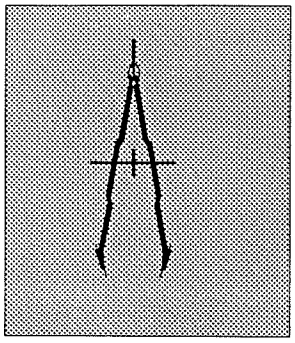

Standard Specifications

CITY OF
Fremont

CITY GOVERNMENT BUILDING
FREMONT, CALIFORNIA 94538
(510) 494-4700

Approved by City Council 4-9-1985

Resolution Nos. 6316, 6317

JANUARY 1995 (AMENDED)

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SPECIFICATIONS FOR SUBDIVISIONS

SECTION 1. DEFINITIONS: Wherever 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:

A. Engineer - "Engineer" shall mean City Engineer of the City of Fremont, California, acting either directly or through properly authorized agents acting within the scope of the particular duties delegated to them.

B. City - The word "City" as used herein means the City of Fremont, Alameda County, California.

C. City Council - "City Council" means the City Council of the City of Fremont, Alameda County, California.

D. Contractor - "Contractor" means the person or persons, co-partnership, or corporation, who have entered into a contract with the City of Fremont as a party or parties of the Second Part or his or their legal representatives.

E. Developer - "Developer" shall mean any individual, firm, association, syndicate, co-partnership, corporation, trust, or any other legal entity affecting a subdivision of land or individual development within the City of Fremont, Alameda County, California.

SECTION 2. REFERENCE TO OTHER SPECIFICATIONS: Where, in these specifications or on the plans, reference is made to the State of California Standard Specifications or to the Standard Specifications, it shall mean the current STANDARD SPECIFICATIONS, State of California, Department of Transportation, at the time of plan approval by the City Engineer.

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:

A. Department of Public Works, or Division of Highways - The City of Fremont, Public Works Department.

B. Director of Public Works - The City of Fremont, Public Works Director.

C. 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.

D. Laboratory - Any laboratory approved by the City of Fremont to test materials and work involved in the contract.

E. State - The City of Fremont, Alameda County, California.

These specifications are to be used in conjunction with the City of Fremont Standard Details and may be modified or supplemented by special provisions placed on the improvement plans as approved by the City Engineer or as required by conditions imposed by the Planning Commission at the time of the tentative map approval.

SECTION 3. LEGAL RELATIONS AND RESPONSIBILITY: The developer's attention is directed to the provisions of Section 7 of the Standard Specifications, all of which are applicable to this contract.

SECTION 4. SANITARY SEWERS AND APPURTENANCES: Where not in conflict with these specifications, all materials and workmanship for sanitary sewers and appurtenances thereto shall be installed as shown on the plans and shall conform to all the requirements therefor of the applicable provisions of the standard specifications of the Union Sanitary District and shall be subject to field inspection by said District.

The developer shall procure from said District all permits and licenses, pay all charges and fees and give all notices necessary and incident to the installation of sanitary sewers and their appurtenances.

At the completion of the work and prior to final acceptance by the City of Fremont, the developer shall furnish the City Engineer with a written certificate from said District to the effect that all such installation has been satisfactorily performed.

SECTION 5. WATER MAINS AND APPURTENANCES: Where not in conflict with these specifications, all materials and workmanship for water main, service connections, and appurtenances thereto shall be installed as shown on the plans and shall conform to all the requirements therefor of the applicable provisions of the standard specifications of the Alameda County Water District and shall be subject to field inspections by said District.

The developer shall procure from said District all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the installation of water mains, service connections and their appurtenances.

At the completion of the work and prior to final acceptance by the City of Fremont, the developer shall furnish the City Engineer with a written certificate from said District to the effect that all such installation has been satisfactorily performed

SECTION 6. PUBLIC UTILITIES: In the event that any City of Fremont, Alameda County Water District, Union Sanitary District, Pacific Gas and Electric Company, Pacific Bell Company, Fremont Cable Television, or San Francisco Water District facilities are encountered, the developer shall effect the necessary coordination to have these structures removed, relocated and/or adjusted as necessary with the respective utility company or district. In the event of damage caused by the developer, he shall immediately notify the respective utility company or district. Repairs shall be made by the utility company or district at the developer's expense.

SECTION 7. FIRE HYDRANTS AND APPURTENANCES: Where not in conflict with these specification, all materials and workmanship for fire hydrants, gated connections, and appurtenances thereto to provide water supply for fire protection shall be installed as shown on the plans and shall conform to all requirements therefore of the applicable provisions of the standard specifications of the City of Fremont or Alameda County Water District and shall be subject to field inspection by said districts.

The developer shall procure from said districts all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the installation of fire hydrants and their appurtenances.

At the completion of the work and prior to final acceptance by the City of Fremont, the developer shall furnish the City Engineer with a written certificate from said districts to the effect that all such installation has been satisfactorily performed.

SECTION 8. WORK WITHIN RAILROAD RIGHT-OF-WAY: The developer shall make all arrangements with the railroad and all work within any railroad right-of-way shall be conducted in accordance with any and all requirements of the railroad company regarding work within the right-of-way and also 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 with City and approval by the City Engineer is given.

The developer shall pay the cost of all fees, bonds, permits, etc.

SECTION 9. CLEARING AND GRUBBING: Clearing and grubbing shall conform to the applicable provisions of Section 16 of the Standard Specifications with the following modifications:

A. No burning of material will be allowed. Combustible material must be disposed of at a site designated in the special provisions or at the local public dump.

B. Unless otherwise noted on the plans, clearing and grubbing shall be performed within the entire street and easement right-of-way area.

C. Existing warning, regulatory and guide signs will be relocated if necessary and replaced by the developer. All signs removed by the developer shall be delivered and stored in a location as designated by the Engineer. All new signs shall be installed by the developer as indicated on the approved plans.

SECTION 10. EARTHWORK: Earthwork shall be classified as "Roadway Excavation," "Ditch Excavation," "Embankment Construction," and "Basement Material."

A. Roadway Excavation shall conform to the requirements of Section 19-2 of the Standard Specifications with the following modification:

1. When directed by the City Engineer, the developer shall excavate soft or unsuitable basement material. The resulting voids shall be filled with selected material or aggregate subbase. Compaction of original ground will not be required prior to placing of this material. Reinforcing fabric may be used in lieu of over excavation provided the planned base section is 18 inches or greater.

2. When directed by the City Engineer, the developer shall install permanent, maintainable subsurface drainage facilities to control excessive moisture in the right-of-way. The design of such facilities shall be signed by a Registered

Civil Engineer and shall be subject to the approval of the City Engineer prior to installation.

B. Ditch Excavation shall conform to the requirements of Section 19-4 of the Standard Specifications

C. Embankment Construction shall conform to the requirements of Section 19-6 of the Standard Specifications and to Section 12 of these specifications.

1. The relative compaction for the original ground as specified in Section 19-5 shall have a minimum compaction of 90% as determined by City of Fremont dry density method. Embankment in street right-of-way to within six inches below subgrade shall be certified by soils engineer at subdivider's expense.

D. Basement Material shall conform to the requirements of Section 19-5 of the Standard Specifications with the following modifications:

1. Compaction of original ground shall be for the full width of the roadbed measured to back of curbs.

2. The relative compaction of the original ground for six inches (6") directly below the grading plane shall be ninety percent (90%) minimum, as determined by City of Fremont Dry Density Method.

E. Method of test for use on subdivisions, parcel map developments and encroachment permit improvements shall be per City of Fremont dry density method. This method of test shall be used to determine the relative compaction of untreated and treated soils and aggregates. Relative compaction in this method is defined as the ratio of the in-place dry density of a soil or aggregate to test maximum dry density of the same soil or aggregate when compacted by a specific test method.

The in-place dry density shall be determined in accordance with Part I of the method of test.

The laboratory test maximum dry density and percent relative compaction shall be determined in accordance with Part II of the method of test.

SECTION 11A. TRENCH BACKFILL IN EXISTING OR PROPOSED FUTURE STREET RIGHT-OF-WAY: 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 substance, and shall be of such nature and so graded that it will bind readily when watered and compacted.

A. When tested in accordance with Section 6 of the Standard Specifications, the material shall conform to the following requirements:

1. Sand equivalent . . . . . 20 min.

2. Gradation Requirements:

(a) Pipe bedding - from the bottom of trench to six to twelve inches (6"-12") above the top of pipe.

(1) Vitrified clay pipe, plastic pipe, tarred and wrapped steel pipe, and copper services:

Passing the 1-inch sieve	100%
Passing the 3/4-inch sieve	90-100%
Passing the No. 4 sieve	35-100%
Passing the No. 30 sieve	5-40%

(2) Concrete pipe and rigid steel conduits: Use same gradation shown in paragraph A-2(b) for upper portion of trench.

(b) Upper portion of trench - the material from the pipe bedding up to roadway subgrade:

Passing the 3-inch sieve	100%
Passing the 1-inch sieve	90-100%
Passing the No. 4 sieve	35-100%
Passing the No. 30 sieve	5-40%

The replacement of existing paving and structural street section shall be in accordance with SD46.

B. Compaction - Trench backfill shall be compacted to a minimum of 90% relative compaction as determined by City of Fremont dry density test method.

Jetting, mechanical tamping or a combination of the two may be used to obtain the required results. When backfilling, no material shall be deposited to depths greater than that which will allow a minimum of 90% relative compaction to be achieved in any portion of that lift. No subsequent lift shall be placed until the previously compacted lift has been approved by the City Engineer. No mechanical tamping will be allowed over conduit without sufficient cover to avoid damage.

SECTION 11B. TRENCH BACKFILL IN PUBLIC UTILITY EASEMENTS OR OTHER AREAS OUT OF EXISTING OR PROPOSED STREET RIGHTS-OF-WAY: Material and compaction shall comply to the requirements of the agency having jurisdiction thereover.

SECTION 12. EMBANKMENT: Unless modified or altered below, embankment and all details shall conform to the requirements of Section 19-6 of the State of California Standard Specifications.

Before any fills, embankments or bases are placed on original ground, ditch or roadway areas shall be completely and carefully cleared and cleaned of all brush, trees, stumps, grass, vegetation and other foreign material. (See Section 9, Clearing and Grubbing.)

SECTION 13. SUBGRADE PREPARATION: Subgrade preparation shall conform to the applicable provisions of Section 19 of the Standard Specifications with the following modifications:

A. The finished subgrade shall be required to have a minimum relative compaction of ninety percent (90%) as determined by City of Fremont dry density method.

B. No subsequent material shall be placed above any layer of prepared subgrade which does not meet the relative compaction requirements specified herein.

SECTION 14. FINISHING ROADWAY: Finishing roadway shall conform to the applicable provisions of Section 22 of the Standard Specifications.

SECTION 15. LIME TREATED SUBBASE: Specifications for and application of lime in the treatment of native material shall conform to the applicable provisions of Section 24 of the Standard Specifications, with the following modifications:

A. Lime treated subbase shall meet the following requirements:

1. "R" value in accordance with State of California Test No. 301 shall be as specified on the plans or in the special provisions.

2. Relative compaction in accordance with State of California Test Method No. 216 or 231 shall be 95% minimum.

SECTION 16. AGGREGATE SUBBASE: Aggregate subbase shall conform to the applicable provisions of Section 25 of the Standard Specifications with the following modifications:

Aggregate subbase shall be modified as follows:

1. Class II

2. Resistance (R-Value) 50 minimum

3. Sand Equivalent 20 minimum

4. The percentage composition by weight as determined by laboratory sieves shall be as follows:

Sieve Size	(R=50) Percentage Passing
3-inch	100
2½-inch	100
#4	25-60
#200	0-11

Oversize materials shall be removed before delivery to the project. Minimum thickness of subbase shall be six inches.

Binder, if required, shall be mixed with the material by blending and mixing until uniform throughout.

SECTION 17. AGGREGATE BASE: Aggregate base shall conform to the applicable provisions of Section 26 of the Standard Specifications:

A. Minimum thickness of aggregate base shall be six inches.

SECTION 18. CEMENT TREATED BASE: Cement-treated base shall be installed in accordance with the provisions of Section 27 of the Standard Specifications.

SECTION 19. ASPHALT CONCRETE: Asphalt concrete for roadways and berms shall conform to the applicable provisions of Section 39 of the Standard Specifications with the following modifications and special requirements:

A. Asphalt concrete shall be Type B.

B. Aggregate grading shall conform to the requirements for ¾-inch maximum, medium gradation, for all courses, except the surface course. The surface course shall be ½-inch maximum, medium gradation.

C. Longitudinal joints in the top layer shall correspond with the edges of the proposed traffic lanes. Longitudinal joints in all other layers shall be offset not less than 0.5 feet alternately each side of the edges of traffic lanes.

SECTION 20. PRIME COAT AND PAINT BINDER: Liquid asphalt prime coat or cracked oil shall be applied to granular bases. In exceptional cases, during wet weather construction, asphaltic paint binder of mixing type emulsion may be used in lieu of prime coat on granular bases, but only if approval or direction is given by the City Engineer.

A. The prime coat to be applied to the aggregate base shall be liquid asphalt Grade SC-70, conforming to the applicable provisions of Section 93 of the Standard Specifications. Prime coat shall not be applied until the aggregate base has been approved by the City Engineer and shall be applied in more than one application if necessary to give full and complete coverage.

B. Tack coat shall be mixing type emulsion SS-1, conforming to the applicable provisions of Section 94 of the Standard Specifications.

SECTION 21. CONCRETE STRUCTURES: Concrete structures, including manholes, inlets, headwalls and outfall structures, shall conform to the applicable provisions of Section 51 of the Standard Specifications with the following modifications:

A. All concrete structures shall be constructed of Class A concrete, as specified in Section 90 of the Standard Specifications.

B. At the option of the contractor, manholes may be constructed with precast manhole sections, as shown on the plans. Precast manhole sections shall conform to the requirements of Section 70-1.02H of the Standard Specifications.

C. Manhole frames and covers shall be gray-iron castings conforming to the applicable provisions of Section 75 of the Standard Specifications and to requirements of the American Society for Testing Materials Designation A48, Class 30B, and shall be match marked in pairs with each cover ground or otherwise finished so that it will fit in its frame without rocking.

D. Inlet frames and grates shall be fabricated of structural steel conforming to the provisions of Section 75-1.02 of the Standard Specifications and shall be hot-dip galvanized after fabrication. After erection, all abraded surfaces shall be cleaned free of rust and oil and neatly soldered with 50-50 solder.

SECTION 22. REINFORCEMENT: Reinforcement shall conform to the applicable provisions of Section 52 of the Standard Specifications with the following modifications:

A. All bends in reinforcing steel shall be cold bends.

B. Where concrete is deposited directly against earth, the minimum clear distance between the reinforcing steel and the earth shall be three inches (3").

C. Reinforcing steel shall be intermediate grade deformed billet-steel bars only.

SECTION 23. REINFORCED CONCRETE PIPE: Reinforced concrete pipe shall conform to the applicable provisions of Section 65 of the Standard Specifications with the following modifications:

A. Reinforced concrete pipe shall conform to the specifications of AASHTO Designation M170 and shall be Class III, or as noted on the plans.

B. The interior of all pipe joints shall be completely filled with mortar and swabbed for the entire circumference.

C. All known crossings of main sanitary sewers, telephone ducts, gas and water mains and other utility lines shall be opened prior to

trenching to determine the exact elevations and depths. Grades of new installations are subject to adjustment to fit existing conditions.

SECTION 24. NON-REINFORCED CONCRETE PIPE: Non-reinforced concrete pipe shall not be used within the street right-of-way. Non-reinforced concrete pipe may, upon specific approval of the City Engineer, be used within easements that exist outside of street right-of-way.

SECTION 25. CONCRETE CURB, GUTTER AND SIDEWALK: Concrete curb, gutter and sidewalk shall conform to the applicable provisions of Section 73 of the Standard Specifications with the following modifications:

A. Concrete shall be Class A, in conformance with Section 90 of the Standard Specifications (or approved equal design) and shall have a maximum slump of three inches (3"). Maximum aggregate size to be one inch (1").

B. Concrete shall be darkened using one pound (1 lb.) lampblack per cubic yard of concrete, except in the Central Business District where "Fremont Tan" is to be produced utilizing color additives and curing seal specified as follows:

NORTHWEST

Central Business District Concrete Coloring Specification: Northeast of the centerline of Walnut Avenue, where colored concrete is specified it shall be colored with pigment No. 6160, manufactured by Davis Colors, or approved equal. Pigment shall be mixed at the rate of 18 pounds of pigment per cubic yard of concrete. Colored concrete shall be used for the entire thickness of the slab. The pigment is available from:

Davis Colors
3700 East Olympic Boulevard
Post Office Box 23100
Los Angeles, California 90023-0100

Local Telephone: (510) 444-4175

Southeast of the centerline of Walnut Avenue, where colored concrete is specified it shall be colored with pigment No. 641, manufactured by Davis Colors or approved equal. Pigment shall be mixed at a rate of 12 pounds of pigment per cubic yard of concrete. Colored concrete shall be used for the entire thickness of the slab. The pigment is available from:

Davis Colors
Bay Area Warehouse
8707 San Leandro Street
Oakland, California 94621

Telephone: (510) 444-4175

Coloring agents manufactured by different companies shall not be used without prior approval. If a substitute product is being proposed, the contractor shall submit technical specifications and a sample of cured concrete mixed with the same materials and proportions as proposed for the project. The engineer shall be the sole judge regarding acceptability of substituted pigments, with the primary consideration being color.

C. Construction details shall conform to the applicable City of Fremont Standard Detail Drawing for curb, gutter and sidewalk section. Deep score marks shall be scored to a depth of 1/5 of the thickness of the concrete being placed.

D. All curb and gutter work shall be water-tested before final acceptance.

SECTION 26. SACKED CONCRETE RIPRAP: Sacked concrete riprap shall conform to the requirements of Section 72 of the Standard Specifications.

SECTION 27. MONUMENTS: Monuments shall be constructed in accordance with City of Fremont Standard Drawing "TYPICAL CONCRETE MONUMENT," SD-17. Forms for the top 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 lengths 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 three (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.

SECTION 28. REFLECTORIZED STREET NAME SIGNS:

General - Street name signs shall consist of an assembly of one, two or three pairs of street name plates, as appropriate, each pair being mounted back-to-back and held by approved hardware at top of two-inch (2") standard galvanized pipe or a "U" channel post of cold rolled galvanized steel.

Metal - All base metal shall be new sheet aluminum of the temper designation 6061 T6, .080 inches thick. The material shall be subject to inspection prior to degreasing operations.

Fabrication - Fabrication of all metal parts shall be accomplished in a uniform and workmanlike manner. The tolerance of the panels shall be plus or minus 1/32 inch. All fabrication, including shearing cutting and punching of holes shall be completed prior to degreasing, etching, and application of reflective sheeting. Panels shall be cut to size and shape and shall be free of buckles, warp, dents, cockles, burrs, and any other defects resulting from fabrication. The surface of all sign panels shall be flat. All plates shall have a one-half inch (½") radius on the corners.

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

Color - Signs shall have a green reflective background with silver legend, without border.

Lettering - The street name lettering shall be four inches (4") in height and shall conform to B, C, or D series capital letters. The widest series of letters possible is to be used with letters being spaced to fill out as much of the sign as possible. "A" series capital letters may be used on thirty-six inch (36") long plates, if necessary. Only one series of letters is to be used on a given plate. The street category, such as avenue, boulevard, circle, court, etc., shall be abbreviated and shall consist of two-inch (2") series C letters. The block number shall consist of two-inch (2") series C numerals and shall be placed on each street name sign directly below the street category designation. Lettering shall be applied to the reflective sheeting by the silk screen process, reverse screening, or other approved method.

General Requirements

A. Date of manufacture shall be placed on the backs of the signs.

SECTION 29. SHEET REFLECTIVE MATERIALS - ENCLOSED LENS: The reflective sheeting shall consist of spherical lens elements embedded within a transparent plastic having a smooth, flat outer surface. The sheeting shall be weather resistant and have a protected pre-coated adhesive backing. Reflective sheeting for applied or demountable cutout letters, numerals, symbols and borders shall be silver white, having a minimum brightness 180 percent that specified above.

A. Reflective Intensity - The reflective sheeting after application to the signs shall meet the following minimum values at 1/3 degree divergence, expressed in units of candle power per foot candle per square foot as measured from a distance of 50 feet between the test panel and light source:

	ANGLE OF INCIDENCE		
	4°	15°	30°
High Intensity Silver	152.0	120.0	60.0
Silver or White	53.0	41.0	25.0
Yellow	19.0	15.0	9.0
Orange	17.0	13.0	7.0
Red	6.6	5.2	3.4
Green	3.6	2.7	1.5
Blue	2.8	1.9	0.7

NOTE: Reflectance values for angles of 4, 15 and 30 degrees shall be an average of the reading left and right of 0 degrees. The brightness value shall be determined by California Test Method No. 642-A, latest edition.

B. Color - The colors red, green, blue, yellow, orange, brown and white shall conform to the ICI Chromaticity Chart No. 23, dated April 1973, included in these specifications, and to the Federal Highway Administration Color Tolerance charts.

The instrumental testing restrictions noted on the FHWA Color Tolerance charts relative to retroreflective materials may be disregarded to the following extent:

As an alternative to visual testing, instruments providing a system of unidirectional illumination and diffuse viewing may be used as a preliminary means of establishing that the colors meet the required CIE limits. In the event of any

dispute concerning the results of instrumental testing, the visual test shall prevail.

C. Adhesive

1. The reflective sheeting shall include a pre-coated tack free adhesive designed for mechanical application and which will adhere to prescribed surfaces only when activated by heat or solvent. For manual application of sign borders, sign repair, emblems and vehicle marking, the pre-coated adhesive shall be pressure sensitive. The pre-coated adhesive shall not require additional adhesive coats on the reflective sheeting or application surface.

2. The adhesive coated sheeting shall form a durable bond to smooth, corrosion and weather resistant surfaces and adhere securely at temperatures of -30° to 200°F. The pre-coated adhesive, 48 hours after application, shall be tough enough to resist scuffing and marring during handling, elastic enough at low temperatures to resist shocking off when struck at -10°F without appreciable decrease in adhesion, vandal-resistant and strong enough to resist peeling the reflective sheeting from the application surface when a five pound/inch width force is applied as outlined in ASTMD903-49. The pre-coated adhesive shall have not staining effect on the reflective sheeting and must be mildew resistant.

D. Film

1. General - The reflective sheeting applied according to manufacturer's recommendations to a clean amorphous chromate treated 0.063" x 2" x 8" aluminum panel, conditioned a minimum of 48 hours and tested at 73.4 ±3.6°F and 50 ±5% relative humidity shall be sufficiently flexible to show no crackling when bent around a 3/4 inch mandrel.

   A 9- by 9-inch reflective sheeting specimen with liner attached shall be conditioned a minimum of one hour at 73.4 ±3.6°F and 50 ±5% relative humidity. The specimen shall be placed on a flat table with adhesive side up. The liner shall then be removed. Ten minutes after liner removal and again after 24 hours, the specimen shall

be measured to determine the amount of dimensional change. The reflective sheeting shall not shrink more than 1/32-inch in ten minutes nor more than 1/8-inch in 24 hours in any dimension.

2. Surface - The sheeting surface shall be smooth and flat, facilitate cleaning and wet performance and exhibit 85° gloss-meter rating of not more than 35 (ASTM D523-53T). The sheeting surface shall be readily processed and compatible with recommended transparent and opaque process inks and show no loss of the color coat with normal handling, cutting and application. Following accelerated exposure as outlined in paragraph E of this specification, no process inks shall be removed when tested by scratching through the ink surface, applying cellophane tape over the scratched area, and removing the tape with one quick motion.

   The sheeting shall permit cutting and color processing at temperatures of 60-100°F and relative humidities of 20-80 percent. The sheeting shall be heat resistant and permit force curing of unapplied sheeting at temperatures up to 150°F and up to 200°F on applied sheeting. The sheeting surface shall be solvent resistant and may be cleaned with gasoline, VM&P Naphtha, mineral spirits, turpentine, methanol, and xylol.

3. Lens Elements - The reflective sheeting shall possess stable and durable spherical lens elements which, following extraction, shall show no deterioration following submersion in a 5N solution of sulfuric acid (H_2SO_4) for 30 minutes at 72°F.

4. The protective liner attached to the adhesive shall be removed by peeling without soaking in water or other solvents and shall be easily removed after accelerated storage for four hours at 150°F under weight of 2.5 pound per square inch.

E. Durability

Processed and applied in accordance with recommended procedures, the reflective material shall be weather resistant and, following cleaning, shall show no appreciable discoloration,

cracking, crazing, blistering or dimensional change and no less than 50% of the specified minimum brightness values when subjected to accelerated weathering for 1,000 hours in accordance with ASTM D822-60 and ASTM Std. G23-69, Type E or EH Weatherometer.

F. Warranty - Suppliers shall present proof that the type of reflective sheeting they intend to use in the manufacture of the signs has been used on highway signs for a period of at least two (2) years and has proven entirely satisfactory.

SECTION 30. STREET AND HIGHWAY SIGNS: Street and highway signs to be installed shall consist of a sign plate with appropriate face of reflective sheeting materials, a 4 x 4 post and concrete foundation, installed in accordance with the standard set forth in Planning Manual, part 8, Traffic, of the State of California Department of Transportation. 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 California Department of Transportation, State of California. Reflective sheeting material used shall conform with the technical requirements for reflective sheeting as outlined in Section 29 of these specifications.

SECTION 31. CONTROL OF MATERIALS

A. Source of Supply and Quality of Materials - At the option of the Engineer, the source of supply of each of the materials may be approved by the Engineer before the delivery is started. Representative preliminary samples of the character and quantity prescribed shall be submitted ten (10) days prior to start of work by the contractor or producer for examination and tested in accordance with the methods referred to under samples and tests. Only materials conforming to the requirements of these specifications and approved by the Engineer shall be used in the work. All materials proposed to be used may be inspected or tested at any time during their preparation and use. If, after trial, it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the contractor shall furnish approved material from other approved sources. No material which, after approval, has in any way become unfit for use shall be used in the work.

B. Samples and Tests - Samples of materials and tests performed shall be in accordance with Section 6-3 of the Standard Specifications.

Any additional testing performed by the Contractor shall be done at his own expense.

C. Storage of Materials - Materials shall be stored in accordance with Section 6-1.03 of the Standard Specifications.

SECTION 32. STREET LIGHTING SYSTEM: The street light system shall conform to the applicable provisions of the City of Fremont Standard Details and Section 86 of the Standard Specifications, with the following modifications:

A. 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 the Underwriters' Laboratories, Inc., label, and/or be listed by the Laboratories, whichever is applicable, and shall be in perfect condition after installation.

B. Excavations shall be backfilled in accordance with Section 11 of these specifications.

C. Foundations - Foundations shall conform to the provisions of Section 86-2.03 and the following:

1. Foundations shall be Class B Portland cement concrete.

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 (4") 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 (4") 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 portion of all anchor bolts shall be provided with two nuts and two washers each.

D. 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) hot dip galvanized steel conforming to UL Publication 6 for rigid metallic conduit; or (2) rigid nonmetallic type conforming

to the requirements of the UL Standard 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 1½ inches in diameter for No. 6 AWG (or larger). In addition, the contractor may, at his option, 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 couplings 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 AWG. All conduit bends greater than 44° shall be factory bends and shall have a radius of not less than 18 inches. 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 receive 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 in the planter strip 18 inches below the sidewalk grade when placed beneath the sidewalk or driveways and 36 or 42 inches below the finish pavement grade when placed within the traveled way on minor streets or thoroughfares respectively. Rigid metal conduit may be lain on top of the existing pavement within new curbed median strips being constructed on top of said pavement.

Conduit shall be placed under existing pavement by jacking or drilling methods only. 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 six inches from the face of the foundation and at least 18 inches below the top of the foundation. Conduit terminating in standards or pedestals shall extend approximately two inches vertically above the foundation and shall be sloped towards the handhole opening. Conduit entering concrete pull boxes shall terminate two inches inside the box wall and not less than two 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, 12-inch minimum crushed rock sumps installed, grout placed around conduit, and metallic conduit bonded.

E. Pull Boxes - Minimum pull box size shall be No. 3½ 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, in the long runs, they shall be spaced at not over 250 feet. A pull box, not smaller than a No. 3½, shall be installed in the conduit run adjacent to every pole, pedestal, or structure, as shown by SD-27.

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.

Where 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 drain rock to a depth of 12 inches as shown on the Standard Detail, to form a drain sump. The crushed rock shall be a permeable material consisting of hard, durable gravel, or crushed stone and shall be free from organic material, clay balls or other deleterious substances.

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

1. Ground connection shall be through a 5/8" x 10' 0" copperweld 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 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 two to four 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 State of California, Department of Public Works, Department of Transportation, Standard Specifications, Section 86-2.10.

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.

3. The ground wire shall be connected to the electrolier by a stud or cap screw, but not by 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 in diameter and equipped with one or two washers as needed to secure the ground wire conveniently.

G. Conductors and wiring shall conform to the provisions of Sections 86-2.08 and 86-2.09 with the following modifications:

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.

2. 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 cause for rejection and shall be removed and replaced with new wire at the contractor's expense.

3. Splices in wires shall be soldered for all wire sizes #10AWG and smaller. Wires larger than #10AWG 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.

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

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

I. High Pressure Sodium Vapor Luminaires shall conform to the provisions in Section 86-6.01 of the Standard Specifications and these special provisions.

1. Luminaire lens shall be polycarbonate for wattages below 250 watts. Luminaires operating at 250 watts or greater shall have glass lenses.

2. Glare shields are not required unless specified on the plans.

3. All luminaires 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.

4. IES distribution should be medium, semi-cutoff, Type III unless otherwise indicted on the approved plans. Cobra head luminaire shall be GE M250A2 Powr/Door, Cross Hinds OV15 Tudor, or approved equal and shall be UL listed.

5. Integral photoelectric cells are to be provided unless switching and automatic control is provided by PG&E.

6. All lamps shall have a rated lamp life of 24,000 hours at the wattage indicated on the plans. Only clear lamps as manufactured by General Electric, Westinghouse or Sylvania shall be used.

7. All luminaires must be equipped with bird guards

J. Electroliers shall conform to the applicable provisions of SD-27 of the City of Fremont Standard Details and the following:

1. Aluminum electroliers shall be fabricated either from spun seamless tubing or from longitudinally welded sheet aluminum, alloy 6063-T6. All standards shall be mounted on four anchor bolts set in a circle of 12-inch diameter. Mast arms shall be six feet long or as specified on the plans.

	Mounting Height (Nominal)	
	30-foot	35-foot
Pole Section Modulus		
At base	9.00 inch^3	11.35 inch^3
At Top	2.58 inch^3	2.70 inch^3
Wall Thickness	0.188 inch	0.250 inch

K. Pole Numbering

All new street light pole installation shall be numbered. Numbers for each installation are assigned by PG&E, telephone number 784-2127. Pole numbers are to be set a minimum of eight feet and a maximum of ten feet above the top of curb. Numbers are to be placed on the street side of the pole, right angles to curbs or travelled way.

Numbers for median installations with dual arms may be individual numbers for each arm or both arms may be assigned a single number. If a pole is assigned a single number, the number is to be placed on both sides of pole facing the travelled way. If pole has separate numbers for each arm, numbers will be placed on side of pole facing respective travelled way.

The numerals shall be black on silver/white background, pressure sensitive engineer grade reflective material 3M #390 Series C.

Background:	2 inches high x 1½ wide
Numerals	1¾ inches high x 1 inch wide

SECTION 33. MAINTAINING TRAFFIC: Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the section entitled "Public Safety" elsewhere in these Special Provisions. Nothing in these Special Provisions shall be construed as relieving the contractor from his responsibility as provided in said Section 7-1.09.

A minimum of one paved traffic lane, not less and ten feet wide, shall be provided for use by public traffic.

Access to private property shall be maintained at all times.

All temporary signs and other warning devices shall be provided by the contractor. The contractor shall refer to the current State of California "Manual of Warning Signs, Lights and Devices for Use in Performance of Work Upon Highways" and the "Uniform Sign Chart," issued by the California Department of Transportation, and shall furnish, erect, maintain and remove all necessary temporary signs and devices. An arrow board shall be used on all lane closures on thoroughfares.

Existing striping and pavement markings shall be restored if obliterated. The use of cat tracking for lane lines shall be permitted; lane lines shall be restriped.

Cat tracking shall be done by the contractor at the end of each working day for the convenience and safety of the traveling public when lane lines on that portion of the street open to traffic have been obscured by the day's activity.

Traffic may not be routed over unpaved roadway unless authorized by the engineer.

When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

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

The contractor shall notify local authorities of this intent to being work at least five (5) days before work is begun. The contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.

No lane closures on thoroughfares will be permitted before 8:30 a.m. or after 4:00 p.m. without the permission of the engineer. If the engineer approves a lane closure, signs will be posted three working days in advance of the closure noticing motorists of date and time of the closure. Flashing arrow boards are to be used on all lane closures on arterials and thoroughfares.

A full width of the traveled way shall be open for public use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays and the day preceding designed legal holidays, and when construction operations are not actively in progress.

Designated legal holidays are: January 1, the third Monday in January, the third Monday in February, the last Monday in may, July 4, the first Monday in September, November 11, Thanksgiving Day, and December 25. When a designated holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11 falls on a Saturday, the preceding Friday shall be a designated legal holiday.

All excess and unsuitable material resulting from the contractor's operation shall be removed as it develops and before the end of each working day.

All hauling on city streets shall be on adopted truck routes. See Truck Network Plan.

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