CITY OF DALY CITY

D E S I G N S T A N D A R D S

February 1990

SECTION 1. GENERAL DESIGN AND SUBMITTALS

1.01 GENERAL

All plans and design for on-site and off-site improvements shall be based on current Daly City Design Standards, Standard Specifications and Drawings. A design engineer or architect may buy these documents from the Public Works Department, City of Daly City, 333 - 90th Street, Daly City, California 94015, telephone (415) 991-8064.

1.02 DRAWINGS

A. Improvement plans shall be 24" x 36" size sheets with a minimum of 1-1/2" border on the left-hand side and 3/4" border on the three remaining sides. Larger size drawings may be reduced photographically to 24" x 36" size with a graphical scale on each sheet.

B. Plans drafted by CADD shall be provided with a back-up floppy disk in the latest version of Autocad or alternate format acceptable to the City Engineer.

1.03 CALCULATIONS

Design calculations for all improvements must be submitted together with the plan submittals.

1.04 CHECK PRINT REVIEW SUBMITTALS

Generally, six (6) complete sets are required for each submittal. The following Schedule of Review Submittals for plans and specifications and cost estimates is recommended:

60%
90%
100%
Final

The City will return one (1) marked-up set with written comments. This set must be returned with the resubmittals.

After final review and approval, the originals (reproducibles) shall be submitted for City Engineer's signature.

The City shall be provided with one (1) set of original vellum or photographically produced mylar reproducibles.

On non-City funded projects, applicants shall provide additional sets of blue prints of the approved plans, specifications, and cost estimates.

1.05 DEDICATIONS

A. No dedication of right of way or easement is required when all proposed public improvements are within existing public rights of way or easements.

B. When a new public street, storm drain, sewer or utility improvement is needed, or when it is determined necessary by the City to widen the existing street to meet the demands of the additional traffic, or when required by the City or the public utilities, the applicant shall dedicate the needed right of way for such improvements.

C. Easements for storm drain, sanitary sewer, and/or water mains to be maintained by the City shall have a minimum width of fifteen feet (15'). Outside of pipe shall not be located closer than five feet (5') to the easement line.

1.06 CONSTRUCTION PLAN NOTES

The General Notes on the construction plans shall direct the contractor's attention to the following:

A. "Underground Service Alert" (USA) notification.

B. Obtain City Business License, encroachment permits, and other required permits.

C. Hours of operation.

D. Notice requirements for sewer, water, and other service disruptions.

E. Liability coverage for contractor's activity naming the City as additional insured.

F. Storage area and security of construction site and responsibility of contractor.

G. Protection of existing and installed utilities during the construction of the project.

H. Protection and replacement of street monuments, lot corner pipes and other permanent monuments disturbed during the process of construction.

I. Work schedule and coordination with the City Inspector.

J. Plan for traffic control and public safety.

K. Daily clean up.

1.07 AS-BUILT DRAWINGS

Contractor shall keep accurate as-built records which show the final location, elevation, and description of the completed work. Contractor shall also note the location and elevation of any existing improvements encountered. As-built records shall be "redlined" on a set of construction plans and shall be supplied to the City Engineer.

The project engineer shall prepare as-built construction record plans showing as-built condition of the project and shall submit the same to the City Engineer immediately upon the construction completion. Photographically produced reproducibles of the As-Built Record Plans shall be signed by the project engineer, field engineer, construction superintendent, and the City's inspector.

- End of Section -

SECTION 2. STREETS

2.01 SCOPE

This section covers the general design requirements and design criteria applicable to the street system as a whole.

2.02 GEOMETRIC DESIGN

A. All City streets shall conform to the requirements set forth in the Daly City Standard Drawings and shall provide for curbs, gutters, sidewalks, driveways, handicapped ramps, as required.

B. If local topographical conditions or other exceptional conditions dictate, the City Engineer may permit exceptions to the given standards to be shown.

C. Intersections shall be at as near ninety degrees (90°) as practicable. Where collector streets, local arterial streets intersect one another, it is desired that they be preceded by a centerline tangent of not less than one hundred feet (100') from the intersection curb return. Maximum street grade through intersections shall be five percent (5%).

D. Minimum longitudinal street grade shall be one half percent (0.5%). Maximum longitudinal street grade shall not exceed eighteen percent (18%). Uniform cross slope grade on all roadways (including super-elevated) shall be two percent (2%) unless otherwise approved by the City Engineer.

E. Curve data is to be shown on the construction plans for all curve-linear surface improvements.

F. Vertical curves shall have a minimum two hundred foot (200') curve length, where feasible.

G. Departure and approach grade at driveways shall not exceed fifteen percent (15%).

H. Local streets in planned developments or in Commercial or industrial areas shall be specially designed according to any applicable, adopted development plan.

I. Minimum vehicular lane width shall be twelve feet (12') clear of parking. One way streets shall have a minimum vehicular lane width of twenty feet (20') clear of parking.

2.03 STRUCTURAL DESIGN

A. The typical street section shown in the Standard Drawing is the minimum required with regards to the structural section of City streets.

B. The structural section of arterial and collector streets shall be designed based on the Design Traffic Index and "R" value of basement materials, but in no case less than what is shown in the Standard Drawing (S-1) or less than the thickness capable of supporting a fifty thousand (50,000) pound fire truck with a forty thousand (40,000) pound rear and eighteen thousand (18,000) pound front axle criteria and an eighteen thousand (18,000) pound point base.

C. Sampling, Testing, and Design: The developers shall be responsible for the sampling and testing of in place and/or imported materials and the design based thereon necessary for determination of appropriate thickness of aggregate base and surfacing.

D. Equivalent construction materials that will meet the requirement of the specified design traffic index may be allowed, in lieu of cross-section shown, subject to the approval of the City Engineer.

E. City streets having more than four (4) utility cuts and trenches per block shall receive one inch (1") minimum thick A.C. overlay along the entire property frontage or the trench length, whichever is greater.

F. Where the City Engineer deems appropriate or where required, the Geotechnical Engineer's recommendations shall be made a part of the design considerations.

G. Trenching and repairs to existing concrete streets shall be as per plans approved by the City Engineer and may require doweling, reinforcement, or special keys to prevent movement or subsidence.

H. Sight distance shall provide a ten foot (10') clear zone sight visibility easement behind the street right-of-way line, with restriction for no sight obstruction within a zone 36"-66" above the roadway.

I. Cold plane conform lines parallel to the flow of traffic shall be six feet (6') wide; cold plane conform lines perpendicular to the flow of traffic shall be ten feet (10') wide. Cold plane to a depth of 0.1'.

J. When widening roadways or sidewalks, the grades shall match existing.

K. Whenever an existing driveway is extended, the condition of existing driveway shall be reviewed.

L. Design Engineer shall certify curb and base rock elevations prior to paving or concrete placement.

M. Median curb height shall provide for one future two inch (2") asphalt concrete overlay. Drainage shall be away from medians except where there are existing drain inlets at the median.

- End of Section -

SECTION 3. STORM DRAINS

3.01 SCOPE

This section covers the general design requirements and design criteria applicable to the storm drain system as a whole.

3.02 IMPROVEMENTS REQUIRED

All property shall be drained into off-site storm sewers using on-site drain inlets, concrete gutters, ditches, swales, pipes, or other permanent improvements, avoiding overland flows to neighboring properties and flow over public sidewalk. The developer shall be responsible for such off-site improvements as may be necessary to complete the desired drainage system to serve the property.

3.03 DESIGN CALCULATIONS

Any proven method of calculating runoff may be used in the design. Use of the Rational Method is acceptable for watersheds of less than five (5) acres in the urbanized areas. Unit Hydrograph Method is recommended for run-off calculations and flood routing in watersheds greater than five (5) acres.

For watersheds of less than five (5) acres, the quantity of flow concentrating at the designated point shall be calculated taking into consideration topographical, soil and vegetation conditions, existing and probable improvements in watershed, size of watershed and intensity of precipitation. "Inlet time" or the time involved in the transportation of water from the initial point of concentration in the watershed to the design point through the use of gutters, culverts, storm drains, and ditches shall be used for the time of concentration (duration of storm) for urban areas. The minimum time of concentration to be used is ten (10) minutes.

Rational Formula: $Q = Aci$

- Q = Cubic Feet per Second
- A = Drainage Area, in Acres
- c = Coefficient of runoff, imperviousness factor
  Table - 1
- i = Intensity, Inches per Hour
  Time of Concentration (T_c) - Table 2
  Intensity (i) - Table 3.1, 3.2, 3.3

The drainage system capacity shall be designed in such a way that the system may be extended to serve and to properly handle the entire drainage basin at the time of ultimate development.

Storm systems shall be designed for a 1 in 10 year storm. No area subject to flooding will be designed for less than 1 in 100 year storm.

The storm drain system shall be designed to detain on-site all flows during a ten year frequency storm. The rate of flow from these sites shall not exceed the present rate. Flow shall be retained during the peak period in a two hour duration.

All flow computations shall be based on Manning's Formula:

$$V = \frac{1.486}{n} R^{2/3} S^{1/2}$$

V = Velocity, Feet per Second

R = Hydraulic Radius

S = Energy loss per foot of length

= Slope of energy gradient, for open channels with very small slope.

= Drop in the channel per foot of length, uniform flow.

n = Coefficient of surface roughness (Spun Concrete Pipe N = 0.013)

Closed conduits shall be precast reinforced concrete pipe. Other types of materials may be used when justified, with the approval of the City Engineer.

(1) Minimum pipe diameter allowable on any publicly maintained storm drain shall be fifteen inch (15") diamter.

(2) Minimum velocity in closed conduits shall be two (2) f.p.s. full (feet per second).

(3) Never discharge a larger pipe into a smaller pipe less than twenty-four inches (24") in diameter even though the capacity of the smaller pipe may be greater due to the slope, etc.

(4) Show invert elevations to the nearest 0.1 foot and all other elevations to the nearest 0.01 foot.

(5) Hydraulic grade line shall be a minimum of 0.50 feet below the elevation of inlet grates and manhole covers.

Open conduits shall consist of concrete lined channels, paved bottom channels, or natural earth channels, as specified in these specifications.

(1) Velocity =

	Minimum	Maximum
a. Unlined ditches	2 f.p.s.	4 f.p.s.
b. Lined ditches	2 f.p.s.	6 f.p.s.

(2) Freeboard of at least one foot (1') shall be provided at design capacity of all channels with earth slopes. On gunite lined channels, 0.5 feet of freeboard shall be provided below top of lining.

Hydraulic gradients shall be plotted on all storm drain profiles.

3.04 DESIGN CONSIDERATIONS

A. Alignment - The alignment of open ditches, swales, and paved channels shall be maintained as nearly as possible.

B. Appurtenant Structures:

(1) Manholes -

a. Standard precast concrete manholes will be used wherever feasible. When cases arise where special manholes or junction boxes are required, the design must be approved by the City Engineer. In no case will junction boxes be allowed which are smaller than twenty-four inches (24") inside diameter.

b. Manholes shall be located at junction points, changes in gradient and changes in conduit size. On straight or curved pipe lines with radii of two hundred feet (200') or more, manholes shall be placed at the BC or EC of the curve and on three hundred foot (300') maximum intervals. Curves with radii less than two hundred feet (200') will be handled on an individual basis.

(2) Inlets -

a. Gutter inlets shall be in accordance with the types shown in the Standard Drawings or other approved special inlets.

b. Inlets shall be spaced so that gutter flow does not exceed four hundred feet (400') or the capacity of the gutter for a ten (10) year storm whichever is the lesser distance and so as to intercept all drainage draining into the inlet.

c. Grate type inlets on a continuous grade in excess of three percent (3%) cannot be considered as accepting their full capacity of flow. Care should be exercised in placing grates outside of normal pedestrian traffic. The effective area of opening on each grate should be considered to be fifty percent (50%) of the actual area due to the assumption that the grate will be clogged by debris.

(3) Junction Box -

a. Junction boxes will be constructed of Class A reinforced Portland Cement concrete or fabricated from reinforced concrete pipe sections where size limitations permit.

b. Minimum wall thickness for poured-in-place reinforced concrete junction boxes shall be six inches (6").

c. The inside dimension of junction boxes shall be such as to provide a minimum of three inches (3") of clearance on the outside diameter of the largest outfall pipe for pipes less than forty-eight inches (48") in nominal diameter.

d. All junction boxes shall have the standard twenty-four inch (24") manhole access with cover.

e. Precast type junction boxes fabricated from reinforced concrete pipe shall utilize the standard cover shown in the Standard Drawing SD-4.

(4) Reinforced Concrete Box Culverts and CMP -

a. When specified by the Engineer, RC box culverts and CMP shall be installed.

b. All materials, designs, and construction shall conform to the requirements of the State Standard Specifications and State Standard Drawings, unless otherwise specified by the City Engineer.

TABLE 1. RECOMMENDED RUNOFF COEFFICIENTS

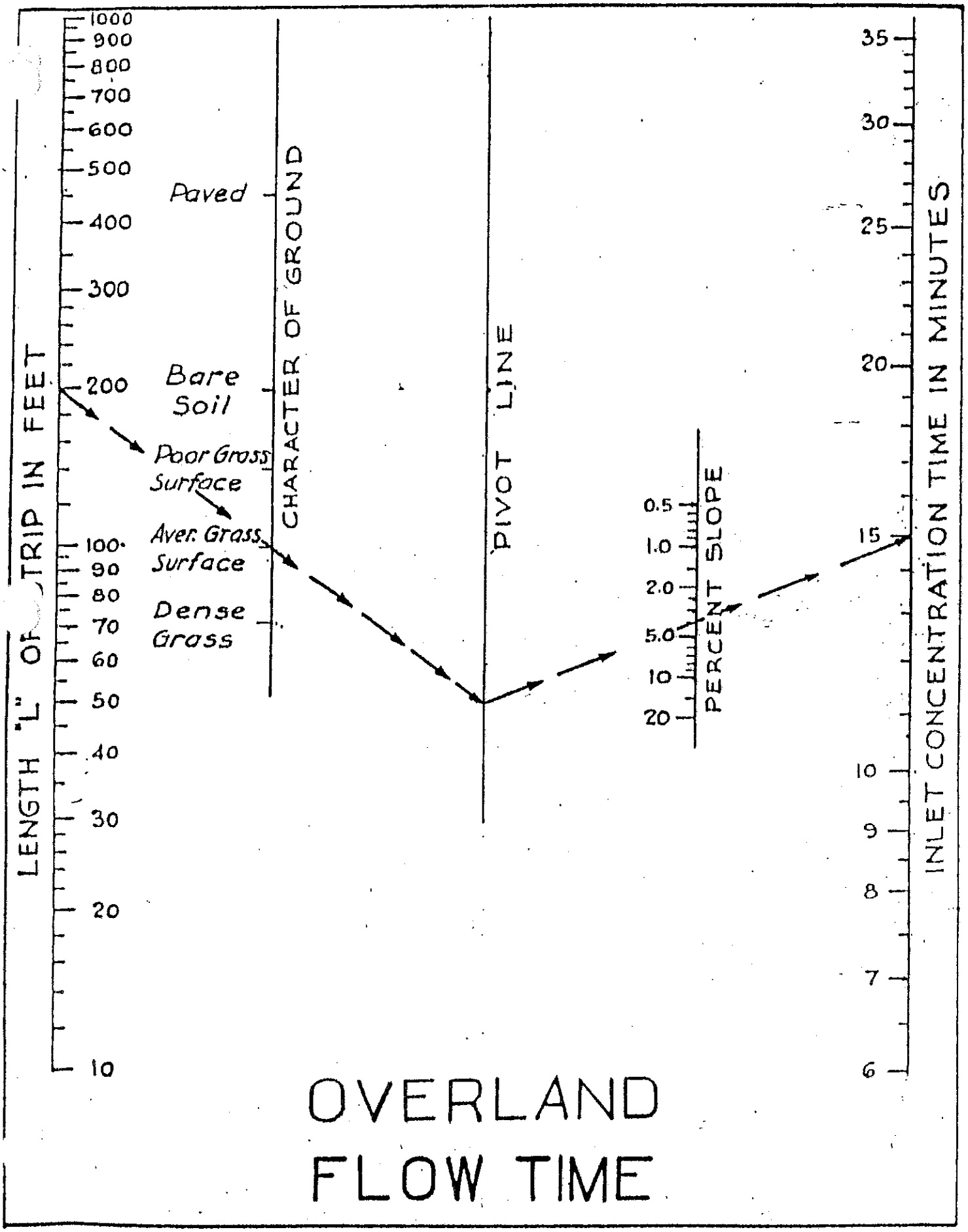
Description of Area	Runoff Coefficients
Business	
Downtown	0.95
Neighborhood	0.70
Residential	
Single Family	0.50
Multi-units, attached	0.75
Apartment	0.70
Industrial	
Light	0.80
Heavy	0.90
Parks, Cemeteries	0.25
Playgrounds	0.35
Railroad Yard	0.35
Unimproved	0.30

It often is desirable to develop a composite runoff based on the percentage of different types of surface in the drainage area. This procedure often is applied to typical "sample" blocks as a guide to selection of reasonable values of the coefficient for an entire area. Coefficients with respect to surface type currently in use are:

Character of Surface	Runoff Coefficients
Pavement	
Asphalt and Concrete	0.95
Brick	0.85
Roofs	0.95
Lawns, sandy soil	
Flat, 2 percent	0.17
Average, 2 to 7 percent	0.22
Steep, 7 percent	0.35

The coefficients in these two tabulations are applicable for storms of 5 to 10 year frequencies. Less frequent, higher intensity storms will require the use of lighter coefficients because infiltration and other losses have a proportionally smaller effect on runoff. The coefficients are based on the assumption that the design storm does not occur when the ground surface is frozen.

TABLE 2



OVERLAND FLOW TIME

TABLE 3-1

SITE STORM DRAINAGE

Use Caltrans storm drainage methods

P_{60} = 1.45 inches per hour

Zone = B-2, 0.69-0.67

Runoff from Chart "K", Zone B

t_c	I_{100}	I_{10}
10	3.30	2.31
11	3.15	2.21
12	3.05	2.14
13	2.95	2.07
14	2.85	2.00
15	2.75	1.93
16	2.65	1.86
17	2.55	1.79
18	2.50	1.75
19	2.45	1.71
20	2.40	1.68
25	2.20	1.52
30	2.00	1.38
35	1.85	1.28
40	1.75	1.21
45	1.65	1.14
50	1.55	1.07
55	1.50	1.04
60	1.45	1.00

t_c	I_{100}	I_{10}
70	1.34	0.92
80	1.28	0.88
90	1.20	0.83
100	1.15	0.79
110	1.10	0.76
120	1.05	0.72
130	1.02	0.70
140	0.98	0.68
150	0.94	0.65
160	0.91	0.63
170	0.88	0.61
180	0.86	0.59

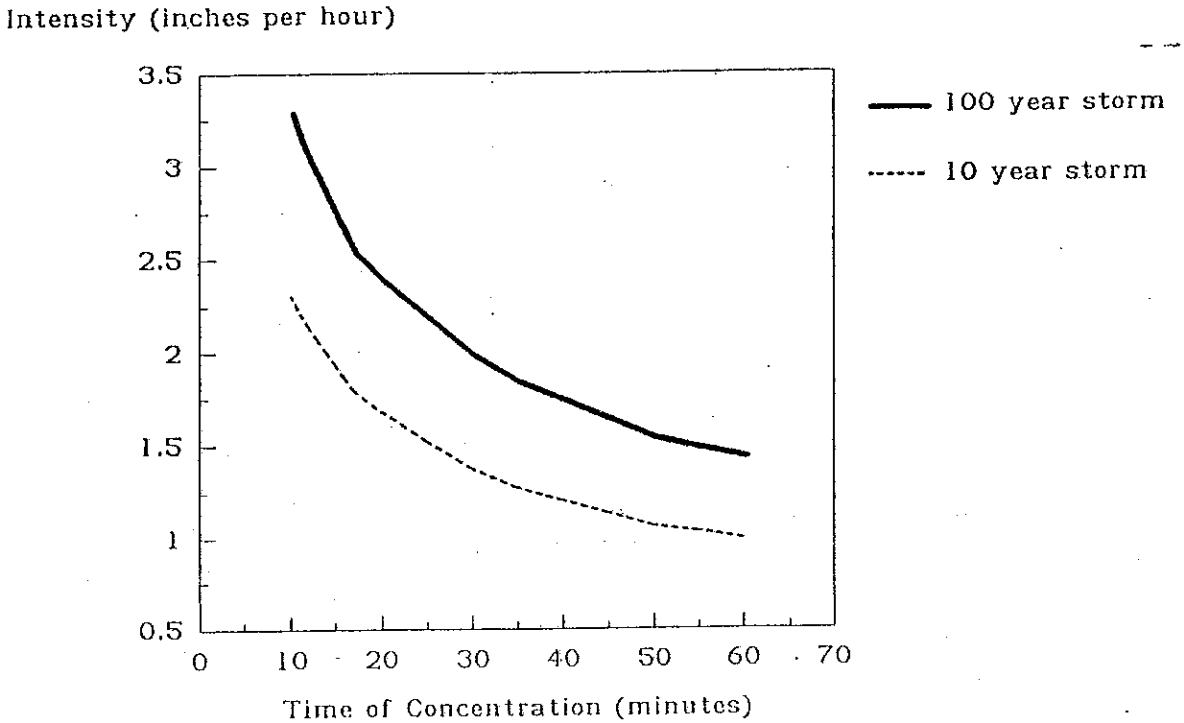
t_c Time of concentration in minutes

I_{10} Intensity for 10 year storm in inches per hour

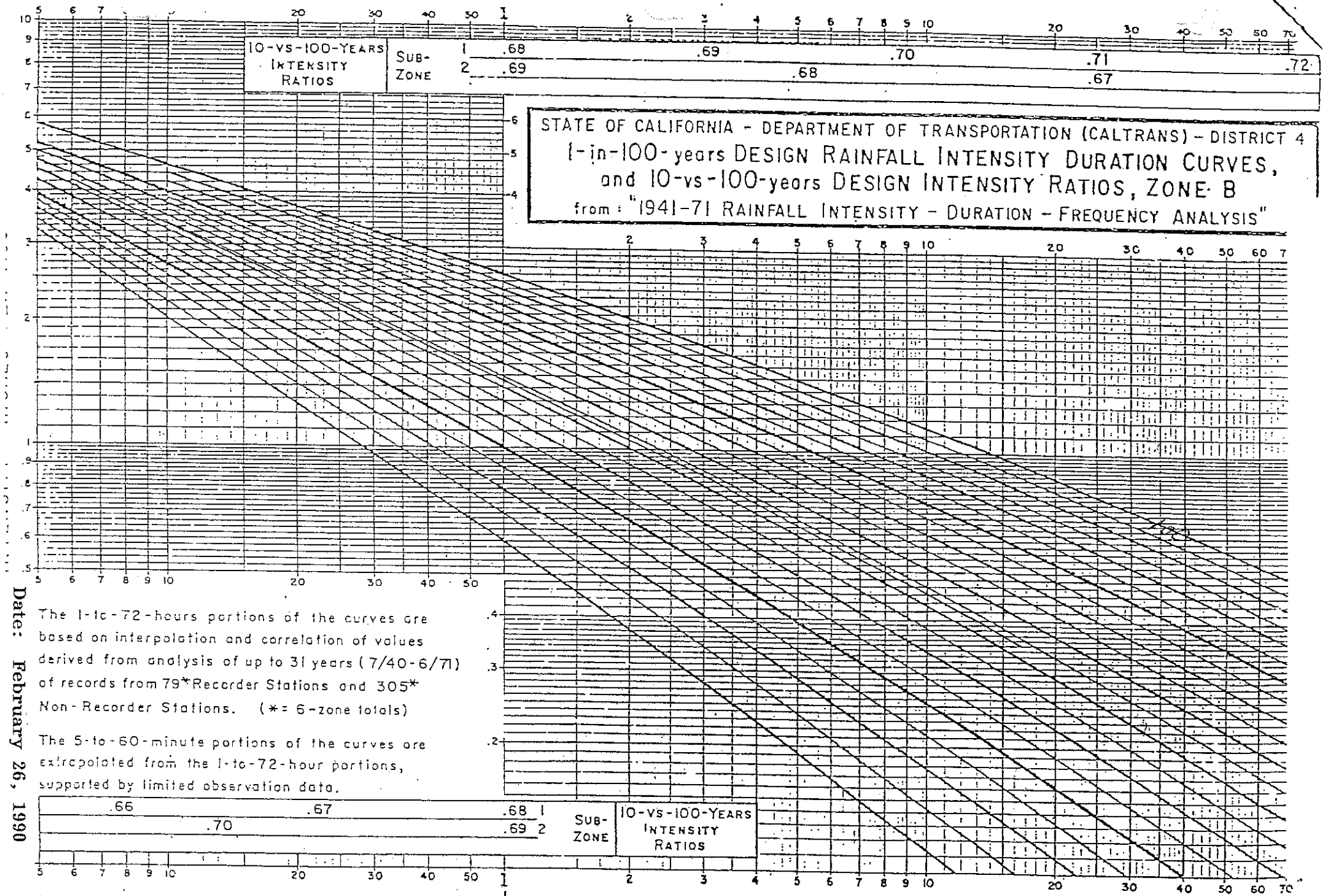
I_{100} Intensity for 100 year storm in inches per hour

TABLE 3-2

Site Hydrology (Runoff)



Rainfall data from Caltrans Chart "K", Zone B



Date: February 26, 1990

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CHART "K", ZONE B

EK/ERR
9/74

SECTION 4. SANITARY SEWER SYSTEM

4.01 SCOPE

This section covers the general design requirements, design, and treatment criteria applicable to the sewerage system as a whole.

4.02 DESIGN CALCULATIONS

Design calculations submitted for Engineering Division review shall be in a neat acceptable form, and shall indicate the date, signature of the Engineer, and the Engineer's State of California Registration Number.

Design calculations will be required for all subdivision sewers or where, in the judgment of the Engineer, they are necessary.

A. Sewers and Pipelines.

Design calculations for sewers and pipelines shall be presented in tabular form and shall include the following information for each section of sewer: terminal manhole designation, ground elevations at the terminal manholes, incremental and cumulative tributary areas, incremental and cumulative tributary population, incremental average and maximum domestic sewage flow, incremental infiltration allowance, cumulative design flow, invert elevations or terminal manholes, length of sewer run, and sewer size, slope, capacity, and velocity.
Design calculations shall show conformance to "Criteria for Separation of Water Mains and Sanitary Sewers" (California Waterworks Standards), as contained in Section 64630, Title 22, California Administrative Code.

B. Pumping Stations.

Design calculations for pumping stations shall include soils data, structural, electrical, and mechanical design calculations, hydraulic calculations, including the basis for average and peak flows, calculations for wet well volume, curves indicating force main characteristics, and individual and combined pump head-capacity curves.

4.03 UNIT DESIGN FACTORS

A. Population Densities.

Population densities for determining ultimate tributary population shall be as indicated in the report on file at the District Office. Those densities shall be modified where conditions are known to be different. In the case of such modifications, the applicant shall submit substantiating data.

B. Sewage Flow.

(1) Per Capita Domestic Sewage Flow.-- The average dry weather per capita domestic flow shall be taken as ninety (90) gallons per day.

(2) Ratio of Peak to Average Flow.-- The ratio of peak to average dry weather sewage flow is a function of the tributary population, and the following tabulated values shall be used.

Population	Ratio of Peak to Average Sewage Flow
1,000 and less	2.50
2,000	2.25
3,000	2.15
4,000	2.05
5,000	1.98
10,000	1.82
20,000	1.68
50,000	1.55

(3) Commercial Sewage Flow.-- Sewage flow for commercial areas shall be determined in accordance with the type of use, recycling, number of weighted fixture units and a flow rate of thirty (30) gallons per day per weighted fixture unit.

(4) Industrial Sewage Flow.-- Sewage flow for industrial areas shall be determined by the proposed type of industry and the recycling requirements. If the type of industry is unknown, design values shall be three thousand (3,000) gallons per acre per day average flow and nine thousand (9,000) gallons per acre per day peak flow.

(5) Infiltration.-- The infiltration rate shall not exceed two hundred (200) gallons per day per inch diameter per mile of length on all new sewers.

(6) Inflow Sources.-- No inflow sources which include rainwater, stormwater, groundwater, street drainage, subsurface drainage, roof drainage, yard drainage, and water from yard fountains, ponds or lawn sprays or any other uncontaminated water shall be discharged into the public sewer.

4.04 GRAVITY SEWERS

A. Minimum Size Main Sewer.

The minimum diameter for main sewer shall be eight inches (8").

B. Minimum Size Side Sewer.

The minimum diameter for side sewers shall be four inches (4"). For side sewers serving commercial or industrial buildings, or multiple family living units having four (4) or more units, the minimum diameter shall be six inches (6").

C. Minimum Slopes.

For side sewers, the minimum slope shall be two percent (2%) for four inch (4") and one percent (1%) for six inch (6"). For main sewers, the minimum slope shall be that required to obtain a velocity of two feet (2') per second when the sewer is flowing full or one-half full. For the purpose of computing velocity, the Manning's coefficient of roughness "n" shall be 0.015 for sewers eight inches (8") in diameter and smaller, and 0.013 for sewers larger than eight inches (8") in diameter.

D. Steep Slopes.

For main sewers installed on steep slopes, special design features may be required. Depending upon conditions of the specific installation, such items as underdrains, check dams, special anchorage, or special pipe material may be required. Based upon data supplied, the Engineer will assess each case and recommend certain special requirements.

E. Minimum Depth.

The minimum depth of cover for any public sewer shall be three feet (3'). If it is impossible to obtain the specified minimum depth, the sewer shall be encased in concrete or use ductile iron pipe.

For side sewers, minimum depths of cover shall be as follows:

(1) At the property line - 3 feet.

(2) From property line to within eight feet (8') of the building plumbing - 2.5 feet.

(3) At the building plumbing connection - 2.0 feet.

When the minimum depths of cover listed above are impossible to obtain, the use of cast iron or concrete encased pipe shall be required.

F. Manholes.

Manholes shall be provided at every line or grade change and at every point where the sewer changes size. In addition, manholes shall be provided at maximum intervals of three hundred feet (300') on sewer twenty one inches (21") in diameter and smaller, and three hundred feet (300') on sewers larger than twenty one inches (21") in diameter. Manholes shall be eccentric.

G. Flushing Inlets or Rod Holes.

Flushing inlets or rod holes may be permitted on dead-end runs where the length of the sewer downstream to the next manholes is less than one hundred fifty feet (150').

H. Types of Pipe Permitted.

Complete specifications for all approved pipe materials are given in Section 02720, "Sanitary Sewer Collection System." Limitations on the use of specific pipe materials are listed below.

(1) Gravity Sewers.-- Only VCP or D.I. pipe shall be permitted.

(2) Force Mains.-- In general, glass lined ductile iron pipe shall be used for force mains.

I. Cleanouts and Side Sewers.

Each side sewer shall have a cleanout installed near the back of the street right of way line as per the local Plumbing Code and City Standard Drawings and Specifications. The cleanout may be within the sidewalk area in areas where building construction is allowed with zero setback.

J. Backwater Overflow Device or Check Valve.

Side sewers connecting houses having a finished floor elevation twelve inches (12") or less above the top elevation of the nearest upstream structure shall have a backwater overflow device or check valve installed on them next to the cleanout. When conditions exist where the sewage cannot overflow on the area surrounding such installation without damage to property, a backwater check valve and shutoff system shall be installed in accordance with Standard Drawing SS-12 of the City of Daly City Standard Specifications.

4.05 FORCE MAINS

Force mains shall be designed using a Hazen and Williams coefficient or roughness "C" of 150 for glass lined ductile iron pipe.

4.06 PUMPING STATIONS

Certain basic requirements for pumping station design are listed below:

A. Stand-by Power.

Each pumping station must be equipped with a source of stand-by or emergency power which will automatically start upon the failure of external power. In special cases, this requirement may be waived by the Engineer.

B. High Water Alarm.

Each pumping station must be equipped with the necessary electrical equipment to transmit a high water alarm over a leased telephone circuit to a remote alarm panel.

C. Architectural Considerations.

Each pumping station must blend harmoniously with neighboring structures. Architectural considerations shall include the superstructure, ornamental fencing, landscaping and other design features that may be required by the City of Daly City Department of Economic & Community Development.

D. Access/Easements.

Sewer mains shall be located in street right of ways or dedicated easements to facilitate access for maintenance and repair. Departure from this design policy shall require prior approval of the Engineer.

E. Telemetry Capability.

New facilities shall be designed to provide the capability for the installation of a telemetry system.

- End of Section -

SECTION 5. PUMPING FACILITIES

5.01 SCOPE

The following criteria is given to establish a minimum level of service and construction. Alternatives may be suggested, and will be reviewed by the City Engineer.

5.02 BASIC STRUCTURES

Design of all structures will be made to enclose all facility components, except in the case of a pneumatic facility where the pneumatic tank may be outside. Each pumping station must blend harmoniously with neighboring structures. Aesthetic considerations shall include the superstructure, ornamental fencing, landscaping, and other design features, and shall incorporate any requirements of the Department of Economic & Community Development. Design and materials will include concrete block walls, a sloped wood beam roof that will conform to all National Roofing Contractors Association standards (20 year) and will include access hatches over all pumps and standby power equipment to allow easy removal of same. All street-level access doors will be double, thirty inch (30)" wide doors without windows or louvers. Facility ventilation will be supplied by louvers in outside walls with hinged shutters mounted on the interior. The size of the structure will be designed to allow a minimum of three feet (3') of clearance between equipment and between walls to facilitate ease of maintenance. Flooring shall be a concrete slab with floor drains and adequate slope to drain entire floor. All equipment shall be mounted on raised concrete pads of at least four inches (4") above floor level. Foundation shall be designed to current seismic requirements. Cathodic protection shall be provided for all piping. Off-street parking shall be provided for two vehicles. All utilities shall be undergrounded to the facility. Inside lighting shall be activated when the entrance door is opened and a switch within one foot (1') of the door opening. The noise level within ten feet (10') of the building structure shall be no greater than fifty (50) dBA. All new pump stations shall have on-site emergency power as outlined in section F.

5.03 PUMPING EQUIPMENT, HYDROPNEUMATIC FACILITY

All pumps will be of the vertical turbine type, manufactured by Byron Jackson, or equal. Drive units shall be U.S. Motors,or equal, with part winding start. The sizing of the pumping equipment will be based upon an engineer's study to determine the maximum peak domestic flow required for the service area, including any additional services being added. There must be a redundancy in the domestic supply pumps of a number to assure that there will always be capacity to supply the peak domestic flow in the event that any one domestic pump is out of service. A separate fire pump system will be required to meet fire flows. The required fire flows will be determined by the Daly City Fire Department.

Each pump will include a bypass pump discharge control/pressure relief valve manufactured by Cla-Val, or equal. The bypass shall be signed to pass at least twenty five percent (25%) of the pump discharge flow. This valve shall perform the following three functions:

1) Allow starting and stopping of the pump against an open bypass valve (to reduce water hammer);

2) Relieve over-pressure; and

3) Allow pumping into the zone against a closed valve.

The fire pump(s) must be sized based on required fire flow plus maximum peak domestic use as determined by an engineering study guided by the City's Master Water Plan. The fire pump system does not require redundancy.

5.04 PUMPING EQUIPMENT, ADDITIONS TO EXISTING FACILITIES

All additional equipment will be compatible to the existing equipment currently in use in the station. This will include, but not be restricted to, pump and motor, make and model. Sizing of equipment will match the larger of the equipment in use, unless stipulated otherwise. Additional facility hardware modifications may be required as part of the facility addition to accomodate the increase in flow.

5.05 OPERATING CONTROLS AND STRATEGY, HYDROPNEUMATIC FACILITY

A. AUTOMATIC PUMP CONTROLS.--

There shall be furnished and installed a completely integrated automatic domestic water and fire pump control system specifically designed for each application to provide adequate water system pressure over the varying demand requirements of each facility. The system will be complete with the pump control panel, stainless steel level control elements in the hydropneumatic tank, integrated pressure controls and other appurtenances as required. The system shall be furnished by a single manufacturer who will assume the overall undivided responsibility of the performance and who shall have had at least five years proven experience in furnishing municipal domestic water pump control equipment. The complete control system shall be as manufactured by Autocon Industries, Control Manufacturing Company or approved equal. All equipment shall be factory tested to meet the specified requirements and a certified factory test report shall be submitted for approval.

B. DESCRIPTION OF SYSTEM OPERATION.--

Under normal domestic demands, as the system pressure falls to 55 psig, the lead pump, (which is to be automatically alternated), will start and continue to supply the system demands until the high water level in the hydropneumatic tank is reestablished. The level/pressure transducers will automatically stop the lead booster pump and start one of the two air compressors until the 70 psig pressure is reestablished in the hydropneumatic tank. If the lead pump cannot handle the system demands, the lag pump shall be automatically started at 50 psig and both pumps shall continue to run until the system pressure is reestablished and the correct level in the hydropneumatic tank has been reestablished. Each one of the two domestic pumps shall be capable of providing normal domestic flow independent of each other.

Upon a fire flow demand (determined by a falling system pressure to 45 psig), the fire pumps shall start and continue to run until the fire demand has ceased and the system pressure is above 75 psig. There will be an overrun period timer adjustable 0-3 minutes. Interlocking shall be provided to stop the domestic pumps during fire pump operation unless the fire pump fails to maintain system pressure, at which time the domestic pumps will be restarted to assist the fire pump at the above stated pressure intervals. A time delay will prevent any pumps from starting simultaneously.

Alarms shall be provided for high and low system pressure. The complete programming, sequencing, alternating, hydropneumatic tank control system shall be equal to an Autocon Industries' Duotrol Class 1503 with fire pump provisions, or approved equal.

5.06 EMERGENCY STANDBY ELECTRICAL SYSTEM

A. ENGINE.--

The turbo-charged and inter-cooled engine shall be diesel fueled, 6 cylinder, 4-cycle and liquid-cooled. Manufacturer shall be Cummins or equal. Site fuel storage will be indoors, aboveground, in a double-wall containment approved by the Daly City Fire Department and of a capacity to supply thirty six (36) hours of emergency run time. Engine shall be muffled to produce a noise level of no greater than 60 dBA.

B. GENERATOR.--

Shall be sized in output to provide all power required to operate all facility functions of a normally operating station.

The generator shall be four pole, brushless, 12 lead reconnectable of drip-proof construction with Amortisseur windings. Insulation shall be class F with epoxy varnish. Generator field current shall be controlled by a rotating Thyrister bridge module optically coupled to a firing circuit type voltage regulator. The exciter shall be 24 pole permanent magnet type. Generators controlled by wound field exciters will not be accepted unless they meet the following performance:

- Radio-interference suppression meeting commercial standards shall be supplied.

- Voltage regulation shall be within plus or minus 2% of rated voltage, from no load to rated load.

Upon application of 90% rated load in one step, voltage dip as measured by a light beam recorder or oscilloscope shall not exceed 15%, recovery to stable voltage shall occur within .1 second. Stable or steady state operation is defined as operation with terminal voltage remaining constant within plus or minus 1/2 of one (1) percent of rated voltage. Voltage adjustment range shall be plus or minus 5% of rated voltage. Temperature rise shall be within NEMA, IEEE, and ANSI standards.

If a line to neutral short circuit occurs, the generator shall support 300% rated current for 10 seconds without externally mounted devices.

All battery packs shall have an approved cover.

C. CONTROLLER.--

Set mounted controller facing rear shall be vibration isolated on the generator enclosure. It shall be of solid state design. Relays will be acceptable only for high current circuits. Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine. The controller shall include:

- Fused DC circuits.

- Complete 2 wire start/stop control which shall operate on activation of a remote contact.

- Cranking period controlled by a speed sensor which disengages the starting motor when the engine has started. Battery charging alternator or generator voltage may not be used for this signal.

- The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then re-engage the starter.

- Cranking cycler with individually adjustable (2 to 20 seconds) on and off cranking periods.
- Over-cranking protection designed to open the cranking circuit after 60 seconds if the engine fails to start.
- Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure or overspeed are received, with reset button.
- Adjustable (2 to 10 minute) factory set at 5 minute time delay to permit unloaded running of the standby set after transfer of the load to normal.
- Alarm horn.
- Three position (automatic-off-test) selector switch.
- Emergency stop switch.
- Test button for indicating lights.

D. INSTRUMENT PANEL.--

A set mounted instrument panel shall include:

- Dual range voltmeter 3-1/2 inch ± 2% accuracy.
- Dual range ammeter 3-1/2 inch ± 2% accuracy.
- Voltmeter-ammeter phase selector switch.
- Lights to indicate high or low meter scale.
- Direct reading pointer type frequency meter 3-1/2 inch ± .3 hz accuracy.
- Panel illumination light.
- Battery charging ammeter.
- Oil pressure gauge.
- Running time meter.
- Plug-in voltage regulator with front panel voltage adjusting rheostat.

5.07 AIR COMPRESSORS

Two Autocon Industries or approved equal hydropneumatic tank air compressor supply units shall be provided as shown and shall be sized to deliver approximately 15 cubic feet each of free air at the high system pressure specified and shall be pressure-lubricated, base-mounted, air- cooled and complete with an OSHA guard belt connected to a 5 hp 3-phase, 480-volt open drip-proof electric motor. These two units shall be designed to provide unloaded starting, rated for continuous operation and complete with an air intake filter system. Units shall be contractor- mounted and pneumatically-connected to the hydropneumatic tank with a quick disconnect coupling to allow for ready replacement and/or plugging in an emergency air supply. Each unit shall be manifolded for removal without the necessity of shutting down the opposite compressor.

5.08 HYDROPNEUMATIC TANK

Shall be Ace Bueler MFG. Co., 125 psi, ASME tank, or approved equal. It shall be hydrostatically tested and stamped for air operating pressure of 125 psi in accordance with ASME code for unfired pressure vessels. It shall be sized for a normal system operation to maintain 2/3 water and 1/3 air. It shall also be sized to maintain a water level in the tank of at least 1/3 water during fire pump startup and the duration of fire pump service.

5.09 PRESSURE RELIEF VALVE, PNEUMATIC STATION

A pressure relief valve will be installed between the suction and discharge manifolds to serve the purpose of relieving overpressure on the discharge side of the manifold. The valve will be sized to accomodate the maximum design station flow rate. The valve will be manufactured by Cla-Val, or equal. The operating pressure range controls must allow a minimum field adjustment of 30% beyond both the high and low station operating pressures. The valve is to be furnished with bracket-mounted, NEMA 4 limit switch, single pole, double throw, to indicate valve closed or partial open condition.

5.10 TELEMETRY CAPABILITIES

All new facilities shall be required to include the installation of a Model 2500 RTU as manufactured by HSQ Technologies, to provide pump start/stop control capabilities by RF communications with the CPU currently in use by the City Water Department. This will include the cost of any software additions or modifications that may be required to put the new unit on line with the existing CPU. All binary, analog and counter points that will be required to be monitored will be tied in to the RTU and field tested by HSQ Technical personnel.

- End of Section -

SECTION 6. WATER SUPPLY SYSTEM

6.01 SCOPE

This section covers the general design requirements and design criteria applicable to the water supply system as a whole.

6.02 DESIGN CONSIDERATIONS

A. Water system shall be designed to provide sufficient pump or gravity capacity and with piping and power supply arranged so that, in conjunction with available storage, the maximum required fire flow can be delivered with the largest pump out of service, or with the failure of any circuit or electrical device, or a break in a main, or the repair of a valve.

B. Pipes six inches (6") in diameter minimum shall be used for hydrant supply. Dead ends (no flow) shall be eliminated. Calculations shall be required to show how the pipe size was determined. For complex of high demand situations, a hydraulic analysis may be required along with updating of the City's Water Master Plan files.

(1) In business and industrial districts, eight inch (8") and twelve inch (12"); the former to be used only where it completes a good grid and the latter for long lines not interconnected.

(2) In residential districts, eight inch (8") minimum except in cul-de-sacs less than 300 feet in length where six inch (6") minimum may be allowed.

C. Hydrants shall be installed so that there will be one or two at each intersection, depending upon fire flow demand, with intermediate hydrants so that they are not over three hundred feet (300') apart. Hydrants will be placed on opposite sides of roadways four lanes and wider or on roadways with medians.

D. Valve locations shall conform to the following:

(1) Line valves shall be a maximum three hundred feet (300') apart.

(2) Valves shall be placed at each intersection.

(3) Valves shall be placed at each leg of a tee or cross, except for hydrant tap.

E. Automatic fire sprinkler system must include a detector check installed by the applicant, meter furnished by City and included as part of the applicant's fee for connection to the City water system.

F. For cross-connection control, Manual M-14 of the American Water Works Association (AWWA), or as subsequently amended, will be used as a guide to determine the need and type device for backflow protection on automatic fire sprinkler systems.

Factors controlling backflow protection requirements shall be those conditions present as defined in Class 3 through Class 6 systems of American Water Works Association (AWWA) Manual M-14.

The existence of a Fire Department pumper connection does not, in itself, establish the need for backflow protection.

Backflow protection devices at each meter/service shall be installed in consultation with San Mateo County Environmental Health Department, and Daly City Building Division.

G. In high pressure areas, provide pressure relief valves on water services to reduce the line pressure to between 60-80 psi. The fire sprinkler system design shall be based on no higher than 80 psig. or system pressure, which ever is lower.

- End of Section -

SECTION 7. STREET TREES

7.01 SCOPE

This section covers street tree selection and placement. For additional planting specifications, refer to the City of Daly City Standard Specifications and Drawings.

7.02 PLAN REQUIREMENTS

A. Tree planting plan shall be accurately drawn to scale.

B. Tree planting shall show building setbacks, street lights, driveways, street signs, parking meters, bus stops, hydrants, and other features that may affect the placement of trees.

C. Tree planting plan shall show size, type and botanical and common name of plant material. The plan shall also designate the type and manufacturer of the tree well grates, ornamental tree guards and irrigation details where required by the City.

7.03 DESIGN CONSIDERATIONS

A. Street trees shall be selected from the attached list.

B. Size shall be fifteen (15) gallons or larger. Trees larger than fifteen (15) gallons may be required.

C. Trunk caliper shall be one inch (1") minimum, measured three feet (3') above the root ball.

D. All speciments shall be full, healthy, well balanced and pest free. Root balls shall not be girdled.

7.04 TREE WELL

A. Tree well placement shall provide sufficient clearance for pedestrians, wheel chairs, and vehicular traffic.

B. For sidewalks eight feet (8') wide or less, well shall be twenty-four inches (24") square, thirty inches (30") deep, placed directly back of street curb (see City Standard Drawing PR-2).

C. For sidewalks greater than eight feet (8') wide, well shall be thirty six inches (36") square, thirty inches (30") deep, placed eighteen inches (18") back from street curb (see Standard Drawing PR-1).

7.05 TREE PLANTING

A. Backfill shall be sifted native soil.

B. Top two inches (2") to grade level shall be filled with decomposed granite or quarry fines.

C. A three inch (3") diameter by thirty inch (30") long perforated PVC tube shall be installed as a watering reservoir, standing to depth of hole up to grade. This tube shall be filled with three-fourth inch (3/4") drain rock and covered with a cap or filter fabric cover. This requirement may be omitted if a Century Deep-Watering System root barrier, or equal, is installed.

D. Planting details shall be in accordance with the City Standard Drawings.

7.06 ROOT BARRIER

A. Line well edge with nineteen and one-half inch (19-1/2") Bio-Barrier, as manufactured by Elanco Products Company, and overlap barrier ends four inches (4") minimum.

B. Top of barrier shall be one inch (1") below grade level.

C. "Deep Root" Barrier, as manufactured by Deep Root Corporation, is an accepted alternative.

D. Use of the Century Deep-Watering System is also acceptable, in which case the watering reservoir pipe may be omitted.

7.07 TREE STAKING

A. Two (2) stakes per tree, two inch (2") minimum diameter lodge poles, ten feet (10') long, treated with copper napthanate.

B. Poles shall be installed to a depth twelve inches (12") below root ball bottom.

C. Poles shall be secured with two (2) one inch (1") by four inches (4") redwood braces on upwind side of tree.

D. Install four (4) flat rubber ties per tree as per Standard Plans.

7.08 TREE LOCATIONS

A. Curbside Street Trees.

(1) Adjacent to Bus Zones -

Where adjacent sidewalks are less than fifteen feet (15') in width. Location shall conform with the following criteria:

a. Near Side Bus Stop: Trees shall be planted no closer than seventy-five feet (75') from the corner property line (see Standard Drawing PR-13).

b. Far Side Bus Stop - Trees shall be planted no closer than sixty feet (60') from the corner property line (see Standard Drawing PR-13).

(2) Adjacent to Intersections.

a. On the approach to any intersection, trees shall be planted no closer than twenty-five feet (25') from the corner property line (see Standard Drawing PR-13).

b. Trees located in the sidewalk area shall be so located that visibility of traffic signals or STOP signs will be assured at all times.

(3) Adjacent to Fire Hydrant and Fire Escapes.

a. Trees shall be planted no closer than five feet (5') from either side of a fire hydrant (see Standard Drawing PR-13).

b. The width of the fire escape balcony, projected down to the sidewalk and to the curb, shall remain clear of any trees, as shall an adjacent five foot (5') area (see Standard Drawing PR-13).

(4) Minimum Clearance from Other Common Sidewalk Features.

Driveways	10'
Gas and water meters and mains	5'
Manholes and other utility vaults	5'
Telephone and other utility poles	5'
Parking meters	5'
Sewer laterals/cleanouts	5'

(5) Lowest scaffold branch must provide a six foot (6') minimum vertical clearance, and eight foot (8') is preferred (see Standard Drawing PR-12).

B. Trees in Median Islands and Channelization Islands.

(1) All plant material shall be located so that a minimum of two (2) traffic signal lamps indicating the same signal phase shall be continuously visible from a stopping sight distance determined by the 85th percentile speed of the street as follows:

85th Percentile Speed (MPH)	Stopping Sight Distance (FEET)
25	175
30	250
40	400
50	550

(2) Within the stopping sight distance, plant material shall have a maximum mature height of thirty inches (30") in order to assure unobstructed sight distance of all traffic control devices.

(2) Trees shall be planted not less than two feet (2') from the inside of the curb.

(3) The lowest scaffold branch must provide a fourteen foot (14') minimum vertical clearance. Until this minimum is established, no branches shall extend beyond the face of the island curb (see Standard Drawing PR-12).

- End of Section -

APPENDIX A

STREET TREE LIST

1. Ginko Biloba (Maiden Hair Tree) - male species only.
2. Dodonea Viscosa 'Purpurea' (Purple Hopseed Tree)
3. Geijera Parvifolia (Australian Willow) - plant only in full sun conditions.
4. Laurus Nobilis 'Saratoga' (Grecian Laurel or Sweet Bay)
5. Tristania Laurina 'Elegant' (Kanooka Box)
6. Photinia Fraseri (Flame Tree) but not 'Indian Princess' (only five feet high at 6 years)
7. Callistemon Viminalis (Weeping Callistemon)
8. Podocarpus Gracillior (Fern Pine) - often sold as Ficus Microcarpa
9. Ficus Retusa 'Nitida' (Indian Laurel) aka Ficus Microcarpa Nitida, esp. "Green Gem."
10. Pyrus Kawakamil (Evergreen Pear) 'Kew' or 'Fastigata' (erect and narrow habit 3' wide x 25' high)
11. Koelreuteria Paniculata (Goldenrain Tree)
12. Melaleuca Linariifolia (Flaxleaf Paperbark)
13. Metrosidero Excelsus or M. Tomentosus (New Zealand Christmas Tree) (Note: Metrosideros Excelsus is not recommended at this time due to over planting in Daly City area.

SECTION 8. LANDSCAPE

8.01 SCOPE

These standards shall apply to all new construction or renovation where landscaping has been required by code or through conditions of approval of a discretionary permit approved by the City Council (i.e., Planned Developments, Use Permits, Variances and Subdivisions).

8.02 PLAN REQUIREMENTS

A. The applicant shall provide three (3) copies of complete landscaping and irrigation plans prepared by a registered architect, landscape architect, licensed landscape contractor, licensed nurseryman, or other similarly qualified person for approval by the Planning Division and Department of Parks and Recreation prior to the issuance of building permits.

B. The irrigation plan shall be submitted as a separate drawing and shall contain:

(1) Location, type, and size of all irrigation components, including water meter or specifications of pump and/or other source.

(2) Minimum static water pressure of P.O.C. (point of connection).

(3) Gallons per minute and precipitation rates for each valve circuit.

(4) Irrigation schedules reflecting the amount of water needed to maintain adequate plant health and growth based on actual water needs and climate for the area. This schedule shall include run times, frequency, and cycles for each valve circuit. Irrigation watering schedules shall include the following:

a. Schedule for the establishment of new plant material and length of establishment.

b. Schedule for the maintenance of plant material after establishment.

C. Plans shall be accurately drawn to scale adequate for review.

D. The landscape plans shall show location of all proposed plant material, together with a plant key indicating botanical names, common names, size and quantity. Twenty-four inch (24") box trees shall be planted in specified areas.

E. Plans shall show property lines, easements, street names, contour lines, proposed and existing utilities (i.e., hydrants, light poles, utility cabinets, transformers) grading and drainage.

F. Plans shall show existing landscaping and indicate the type and size of mature trees (trunk diameter measured at three feet (3') from grade). Indicate on plans which trees are to be removed and which are to be retained.

G. Indicate on plans how existing trees to be retained shall be protected during construction. (Note: A three foot (3') high fence along the tree's dripline will be adequate.)

8.03 DESIGN CONSIDERATIONS

A. All areas not covered by buildings, parking, driveways, or other allowed surfaces shall be landscaped.

B. Hillsides exceeding a 2 to 1 slope shall incorporate terracing where possible.

C. There shall be a level area, at least two feet (2') in width, at the bottom of slopes adjacent to curbs, paved areas or other impervious surfaces to prevent water run-off.

D. The property between the sidewalk and the front property line shall be landscaped and maintained as an integral part of the site.

E. Landscaping shall compliment the site's architecture and shall be integrated with both the proposed development, as well as, with existing adjacent building and surrounding landscape.

8.04 IRRIGATION

A. A water irrigation system with adequate coverage which includes automatic controllers and low volume irrigation system components, including but not limited to drip or bubble irrigation components, shall be provided for all required landscaping and shall be maintained at all times.

B. Irrigation systems shall include a multi-program controller capable of multiple cycles.

C. Separate valved sections shall be installed based on water use of plantings and exposures.

D. All sprinkler heads shall have matched precipitation rates within each control valve circuit.

E. Pop up sprinklers in turf areas shall be at least four inch (4") pop-up height.

F. Sprinkler heads shall have a check valve installed to prevent low head drainage when necessary.

G. Sprinkler heads spacing shall be placed at a maximum of fifty percent (50%) of the diameter of the throw.

H. Individual heads (bubblers or drip) shall be used in isolated areas and plantings. This eliminates watering of bare ground.

I. Minimize overspray through efficient layout of sprinkler heads.

J. Use drip or bubbler irrigation systems for trees if planted alone or in ground cover or turf areas.

K. Sprinkler heads with a precipitation rate of .85 inch/hour or less shall be used on slopes exceeding a 4 to 1 ratio.

L. Overhead irrigation systems shall not be used on slopes exceeding 2 to 1 ratio.

8.05 **PLANT MATERIAL**

A. Native and drought tolerant plant materials shall be used to the greatest extent possible. In the instance where drought tolerant plants are used, and subject to the approval of the City Planner and Director of Parks and Recreation, a temporary irrigation system may be allowed provided that it is operated for at least two (2) years following plant installation. A list of drought tolerant plant material may be obtained from the East Bay Municipal Utility District, telephone (415) 820-6600, entitled "Water Conservation Plants and Landscapes for the Bay Area."

B. In general, all shrubs or any vegetation at points of ingress and egress shall be maintained at a height no greater than thirty inches (30"). Trees must be trimmed in a manner to maintain a site clearance underneath the branches of five feet (5') from grade.

C. Selection of street trees shall be from the list of approved trees attached herewith.

D. When street trees are required, such trees shall be installed in accordance with the requirements set forth in Section 7, "Street Trees," of the City of Daly City Design Standards.

E. Turf shall be used only when practical as in high use or aesthetically desirable areas. When turf is used, drought resistant varieties shall be considered. Turf should not be used in slopes in excess of a 4 to 1 ratio.

8.06 INSTALLATION AND MAINTENANCE

A. Landscaping and irrigation shall be installed in accordance with the approved plans and shall thereafter be maintained in a neat, clean, and healthful condition.

B. A city inspection by the City Engineer or Building Inspector shall be made of all landscape installations one (1) year after final inspection to verify proper plant establishment and irrigation system operations. The developer shall remedy any deficiencies found in said inspection within thirty (30) days of notification.

- End of Section -

STREET TREE LIST

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7. Callistemon Viminalis (Weeping Callistemon)
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10. Pyrus Kawakamil (Evergreen Pear) 'Kew' or 'Fastigata' (erect and narrow habit 3' wide x 25' high)
11. Koelreuteria Paniculata (Goldenrain Tree)
12. Melaleuca Linariifolia (Flaxleaf Paperbark)
13. Metrosidero Excelsus or M. Tomentosus (New Zealand Christmas Tree)
    (Note: Metrosideros Excelsus is not recommended at this time due to over planting in Daly City area.
14. Other trees approved by the Director of Parks and Recreation.