top soil import, mixing, spreading, stock piling and applying soil amendments.

18.2.2 MATERIALS. Provisions governing materials shall be as specified in Section 20-2 of the Standard Specifications, except as modified herein. "Highway right of way" as used in said section 20-2 shall be defined to refer to the project site in the context of these specifications.

Top soil shall be obtained from sources within the project site, or imported from sources outside the project site or from both such sources, whichever is provided in the special provisions or shown on the plans. Top soil shall be horticulturally suitable, as determined by a certified horticultural laboratory or the Engineer. It shall consist of fertile, friable soil of loamy character and shall contain an amount of organic matter normal to the region of work. It shall not contain clods, rocks, sticks, roots or other debris, nor shall it contain unreasonable amounts of weed or weed seeds. Top soil shall be capable of sustaining healthy plant life.

Soil Amendment shall be the following: Redwood sawdust; or mineralized and nitrogenized stabilized bark; or sawdust containing a wetting agent; or earth and composted rice hulls/

Commercial Fertilizer: 6-6-8 (16% nitrogen, 6% phosphoric acid, 8% potash) at a rate of 20 pounds per 1,000 square feet. Fertilizer shall comply with the requirements of the California Food and Agricultural Code.

Backfill Mix for trees and shrubs shall be composed of site soil and contractor mix at a rate of 1:1 with the addition of 2 pounds of 16-6-8 fertilizer per cubic yard.

18.3 IRRIGATION

18.3.1 DESCRIPTION. The work includes but is not necessarily limited to the furnishing of all materials, equipment and labor required or necessary to install the following: an irrigation system as shown on the plans and specified herein; all items connected with the water and irrigation system necessary to provide a complete working installation; and connections of irrigation system to water meter.

#### 18.3.2 MATERIALS FOR PIPE FITTINGS:

Pressure Mains: shall be virgin polyvinyl chloride, #1120-1220, Schedule 40, NSF approved, solvent welded joints. All fittings shall be Schedule 40 PVC or as specified on the plans.

Non-Pressure, Sprinkler Laterals: shall be virgin polyvinyl chloride, #1120-1220, 200 psi, NFS approved solvent welded joints. All fittings shall be Schedule 40 PVC or specified on the plans.

Threaded PVC Pipe and Nipples: shall be IPS Schedule 80. Threaded adapters shall be used when connecting pipe to valves.

Irrigation Control Wire: from clocks to valves shall be a minimum of #14 direct burial or larger as required by length per manufacturer's specifications. Wires connecting each solenoid to the control panel shall be red for positive identifications. All common return wiring shall be color white.

18.3.3 EQUIPMENT. Back flow preventer, controllers, remote control valves, and sprinkler heads shall be as described on the drawings.

#### 18.3.4 SPECIAL INSTRUCTION

18.3.4.1 PROTECTION. The Contractor shall be responsible for any damage to the work covered by these specifications before the final acceptance of his work. He shall securely cover all openings into the systems and cover all apparatus, equipment and appliances, both before and after being set in place to prevent obstructions in the pipes and the breakage, misuse or disfigurement of the equipment, apparatus or appliances.

18.3.4.2 VERIFICATION OF DIMENSIONS. All plot dimensions are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and shall report any variations to the Engineer.

18.3.4.3 UTILITIES. The Contractor shall verify the location of all utilities and services in the line of work. When connecting to existing utilities, the contractor shall uncover these utilities and verify their location. The Contractor shall obtain the City's approval of any changes necessary for proper connection to said existing utilities and comply with City specifications for same.

18.3.4.4 ELECTRICAL CONNECTION. Electrical Connection shall be in full compliance with local codes. The Contractor shall extend electrical service from existing electrical panel and shall connect the controller. Service shall be extended using metallic electrical conduit to location of controller or as approved by the City.

18.3.5 INSTALLATION. All other areas shall have the following minimum coverages from top of pipe to finish grade:

- i) Line water mains 1 ½ inches and larger – 24 inches;
- ii) Line water mains 1 ¼ inches and less – 18 inches;
- iii) Laterals – 12 inches.

18.3.5.1 PIPE LINES. Pipe lines shall be installed in the locations and of the sized shown on the plans or specified herein and shall be of the materials and workmanship herein specified. Where piping on the plans is shown under paved areas but running parallel and adjacent to planted areas, the intent of the drawings is to install the piping in planted areas.

Piping shall be buried in standard narrow trenches, 6” minimum width.

The bottom of trenches shall be smooth and free from rocks and debris before the pipe is placed. The pipe shall make contact with firm soil at all points in the trenches.

Provide oversized PVC casings at all penetrations of walls or other structures for all irrigation mains and laterals. Casings are to be placed at proper depths to provide specified minimum coverages.

Under paved areas, oversized PVC casings shall be placed prior to paving operations and at proper depths.

Backfill shall be placed in 6” layers and mechanically tamped. Only fine materials free from rocks, lumps, or debris shall be used in the backfill. The top 6” of the backfill shall be approved topsoil in planting areas.

18.3.5.2 SETTLEMENT ADJUSTMENT. If, within one year from the date of completion, settlement occurs and adjustments in pipes or paving are necessary to bring the system or paving to the proper level of the permanent grade, the Contractor, as part of the work under the contract, shall make all adjustments without extra cost to the City.

18.3.5.3 UNDERGROUND LINES UP TO TWO INCHES INCLUSIVE. All lines shall have a minimum horizontal clearance of 12” from the lines of other trades. This requirement does not apply to any lines crossing at angles from 45 to 90 degrees with each other. A minimum 2” vertical clearance shall be maintained between lines which cross between these angles. No line shall be installed parallel to and directly over another line.

18.3.5.4 PIPING. Piping shall be installed in accordance with the plans, true to line and grade with proper and uniform supports and guides to maintain such alignment; pipe shall be installed without undue stresses or strains. Thrust blocks shall be provided as necessary. At the end of each day’s work, open ends of pipe shall be plugged; crimping of pipe will not be permitted.

18.3.6 TESTS

18.3.6.1 PRESSURE WATER MAINS. Before any portion of the system is covered in the backfill process, and while the systems can be observed for leaks, all pipe ends shall be capped and maximum available pressure shall be applied. All leaks shall be repaired and all lines shall be approved by the City before backfilling trenches. All tests shall be made in the presence of the City Inspector.

18.3.6.2 NON-PRESSURE LINES. Lines shall be flushed clean before heads or hose bibs are installed.

18.3.6.3 PROPOSED CHANGES. The City shall be notified of all proposed changes; no changes shall be made without written approval of the City.

18.3.7 AS – BUILT DRAWINGS. The Contractor shall furnish the City with a reproducible as-built drawing of the irrigation layout. All lines, valves, fittings, etc., shall be properly located and identified as to size, catalog number and manufacturer.

18.3.8 SPRINKLER COVERAGE. The Contractor shall be responsible for the determination of the head locations in the field as show. If, after testing, the proper coverage of each is not adequate due to improper location, the Contractor shall make minor changes in location to achieve proper coverage at no additional cost to City.

18.3.9 MATERIALS TO BE FURNISHED. The following materials shall be furnished to City:

Controller keys – furnish all locking keys;  
Coupling – furnish one coupler per quick coupling valve.

#### 18.4. PLANTING

18.4.1 DESCRIPTION. The work includes, but is not necessarily limited to, the furnishing of all materials, equipment and labor required or necessary to install and complete the fine grading, clearing and preparing planting areas, soil conditioning, planting and establishing plants as shown on the plans and specified in these specifications and special provisions. This work shall also include the removal, replacement, and relocation of existing landscaping as shown on the improvement plans.

#### 18.4.2 MATERIALS

18.4.2.1 ORGANIC SOIL AMENDMENT: Mineralized and nitrogen stabilized bark and/or sawdust containing wetting agent, or ground and composted rice hulls.

18.4.2.2 COMMERCIAL FERTILIZE: Unless otherwise specified by the City Engineer or through a certified horticultural soils laboratory recommendation, commercial pre-plant fertilizer with an analysis of 16-6-8 (16% nitrogen, 6% phosphoric acid, 8% potash) is to be incorporated at a rate of 20 pounds per 1,000 square feet of planting area. The fertilizer is to be incorporated into the top 4 to 6 inches of soil. The fertilizer is to be delivered to the site in original, unopened containers, each bearing the manufacturer's statement of analysis.

18.4.2.3 LAWN SEED: Fresh, clean, new crop and mixed by supplier. Each container shall be affixed with a guaranteed statement of composition of mixture and percentages of purity and germination of each variety. The percentage by weight of the seed mixture shall be provided.

18.4.2.4 SEED MIX: Unless otherwise specified seed mix shall be 50% Perennial Ryegrass, 30% Creeping Red Fescue, 20% Kentucky Bluegrass at a rate of 10 pounds per 1000 square feet.

18.4.2.5 QUALITY AND SIZE. Plant materials shall not be “pot bound” with circling roots or roots growing out of the nursery container. They shall be vigorous and of normal habit of growth and shall be free of pests. The plants shall conform to the standards as outlined by the California Association of Nurserymen and to applicable State of California Codes. Plants shall be nursery grown and of the size indicated in the plant list and shall be labeled as to its species.

18.4.2.6 INSPECTION. Plants shall be subject to inspection and approval at the place of growth and upon delivery. No plants shall be planted until they have been approved by the City. Certificates of inspection shall be furnished as may be required by Federal, State and other authorities.

18.4.2.7 SUBSTITUTES. Substitute shall not be permitted except when proof is submitted that plants specified are not available and then only upon approval of the Engineer.

18.4.2.8 PLANT LIST. Quantities furnished shall be as indicated and as necessary to complete work shown on plans at the spacing indicated.

18.4.3 FINE GRADING. Grade and shape topsoil by blading and other means to provide smooth finished surfaces true to slopes and grades.

Any compaction resulting from spreading and grading operations shall be cultivated to a six-inch (6”) minimum depth and as required to break up the compaction.

Rake mechanically or by hand to remove stones 1 ½ inches or greater in diameter and other foreign materials.

Grades shall be adjusted so that at the completion of soil conditioning and planting the finished grades are one-half (1/2”) inches below top of adjacent pavements or other controls.

18.4.4. PLANTING TREES AND SHRUBS:

- i) Stake tree locations or place trees in containers at locations indicated on the plan and secure Engineer’s approval before digging pits.
- ii) Unless otherwise specified or shown on the plans, excavate square pits with vertical sides for all plants.
  - a) Pits for plants from 7 ½ gallon containers or smaller shall be at least one foot larger than the root spread or ball and at least one foot greater in depth;
  - b) Pits for plants from 15 gallon containers or larger shall be at least two feet larger than the root spread or ball and at least one foot greater in depth.
- iii) Remove rock and other underground obstructions as necessary to complete above excavations.



- iv) Set plants upright in center of pits, the crown to be two inches (2") above finished grade. Compact soil uniformly and water thoroughly. Form neat 4" basins with soil at edge of pits. Fine grade and hand rake soil in all planting areas.
- v) Prune all plants in accordance with standard practice or as direct by the Engineer. Shearing is not permitted unless so directed.
- vi) Stake trees by driving stakes at least two feet (2') below finish grade on each side of root ball and at or near the windward side of trunk. See tree staking detail.
- vii) Provide one slow-release fertilizer tablet with each tree planting.

18.4.5 PLANTING LAWNS. Seed bed shall be prepared by raking, smoothing and rolling. Fill low spots and re-roll as necessary.

Seed uniformly at the rate shown on the plans or specified by the Engineer.

Mulch with 1/8" to 1/4" depth of organic soil amendment and roll lightly.

Water as often as weather conditions required and as necessary to maintain proper moisture level to ensure germination of seed.

18.4.6 PLANTING GROUND COVER. Space the ground cover plants in evenly spaced rows 12" O. C. as indicated on the drawings, staggering the spaces around shrubs and trees. Plant only in soil that is moist but friable, never dry or wet and soggy. In the case of planting in the open or hot days, shorten the time between planting and wetting.

Keep flats moistened at all times and moisten prior to planting.

18.4.7 MAINTENANCE, FINAL INSPECTION AND ACCEPTANCE.

18.4.7.1 MAINTENANCE. Maintenance shall begin immediately after each plant is planted and shall continue in accordance with the following requirements:

Maintenance shall include frequent watering, mowing, cultivating, pruning, weeding, spraying, feeding and protection against damage by erosion and rains. Stake and barricade planting to guard against trespassing, replacing plant materials, and other necessary work to insure plants of healthy and well-tended state.

18.4.7.2 INSPECTION. As soon as all plants have been installed and lawns have been seeded, a preliminary inspection shall be made by City inspectors. Upon approval of the work a 60 calendar day maintenance period shall begin. If any plants or work are not approved at this time, Contractor shall immediately replace and/or repair and continue regular maintenance. Another preliminary inspection shall then be made and upon approval of replacements and/or repairs, the 60 – day maintenance period shall begin.

18.4.7.3 FERTILIZER. Fertilizer lawn and ground cover planting with commercial fertilizer (16-6-8) at the rate of 20 pounds per 1000 square feet one week before the end of the maintenance period.

18.4.7.4 FINAL INSPECTION. Final inspection of the work shall be made at the end of this 60 – day maintenance period. Contractor shall submit written notice requesting this inspection at least one week prior to the anticipated date of inspection.

New lawns to be considered for acceptance shall have uniform coverage and be in good condition, free of all weeds, grasses foreign to the sod mix and bare spots.

Plant basins shall be repaired, all trees and shrubs given a final watering, and the job cleared of all weeds and debris and presented in a neat and orderly fashion.

The work shall be accepted upon successful completion of the 60 – day maintenance period or upon the acceptance of the project by the City Council, whichever occurs last.

The intent of these specifications is to insure that work done under this contract and material supplies are of first class quality to all aspects and that the planting is turned over to the City in a vigorous, healthy condition.

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SECTION 19: GROOVE AND GRIND PAVEMENT

19.1 DESCRIPTION

This work shall consist of grooving and grinding asphalt concrete or Portland cement concrete pavement, bridge decks and roadway surfaces of structure as shown on the plans and as specified in the special provisions and Section 42 of the Standard Specifications.

All work shall be done in accordance with Section 42 of the Standard Specifications, unless otherwise specified on the plans or in the special provisions or indicated herein.

19.2 MEASUREMENT

Pavement grooving and grinding on existing pavements will be measured by the square yard. The quantity of pavement grinding to be measured for payment will be determined by multiplying the width of the area ground by the length ground. The quantity of pavement grooving to be paid for will be determined by multiplying the width of the grooved area by the horizontal length grooved.

19.3 PAYMENT

The contract price paid per square yard for grooving and grinding existing concrete pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in grinding the existing pavement and removing residue, including furnishing water for washing the pavement, as shown on the plans, as specified in these specifications and the special provisions and as directed by the Engineer.

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SECTION 20: PAVEMENT REINFORCING FABRIC

20.1 DESCRIPTION

This work shall consist of placing pavement reinforcing fabric at the locations shown on the plans and in conformance with Sections 39-4 and 88 of the Standard Specifications.

Engineering fabrics consisting of pavement reinforcing fabric and filter fabric shall conform to the requirements in Section 88, “Engineering Fabrics” of the Standard Specifications.

Engineering fabrics shall be placed in accordance with the various sections of these specifications requiring the use of an engineering fabric or as specified in the special provisions.

A Certificate of Compliance for each kind of engineering fabric used on the project shall be furnished to the Engineer in accordance with the provisions in Section 6-1-.07, “Certificates of Compliance”.

Engineering fabrics shall be furnished in protective covers capable of protecting the fabric from ultraviolet rays, abrasion, and water.

Pavement reinforcing fabric shall be manufactured from polyester, polypropylene, or polypropylene nylon material. The fabric shall be non-woven, and shall conform to the following:

**Table 20-1: Pavement Reinforcing Fabric Specifications**

Weight, ounces per square yard ASTM Designation: D 1910	3.0 to 8.0
Grab tensile strength ( 1-inch grip), pounds min. ASTM Designation: D 1117	90
Elongation at break, percent, min. ASTM Designation: D 1117	40
Fabric thickness, mils. ASTM Designation: D 461	12 to 100

20.2 PLACEMENT

Prior to placing the fabric, existing pavement to receive the fabric shall be cleaned of all materials such as, but not limited to, leaves, sand, dirt, gravel, water and vegetation. This cleaning shall be done to the satisfaction of the Engineer.

Cracks between 1/8" and 1/4" will be filled as directed by the Engineer, with a crack filler. Wider cracks or holes are to be repaired with slurry, cold or hot mix. Placement of the fabric shall be made only under the following conditions:

- i) the ambient air temperature is above 60 degrees F and rising;
- ii) the pavement is dry and the pavement temperature is above 50 degrees F and rising.

The surface area to receive the fabric shall be sprayed with steam-refined pavement asphalt type SR-4000 in the range of 0.25 gallons per square yard. (Refer to Section 92-1.04, "Applying Asphalt" of the State of California Standard Specification). The exact rate of application will be determined by the Engineer. The asphalt shall be sprayed with a suitably metered truck or the truck must have been recently calibrated to Test Method Calif. No. 399A. The temperature of the asphalt binder must be spread in the range of 290 degrees F and 365 degrees F.

The width of asphalt application will be the fabric width plus four inches (4"). Paving asphalt shall be applied no farther in advance of the overlay than the distance which the Contractor can maintain free of traffic. The paving operation shall closely follow fabric placement and no more fabric than can be covered up with the hot mix that working day shall be placed.

The fabric shall be stretched, aligned, and placed with no wrinkles that lap. The test for lapping shall be made by gathering the fabric in a wrinkle. If the height of the doubled portion of extra fabric is 1/2 inch or more, the fabric shall be cut to remove the wrinkle, then lapped in the direction of paving. Lap in excess of 2" shall be removed.

Pavement reinforcing fabric shall not be placed in area of conform tapers where the thickness of the overlying asphalt concrete is 0.08 – foot or less.

Adjacent borders of the fabric shall be lapped 2 to 4 inches. The preceding roll shall lap 2 to 4 inches over the following roll in the direction of paving at ends of rolls or at any break. At fabric overlays, both the tack coat and the fabric shall overlap the previously placed fabric by the same amount.

Seating of the fabric with rolling equipment after placing will be permitted. Turning off 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.

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 placed a small quantity of asphalt concrete over the fabric.

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.

### 20.3 MEASUREMENT

Pavement reinforcement fabric will be measured by the square yard. The quantity to be paid for will be the actual area of surface covered by the fabric.

### 20.4 PAYMENT

The contract price per square yard for pavement reinforcing fabric shall include full compensation for furnishing all labor, materials, including paving asphalt, tools, equipment and incidentals and for doing all the work involved in furnishing and placing pavement reinforcing fabric complete in place as shown on the plans, required by these special provisions and as directed by the Engineer.

CITY OF UNION CITY

STANDARD SPECIFICATIONS

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SECTION 21: TRAFFIC SIGNALS AND HIGHWAY LIGHTING

21.1 TRAFFIC SIGNALS AND HIGHWAY LIGHTING

21.1.1 GENERAL. The work to be done consists of installing a traffic signal system including furnishing and installing new equipment, including controller and controller cabinet, miscellaneous conduits, pull boxes, wiring and providing all necessary materials and equipment as shown on the plans, as specified herein and as necessary to furnish a complete job in all respects.

Unless otherwise specified, all work shall conform to the provisions of the Standard Specifications and to the applicable Standard Plans of the State of California, Department of Transportation (CALTRANS), latest version. References contained herein to Section 86, or portions thereof, refer to Section 86, or portions thereof, of the Standard Specifications. In the event of apparent conflict between the Standard Specifications, the Standard Plans, the plans, and these specifications, those requirements determined by the Engineer to give the greater protection or result in the best installation, shall govern.

21.1.2 EQUIPMENT LIST AND DRAWINGS. Equipment list and drawings of electrical equipment and material shall conform to the provisions in section 86-1.03, "Equipment List and Drawings", of the Standard Specifications and these specifications.

The controller cabinet schematic wiring diagram and intersection sketch shall be combined into one drawing so that when the cabinet door is fully open, the drawing is oriented with the intersection.

The Contractor shall furnish a maintenance manual for all controller units, auxiliary equipment, and vehicle detector sensor units, control units and amplifiers. The maintenance manual and operation manual may be combined into one manual. The maintenance manual or combined maintenance and operation manual shall be submitted at the time the controllers are delivered for testing or, if required by the Engineer, previous to purchase. The maintenance manual shall include, but need not be limited to, the following items:

- (a) Specifications
- (b) Design characteristics
- (c) General operation theory
- (d) Function of all controls
- (e) Trouble shooting procedure (diagnostic routine)
- (f) Block circuit diagram
- (g) Geographical layout of components
- (h) Schematic diagram
- (i) List of replaceable component parts with stock numbers

The intersection sketch shall show the detector identifications as shown on the plans. Field wire connecting terminals shall include all detectors, pedestrian push buttons, WALK-DON'T WALK signals, vehicular signal heads, and terminals provided for future installations.

21.1.3 WARRANTS, GUARANTEES AND INSTRUCTION SHEET. Warranties, guarantees and instruction sheets shall conform to the provisions in Section 86-1.04 "Warranties, Guarantees and Instruction Sheets", of the Standard Specifications and these specifications.

All equipment furnished shall be guaranteed to the City by the manufacturers for a period of not less than one year following the date of acceptance of the signal installation involving such equipment. If any part (or parts) is found to be defective in materials or workmanship within the one year period, and it is determined by the Engineer or by an authorized manufacturer's representative that said part (or parts) cannot be repaired on the site, the manufacturer shall provide a replacement part (or parts) of equal kind and/or type during the repair period, and shall be responsible for the removal, handling, repair or replacement, and reinstallation of the part (or parts) until such time as the traffic signal equipment is functioning as specified and as intended herein; the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

The Contractor shall provide, prior to acceptance by the City, a "Maintenance Bond", in an amount equal to ten percent (10%) of the total contract price. The "Maintenance Bond" shall become effective upon the acceptance of the project, by the City Council, and be valid for a period of one year.

21.1.4 ON-SITE MEETING. Prior to the actual beginning of any work on the traffic signal system, an on-site meeting shall be held to familiarize all parties with the work to be done and City inspection procedures. The Contractor, at his convenience, shall notify the Engineer of a proposed meeting date, time and location.

21.1.5 SCHEDULING OF WORK. Scheduling of work shall conform to Section 86-1.06, "Scheduling of Work", of the Standard Specifications and these specifications.

The first order of work shall be to place the order for the traffic signal equipment. The Contractor shall furnish the Engineer with a statement from the vendor that the order for said equipment has been received and accepted by said vendor.

21.1.06 FOUNDATIONS. Foundations shall conform to the provisions in Section 86-2.03, "Foundations", of the Standard Specifications.

21.1.7 STANDARDS, STEEL PEDESTALS AND POSTS. Standard, steel pedestals and posts shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts", of the Standard Specifications and these specifications.

21.1.8 CONDUIT. Conduit shall conform to the provisions in Section 86-2.05, "Conduit", of the Standard Specifications and these specifications.



Section 86-2.05A, “Material”, of the Standard Specifications is revised to read:

Conduit and fittings shall be one of the following:

1. Rigid steel conduit conforming to UL Publication UL 6 for Rigid Metallic Conduit. The zinc coating will be tested for uniformity according to ASTM Designation: A239.
2. Polyvinyl chloride coated galvanized steel conduit consisting of galvanized rigid steel conduit conforming to (1) above, with a PC coating bonded to the exterior surface. The plastic coating shall have a minimum thickness of 18 mils.

All conduit and conduit fittings shall be listed by UL.

Non-metallic type conduit shall not be used, except when shown on the plans for detector installation.

Insulated bonding bushings will be required on metal conduit.

After conductors have been installed, the ends of conduits terminating in pull boxes and controller cabinets shall be sealed with an approved type of sealing compound.

At locations where conduit is to be installed by jacking or drilling as provided in Section 86-2.05C, “Installation”, of the Standard Specifications, if delay to any vehicle will not exceed 5 minutes, conduit may be installed as follows:

Conduit shall be placed under existing pavement in a trench approximately two inches (2”) wider than the outside diameter of the conduit to be installed. Trench width shall not exceed six inches (6”). The top of the installed conduit shall be a minimum of nine inches (9”) below finish grade.

The outline of all areas of pavement to be removed shall be cut to minimum depth of 3 inches 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 in the bottom of the trench and the trench shall be backfilled, with commercial quality concrete containing not less than 564 pounds of cement per cubic yard, to not less than 0.20 foot below the pavement surface for asphalt surfaced roadways. For Portland cement concrete-surfaced roadways, backfill with commercial concrete to 0.50 foot below the pavement surface. The top 0.20 foot of asphalt-surfaced roadways shall be backfilled with asphalt concrete produced from commercial quality paving asphalt and aggregates. For Portland cement concrete-surfaced roadways, the top 0.50 foot shall be backfilled with Portland cement concrete containing not less than 705 pounds of cement per cubic yard and accelerating admixtures for other provisions for high early strength. Calcium chloride shall not be used in concrete which will be in contact with metal conduit.

Spreading and compacting of asphalt concrete shall be performed by any method which will produce an asphalt concrete surfacing of uniform smoothness, texture, and density.

Spreading and finishing of Portland cement concrete surfacing shall be performed by a method which will produce a Portland cement concrete surfacing of uniform smoothness, and texture equal to the adjacent surface.

21.1.09 PULL BOXES. Pull boxes shall conform to the provisions in Section 86-2.06, "Pull Boxes", of the Standard Specifications and these specifications.

Pull boxes shall be installed at the locations shown on the plans or as specified. The Contractor may, at his option and expense, use pull boxes of a larger standard size than that shown or specified.

In addition to the methods for fastening marking strips to metal pull box covers specified in Section 86-2.06B, "Cover Marking", of the Standard Specifications, strips may be fastened with ¼ inch stainless steel rivets.

Grout in bottom of pull boxes will not be required.

Recesses for suspension of ballasts will not be required.

21.1.10 CONDUCTORS AND WIRING. Conductors and wiring shall conform to the provisions in Section 86-2.08, "Conductors", and Section 86-2.09, "Wiring", of the Standard Specifications and these specifications.

Conductors shall be spliced by the use of "C" shaped compression connectors as shown on the plans.

Splices shall be insulated by "Method B".

All signal conductors may be spliced, in pull boxes, where circuits branch.

All conductors shall be banded in each controller cabinet.

Sufficient traffic signal light conductors shall be provided to perform the functional operation of the signal and, in addition thereto, three (3) spare conductors shall be provided in all conduits containing traffic signal light conductors, unless shown otherwise on the plans.

21.1.11 BONDING AND GROUND. Bonding and grounding shall conform to the provisions in Section 86-2.10, "Bonding and Grounding", of the Standard Specifications and these specifications.

Grounding jumper shall be attached by a 3/16 – inch or larger brass bolt in the signal standard or controller pedestal and shall be run to the conduit, ground rod or bonding wire in adjacent pull box.

Grounding jumper shall be visible after cap has been poured on foundation.

21.1.12 through 21.1.14 – BLANK

21.1.1.15 SIGNAL FACES AND SIGNAL HEADS. Signal faces, signal heads and auxiliary equipment, as shown on the plans, and the installation thereof, shall conform to the provisions in Section 86-4.01, "Vehicle Signal Faces"; 86-4.02, "Directional Louvers"; 86-4.03, "Backplates"; and 86-4.06, "Signal Mounting Assemblies" of the Standard Specifications and these specifications.

Signal sections shall be physically interchangeable between 8-inch and 12-inch units of an individual manufacturer.

The Contractor shall furnish all lamps for traffic signal units, including signal backplates.

Visors on mast arm hung signals shall be “tunnel” type with open slot at bottom.

Reflectors shall be made of silvered glass, plastic or specular aluminum with anodic coating. All reflectors shall conform to the provisions in ANSI Standard: D-10.1.

21-1.16 PROGRAMMED VISIBILITY TRAFFIC SIGNAL HEADS. Programmed visibility traffic signal heads shall conform to the provisions in Section 86-4.04, “Programmed Visibility Vehicle Signal Faces”, of the Standard Specifications and these specifications.

Lamps shall be finished by the Contractor.

The Contractor shall arrange to have signal technician, qualified to program programmed visibility type signal heads, to be present at the time the signal heads are put into use.

21.1.17 PEDESTRIAN SIGNALS. Pedestrian signals shall conform to the provisions in Section 86-4.05, “Pedestrian Signal Faces”, of the Standard Specifications and these specifications.

Pedestrian signals shall be Type C.

A 1 ½ inch deep eggcrate type screen and mounting frame of 0.020 inch minimum thickness 3003 H14 aluminum alloy or polycarbonate plastic shall be provided to cover the words “DON’T” and “WALK”.

The vertical spacing of the horizontal members shall be ½ inch starting approximately ¼ inch above and ending approximately ¼ inch below the “DON’T” and “WALK” legends, respectively. The vertical members shall be spaced horizontally from ¼ inch left of the legend area to ¼ inch right of the legend area at ½ inch intervals, or may be placed approximately ¼ inch left and right of each vertical stroke of the “DON’T” legend.

Additional members may be employed outside the two legend area for structural strength.

The eggcrate type screen shall be installed parallel to the face of the “DON’T WALK” message and shall be held in place by the use of stainless steel screws.

The screen and frame shall be anodized flat black enamel as specified in Section 91-4.01, “Enamel; Traffic Signal Lusterless Black”, of the Standard Specifications. Said enamel shall be applied in the stop at the Contractor’s expense.

Alternate methods may be substituted for the above screening, providing the results are equal to or superior to those obtained with the above specified screens as determined by the Engineer.

21.1.18 DETECTORS. Detectors shall conform to the provisions in Section 86-5, “Detectors”, of the Standard Specifications and these specifications or as required by the Engineer.

Loop detector lead-in cable shall be Type A, Type B or Type C, unless otherwise indicated on the plans or required by Engineer.

In lieu of the epoxy sealant specified in Section 86-5.01A(5), “Installation Details”, of the Standard Specifications slots may be filled with an elastomeric sealant conforming to the following:

The sealant shall be a polyurethane material of a composition that will, within its stated shelf life, cure only in the presence of moisture. Sealant shall be suitable for use in both asphalt concrete and Portland cement concrete.

The cured sealant shall have the following performance characteristics:

Table 21-1: Sealant Performance Characteristics

<u>Property And Results</u>	<u>Measuring Standard and Conditions</u>
Hardness (indentation) 65-85	ASTM D 2240 Rex. Type A, Model 1700 77 deg. F (25 Deg. C) 50 % relative humidity.
Tensile Strength 500 psi, minimum tensile; 400% minimum elongation	ASTM B 117 28 days at 100 deg. F (38 deg. C) 5% NaCl, Die C, pulled at 20 IPM
Dielectric Constant Less than 25% change over a temperature range of -30 to 50 deg. C	ASTM D 150

In lieu of the requirements for filling slots in asphalt concrete pavement specified in Section 86-5.01A(5), “Installation Details”, of the Standard Specifications, slots in asphalt concrete pavement shall be filled as follows:

After conductors are installed in the slots cut in the pavement, paint binder shall be applied to all vertical surface of slots in accordance with the provisions in Section 94, “Asphaltic Emulsions”, of the Standard Specifications. The slots shall then be filled with asphaltic concrete sealant.

Temperature of sealant material during installation shall be above 70 deg. F. Air temperature during installation shall be above 50 deg. F. Sealant placed in the slots shall be compacted by use of an 8-inch diameter by 1/8- inch thick steel hand roller or other tool approved by the Engineer. Compacted sealant shall be flushed with the pavement surface. Minimum conductor coverage shall be 5/8 inch. Excess sealant remaining after rolling shall not be reused. Traffic may be released immediately over compacted material.

The number of sensor units and lead-in cables required to achieve the specified detection shall be installed.

The Contractor shall test the detectors with a motor driven cycle, as defined in the California Vehicle Code, that is licensed for street used by the Department of Motor Vehicles of the State of California. The unladen weight of the vehicle shall not exceed 220 pounds and the engine displacement shall not exceed 100 cubic centimeters.

Special features, components or vehicles designed to activate the detector will not be permitted. The Contractor shall provide an operator who shall drive the motor-driven cycle through the response or detection area of the detector at not less 3 miles per hour nor more than 7 miles per hour. The detector shall provide an indication in response to this test

21.1.19 PEDESTRIAN PUSHBUTTONS. Pedestrian pushbuttons shall conform to the provisions in Section 86-5.02, "Pedestrian Pushbuttons", of the Standard Specifications and these specifications.

Instruction signs for pedestrian pushbuttons shall be either 5 inch by 7 inch nominal size or the 9 inch by 12 inch nominal size or as shown on the plans.

21.1.20 PAYMENT. The lump sum price or prices paid for all work under this section shall conform to the provisions of Section 86-8, "Payment", of the Standard Specifications.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 22: INTRODUCTION AND SCOPE OF DESIGN CRITERIA

The following “Standard Design Criteria”, has been set up by the City of Union City to aid consulting engineers doing work within the city limits. The standards set forth are the minimum design standards of the City. These standards are to be used as a guide. The design and plans for all projects shall be subject to approval of the City Engineer.

While these criteria are primarily intended to apply to street improvements and their plans, it should be noted that the plan checking function of the Engineering Divisions of the City of Union City includes assurance that all final maps (i.e. subdivision maps and parcel maps) comply with applicable provisions of the Subdivision Map Act, latest edition, and with Title 17 of the Union City Municipal Code.

The maximum closure error acceptable on the adjusted map shall not exceed the following:

Boundary closure	0.015 ft.
Block closure	0.010 ft.
Lot closure	0.010 ft.
Monument closure line	0.010 ft.

# CITY OF UNION CITY

## STANDARD DESIGN CRITERIA

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### 23.1 PROCEDURE

The Engineering Division of the City shall furnish the developer's engineer, at the cost of reproduction, and requested information, including established street grades, bench marks, standard details and these standard design criteria. The locations and elevations of existing utilities shall be verified in the field by the developer's engineer. When this engineer has completed and checked his plans, he may submit two sets of prints and design calculations for review and approval by the City Engineer. Incomplete plans shall be returned to the engineer without being reviewed. Developer's engineer shall be responsible to coordinate his work with the Alameda County Water District (ACWD), Alameda County Flood Control and Water Conservation District (ACFCWCD), Union Sanitary District (USD), Pacific Gas and Electric Company (P. G. & E.), Pacific Bell, Pacific Cable Television, and any other affected utilities or public agencies, and for application to the Public Utility Commission for required railroad crossing.

### 23.2 PRELIMINARY PLANS.

Preliminary plans may be submitted for general review of street geometric and design concept prior to submittal of improvement plans. Preliminary plans shall be marked "For Preliminary Review Only".

23.2.1 PLANS. All plans shall be on 24" x 36" sheets with margins on the left, top, bottom, and right sides. Plan profile paper shall be used with the profile on either the top half or the bottom half of the paper. Photographic reductions will be acceptable only if the reduced copy is at a standard engineering scale.

23.2.2 SCALE. The scale for improvement plans shall not be smaller than one inch equals fifty feet (1" = 50'). The vertical scale on profiles shall not be smaller than one inch equals four feet (1" = 4').

23.2.3 TITLE BLOCK. Each sheet shall have a title block. The title block shall show the name of the project, the name of the engineer, the scale and the date. The first sheet shall have a location map, legend and all necessary approval blocks.

23.2.4 ENGINEER PLANS. These plans shall clearly show the work to be done. Separate sheets are suggested for the following:

- a. Grading plan
- b. Final and interim erosion and sediment control plan.
- c. Plan and profile for proposed improvements.
- d. Street lighting plan
- e. Sign and striping plan

- f. Landscaping plan
- g. Irrigation plan
- h. An overall map showing the location of storm drain, sanitary sewer laterals, manholes, catch basins, fire hydrants, street name signs, stop signs, electroliers, benchmark, etc.

23.2.5 BENCHMARK AND ELEVATION. The Engineering Division shall give the engineer a benchmark in the vicinity of the job, when such benches are available. This benchmark shall be noted on the cover sheet. All elevations shall be Mean Sea Level datum and shall be so stated on the cover sheet. Vertical “equations” shall be avoided.

23.2.6 ITEMS TO BE SHOWN ON THE PLANS. The following information shall be included on the plans:

North Arrow	Easements, purpose and width
Street Names	Street right of way lines
Existing Topography	Lot lines and lot numbers
Existing public and private utilities	Monuments and monument lines
Plan and profile of existing and proposed Surface and underground improvements	Profiles of existing ground as required for the design of the work.
Typical cross section of streets	Flow line elevations of all gravity flow systems and appurtenant structures
Joint utility trenches under or behind sidewalk	Basis of elevations
Top of curb and center line elevations at appropriate locations	TBM descriptions and elevations
Proposed street tree locations	Proposed BM descriptions and locations

23.2.7 STANDARD NOTES. The following standard notes shall be included on all plans for the modification or construction of street improvements within the public right-of-way:

- a. All work to be done in accordance with the specifications of the City of Union City and the State of California, Department of Transportation, Standard Specifications, latest revision.
- b. Contractors shall kept the City Police, Fire Department, and Public Works Department informed daily regarding excavations, barricades, and detours.
- c. Contractor shall notify the City Engineer or his representative at least two (2) days prior to commencing work.



- d. Contractor shall leave an emergency telephone number with the above departments.
- e. The City of Union City Standard Monuments are to be placed as shown on the plans.
- f. All underground utilities are to be completed before placing base rock.
- g. All existing utilities indicated are intended to show approximate locations only. It is the contractor's responsibility to verify the actual location of same prior to starting construction.
- h. Prior to commencement of work, contractor shall contact the Underground Service Alert at 800-642-2444.
- i. Trenches five feet (5') or more in depth shall be shored in accordance with Cal/OSHA standards and all applicable state regulations, in addition the City of Union City Trench Shoring Details.

23.2.8 DURING STREET CONSTRUCTION the engineer shall furnish the City three copies of all cut sheets derived from the staking of all cur, gutter and storm lines, and their laterals or services.

23.2.9 STREET TREES. At least one tree shall be planted for each single family residential lot frontage. Each tree shall be 15 gallons in size. Tree spacing shall be no greater than fifty (50) linear feet.

Tree types shall be approved by the Public Works Grounds Supervisor, who may inspect these trees at the nursery prior to being planted. Developer shall maintain trees until the end of the maintenance period for street improvements, or for a period of one year, whichever is greater.

The names, quantities and specific locations of the approved tree types shall be shown on the improvement plans.

Street trees shall not be located closer than 20 feet from an electrolier, or 10 feet from a sanitary lateral. Distance specified shall be horizontal.

### 23.3 STATIONING

All improvements shall be referenced to the center line stationing or a construction line referenced back to a center line. Stationing shall be shown for the following:

- |   |                       |
|---|-----------------------|
| a) Beginning and end of improvements    | i) Grade Breaks       |
| b) Centerline intersections             | j) Manholes           |
| c) Monuments                            | k) Cleanouts, outlets |
| d) Curb returns                         | l) Sewer Laterals     |
| e) BC, PRC and EC of horizontal curves  | m) Driveways          |
| f) PIVC, BVC and EVC of vertical curves | n) Street Lights      |
| g) Fire Hydrants                        | o) Barricades         |
| h) Match lines                          | p) Tract Boundaries   |

This is not meant to be a complete list and any other pertinent features shall be stationed.

#### 23.4. TYPICAL SECTION

A typical section shall be shown for each street width or pavement structural section, and transverse from shall be shown in the typical section.

#### 23.5 LOCATION OF UTILITY LINES

Insofar as possible, no utility lines shall be constructed along the center line of a public street.

Where a public street terminates at a barricade, and feature extension of the street is possible, all utility lines shall be stubbed out to the end of the pavement.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 24: STREET DESIGN CRITERIA

24.1 STREET WIDTHS

Right of way width and geometric section shall be as designated in the City Standard Details or as otherwise approved by the City Engineer. See Section 24.4.1 for standard right of way widths for various street types.

24.2 ALIGNMENT

24.2.1 AT STREET INTERSECTIONS, minimum face of curb radius shall be 30 feet for 60-foot residential and smaller streets. The curb radius shall be 40 feet for resident streets larger than 60 feet. For 64-foot industrial and larger streets, face of curb radius shall be 40 feet. At intersections of dissimilar street widths, curb radii shall be as specified above for the widest street in the intersection.

24.4.2 MINIMUM CENTERLINE RADIUS for 50, 56, and 60-foot frontage and residential streets shall be two hundred (200) feet. Minimum centerline radius for 64-foot industrial and 68-foot residential collector streets shall be three hundred (300) feet. Minimum centerline radius for 68, 84, 92, 100, 104, and 110-foot arterial streets shall be five hundred (500) feet.

24.2.3 WHERE THE REVERSING curves are required, the curves shall be separated by a tangent section whenever possible.

24.2.4 STREET CENTERLINES shall intersect at 90 degrees. This includes curving center lines.

24.2.5 PUBLIC UTILITY EASEMENT shall be located adjacent to the public right-of-way and have a minimum width of six feet.

24.3 SLOPE

24.3.1 THE NOMINAL LONGITUDINAL SLOPE for all streets shall be 0.4%. On special cases, when approved by the City Engineer, a minimum slope of 0.3% may be used. This minimum grade of 0.4% shall be held around the outside of a horizontal curve and around curb returns.

24.3.2 ALL STREETS SHALL HAVE TWO PERCENT (2%) cross slopes as shown on the City Standard Details for geometric street locations.

24.3.3 GRADES ON MISSION BOULEVARD shall be first approved by the City and than sent to the Department of Transportation, State of California for state approval.

24.3.4 WHERE CONFORMS are required to meet existing streets, the maximum slope of the conform shall be 0.4%. Where conforms are not required, headerboards shall be placed at the end of the improvements.

24.3.5 VALLEY GUTTERS shall be avoided within the public right-of-way whenever possible.

24.3.6 VERTICAL CURVES or intermediate grade brakes shall be used when the algebraic difference in grade is greater than 1%. Vertical curves shall be of sufficient length to provide adequate passing and sight distance, but in no case shorter than fifty feet. The engineer shall provide enough grades and stakes so that curb and gutter can be constructed to a smooth curve. Angle points will not be allowed in curb and gutter construction.

24.3 PAVEMENT SECTION

24.4.1 PAVEMENT THICKNESS and structural section shall be designed in accordance with Gravel Equivalent requirement as determined by the Resistance Value (stabilometer method, CALTRANS test method 301-F) and the Traffic Index as determined in paragraph 3-04.2 below. R-value and T. I. used to determine street sections shall be shown on the plans under the related “typical cross section” of the street. Test samples of basement soil or subgrade obtained for design purposes shall be furnished by the developer’s engineer. The City shall be notified prior to sampling so that a City representative may be present. Where R-values are not provided for native material, an R-value of 5 shall be used.

**Table 24-1: Right Of Way Width And Traffic Index**

<u>Description</u>	<u>Right-Of-Way Width</u>	<u>Lots Served</u>	<u>Min. T. I.</u>
Private	24’ Min.		6.0
Cul-de-sac	40’ Min.-face of curb radius		7.0
Frontage	50’		7.0
Minor Residential	56’	25 or less	7.5
Residential	60’	25 to 50	7.5
Minor Collector	68’	50 to 150	7.5
Major Collector	68’	150 to 500	8.0
Industrial	64’	-	8.0
Arterial	84’, 92’, 100’, 104’ & 110’	-	Compute

All traffic indexes shall be approved by the City Engineer.

24.4.2 THE MINIMUM THICKNESS OF ASPHALT concrete surfacing shall be five inches (5”).

24.4.3 THE MINIMUM THICKNESS OF BASE shall be eight inches (8"). Class 2 aggregate base (R=78 Minimum) shall be used.

24.4.4 TEMPORARY CONFORMS shall be two inches of asphalt concrete surfacing and four inches of Class 2 aggregate base.

#### 24.5 DRIVEWAY STANDARDS

The following driveway standards do not apply to expressways or controlled access highways where access is limited by deed restrictions or other legal controls.

Side yard driveway shall be provided along residential streets when recreational vehicle parking can be provided for. The number and width of permitted driveways shall be regulated and based on the needs of the parcel served. They shall not be excessive to the detriment of the abutting street capacity and efficiency.

The total width of residential driveways shall not exceed 40% of the frontage, and the width of commercial and industrial driveways shall not exceed 60% of the frontage except on cul-de-sacs.

Driveway width is measured along the curb line, and consists of the total width of the depressed and transition sections, that is, from point of full height curb, across the driveway, to opposite point of full height curb.

24.5.1 MAXIMUM DRIVEWAY WIDTH. Driveway width shall not be greater than 20 feet for residential use and 41 feet for commercial and industrial uses. As an exception, driveway width of up to 45 feet may be allowed on a common driveway, or when required in special cases for industrial and commercial uses.

24.5.2 MINIMUM DRIVEWAYS WIDTH. The minimum width of driveway approach shall be 17 feet from full height to full height of the curb.

24.5.3 INTERSECTING STREETS. The driveway transition shall normally be permitted no closer than 10 feet from the tangent of the curb return. Commercial and industrial driveways on arterials may be prohibited within 100 feet from the projected property line of the intersection street where the intersection is signalized or is planned for future signalization, or where the intersection capacity is critical.

24.5.4 DISTANCE FROM UTILITY OR SAFETY DEVICES. Driveway approaches shall clear all public facilities such as electroliers, traffic signal standards, utility poles, fire hydrants, and street trees by a minimum of three (3) feet. Any relocation of public facilities required to maintain such clearance shall be at the expense of the owner who is installing the driveway approach.

24.5.5 DISTANCE BETWEEN DRIVEWAYS. As much as practical, the total curb length between driveways shall be in multiples of twenty-two feet (22').

Where the nature of the subdivision requires the location of several driveways in close proximity to each other, for example driveways along cul-de-sacs, full height of curb shall be maintained for a minimum distance of six (6) feet between the transitions of adjoining driveways.

24.5.6 COMMON USE DRIVEWAYS. Joint use of driveways may be permitted in special cases.

24.5.7 REMOVAL. Any abandoned driveway shall be completely removed and replaced with standard sidewalk, curb and gutter.

24.5.8 PARKING LOTS. Parking lot driveways shall be designed in such a manner as to obviate the use of the abutting public street for vehicular circulation solely related to the parking lot.

24.5.9 GRADE. Driveway grade shall be designed to preclude any part of automobile frame dragging or “hanging up” on the street or driveway.

24.5.10 MODIFICATION. The above standards may be modified by the City Engineer for unusual conditions, or where necessary to promote a smooth flow of traffic.

#### 24.6 SIDEWALK STANDARDS

Sidewalks shall be designed as specified on the applicable standard details or as shown on the plans. In general, monolithic sidewalks shall be used. Split pattern and meandering sidewalks shall be used only with the approval of the City Engineer or as required by City for a particular project.

24.6.1 MONOLITHIC SIDEWALK. Monolithic sidewalks shall have a minimum width of five (5) feet, measured from the face of curb.

24.6.2 SPLIT PATTERN SIDEWALK. Split pattern sidewalks shall have a minimum width of four (4) feet.

#### 24.7 STANDARD CITY MONUMENTS

Standard city monuments shall be placed along the centerline or the monument line of streets, and located at the BC, PRC and EC of horizontal curves at street intersections and at angle points.

Monuments shall be located on curves so that adjacent monuments can be sighted along chords contained entirely within the public right of way.

#### 24.8 FACE OF CURB

The face of curb radius, central angle, and curve length shall be shown for horizontal curves and curb returns.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 25: STORM DRAIN SYSTEMS DESIGN CRITERIA

25.1 SYSTEM DESIGN REQUIREMENTS

25.1.1 THE STORM DRAIN SYSTEM shall be designed in accordance with the requirements of these specifications or as required by the City Engineer.

25.1.2 PLAN REVIEW PROCESS. Drainage and erosion control plans shall be reviewed by both the Alameda County Flood Control and Water Conservation District (ACFCWCD) and the City. Two sets of plans shall be submitted to both agencies for review. After all comments and revisions have been incorporated into the plans, three sets of the final plans shall be submitted to the City's Public Works Department for the necessary permits before construction begins. The ACFCWCD may be contacted as follows:

Alameda County Flood Control  
And Water Conservation District  
399 Elmhurst Street  
Hayward, CA 94544  
(510) 670-5480

25.2 PIPES

25.2.1 REINFORCED CONCRETE pipe shall be Class III as designated by ASTM Specification C-76.

25.2.2 Plastic Pipes --- more spec. text

25.2.3 HDPE pipes - . more spec. text

25.2.4 CURVED SEWERS. Curved sewers shall be allowed provided that radius of curvature exceeds manufacturer's recommendations. The radius of curvature, length of curve and central angle shall be specified on plans.

25.3 DESIGN

25.3.1 MINIMUM SIZE OF MAINS in the public right of way shall be 15". Laterals to curb inlets may be 12" minimum.

25.3.2 THE RATIONAL METHOD will be used for design. Design storm shall be based on:

1. A 25 – year recurrence interval for drainage areas of 50 acres or less;

2. A 50 – year storm for areas of more than 50 acres and less than 6,400 acres (or 10 square miles).

Design storm for areas greater than 10 square miles shall be subject to criteria to be established by the City Engineer at the time of design.

25.3.3 STORM DRAIN SYSTEM CALCULATIONS. Peak runoff shall be computed using the Rational Method ,  $Q = CIA$ . The use of the Rational Method is acceptable for sites with the following conditions:

- 1) Site less than 320 acres
- 2) Time of Concentration less than 1 hour
- 3) Storm duration greater than or equal to Time of Concentration

For sites that do not meet these requirements, the use of alternate methods such as NRCS(TR55) or Unit Hydrograph shall be utilized. The selection of the method shall be established by the City Engineer at the time of design.

- A. “Q” is the peak runoff in cubic feet per second and is used as the basis for design of the storm drain system.
- B. “C” is the runoff coefficient having a value between 0.0 and 1.0 and modified by slope and rainfall intensity.  $C = C + C_s + C_i$ , where:

- C is the design runoff coefficient
- C is the base runoff coefficient
- $C_s$  is the slope adjustment factor
- $C_i$  is the rainfall intensity adjustment factor

Equations for computing  $C_s$  and  $C_i$  are given in the Hydrology And Hydraulics Criteria Summary. The base runoff coefficient values, C are given below:

<u>C</u>	<u>LAND USE DESCRIPTION</u>
0.20	Undeveloped land, Agricultural, Parks, Golf courses
0.60	Minimum value, hillside areas in excess of 10% average slope
0.40	Single – Family Residential
0.60	Condominiums, Duplexes, Apartments, Institutions, Mobile Home, Light Industrial (40% open space)
0.70	Medium Industrial (30% open space), Light commercial (professional offices, etc.)
0.80	Heavy Industrial (20% open space), Heavy Commercial (shopping centers, etc.)

The City Engineer shall approve the coefficient of runoff to be used for developments not included in the above tabulation.

- C. “i” is the design storm rainfall intensity in inches per hour and shall be determined for the yearly frequency specified above, using the ACFCWCD’s charts for Unit Rainfall Intensity Factor and the Mean Annual Precipitation (MAP).



D. “A” is the area in acres contributing to the system. All upstream areas are to be considered fully developed to the used shown on the latest adopted General Plan.

All hydrology calculations using this method shall be entered on the ACFCWCD’s Form 21.2. A copy of this form may be obtained from the district’s Elmhurst Street offices in the City of Hayward.

25.3.4 THE MANNING’S FORMULA shall be used to calculate hydraulic profiles. The friction value “n” for particular pipes or facility shall be as indicated in the Hydrology And Hydraulics Criteria Summary, Alameda County Flood Control And Water Conservation District.

25.3.5 HYDRAULIC GRADE LINE AND FREEBOARD REQUIREMENTS. All storm drainage systems shall be designed to maintain a minimum hydraulic grade elevation of 1.25 feet below its top of curb at each inlet and manhole, and an energy grade elevation no higher than the top of curb at each inlet and manhole.

35.3.5.1 WAIVER OF MINIMUM REQUIREMENTS. A waiver of the hydraulic grade elevation and freeboard requirements, as contained in this design criteria and the Hydrology And Hydraulics Criteria Summary, may be granted by the City Engineer. The project engineer shall apply for waiver in writing stating why such a waiver is needed.

Waivers may be granted only in exceptional circumstances and for situations where potential flooding is only likely to occur in areas with no damage to property (for example, parking areas with adjacent building pad elevations above flood elevations). In general, the worst acceptable case is a zero freeboard.

A waiver certificate from the City Engineer shall be required by the Alameda County Flood Control District if a drainage plan does not meet required minimum conditions.

25.3.5.2 COUNTY ENCROACHMENT PERMIT REQUIRED. Storm drain systems, which outfall into major drainage channels under the jurisdiction of Alameda County shall be designed in consultation with the County. Such a system may require an encroachment permit from Alameda County Flood Control and Water Conservation District.

25.3.6 LIMITING VELOCITIES AND MINIMUM INVERT SLOPE.

Table 25 – 2: Limiting Velocities & Minimum Invert Slope

<u>FACILITY</u>	MIN. VELOCITY (ft/sec)	Max. Velocity (ft/sec)	Min. Slope (ft/sec)
Earth Channels	2.0	6.0	0.0035
Concrete Lined Channels	2.0	14.0	0.0035
Closed Conduits	3.0	14.0	0.0035

25.3.7 AT CHANGES IN DIRECTION, a velocity headloss shall be included.

25.3.8 UTILITY LINE CONFLICT. Care must be taken so that storm drain pipes, water and sanitary sewer lines do not conflict with each other.

25.3.9 LOCATION of storm drains shall normally be in the pavement area and not in easements or under the curb.

25.3.10 TWO SETS OF ALL DRAINAGE PLANS and hydraulic calculations showing all relevant data and hydrology maps all contributory areas shall be submitted with the plans to Alameda County Flood Control and Water Conservation District and to the City.

#### 25.4 MANHOLES

25.4.1 LOCATIONS. Manholes shall be located at the following points:

At all changes in slope

At all changes in size of pipe

At all changes in direction and at intersections of lines, including inlet runs at the B.C., E.C. and P.R.C. on curved sewers.

25.4.2 FOR PIPES 33" OR SMALLER in diameter, manholes will have a nominal spacing of three hundred feet (300') with a maximum spacing of three hundred fifty feet (350)' for pipes 36" and larger, the manholes spacing shall be individually designed for each job.

25.4.3 "DROP MANHOLES" shall be utilized where necessary to provide velocities below the maximum.

#### 25.5 INLET

25.5.1 TYPE. Street drainage shall incorporate the standard curb inlets, shown on the City Standard Details, for ingress of water into storm drain systems. Where storm drain ingress is required in a street location, a standard field inlet shall be used.

25.5.2 LOCATION. Inlets shall be located at the following points

At all low points

At all points where depth of flow in the gutter exceeds 0.4 feet

At street intersections

Generally, the first inlet from the high points shall be located not more than one thousand feet (1000') from said high point provided the depth of flow in the gutter does not exceed 0.4 feet. Thereafter, the inlets shall have an average spacing of six hundred feet (600').

25.5.3 INLET LATERAL RUNS shall be 12" in diameter with a minimum slope of one percent (1%). Inlets shall be connected directly to the manholes and not to another inlet.

25.5.4 IN AREAS WHERE LARGE LOTS will be drained to the street, plugged twelve-inch (12”) stubs should be placed from the inlet to the property line.

#### 25.6 DRAINING OF PRIVATE LOTS

When connections directly into manholes are made from private lots, a cleanout or catch basin shall be placed just behind the property line accessible from the street. The minimum conduit size shall be 12” within the street area.

#### 25.7 OUTFALLS

Outfalls or any storm drain system to be dedicated to the Alameda County Flood Control and Water Conservation District shall be designed in accordance with the Alameda County Flood Control and Water Conservation District requirements.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 26: WATER SYSTEM DESIGN CRITERIA

26.1 WATER SYSTEM

The water system shall be designed in accordance with the requirements of the Alameda County Water District. Water lines shall be designed to clear gravity flow systems. (Minimum vertical separation at crossings shall be 12". Minimum horizontal separation for parallel systems shall be five feet (5').

26.2 FIRE HYDRANTS

26.2.1 THE HYDRANT LOCATIONS and spacing shall be approved by the Fire Chief and the City Engineer. Hydrants shall not be located closer than five feet from any vertical structure, or three feet from any driveway.

26.2.2 TYPES of hydrants shall be as follows:

- A. Residential and Light Commercial  
(1 – 2 ½" and 1 – 4 ½" NST Outlets)

- Long Beach, Anacapa Type, Model 614;
  - Long Beach, East Bay Series, Model 614;
  - Rich, East Bay Series, Model 5;
  - Rich, Ranger 900 Series, Model 950;
  - Or approved equal.

- B. Industrial And Heavy Commercial  
(2 – 2 ½" and 1 – 4 ½" NST Outlets)

- James Jones, Model J – 3760;
  - Long Beach, Anacapa Type, Mode 615;
  - Rich, MGS 70 Series, Type 76;
  - Rich, Ranger 900 Series, Model 960;
  - Or approved equal.

26.2.3 FIRE FLOW REQUIREMENTS

- A. Hydrant – Fire flow required from each hydrant shall be a minimum of 1000 gallons per minute. Hydrant residual pressure shall be a minimum of 20 pounds under ordinary flow conditions to provide a positive pressure on the suction side of the pumper.

B. Hydrant Spacing – Minimum fire flows required for various uses as specified in this section shall be within a radius of not more than 500 feet for use in residential districts and within a radius of not more than 300 feet in commercial and industrial districts.

In developed residential districts which are fully protected by automatic sprinkler systems, the Fire Chief may allow hydrant spacing every 1,000 linear feet.

C. Volume Of Flow Received For Various Uses:

	<u>Minimum</u>	<u>Flows</u>
Well spaced, average, single – family dwellings	1,000	GPM
2 to 3 story apartment houses, well spaced	2,500	GPM
Neighborhood shopping centers of ordinary construction with a supermarket of about 20,000 sq. ft.	4,000	GPM
Large regional shopping centers	6,000	GPM
“Industrial park” districts of single story, moderate sized buildings, well separated and sprinklered	5,000	GPM

### 26.3 WATER SERVICES

26.3.1 WATER SERVICES AND METER BOXES. In general, water services and meter boxes shall be installed for each lot. On subdivisions, meters shall be installed for each lot.

26.3.2 LOCATION. In general, the services should be located in the middle of the lot. The locations shall be stationed on the plans. Services shall not be located in driveways and shall not be less than five feet from the sewer lateral.

26.3.3 WHENEVER POSSIBLE, service size and location shall be determined and installed at the time of street construction.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 27: SANITARY SEWER SYSTEMS DESIGN CRITERIA

27.1 SANITARY SEWERS shall be designed in accordance with the requirements of the Union Sanitary District.

27.2 LATERALS. Laterals shall be provided for every lot.

27.2.1 LOCATION. Laterals shall be located at approximately the middle of each lot.

27.3 CONSTRUCTION. The laterals shall be installed at the time of street construction.

CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 28: STREET LIGHTS DESIGN CRITERIA

28.1 PLAN APPROVAL

Street lighting plans shall be approved by the City Engineer.

28.2 DESIGN BY LICENSED CIVIL OR ELECTRICAL ENGINEER

Plans involving five (5) electroliers or less may be designed by a licensed civil engineer. Plans involving more than five (5) electroliers shall be designed by a licensed electrical engineer.

The plan shall show all existing adjacent electroliers.

28.2.1 SERVICE POINTS. The following procedure shall be followed in coordinating work with Pacific Gas and Electric Company for establishing service points:

1. Project engineer shall send 5 copies of preliminary electrolier layout plans to Public Works Department for review and approval.
2. Public Works Department shall send 2 copies of approved preliminary plans to P.G. & E. for location of feed points.
3. P. G. & E. shall make recommendations for the location of feed points for Public Works approval.
4. Public Works shall inform project engineer of approved service points and other revisions to the plans.
5. Project engineer shall resubmit 5 copies of revised plans showing service points for final approval by Public Works Department.
6. Public Works shall send 2 copies of the final plans to P.G. & E.

Any deviation from the approved final plan during construction shall require the approval of the City Engineer. Public Works Department shall notify P.G. & E of any such changes.

Contractor shall install electroliers as part of the public street improvements.

28.3 ELECTROLIER SPECIFICATIONS

28.3.1 THE SCHEDULE for street lights shall be LS – 2B

28.3.2 ALL STREET LIGHTS shall be 70 – watt high pressure sodium lights, 30 feet high, except that on all 84 – foot and wider arterial streets, street lights shall be 150 – watt high pressure sodium lights, 35 feet high.

28.3.3 STREET LIGHTING DESIGN shall meet the American national Standard established by the IES.



CITY OF UNION CITY

STANDARD DESIGN CRITERIA

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SECTION 29: HANDICAP PROVISIONS

29.1 HANDICAP REQUIREMENTS

Handicap requirements for on – site improvements shall be as follows:

29.1.1 HANDICAP RAMPS shall be provided to allow easy access to sidewalks. Such ramps shall be designed in accordance with the City Standard Details.

29.1.2 PLATFORMS shall be provided at doors and/or doorways, as necessary for easy access by the handicapped.

29.1.3 PARKING LOTS shall be designed and striped with the following consideration for the handicapped:

- A. Accessible parking space near building
- B. Lots identified for use by physically handicapped only
- C. Parking spaces to have a side opened on level surface
- D. 12’ – 0” minimum width parking space
- E. Physically handicapped shall not be compelled to walk or wheel behind parked cars

29.1.4 HANDICAP PARKING REQUIREMENTS shall be as follows:

IT  
Handicap Parking Requirements

<u>PARKING SPACES</u>	<u>HANDICAP SPACES REQUIRED</u>
0 – 40	1
41 – 80	2
81 – 120	3
121 – 160	4
161 – 300	5
301 – 400	6
401 – 500	7
Over 500	7 + (1 per each additional 200 or fraction thereof)

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