

RESOLUTION NO. 4290

RESOLUTION ADOPTING DESIGN STANDARDS FOR SUBDIVISIONS AND DEVELOPMENTS

RESOLVED, that the City of Lodi, Public Works Department Design Standards, a copy of which is annexed hereto and thereby made a part hereof as if set forth in full herein, be and the same is hereby approved and adopted by the City Council of the City of Lodi; and

BE IT FURTHER RESOLVED that all other resolutions in conflict herewith are hereby repealed to the extent of any duplication or conflict herewith.

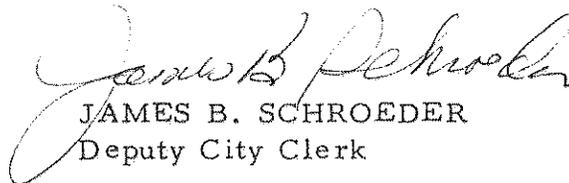
Dated: November 17, 1976

I hereby certify that Resolution No. 4290 was passed and adopted by the City Council of the City of Lodi in a regular meeting held November 17, 1976 by the following vote:

Ayes: Councilmen - Ehrhardt, Katnich, Katzakian, Pinkerton and Hughes

Noes: Councilmen - None

Absent: Councilmen - None


JAMES B. SCHROEDER
Deputy City Clerk



DESIGN STANDARDS

CITY OF LODI
PUBLIC WORKS DEPARTMENT

NOV 15 1976

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PURPOSE AND INTENT

The purpose and intent of these Design Standards is to clarify and consolidate present design criteria in the City of Lodi.

SCOPE

The Design Standards as hereinafter specified shall be used as the basis of design for all development within the jurisdiction of the City of Lodi.

DESIGN

The design of each development is in itself a special case and these Design Standards shall not be construed to be the maximum required design on all or any separate phase of the construction. Under certain conditions, any or all phases of the development may be required to exceed these specifications. It is also recognized that there may be developments where it is impossible to meet these Design Standards. It is suggested that these cases be reviewed with the Public Works Director early in the design process to minimize reworking plans where deviation is not permitted.

Contact City of Lodi Utility Department for the design of electrical facilities.

FINAL AUTHORITY

The Public Works Director shall be the final authority on all questions which may arise as to the interpretation of these standards. The Director's decision shall be final and he shall have authority to enforce and make effective such decisions. For appeals from the Director's decisions see Section 22-9 of the Lodi Municipal Code.

GENERAL NOTES

The typical General Notes required for all off-site improvement plans have been included as Appendix A of these Design Standards.

BID ITEM ORDER

The bid item order and units for improvement plans have been included as Appendix B of these Design Standards.

CHECK LIST

A check list has been included in Appendix C of these Design Standards in order to familiarize the development engineer with some of the items checked by the City to insure compliance and completeness of the improvement plans.

1.100 GENERAL

All streets shall be designed in accordance with accepted engineering principles and shall conform to these Design Standards.

Street improvements, including curb, gutter, sidewalk and street construction, shall be constructed in conjunction with the types of developments outlined in "The Code of the City of Lodi, California."

1.200 STREET RIGHTS OF WAY

The right-of-way widths and typical sections for the various class streets shall conform to the City of Lodi Standard Plans and the established Specific Plans on file in the Public Works Department.

Cul-de-sac streets shall have a turn-around at the end with a minimum radius on the right of way of 50 feet. The reversing curves at the beginning of the turn-around shall also be 50 feet radius.

"Knuckles" on residential streets shall conform to Standard Plan 133.

Right-of-way corner cutoffs shall have a minimum radius of 20 feet, except in industrial areas where it shall be 25 feet. An equivalent chord cutoff may be substituted for an arc.

1.300 ALLEY RIGHTS OF WAY

The minimum width of an alley shall be 20 feet with a 20-foot paved roadway.

1.400 SUBDIVISION BOUNDARIES

Subdivision boundary lines should follow lot lines where possible and should cross streets perpendicular to street centerlines. Streets shall be fully improved within tract boundaries.

Streets on tract boundaries shall have a minimum 32-foot paved section.

1.500 STRUCTURAL SECTION

1.501 Subgrade The subgrade shall consist of 6 inches of native material removed and compacted at 95% relative compaction over 6 inches of compacted original ground at 90% relative compaction.

1.502 Pavement The pavement shall be designed in accordance with the procedures contained in the State of California Department of Transportation Highway Design Manual.

The Traffic Index shall be established by the Public Works Department.

A certified soils laboratory shall conduct the necessary soils tests and shall recommend the pavement section.

The minimum pavement section shall be 0.20 foot of asphalt concrete over 0.30 foot of aggregate base or a full-depth asphalt concrete section of 0.35 foot.

1.600 HORIZONTAL ALIGNMENT

1.601 Intersection Angle Streets shall intersect at right angles. Curved streets shall have at least 50 feet of centerline tangent from the projected curb line of the intersecting street.

1.602 Opposing Streets All streets entering upon opposite sides of any given street shall have their centerlines directly opposite each other or separated by at least 150 feet.

The minimum distance between streets entering a restricted access street shall be as provided by a Specific Plan adopted by the Planning Commission and City Council of the City of Lodi.

1.603 Street Curvature Design of curved arterial and collector streets shall be based on the State of California Department of Transportation Highway Design Manual. The minimum radius of curvature of centerline shall be 750 feet on thoroughfares and arterials and 500 feet on collectors. Minimum radius on other streets shall be 250 feet.

There shall be a tangent between reversing curves of at least 150 feet on thoroughfare, arterial and collector streets, and 50 feet on all other streets.

1.604 Cul-de-sac The maximum length of a cul-de-sac street, from center of intersecting street to center of turn-around, shall be 500 feet.

1.605 Curb Return Radii

Residential and Non-Residential - Minimum radius shall be 25 feet.

Commercial - In the downtown area the minimum radius shall be 15 feet. In other areas the radius shall be determined by the Public Works Director.

Industrial - Minimum radius shall be 30 feet.

1.606 Minor Streets Minor streets shall be so laid out that their use by through traffic will be discouraged.

1.607 Block Lengths Block lengths shall not exceed 1300 feet.

1.700 VERTICAL ALIGNMENT

1.701 Top of Curb Grades Grades shall not be less than 0.25 per cent and not greater than 6 per cent. Where matching existing controls, the minimum grade may be reduced with the approval of the Public Works Director.

The minimum top of curb elevation shall be 1 foot above the design water surface of the Master Plan Storm Drainage Basin to which the proposed improvement is tributary. This minimum elevation may be obtained from the Public Works Director.

A minimum top of curb elevation of 1 foot above the hydraulic grade line shall be maintained.

Grades on opposite sides of the street shall be the same wherever practical.

1.702 Curves Where the curb radius is less than 100 feet it shall have a grade of not less than 0.30 per cent.

1.703 Curb Returns The minimum fall around returns shall be 0.20 feet.

1.704 Cross Slope The standard cross slope of the street shall be $2\frac{1}{2}$ per cent. Where necessary when matching existing facilities, the cross slope may vary between 1 per cent and 4 per cent.

The centerline grade of the pavement surface through an intersection shall not be more than 2 per cent.

1.705 Vertical Curves Where the algebraic difference in slope exceeds 1 per cent, a vertical curve shall be used. The minimum length of vertical curve shall be $1.2 AV^2$, where A equals the algebraic difference in grades in per cent \div 100 and V is the design speed in miles per hour.

1.800 CURB, GUTTER & SIDEWALK

Curb, gutter and sidewalk shall be installed in conformance with the City of Lodi Construction Specifications and Standard Plans.

1.801 Curb and Gutter

Square-type curb and gutter shall be installed along frontages conforming to any of the following criteria:

1. Thoroughfare, arterial, or collector streets;
2. Residential - GA, MD, HD
3. Commercial or industrial frontage;
4. School, church or park frontage;
5. Any curb fronting a street centerline radius less than 218 feet specifically approved by the Public Works Director;
6. All curb returns;
7. Any block face where 60 per cent of the block is existing square-type or is required to be square-type for any of the above reasons;
8. Other areas designated by the Planning Commission or City Council.

Driveway-type curb and gutter may be installed at all other frontages.

1.802 Sidewalk The minimum widths of sidewalk shall be 5 feet in residential and industrial areas, $7\frac{1}{2}$ feet in commercial areas, or as noted on the Specific Plan.

1.803 Pedestrian Ramp for the Handicapped Pedestrian ramps for the handicapped shall be installed in all curb returns and shall conform to Standard Plan 132.

1.804 Replacement and Repair Where existing curb, gutter, sidewalk and driveways do not meet the current City standards and are in need of repairs, it shall be the developer's responsibility to remove and replace the necessary curb, gutter and sidewalk. Refer to Standard Plan 117 for minimum standards for existing curb, gutter and sidewalk. Where curb, gutter, sidewalk and/or driveways are removed, the concrete shall be removed to the nearest expansion, weakened plane or construction joint or sawed at the nearest score line to the minimum depth of $1\frac{1}{2}$ inches.

1.900 DRIVEWAY STANDARDS

The following driveway standards are not applicable to freeway or controlled access highways where access is limited by deed restrictions or other controls.

The number and width of permitted driveways is regulated by the Public Works Department and shall be based on the needs of the parcel served. They shall not be detrimental to the abutting street capacity, safety, and/or efficiency.

Driveway width is measured at the curb line, and includes only the width of the fully depressed section.

The Public Works Director may modify any of the following standards in order to provide better traffic movements or because of special or unusual conditions.

1.901 Width

- a. Maximum - Driveway width shall not be greater than 30 feet, except that this width may be increased to 35 feet for common driveways.

The total width of commercial and industrial driveways shall not exceed 60 per cent of the frontage.

- b. Minimum - The minimum width of a single driveway shall be 12 feet and 24 feet for a common driveway.

1.902 Distance from Curb Returns

- a. Intersecting Streets - The driveway transition shall not be permitted closer than 25 feet from the projected curb line of the intersecting street and no closer than 10 feet from the nearest BCR or ECR.

Commercial and industrial driveways on arterials may be prohibited within 100 feet from the projected right-of-way line of the intersecting street where the intersection is presently or is planned for signalization, or intersection capacity is critical.

- b. Alley - The driveway transition shall be permitted no closer than 10 feet from the projected intersecting alley curb face, and no closer than 2 feet from the nearest alley BCR or ECR.

1.903 Distance From Utility or Safety Devices The driveway transition shall clear all public facilities such as electroliners, traffic signal standards, utility poles, fire hydrants, and street trees by a minimum of 3 feet. Any relocation of public facilities required to maintain such clearance shall be at the expense of the owner who is installing the driveway.

1.904 Distance Between Driveways A minimum of 4 feet of full curb height shall be maintained between the transitions of adjoining driveways. No driveway shall be constructed which results in a curb length between transitions in excess of 14 feet, unless the curb length is at least 22 feet in length. Where practical, the total space between driveway transitions shall be in multiples of 22 feet plus 4 feet. $(S = 22 X + 4)$

1.905 Distance From Property Line A minimum of 2 feet of full curb height shall be maintained between the property line and driveway transition.

1.906 Common Use Driveways Common use driveways may be permitted in special cases.

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

1.908 Parking Lots Parking lot driveways shall be designed in such a manner as to preclude the use of the abutting public street for vehicular circulation solely related to the parking lot. Design shall conform to Standard Plan 133.

1.909 Grade Driveway grades shall be designed to keep the automobile from dragging or "hanging up" on the street or driveway.

2.100 GENERAL

Sanitary sewers shall be designed in accordance with accepted engineering principles and shall conform to these design standards.

Engineering calculations shall be submitted to the Public Works Director for the design of all proposed sanitary sewer systems. The calculations shall include the following items:

1. A plan, preferably 1" = 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary areas outside the project limits, zoning, projected land use, and any features affecting the system design.
2. Design flows at major junction points including flows coming from outside the project limits.
3. Size, length, slope, and invert elevations of all proposed lines and location of manholes.

Storm water shall not be connected or discharged into a sanitary sewer. Industrial waste may be connected or discharged into a sanitary sewer with approval of the Public Works Director. All installations shall be made in conformance with the City of Lodi Construction Specifications.

2.200 AVERAGE FLOW

Where possible, the average flows shall be completed on a per capita basis using a minimum 120 gal/capita/day and 3 capita/unit. When the exact density is not known the zoning map and the general plan shall be used to determine the appropriate densities, and the following chart should then be used to determine the average flows.

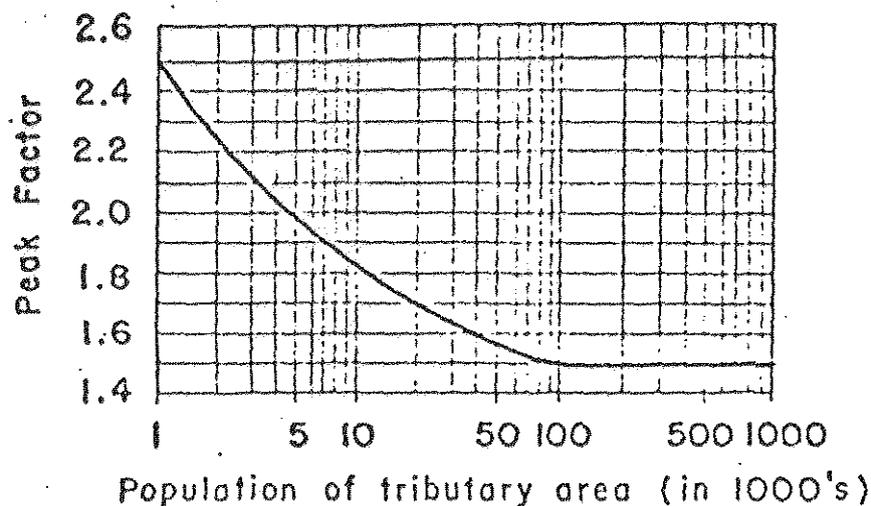
ZONING	Units/Acre*	Capita/Unit	Gals/Day/Capita	Average Flow cfs/Acre
R-1 (Residential)	4	3.0	120	0.00223
R-2 (Residential)	6	3.0	120	0.00334
R-GA (Residential Garden Apartment)	20	2.5	120	0.00928
R-MD (Residential Medium Density)	30	2.5	120	0.01392
R-HD (Residential High Density)	<u>40</u>	<u>2.5</u>	<u>120</u>	<u>0.01857</u>
Industrial	30 capita/acre		100	0.00464
Commercial	Average Flow = 1.74 (R-1 Avg. Flow)			0.00388
Schools & Churches	Not less than Average Design Flow of R-1 or the average density of immediate area whichever is greater			0.000039 cfs/student

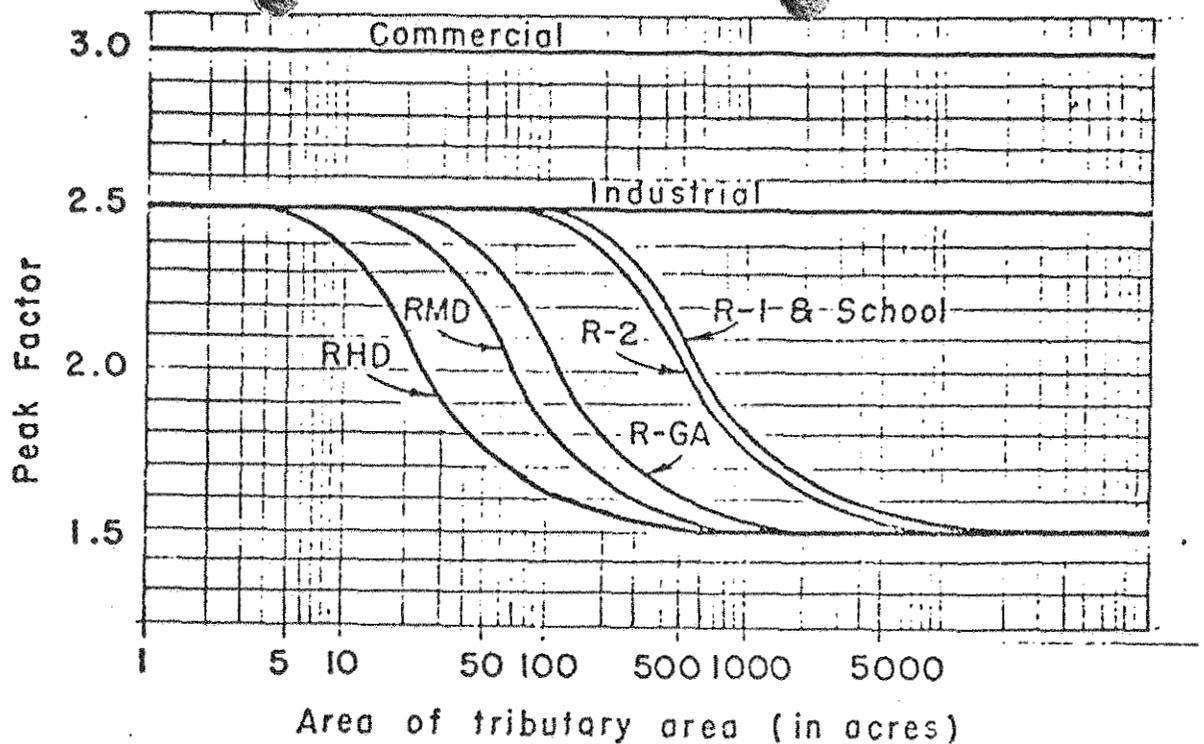
*In calculating the tributary areas the gross area should be used, this includes street rights of way.

The averages shown above are minimum flows and in some situations may have to be increased due to higher densities or differing land uses.

2.300 DESIGN FLOW

The total design flow shall be determined by multiplying the average design flow by a peak factor obtained from one of the following graphs:





Manning's formula shall be used to determine the relation of design flow, slope, velocity and pipe diameter. The friction factor, "n", shall be 0.013 for all types of pipe.

An example problem, using the above criteria, is shown in Appendix E of these Design Standards.

2.400 VERTICAL ALIGNMENT

The minimum cover on sanitary sewer lines shall be 3 feet.

When crossing a water main it is desirable that the sanitary sewer be installed below the water main with a clearance of 12 inches. The minimum vertical clearance of 3 inches shall be maintained between a storm drain or water main.

At points of convergence of pipes of various sizes, the tops of the pipe elevations, shall match.

2.500 HORIZONTAL ALIGNMENT

Sanitary sewers shall be placed within street rights of way unless placement in an easement is specifically approved by the Public Works Director.

Alignment shall be parallel to the street centerline wherever possible.

The horizontal alignment of sanitary sewers in new subdivision streets shall be 6 feet north or 6 feet west of the street centerline, as shown on Standard Plan 601. In existing streets and non-residential streets the alignment may vary from Standard Plan 601 with approval of the Public Works Director, but in no case shall there be less than 10 feet horizontal clearance to a water main.

Curved sewers are allowed in curved streets when curvature does not exceed manufacturer's recommendations.

Sanitary sewers shall not be constructed within 50 feet of any existing or proposed well site. Installations within 200 feet of an existing well or future well site shall be brought to the attention of the Public Works Director and shall be designed under his direction and in accordance with the California State Department of Public Health recommendations.

2.600 SLOPE

Sanitary sewers shall be designed to flow full and with a minimum velocity of 2.0 feet per second. The available slope shall be used to obtain the minimum 2.0 feet per second. Use of lower velocities shall have the specific approval of the Public Works Director. The maximum velocity shall be 10 feet per second.

2.700 PIPE

The pipe used for sanitary sewers shall have a minimum diameter of 6 inches. The pipe shall have rubber gasket joints and shall conform to the following ASTM Specifications (latest revision):

1. CONCRETE PIPE

Non-reinforced (24-inch and smaller)	C-14
Reinforced (12-inch and larger)	C-76
Rubber Gasketed Joints (10-inch and smaller)	C-443
Rubber Gasketed Joints (12-inch and larger)	C-361 Joint and C-443 Gasket

2. VITRIFIED CLAY PIPE

Compression Joint for Bell & Spigot Pipe	C-425
or	
Compression Couplings for Plain End Pipe	C-594

3. ASBESTOS CEMENT SEWER PIPE

Rubber Gasket	C-428 Type II
4. ABS SOLID WALL PIPE (4-inch and 6-inch)	D2751 SDR35
5. ABS COMPOSITE PIPE (8-inch to 15-inch)	D2680
6. PVC SEWER PIPE (4-inch to 12-inch)	D3034 SDR35

Refer to Standard Plan 609 for class of pipe requirements for various cover and size combinations for concrete pipe, vitrified clay pipe, and asbestos cement sewer pipe. ABS and PVC pipe shall be tested for over-deflection with a rigid mandrel undersized 4 per cent.

2.800 HOUSE SERVICE

The minimum size service is .4 inches and shall be installed in conformance with Standard Plan 203.

2.900 MANHOLES

Manholes shall be placed at the intersections of all sanitary sewers, at all locations where there is change in size, grade or direction and at the ends of all permanent lines.

Manhole spacing shall conform to the following limits:

<u>Diameter</u>	<u>Maximum Spacing</u>
10" and under	400 feet
12" to 18"	600 feet
21" and over	900 feet

Drop manholes will not be permitted.

Manholes shall be constructed at all service lateral connections where the main line is not $1\frac{1}{2}$ times the size of the service lateral.

Sanitary sewer manholes shall be constructed in conformance with Standard Plan 201.

2.1000 PUMP STATIONS

Pump stations shall have 50% standby and a minimum of 2 pumps. Standby power shall be provided.

2.1100 CLEANING AND TESTING

Sanitary sewers shall be flushed with an approved sewer ball and solid mandrel and shall pass a leakage test in conformance with the City of Lodi Construction Specifications prior to final acceptance by the City.

3.100 GENERAL

All drainage facilities shall be designed in accordance with accepted engineering principles, and shall conform to these Design Standards.

3.200 SUBMITTAL OF DRAINAGE CALCULATIONS

Drainage calculations are required for any new subdivision or development. Submittal of drainage calculations shall include the following items:

1. Hydrology and hydraulic calculations together with assumptions, charts, tables, references and methods used.

An example problem is shown in Appendix D of these Design Standards.

2. A plan, preferably 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including offsite drainage), and peak flow in all pipes.
3. A plan showing the hydraulic grade line (HGL), the proposed storm drain including slopes and sizes and top of curb in profile. Elevations should be shown at all changes in slope of the HGL, proposed storm drain and top of curb.

3.300 DESIGN FLOW

The Rational Method ($Q = CiA$) shall be used to determine the quantity of runoff (Q) in designing a storm drain system.

Values for the coefficient of runoff (C) are as follows:

Parks	0.10
R-1 and R-2 (Residential)	0.40
R-GA, R-MD and R-HD (Apartments)	0.50
Schools and Churches	0.50
Industrial	0.90
Commercial	0.80

Values for rainfall intensity (i) for corresponding time of concentration shall be taken from Standard Plan 606. A maximum roof to gutter time of 25 minutes should be used.

The Area (A) shall be the tributary drainage area in acres.

Manning's formula shall be used to determine the relation of design flow, slope, velocity and pipe diameter. The friction factor, "n", shall be 0.013 for all types of pipe.

3.400 HYDRAULIC GRADE LINE

All storm drains shall be designed for the maximum storm water entering the drain at the point of concentration and shall have a minimum of 1 foot of freeboard between the top of curb and the Hydraulic Grade Line.

3.500 PRIVATE PONDING BASINS, SINGLE PARCEL

If a temporary ponding basin on private property to drain a single, one ownership parcel is approved by the Public Works Director it shall be designed based on the following criteria:

1. A 48-hour, 10-year storm, total rainfall of 3.3 inches shall be used if a reasonable outlet is provided. If no disposal other than evaporation, percolation or irrigation is provided, a 48-hour, 100-year storm, total rainfall of 4.8 inches, shall be used.
2. The maximum water surface of the basin shall be 1 foot below the elevation of the top of curb at the lowest catch basin inlet within the tributary area. The maximum water surface of the basin may be 1 foot above the design hydraulic grade line at the basin.
3. Fencing shall be provided around all basins greater than 3 feet in depth.
4. Adequate all weather access shall be provided.
5. The tributary drainage system shall be designed to connect to the City's future storm drainage system.

3.600 PRIVATE PONDING BASIN, MULTIPLE PARCEL

If a temporary ponding basin is approved by the City Council for other than a single, one-ownership parcel, the following criteria should be considered in its design.

1. The Developer shall pay the City for maintaining and operating the storm water drainage system and appurtenances.
2. The basin may be deeded to the City as long as the area is used as a ponding basin. When the City of Lodi storm drain system is expanded to serve the area, the parcel of land reverts back to the developer's ownership and shall be restored back to original condition by the owner.
3. A minimum 10-foot wide access road shall be provided around the basin.
4. The maximum side slope shall be 6:1.
5. Six-foot chain link fencing with redwood lath filler shall be provided around the basin with double 8-foot gates and one 3-foot man gate.
6. The basin shall store a 10-year, 48-hour storm or a total of 3.3 inches over the service area.
7. The basin shall not be able to be reasonably served by any public storm drainage system.
8. The maximum design water surface of the basin shall be a minimum of 12 inches below the elevation of the top of curb of the lowest catch basin inlet within the tributary area.
9. The tributary drainage system shall be designed to connect to the City's future storm drainage system.
10. Facilities shall be provided to enable the basin to be pumped or drained into a public permanent system within a 48-hour period. The pump station shall have 50% standby and a minimum of 2 pumps.

3.700 VERTICAL ALIGNMENT

The minimum cover on main line storm drains shall be 2 feet in residential streets and 2½ feet in all other streets.

Catch basin laterals that have less than 18 inches of cover shall be encased in concrete.

A minimum vertical clearance of 3 inches shall be maintained between a sanitary sewer, water main, or other underground utility.

At points of convergence of pipes of various sizes, the tops of the pipe elevations shall match unless specifically approved by the Public Works Director. This does not apply to catch basin laterals.

3.800 HORIZONTAL ALIGNMENT

Storm drains shall be placed within street rights of way unless placement in an easement is specifically approved by the Public Works Director.

Alignment shall be parallel to the street centerline wherever possible.

The horizontal alignment of storm drains in new subdivision streets shall be 4 feet south or 4 feet east of the street centerline, as shown on Standard Plan 601. In existing streets and non-residential streets the alignment may vary from Standard Plan 601 with approval of the Public Works Director.

Curved storm drains are allowed in curved streets when curvature does not exceed the pipe manufacturer's recommendations.

3.900 SLOPE

Storm drains shall have minimum slopes equal to that necessary to give a velocity of 2.0 feet per second when flowing half full regardless of the slope of the Hydraulic Grade Line. Use of lower velocities shall use available fall and have the specific approval of the Public Works Director.

Storm drains shall have a minimum slope of 0.05 per cent.

Catch basin laterals shall have a minimum fall of 0.10 foot between the catch basin and manhole. Desirable fall is 0.30 foot or more.

3.1000 PIPE

The minimum size for storm drains shall be 12-inch diameter.

All catch basin laterals shall have a minimum diameter of 12 inches.

All pipe shall conform to the following ASTM specifications:

1. CONCRETE PIPE

Non-reinforced (24-inch or smaller) mortar joint	C-14
Reinforced (12-inch or larger) mortar joint	C-76
Rubber Gasketed Joints (10-inch & smaller)-optional	C-443
Rubber Gasketed Joints (12-inch or larger)-optional	C-361 Joint and C-443 Gasket

2. ASBESTOS CEMENT PIPE

C-428 Type II

Plastic Couplings

D-1248 Type I, Class C
Category 5

Rubber Gasket - optional

D-1869

The asbestos cement pipe shall be designated by class based on the crushing strength per foot of pipe as listed in the following table:

<u>Pipe Class</u>	<u>Crushing Strength Per Foot In Pounds</u>
II	1500 D
III	2000 D
IV	3000 D
V	3750 D

(Where D is the diameter of pipe in feet)

Refer to Standard Plan 609 for class of pipe requirements for various cover and size requirements.

Cast-in-place concrete pipe, 30 inches and larger, may be used when specifically approved by the Public Works Director. Cast-in-place pipe will not normally be permitted in existing streets.

3.1100 MANHOLES

Manholes shall be placed at the intersections of all storm drains, at all locations where there is a change in size, change in horizontal or vertical alignment and at the ends of all permanent lines.

Manhole spacing shall conform to the following limits:

<u>Diameter</u>	<u>Maximum Spacing</u>
12" to 30"	500 feet
33" to 54"	750 feet
60" and over	1000 feet

Manholes will not be required where a single catch basin meets the following criteria:

1. Maximum size of catch basin lateral shall be 15 inches.
2. Storm drain has a diameter of 30 inches or larger.
3. No other existing or future catch basins are within 100 feet along storm drain centerline.
4. Connection is made in conformance with Standard Plan 305.

All storm drain manholes shall be constructed in conformance with Standard Plan 301 unless otherwise approved by the Public Works Director.

3.1200 CATCH BASINS

Side inlet catch basins shall be located at all low points and shall be spaced in such a manner that design flows will not encroach into the travel lanes. Standard Plan 608 provides a Hydraulic Street Capacity Chart for use in determining whether the design flows encroach into the travel lanes.

The total gutter run contributing to any catch basin shall not exceed 1,000 feet. It is desirable to locate catch basins on the BCR or ECR which will intercept the most runoff and also keep the main pedestrian crossing as dry as possible.

Side inlet catch basins shall be constructed in conformance with Standard Plan 303.

Drop inlet catch basins shall be constructed only in alleys or as temporary installations on unimproved streets where curb and gutter has not yet been installed.

3.1300 SIPHONS

Inverted siphons will not be permitted.

3.1400 VALLEY GUTTERS

Valley gutters will be allowed only at intersections of cul-de-sac streets which provide access to less than 10 lots. Valley gutters shall be constructed in conformance with Standard Plan 116.

3.1500 ON-SITE DRAINAGE

All developed areas larger than one acre shall tie on-site drainage into the City of Lodi's storm drain system.

3.1600 PRIVATE STORM DRAIN CONNECTIONS

The minimum size for private storm drain connections shall be 6-inch diameter.

The pipe shall conform to the storm drain pipe specifications.

A reasonably accessible structure shall be provided on the private storm drain connection within 10 feet of the street or alley right of way line.

Private storm drain connections shall be tied into alley or street catch basins or manholes.

Manholes will be required unless all the following criteria are satisfied:

1. Maximum size of service shall be 15 inches.
2. Storm drain line has a diameter of 30 inches or larger.
3. Connection is made in conformance with Standard Plan 305.

4.100 GENERAL

Water facilities shall be designed in accordance with accepted engineering principles and shall conform to these design standards.

All materials shall conform to current American Water Works Association Standards.

All installations shall conform to regulations prescribed by the California State Department of Public Health.

All installations shall be made in conformance with the City of Lodi Construction Specifications.

4.200 VERTICAL ALIGNMENT

The minimum cover on water mains shall be 3 feet.

When crossing a sanitary sewer it is desirable that the water main be installed above the sanitary sewer with a clearance of 12 inches. The minimum vertical clearance of 3 inches shall be maintained between a sanitary sewer or storm drain.

The invert elevations and slopes shall be shown on all water main improvement plans.

All high points within the system shall be located at fire hydrant locations.

4.300 HORIZONTAL ALIGNMENT

Water mains shall be installed within street rights of way unless an easement installation is specifically approved by the Public Works Director. Alignment shall be parallel to the street centerline wherever possible.

In new developments the horizontal alignment of water mains shall be 12 feet south or 12 feet east of the street centerline, as shown on Standard Plan 601. In existing streets and non-residential streets the alignment may vary from Standard Plan 601 with approval of the Public Works Director, but in no case shall there be less than 10 feet horizontal clearance to a sanitary sewer, or 6 feet horizontal clearance to a storm drain or industrial waste line.

Curved water mains are allowed in curved streets when curvature does not exceed manufacturer's recommendations.

4.400 PIPE

The minimum size pipe used for water mains shall have a nominal diameter of 6 inches. Larger sizes will be required as designated by the Public Works Director from the City of Lodi Master Water Plan. An 8-inch minimum line size will be required in high density, commercial, industrial and school areas. Industrial areas may require installation of 10 and/or 12-inch mains. Six-inch mains shall be used only when they complete a good grid system. Where grids exceed 600 feet in length, 8-inch mains shall be used.

All pipe shall be asbestos cement, Class 150, with Ring-Tite or Fluid-Tite connections and shall conform to AWWA Standard C-400. Cast iron pipe or mechanical joint cast iron pipe may be used with specific approval of the Public Works Director.

4.500 WATER SERVICE

The minimum size service is 1 inch and shall be installed in conformance with Standard Plan 403. One and one-half inch and 2-inch services shall be installed in conformance with Standard Plan 406. Four-inch and larger shall be installed in conformance with Standard Plan 407.

4.600 FIRE HYDRANTS

Fire hydrants shall be supplied from the largest available main.

Fire hydrants shall be fed from 2 directions unless specifically approved by the Public Works Director and Fire Chief.

Fire hydrant spacing and distribution shall be determined as follows:

1. The maximum hose lay shall be 150 feet in high density, commercial, industrial zoning or high-value districts, with a maximum spacing of 300 feet.
2. The maximum hose lay shall be 250 feet in residential areas with a maximum spacing of 500 feet.
3. On divided streets, planned divided streets or state highways, the above spacing shall apply to both sides of the street.

4. A fire hydrant shall be located within 200 feet of the radius point of all cul-de-sacs.
5. Distribution main, fire hydrant and fire flow requirements shall also conform to the recommended standards of Insurance Services Office. Refer to "Guide for Determination of Required Fire Flow" published by Insurance Services Office.
6. On-site hydrants may also be required in conformance with Lodi City Code, Chapter 5, Article VI, "On-Site Fire Protection Requirements for New Construction."

Fire flow and fire hydrant distribution, including the number of hydrants required and specific locations, shall be approved by the Public Works Director and the Fire Chief.

Fire hydrants shall be installed in conformance with Standard Plan 401.

4.700 VALVES

Valves shall be spaced and located in conformance with the following criteria:

1. 400-foot maximum spacing in high-value districts.
2. 600-foot maximum spacing in residential districts.
3. Water mains shall be valved on each side and outside of railroad, freeway and canal right of way crossings.
4. At "tees," valves will be required as follows:
 - a. 2 valves where one leg is less than 8 inches, with one of the valves being on the smaller leg.
 - b. 3 valves where all legs are 8 inches or larger.
5. At "crosses," valves will be required as follows:
 - a. 3 valves where one or more legs is less than 8 inches with valves on each of the smaller legs.
 - b. 4 valves where all legs are 8 inches or larger.
6. At locations so that future tie-ins will not interrupt service.

Valves shall be installed in conformance with Standard Plan 402.

4.800 DEADEND RUNS

Permanent deadend runs shall be no longer than 250 feet unless specifically approved by the Public Works Director. Eight-inch mains shall be used on deadend runs which serve fire hydrants. Reasonable looping of water mains will be required.

4.900 BLOW-OFFS

Blow-offs shall be constructed at the end of all deadend runs in conformance with Standard Plan 404.

4.1000 THRUST BLOCKS

Thrust blocks shall be installed in conformance with Standard Plan 405.

4.1100 WATER LINE ACCEPTANCE TEST

Water lines shall be pressure tested, disinfected, flushed, and tested for bacteria in conformance with the City of Lodi Construction Specifications prior to final acceptance by the City.

The following *General Notes* should be used on all improvement plans submitted to the City of Lodi. Use only the notes which are applicable to the proposed improvement.

GENERAL NOTES

1. All work shall conform to the City of Lodi Construction Specifications and Standard Plans.
2. The following City of Lodi Standard Plans are hereby made a part of these plans.

102	122	
113	124	(List applicable Standard Plans)
119	etc.	
3. Refer to the final map of this subdivision for all centerline and property line data.
4. The street light system shall be installed in conformance with the street light plans prepared by the City of Lodi Utility Department.
5. All construction staking for curb, gutter, and sidewalk, sanitary sewers, storm drains, and water lines shall be done by a Registered Civil Engineer, or Licensed Land Surveyor.
6. The existing underground utilities are plotted from available records. The Contractor shall take precautionary measures to protect these utilities. The Contractor shall do no excavation until all utility agencies have been notified and have been given the opportunity to mark their facilities in the field.
7. House services, fire hydrant laterals, and street light conduit shall be installed prior to curb, gutter and sidewalk construction. All underground utilities within the street area, including gas and telephone lines, shall be installed prior to penetration treatment.
8. Bedding for all pipe lines shall be Class "C" conforming to City of Lodi Standard Plan 501.
9. Bench mark monuments will be furnished by the City of Lodi and shall be installed by the Contractor at locations shown.
10. All existing irrigation lines within the right of way shall be crushed in place or removed.
11. Where noted, the City of Lodi will make the connection to the existing water system after the Contractor has exposed the existing main and has laid the proposed water main within 10 feet of the tie-in point.
12. The Contractor shall do all the necessary excavation and backfill for the underground electrical installations and the ties to the existing water system which will be made by the City of Lodi.
13. All off-site sanitary sewers shall be balled and shall pass leakage tests prior to final acceptance.

14. All off-site water lines shall be pressure tested, disinfected, flushed, and tested for bacteria in conformance with the City of Lodi Construction Specifications prior to final acceptance by the City.

STREET SYSTEM

Roadway Excavation	CY
Compact Original Ground	SF
Concrete Subgrade Compaction	SF
Aggregate Base, Class 2	T
Liquid Asphalt, SC 250	T
Asphalt Concrete, Type B	T
Square-type Curb and Gutter	LF
Driveway-type Curb and Gutter	LF
Sidewalk	SF
Commercial-type Driveway	SF
Concrete Alley Approach	SF
Tree Wells (list type)	EA
Survey Monument	EA
Barricade or Guard Rail	EA
Street Sign	EA

WATER SYSTEM

* ACP, Class 150	LF
* Valve	EA
Fire Hydrant (Rich "Ranger" 960)	EA
Fire Hydrant (Rich "Ranger" 945)	EA
* Blow-off	EA
* Water Service	EA

STORM SYSTEM

* RCP, C-76 Class II (or specified alternate)	LF
* Cast-in-Place Concrete Pipe	LF
* CP, C-14 Extra Strength	LF
60" Manhole	EA
48" Manhole (list type)	EA
Side Inlet Catch Basin	EA
Drop Inlet Catch Basin	EA

SANITARY SYSTEM

* RCP, C-76 Class II (or specified alternate)	LF
* CP, C-14 Extra Strength	LF
48" Manhole	EA
* Sanitary Sewer Service	EA
Riser	EA

*Indicate size, list in order of largest diameter or size first.
List any additional bid items with the most nearly related bid item.

COMMENTS

- 7. Top of manhole elevation shown where applicable
- 8. Location of manhole ring and cover shown
- 9. Sizes of all existing lines shown
- 10. Show curve data if line is constructed on curve
- 11. Show how on-site drainage is handled

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SANITARY SEWER

- 1. Design conforms to City of Lodi Engineering Design Standard & 200 Series of Std. Plans
- 2. Size of line shown in plan
- 3. Slope, length, size, type and class of pipe shown in profile
- 4. Length shown as distance between manholes
- 5. Invert elevations shown at all manholes and grade breaks
- 6. Top of manhole elevation shown where applicable
- 7. Location of manhole ring and cover shown
- 8. Sizes of all existing lines shown
- 9. Show curve data if line is constructed on curve

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WATER

- 1. Design conforms to City of Lodi Engineering Design Standards and 400 series of Standard Plans
- 2. Size of line shown in plan
- 3. Slope, length, size, type and class of pipe shown in profile
- 4. Length shown as distance between crosses or tees
- 5. Invert elevations shown at all grade breaks
- 6. Sizes of all existing lines shown
- 7. Show curve data if line is constructed on curve
- 8. T. C. at fire hydrant locations
- 9. Fire Hydrant location approved by Fire Chief

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

CITY USE ONLY

- 1. One set of quantity calculations on formal calc. sheet submitted for all contract jobs
- 2. "Notes to Inspector" submitted for all contract jobs
- 3. Engineer to check plan file entry, e.g., number, limits, type of construction
- 4. Tick marks on all contract plans
- 5. Contract vicinity map to show project limits, scale, north arrow and nearest FH's

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

CITY OF LODI

STORM DRAIN DESIGN EXAMPLE

The following procedure, based on the Rational Formula $Q = CiA$ in conjunction with the City of Lodi Design Standards, is used in determining design Q 's for City of Lodi projects. A runoff calculation example is attached, and referenced to, for the purpose of illustration.

Procedure

1. On a plan, preferably 1" = 100' scale, show proposed street system, existing and proposed drainage systems and delineate tributary sub-areas. (See sheet 3)
2. Assume initial time of concentration (T_i), roof to gutter runoff time, normally 25 minutes.
3. Calculate travel time (T_t) to the first inlet. Assume average velocity in curb and gutter to be 1.5 feet per second.
4. The time of concentration (T_c) to the inlet is then the sum of the initial time of concentration and the travel time. $T_c = T_i + T_t$ (See sheet 4, line 1).
5. Determine "i"; rainfall intensity in inches per hour, for a time equal to the time of concentration (T_c) from the attached Rainfall Intensity Table, City of Lodi Standard Plan 606.
6. Determine "C", coefficient of runoff using C values given in City of Lodi Design Standards.
7. Determine "A", the area of the tributary sub-areas to the nearest 0.1 acres.
8. Compute $Q = CiA$, where Q equals the peak flow in cubic feet per second (see sheet 4, line 1).
9. Considering all criteria (available slope, cover, hydraulic grade line etc.), establish pipe size and slope, then determine pipe velocity and travel time (T_t) required to carry above Q to the next M.H. inlet or M.H. confluence. Use Manning's "n" equals 0.013 for all pipes.

Example: $Q = 0.3$ cfs, $d = 12''$, HGL Slope $s = 0.0010$ and $L = 42'$

Using King's Handbook
(Fifth Edition)

Using Manning's
Circular Calculator

$$K' = \frac{Qn}{d^{8/3} S^{1/2}} \quad \text{Table 7-14}$$

$$= \frac{(0.3)(.013)}{(1.0)(.0316)}$$

$$K' = 0.123 \quad D/d = .28$$

$$a = Cd^2 \quad \text{Table 7-4}$$

$$a = (.245)(1)^2 = .245 \text{ ft.}^2$$

$$v = Q/a = 0.3/.245 = 1.22 \text{ fps}$$

$$T_t = \frac{42 \text{ ft.}}{1.2 \text{ fps} \times 60 \text{ sec/min.}} = 0.6 \text{ min}$$

Read direct $D/d = .35$

THEN:

Read direct $v = 1.2$ fps

10. Compute new time of concentration to next M.H. inlet or M.H. confluence.

$$T_{c2} = T_{c1} + T_t2$$

$$T_{c2} = 27.0 + 0.6 + 3.3 = 30.9 \text{ min. (See sheet 4, line 1, 2, & 3)}$$

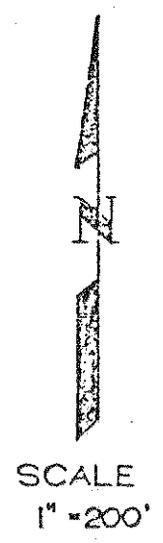
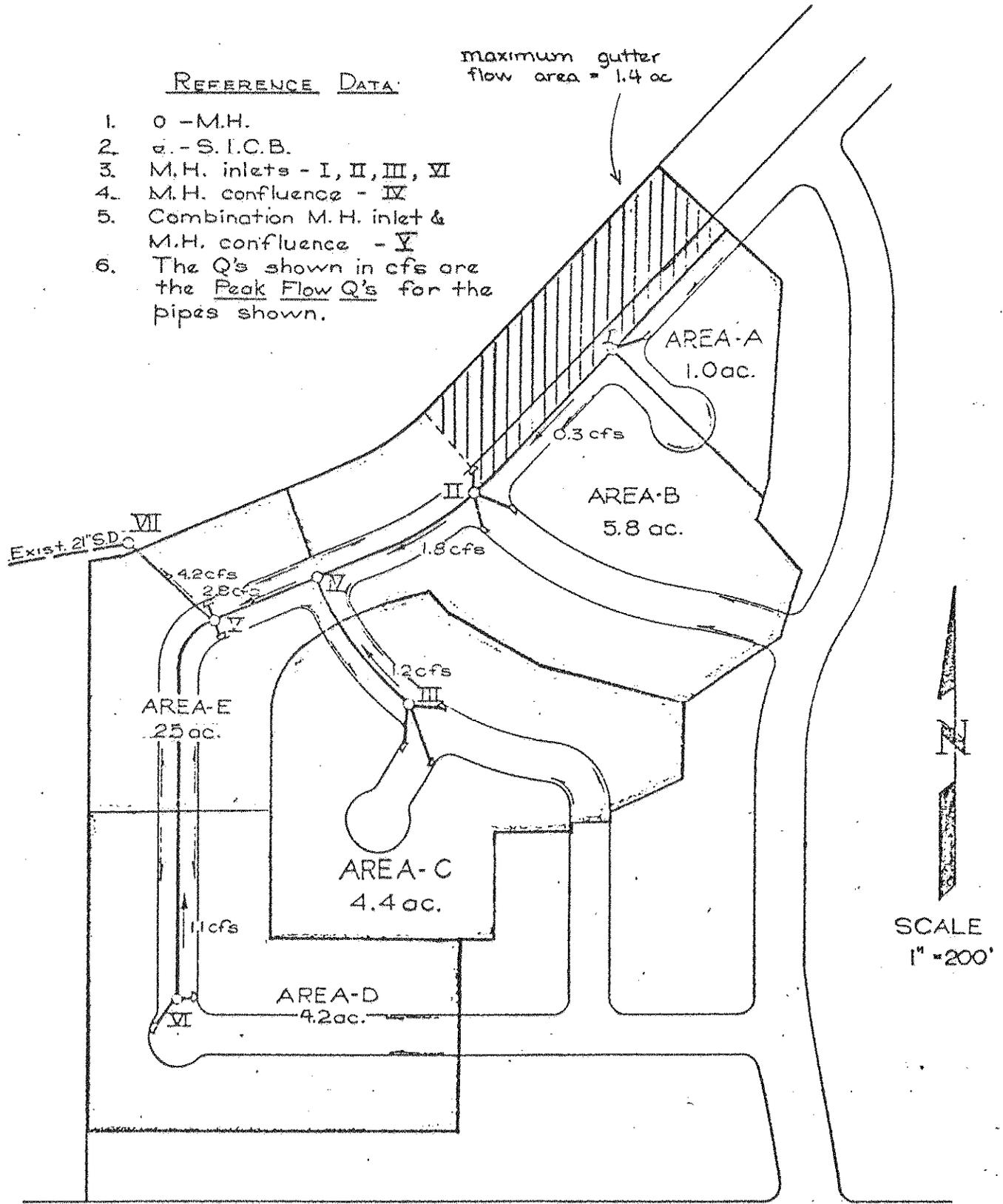
- (a) At M.H. inlets compare the new T_{c2} for the pipe system upstream to the T_c for the tributary sub-area which contributes to the M.H. inlet. Calculate the total peak flow at the inlet, using the longest T_c and the procedure outlined above for determining C and i . (See sheet 4, lines 4 and 5). Then proceed downstream in the same manner outlined in steps 9 and 10.
- (b) At M.H. confluences compare the T_c for each leg of the confluence. Calculate the total peak flow at the confluence using the longest T_c . (See sheet 4, lines 9 & 10). Then proceed downstream in the same manner outlined in steps 9 and 10.
- (c) At combination M.H. inlet and M.H. confluence follow procedures outlined in steps 10(a) and 10(b). (See sheet 5, lines 14 & 15)

The following example illustrates the procedure used by the City of Lodi for calculating runoff.

REFERENCE DATA:

1. 0 - M.H.
2. 2 - S.I.C.B.
3. M.H. inlets - I, II, III, VI
4. M.H. confluence - IV
5. Combination M.H. inlet & M.H. confluence - V
6. The Q's shown in cfs are the Peak Flow Q's for the pipes shown.

maximum gutter flow area = 1.4 ac



PROJECT NO. 000
 DATE: 2-28-67
 BY: JLR/ko
 SHEET NO. 4 of 5

TITLE: TRACT NAME & NUMBER

POINT OF REFERENCE	AKLA A ACRES	C ΣA % ACRES	T _c min.	I in/hr	Q CFS	PIPE SIZE IN	HGL SLOPE ft/ft	LENGTH L ft	VELOCITY V ft/sec	T _t MIN	FALL ft	FL	ELEVATION	REMARKS
AREA A I SICB	1.0	40	27.0	.69	0.3	12	0.0010	42'	1.7 1/2	0.6				t _t + t _c = t _c 180 / (1.5 x 60) = 2.0 + 25 = 27.0 min
I			27.6											
II			30.9			12	0.0020	300'	1.5 1/2	3.3				
II SICB			30.3			12								480 / (1.5 x 60) = 5.3 + 25 = 30.3 min Assume t _t = 0.6 from MH's to SICB Since all tributary areas are nearly equal, since 30.9 = 30.9 use t _c = 30.9 min
AREA B II	5.8	40	30.9	.65	1.8	15	0.0010	225'	1.9 1/2	2.0				
IV			32.9											
III SICB			28.1											
AREA C III	4.4	40	28.7	.67	1.2	12	0.0010	245'	1.6 1/2	2.5				280 / (1.5 x 60) = 3.1 + 25 = 28.1 min Assume t _t = 0.6 min Since 31.2 < 32.9 use t _c = 32.9 min
IV			31.2											
IV	.40	11.2	32.9	.62	2.8	15	0.0030	167'	3.3 1/2	0.8				6.8 + 4.4 = 11.2 acres
V			33.7											

TITLE: TRACT NAME & NUMBER

PROJECT NO. 000
 DATE: 2-28-67
 BY: JCR/MSB
 SHEET NO. 5 of 5

POINT OF REFERENCE	AREA A ACRES	C %	EA ACRES	Tc min	I in/hr	Q CFS	PIPE SIZE IN	HGL slope ft/ft	LENGTH L FT	VELOCITY V ft/sec	Tc min	FALL FT	FL
VI	4.2	.40	4.2	30.7	.65	1.1	12	0.0010	530'	1.6 1/2	55		
VI side				30.1									
AREA D													
V	2.5	.40	17.9	36.2	.59	4.2							
AREA E													

Pipe 12 in
 Remarks:
 $460/15 \times 10 = 5.1 + 25 = 30.1$ min
 Assume $t_c = 0.6$ min
 Since $36.2 > 30.7$ use $t_c = 36.2$ min
 Assume t_c from Area E < 36.2 min
 $11.2 + 4.2 + 2.5 = 17.9$ acres.
 Check maximum gutter flow
 (Cross-hatched area on sheets
 & Std Plan 608)
 $T_c = \left(\frac{480}{1.5 \times 160} + 25 \right) = 30.3$
 $\therefore Q = 1.4 \times 4 \times 0.4 \times 30.3$
 Assume gutter slope = 0.002
 $\therefore S^{1/2} = 0.05$
 $Q/5 = \frac{0.37}{0.05} = 7.4$
 Using square-type C & G
 street flooding 5.9'
 from face of curb
 is less than 8.0 ft
 for parking so OK

CITY OF LODI

SANITARY SEWER DESIGN EXAMPLE

The following procedure is used in determining design Q'a for City of Lodi projects. —
A flow calculation example is attached and referenced to, for the purpose of illustration.

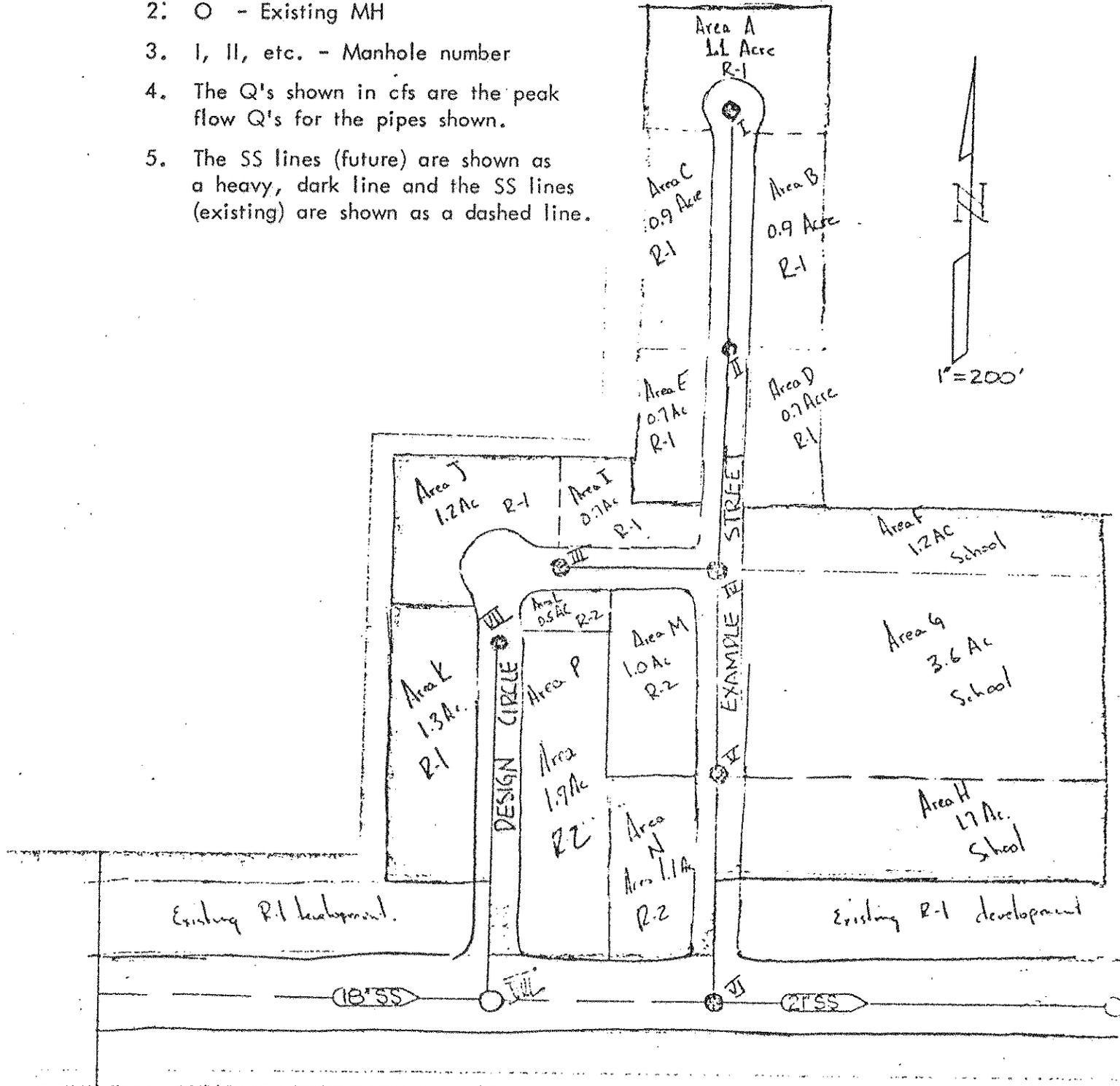
Procedure

1. A plan, preferably 1" = 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary areas outside the project limits, zoning, projected land use, and any features affecting the system design.
2. Determine and show the tributary sub-areas to the nearest 0.1 acre.
3. Considering all criteria (available slope, cover and design standards) establish pipe size and slope, then determine velocity and pipe capacity.

The following example illustrates the procedure used by the City of Lodi for calculating sanitary sewer flows.

REFERENCE DATA

1. ○ - Future MH
2. ○ - Existing MH
3. I, II, etc. - Manhole number
4. The Q's shown in cfs are the peak flow Q's for the pipes shown.
5. The SS lines (future) are shown as a heavy, dark line and the SS lines (existing) are shown as a dashed line.



TITLE: (Tract Name and Number)

IN: Form 2002
 DATE: 11/13/02

Tract Name	Area No.	From MH	To MH	Length (feet)	Area (Acres)	Flow Per Acre (CFS)	Aver. Flow (CFS)	Accum. Flow (CFS)	Peak Flow (CFS)	Dia. (in.)	Slope (%)	Velocity (FPS)	Capacity Full (GFS)	Remarks
Sample Street	A	I	I		1.1	.00219	.0024							
	B	I	I		0.9	"	.002							
	C	I	II	340	0.9	"	.002	.0064	.016	6	.5	2.0	.04	
	D	I	II		0.7	"	.0015							
	E	I	III		0.7	"	.0015							
	F	I	III	310	1.2	"	.0026	.012	.030	6	.5	2.0	.04	
	G	I	IV		1.2	"	.0026							
	H	I	IV		0.7	"	.0015							
	I	I	V		0.7	"	.0015							
	J	I	V		0.7	"	.0015							
Sample Street	K	VI	VI		1.0	.00329	.0016	.0057	.014	6	.5	2.0	.04	
	L	VI	VI		0.5	"	.0038							
	M	VI	VI	230	1.0	.00329	.0016	.0057	.014	6	.5	2.0	.04	
	N	VI	VI		0.5	.00329	.0036	.029	.013	6	.5	2.0	.04	
Sample Street	O	VI	VI	290	3.6	.00219	.0037	.036	.070	6	.5	2.0	.04	
	P	VI	VIII	320	1.1	.00329	.0036							
Sample Street	Q	VI	VIII	500	1.7	.00219	.0037	.036	.070	6	.5	2.0	.04	
	R	VI	VIII		1.3	.00219	.0025	.0091	.023	6	.5	2.0	.04	
Sample Street	S	VI	VIII		1.9	.00329	.0063	.0091	.023	6	.5	2.0	.04	
	T	VI	VIII		1.3	.00219	.0025	.0091	.023	6	.5	2.0	.04	

Setback zone adjacent to R-1 - Use R-1 setback to R-1 - Use R-1 setback

M.H. VIII is on side of M.H.

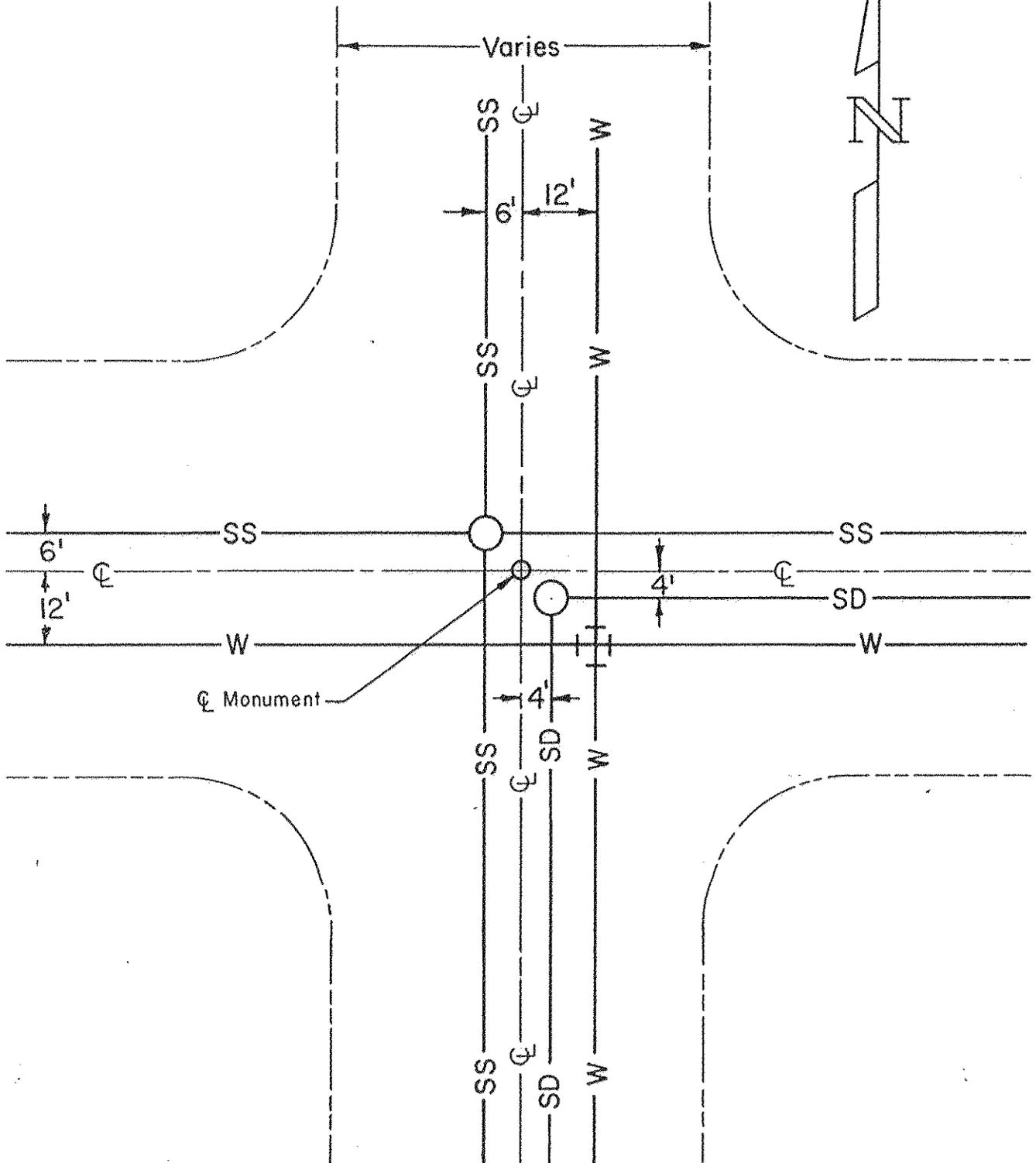
* PEAK FLOW = 2.5



CITY OF LODI

PUBLIC WORKS DEPARTMENT

STANDARD UTILITY LOCATIONS IN STREETS



Drawn **KT**
 Checked **JBG**
 Date **JULY 1976**

No.	Revised	By

Approved By
John R. Kowalski
 Public Works Director
 REC 17509

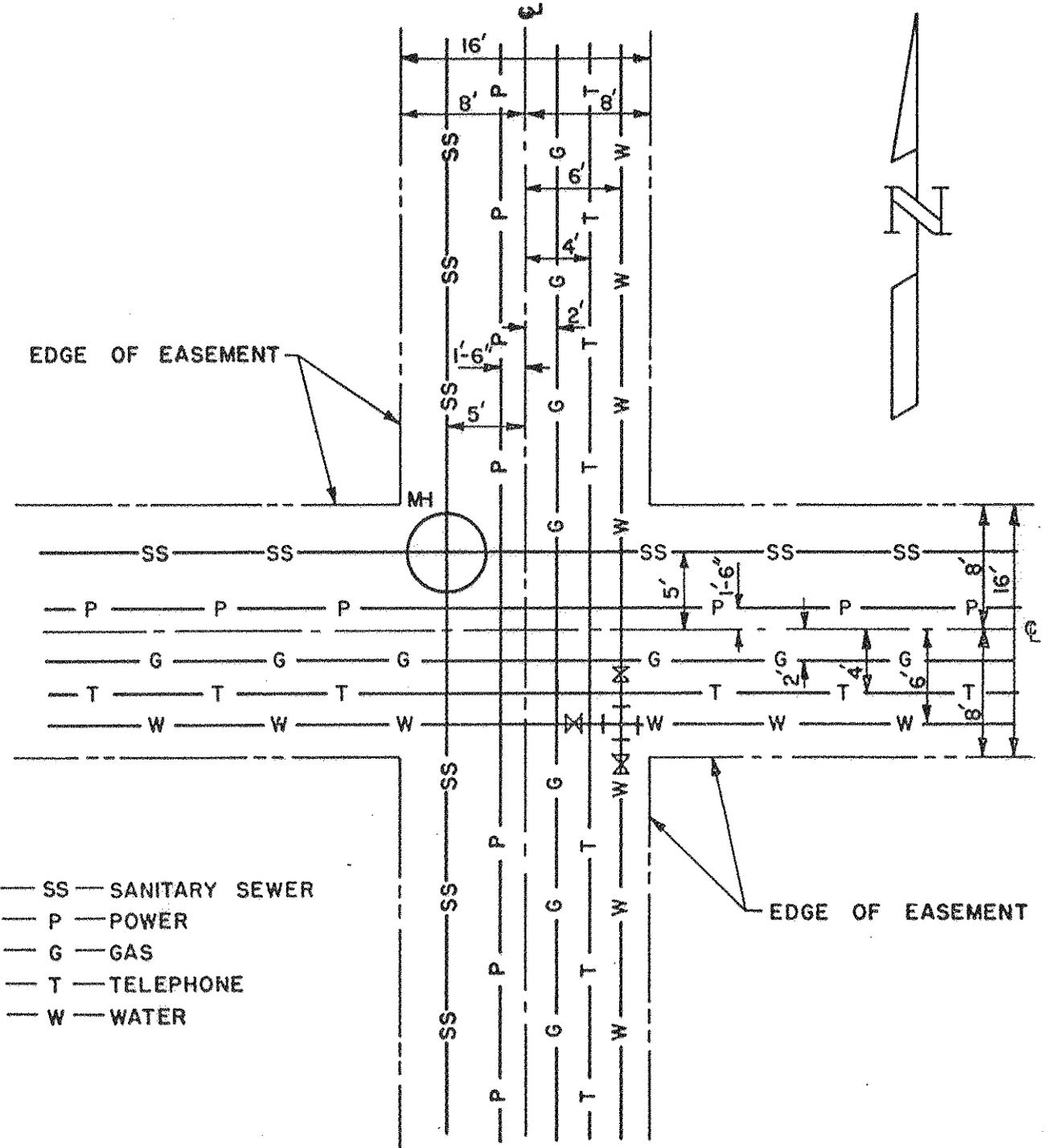
STD PLAN 601
 8-25-76



CITY OF LODI

PUBLIC WORKS DEPARTMENT

STANDARD UTILITY LOCATIONS IN EASEMENTS



- SS — SANITARY SEWER
- P — POWER
- G — GAS
- T — TELEPHONE
- W — WATER

Drawn LL	No.	Revised	By	Approved By
Checked JBG				<i>Jarvis Roush</i>
Date JULY 1976				Public Works Director RFE 17509

STD PLAN 602

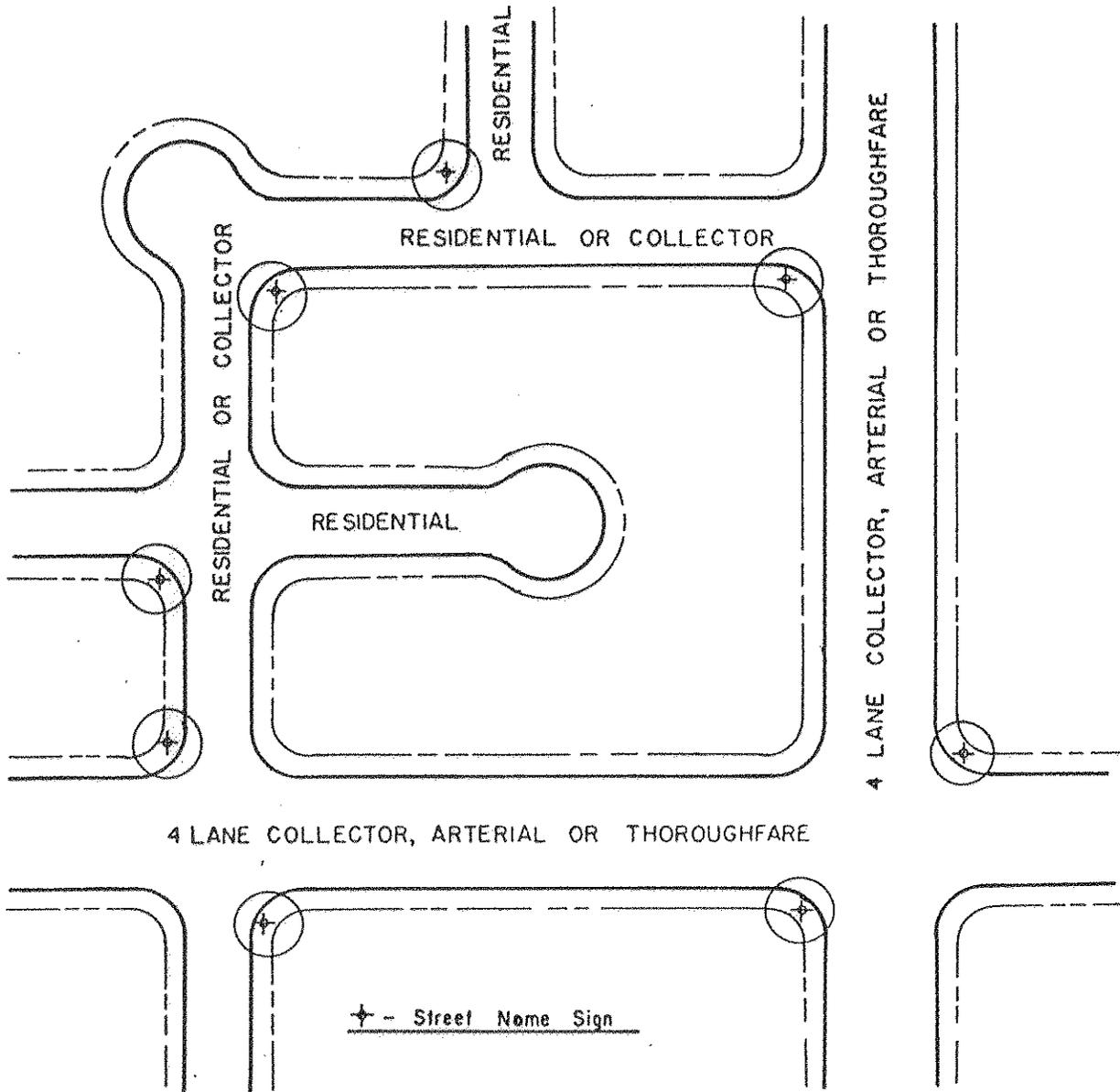
8-25-76



CITY OF LODI

PUBLIC WORKS DEPARTMENT

STREET NAME SIGN LOCATION



Place one (1) street sign at the intersection of two RESIDENTIALS.

Place two (2) street signs at the intersection of a RESIDENTIAL or COLLECTOR with a 4 LANE COLLECTOR, ARTERIAL or THOROUGHFARE.

Place two (2) street signs at the intersection of any two 4 LANE COLLECTORS, ARTERIALS or THOROUGHFARES or any combination thereof.

Drawn KB	No. 1	Revised 6-75	By K.B.	Approved By <i>Jack D. Lombar</i>	STD PLAN 603
Checked JBG				Public Works Director RCE 17509	
Date JUNE 1975				9-1-75	



CITY OF LODI

PUBLIC WORKS DEPARTMENT

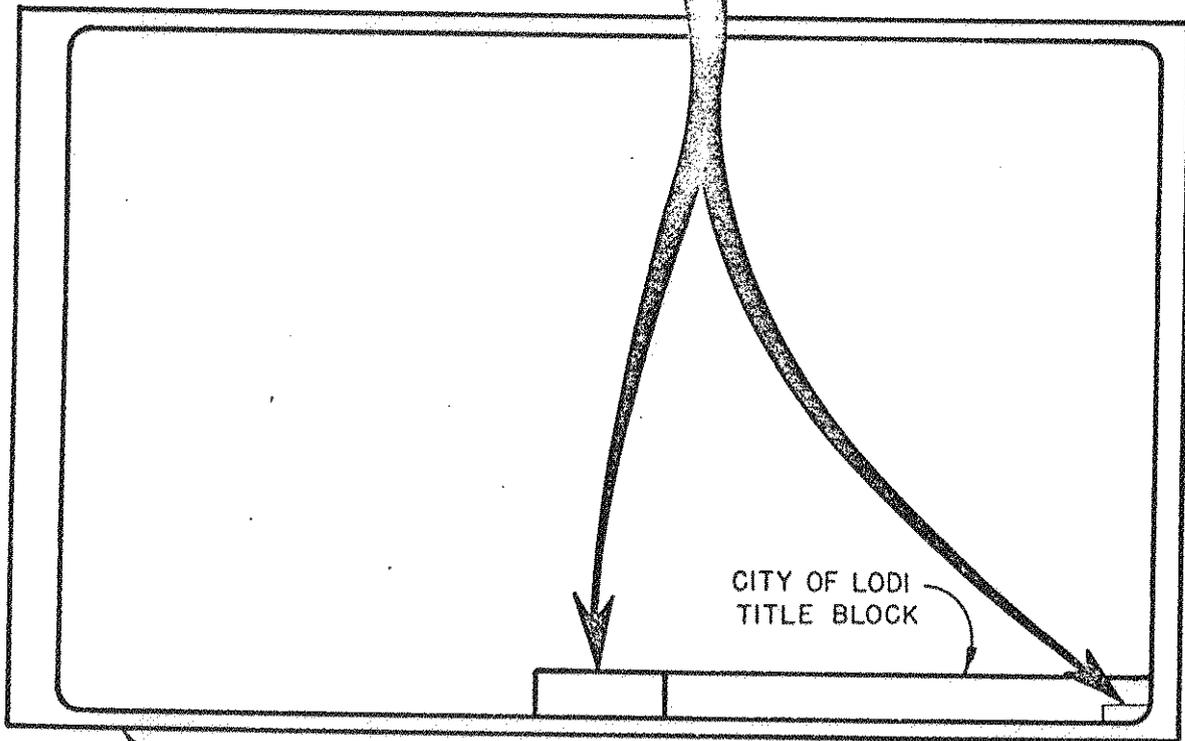
TITLE BLOCK
FOR PRIVATE ENGINEERS

$7\frac{1}{16}$ "	PREPARED IN THE OFFICE OF: _____
	DESIGNED UNDER THE SUPERVISION OF: _____ RCE _____

DETAIL
FULL SCALE

DRAWING
68D00

$\frac{3}{16}$ " MIN. SIZE



STANDARD CITY OF LODI DRAWING SHEET 22"X 36"

NOTE:
THE CITY OF LODI WILL FURNISH STANDARD SINGLE PLAN AND PROFILE OR PLAIN SHEETS AT THE DEPT OF PUBLIC WORKS.

Drawn KT	No.	Revised	By	Approved By
Checked JBG				<i>Jack H. ...</i>
Date JULY 1976				Public Works Director RCE 7509

STD
PLAN 604

B-25-76



CITY OF LODI

PUBLIC WORKS DEPARTMENT

FINAL MAP CERTIFICATES

The following certificates shall be used on all Final Maps submitted to the City of Lodi

COUNTY SURVEYOR CERTIFICATE

I, William J. Ward, do hereby certify that I have examined this final map of Tract No. _____, Subdivisions of San Joaquin County, " _____, " City of Lodi, California and that the subdivision shown thereon complies with all the provisions of the California Subdivision Map Act, as amended, and that this map is technically correct.

(date)

William J. Ward - County Surveyor of San Joaquin County, State of California

CITY CLERK CERTIFICATE

This is to certify that at its regularly held meeting on _____, the City Council of the City of Lodi approved this final map of Tract No. _____, Subdivision of San Joaquin County, " _____, " City of Lodi, California, and accepted on behalf of the public the dedication of all Public Utility Easements shown thereon and rejected the offer of all streets shown on said map until their improvement has been completed in accordance with the Lodi City Code, Chapter 22.

(date)

Alice M. Reimche - City Clerk and Clerk of the City Council of the City of Lodi

CITY ENGINEER CERTIFICATE

I, Jack L. Ronsko, do hereby certify that I am City Engineer and that I have examined this final map of Tract No. _____, Subdivisions of San Joaquin County, " _____, " City of Lodi, California, and that the subdivision shown hereon is substantially the same as it appeared on the Tentative Map and any approved alterations thereof. I do further certify that all the provisions of the Lodi City Code, Chapter 22 at the time of approval of the Tentative Map have been complied with.

(date)

Jack L. Ronsko, RCE 17509
City Engineer of the City of Lodi

SURVEYOR CERTIFICATE

I, _____, do hereby certify that I am the Registered Civil Engineer (or Land Surveyor) responsible for the survey of lands shown on this map and that the said survey was made in _____ and the same is true and complete as shown. All monuments are of the character and occupy the positions indicated or will be set in such positions before subdivision improvements are complete, and that the monuments are, or will be, sufficient to enable the survey to be retraced.

(date)

Name RCE or LS Number

OWNER CERTIFICATE

We hereby certify that we are all the parties having any record, title or interest in the lands subdivided and shown upon this map and we do hereby consent to the preparation and recordation of this final map.

We also hereby offer to dedicate for public use all streets shown on said map and all easements for public utilities designated as Public Utility Easements (P.U.E.) as shown on said map; such parcels of land to be kept open and free from buildings and structures of any kind.

(date)

Name

Name

Drawn PF
Checked JBG
Date AUG 1976

No.	Revised	By

Approved By
Jack L. Ronsko
Public Works Director
RCE 17509

8-25-76

STD PLAN 605



CITY OF LODI

PUBLIC WORKS DEPARTMENT

RAINFALL INTENSITY TABLE

TIME OF CONCENTRATION (in minutes)	2 ± YEAR STORM INTENSITY in. / hour	TIME OF CONCENTRATION (in minutes)	2 ± YEAR STORM INTENSITY in. / hour
25	.71	65	.40
26	.70	70	.39
27	.69	75	.37
28	.68	80	.36
29	.67	85	.35
30	.66	90	.34
31	.65	95	.33
32	.64	100	.32
33	.62	105	.31
34	.61	110	.30
35	.60	115	.28
36	.59	120	.27
37	.58	125	.26
38	.57	130	.26
39	.56	135	.25
40	.55	140	.25
41	.54	145	.24
42	.53	150	.24
43	.52	155	.23
44	.51	160	.23
45	.50	165	.22
46	.49	170	.22
47	.48	175	.21
48	.48	180	.21
49	.47	185	.21
50	.47	190	.20
51	.46	195	.20
52	.45	200	.20
53	.45	205	.19
54	.44	210	.19
55	.44	215	.19
56	.43	220	.19
57	.43	225	.18
58	.42	230	.18
59	.42	235	.18
60	.41	240	.18

Drawn P.F.	No.	Revised	By	Approved By
Checked JBG				<i>Jack D. Loush</i>
Date AUG. 1976				Public Works Director RCF 17509

8-25-76

STD PLAN 606



CITY OF LODI

PUBLIC WORKS DEPARTMENT

GUTTER HYDRAULIC CAPACITIES

Assumptions:

Street Cross Slope = 2½%

Manning's "n" = .015

Pavement hike-up at toe of curb = 3/8"

DRIVEWAY-TYPE CURB & GUTTER

Depth (ft.)	Area (SF)	Street Flooding	
		from top of curb (ft.)	Q*/(s)½
0.20	0.2	2.1	5.1
0.21	0.3	2.6	5.2
0.22	0.3	3.0	5.6
0.23	0.3	3.5	6.1
0.24	0.3	3.9	6.8
0.25	0.4	4.4	7.7
0.26	0.4	4.8	8.6
0.27	0.5	5.3	9.8
0.28	0.5	5.7	11.1
0.29	0.6	6.2	12.5
0.30	0.7	6.6	14.2
0.31	0.7	7.1	15.9
0.32	0.8	7.5	17.9
0.33	0.9	8.0	20.1
0.34	1.0	8.4	22.4
0.35	1.0	8.9	25.0
0.36	1.1	9.3	27.8
0.37	1.2	9.8	31.0
0.38	1.3	10.2	34.2
0.39	1.4	10.7	37.5
0.40	1.6	11.1	41.2
0.41	1.7	11.6	45.0
0.42	1.8	12.0	49.3

FLOW EXCEEDS TOP OF CURB

* Q - Flow in cfs

s - Slope in curb and gutter

SQUARE-TYPE CURB & GUTTER

Depth (ft.)	Area (SF)	Street Flooding	
		from curb face (ft.)	Q*/(s)½
0.20	0.2	3.3	3.6
0.21	0.3	3.7	4.2
0.22	0.3	4.1	5.0
0.23	0.3	4.5	5.8
0.24	0.4	4.9	6.8
0.25	0.4	5.3	8.0
0.26	0.5	5.7	9.3
0.27	0.6	6.1	10.7
0.28	0.6	6.5	12.2
0.29	0.7	6.9	14.0
0.30	0.8	7.3	15.9
0.31	0.8	7.7	17.9
0.32	0.9	8.1	20.2
0.33	1.0	8.5	22.7
0.34	1.1	8.9	25.3
0.35	1.2	9.3	28.1
0.36	1.3	9.7	31.1
0.37	1.4	10.1	34.4
0.38	1.5	10.5	37.8
0.39	1.6	10.9	41.5
0.40	1.7	11.3	45.4
0.41	1.8	11.7	49.6
0.42	1.9	12.1	54.0
0.43	2.0	12.5	58.6
0.44	2.2	12.9	63.5
0.45	2.3	13.3	68.6
0.46	2.4	13.7	73.9
0.47	2.6	14.1	79.6
0.48	2.7	14.5	85.4
0.49	2.9	14.9	91.8
0.50	3.0	15.3	98.2

FLOW EXCEEDS TOP OF CURB

Drawn	D.M.	No.	Revised	By	Approved By
Checked	J.B.G.				<i>Jack I. Louie</i> 10-2-76
Date	SEPT 1976				Public Works Director RCE 17509

STD PLAN 608



CITY OF LODI

PUBLIC WORKS DEPARTMENT

PIPE CLASS REQUIREMENTS

(CLASS C BEDDING)

C-14 CONCRETE PIPE PIPE SIZE

COVER	4"	6"	8"	10"	12"	15"	18"	21"	24"
2'								CI 3	
3'									
4'									
5'					CI 2				
6'									
7'									
8'									
9'									
10'									
11'									CI 3
12'									
13'					CI 3		SPECIAL BEDDING		
14'									

ASBESTOS CEMENT PIPE & C-76 CONCRETE PIPE PIPE SIZE

COVER	12"	15"	18"	21"	24"	30"
2'		CI IX	CI IX		CI III	
3'						
4'					CI II	
5'						
6'		CI III				
7'						
8'						
9'						
10'						
11'						
12'		CI IX				
13'						
14'						

ASBESTOS CEMENT SEWER PIPE PIPE SIZE

COVER	4"	6"	8"	10"	12"	14"	16"	18"	21"	24"	30"
2'								3300	4000	4000	5000
3'											4000
4'											
5'											
6'		1500				2400					
7'											
8'								3300			
9'											
10'											
11'									4000		5000
12'											SPECIAL BEDDING
13'											
14'											

VITRIFIED CLAY PIPE PIPE SIZE

COVER	4"	6"	8"	10"	12"	15"	18"	21"	24"	30"
2'										
3'										
4'										
5'										
6'										
7'										
8'										
9'										
10'										
11'										
12'										
13'										
14'										

Drawn D.M.	No. 1	Revised 10-19-76	By	Approved By <i>Julia Lovelace</i>	STD PLAN 609
Checked J.B.G.				Public Works Director RC 17509	
Date AUG. 1976				B-25-76	