



Think Inside the Triangle™
City of Tracy

Engineering Design & Construction Standards



DESIGN STANDARDS

Development Services Department
Resolution No. 2020-031 ♦ February 18, 2020

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ENGINEERING DESIGN STANDARDS
Resolution 2020-031

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SECTION 1

GENERAL

1.01 Purpose and Intent

The purpose and intent of these Design Standards is to provide minimum standards for the design, construction, maintenance, repair, and alteration of all public facilities and specified private improvements. The public facilities and private improvements subject to these Design Standards shall include roadways (including streets, alleys, bikeways, medians, sidewalks, curbs, gutters, driveways, right of way landscaping, and intersection improvements), storm drainage (including channels, pipes, detention and retention facilities), wastewater facilities (including collection and treatment), recycled and potable water facilities (including conveyance, storage, and treatment), parks (including mini parks, neighborhood parks, and community parks), public buildings, and all appurtenances thereto, within the City.

1.02 Legal Authority for Design Standards

These Design Standards are an implementation of existing obligations imposed upon applicants for design and construction of public improvements pursuant to: state law including the California Constitution, the Planning and Zoning Law (Government Code Sections 65000 *et seq.*), the Subdivision Map Act (Government Code Sections 66410 *et seq.*), the California Environmental Quality Act (Public Resources Code Sections 21000 *et seq.*, "CEQA"), and the Guidelines for California Environmental Quality Act (California Administrative Code, Title 14, Sections 15000 *et seq.*, "CEQA Guidelines"); all City Regulations including the City's General Plan, the Tracy Municipal Code ("TMC"), all mitigation measures set forth in environmental documents relevant to the application prepared pursuant to CEQA, all conditions of approval for any development project relevant to the application, and all other relevant City Regulations set forth in ordinances, resolutions, specific plans, policies, and procedures, including the City's Design Documents (including the Standard Plans, Standard Specifications, Design Standards, and relevant Public Facility Master Plans); and the court cases which interpret those laws and regulations. Any items not included in the Standards shall be designed in accordance with the State Planning Manual, California Code of Regulations Title 24, State Highway Design Manual, Subdivision Ordinance or Zoning Ordinance as defined below, or as directed by the City Engineer.

1.03 Application of Design Standards to Public and Private Facilities

The primary scope and intent of these Design Standards is for public facilities to be constructed and turned over to the City for operation and/or maintenance. However, these Design Standards shall also apply to privately owned and maintained

improvements that have a potential effect on the public health, safety, and welfare, as determined by the City Engineer.

1.04 Limitations of Design Standards

These Design Standards shall not be construed to be a maximum required design on any project, or portion of a project. These Design Standards are not intended to replace the professional discretion and judgment of any Design Engineer, Land Surveyor, or Landscape Architect. It is the responsibility of each Design Engineer, Land Surveyor, and Landscape Architect to exercise the required standard of care in designing the facilities and improvements described herein.

1.05 Requests by Applicant for Minor Deviations from Design Standards

1.05(A). An applicant may make a request for a minor deviation from these Design Standards provided that the applicant pays a fee to cover all City costs in reviewing the request (including costs related to City staff time and any consultant services deemed necessary by the City Engineer), and the applicant establishes in writing, to the satisfaction of the City Engineer, that: (1) there are extraordinary circumstances which: (a) warrant the proposed deviation to the Design Standards, and (b) are particular to the development project application, and (c) are not equally applicable to a significant portion of development projects in the City; and (2) the proposed deviation meets or exceeds the standard of care relevant to the circumstances of the request; and (3) the proposed deviation will not result in a negative impact on the health, safety, or welfare of City residents; and (4) the proposed deviation will not result in any unreasonable maintenance or operation costs to the City; and (5) approval of the proposed deviation could not be used by other applicants with similar circumstances to effectively modify the City's ability to enforce the Design Standards. If an applicant desires to request a deviation from these Design Standards, the applicant shall have the burden of submitting the request in a timely manner, in order to provide sufficient time for complete review and consideration of the request by the City Engineer.

1.05(B). After a request for a minor deviation is made in accordance with Section 1.05(A), the City Engineer shall prepare a written response to the applicant in one of the following forms: (1) if additional documentation is required to be submitted by the applicant in order to substantiate or clarify the request, the response shall outline the additional documentation; or (2) if the City Engineer determines that the applicant has provided documentation which satisfies the requirements of Section 1.05(A), the response shall identify the parameters of the approved minor deviation from the Design Standards; or (3) if the City Engineer determines that the applicant has not provided documentation which satisfies the requirements of Section 1.05(A), the response shall identify which requirements of Section 1.05(A) have not been satisfied.

1.05(C). If the City Engineer provides a written response, in accordance with Section 1.05(B)(2), which identifies the parameters of the approved minor deviation from the Design Standards, then the written response shall be incorporated by reference into the document (e.g., Subdivision Improvement Agreement) to which the request applies.

1.06 Initiation of Changes to Design Standards by the City Engineer

The City Engineer shall review the Design Standards on a regular basis, and make recommendations to the City Council to make modifications or updates to the Design Standards in the best interests of the City. Any modifications or updates to the Design Standards shall be subject to the final approval of the City Council.

1.07 Final Authority

The City Engineer shall be the final authority on all questions, which may arise as to the interpretation or enforcement of these Design Standards. Appeals of the City Engineer's decisions may be made in accordance with Tracy Municipal Code Chapter 1.12.

1.08 Definitions

Unless otherwise provided in these Design Standards, the definitions set forth in Tracy Municipal Code Chapter 1.08, Chapter 10.08 and Chapter 12.08 shall apply to these Design Standards. As used in these Design Standards:

“American Water Works Association Standards” means Publications of the American Water Works Association that specify the quality of materials used in the construction of potable water systems.

“Applicant” means “Developer” as defined herein.

“Best Management Practices” means a technique or series of techniques which when used in an erosion control plan is effective in controlling construction related runoff, erosion and sedimentation. The City of Tracy Multi-Agency Post-Construction Storm water Standards Manual (June 2015), the State Water Resources Control Board General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), and the Caltrans Construction Site Best Management Practices (BMP) Manual (latest edition) are the reference documents that the City of Tracy uses to evaluate erosion control plans.

“Caltrans Construction Site Best Management Practices (BMP) Manual” is a reference document that the City of Tracy uses to evaluate erosion control plans.

“CBC” means the latest version of the California Building Code, as adopted and amended by the City of Tracy pursuant to Tracy Municipal Code Title 9.

“City” means the City of Tracy.

“City Engineer” means the City Engineer of the City of Tracy, California or any duly licensed person designated by the City Manager or City Engineer to perform the functions of the “City Engineer” specified herein.

“City Regulations” means all written laws, rules, and policies established by the City, including those set forth in the City of Tracy General Plan, Tracy Municipal Code, ordinances, resolutions, specific plans, policies, procedures, and the City’s Design Documents (including the Standard Plans, Standard Specifications, Design Standards, and relevant Public Facility Master Plans).

“Design” means the written description of improvements planned to be constructed (depicted with graphics and/or words), as set forth on plans and/or specifications prepared by an Engineer of Record in accordance with these Design Standards, subject to the review and approval of the City Engineer, including, but not limited to, vertical and horizontal alignments and locations of improvements, grade, geometric section, structural section, and size or dimensions of improvements.

“Design Engineer” means any duly licensed professional engineer who is registered to practice engineering in the State of California for the field of engineering related to the design or document submitted to the City for review in accordance with these Design Standards.

“Developer” means a person, or other legal entity, who applies to the City to divide, or cause to be divided, real property into a Development Project, or who applies to the City to develop or improve into a Development Project any existing parcel of real property.

“Development Project” means any project undertaken for the purpose of development, as defined in the Mitigation Fee Act (California Government Code Sections 66000, et seq., also known as “AB 1600”, and shall specifically include any tentative parcel map, tentative subdivision map, final parcel map, final subdivision map, preliminary development plan, final development plan, or building permit.

“Final Erosion and Sediment Control Plan” means a set of Best Management Practices designed to control surface runoff and erosion and to retain sediment on a particular

site after all other planned final structures and permanent improvements have been erected or installed.

“Highway Design Manual” means the Highway Design Manual of the State of California, Department of Transportation, and latest edition.

“Hill Area” means a development project or a definable portion thereof with a natural slope of six percent (6%) or greater.

“Improvement” means the completed work of construction for the types of facilities described by these Design Standards, including, but not limited to, roadways (including streets, alleys, bikeways, medians, sidewalks, curbs, gutters, driveways, right of way landscaping, and intersection improvements), storm drainage (including channels, pipes, temporary retention, and permanent detention), wastewater facilities (including collection and treatment), potable and recycled water facilities (including conveyance, storage, and treatment), parks (including mini parks, neighborhood parks, and community parks), public buildings, and all appurtenances thereunto, within the City.

“Interim Erosion and Sediment Control Plan” means a set of Best Management Practice designed to control surface runoff and erosion, and to retain sediment on a particular site during the period in which construction related land disturbances, fills and soil storage occurs, but before final improvements are accepted.

“Land Surveyor” means any duly licensed Land Surveyor who is registered to practice land surveying in the State of California for the document submitted to the City for review in accordance with these Design Standards.

“Landscape Architect” means any duly licensed landscape architect who is registered to practice landscape architecture in the State of California for the design or document submitted to the City for review in accordance with these Design Standards.

“National Fire Protection Association Standards” means publications of the National Fire Protection Association establishing standards for the location and fire flow of fire hydrants.

“Natural Slope” means a slope which is not man made, and is the predominate slope of land in a natural condition, disregarding minor surface humps or hollows.

“Parks and Parkways Design Manual” means the latest edition of the Parks and Streetscapes Standard Plans (2019) and Streetscape Design Guidelines (2019).

“Plans and Specifications” means the graphic representation (“plans”) and the verbal description (“specifications”) of the design, prepared by an Engineer of Record and subject to the review and approval of the City Engineer in accordance with these Design Standards.

“Private Facility” or “Private Improvement” means an improvement, which is to remain in private ownership, and is not to be dedicated, or offered for dedication, to the public.

“Public Facility” or “Public Improvement” means an improvement, which is dedicated, or to be offered for dedication, to the public.

“Public Facility Master Plans” means the collective reference to all of the master plans for each public facility as adopted by the City Council, which generally includes: an identification of the City’s standards regarding the level of service to be provided to users of the public facility; and a technical analysis of the infrastructure and services required to provide the identified level of service to the City under buildout conditions.

“Required Public Improvements” means all public facilities required to serve the development project, as determined by the City Engineer. The scope of public facilities included within the definition of required public improvements shall be sufficient to allow the development project to have the capability to be functional for its intended land uses in accordance with the standards set forth in City Regulations including the Public Facility Master Plans.

“Recycled Water” means non-potable water that as a result of treatment of wastewater by the City of Tracy is suitable for outside landscape irrigation use or other controlled use as approved by the City of Tracy.

“Ridge” shall mean a long narrow, conspicuous elevation of land, at the top of a range of hills or mountains.

“Ridgeline” means a distinct edge of landform against a backdrop of land either visible from in or around the City of Tracy, or from major vehicular corridors.

“Roadway Master Plan” means Citywide Roadway & Transportation Master Plan, November 2012 by RBF Consulting, and latest updates.

“Standard Plans” means the Standard Plans of the City of Tracy.

“Standard Specifications” means the Standard Specifications of the City of Tracy.

“Standard Plans and Specifications for Public Works Construction” means the plans and specifications written and promulgated by Public Works Standards, Inc., popularly known as the “Green Book”, latest edition.

“State Standard Plans and Specifications” means the plans and specifications written by The State of California, Department of Transportation, and latest edition.

“Subdivider” means “Developer” as defined herein.

“Subdivision Ordinance” means the Subdivision Ordinance of the City of Tracy.

“TMC” means the Tracy Municipal Code.

“Zoning Ordinance” means the Zoning Ordinance of the City of Tracy, Tracy Municipal Code chapter 10.08.

1.09 Abbreviations

Unless otherwise provided in these Design Standards, the abbreviations set forth in the “Standard Specifications” and the “Standard Specifications for Public Works Construction” shall apply to these Design Standards. As used in these Design Standards:

“AB” means Aggregate Base, which is compacted granular material creating a foundation for the surface course in the street pavement section.

“AC” means Asphalt Concrete, which is the top course of the street flexible pavement section consisting of a mixture of mineral aggregates and asphaltic materials.

“ASB” means Aggregate Sub Base, which is an optional layer in the street pavement section, between the aggregate base and the compacted natural soil material.

“BCR, ECR” means beginning or end of the curb return where the curve for the curb return is tangent to the curb, which is parallel to the street centerline.

“EGL” means energy grade line, which is the combination of pressure head, velocity head, and elevation head, in a storm drainage system.

“HGL” means hydraulic grade line, which is the water surface elevation slope of a storm drainage system, when flowing at design storm capacity.

“PCC” means Portland cement concrete, which includes cement, aggregates, water and any mixtures such as fly ash or lamp black as required.

“R value” means resistance value, which is a measure of the strength or bearing capacity of soil to sustain the structural loads of buildings or pavement traffic loads.

“TI” means traffic index, which is a measure of traffic volumes and wheel loads on the street pavement section.

SECTION 2

PLANS AND SPECIFICATIONS

2.01 General

No work of construction for any development project or public improvement shall be performed by any person without first obtaining written approval from the City Engineer of all required plans and specifications, and all required supporting documents. Supporting documentation includes dedications, or offers to dedicate, all required interests in real property. The requirements of this Section 2 are in addition to the requirements of all other City Regulations, including the Subdivision Ordinance.

2.02 Preparation of Plans and Specifications

Plans and specifications shall be prepared in accordance with the following requirements:

2.02(A). Persons authorized to prepare documents: Each document required by these Design Standards shall be prepared by a person duly licensed and registered, in accordance with State law. Generally, State law requires all improvement plans and grading plans to be prepared by a Design Engineer (a civil engineer, structural engineer, or soil engineer, depending upon the particular document prepared), and all landscape plans to be prepared by a Landscape Architect.

2.02(B). General Drafting Requirements

1. Dimensions - Plans shall be clearly and legibly drawn in ink on City of Tracy Standard 24" x 36" Improvement Plan Sheets.
2. City of Tracy title block is available from the City Engineer.
3. Scale - Horizontal scale shall be a minimum of 1" = 40'; vertical scale shall be appropriate to the site.
4. Standard Drafting Symbols- Plans shall include standard drafting symbols shown in the Legend, attached hereto as Appendix A. All lettering shall be a minimum height of 0.1".

2.02(C). Format of all Plans

1. Title Sheet

- a. Title block indicating name of Subdivision or development project (including tract number and/or project number).
 - b. Vicinity Map with North Arrow.
 - c. Index of sheets.
 - d. City Engineer's Signature Block.
 - e. Fire Department Signature Block
 - f. Signature Block for Design Engineer(s) (or Landscape Architect, for landscape plans), including stamp.
 - g. General and special notes relating to construction methods. City Standard Notes, as set forth in Appendix B of these Design Standards, shall be included. These notes may be shown on Sheet 2.
 - h. List of applicable City Standards, with latest revision date.
 - i. Temporary and permanent bench marks locations including their descriptions and reference to City Datum (NAVD88).
2. Sheet No. 2
- a. Plan view showing the entire street right-of-way layout (Scale: 1" = 100'), proposed water and sewer mains, storm drainage system, fire hydrants, street light locations, lot numbers and other miscellaneous improvements to be installed. This sheet shall show the limits of each sheet of the plans.
 - b. Complete Legend using the standard symbols as shown in Appendix A of these Design Standards.
 - c. Typical Street Sections. Show storm drain open channels where applicable in these sections.
 - d. Pavement Design Chart showing street name (and station if section changes), TI, R value, AC, AB, and ASB thickness.

2.02(D). Technical Elements to be Included in Plans. The following elements shall be included as separate sheets within the improvement plans; provided, however, if the City Engineer determines that practical considerations (such as the size of the development project, or other design complications) dictate separate sets of plans for

one or more of the following elements, the City Engineer may require the developer to submit separate sets of plans concurrently with the improvement plans.

1. Demolitions and Abandonment Plan

- a. Plan view showing existing topography at a scale large enough to clearly show existing improvements.
- b. Existing surface and subsurface improvements, including but not limited to buildings, wells, septic tanks, and leach fields.

2. Grading Plan

- a. Plan view at 1" = 40' showing existing and proposed topography on site and a minimum 50' of the immediately adjacent areas.
- b. Contours shall be drawn at one-foot intervals where existing ground slopes are less than 6%, and at two-foot intervals where existing slopes are between 6% and 10%, and at five-foot intervals where existing slopes are greater than 10%.
- c. Top of curb elevations at all property line extensions and grade breaks.
- d. Street slopes at centerline.
- e. Pad elevations.
- f. Lot numbers.
- g. Storm drain structures and pipelines.
- h. Retaining walls and sound walls.
- i. Typical lot grading details showing plan and section.
- j. Elevations at rear of all lots.
- k. Erosion and Sediment Control Plan for all Grading Plans. Both interim and final erosion control plans shall be prepared in accordance with Best Management Practices.

3. Signing and Striping Plan

- a. Provide a plan at a scale sufficient to clearly indicate all street striping and signing.
4. Street Plan and Profiles
 - a. Plan views at a scale of 1" = 40' for all proposed improvements, and all existing improvements in the vicinity of the proposed improvements.
 - b. Proposed improvements shall include sidewalk, curb, gutter, curb ramps, driveways, sewer mains and laterals, recycled water systems, water mains and services, storm drains, manholes, drainage inlets, valves, fire hydrants, barricades, street lights, survey monuments, post-construction stormwater treatment devices and facilities, and other information relevant to the construction of the proposed improvements.
 - c. Centerline stationing shall be shown with grades indicated in plain view for street intersections, drainage structures (include dimensions or station offsets from centerline), beginning and ending of curb returns and other curves.
 - d. Street plans shall include right-of-way lines and widths, street widths and names, and easement widths.
 - e. Profile view of each street shall be shown on the same sheet as plan view and at vertical scale of 1" = 2' for non-Hill Area development plan, and vertical scale 1" = 4' for Hill Area development plans. Plan sheets with alternate, or additional scales may be required if the City engineer determines (based upon characteristics of the project, such as topography or size) that the alternates are necessary to adequately describe the improvements.
 - f. Profile view shall show existing grade at centerline of street, proposed top of curb, sanitary sewer mains, water mains, storm drains, recycled water and utility crossings.
 - g. Elevations shall be shown in profile of top of curb at grade breakpoints, sanitary sewer manholes, storm drain manholes and drainage inlet inverts, high points and low points of water mains. Vertical curves shall show station and elevation of beginning points, points of intersections, low points and ending points.
 - h. Street, storm drain, and sewer main slopes shall be shown. Size, type/class of pipe and pipe lengths shall be shown.

- i. Curve data shall be shown in plain view or by tabulation for street centerlines, face of curbs, (including curb returns) storm drain, sanitary sewer and water lines. Curve data may be omitted on storm drainpipes, sewer lines or water lines if they are concentric with the street centerline.
- j. Hydraulic Grade Lines (HGL) elevations shown in profile view at every structure.

5. Detail Sheets or Off-Site Improvements

- a. Additional drawings may be required to show special project improvements or structures.
- b. Plan and profiles of streets, storm drain lines, sanitary sewers or water lines required off site of the development project.

2.02(E). Landscape Plans. The following elements shall be submitted as a separate set of plans, concurrently with the improvement plans:

- 1. Include all elements required by Section 2.02(C).
- 2. Scale shall be 1" = 20'.
- 3. Irrigation and Planting Specification.
- 4. Water Efficient Landscape Ordinance (WELO) compliance statement.

2.03 Submittals

The applicant shall submit a complete set of plans and required submittals, in accordance with these Design Standards, and in accordance with the checklist set forth in Appendix D. This checklist will be used by the City Engineer, and City staff, to review the adequacy of plans and specifications submitted to the City. However, use of the checklist shall not relieve the Design Engineer or the applicant of the obligation to comply with all requirements set forth in City Regulations, including these Design Standards, and the Subdivision Ordinance. Incomplete plans or partial submittals will be returned to the Design Engineer without a complete review by the City. Delays may be incurred by the applicant when incomplete plans or partial packages are submitted for review.

2.03(A). Improvement Plans. A complete submittal of improvement plans shall include, at a minimum, the following elements:

1. Final Report of Action of the City Council (or Planning Commission if the Planning Commission is the governing body with approval authority over the development project), including a complete set of the conditions of approval for the project (including both Planning Division and Engineering Division) - 2 Sets.
2. Approved Tentative Map - 1 Original (in accordance with the Final Report of Action signed by the City Engineer and the City Planner), and 1 copy of the Original.
3. Improvement Plans (with supporting calculations) - 5 Sets. Striping Plans are required for each development project. Demolition Plans are required when existing structures will be or have recently been removed. Supporting calculations are required for pavement sections and retaining walls.
4. Water Package
 - a. Hydraulic calculations are required in compliance with Section 6 of these Standards.
5. Sanitary Sewer Package - 2 Sets. Engineering calculations for the design of all proposed sanitary sewer systems shall include the following items:
 - a. A plan at 1" = 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary area outside the project limits, zoning, projected land use, and any features affecting the system design.
 - b. Design flows at major junction points including flows coming from outside the project limits.
 - c. Size, length, slope, and invert elevations of all proposed sanitary sewer mains, and location of manholes.
6. Storm Drain Package - 4 Sets.

Drainage calculations are required for any new subdivision or development and shall comply with Section 5 of these Standards. Submittal of drainage calculations shall include the following items:

- a. Hydrology calculations for 10 year and 100 year storms, together with assumptions, charts, tables, references and methods used.

- b. A plan at 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including off-site drainage), and peak-flow in all pipes.
 - c. The hydraulic calculations shall show as a minimum the hydraulic grade line (HGL), Energy Grade Line (EGL) (in Hill Area), the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, structure losses, tail water assumptions, energy dissipaters, and top of curb elevations (or freeboard at structures).
 - d. Calculations for temporary storm drain detention/retention basins, if to be installed.
 - e. Storm water quality calculations as required per the City's Multi-Agency Post-Construction Storm Water Standards Manual.
7. Erosion and Sediment Control Plan - 3 Sets.
8. Joint trench plans
9. Landscape and Irrigation plans, including Landscape Document Package as required by the Water Efficient Landscape Ordinance (WELo)
10. Photometric exhibit for street lighting
11. Engineers' Estimate - 3 Sets. The estimate shall utilize the City's standard unit cost estimates and other requirements as defined in Section 10 and Appendix G of these Design Standards.
12. Final Map Package - 5 Sets. The final map package shall include the following elements:
 - a. The complete Final Map prepared in conformance with the State Subdivision Map Act, the City's Subdivision Ordinance, and the Certificate/Statement Sheets attached hereto in Appendix C.
 - b. Title report, no more than 3 months old as of the date of submittal.
 - c. Copies of all deeds and easements referenced in the Title Report.

- d. Deeds of all adjoining parcels.
- e. Copies of all maps referenced on the Final Map.
- f. Fee Title deed.
- g. Lot, parcel and boundary closure calculations.
- h. For off-site improvements, copies of all required easements, or rights-of-way, or rights of entry.
- i. In addition to the filing requirements listed herein, all Final Maps submitted to the City for review shall also be filed electronically in a format consistent with the City's use of the NAD 83 grid system and the City's Auto CAD format. In lieu of an electronic submittal, the applicant may pay a fee established by the City Council.
- j. Building Architectural approval.
- k. Evidence of ECU's granted by Capacity Allocation Review Board (CARB).

13. Soils Report - 3 Sets.

14. Plan Check Fee Payment.

2.03(B). Grading Permit. A developer may seek a Grading Permit prior to the approval of the Improvement Plans. However, prior to obtaining a grading permit, the project applicant shall prepare a detailed grading plan, with erosion and sediment control plan, which conforms to these Design Standards and Chapter 9.04 of Tracy Municipal Code Title 9 for review and approval by the City Engineer. Grading Plans in the Hill Area shall identify (but not be limited to) limits and techniques of grading, cut and fill data, proposed slope angles, erosion control measure, re-vegetation plan and stabilization techniques in accordance with Section 8 of these Design Standards. Special conditions may require additional items. A complete submittal for a grading permit shall include, at a minimum, the following elements:

- 1. All requirements of Section 2.03(A), above, except:
 - a. For Section 2.03(A)(3), the improvement plans shall be required to have, at a minimum, a complete second plan check review by the City, with only minor corrections remaining to be made by the developer.

- b. For Section 2.03(A)12, the final map shall be required to have, at a minimum, a complete second plan check review by the City, with only minor corrections remaining to be made by the developer.
2. Grading Plans - 3 Sets.
3. Grading Permit Fee payment.
4. Storm Water Pollution Prevention Plan (SWPPP) submitted with the WD ID number, or Notice of Intent.

SECTION 3

STREET DESIGN STANDARDS

3.01 General

Roadway and street systems shall be designed and constructed in accordance with all City Regulations, including the Roadway Master Plan (and all supplements thereto), the Standard Specifications, The Caltrans Highway Design Manual, and these Design Standards. For each development project, the design of roadway and street systems shall be of such a size to provide capacity to adequately accommodate all traffic trips that can be reasonably anticipated to be generated for the development project, and the surrounding areas as identified in the Roadway Master Plan.

3.02 Streets Rights-of-Way/Easements

3.02(A). The right-of-way widths and typical sections for all streets shall be in accordance with all City Regulations, including the Roadway Master Plan and the Standard Plans. Required right of way widths and street cross sections in Infill areas shall conform to Standard Plans 100-106 inclusive or as directed by the City Engineer. Required right of way widths and street cross sections in new service areas shall conform the Roadway Master Plan and Standard Plans 107-112, inclusive.

3.02(B). Right-of-way corner returns shall have a minimum radius of 25'; except, in industrial areas, where the minimum radius shall be either 45' or 50' (A 50' foot corner return radius shall be used within an industrial area that intersects with an arterial roadway).

3.02(C). Public Utility Easements on private property shall be 10' in width and provide for placement and maintenance of privately owned underground utilities. Where the City Engineer finds that sufficient public right-of-way exists, underground utilities may be placed within said public right-of-way under a franchise agreement.

3.02(D). Public sewer, water, recycled water and storm drain easements on private property shall be 20' in width and provide for the purposes of installation, operation, and maintenance of said utilities.

3.03 Subdivision Boundaries / Monuments

3.03(A). 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.

3.03(B). Street centerlines shall be monumental. All new street monuments proposed by a tract map shall be constructed in accordance with the Survey Monument Standard Plan 116.

3.04 Structural Section

3.04(A). Design. For the purpose of structural design, streets shall be designed utilizing the following minimum traffic indices. If there is insufficient soils data, specifically R-values, then streets shall be designed using an assumed R-value of 5. The table below lists typical sections for an R-value of 5.

Class	Traffic Index	Sections with R=5	
		A.C.	A.B.
Arterials	11	0.55'	2.20'
Major Residential Collector	9	0.40'	1.80'
Minor Residential Collector	9	0.40'	1.80'
Specific Plan Collector	9	0.40'	1.80'
Residential	9	0.40'	1.80'
Cul-de-Sac	9	0.40'	1.80'
Parking Lots	9	0.40'	1.80'
Neighborhood Entry	9	0.40'	1.80'
Industrial	9	0.40'	1.80'
Frontage	9	0.40'	1.80'

Note: Under special circumstances the City Engineer may consider alternates roadway section designs, including, but not limited to lime or cement treat subgrade, and deep lift asphalt sections.

3.04(B). The minimum street section shall be determined from "R" values obtained from material gathered from the level of the proposed sub-grade using the design method described in the Highway Design Manual. In no case shall the minimum

street section be less than 0.25 feet of asphalt concrete and 0.95 feet of aggregate base. Aggregate base section may be comprised of an equivalent section of aggregate base and aggregate sub-base.

3.04(C). The final lift of asphalt concrete shall be placed prior to street by street acceptance. Prior to tract acceptance, by City Council, all streets damaged by construction shall be repaired to the City's Satisfaction. Streets damaged by construction activities shall have a grind and minimum 2" overlay from curb to curb for the entire block length.

3.04(D). During construction, R-values will be taken at the final sub-grade elevation after rough grading. Variations from the Improvement Plans will require redesign of the street section. Number and location of tests will be at the discretion of the City Engineer, based on Project specific soil conditions. Costs for all testing shall be the responsibility of the developer. These requirements shall not apply if R-values of 5 were used in the original design.

3.04(E). Subgrade Preparation. A minimum of 6" below finished subgrade shall be compactible native material scarified, moisture conditioned, and compacted at 95% relative compaction. A certified soils laboratory under contract with the City shall conduct the necessary soils tests. Heavy truck proof-rolling will be required to observe subgrade stability.

3.04(F). Roadway shoulders shall be a minimum of four feet wide. Cross slope shall not exceed 2%. Minimum section shall be 6" of AB compacted to 95% over 6" of native material compacted to no less than 90%. Finished slopes from edge of shoulder backing to conform limits shall not exceed 4:1.

3.05 Horizontal Alignment

3.05(A). Intersections. Streets shall intersect at as near right angles as practicable, and in no case shall be greater than 10 degrees from perpendicular without City Engineer approval. Curved streets shall have at least 50 feet of centerline tangent from the projected curb line of the intersecting street.

3.05(B). Minimum Spacing between Streets

1. Streets entering upon opposite sides of a given street shall have their centerlines directly opposite each other, or their centerlines shall be offset by at least 150 feet on all residential and minor collector streets with actual (or projected) traffic volumes less than 2000 ADT (Average Daily Traffic). The minimum offset or spacing shall be 250 feet on streets with traffic volumes higher than 2000 ADT.

2. Neighborhood entries with traffic volumes less than 2000 ADT shall have the following minimum spacing between intersecting streets:

<u>Maximum ADT</u>	<u>Minimum Spacing</u>
2000	250 feet
1500	200 feet

3. The City Engineer may require intersections spacing to be greater than the above stated minimum distances if site-specific conditions present an unusual safety concern. Intersection traffic volumes and intersection traffic control are factors to be considered in any instance where deviation from these standards are requested by the developer in accordance with Section 1.05, or required by the City. At neighborhood entries with less than 1000 ADT, the City Engineer may allow a minimum spacing of 150 feet, subject to completion of a traffic analysis and recommendation by a registered Traffic Engineer.

3.05(C). 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 arterial and 500 feet on collectors. Minimum radius on other streets shall be 300 feet.

3.05(D). Cul-de-Sac and Knuckles. The maximum length of a cul-de-sac street, from center of intersecting street to center of turnarounds, shall be 500 feet. Bulb and knuckle radius shall be designed to allow unimpeded emergency vehicle turning.

3.05(E). Curb Return Radii.

1. Residential and Non-Residential - Minimum radius shall be 35 feet.
2. Commercial - In the downtown area, the minimum radius shall be 20 feet. In other areas, the radius shall be determined by the City Engineer, subject to completion of a traffic analysis of the project specific demands, and recommendation by a registered Traffic Engineer.
3. Industrial - Minimum radius shall be 55 feet. Maximum shall be 60.

3.05(F). Minor Streets. Minor streets shall be so laid out that their use by through traffic will be discouraged.

3.05(G). Block Lengths. Block lengths shall not exceed 1,000 feet.

3.06 Vertical Alignment

3.06(A). Top of Curb Grades

1. Grades shall be not less than 0.40 percent and not greater than 6 percent (6%), except in Hill Area, where grades of Collector and Arterial streets shall not exceed ten percent (10%) and grades of residential local streets shall not exceed twelve percent (12%). A developer may request a deviation from this standard, in accordance with Section 1.05, if the developer provides documentation to the satisfaction of the City Engineer, which establishes that the grading impact would be significantly reduced, scarring of natural terrain minimized and emergency vehicle access not compromised. The use of split-level roads shall be encouraged in the Hill Area, wherever the terrain warrants.
2. A minimum top of curb elevation of 1 foot above the hydraulic grade line shall be maintained. The Energy Grade Line shall be no higher than 0.1 foot below the storm drain manhole rim elevation or storm drain catch basin grate elevation.
3. Grades on opposite sides of the street shall be the same wherever practical, and may be super-elevated when required to accommodate design speeds.

3.06(B). Curb Returns. The minimum fall around returns shall be 0.20 feet or a slope of 0.005 whichever is greater.

3.06(C). Cross Slope. The standard cross slope of the street shall be 2 percent. Where necessary when matching existing facilities, the cross slope may vary between 1 percent and 4 percent.

3.06(D). Vertical Curves. Where the algebraic difference in slope exceeds 2 percent, a vertical curve shall be used. The minimum length of vertical curve shall be 50' minimum or as required by the Highway Design Manual, whichever is larger.

3.07 Curb, Gutter & Sidewalk

3.07(A). General

1. Curb, gutter, and sidewalk shall be installed in conformance with the City Standard Specifications and Standard Plans. Concrete shall be class "B" 2500psi at 28 days, 3/4 inch maximum aggregate size with 1/2-lb lampblack per yard.
2. Vertical curb and gutter shall be installed along all frontages conforming to the City Regulations.

3. Rolled type curb and gutter shall not be installed other than as replacement. Rolled type curb and gutter is not allowed on new developments.
4. Hot Mix Asphalt Dikes may be used on an interim basis and shall conform to State of California Department of Transportation Standard Plan A87B.

3.07(B). Sidewalk. The minimum widths of sidewalk shall be 5 feet in residential areas, 10 feet in commercial areas, or as noted on the Standard Plans. All sidewalks shall be reinforced and have a minimum of 6 inches in thickness.

3.07(C). Curb Ramps.

1. Curb ramps shall be installed in all locations required by the City for ADA access including curb returns, crosswalks, etc. Where existing improvements do not have curb ramps, or the ramps do not meet current standards, the requirement to install new ramps shall be triggered when an asphalt overlay is placed adjacent to the curb ramp. Street maintenance in the form of seal coats or spot reconstruction (dig-out repairs) does not trigger new or replacement curb ramps construction.
2. Curb ramps shall conform to current ADA standards, California Code of Regulations Title 24, and Standard Plan 130 (which identifies Case A and Case B). Case B shall be used for all new construction in curb returns, except for Hill Areas, when a maximum ramp slope of 8.33% would be exceeded by utilizing Case B, in which case, Case A shall be used.
3. Curb ramps shall be positioned to align with crosswalks, providing a pedestrian route perpendicular to roadway centerline and at a safe offset distance from parallel traffic. In certain cases more than one ramp may be required along the same curb return.

3.07(D). Replacement and Repair

1. Where existing curb, gutter, sidewalk, and/or driveways do not meet current City Regulations and are in need of repair, it shall be the Developer responsibility to remove and replace necessary curb, gutter, sidewalk and driveway. Refer to Standard Plan 129 for minimum repair standards.
2. Where curb, gutter, sidewalk, and/or driveways are removed, the concrete shall be removed to the nearest expansion, weakened plane, score line or construction joint by saw cutting. When concrete curbs, gutters and driveway

approaches abut asphalt concrete a minimum one foot shall be removed to allow forms to be set and concrete placed. Asphalt shall be replaced in lifts not to exceed 2 ½" and compacted to no less than 95%. The asphalt thickness shall be 1 inch greater than the existing road section.

3. The City Engineer or designee may require the replacement or repair of curb gutter, sidewalk, and/or driveways during the review of plans submitted for Building or Construction Permits. Concrete shall be deemed in need of repair if the horizontal or vertical displacement between sections exceeds ½-inch.

3.08 Driveway Standards

3.08(A). General

1. The driveway standards set forth in these Design Standards are not applicable to freeway or controlled access highways where access is limited by deed restrictions or other controls.
2. The City Engineer may apply a higher standard than those set forth in these Design Standards, if there is documentation of unique demands for a particular development project, which require additional mitigation measures.
3. Design and construction of driveways shall be of the Standard City of Tracy design as shown on Standard Plans 130 and 131. For the Hill Area, driveway grades exceeding 12%, up to a maximum of 15%, shall be constructed of a grooved concrete-paved surface to provide sufficient traction for emergency vehicles. The angle of approach shall be no more than 8 degrees and there shall be minimum clearances of 8 inches in accordance with the current edition of the National Fire Protection Association publication (NFPA) 1901.
4. Driveway ramps up or down the elevated or depressed parking lots or garages shall start at a point 3 feet beyond the right-of-way line with a 6-foot minimum vertical curve.
5. Common use driveways are not allowed for residential driveways.
6. Residential lots shall have only one driveway.

3.08(B). Width

1. Maximum - Driveway width shall not be greater than 34 feet for commercial parcels and 18 feet for residential lots. Driveways shall conform to Standard Plans 130 and 131. The total width of commercial and industrial driveways

shall not exceed 60 percent of the frontage. The driveway approach at the face of curb shall have 3 feet wide tapers on each side of the driveway. Thus the maximum width of the driveway approach at the face of curb for residential is 24 feet and for commercial is 40 feet.

2. Minimum - The minimum width of a single driveway shall be 9 feet.

3.08(C). Distance from Curb Returns

1. Intersecting Streets.

a. Multi-family or commercial driveways shall be located so that the closest point of the fully depressed section shall be a minimum 25' to the BCR or a minimum 50' to the extension of the face of curb of the intersecting streets.

b. Commercial and industrial driveways on arterials are prohibited within 100 feet of the projected curb line of the intersecting street where the intersection is presently or is planned for signalization, or intersection capacity is critical.

2. 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.

3.08(D). Distance from Utilities, Safety Devices and Street Trees. The driveway transition shall clear all public facilities such as electroliers, traffic signal standards, utility poles, fire hydrants, sanitary sewer cleanout boxes, water meter boxes, street sign posts 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 property owner who is installing the driveway.

3.08(E). Distance Between Driveways. A minimum of 3 feet of full height curb shall be maintained between the transitions of adjoining residential driveways. Proposed locations of commercial or multi-family driveways shall be considered on a case by case basis by the City Engineer.

3.08(F). Distance from Property Line. A minimum of 1.5 feet of full height curb shall be maintained between the property line and driveway transition.

3.08(G). Removal. Any abandoned driveway shall be completely removed and replaced with standard sidewalk, curb, and gutter per City Standard Plans.

3.08(H). 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 130 for Commercial Driveway.

3.09 Intersections

3.09(A). All Major Arterials, Expressways, Parkways and Industrial Streets shall meet WB-50, 60-foot turning radius to allow for Fire Department design vehicle access.

3.09(B). Street intersections shall be designed so that the larger street or through street maintains its cross-slope through the intersection. The plans shall clearly indicate which street cross-slope is to be maintained.

3.09(C). Sufficient elevations shall be shown on the plan or profile to clearly indicate storm drainage patterns and cross slopes. As a minimum, the elevation at the centerline intersection point and at grade breaks on the centerline of side streets shall be shown, as well as curb and gutter profiles. Larger intersections may require additional details of pavement grading.

3.09(D). Intersections shall be designed to drain all water to drainage inlets without ponding or draining upstream water across intersections. The City Engineer may require detailed design submittals for problem intersections.

3.09(E). In the Hill Area, the grade of the pavement surface across an intersection shall not be more than 6%. The gradient of any street entering an intersection shall not be more than 2% within a distance of 50-feet from near curb line of the crossing street. Proper sight and stopping distances shall be provided.

3.09(F). Sight distances at intersections are critical in the Hill Area because of the added vertical dimension. Sight distances shall be established in accordance with Caltrans Highway Design Manual and City Standard Plan 145. An intersection sight distance plan shall be submitted for all Development plans.

3.09(G). Subdivisions that intersect a major arterial roadway without a signalized intersection shall prohibit left turn movements. Only right-in and right-out movements will be allowed. All entries shall have deceleration and acceleration lanes on the major arterial. Additional right-of-way to accommodate these deceleration and acceleration lanes shall be provided by the developer.

3.10 Design Speed

Street speeds shall be posted as listed in the following table. Design speeds shall be a minimum of ten (10) miles per hour above the posted speed.

<u>STREET TYPE</u>	<u>POSTED SPEED</u>	<u>DESIGN SPEED</u>
Residential Streets	25 mph	35 mph
Collector Streets	35 mph	45 mph
Minor Collector Streets	25 mph	35 mph
Arterial Streets	45 mph	55 mph
Minor Arterial Streets	45 mph	55 mph

3.11 Street Striping

A separate plan sheet shall be prepared at a scale sufficient to clearly indicate all street striping, including centerline, stop street markings per the Standard Plans, crosswalks, etc. Street signs shall be shown on the same plan sheet.

3.12 Undergrounding of Utilities

All development projects shall provide for undergrounding of utilities in accordance with the requirements of the Tracy Municipal Code, Chapter 11.08.

3.13 Overlaying of Streets

3.13(A).The City Standard overlay shall be a 2-inch Type A, Asphalt Concrete overlay with TruPave (or equal) pavement reinforcing fabric.

3.13(B).If a development project connects to existing utilities which require trenching of existing street pavement, the Developer is required to repair the street by providing a 2 inch grind of the existing asphalt and replacing with 2 inches of new AC with TruPave (or equal) pavement reinforcing fabric. The limits of the overlay shall extend 25 feet beyond the last trench in each direction and shall be from curb to curb. Any work on newly resurfaced streets (by overlay or slurry) are subject to the Moratorium conditions of the Tracy Municipal Code 7.04.080

3.13(C) For a parallel trench longer than one half the length of the a block, a 2" grind and overlay from the lip of gutter to centerline of roadway is required.

3.14 Street Names

New street names shall be reviewed and approved by the Traffic Engineer prior to approval of the Final Map. Street names shall not conflict with other similar names within San Joaquin County.

SECTION 4

SANITARY SEWER DESIGN STANDARDS

4.01 General

4.01(A). Sanitary sewer systems shall be designed and constructed in accordance with all City Regulations, including the current Wastewater Master Plan (including all supplements thereto), the City's Standard Plans, Standard Specification and these Design Standards. For each development project, the design of the sanitary sewer system shall be sized so as to provide wastewater capacity to adequately convey all wastewater that can be reasonably anticipated to be generated by the development project, and the surrounding areas identified in the Wastewater Master Plan.

4.01(B). Storm water shall not be connected or discharged into a sanitary sewer. City standards which regulate the discharge of non-domestic wastewater into the City's sanitary sewer system are set forth in the Tracy Municipal Code, 5.24.140.

4.02 Average Flow

Unless otherwise specified in the Wastewater Master Plan (including supplements thereto), the estimated average wastewater flows for residential dwelling units ("DU") and other land use types are summarized in the table below, based upon an estimated wastewater generation rate of 100 gallons per person per day. The residential DU types are abbreviated as: SFDU (single family detached), MF2-4 (multi-family structure with 2 to 4 DU's per structure), and MF5+ (multi-family structure with 5 or more DU's per structure). The school generation rates are abbreviated as: GPCD (gallons per capita per day).

Estimated Average Sewer Flows

<u>DU Type and Land Use</u>	<u>Density DU/Acre</u>	<u>Persons per DU</u>	<u>Estimated Avg. Flow: GPD/DU & GPD/Acre</u>
Very Low Density Residential	1	3.0	300
SFDU	5	3.0	300
MF2-4	8	2.5	250
MF5+	18	2.0	200
Commercial Office			1375
Limited Industrial			2500
General Industrial			1375
Schools (6-8, 9-12)			30 GPCD
Schools (K-6, K-8)			15 GPCD

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

4.03 Infiltration and Inflow (I/I) and Peaking Factors

4.03(A). Infiltration and Inflow (I/I) represents any non-wastewater discharges that enter the wastewater collection system via facility defects and direct connections. An infiltration value of 500 gallons per day per inch diameter mile is used for all WWMP pipes eight inches and larger. An inflow rate of 400 gallons per day per acre is applied to all the development polygons within the Tracy Hills Specific Plan area.

4.03(B). Residential: The peaking factor corresponds to the population of the tributary area at build out. See Figure 4 for the Tracy Hills peaking factor curve (modified from City of Tracy Engineering Design Standard Figure 4-1).

4.03(C). Commercial and Industrial: The peaking factor is based on the tributary acreage and respective land use designation. The peak dry weather flow factor is 2.5 for industrial flows and 3.0 for commercial flows in accordance with City of Tracy Engineering and Design Standard Figure 4-2.

4.04 Design Criteria

4.04(A). A total design flow shall be determined by multiplying the estimated average flow by a peaking factor obtained from the appropriate graph attached to these Design Standards. Figure 4-1 is based on residential population and shall be used with an assumed 3.0 persons per dwelling unit. Figure 4-2 shall be used for contributory areas when the exact number of units is not known or non-residential areas are included.

4.04(B). 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.

4.05 Vertical Alignment

4.05(A). Minimum pipe cover and clearance shall be maintained in the design of sanitary sewers. If certain conditions exist which make it impractical to meet the minimum cover and clearance requirements, the developer may request a deviation from this standard, in accordance with Section 1.05. If the City Engineer approves the deviation, the conditions and locations shall be specifically noted above the sewer profile on the plans.

4.05(B). Under no conditions or circumstances shall other utilities be allowed to be installed directly over and parallel to any sanitary sewer installation.

4.05(C). Main and trunk sewers shall have a minimum depth of 3 feet from the top of the pipe to the finished grade and a minimum of 2 feet to bottom of street sub-grade. Main and Trunk Sewers shall have a maximum depth of 15 feet to the top of pipe unless approved by the City Engineer in accordance with the procedure outlined in Section 1.05. For mains and trunk lines exceeding 15 feet in depth, an acceptable alternative design is to oversize the pipe by one pipe-size. Inverts of pipes shall be matched at these design exception locations.

4.05(D). Main and trunk sewers shall be at least 10 feet horizontally from, and 1 foot vertically below water lines. A minimum of 12 inches clearance from all other improvements and utilities is required. Construction shall conform to Standard Plan 506.

4.05(E). At points of convergence of pipes of various sizes, the soffits of the pipe elevations shall match.

4.05(F). A change of direction requires a 0.2-foot minimum drop from the incoming pipe flow line to the outgoing pipe flow line in the structure.

4.05(G). Sewer lines shall be installed on a straight grade between manholes.

4.06 Horizontal Alignment

4.06(A). Sanitary sewers shall be placed within the curb-to-curb section of the street right of way per City Standard Plan 504. When necessary to locate sewers in easements, such easement shall be at least 20 feet in width.

4.06(B). Alignment shall be parallel to the street centerline wherever possible.

4.06(C). The horizontal alignment of sanitary sewers in new subdivision streets shall be 5 feet north or 5 feet west of the street centerline, as shown on Standard Plan 504. In existing streets and non-residential streets, the alignment may vary from Standard Plan 504 with approval of the City Engineer in accordance with Section 1.05, but in no case shall there be less than 10 feet horizontal clearance to a water main and 6 feet horizontal clearance to recycled water. Curved sewers are not recommended, however, they may be considered in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

4.06(D). Sanitary sewers shall not be constructed within 100 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 City Engineer and shall be designed in accordance with the California State Department of Public Health recommendations and Tracy Municipal Code.

4.07 Slope

Sanitary sewers shall be designed for the total design flow with a minimum velocity of 2.0 feet per second. The maximum velocity shall be 10 feet per second.

4.08 Pipe

Pipe used for sanitary sewers shall have a minimum diameter of 8 inches. Pipe shall conform to City of Tracy Design Standards and Standard Specifications. Pipe shall be Vitrified Clay Pipe (VCP), Ductile Iron Pipe (DIP), Polyvinyl Chloride (PVC, SDR-26). The City will require a mandrel test to be conducted for all PVC pipe. The City may require an additional mandrel test during the warranty period.

4.09 Sewer Laterals

4.09(A). Sewer laterals are those portions of sewage systems between the sewer main and the sanitary sewer clean out. Sewer laterals shall be constructed in accordance with Standard Plan Nos. 201 and 202. All laterals shall have a cleanout. Each sewer lateral shall be referenced to the plan stationing. All sanitary sewer laterals shall be SDR-26 including the clean out.

4.09(B). The minimum size sewer lateral is four (4) inches for single-family residences, and six (6) inches for commercial, duplex and multi-family lots. The minimum slope of laterals shall be two percent (2%). The minimum separation between sewer and water lateral shall be eleven (11) feet center to center or 10 feet from exterior pipe face to exterior pipe face whichever is greater. Sewer laterals shall have a minimum depth of 3 feet and maximum depth of 5-feet from the top of the pipe to the finished grade at the right-of-way.

4.09(C). All sewer laterals, from property line or edge of easement to the point of connection with the main or manhole shall have an alignment that provides an angle of intersection with the downstream section of the main sewer of no less than 90°.

4.09(D). All sewer laterals shall gravity drain within the right-of-way. Private sewer systems requiring pumping shall pump to a manhole outside the right-of-way prior to discharging into the City maintained system.

4.09(E). Sewer laterals connected to systems having a pumping system or houses having a finished floor elevation 12 inches or less above the rim elevation of the

nearest upstream manhole structure shall require installation of a backflow prevention device immediately upstream of the clean out at the right-of-way.

4.09(F). The maximum deflection at any one point in a sewer lateral, not including fittings at saddle or wye connection to main sewer or at angle points having clean outs, shall be 22-1/2° (1/16 bend) and any two consecutive deflections (bends) shall not be less than 2 feet apart.

4.09(G). Building drains shall not be connected to the sanitary sewer system.

4.09(H). Unused existing services shall be removed. Abandoned at the main by installing a watertight plug or cap at the wye.

4.10 Sanitary Sewer Mains or Lateral Installed in High Ground Areas

If the sanitary sewer main or lateral is to be installed below the high groundwater elevation the design must include special construction features to minimize the amount of inflow and infiltration to the system including but not limited to lining the sewer main and waterproofing the manholes. PVC pipe is the preferred choice when installing below high ground water. Pipe bedding shall be encapsulated in filter fabric when installed in ground water conditions.

4.11 Manholes

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

Manhole spacing shall conform to the following limits:

Diameter	Maximum Spacing
12" and under	400 feet
15" and over	600 feet

4.11(B). Manholes installed in areas outside of the street shall have bolted manhole covers. Rim elevations shall be a minimum of one (1) foot above ground. Bollards shall be installed around the manholes. A minimum of 3-4" diameter, 6 feet high painted white bollards with a 2-foot yellow band at the top shall be installed at each manhole.

4.11(C). Manholes deeper than 10 feet, measured from invert to rim elevation, shall be sixty-inch (60") diameter manholes.

4.11(D). Manholes shall be constructed at all service lateral connections where the main line is not at least 1-1/2 times the size of the service lateral.

4.11(E). Sanitary sewer manholes shall be constructed in conformance with the Standard Plans. The distance between manholes shall be approximately equal. Sewers on curved alignment shall have manholes spaced at a maximum of 300 feet.

4.11(F). Whenever, at manholes, a change in the size of pipe, or an angle of 20° or more in alignment occurs, the flow line of the incoming pipe shall be a minimum of 0.20 feet above the flow line of the outgoing pipe, or an amount necessary to match pipe soffits, whichever is greater. The improvement plans shall show invert in and invert out of the manhole.

4.11(G). A maximum drop of 2 feet from invert of incoming pipe to the top of the outgoing pipe shall be in a standard manhole. Drop manholes shall be used for larger drops. Drop manholes shall be in accordance with Standard Plans 206 and only used with permission of City Engineer. Inside drop manholes are not allowed.

4.11(H). Manholes shall be used at the termination of cul-de-sac sewer mains. Side sewers shall be connected to this manhole for services to adjacent properties.

4.11(I). All weather access roads with turnarounds suitable for maneuvering City maintenance equipment shall be provided for any sewer or storm drain line installed in undeveloped areas or properties. The access road shall be 3" of A.C. over 6" of A.B. and a minimum of 12' wide, or as approved by the City Engineer.

4.11(J). All sanitary manholes shall have water tight gaskets. Manholes with outgoing pipes larger than 10 inches shall be either epoxy coated or have T-lock lining. Manholes installed in high ground water conditions shall have water proofing applied.

4.12 Pump Systems, including Lift Station

4.12(A). All requests to use a sewer force main or lift stations shall be consistent with the Sewer Master Plan and subject to the review and approval of the City Engineer.

1. All sewage pump systems, including residential sewage pumps, when proposed, shall be submitted to the City Engineer for determination of circumstances necessitating such pump usage and design thereof.
2. Use of Submersible type pumps for residential sewer pumping systems will be considered where the installation as a whole will be made in conformance with

the general requirements of the California Division of Industrial Safety and any local electrical codes that may be applicable. In general, a raw sewage sump is classified as a hazardous location, which requires explosion proof equipment with a UL label and/or equivalent construction. Float control equipment must have positive level control to preclude exposing the motor if the motor is not explosion proof. Where electrical devices are immersed in the sewage, controls must be intrinsically safe with redundant controls and positive cutoff to avoid automatic total pump shut down that would expose motor where motor is not explosion proof. Use of submersible pumps will not be approved unless the developer provides the City Engineer with information that the proposed pump meets the above requirements. Where used, pump requirements in so far as solids handling capacity and pump rate head must conform to basic standards required for standard wet pit installations.

3. Pump stations shall have 50 percent standby and a minimum of 2 pumps. Standby power shall be provided.
4. In addition to a properly designed wet well, all pump stations must be designed with a retention chamber capable of storing 8 hours (minimum) of flow in case there is an outage or a break in the force main system.

4.13 Maintenance Responsibility

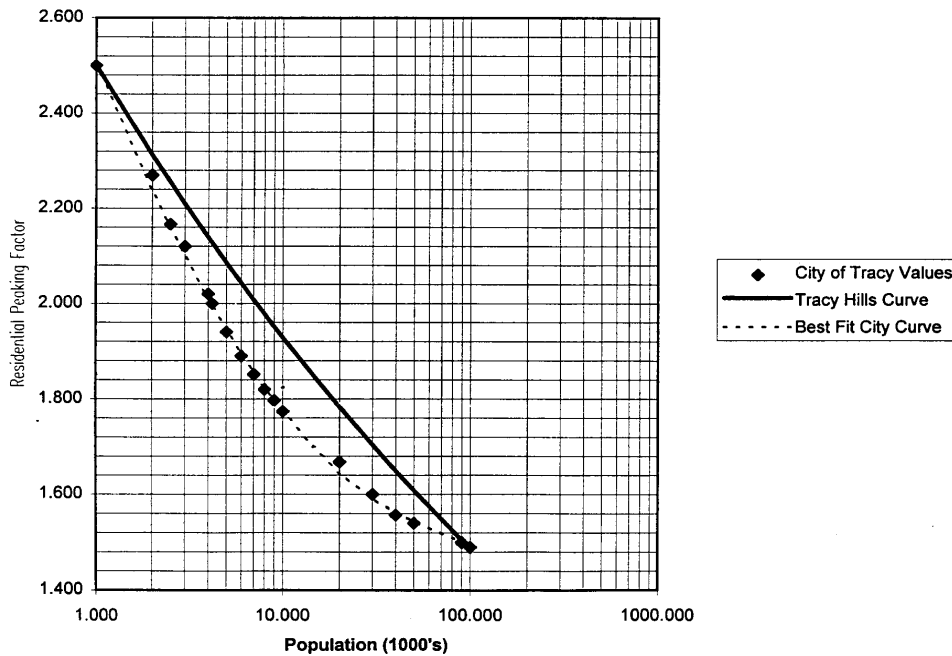
4.13(A). The City will maintain sanitary sewer mains and sanitary sewer laterals located within the public right-of-way or within dedicated public utility easements between the main and the point at which the wye branches off to accommodate the cleanout. The City will not, however, perform maintenance under the following situations:

1. No cleanout exists within the City right-of-way or easement;
2. The cleanout does not conform to City Standard Plans and Specifications;
3. The sewer lateral is not directly accessible from the City right-of-way.

4.13(B). The Property Owner shall be responsible for the installation, repair, and maintenance of the sewer cleanout, riser, wye and all on-site improvements beyond the cleanout.

Figure 4. Residential Peaking Factor Curve

Tracy Hills Residential Peaking Factor			
Peaking Factor ¹	Population (1000's)	Tracy Hills Curve ²	Best Fit City Curve
2.500	1.000	2.500	2.503
2.270	2.000	2.312	2.237
2.166	2.500	2.255	2.160
2.120	3.000	2.209	2.100
2.020	4.000	2.138	2.010
2.000	4.200	2.127	1.996
1.940	5.000	2.085	1.946
1.890	6.000	2.043	1.896
1.852	7.000	2.007	1.857
1.820	8.000	1.978	1.824
1.797	9.000	1.951	1.797
1.774	10.000	1.928	1.774
-	14.444	1.850	1.700
1.668	20.000	1.783	1.645
1.600	30.000	1.704	1.591
1.557	40.000	1.649	1.562
1.540	50.000	1.608	1.543
1.500	90.000	1.505	1.501
1.490	100.000	1.487	1.491



1. Values read from the City of Tracy Standards Figure 4-1
2. $y = 2.5 * (x)^{-0.11275}$

PEAK FACTORS

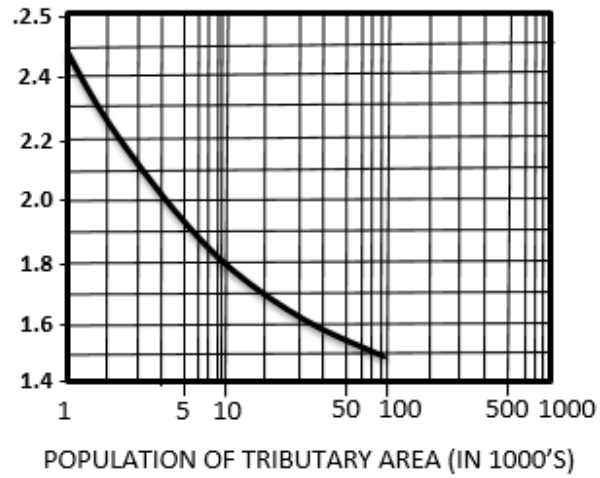


FIGURE 4-1

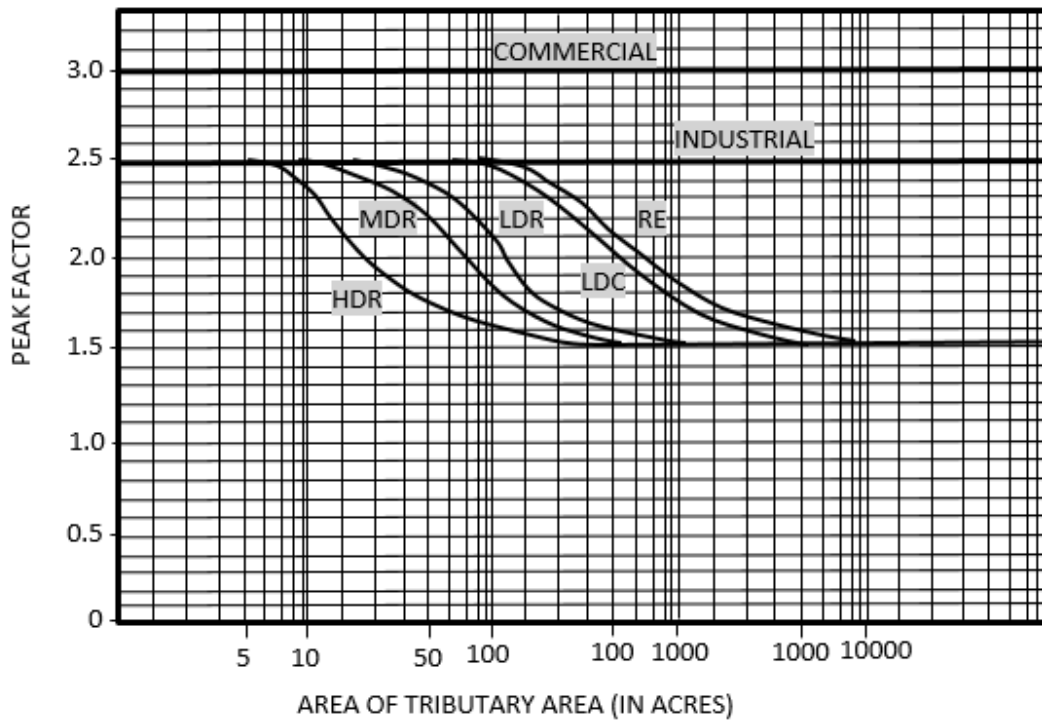


FIGURE 4-2

SECTION 5

STORM DRAINAGE DESIGN STANDARDS

5.01 General

5.01(A). Storm drainage systems shall be designed and constructed in accordance with all City Regulations, including the Citywide Storm Drainage Master Plan (including all supplements thereto), the City of Tracy Multi-Agency Post Construction Stormwater Standards Manual, the Standard Plans and Specifications, and these Design Standards. For each development project, the design of the storm drainage system shall be of such a size to provide storm drainage capacity to adequately convey all storm water that can be reasonably anticipated to be generated for the development project, and the surrounding areas identified in the Citywide Storm Drainage Master Plan. Design Engineers are advised to review proposals, which are potentially at variance with the Citywide Storm Drainage Master Plan or these Design Standards with the City Engineer prior to proceeding with design studies.

5.01(B). Storm water shall not be connected or discharged into a sanitary sewer.

5.01(C). For storm drainage infrastructure that is not identified in the Citywide Storm Drainage Master Plan as being required to have a 100-year storm design capacity, the following criteria shall be applied:

1. The 100-year storm is to be contained within the right-of-way of the public street.
2. The 10-year storm is to be contained within the top of the street curb.
3. Storm drainage facilities will be required where either of the above conditions cannot be satisfied.

5.02 Storm Water Pollution Prevention

5.02(A). Any person performing construction in the City shall prevent pollutants from entering the stormwater conveyance system and comply with all applicable federal, state and local laws, ordinances or regulations including but not limited to the NPDES Construction General Permit and the City's grading, erosion and sediment control policies.

5.02(B). City design standards and best management practices to control the volume, rate, and potential pollutant load of stormwater runoff from new development and

redevelopment projects can be found in the City's Multi-Agency Post-Construction Stormwater Standards Manual. To the extent permitted by law, such requirements shall be incorporated in any development or redevelopment land use entitlement, construction project or building-related permit covering such development that is identified in the manual as being regulated by the manual.

5.02(C)

1. For all construction activities where clearing, grading and excavation results in a land disturbance of one acre or more, prior to issuance of a grading permit through the City's Planning Division, the applicant must file a Notice of Intent. A Storm Water Pollution Prevention Plan (SWPPP) must also be developed, approved by the City, and implemented prior to any land disturbance. The SWPPP shall contain a site map detailing the Best Management Practices (BMPs) to be used in order to contain sediment onsite and prevent erosion.
2. For all construction activities where clearing, grading and excavation results in a land disturbance of less than one acre, prior to issuance of a grading permit through the City's Planning Division, the applicant must complete and submit an Erosion and Sediment Control Plan to the City of Tracy Utilities Department for review and approval. This Plan shall include information detailing the Best Management Practices (BMPs) to be used in order to contain sediment onsite and prevent erosion.

5.02(D).Stormwater Treatment and Control Device Access and Maintenance Agreements

1. The City requires that all structural and non-structural permanent stormwater best management practices not within the control of the City shall be the subject of an enforceable maintenance agreement to ensure the system functions as designed.
2. The maintenance agreement shall provide for the conveyance of any and all easements or other permissions necessary to provide the City with adequate access to the relevant sites in order to facilitate necessary inspections of the stormwater best management practices and to perform routine maintenance as required.
3. Each maintenance agreement shall specify the parties responsible for the proper maintenance of all stormwater best management practices.

4. Information to complete the maintenance agreement (Owner name, approved signatory, legal description, facility map and project stormwater plan including maintenance and operations plan) shall be provided to the Utilities Department within two months of construction documents submittal for Building Permit or before. Prior to final approval for occupancy a completed and fully executed maintenance agreement must be recorded by the County Recorder.

5.03 Submittal of Drainage Calculations

5.03(A). General. Drainage calculations are required for any new subdivision or development project and shall comply with these Design Standards. Submittal of drainage calculations shall include the items outlined in this section.

1. Hydrology calculations for 10 year and 100 year storms, together with assumptions, charts, tables, references, and methods used.
2. A plan, at 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including off-site drainage), and peak-flow in all pipes.
3. The hydraulic calculations shall show as a minimum the hydraulic grade line (HGL), the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, structure losses, tailwater assumptions, and top of curb elevations (or freeboard at structures). The Energy Grade Line (EGL) shall also be shown for hydraulic calculations when the development is in the Hill Area.

5.04 Hydrology Calculations

5.04(A). Areas of 200 Acres or Less. The Rational Method of runoff estimation may be used for tributary areas of 200 acres or less. The Rational Method Formula is as follows:

$$Q = CIA$$

Where: Q = Peak discharge in cubic feet per second (cfs)
C = Coefficient of runoff (see below)
I = Rainfall intensity in inches per hour (in/hr)
A = Tributary area in acres

1. Coefficient of Runoff. The coefficient of runoff (or ratio of runoff/rainfall) is intended to account for the land use factors, which influence peak discharge rate. The following coefficients of runoff shall be used:

<u>Residential</u>		<u>C</u>
Rural Residential	(1-5 acres)	0.25
Suburban Density	(0.5 to 1.0 acre lots)	0.30
Low Density	(Single Family)	0.35
Medium Density	(Multi-Family)	0.50
High Density	(Apartment)	0.65

Non-Residential		
Commercial/Industrial/Office		0.80
Schools		0.50
Parks		0.20
Open Space		0.10
Paved Areas	0.95	

In rare instances, unique site development conditions may warrant adjustments to these coefficients of runoff; however, any adjustments to these values will be subject to the prior approval of the City Engineer.

2. Rainfall Intensity

- a. Rainfall intensity is determined using the intensity-duration-frequency (IDF) curves contained on Figure 5-1 of these Design Standards. To use the IDF curves, first determine the time of concentration (T_c) for the reach under consideration.
- b. For the initial area assume an initial time of concentration (T_i) of 20 minutes for residential and rural residential areas and 10 minutes for commercial or industrial areas. The times of concentration for subsequent downstream areas are increased by the estimated travel time of the pipeline or channelized flow.

- c. Enter the IDF curve with the estimated time of concentration and determine the corresponding rainfall intensity for both the 10-year and 100-year storm occurrences.
3. Estimated Peak Discharge (Peak Rate of Runoff).
 - a. The product of the coefficient of runoff, the rainfall intensity and the area equals the estimated peak discharge. The process is repeated progressively for each succeeding downstream sub-area.
 4. Street Carrying Capacity
 - a. At each juncture or nodal point of calculation, the estimated 10-year and 100-year storm flows shall be compared to the surface carrying capacity of the street. Use the graph appropriate to the street under consideration as shown in Figures 5-2, 5-3, and 5-4 or perform specific normal depth calculations to determine the depth of flow. If the depth of flow is above the top of curb for the 10-year event, a separate drainage conveyance is required.
 - b. In theory, storm runoff may be carried indefinitely on the surface of streets until its interception by facilities defined by the Citywide Storm Drainage Master Plan. In practice, it is recognized that subsurface drainage conduits may be required either by the developer for better site utilization or by the City for reasons of traffic safety, circulation, or other reasons based on public health, safety, or welfare.

5.04(B). Areas Greater than 200 Acres

1. Where the tributary area of a development project exceeds 200 acres, storm drainage facilities should be designed utilizing methods other than the Rational Method Formula.
2. Among the methods available for the estimation of storm flows in tributary areas in excess of 200 acres are:
 - a. HSP. A computer based analysis system, Hydrocomp Simulation Program, based on the Stanford Watershed Model. This is a proprietary model available through Hydrocomp, Inc. of Palo Alto, California.
 - b. HydroCAD. A computer based stormwater modeling software package developed by HydroCAD Software Solutions, L.L.C.

- c. TR-20. This hydrologic analysis program can be used for general project formulation and is available from the US Soil Conservation Service.
 - d. HEC-1 or HEC-HMS. This flood hydrograph package is a computer-based model available from the US Army Corps of Engineers and vendors. HEC-HMS is the model that currently supports the Citywide Storm Drainage Master Plan.
 - e. TR-55. Urban hydrology for Small Watersheds - Technical release No. 55, is available from the US Soil Conservation Service.
3. Prior to initiating design of the development project, the Design Engineer shall review the drainage requirements and design approach with the City Engineer, and Engineering Division Staff.

5.04(C). Manning’s formula shall be used to determine the relation of design flow, slope, velocity, and pipe diameter. The friction factors, “n”, shall be 0.013 for all types of pipe, except for corrugated steel pipe where the “n” shall be 0.025. Corrugated steel pipe shall only be used for arch culvert crossings of streets.

5.05 Hydraulic Grade Line

5.05(A). General. 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.

- 1. The hydraulic grade line (HGL) between structures shall be based upon the Manning’s formula. Use an “n” factor of 0.013.
- 2. Hydraulic losses in structures shall be based upon a value of K, as defined in the table below, and multiplied by $V^2/2$ where V is the velocity of the water in the pipe exiting the structure with the pipe flowing full. $HL = K (V^2/2g)$

TABLE OF HEAD LOSS FACTORS THROUGH STRUCTURES K

1. Straight Run with same size pipe	0.17
2. Straight Run with change pipe size	0.025
3. 0° to 45° Deflection with same in pipe size	0.42
4. 0° to 45° Deflection with change in pipe size	0.50
5. 45° to 90° Deflection with same pipe size	0.75
6. 45° to 90° with change in pipe size	1.00
7. 90° Deflection	1.25
8. Drop Manhole	1.25
9. Short Radius Curves from 50’ and down	0.35

5.06 Temporary Retention Basins, Single Parcel

5.06(A). General. If a temporary retention basin on private property is approved by the City Engineer to drain a single parcel (in accordance with the criteria outlined in Section 5.07(A), below), it shall be designed based on the following:

1. A 48-hour, 10-year storm, total rainfall of 3.12 inches shall be used to determine the required volume if a reasonable outlet is provided. If no disposal other than evaporation, transpiration or, percolation is provided, calculations shall be done per Section 5.07 of these Design Standards.
2. The maximum water surface of the basin shall be one foot below the elevation of the top of curb at the lowest drainage inlet within the tributary area. A minimum one-foot of freeboard shall be provided.
3. Six-foot chain link fence with redwood or plaster lath filler shall be provided around all basins greater than three feet in depth. A vehicle access gate with City master padlock shall be installed.
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.
6. Developer must provide the long-term method of compliance with the City's Multi-Agency Post-Construction Stormwater Standards once the temporary retention basin is removed. This shall include the type of stormwater treatment along with the Project Stormwater Plan.

5.07 Temporary Retention Basins, Multiple Parcel

5.07(A). General

1. Developer may propose the use of a temporary retention basin as a temporary measure for a new development project if the developer establishes to the satisfaction of the City Engineer that: (a) the storm drain system for the development project cannot be connected to the City's permanent storm drainage system; and (b) the temporary retention basin is designed in accordance with all City Regulations, including these Design Standards; and (c) the developer agrees to maintain the temporary retention basin until the storm drainage system for the development project is connected to the City's

permanent storm drainage system; and (d) the developer agrees to remove the temporary retention basin, and connect the storm drainage system for the development project to the City's permanent storm drainage system when the connection is available.

2. If a temporary retention basin is approved by the City Engineer for other than a single, one-ownership parcel with a positive outflow discharge, the criteria set forth in this Section 5.07 shall be utilized in its design.
3. Developer must provide the long-term method of compliance with the City's Multi-Agency Post-Construction Stormwater Standards once the temporary retention basin is removed. This shall include the type of stormwater treatment along with the Project Stormwater Plan.

5.07(B). The design of temporary retention basin having no method of runoff disposal other than evaporation, transpiration or percolation shall meet the minimum requirements set forth in this Section 5.07. These requirements are listed below:

1. The retention basin design shall be the responsibility of the Design Engineer, and subject to review and approval of the City Engineer.
2. Permeability and differential head available must be considered for the life of the development project, not just present values.
3. Earth materials and groundwater conditions evaluation shall be made on a site-specific basis by a qualified geotechnical engineer and include development project-specific subsurface data and percolation tests, all subject to review by the City Engineer.
4. The volume of runoff required to be able to be stored in the retention basin is 2 times the volume of runoff that will discharge to the retention basin during a 10-year 48 hour storm (3.12" of rainfall). Note: The amount of storage required is not reduced by the rate of percolation.
5. Retention basins shall be designed to empty one hundred (100) percent of the computed volume of storage within ten (10) calendar days.
6. The volume of storage required shall be two hundred (200) percent of the computed volume of runoff. In areas of the City where it is demonstrated by site specific geotechnical and percolation testing and/or past performance that underlying soils at a temporary retention basin site are capable of achieving a high rate of percolation, the City may consider reducing the volume of storage requirement to account for a degree of said

percolation. The reduction, if granted by the City Engineer, will be based upon a review of factors of safety, future maintenance commitments, anticipated length of service, future permeability, downstream conditions and/or other considerations. If percolation consideration is granted by the City, the maximum reduction in the volume of storage requirement shall be limited to 25 percent.

7. Levees shall not be permitted around retention basins.
8. The bottom elevation shall be designed to provide five (5) feet of clearance to the groundwater elevation. The City Engineer may approve a clearance less than five (5) feet to groundwater if a written report is provided from a soils engineer establishing the high groundwater elevation taking into account the seasonal variations. In no case shall the clearance be less than two (2) feet.

5.07(C). The design of storm water drainage facilities, which will not be maintained by the City, shall be the responsibility of the Design Engineer and subject to review and approval of the City Engineer.

5.07(D). Calculation of Temporary Retention Basin Capacity

1. Basic Run-off Coefficients

<u>SURFACE</u>	<u>COEFFICIENT</u>
Pond or Basin	1.00
Paving (concrete, asphalt, oiled surface)	0.95
Building or Roof	0.80
Compacted Earth (gravel)	0.75
Lawn or Landscaping	0.20

2. Formulas. The run-off shall be calculated at 3.12" (0.26') for a 10-year, 48-hour storm.

<u>SURFACE AREA</u> <u>(in sq. ft.)</u>	<u>COEFFICIENT</u>	<u>RUN-OFF</u> <u>(in ft.)</u>
Pond Basin = _____	x 1.00 x 0.26'	= _____
Paving = _____	x 0.95 x 0.26'	= _____
Roof = _____	x 0.80 x 0.26'	= _____

Comp Earth = _____	x	0.75 x 0.26'	= _____
Lawn & Landscape = _____	x	0.20 x 0.26'	= _____
Subtotal			= _____

- a. The required basis capacity = subtotal x 2 = _____ cubic feet. (This provides for the occurrence of two ten-year, forty-eight hour storms consecutively.)
- b. If the individual run-off coefficients cannot be determined, average runoff coefficients for various land use areas listed in Section 5.04 may be utilized.

5.07(E). The developer shall provide an easement to the City for emergency access to the temporary retention basin site for maintaining and operation the storm water drainage system and appurtenances.

5.07(F). The maximum side slope shall be 4 to 1.

5.07(G). Six-foot chain link fencing with redwood or plastic lath filler shall be provided around the basin with double eight-foot gates with a City master padlock. Provide Top-Lock slat from PDS Fence Products or approved equal. Alternate fencing types may be required by the City for aesthetic purposes.

5.07(H). A minimum freeboard of one foot shall be provided above the maximum water surface without the use of levees.

5.07(I). The maximum design water surface of the basin shall be a minimum of one foot below the elevation of the top of curb of the lowest catch basin inlet within the tributary area.

5.07(J). The tributary drainage system shall be designed to be easily retrofitted to connect to the City's future permanent storm drainage system.

5.07(K). Show groundwater maximum elevation in basin cross-section.

5.07(L). Provide riprap protection at pipe outfalls into the basin. Riprap shall be 12 inches in size and placed on filter fabric. A minimum of 8 cubic yards is required.

5.07(M). Maintenance of Temporary Retention Basins. Developer shall conduct regular monitoring of retention basin performance to assure compliance with design requirements, particularly percolation and basin emptying rates. Developer shall report to the City annually with observed performance measurements and

maintenance activities. In cases where retention basins fail to meet required performance standards Developer shall propose and carry out necessary remediation to bring the retention basin into compliance.

5.08 Abandonment and Decommissioning of Existing Retention Basins

If a retention basin is no longer needed due to the downstream facilities being installed, the owner of the basin will be required to hire a licensed geotechnical engineer who will prepare a report addressing the proper procedures to abandon and fill the basin. The report must be approved by the City. The report should address removal of all pipe material and vegetation, proper benching, over excavation, maximum lift height and compaction requirements as well as any other items the geotechnical engineer deems appropriate. The owner shall remove all fencing and access roads. Prior to abandoning the basin, the owner shall conduct in the presence of the City's representative a flow test using dye to verify that the downstream system can accept the upstream flows and that all temporary plugs in the downstream system have been removed. Storm drain extensions, connections and other measures needed for contributing storm drainage facilities to be connected to the downstream system must be provided and will need to be approved by the City prior to decommissioning of the basin. The Developer shall submit for City review and approval all import material used to fill the abandoned basin. A grading permit and approved haul route will be required.

5.09 Detention Basin Design

Detention Basins that are considered to be integral to the City's master plan drainage infrastructure are identified in the Citywide Storm Drainage Master Plan. These detention basins are sized to store the contributing runoff produced by a 100-year 24-hour storm under a fully developed watershed condition that is attenuated via storage and outflow discharges. Required volumes and outflow discharge rates are provided in the Master Plan. Development planning and design proposals to make geometric adjustments to these detention basins will be given reasonable consideration by the City as long as the functional storage volumes, outflow rates and other hydraulic parameters presented in the Master Plan are retained.

Appurtenant features of Master Plan detention basins (such as inlet and outlet structures, forebays, landscaping, tiering, emergency spillways or other unique site-specific features) shall be designed using criteria approved by the City Engineer.

Detention Basins that are not identified in the Citywide Storm Drainage Master Plan will require prior approval by the City. If approved by the City, these detention basins shall be designed using criteria approved by the City Engineer.

5.10 Vertical Alignment

5.10(A). The minimum cover on main line storm drains shall be three (3) feet in all streets from the top of pipes to finished grade and two (2) feet from street sub-grade to top of pipe.

5.10(B). Laterals are hereby defined as those storm drain lines connecting a single storm drain inlet to another drainage structure. Lateral lines with less than 36" cover and more than 18" shall be Class IV RCP.

5.10(C). A minimum vertical clearance of 12 inches shall be maintained between a sanitary sewer, water main, and other underground utility.

5.10(D). At points of convergence of pipes of various sizes, the soffits of the pipe elevations shall match. This requirement does not apply to catch basin laterals. The flow line of a lateral entering a drainage structure shall be a minimum 0.2 feet above the flow line of the trunk storm drain line. In all cases, all laterals must be tied into main line storm drain inlet. In instances where grade and topographic constraints do not reasonably allow the soffits of pipes to match at points of convergence of pipes of various sizes, the City may consider matching of pipe inverts as an acceptable alternative, subject to the approval of the City Engineer.

5.10(E). A structure with a change of direction of the trunk line shall have a drop of 0.2 foot from inlet flowline to outlet flowline. The plans shall show the flowline in and out of all structures. In instances where grade and topographic constraints do not reasonably allow for this drop, the City may consider matching of pipe inverts as an acceptable alternative, subject to the approval of the City Engineer. In storm drain systems, for the Hill Area, an energy dissipater shall be provided at the downstream end of the drainage system when velocities exceed 6 fps. In earthen channels or natural swales, rock riprap protection is required when velocities exceed 6 fps.

5.10(F). On concrete-lined ditches, splash walls, shall be provided whenever two ditches converge, at bends, or where longitudinal slope flattens out.

5.10(G). Concrete valley gutters are required within channel ways to accommodate low flow or nuisance water.

5.11 Horizontal Alignment

5.11(A). Storm drains shall be placed within the street right-of-way whenever possible per Standard Plan 504.

5.11(B). Alignment shall be parallel to the street centerline wherever possible.

5.11(C). The horizontal alignment of storm drains in new streets shall be 1.25 feet behind the top face of the curb, as shown on Standard Plan 504. In existing streets and non-residential streets, the developer may request a deviation from this standard in accordance with Section 1.05, but in no case shall there be less than 6 feet horizontal clearance to other utilities.

5.11(D). Curved storm drains are not recommended, however, they may be considered in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

5.12 Slope

5.12(A). 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.

1. Drop inlet laterals shall have a minimum fall of 0.10 foot between the drop inlet and manhole. Desirable fall is 0.30 foot or more. A lateral between two drop inlets shall have a minimum fall of 0.20 foot.

5.13 Pipe

5.13(A). The minimum size for storm drains, including laterals, shall be 12-inch diameter.

5.13(B). Reinforced concrete pipe, for storm drains in the Hill Area, which carry flows with velocities exceeding 14 feet per second shall be centrifugally spun, dense, thick walled RCP and have double gasketed joints when located in fill areas and single gasketed with smooth concentric joints in all other areas. The concrete protective cover from the inner surface to the reinforcement shall be 2-inch minimum. Other requirements may apply under these conditions to maintain position, seal and stability.

5.13(C). When storm drain pipe lines are steeper than 20%, cut off walls shall be designed & constructed at maximum 50-foot intervals around the pipes in the trench area.

5.14 Manholes

5.14(A). 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. Drop inlets may be substituted for manholes.

5.14(B). Manhole spacing shall conform to the following limits:

Pipe Diameter	Maximum Spacing
Pipe less than 30"	400 feet
Pipe 30" and greater	600 feet

5.14(C). All storm drain manholes shall be constructed in conformance with Standard Plan 300. All storm drain manholes installed outside the public right-of-way shall have bolted lids. When the manhole is designed with head then bolted lids and rubber seals are required.

5.14(D). Where energy dissipation is necessary due to high flow velocities, Design Engineer shall submit design assumptions and mitigations to the City.

5.15 Catch Basins

5.15(A). Drop inlets shall be located at all low points. Drop inlets shall be constructed in conformance with Standard Plan 301. Manhole bases for inlets shall be used on all lines larger than 24".

5.15(B). A "No Dumping - Drains to River" storm drain marker is required at all storm drain inlets. The marker shall be permanently placed in clear site, adjacent to the inlet.

5.15(C). In the Hill Area, inlet capacity shall be verified to ensure that gutter flow with high velocities would be able to enter the underground system. Caltrans Inlet Type GOL 1992, which has a large gallery and an extended curb opening, shall be used where higher gutter flow velocities are expected. Inlets more closely spaced than City minimum requirements may be required. The developer may request a deviation from these standards by following the procedure outlined in Section 1.05.

5.16 Siphons

Inverted siphons will not be permitted.

5.17 Valley Gutters

Valley gutters are not allowed to be used within the City's rights-of-way.

5.18 On-Site Drainage

All developed areas larger than ¼ acre shall tie on-site drainage into the City's storm drain system.

5.19 Private Storm Drain Connections

5.19(A). The minimum size for private storm drain connections shall be 6-inch diameter.

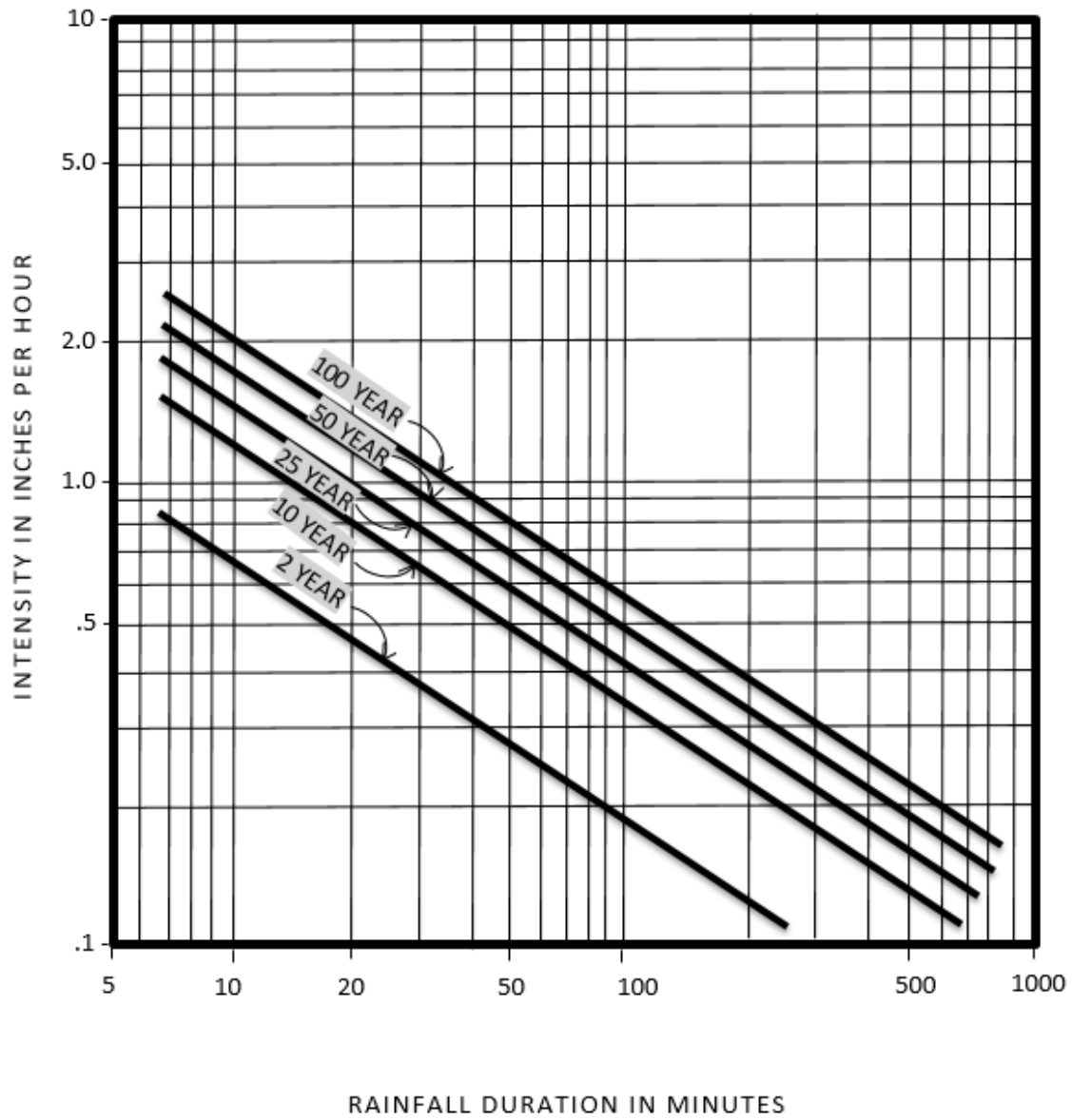
5.19(B). The pipe shall conform to the storm drain specifications.

5.19(C). 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 when practical.

5.20 Park Storm Drain Connections

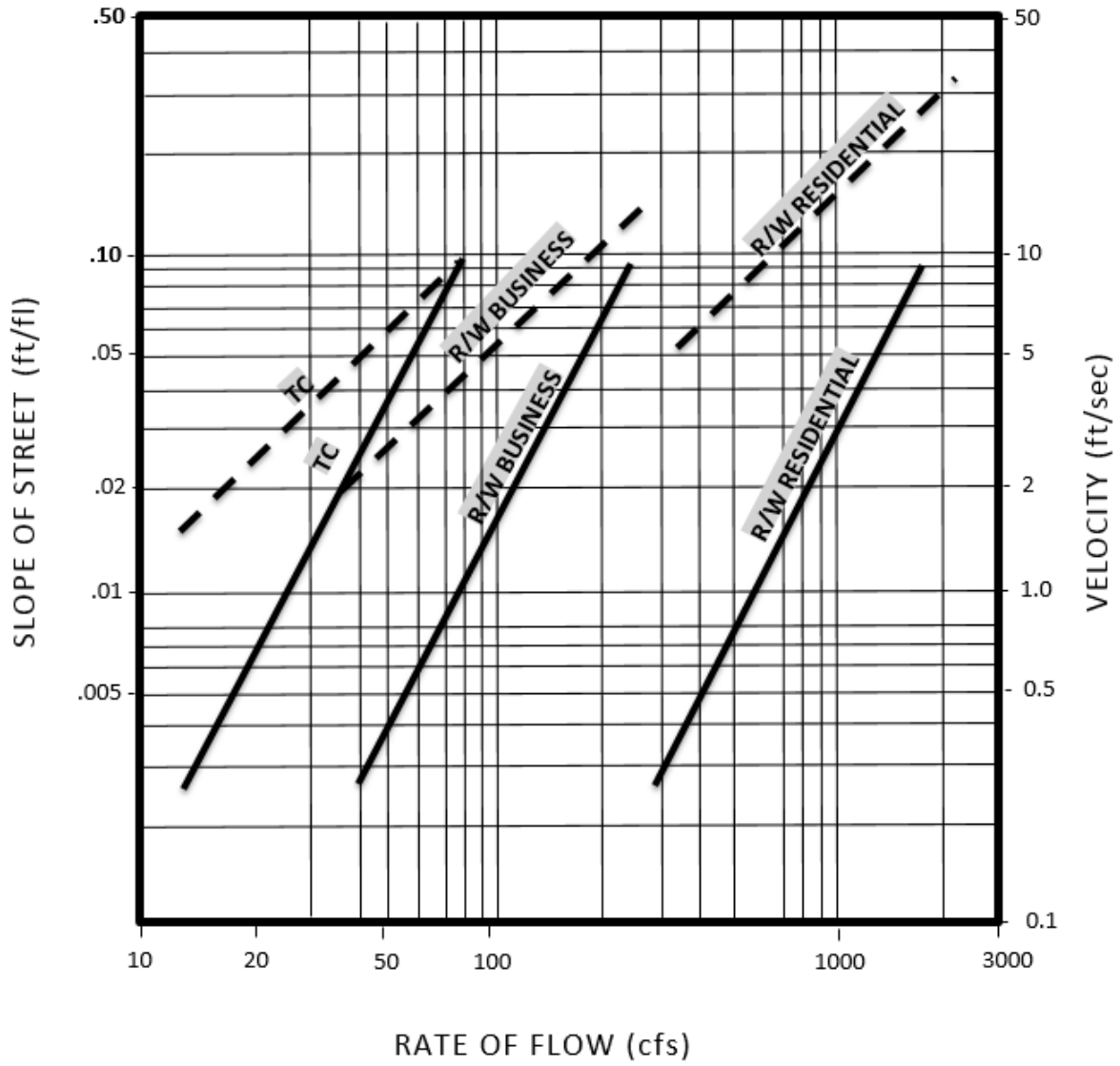
Provide a storm drain stub into every park site. The minimum size for park storm drain connection shall be 12-inch diameter.

RAINFALL INTENSITY CURVE



5 - 1

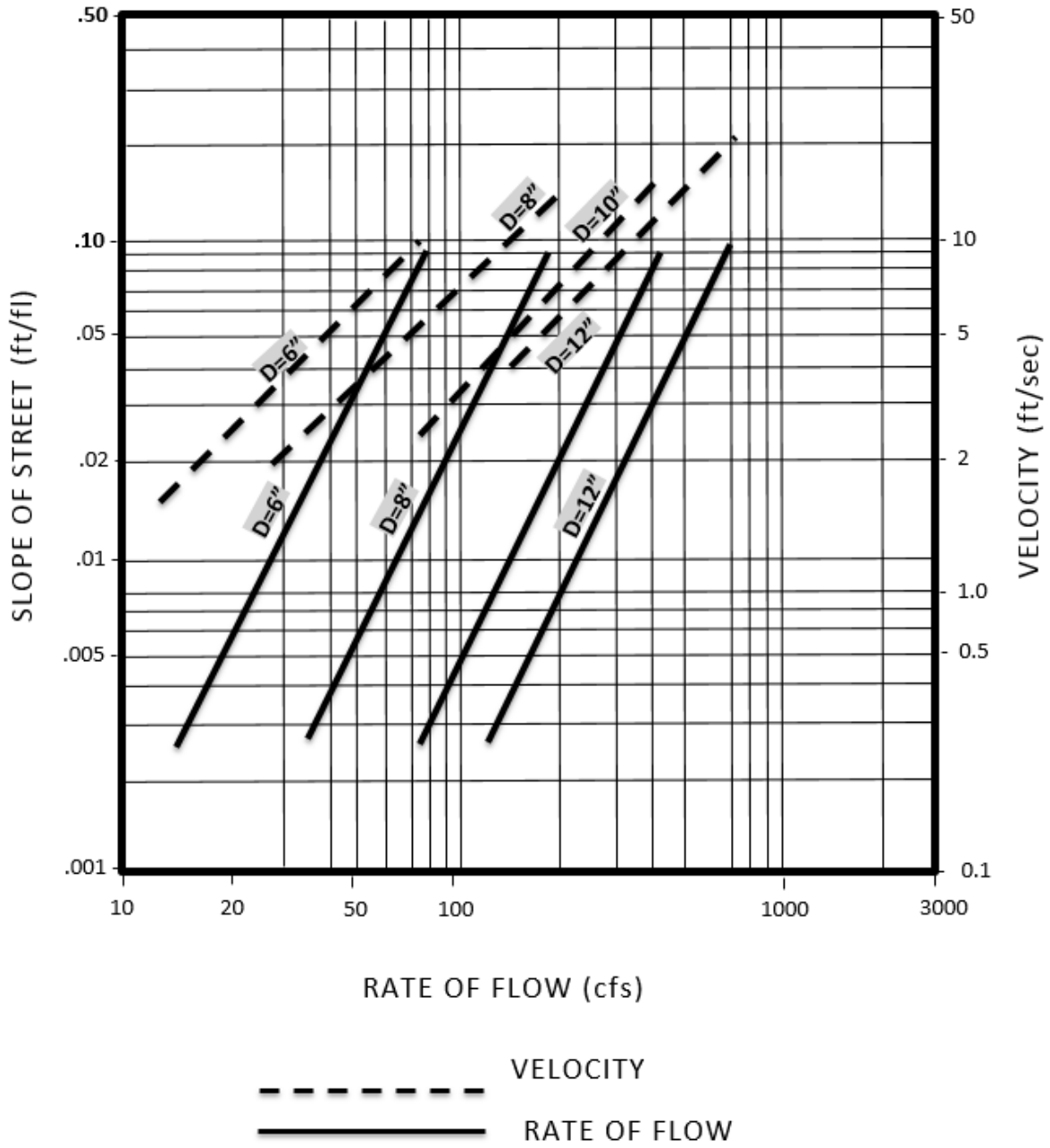
COLLECTOR STREET DRAINAGE



- - - - - VELOCITY
 _____ RATE OF FLOW

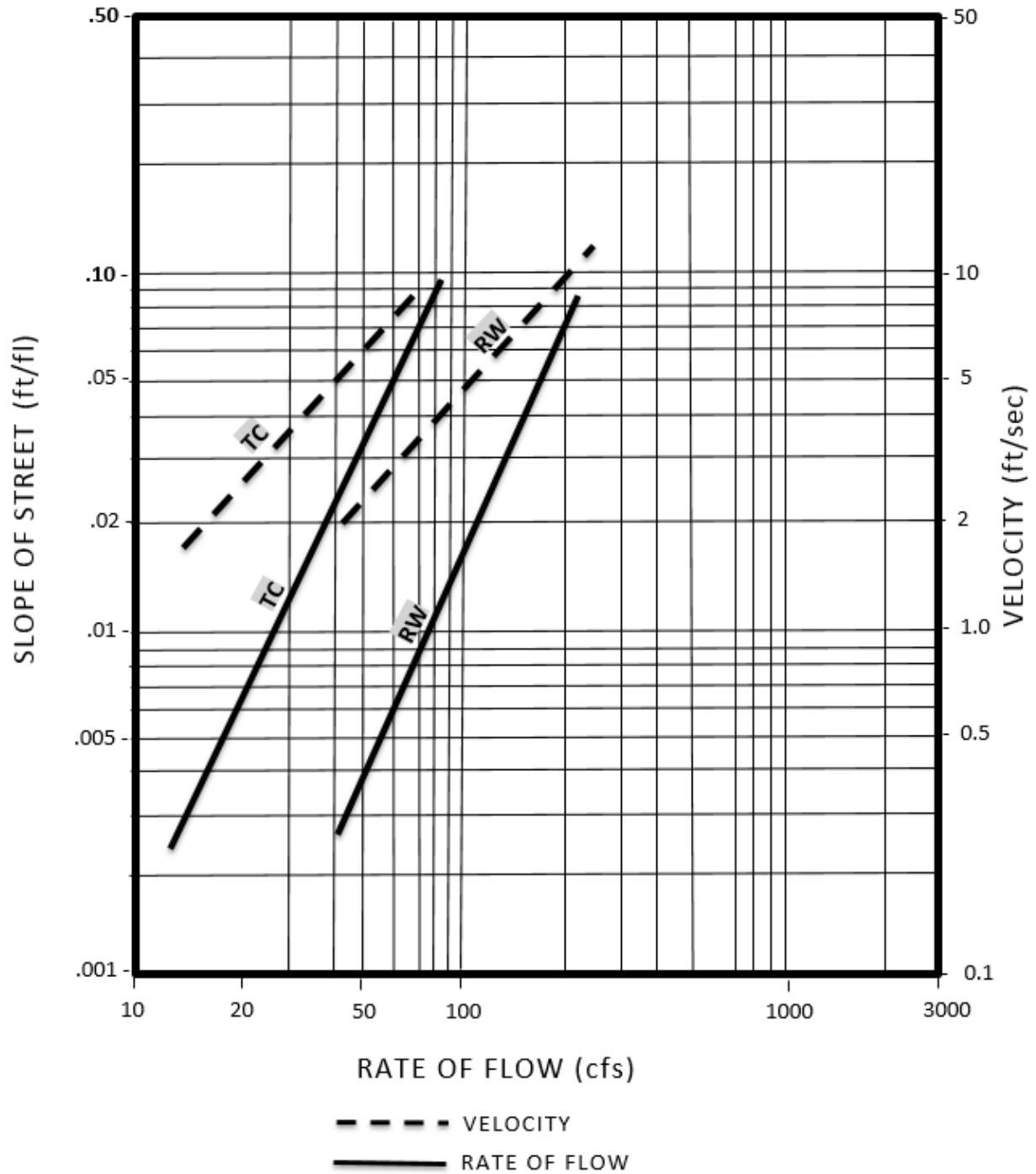
5 - 2

INDUSTRIAL STREET DRAINAGE



5 - 3

ARTERIAL STREET DRAINAGE



5 - 4

SECTION 6

WATER DESIGN STANDARDS

6.01 General

6.01(A). Water systems shall be designed and constructed in accordance with all City Regulations, including the Water Master Plan (including all supplements thereto), the Standard Plans and Specifications, and these Design Standards. For each development project, the design of the water system shall be of such a size to provide water supply and distribution capacity to adequately convey all water that can be reasonably anticipated to be needed for the development project, and the surrounding areas identified in the Water Master Plan. Design Engineers are advised to review proposals, which are potentially at variance with the Master Plan with the City Engineer prior to proceeding with design studies.

6.01(B). Unless otherwise specified in these Design Standards, all materials shall conform to the American Water Works Association Standards.

6.01(C). Unless otherwise specified in these Design Standards, all installations shall conform to regulations prescribed by the California State Department of Public Health and Water Resources Control Board.

6.02 Standard Operational and Design Criteria for Water Distribution System

6.02(A). The following tables provide design criteria and operational standards for water distribution systems.

1. **Table 6-1.** Potable Water Facility Planning Criteria

<u>Description</u>	<u>Planning Criteria</u>
Facilities	
Water treatment plant	Maximum day demands
Reservoirs ^(a)	<ul style="list-style-type: none">• Emergency: 2 x average day• Operational: 30% of max day• Fire: fire flow x duration
Distribution Pump Stations	
Number	Two (2) per pressure zone boundary (except where redundant pumps are included in single pump station)

<u>Description</u>	<u>Planning Criteria</u>
Capacity	Equal to maximum day demand plus fire flow for the immediate pressure zone it is serving, and maximum day demand for all additional pressure zones, which are provided service from this pressure zone.
Backup Power	Equip each pump station with a plug in adapter to allow interconnection to a portable generator. Generator must supply enough power to meet firm capacity of pump stations. (Firm capacity is equal to pump station capacity with the largest pump out of service)
Pipelines	
Material ^(b)	Ductile Iron
Minimum diameter	8" Main Line, 6" Main Lane only at cul-de-sac beyond fire hydrant, 6" min. Laterals Serving Fire Hydrant
Hazen Williams "C"	130 for Ductile Iron & Cement Mortar Lined Pipe
Appurtenances	
Minimum isolation valve spacing	800' (Residential), 1,000' (Commercial/Industrial)
Minimum fire hydrant spacing	500' (Residential), 300' (Commercial/Industrial)
Pressure Zone Service Elevation Boundaries	
Zone 1 - lower/upper (feet)	0/75
Zone 2 - lower/upper (feet)	75/150
Zone 3 - lower/upper (feet)	150/310
Zone 4 - lower/upper (feet)	310/470
Zone 5 - lower/upper (feet)	470/630

- (a) Each pressure zone shall have two reservoirs: provided, however, one reservoir may be permitted if the Applicant provides documentation to the satisfaction of the City Engineer that establishes that the existing and proposed water system improvements provide storage redundancy adequate to serve the pressure zone in the event that the reservoir is temporarily out of service.
- (b) Pipeline material is subject to change depending on depth of cover, chemical makeup of soil and internal pressure.

2. **Table 6-2.** Potable Water Facility Design Criteria

<u>Description</u>	<u>Value</u>
Distribution Pipelines	
Maximum head loss. During non-fire flow conditions (ft/1,000 ft)	7
Maximum velocity. During peak hour conditions (ft/sec)	8
Maximum velocity. During maximum day plus fire flow conditions (ft/sec)	12
System Pressures	
Minimum pressure (psi) ^(a)	40
Minimum pressure. During maximum day plus fire flow conditions (psi) ^(b)	30
Maximum pipeline pressure (pressure in the main line)(psi)	120
Maximum service pressure (pressure at the customer tap)(psi).PRV required for 80+ P.S.I.	80
Reservoirs	
Type	Buried Concrete Reservoirs and Above Ground Tanks are allowed on a case by case basis
Pipelines	
Minimum depth of cover	3' for mains 10" and less, 4' cover for mains larger than 10"

^(a) Pressure assumed at pad elevation; which is assumed to be no greater than 10 feet above the pipeline main.

^(b) Pressure assumed to be at the hydrant location.

6.02(B). Fire Flow Requirements.

1. The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.1 of the California Fire Code, with the following exceptions:

- a. A reduction in required fire flow of up to 50 percent, as approved by the Fire Chief, is allowed when the building is provided with an automatic sprinkler system approved pursuant to the adopted NFPA Standards. The resulting fire flow shall not be less than 1500 gallons

per minute. Reduction of fire flow does not apply to the number of fire hydrants required or duration of fire flow required.

- b. A reduction in required fire flow of up to 75 percent, as approved by the Fire Chief, is allowed for warehouse buildings of Type I, Type II, and Type III-N construction when the building is provided with an early suppression fast response fire sprinkler systems. Reduction of fire flow does not apply to number of fire hydrants required or duration of fire flow required.
2. The minimum fire flows identified are to be met concurrently with maximum day demand conditions on the rest of the system while maintaining a minimum residual system pressure of 30 psi. These fire flows and their expected durations are also to be used in identifying treated water storage requirements.

6.03 Vertical Alignment

6.03(A). The minimum cover on water mains 10" and smaller shall be 3 feet from the top of pipe to finished grade. For mains 12" and larger minimum cover shall be 4 feet from top of pipe to finish grade.

6.03(B). When crossing another pipeline the water main shall be installed above the pipeline with a minimum clearance of 12 inches. Proposed exceptions shall conform to California Code of Regulations Title 22.

6.03(C). Top of pipe elevations shall be shown on all water main improvement plans at high points, low points and grade breaks.

6.03(D). At high points within the system combination air valves (CAV) shall be required. Combination air valves shall be shown in both profile view and plan view and located at lot line extensions. Combination air valves shall conform to Standard Plan 409.

6.04 Horizontal Alignment

6.04(A). Water mains shall be installed within the paved portion of the street right-of-way unless an easement installation is specifically approved by the City Engineer. Alignment shall be parallel to the street centerline wherever possible.

6.04(B). In new development projects, the horizontal alignment of water mains shall be 10 feet south or 10 feet east of the street centerline, as shown on Standard Plan 504. In existing streets and non-residential streets, the developer may request a deviation from this standard in accordance with Section 1.05, but in no case shall there be less

than 10 feet horizontal clearance to a sanitary sewer and 4 feet horizontal clearance to a storm drain or tertiary recycled water main. Curved water mains are allowed in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

6.04(C). The water system shall be looped, as required, to provide adequate fire flow and water circulation.

6.05 Pipe Size and Material

6.05(A). Unless otherwise specified in the Water Master Plan: the minimum size pipe used for water mains shall have a nominal diameter of 8 inches; however, water mains serving a cul-de-sac beyond a fire hydrant may use a 6 inch diameter line, and industrial areas may require installation of 12 inch mains.

6.05(B). All pipe for potable water systems shall be ductile iron, conforming to the Standard Specifications.

6.05(C). Pipe material for recycled water system shall be PVC (AWWA C-900), "purple pipe".

6.06 Water Service

6.06(A). The minimum size service is 1 inch and shall be installed in conformance with Standard Plan 403. The minimum size irrigation service for a streetscape application is 2 inch, and neighborhood parks require 4 inch.

6.06(B). All water services shall be metered. Meters shall be furnished and installed by developer. The minimum separation between the water and sewer laterals shall be eleven (11) feet center to center. All water meters shall be Sensus SR2 Radio Read with Flexnet 520M transceiver or approved equal. Meters shall not be located in driveways or areas subject to traffic.

6.06(C). A pressure-regulating valve (PRV) will be required on all water services with a static service pressure greater than eighty (80) pounds per square inch (psi). The PRV installation shall conform to the requirements in the current edition of the California Plumbing Code.

6.06(D). A check valve shall be installed on the house side of all water meters 2" or less.

6.06(E). Any water connection larger than 4 inches must be made with a cut in and a tee installed on the main. If any water main will experience a shutdown, all affected

users must be provided a 72-hour advance written notice. Written notices must be reviewed and approved by the City prior to distribution.

6.06(F). Unused, existing services shall be abandoned by removing the service from the right-of-way to the main. For services 2" diameter or less, pothole, cut-out and remove the corporation stop and saddle at the main and install a full-circle 3/16 stainless steel repair clamp over the hole. For services larger than 2" diameter, remove the existing valve and install a blind flange on the tee at the main.

6.07 Fire Hydrants

6.07(A). Fire hydrants shall be supplied from the largest available main.

6.07(B). Fire hydrants shall be fed from two directions unless located in a cul-de-sac.

6.07(C). Fire hydrant spacing and distribution shall be determined based upon Table No. C105.1 from the California Fire Code, amended to read as follows:

**Table No. C105.1
Number and Distribution of Fire Hydrants**

FIRE FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS^{a,b&c} (Ft.)	MAXIMUM DISTANCE FROM HYDRANT TO ANY POINT ON STREET OR ROADWAY FRONTAGE^{d, e} (Ft.)
1750 or less	1	300	150
2000-2250	2	300	150
2500	3	300	150
3000	3	300	150
3500-4000	4	300	150
4500-5000	5	300	150
5500	6	300	150
6000	6	250	150
6500-7000	7	250	150
7500 or more	8 or more ^b	200	120

- a. Reduce by 150 feet for dead-end streets or roadways.
- b. One Hydrant for each 1000 gpm or fraction thereof.
- c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants should be provided at not less than 1000 foot (305 m) spacing to provide for transportation hazards. In addition, there shall be at least one hydrant at each intersection.
- d. Average spacing between hydrants may be extended to 500 feet on streets serving one and two family dwellings.
- e. A fire hydrant shall be located within 200 feet of the center of all cul-de-sacs.

6.07(D). Hydrants shall be required on both sides of the street whenever one or more of the following conditions exist:

1. When streets have median center dividers that make access to hydrants difficult, cause time delay, or create undue hazard or both.
2. When the street is a state highway or has four or more lanes of traffic.
3. When the street width is in excess of 88 feet.
4. When the planned street calls for either center dividers, four or more lanes of traffic, or a street width in excess of 88 feet pursuant to the Roadway Master Plan.

6.07(E). Fire hydrant shall be installed in conformance with Standard Plan 401 and shall be approved by the City Engineer and Fire Chief based on National Fire Protection Association (NFPA) Standards. Fire hydrants shall be Jones "4040" / CLOW 850 or approved equal.

6.07(F). City owned street fire hydrants shall have their own separate connection to the street water main. No additional users shall connect to the fire hydrant lateral. No private connections for domestic, fire or irrigation supply are allowed to connect to the fire hydrant lateral.

6.08 Valves

6.08(A). Main valves shall be located so that any section of the water system can be controlled by operating a maximum of 3 valves. In addition, valves shall be spaced so that a maximum of 1,000 feet of water main is controlled by the valves. When butterfly valves are used, butterfly operator shall be toward nearest property lines.

6.08(B). Valves installed on all ten inch (10") and smaller lines shall be gate valves. Mains twelve inch (12") and larger shall utilize butterfly valves.

1. Butterfly valves: 12" and larger rubber seated, tight closing type meeting or exceeding A.W.W.A C504. Valves body shall be cast iron, A.S.T.M. A48 Class 40 with rubber seat secured with an integral 18-8 stainless steel nylon locked screws. Rubber seat shall be a full circle 360' seated no penetrated by the valve shaft. Packing shall be "triple seal" rubber designed for permanent underground duty. Valve operator shall be of the traveling nut type, sealed, gasketed and lubricated for service. It shall withstand an input torque of 450 ft.-lbs. Only valves on approved materials list "Standard Specifications, Appendix A" shall be used.

2. Gate Valves: 10" and smaller as shown on list of approved materials "Standard Specifications, Appendix A".

6.08(C). Valves shall be installed in conformance with Standard Plan 402.

6.08(D). All valve box risers shall be installed with a concrete base below the valve box to prevent the riser from shifting.

6.09 Backflow Prevention Devices

6.09(A). All commercial private water supply pipelines shall be provided with an approved backflow prevention device.

6.09(B). Backflow prevention device shall be in the form of either a Double Detector Check Valve Assembly or a Reduced Pressure Principal Backflow Preventer, per City Standard Plans.

6.09(C). The type of Backflow Preventer required will be recommended by the Design Engineer, depending on whether the location is deemed to be a low hazard potential or whether dangerous or toxic substances are involved, and approved by the City Engineer.

6.09(D). Backflow prevention devices shall be approved by the City and shall bear the stamp of Underwriters Laboratories (U.L.).

6.09(E). Devices shall be installed on private property.

6.10 Dead end Runs

Permanent dead end runs shall be no longer than 250 feet unless on a cul-de-sac. Eight-inch mains shall be used on dead end runs, which serve fire hydrants. Reasonable looping of water mains will be required.

6.11 Blow-Offs

Blow-Offs shall be constructed at the end of all dead end runs. Blow-Offs for future extensions shall be installed at mains to be extended at a later date. Installation shall be in paved areas in conformance with Standard Plan 409. For dead ends at high points of water mains a combination air and vacuum release valve assembly and blow-off conforming to Standard Plan 410 is required.

6.12 Thrust Blocks

Thrust blocks shall be installed in conformance with Standard Plan 414. Joint Restraints are an acceptable alternative.

6.13 Maintenance Responsibility

6.13(A). The City will maintain water mains and water services located within the public right-of-way or within dedicated public utility easements from the main up to and including the domestic meter and the detector meter.

6.13(B). Property owners shall maintain backflow prevention devices and service runs beyond the meter. Backflow prevention devices shall be located on private property.

SECTION 7

RECLAIMED WATER STANDARDS

7.01 General

7.01(A). Reclaimed Water Systems shall be designed and constructed in accordance with all City Regulations, including the Water Master Plan (including all supplements thereto), Sanitary Sewer Master Plan (including all supplements thereto), City Standard Plans, City Standard Specifications, and City Design Standards. For each Development project, the design of the reclaimed water system shall be of such size to provide reclaimed water supply and distribution to adequately convey all reclaimed water that can be reasonably anticipated to be needed for the development project, and the surrounding areas identified in the City's master plans. Design Engineers are advised to review proposals, which are potentially at variance with the Master Plans with the City Engineer prior to proceeding with design studies.

7.01(B). Unless otherwise specified in these Design Standards, all materials shall conform to the City's Standard Plans and approved material list.

7.01 (C). Unless otherwise specified in these Design Standards, all installations shall conform to the City's Standard Plans, Manufacturers installation instructions and all regulations prescribed by the California State Department of Public Health.

7.01 (D). California Department of Public Health regulations require water mains and supply line to be installed at least 4 feet horizontally from, and one foot above a parallel pipeline conveying reclaimed water.

7.02 Vertical Alignment

7.02(A). The minimum cover on all reclaimed water mains shall be 4 feet from the top of pipe to finish grade.

7.02(B). Separation from potable water pipelines shall comply with California Code of Regulations Title 22.

7.02(C). Where a reclaimed water main and a potable water main cross, the reclaimed water main shall have a minimum clearance of 12 inches below the potable water main. Reclaimed water mains shall only cross potable water mains at an approximate 90 degree angle.

7.02(D). Top of pipe elevations shall be shown on all reclaimed water main improvement plans at high points, low points, grade breaks, and at all water main crossings.

7.02(E). At high points (any elevation difference greater than $\frac{1}{2}$ diameter of the pipe) within the distribution system, combination air release and air/vacuum release valves enclosure shall be tagged recycled water. CAVs shall be either APCO or Crispin valves with surge attenuation, as determined by the Design Engineer and approved by the City Engineer. Location shall be shown in plan and profile view on all improvement plans.

7.03 Horizontal Alignment

7.03(A). Reclaimed water mains shall be installed within the paved portion of the street right of way when possible. All reclaimed water mains shall be installed within dedicated right of way or dedicated easements with a minimum width of 20 feet. Alignment shall be parallel to the street centerline wherever possible.

7.03(B). In new development projects, the horizontal alignment of reclaimed water mains shall be 10 feet north or 10 feet west of the street centerline, as shown on Standard Plan #504. In existing streets and nonresidential streets, the Developer may request a deviation from this standard in accordance with Section 1.05, but in no case shall there be less than 4 feet horizontal clearance to a water main. Curved reclaimed water mains are allowed in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

7.03(C). The reclaimed water system shall be looped, as required, to provide adequate flow and circulation.

7.04 Pipe Size and Material

7.04(A). Unless otherwise specified in the Water Master Plan, the minimum size pipe used for reclaimed water mains shall be 4 inches. All reclaimed water systems shall be installed with tracer wire and warning tape as per Standard Plan #600 & #601.

7.04(B). Pipe material for reclaimed water mains shall be PVC. All reclaimed water main distribution pipe 4 inch thru 12 inch shall be C900 "purple pipe". All reclaimed water main distribution pipe greater than 12 inches shall be C905 "purple pipe". Ductile Iron pipe shall only be used in special cases and with the City Engineer's approval. Buried ductile iron pipe shall be wrapped with a purple colored polyethylene membrane in accordance with AWWA C105. The

polyethylene sheets shall be 8 mils thick, minimum, and labeled "RECLAIMED WATER - DO NOT DRINK".

7.04(C). Material for recycled water fittings shall be ductile iron in conformance with the Standard Specifications for potable water fittings.

7.05 Services

7.05(A). The minimum size service is 1-1/2 inch and shall be installed in conformance with Standard Plan 600. The minimum size service for a streetscape application and neighborhood park shall be 4 inches

7.05(B). All water services shall be metered. Meters shall be furnished and installed by the developer. The minimum separation between reclaimed water and potable water services shall be 4 feet outside of pipe to outside of pipe. All water meters shall be Sensus radio read with Flexnet 520M. Meters shall not be installed in driveways or areas subject to traffic.

7.05(C). Any reclaimed water connection larger than 4 inches connecting to an existing main shall be subject to review by the City Engineer. Connections shall be made with a cut in and a tee installed on the main. Hot taps may be considered by the City Engineer. If any reclaimed water main will experience a shutdown, all affected users must be provided a 72 hour advanced written notice. All written notices shall be reviewed and approved prior to the Developers distribution of said notices.

7.06 Valves

7.06(A). Valves shall be installed on all reclaimed water mains according to the following schedule: 4 valves at crosses; 3 valves at tees. Where no reclaimed water line intersections are existing, a main line valve shall be installed every 1000 feet maximum. Valves installed on all 10 inch and smaller mains shall be gate valves. Mains 12 inch and larger shall utilize butterfly valves. List valve information on approved material list.

7.06(B). Valves shall be installed in conformance with Standard Plan 402.

7.07 Backflow Prevention Devices

7.07(A). The need for and type of backflow prevention device required will be determined by the Design Engineer and approved by the City Engineer prior to installation. If a backflow prevention device is required, all backflow prevention

devices shall bear the stamp of Underwriters Laboratories (U.L.). All backflow prevention devices shall be tested and certified prior to acceptance by the City. Devices shall be installed on private property.

7.07(B). Property owners shall maintain backflow prevention devices and service runs beyond the reclaimed water meter. Backflow prevention devices shall be tested and certified once a year.

7.08 Meters Boxes and Vaults

7.09 Dead end Runs

7.09(A). Permanent dead end runs shall be no longer than 250 feet unless on a cul-de-sac. Eight inch mains shall be used on dead end runs which serve fire hydrants. Reasonable looping of water mains will be required.

7.10 Blow-Offs

7.10(A). Blow-offs shall be installed in conformance with Standard Plan 602.

7.11 Thrust Blocks and Joint Restraint

7.11(A). Thrust blocks shall be installed in conformance with Standard Plan 414.

7.11(B). All PVC bell joints shall be restrained for both C900 and C905 PVC pipe. The bell joint restraint shall consist of either an approved restrained PVC joint provided by the same manufacturer of the PVC pipe or approved bell joint harness. All bell joint restraint harness assemblies shall be made of ductile iron, coated with a manufacturer applied epoxy coating or polyester powder coating, including stainless steel bolts, nuts and rods. The bell joint restraint harness shall be manufacturer approved for use with PVC pipe and rated for at least 200 psi.

7.11(C). All valve and fittings shall be restrained to C900 and C905 pipe with an approved wedge action retainer gland or other approved restraining method. All DIP fittings for reclaimed water use shall be identified by purple wrapping with 8 mil polyethylene wrap. Alternate restraining methods and mechanical joint restraints may be used upon approval of the City Engineer.

7.12 Tracer Wire

7.12(A). Tracer wire shall be installed along all portions of the main including service runs regardless of size and type of material. Tracer wire shall be attached to the reclaimed water main or service run in no less than three locations per pipe section

by using Christy's 10 mil tape or approved equal. Duct tape of any kind is not allowed. Tape shall be wrapped around the entire pipe a minimum of one complete wrap.

7.12(B). Tracer wire shall be 10 AWG annealed bare copper solid strand wire with HMW-PE (High Molecular Weight Polyethylene) insulation material, a minimum insulation thickness of 0.045". Insulation color shall be "PURPLE".

7.13 Detectable Marking Tape

7.13(A). Detectable marking tape shall be Christy's or approved equal 6 inch wide marking tape. The standard color/legend combination shall be as follows: color-purple, text "Caution Recycled/Reclaimed Water Line Buried Below".

SECTION 8

STREET LIGHTING

8.01 General

8.01(A). All street lighting shall be LED, installed as required by the City Standard Plans. The lighting system shall be designed to best serve the area and to minimize the length of service runs from the points of connection to the street lights.

8.01(B). In the Hill Area, low glare streetlights shall be utilized. The lamps shall be shielded from the top and sides. Developer shall submit plans for City Engineer review and approval, which indicate compliance of low, glare street lighting and appropriate shielding.

8.01(C). Developer shall submit photometric analysis plans for City Engineer review and approval, which will indicate compliance with lighting design requirements of Standard Plan #146 and Figures 8-1 through 8-5.

8.02 Locations

All streetlights shall be shown on the Improvement Plans. The location and spacing shall be as outlined below and as shown on Figures 8-1 through 8-5. Additional streetlights shall be provided per note #15, Standard Plan 146.

8.02(A). Spacing

1. The maximum distance between street light standards shall be: 200 feet on residential streets, 150 feet on collectors and industrial streets, 120 feet on minor arterial streets, 70 feet on major arterial streets without a median, and 120 feet on major arterial streets with a median.
2. Street light standards shall be installed on alternating sides except when medians are to be constructed. Street lights in medians are to be installed using double, 15' mast arms on 30-foot high poles maximum 120 feet apart and at least 20' from the median island nose. Lights shall be evenly spaced as much as possible.

8.02(B). Cul-de-sacs

1. A streetlight is required when the cul-de-sac is more than 100 feet deep as measured from the face-of-curb extension of the through street to the face-of-curb at the rear of the cul-de-sac.

2. A streetlight is required at the midpoint of the cul-de-sac if the depth, as measured above, is greater than 300 feet.

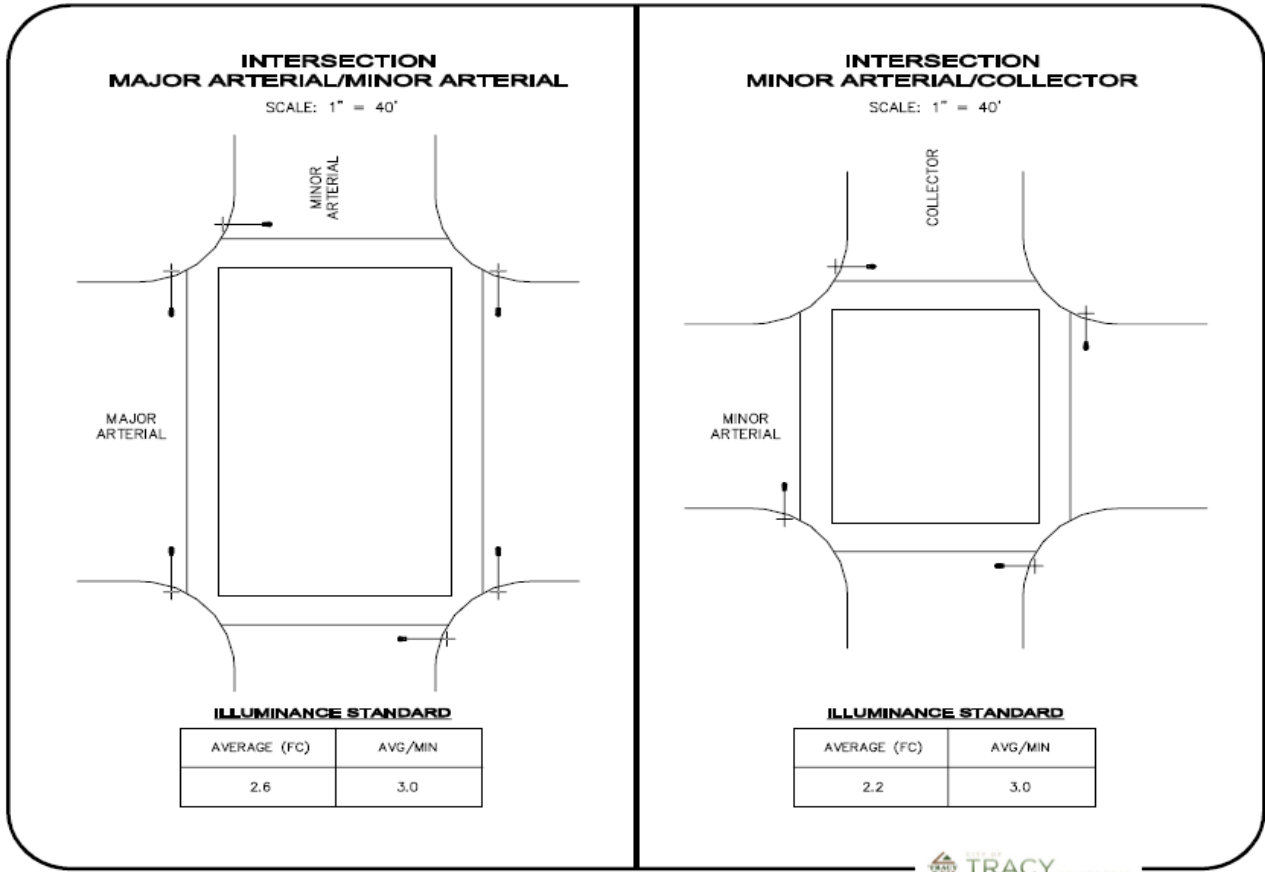
8.02(C). Intersections. When standard is to be placed at an intersection, preference shall be given to the larger street. The number of electroliers placed at intersections shall be as follows.

1. For a residential/residential intersection, a collector/residential intersection, or a minor arterial/collector intersection there shall be a minimum of 4 electroliers, one at each corner extending over each approach.
2. For a major arterial/minor arterial intersection, there shall be a minimum of 6 electroliers: 4 shall extend over the major arterial and 2 over the minor arterial.
3. Additional electroliers shall be provided as necessary to comply with the intersection lighting design requirements of Standard Plan 146, Figures 8-1 and 8-2.

8.03 Design Criteria

8.03(A). Poles, mast arms and footings shall be designed to resist the overturning caused by a 100 mph wind load.

8.03(B). Street light conduit shall be a minimum of one and a half (1.5) inches in diameter and designed for a maximum fill of 26%. Existing conduits may be sized for a maximum fill of 40%.



TYPICAL INTERSECTION LIGHTING REQUIREMENTS



FIGURE 8-1

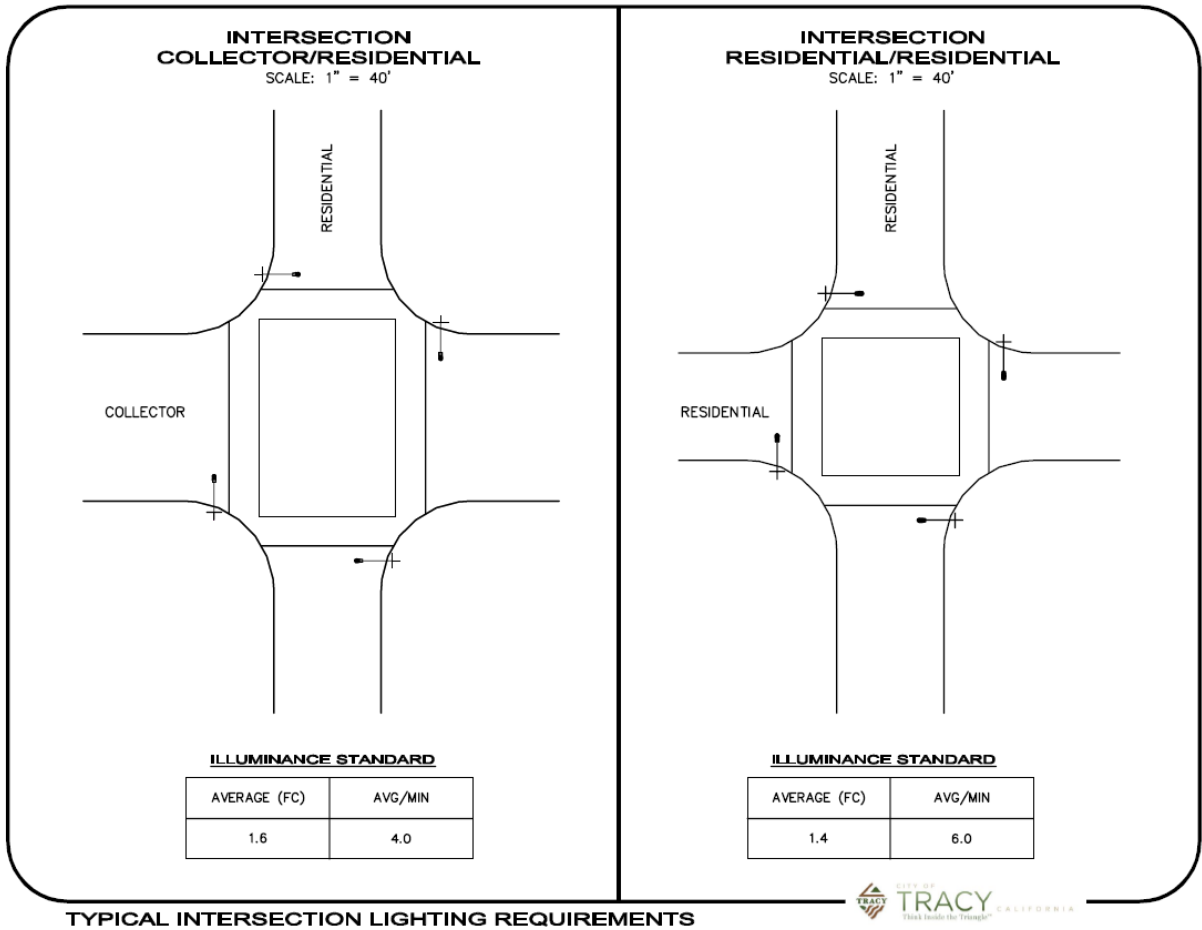


FIGURE 8-2

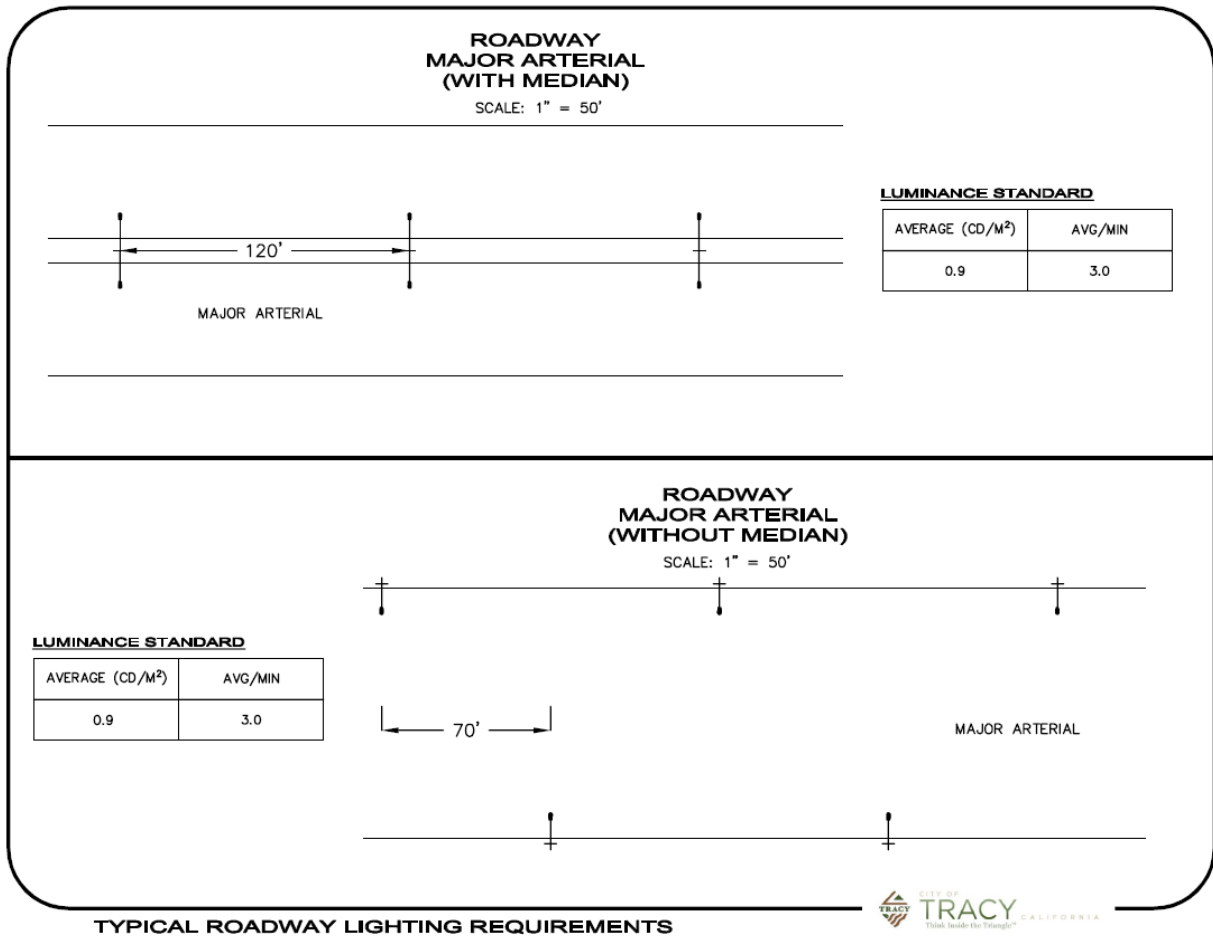


FIGURE 8-3

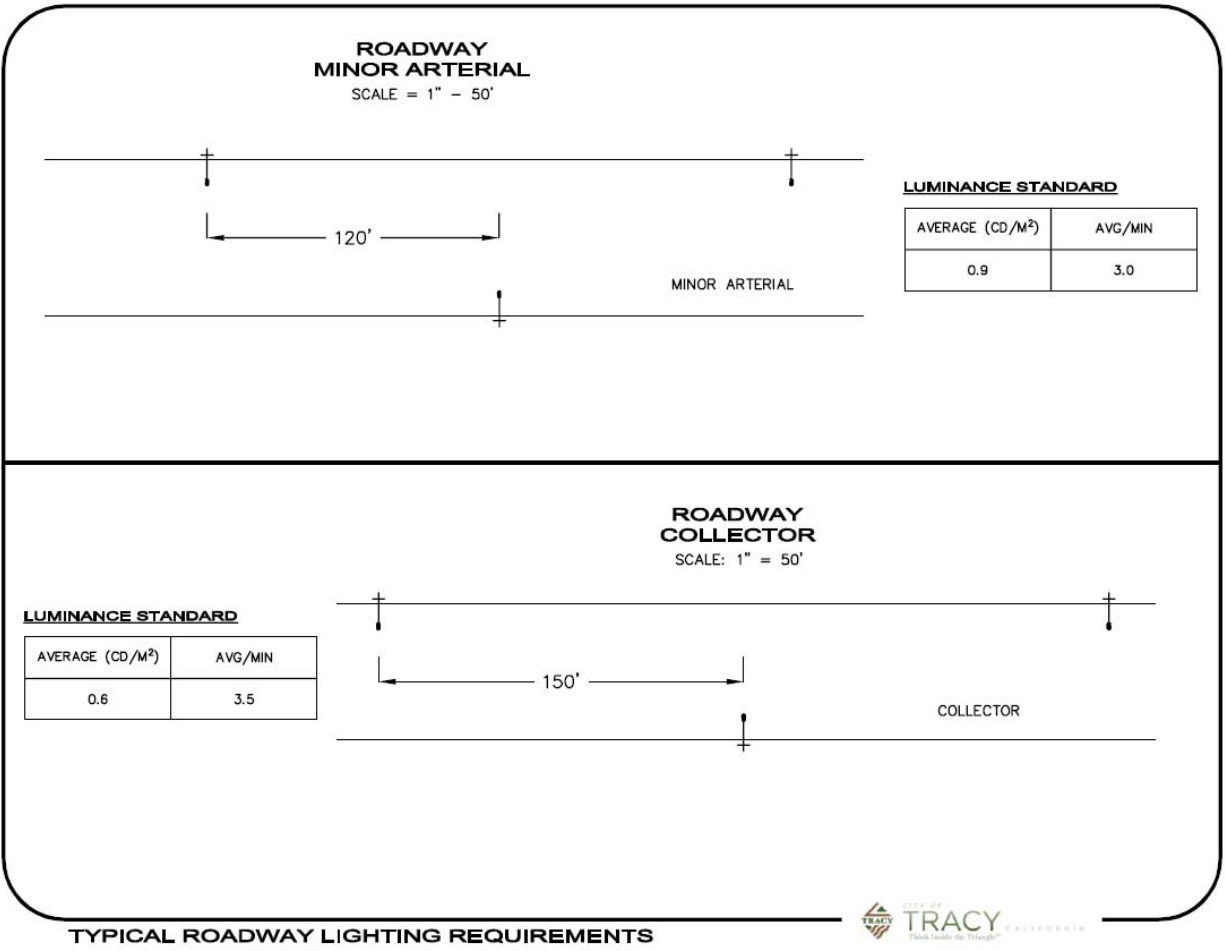
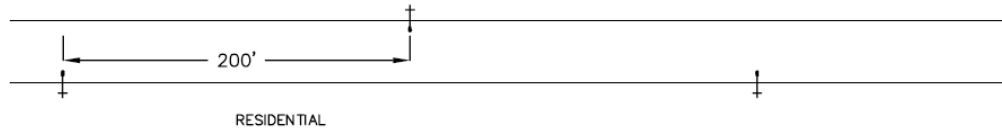


FIGURE 8-4

**ROADWAY
RESIDENTIAL**
SCALE: 1" = 70'



LUMINANCE STANDARD

AVERAGE (CD/M ²)	AVG/MIN
0.5	6.0

TYPICAL ROADWAY LIGHTING REQUIREMENTS



FIGURE 8-5

SECTION 9

GRADING DESIGN STANDARDS

9.01 General

9.01(A). All grading shall be designed in accordance with the soils report and Chapter 18 of the latest California Building Code as specified in Chapter 9.04 of Tracy Municipal Code Title 9.

9.01(B). In the Hill Area, phasing of grading shall be identified within the grading permit and shall address stock piling and hauling of excess material, temporary and permanent erosion control, and drainage provisions. All finished slopes between 5 and 15 feet in height, as measured from the toe of slope to the top of slope, shall be contour graded. Contour grading shall include the use of horizontal and vertical curve variations, creating undulating terrain, rounding of slopes at slope intersections and transition zones with natural grade, and creating pad configurations with some curvilinear perimeters. All finished slopes greater than 15 feet in height, as measured from toe of slope to top of slope shall be landform graded. Grading shall include following underlying topographic features, rather than cutting across them for a maximum of 15 feet in depth.

9.01(C). The maximum slope allowed in the Hill Area shall be a 3:1 ratio except where the grade differential is one foot or less where the slope may be 2:1 if supported by the soils report. It is recognized that certain limited exceptions may be necessary. Exceptions shall be minimized and shall provide compensating engineering mitigations. Further, all property lines for lots shall be at the top of the slopes in accordance with paragraph 9.03(A) of this section. Grading shall conform to the following standards for pad-graded lots:

1. SIDE YARDS - The vertical differential between adjacent building pads shall not exceed 5 feet. A combination of retaining walls and 3:1 slope may be used. Where retaining walls are used, the property line may be at the face of the retaining wall provided that no slope is involved.
2. REAR YARDS - Slopes shall not exceed 10 feet in vertical height. Where 3:1 slopes are used, there shall be a minimum of 10 feet between the toe of slope and the furthest projection of the building footprint. Where retaining walls are used, there shall be a minimum of 18 inches of level soil at both the top and bottom faces of the retaining wall and a minimum of 10 feet between the face of a retaining wall and the furthest projection of a building footprint.

9.01(D). In the Hill Area, every reasonable effort shall be made to minimize grading impacts to harmonize with the natural contours and character of the land, including

preservation of trees and their drip lines. The natural Preservation of open, undisturbed ridgelines shall be further achieved through site planning and grading plan review.

9.02 Soils Report

A comprehensive soils report shall be prepared for each development project in the City. The report must be prepared by a duly licensed Professional Engineer. A minimum of five tests samples shall be taken. It shall include R values (if greater than 5) taken at the site with a map showing the locations and depths of the test samples. Additionally, it shall include ground water elevations, excavation and grading recommendations, determination if expansive soil is present, foundation recommendations, drainage and erosion control methods, etc.

9.03 Grading at Property Lines

9.03(A). The fence for any proposed or existing site or parcel located within the grading project shall be setback a minimum 1.5' from the top of the slope.

9.03(B). Excavation and fill slopes shall be set back a minimum of two feet from the project boundary line except as provided below.

9.03(C). Pad excavations may cross a phasing line of a project as long as a method has been provided to allow construction on the newly created parcel, which will protect the right of any future owners of either phase of the project. The pad extension shall extend a minimum two (2) feet across the phasing boundary line of the project.

9.03(D). Cut or fill slopes may be allowed on adjacent existing parcels with a recorded slope easement from the current owners of the existing parcel.

9.03(E). Retaining walls shall be masonry or reinforced concrete. Calculations shall be provided with submittal of improvement plans for walls 4 feet and higher from bottom of footing to top of wall and will require a City Building Permit.

9.04 Lot Grading

9.04(A). Lots shall be graded to slope a minimum of 1% toward a public street from the rear of the lot to the back of fronting sidewalks or top of curb grades. Level pad elevations for building shall be at least 0.1' above the high point as determined above. A developer may request a deviation from this standard, in accordance with Section 1.05, if the developer provides documentation to the satisfaction of the City Engineer that special conditions exist and that disposal of all site drainage can be provided in a safe manner. However, no bubble up drains or low points at the backyard will be allowed.

9.04(B). Lots shall be graded such that no pad elevation shall be less than 0.7' above the release point of the subdivision. The release point shall be defined as the point at which storm waters leave the subdivision with total failure of the storm drain system.

9.04(C). Within the Hill Area, grading shall be limited to required building pad areas, driveways, and adjacent outdoor amenities. Developers shall use foundation systems that minimize grading, forcing the building to conform to the land, rather than conforming the land to the building. Where feasible, lot-building pads shall be designed to conform with contours and to daylight in the center of the building pad to ensure a minimum of cut and fill. Individual lot retaining walls within required front or side yard setbacks shall not exceed 3 feet in height. All other retaining walls shall not exceed 6 feet in height. The combined height of a retaining wall and fence shall not exceed 8 feet except that in side yard conditions the combined height of a retaining wall and fence combination may be up to 10 feet if side yard set backs are increased one foot for each foot that the combination exceeds 8 feet.

9.05 Work During Rainfall Months

9.05(A). Grading operations shall be targeted for the dry months of the year (April 15 to October 15). If project construction occurs during rainy weather season (October 15 to April 15), erosion and sediment control measures must be in place prior to and during construction. All stockpiled materials must be covered and shall not be deposited or stored where material may be transported to the City's storm drainage system. Best Management Practices described in the ESCP or SWPPP shall be maintained continuously during active construction.

9.05(B). All slopes constructed as part of the cut/fill operations shall be hydro seeded as soon as final grading of each slope has been completed. All storm drain inlets shall be protected by best management practices described in either the site SWPPP or ESCP prior to construction activities and maintained throughout active construction. Construction entrances shall be stabilized per Caltrans Construction Site Best Management Practices (BMP) Manual or the California Stormwater Quality Association (CASQA) BMP Handbook for New Development and Redevelopment.

9.06 Erosion Control

9.06(A). An Erosion and Sediment Control Plan is required for any grading project. The plan shall be submitted for review and approval by the City Engineer or his designee.

9.06(B). The Erosion and Sediment Control Plan shall show control facilities such as, desilting basins, detention basins, interim seeding, silt fences, etc. Erosion Control Plans will be reviewed and approved in the same manner as grading plans.

9.06(C). Erosion Control Plans shall include the following:

1. All slopes constructed as part of cut/fill operations shall be seeded and planted as soon as final grading has been completed. Slopes shall be covered when not actively being worked on and shall not be placed where sediment may discharge to the City's storm drainage system.
2. Temporary stockpiles of soil shall have in place best management practices as described in the approved project SWPPP or ESCP.
3. Temporary runoff channels that drain construction zones shall have best management practices outlined in the approved project SWPPP or ESCP.
4. All storm drain inlets shall be protected per Caltrans Construction Site Best Management Practices Manual or the California Stormwater Quality Association (CASQA) BMP Handbook for New Development and Redevelopment until the area is stabilized.
5. Construction entrances to all City streets shall be stabilized per Caltrans Construction Site Best Management Practices Manual or the California Stormwater Quality Association (CASQA) BMP Handbook for New Development and Redevelopment

9.06(D). Both an Interim and Final Erosion Control Plan shall be submitted, and shall be designed to protect adjacent property, water courses, public facilities and receiving water from an abnormal deposition of sediment or dust. The Design Engineer shall be responsible for inspection and modification of the erosion and sediment control devices during the rainy season. After each rainstorm, per the SWPPP or ESCP, conduct BMP site inspection and make any necessary repairs, changes, and cleanups necessary to ensure BMP's are working properly.

9.06(E). For all grading on property of 1 acre or more, the designer shall submit one (1) electronic copy of the SWPPP to the Utilities Department and one (1) hard copy to the Design Engineer. A copy of the SWPPP must be available for review at all times during construction at the project site.

9.07 Trenching and Backfill

9.07(A). Where the depth of cover over any utility is less than three feet or greater than 15 feet, the Design Engineer must provide load calculations, special trench designs, or both, to ensure integrity of the utility.

9.07(B). In existing public streets the standard “Tee” trench is to be used with no trenches left open overnight; temporary paving or plating is required.

SECTION 10

WALL DESIGN STANDARDS

10.01 General

10.01(A). Walls shall be designed and constructed in accordance with all City Regulations, including Tracy Municipal Code Title 9, the Parks and Streetscapes Standard Plans (including all supplements thereto), Chapter 16 of the California Building Code, the Standard Specifications, and these Design Standards.

10.02 Design Standards

10.02(A). Sub Drains. Sub drains shall be installed at the bottom of all retaining walls. The holes, or perforations in the pipe(s), shall be placed downward to prevent them from becoming plugged, and the pipes shall be laid in gravel (pervious) bedding which entirely surrounds the pipe. The pipe and gravel shall be wrapped in a filter fabric. A building permit shall be required prior to the construction of any retaining wall. Discharge locations for sub drains shall be shown on the civil plans and approved by the City Engineer.

9.02(B). Pier Depth. Pier depth shall be calculated per Tracy Municipal Code Title 9.

9.02(C). Wall Foundation Encroachments. If the foundation of the wall encroaches on private property, an easement to the City for the width of this encroachment must be provided.

10.03 Finish Treatments

Finish treatments shall be approved by the City and shall be in general conformance with the Parks and Streetscapes Standard Plans.

10.04 Color

All color shall be integral to the wall.

10.05 Panel Walls

Panel walls are not permitted in the City.

10.06 Walls in Hill Areas

10.06(A). In the Hill Area, where wall heights are within fifty (50) feet of major roadways, residences, commercial or public facilities or sites (such as parks or parkways), and where the grade differential is greater than 10 feet, walls shall be broken into tiers or steps, each of which shall not exceed a height of 6'. Each wall tier shall be offset a minimum distance of 4 feet and appropriately landscaped/irrigated to further reduce visual impacts of the wall system. Shrubs, vines, climbing groundcover or other approved landscaping could be used. Design of the wall (materials, colors) shall be compatible with the natural surroundings. The maximum height of any wall, regardless of its visibility from off-site viewpoints, shall be 12 feet.

10.06(B). No retaining wall shall adjoin the edge of any public walkway. A landscaping/setback buffer width of not less than 4 feet shall be provided between the wall and the walkway.

10.07 Improvement Plans for Masonry Walls

10.07(A). Improvement plans for masonry walls must include the following information at a minimum:

1. Top and bottom elevation of the wall on both sides.
2. Top of curb elevation.
3. Drainage behind (private side) and along the wall, with subdrain details and discharge locations shown.
4. Wall stationing.
4. Offset of the wall (staggering) in accordance with the final map.
5. Structural details for wall and foundation/footing.

SECTION 11

ESTIMATES FOR BONDING PURPOSES

11.01 General

Concurrently with the submittal of improvement plans, and prior to the City's approval of any final map, the developer shall prepare an estimated cost to construct all public improvements required for the development project, in accordance with the City's standard estimated unit costs, set forth in Appendix G of these Design Standards.

11.02 Costs

11.02(A). The City has established standard estimated unit costs for the most common public improvements constructed in conjunction with development projects. The City's standard estimated unit costs are based upon an estimate of the cost to the City to construct the public improvements, and are not intended to estimate the costs which the developer may incur. The City's standard estimated unit costs are set forth in Appendix G of these Design Standards.

11.02(B). A ten percent (10%) contingency shall be added to the standard estimated unit costs to protect the City from inflation of costs and unforeseen conditions.

11.02(C). The cost estimate must include the cost to underground overhead utilities if undergrounding of utilities is required.

11.03 Form

The estimate shall be in the form of a table listing items, units, and unit costs, quantity of each item and the total cost of the improvement.

11.04 Grading

11.04(A). Estimates for grading shall indicate cubic yards of both cut and fill to be moved onsite and cubic yards of import or export required, if any. Estimates for grading shall include the costs of any grading performed under a grading permit. Estimates for grading shall also include erosion and sediment control measures.

11.04(B). Grading of temporary drainage basins shall be shown as a separate item and shall include cost of refilling the basin, including all cost of restoring the basin area to its original condition.

11.05 Construction in Existing Streets

When new facilities are to be installed in existing streets, unit prices for underground improvements shall be increased. To simplify the estimation of these costs the City will require a fifty percent (50%) increase in unit prices.

11.06 Groundwater

If the City Engineer has information, based on a soils report or other reliable information, which indicates that ground water will be encountered during construction, unit costs for all pipelines installed within 2 feet of the ground water shall be increased by \$10.00 per lineal foot.

SECTION 12

DEMOLITIONS AND ABANDONMENT PLAN

12.01 General

A Demolition and Abandonment Plan shall be prepared when the development site has existing improvements upon it. The City's primary purpose for requiring the developer to prepare this plan is to identify those sites, which may have wells, septic tanks, septic tank leach fields, pipelines, underground storage tanks, utilities, drain tiles, irrigation facilities, retention basins, etc. that require special treatments for abandonment or significant costs to prepare the site for construction.

12.02 Content

The demolition and abandonment plan, when required, shall show all houses or other structures, wells, septic tanks, septic tank leach fields, pipelines, storm drain retention or detention basins, irrigation facilities, utilities, streets or roads, bridges or other concrete structures that currently exist at the site of the planned development. The Design Engineer is encouraged to contact the City Engineer, and Engineering Division staff, as early as possible during the design process to determine if this demolition and abandonment plan is required, what scale will be acceptable and which existing improvements are required to be shown. A San Joaquin County Valley Unified Air Pollution Control District " Compliance Questionnaire " must be filled out and submitted to the City of Tracy Building Department prior to any demolition work.

12.03 Scale

The drawings shall be prepared at a scale sufficient to clearly show all existing improvements, as described above.

APPENDIX A

LEGEND

PROPOSED	DESCRIPTION	EXISTING
	TRACT BOUNDARY	
	EASEMENT LINE	
	LOT LINE	
	RIGHT OF WAY	
	CENTER LINE	
	FLOW LINE	
	STORM DRAIN	
	SANITARY SEWER	
	WATER	
	RECLAIMED WATER	
	CURB & GUTTER	
	SIDEWALK	
	DROP INLET/ STORM WATER INLET	
	MANHOLE	
	FIRE HYDRANT	
	AIR RELEASE VALVE	
	BLOWOFF RISER	
	GATE VALVE	
	PAVEMENT MARKER	
	FENCE	
	SLOPE	
	CONTOUR ELEVATIONS	
	SPOT ELEVATION	
	MONUMENT	

APPENDIX B

CITY STANDARD NOTES

1. All work shall conform to City of Tracy Standard Specifications and Standard Plans. The work is subject to the inspection and approval of the City Engineer, and the Engineering Division inspectors. Contact Engineering Division Construction Management at (209) 831-4600, two working days (48 hours) prior to the start of any work to arrange for inspection.
2. These plans have been checked by the City of Tracy for conformance with the City's minimum standards, but such checking by the City does not relieve the developer from its responsibility to find and correct errors, omissions or make changes required by conditions discovered in the field during the course of construction. Any request by the developer to change these plans shall be submitted in writing to the City Engineer.
3. All revisions to this plan must be reviewed by the City Engineer prior to construction and shall be accurately shown on revised plans stamped and signed by the City Engineer prior to the installation of the improvements.
4. All construction staking for curb, gutter, sidewalk, sanitary sewers, storm drains, water lines, fire hydrants, and electroliers, etc., shall be done by the registered civil engineer of record or licensed Land Surveyor. Horizontal control and cut sheets shall be provided to the City prior to start of work.
5. Existing utilities are plotted from available records. The developer shall take precautionary measures to protect these utilities. The developer shall perform no excavation until all utility agencies and the City of Tracy have been notified and have been given the opportunity to mark their facilities in the field. Notify Underground Service Alert at (800) 227-2600 at least two (2) working days prior to any excavation. Some agencies such as irrigation districts may not be part of Underground Service Alert and must be contacted separately.
6. Water mains and services, sanitary sewer mains and laterals, storm drain mains and laterals, joint trench utilities, street light conduit, and all other underground utilities shall be installed, tested, repaired and retested if necessary prior to curb, gutter, sidewalk and street paving installation.
7. Survey Monuments shall be furnished and installed by the developer at locations shown on the Final Map. Submit to the City Engineer a Letter of Certification from the Licensed Land Surveyor certifying all fees have been paid and that all

monuments are installed and tagged in accordance with the approved Final Map prior to tract acceptance.

8. All underground utilities abandoned during construction shall be removed.
9. All sanitary sewer mains shall be balled and flushed, pass a low air leakage test, and video inspected (copies shall be given to the City of Tracy), in conformance with City of Tracy Standard Specifications prior to acceptance by the City. All testing shall be performed after 80% of the street aggregate base has been placed and compacted prior to paving.
10. All water lines shall be pressure-tested, disinfected, flushed, and tested for bacteria in conformance with the City of Tracy Design Standards and Standard Specifications prior to acceptance by the City. Testing shall be performed after 80% of the street base rock has been placed and compacted and prior to final lift of asphalt paving. Bacteria sampling shall be conducted by the City. After collection, the samples will be submitted to an independent lab for testing.
11. Testing
 - a) All sampling and testing called for by the City Engineer shall be paid for by the Developer or contractor.
 - b) Roadway subbase, base, asphalt, and trench backfill compaction testing shall be performed by a soils lab contracting with the City of Tracy.
 - c) Tests for subgrade R-values are required prior to the installation of base rock when R-values assumed in design are greater than 5.
 - d) A minimum of 48 hours' notice is required to schedule all soils testing services.
12. Street signs shall be installed at all intersections per City Design Standards, Standard Plans, and Standard Specifications.
13. Traffic signs shall be installed in conformance with the California Manual on Uniform Traffic Control Devices (CA MUTCD) at locations specified by City Design Standards, Standard Plans, and Standard Specifications.
14. Street striping shall include stop bars, centerline striping or markers, crosswalks and all other markings required by the City Design Standards, Standard Plans, Standard Specifications and CA MUTCD. Striping shall be done with

thermoplastic and reflective markers. Striping on all roadways shall be cat-tracked and approved by the City Engineer or designee prior to final installation.

15. All trenches shall be backfilled in accordance with City Design Standards, Standard Plans, and Standard Specifications. Compaction shall be achieved by mechanical means. No flooding, ponding or jetting shall be permitted.
16. When widening the pavement on an existing road, the existing pavement shall be cut to a neat line and removed back to an existing adequate structural section, or to the original road section. An exploratory trench, or pot holing, may be required to determine the limits of pavement removal.
17. Existing curb, gutter, and sidewalk within the project limits that are damaged or displaced, even though they were not to be removed, shall be replaced per City Standard Plans even if damage or displacement occurred prior to any work performed by the Developer.
18. At the intersection of two streets, the full structural section of the most prominent street shall be continued through the intersection.
19. Asbestos Cement Pipe (ACP) or fittings shall not be used within the City of Tracy and shall be removed if found.
20. Contractor shall notify the City Engineer immediately upon the discovery of a survey monument within the construction limits.
21. All street monuments, lot corner, and other permanent pipe or monuments within the construction limits shall be referenced by a registered land surveyor by means of a pre-construction corner record. Monuments disturbed during the process of construction shall be replaced prior to City acceptance of improvements.
22. The Developer shall control dust at all times during construction as required by the City of Tracy.
23. Prior to trenching for any sewer, water, or storm drain pipe, the Developer shall verify, in the field, the size and location of the existing pipe at the point of connection. Any deviation from the plans shall be resolved by the Design Engineer and reviewed by the City Engineer prior to trenching.
24. Manholes, valves, cleanouts, etc., shall be brought to finish grade by the developer after the final paving course is placed. Existing iron shall be lowered, then raised after final paving per Standard Plan 118. Locking grade rings of any kind are not allowed.

25. The installation of erosion and sediment controls per the approved SWPPP or ESCP shall be implemented prior to construction and maintained throughout the duration of the project. The BMPs shall not allow turbid or sediment-laden waters to enter the storm drainage system.
26. If, during construction, archaeological remains are encountered, construction in the vicinity shall be halted, an archaeologist consulted, and the City Engineer notified. If, in the opinion of the archaeologist, the remains are significant, measures as may be required by the City of Tracy, shall be taken to protect them.
27. Work shall be restricted to weekdays between 7:30 AM and 7:00 PM and weekends between 9:00 AM and 5:00 PM. Alternate hours must be approved by the City Engineer. Work which requires any traffic lane closures or restriction of the traveled way shall be limited to 9:00 AM to 3:30 PM in the commute direction and 8:00 AM to 4:30 PM in the non-commute direction. Commute directions shall be as determined by the City Engineer.
28. The overtime cost for inspecting work requiring City inspection, performed before 7:00 AM and after 3:30 PM, shall be paid by the developer before the work is authorized.
29. Construction equipment which operates at a noise level in excess of 85 decibels (measured on the A-weighted scale defined in ANSI S-1.4) at a distance of 100 feet from the equipment is prohibited.
30. The developer shall keep excavations free from water during construction. The static water level shall be drawn down a minimum of 2 feet below bottom of excavations to maintain undisturbed state of natural soils and allow placement of any fill to specified density. Disposal of water shall not damage property or create a public nuisance.
31. Disposal of construction dewater into the City sanitary sewer or storm drain system may be allowed by the City when jurisdictional water quality standards are satisfied. Contractor shall submit a dewatering plan, obtain all necessary permits, and conduct water quality testing as required to comply with permit requirements. The dewatering plan must be approved by the Utilities Department prior to beginning any dewatering activities.
32. Developer shall maintain all streets, sidewalks, and all other public right-of-way in a clean, safe and usable condition throughout the course of construction. All spills of soil, rock, construction debris, etc., shall be removed immediately from publicly owned property. All adjacent property, private or public, shall be maintained in a clean, safe and usable condition. The developer shall provide for

safe, unobstructed access to private property adjacent to work throughout the period of construction.

33. If a development project connects to existing utilities, which require trenching of existing street pavement, the Developer is required to repair the street by providing a 2" grind of the existing asphalt and replacing with 2" of asphalt concrete over pavement reinforcement fabric. The limits of the overlay shall extend 25' on either side of trenches crossing perpendicular to the street centerline and from centerline to lip of gutter for longitudinal trenches.

APPENDIX C

OWNER'S STATEMENTS

Pursuant to Government Code Section 66436, the undersigned, _____ (hereinafter "Owner(s)"), do hereby state that I (we) are the owner(s) of all the real property and easements delineated and embraced within the exterior boundary line of the herein embodied final map entitled " _____, City of Tracy, County of San Joaquin, State of California" consisting of _____ () sheets (hereinafter "Final Map"), that (Owner(s)) have caused the Final Map to be prepared for record and consent to the preparation and recordation of the Final Map; that the Final Map particularly sets forth and describes all the lots intended for sale by number with their precise length and width; that the Final Map particularly sets forth and describes the parcels of land reserved for public or private purposes by their boundaries, courses and extent.

Pursuant to Government Code Section 66439, the Owner(s), do hereby offer to dedicate to the City of Tracy forever the parcels of real property shown upon the Final Map marked _____ as embraced within the exterior boundary line upon the Final Map, for the uses and purposes of public highways.

Pursuant to Government Code Section 66439, the Owner(s), do hereby offer to dedicate to the City of Tracy forever the parcels of real property shown upon the Final Map marked _____ as embraced within the exterior boundary line upon the Final Map, for the uses and purposes of public _____ [parks].

Pursuant to Government Code Section 66439, the Owner(s), do hereby dedicate to the public forever a non-exclusive easement together with the right to construct, reconstruct, repair and maintain poles, wires, cables, pipes, and conduits and their appurtenances upon, over and under the real property shown upon the Final Map marked "P.U.E." or "Public Utility Easement" as embraced within the exterior boundary line upon the Final Map.

Pursuant to Government Code Section 66439, the Owner(s), do hereby dedicate to the City of Tracy forever a non-exclusive easement together with the right to construct, reconstruct, repair and maintain public improvements and their appurtenances upon, and under the real property shown upon the Final Map marked "P.S.E." or "Public Service Easement" as embraced within the exterior boundary line upon the Final Map.

CITY CLERK'S STATEMENT

State of _____)
County of _____)

Pursuant to Government Code Section 66440, I, _____, am the City Clerk of the City of Tracy (hereinafter "City Clerk"), and the clerk of the City Council of the City of Tracy (hereinafter "City Council"). I do hereby state that the herein embodied final map entitled "_____, City of Tracy, County of San Joaquin, State of California" consisting of ___ sheets (hereinafter "Final Map"), was presented to the City Council, at the duly noticed meeting held on the _____ day of _____, 202_, and that the City Council did thereupon by Resolution No. _____, duly passed and adopted at said meeting: (1) approved the Final Map and authorized its recordation, and (2) accepted on the behalf of the public, for public use, the dedication of all real property shown upon the Final Map marked "P.U.E." (or "Public Utility Easement") and "P.S.E." (or "Public Service Easement"); and (3) accepted, subject to completion of improvements, the offer of dedication of all real property shown upon the Final Map marked _____ for the uses and purposes of public highways and _____ [parks].

In witness whereof I have hereby signed this Final Map this _____ day of _____, 20__.

CITY CLERK, AND CLERK
OF THE CITY COUNCIL, OF THE CITY
OF TRACY, COUNTY OF SAN JOAQUIN,
STATE OF CALIFORNIA

By: _____
CITY CLERK

COUNTY RECORDER'S STATEMENT

Filed on this ____ day of _____, 200__, at _____M, Book ____ of parcel maps, at page _____, at the request of _____.

COUNTY RECORDER

Recorded at the request of _____ at _____M. on the ____ day of _____, 200__, in Book ____ of maps at Page _____, in the office of the County Recorder of the County of San Joaquin, State of California.

COUNTY RECORDED IN AND FOR THE
COUNTY OF SAN JOAQUIN, STATE OF
CALIFORNIA

By: _____
DEPUTY COUNTY RECORDER

SURVEYOR'S STATEMENT

Pursuant to Government Code Section 66441, I, the undersigned, _____, do hereby state that I am the surveyor responsible for the survey from which the herein embodied final map entitled "_____, City of Tracy, County of San Joaquin, State of California" consisting of _____() sheets (hereinafter "Final Map"), has been prepared. I further hereby state that: (1) the date of survey was _____; and (2) that said survey and this Final Map were made by me or under my direction; and (3) that said survey is true and complete as shown; and (4) the monuments are of the character and occupy the positions indicated on the Final Map [***ALTERNATIVE LANGUAGE FOR STATEMENT #4: the monuments will be set in the positions indicated on the Final Map by no later than two years after City Council approval of this Final Map**]; and (5) said monuments are [***ALTERNATIVE LANGUAGE: will be***] sufficient to enable the survey to be retraced.

Signed this _____ day of _____, 200__.

CITY ENGINEER’S STATEMENT

Pursuant to Government Code Section 66442, I, _____, City Engineer of the City of Tracy, do hereby state that I have examined the herein embodied final map entitled “_____, City of Tracy, County of San Joaquin, State of California” consisting of _____ () sheets (hereinafter “Final Map”). I further hereby state that: (1) the subdivision as shown upon the Final Map is substantially the same as it appeared on the tentative map, and any approved alterations thereof; and (2) all provision of Government Code, division 2, chapter 2, and all provisions of any local ordinances applicable at the time of approval of the tentative map have been complied with.

In witness were of, I have hereby signed this Final Map this _____, day of _____, 20__.

[NAME] RCE [LICENCE NO.]
CITY ENGINEER OF THE CITY OF TRACY
COUNTY OF SAN JOAQUIN,
STATE OF CALIFORNIA

CITY LAND SURVEYOR’S STATEMENT

Pursuant to Government Code Section 66442, I _____, do hereby state that I have examined the herein embodied final map and am satisfied that said map is technically correct.

[NAME] [Pre-1982] RCE or LS [LICENCE NO.]
LICSNSE EXPIRES 12-31-[YEAR]

ACKNOWLEDGMENT (CORPORATION)

State of _____)
County of _____)

On _____, 200__ before me, the undersigned, a Notary Public in and for said County and State, personally appeared _____ & _____, known to me (or proven to me on the basis of satisfactory evidence) to be the _____ & _____ of the corporation that executed the foregoing statement, and also known to me to be the persons who executed it on behalf of such corporation and acknowledged to me that such corporation executed the within statement pursuant to its by-laws or a resolution of its Board of Directors.

Witness my hand and official seal.

Signature: _____
NOTARY PUBLIC
IN AND FOR SAID
COUNTY & STATE

My commission expires: _____

ACKNOWLEDGMENT (PARTNERSHIP)

State of _____)
County of _____)

On _____, before me, the undersigned, a Notary Public in and for said State, personally appeared _____, personally known to me (or proven to me on the basis of satisfactory evidence) to be the persons that executed the within instrument as _____ partners on behalf of _____, the Partnership therein named and acknowledged to me that the partnership executed it.

Signature _____

My commission expires _____

ACKNOWLEDGEMENT (INDIVIDUAL)

State of _____)
County of _____) S.S.

On this _____ day of _____, 200____, before me, the undersigned, a Notary Public in and for said County and State, personally appeared _____, personally known to me (or proven to me on the basis of satisfactory evidence) to be the person (s) that execute the within instrument, and acknowledged to me that said individual (s) executed it.

MY COMMISSION EXPIRES	NOTARY PUBLIC IN AND FOR THE COUNTY OF ALAMEDA STATE OF CALIFORNIA
-----------------------	--

The undersigned, do hereby reserve to the homeowners of subdivision _____ a non-exclusive easement together with the right to construct, reconstruct, repair and maintain roads, streets or alleys and their appurtenances upon, and under the strips of land shown upon said map marked "P.A.E." or "Private Access Easement" as embraced within the exterior boundary line upon said map.

The undersigned, do hereby reserve to the Homeowners Association of subdivision _____ a non-exclusive easement together with the right to construct, reconstruct, repair and maintain, a private storm drain line and their appurtenances including the clearing of obstructions and vegetation upon and under the strips of land shown upon said map marked "P.S.D.E." or "Private Storm Drain Easement" as embraced within the exterior boundary line upon said map.

APPENDIX D

PLAN REVIEW CHECK LIST

Development Project Name _____
Development Project Number _____

Design Engineer _____
Contact Person _____
Telephone Number _____

Owner Name _____
Contact Person _____
Telephone Number _____

Developer Name _____
Contact Person _____
Telephone Number _____

Assessor's Parcel No. _____
Tentative Map Approval Date _____
Tentative Map Expiration Date _____

() First Check () Recheck # _____

- ___ Sets of Final Report of Action (Conditions of Approval) (Minimum: 2)
- ___ Original Signed Tentative Map (Minimum: 1)
- ___ Copy of Original Signed Tentative Map (Minimum: 1)
- ___ Sets of Plans (with calculations) (Minimum: 5)
- ___ Sets of Storm Drainage Package (Minimum: 4)
- ___ Sets of Engineer's Estimate (Minimum: 3)
- ___ Sets of Sanitary Sewer Package (Minimum: 2)
- ___ Sets of Final Map Package (Minimum: 5)
- ___ Sets of Soils Report (Minimum: 3)
- ___ Sets of SWPPP (Minimum: 1 electronic to WaterResources@cityoftracy.org and 1 hard copy)
- ___ Sets of Erosion and Sediment Control Plan (Minimum: 3)

Preliminary Bond Estimate \$ _____
Preliminary Plan Review Fee @ 5.78% \$ _____
Final Bond Estimate \$ _____
Final Plan Review Fee @ 5.78% \$ _____

I. General

- ___ 1. Plans on 24" x 36" standard City plan sheets.
- ___ 2. North arrow and scale on each sheet. North up and/or left.
- ___ 3. Titles and numbers on all sheets and match index.
- ___ 4. Conformance to Tentative Map and Conditions of Approval, including street and R/W widths, grading, drainage, sewerage, water lines, recycled water, number and size of lots etc.
- ___ 5. Complete package has been submitted, including joint trench plans, landscape and irrigation plans, and erosion and sediment control plans.

II. Title Sheet

- ___ 1. Name of Subdivision Tract or development project.
- ___ 2. Tract Number and Assessor's Parcel Number (APN).
- ___ 3. Vicinity Map with north arrow (north up and/or left).
- ___ 4. Sheet Index, show street names.
- ___ 5. City Engineer's Signature Block.
- ___ 6. Fire Code Official Signature Block.
- ___ 7. Design Engineer Signature Block, Geotechnical Engineer's signature block on Grading Plan.
- ___ 8. General Notes per Appendix B of the Design Standards (may be on sheet 2).

III. Sheet Two (And Three If Required)

- ___ 1. Utility map showing all streets, utilities, structures, etc. and show improvement plan sheet layout. (1" = 100' scale).
- ___ 2. Drafting symbol legend, specific to project.
- ___ 3. Street typical sections shown with street name, AC, AB, and ASB thickness, curbs, sidewalks, and right of way.
- ___ 4. Structural sections shown and agree with City Standards.
- ___ 5. Curb shown.
- ___ 6. Right-of-way and street widths shown.
- ___ 7. Cross-slope shown-note relative difference of and T/C.
- ___ 8. Sidewalk shown.
- ___ 9. Pedestrian paths shown.
- ___ 10. Drainage ways shown.
- ___ 11. Temporary and permanent bench marks and descriptions.
- ___ 12. List of Abbreviations.
- ___ 13. Provide minimum three temporary benchmarks established and shown on the plans.

IV. Demolition and Abandonment Plan (If Required)

- ___ 1. Show existing buildings and structures.
- ___ 2. Existing septic tanks and leach fields shown.
- ___ 3. Existing wells shown.
- ___ 4. Show existing trees and trees to be removed.
- ___ 5. Show existing private and public utilities.
- ___ 6. Show exiting tile drains and any required mitigation.
- ___ 7. Show existing pavements and concrete flatwork.

V. Grading Plans

- ___ 1. Existing contours and spot elevations shown at grade breaks and minimum 50 feet on center shown and extended 50' beyond project boundary. Provide a sufficient amount of contour lines to clearly represent surrounding terrain.
- ___ 2. Proposed pad grades.
- ___ 3. T/C elevations at property line extensions.
- ___ 4. T/C at grade breaks and curb returns shown.
- ___ 5. T/C at storm drain inlets shown.
- ___ 6. Storm drain lines and structures shown, including cleanouts or junction boxes.
- ___ 7. Street slopes at centerlines.
- ___ 8. Lot number, property and boundary lines shown.
- ___ 9. Show retaining wall and sound wall location and height, provide top and bottom wall elevations.
- ___ 10. Plan view of typical lot drainage. Minimum slope of drainage swales shall be 1%
- ___ 11. Section of typical lot to show property line, graded slopes, retaining walls, and fences.
- ___ 12. Show grading required for off-site drainage.
- ___ 13. Grading shown between back-of-curb or sidewalk and original ground at right-of-way line.
- ___ 14. Grading beyond right of way or project boundary to original ground/conform limits with associated construction easements.
- ___ 15. Grading conforms to adjacent properties shown such that no storm drainage is released from the site.
- ___ 16. Check no drainage across lot lines and lots to drain to streets.
- ___ 17. Maximum slopes 4:1 or per Soils Report.
- ___ 18. All pads elevations must conform to Design Standard 9.04(B).
- ___ 19. Elevations at rear of lots shown.
- ___ 20. Temporary erosion control and/or slope protection devices.

VI. Streets

A. Plan Views

- ___1. Wheelchair ramps shown per Standard Plans. Call out case numbers.
- ___2. Radius of curvature, central angle, and length shown on all street centerline curves as per Design Standard 3.05(C).
- ___3. Curb curve data given - central angle, length, and radius as per Design Standard 3.05(E).
- ___4. Scale 1" = 40' minimum or 1" = 20' if needed to adequately show improvements if required by City Engineer.
- ___5. Cul-de-sac radius per std. plan #114.
- ___6. Property corner cutoffs used when wheelchair ramps installed, otherwise concentric with curb.
- ___7. R/W and street width dimensions shown.
- ___8. Centerline stationing at 100' and at BC and EC of curves.
- ___9. Lot/parcel lines and numbers/letters shown.
- ___10. Cul-de-sac cross slopes from high point to gutter lip minimum 2% and Maximum 4%.
- ___11. Valley gutters (Standard Plan 117) - provide adequate amount of grades to clearly show flow across entire span
- ___12. Stationing and offset on all utilities and drainage structures shown.
- ___13. T/C elevation shown at all drain structures and fire hydrants.
- ___14. All public and private easements shown and dimensioned.
- ___15. Location of existing and proposed underground pipes and utilities shown.
- ___16. Location of fire hydrants as approved by Fire Code Official.
- ___17. Street monuments and benchmarks shown.
- ___18. Pedestrian Paths shown. Basic grades shown.
- ___19. Street names shown.
- ___20. Stations and elevations street intersections shown.
- ___21. All notes and symbols standard and conforming to legend.
- ___22. All existing utility poles, manholes, valves, air release valves, signs, mailboxes, trees, etc. shown. Indicate those to be removed, relocated or adjusted to grade.
- ___23. Continuations and cross streets properly referenced (For example: Match Line See sheet # ___).
- ___24. Project limits.
- ___25. Standard street knuckle per Standard Plan 113.
- ___26. Street signs, traffic signs and barricades shown.
- ___27. Driveway locations and widths shown. 3' vertical curb between driveways and 1.5' to property lines. Clearance requirements per Design Standard 3.09(D).
- ___28. Field inspection should identify any damaged frontage improvements. Damaged improvements shall be replaced per City Standards.

B. Profiles

- ___1. Vertical curves designed for proper speeds per Highway Design Manual.

- ___2. Minimum vertical curve lengths observed (50').
- ___3. Vertical scale 1" = 2".
- ___4. Vertical curve used for grade breaks greater than 2%.
- ___5. In cul-de-sacs, show profiles at centerline from end on T/C profile through the radius point to top of curb at end of cul-de-sac (dashed line).
- ___6. 2% maximum grade observed across intersections.
- ___7. 0.4% minimum grade observed on all streets at curb.
- ___8. All existing and proposed underground pipes and utilities shown; storm drain, water and sewers.
- ___9. Existing ground on centerline shown.
- ___10. Finished grade profile for top of curb shown.
- ___11. Centerline profiles and slopes of intersecting streets shown on to their point of intersection.
- ___12. Off-site profile to catch point shown where road is constructed beyond subdivision boundary (minimum 50-foot beyond project limits).
- ___13. Centerline stations and elevations shown at all BVC, EVC, PIVC, grade breaks, low points and high points, and TC or rim elevation at all drainage structures.
- ___14. All slopes in profile shown.
- ___15. Show all utility crossings with clearances indicated.
- ___16. Manhole and drop inlet invert and flowline elevations shown.
- ___17. Elevation at high and low points of water mains shown.

VII Sanitary Sewers

- ___1. System in agreement with Tentative map and Master plan.
- ___2. Design conforms to City Standards.
- ___3. Size of line shown (8" min. main, 4" min. lateral).
- ___4. Adequate cover (3' min to finished grade - 2' min. to sub-grade). Ductile pipe or engineered alternatives if shallower.
- ___5. Clearance with water main (1' vertical, 10' horizontal O.D.).
- ___6. Size, slope, length between structures, and type of pipe.
- ___7. Connection to existing facilities possible. Manhole installed when tying to existing lines.
- ___8. Extension possible. Lines to subdivision boundary.
- ___9. Sewer line to be located per Standard Plan 504.
- ___10. Curves allowed within 80% of recommendations of pipe manufacturer. Show curve data or offsets if concentric with centerline.
- ___11. Top of manhole elevations shown.
- ___12. Stations given for manholes.
- ___13. Sizes of existing lines shown.
- ___14. Pipe types allowed - VCP, PVC, SDR-26 and D.I.
- ___15. 600' maximum distance manhole to manhole and for pipe 15" and over, 400' maximum spacing for pipe 12" and under.

- ___16. Minimum 2 fps velocity @ total design flow.
- ___17. 0.2' drop around corner through manhole.
- ___18. Bolted manhole covers for any off street manholes.
- ___19. In unimproved areas, manholes extended 1' above ground.
- ___20. Check sanitary calculations.
- ___21. Laterals shown in plan and 11' center to center separation from water services and 1' below water if crossing (follow health department's diagram).
- ___22. Special approval areas shall be noted in profile (less than minimum cover and clearances).

VIII. Drainage

A. Hydrology - Hydraulics

- ___1. Calculations per City Design Standards and based on 10-year storm with minimum velocity of 2 fps.
- ___2. Calculations shall include: HGL, FL, EL, Q, A, S, V, freeboard at structures, structure losses, and tailwater assumptions.
- ___3. Adequacy of on-site and off-site drainage system verified.
- ___4. All starting water surface and tributary area calculations adequately verified.
- ___5. Drainage plan showing street systems, existing and proposed drainage system, slope arrows, tributary sub-areas in acres, peak flow in all pipes (1" = 100' preferred).
- ___6. All pipe and structures in tributary areas labeled to correspond with calculations.
- ___7. Multi-Agency Post-Construction Stormwater Standards - Project Stormwater Plan (for over 2500 square feet of impervious surfaces).

B. Easements

- ___1. Off-site drainage improvements (plan and profile) and accompanying easements shown. Off-site offers of dedication (plat map and legal description) for drainage easement submitted for review.
- ___2. Off-site work to be done but no easement required (right-of-entry submitted for review).
- ___3. Easement widths indicated.
- ___4. Easements across lots not permitted.

C. Structures

- ___1. Max. Diameter pipes through drainage structures observed.
 Standard D.I. - 24"
 Manhole Base - > 24"

- ___ 2. 1.00' minimum HGL to TC.
- ___ 3. Special structure calculation provided.

D. Pipe

- ___ 1. Minimum pipe slope of 0.5% observed for pipes 33" and larger.
- ___ 2. Size, slope, length between structures, type and class or thickness of pipe shown in profiles (12" minimum).
- ___ 3. RCP, CIPP and double-dipped bituminous spiral ribbed pipe only.
- ___ 4. Trunk lines 1.25' behind face of curb.
- ___ 5. On all curves where non-standard pipes are to be used, indicate clearly on the plans.
- ___ 6. Outlet protection provided.
- ___ 7. 3' minimum cover over pipe to finished grade observed (provided manufacturer specs do not require more) unless special design and calcs submitted.
- ___ 8. Curve radii allowed to within 80% of pipe manufacturer's recommendations.
- ___ 9. All curve data at centerline of pipe shown unless concentric with street then offsets allowed.
- ___ 10. Elevations, slopes and distances all mathematically correct.
- ___ 11. Match hydraulic/hydrology calculations.
- ___ 12. 400' maximum distance manhole to manhole for pipe less than 30". For pipe 30" and greater maximum spacing 600'

E. Channels

- ___ 1. Maximum velocity in earth channel verified by soils report.
- ___ 2. Channel side slopes as specified by soils report.
- ___ 3. Channel design per Drainage Master Plan.

F. Temporary Storm Drain Retention Basins

- ___ 1. Runoff volume calculations per City Design Standards.
- ___ 2. Groundwater level shown on basin section.
- ___ 3. Basin bottom 5' above water table unless statement from soils engineer indicates range of depths then 2' allowed.
- ___ 4. Outfall protection using riprap required.
- ___ 5. Chain link fence with slats around basin required.
- ___ 6. Ramp at 10% maximum required.
- ___ 7. Off-tract basins require an access road around the basin.
- ___ 8. Easements are required.
- ___ 9. 4:1 side slopes, or flatter.

IX. Water Lines

- ___1. System in agreement with Tentative Map.
- ___2. Design conforms to City Design Standards.
- ___3. Size - 8" min. except cul-de-sacs without hydrants where 6" is allowed.
- ___4. Valves (minimum 3 at a cross, 2 at a tee; every 1000' max.).
- ___5. Hydrants - locations as shown on approved Tentative Map.
- ___6. Cover - 3' min. to finished grade.
- ___7. Proper separation from sewer lines (1' vertical, 10' horizontal O.D.).
- ___8. Location - per City Standard Plan 504.
- ___9. Lines kept in streets.
- ___10. Crossings with sewer mains or laterals meet health standards.
- ___11. Length, size and class of pipe shown in profile.
- ___12. Length shown as distance between crosses or tees.
- ___13. Invert elevations shown at grade breaks, high points, and low points.
- ___14. Sizes of all existing lines shown.
- ___15. Top of curb at hydrant locations shown.
- ___16. Curves allowed to within 80% of pipe manufacturers recommendations. Curve data shown unless concentric with street improvements where slowing offsets are acceptable.
- ___17. Combination Air Valves and Blow-offs location shown on plan view.
- ___18. Air and vacuum valves at high points and elevated cul-de-sacs if difference in elevation greater than 1/2 pipe diameter.
- ___19. Connection to existing facilities.
- ___20. At points of future expansion install temporary blowoff with valve.
- ___21. Lines extended to tract boundaries and along frontage.
- ___22. House services shown in plan (11' center to center separation from sewer lateral).
- ___23. Fire hydrants maximum spacing - per design std 6.07(c)

X. Street Lighting

- ___1. Shown on 1" = 100' scale plan.
- ___2. All Street Lighting shall be designer per Std. Plans #146, Sheets 1 through 10.

XI. Engineer's Cost Estimate

- ___1. Verify that unit costs agree with City Standard Costs. Check that costs are current version.
- ___2. Verify quantities of all items.
- ___3. Review with plans to determine if there are missing items.
- ___4. 10% contingency required.
- ___5. Grading quantities shown - lump sum not acceptable.

- ___6. Driveways included as separate item.
- ___7. Sidewalk on lineal foot and not included in curb and gutter item.
- ___8. Increase costs of facilities installed in existing streets by 50%.
- ___9. Check groundwater depth. If pipes installed below water table increase costs by \$10 per lineal foot.
- ___10. For each 20 electroliers, 1 extra is required.
- ___11. When resubmitted verify that all changes in plans are reflected in the estimate.

XII. Landscape

A. Landscape Improvement Plans

- ___1. Three prints of plans on 24" x 36" with 1" margin on City's title block, scale 1:20 or 1:10 (when public right-of-way or landscape maintenance district is involved).
- ___2. Three prints each of Title Sheet and Map.
- ___3. Three Grading and Drainage Plans.
- ___4. Two copies of quantity and cost estimate for public improvements.
- ___5. Two non-interference letters from public utility companies with any existing easements or facilities.
- ___6. Two copies of the preliminary soils report from Soils Lab.
- ___7. Two copies of calculations for shade structures.
- ___8. Two copies of water conservation concept statements.
- ___9. Two copies of calculations of the maximum applied water allowance.
- ___10. Two copies of calculations of the estimated applied water use.
- ___11. Two copies of calculations of the estimated total water use.
- ___12. Two copies of irrigation controller schedules (establishment & long term).
- ___13. Two copies of certificates of substantial completion (to be submitted after installation of landscaping).
- ___14. All Landscape Design must comply with A1.0, A1.2, A1.3, A1.4 & A1.5

B. Site Improvement Plans/Grading Plans

- ___1. Three prints of plans on 24" x 36" with 1" margin on City's standard title block showing existing and new public sewer lines.
- ___2. Copy of the preliminary soils report.
- ___3. Two copies of the on-site and off-site drainage study.
- ___4. Two copies of any other calculations.
- ___5. Print of boundary survey or map of property, or an acceptable legal description if a map is not available.
- ___6. Non-interference letter from public utility companies, with any existing facilities/easements.

Note: All landscape design and details must conform to City of Tracy's Parks and Streetscapes Standard Plans, current edition. Final submittal must be made on mylar sheets with licensed California Landscape Architect and original signature on wet stamp for each sheet.

APPENDIX E

SANITARY SEWER DESIGN PROCEDURE

The following procedure is used in determining design Q's for City of Tracy Projects.

Procedure:

1. A plan, preferably 1" = 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary areas outside of 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.

APPENDIX F

STORM DRAIN DESIGN EXAMPLE

The following procedure, BASED ON THE Rational Formula $Q = CIA$ in conjunction with the City of Tracy Design Standards, is used in determining design Q 's for City of Tracy projects.

Procedure:

1. A plan, preferably 1" - 100' scale, showing the proposed street system, existing and proposed drainage systems and delineating tributary sub-areas.
2. Assume initial time of concentration (T_i); roof to gutter runoff time, normally 20 minutes for residential development and 10 minutes for commercial or industrial areas.
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. $T_c = T_i + T_t$
5. Determine "I", rainfall intensity in inches per hour, for a time equal to the time of concentration (T_c) from the Rainfall Intensity Curve, Figure 5-1 of these Design Standards.
6. Determine "C", coefficient of runoff using C values given in the City of Tracy Design Standards, Section 5.04(A) (1).
7. Determine "A", the area of the tributary sub-areas to the nearest 0.1-acre.
8. Compute $Q = CIA$, where Q equals the peak flow in cubic feet per second.
10. Considering all criteria (available slope, cover, hydraulic grade line, etc.), establish pipe size and slope, and then determine pipe velocity and travel time (T_t) required to carry the above Q to the next M.H. inlet or M.H. confluence. Use Manning's "n" of 0.013 for all pipes.

APPENDIX G

UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS		
Description	Unit	Unit Price
<i>Site Preparation and Grading</i>		
Clearing and Grubbing	Acre	\$500.00
Remove exist pavement	SF	\$1.00
Remove exist pavement	CY	\$25.00
Remove concrete sidewalk	CY	\$15.00
Remove concrete curb and gutter	CY	\$15.00
Remove concrete underground R.C.C. structures	CY	\$30.00
Remove concrete culverts	LF	\$10.00
Remove exist abandoned utilities	LF	\$10.00
Tree removal	EA	\$150.00
Remove barricade	EA	\$500.00
Earthwork	CY	\$2.00
Imported fill	CY	\$12.00
Finish lot grading	EA	\$1,000.00
Retaining wall, < 2-ft	LF	\$30.00
Retaining wall, < 3-ft	LF	\$40.00
Tree protection	EA	\$300.00
Tree planting	EA	\$500.00
<i>Erosion Control</i>		
Silt fence	LF	\$6.00
Straw bale barrier - complete	EA	\$200.00
Stabilized construction entrance	EA	\$1,000.00
Erosion control	Acre	\$2,000.00
<i>Water</i>		
6" DIP	LF	\$18.00
6" PVC	LF	\$15.00
8" DIP	LF	\$22.00
8" PVC	LF	\$18.00
12" PVC	LF	\$30.00
16" DIP	LF	\$40.00
16" PVC	LF	\$36.00
6" valve	EA	\$650.00
8" valve	EA	\$750.00
12" valve	EA	\$1,200.00
12 " b'fly valve	EA	\$1,500.00
16" valve	EA	\$2,300.00
Hydrant bury, valve, and tee	EA	\$2,500.00
Connect to exist water - incl isolation ass'y	EA	\$2,000.00
1" service to new water	EA	\$400.00

UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS

Description	Unit	Unit Price
1" service to exist water	EA	\$700.00
2" blowoff	EA	\$800.00
Air release valve	EA	\$1,000.00
Steel casing	LF	varies \$2.00 per inch of diameter
Corrosion monitoring test station	EA	varies
Sanitary		
6" VCP	LF	\$15.00
6" PVC	LF	\$12.00
8" VCP	LF	\$22.00
8" PVC	LF	\$20.00
10" VCP	LF	\$25.00
10" PVC	LF	\$22.00
12" VCP	LF	\$30.00
12" PVC	LF	\$25.00
15" PVC	LF	\$40.00
18" PVC	LF	\$50.00
Sanitary sewer manhole - Type 1	EA	\$2,000.00
Sanitary sewer manhole - Type 2	EA	\$2,200.00
Sanitary sewer manhole - Type 3	EA	\$2,500.00
Sanitary sewer manhole - deep	EA	\$4,000.00
Drop manhole	EA	\$3,000.00
60" diameter manhole	EA	\$4,000.00
Lamphole	EA	\$500.00
Clean out	EA	\$500.00
Connect to exist	EA	\$1,000.00
Lateral on new mains	EA	\$400.00
Lateral on exist mains	EA	\$700.00
Lateral	EA	\$400.00
Lateral - deep	EA	\$1,000.00
Plug end	EA	\$200.00
Storm		
Field inlet	EA	\$1,200.00
Catch basin - Type 1	EA	\$1,500.00
Catch basin - Type 2	EA	\$1,800.00
Storm drain manhole - Type 1	EA	\$2,000.00
Storm drain manhole - Type 2	EA	\$2,500.00
Storm drain manhole - Type 3	EA	\$2,800.00
60" manhole	EA	\$3,000.00
72" manhole	EA	\$4,000.00
12" RCP	LF	\$22.00
15" RCP	LF	\$25.00

UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS

Description	Unit	Unit Price
18" RCP	LF	\$33.00
24" RCP	LF	\$40.00
30" RCP	LF	\$50.00
36" RCP	LF	\$60.00
48" RCP	LF	\$90.00
60" RCP	LF	\$125.00
Plug end	EA	\$200.00
Streets		
6-in vert curb and gutter	LF	\$10.00
4-1/2" roll curb and gutter	LF	\$8.00
8" median curb	LF	\$10.00
Sidewalk, incl ramp and return	SF	\$4.00
Sidewalk	SF	\$2.50
HC ramp - labor	EA	\$750.00
HC ramp	EA	\$750.00
Curb return, incl. ramp	EA	\$1,500.00
Mid-block HC ramp	EA	\$750.00
Residential driveway apron	SF	\$3.00
Driveway approach	EA	\$500.00
Commercial driveway - Type 27	EA	\$1,500.00
Commercial driveway - Type 38	EA	\$2,000.00
Fine grading	SF	\$0.20
0.10-ft overlay	SF	\$1.00
0.25-ft overlay	SF	\$1.50
2.5" A.C./4" A.B.	SF	\$2.40
3" A.C./5" A.B.	SF	\$3.00
5" A.C./12" A.B.	SF	\$5.00
3" A.C.	SF	\$1.50
3-1/2" A.C.	SF	\$1.76
4" A.C.	SF	\$2.00
5" A.C.	SF	\$2.50
6" A.C.	SF	\$3.00
7" A.C.	SF	\$3.50
8" A.C.	SF	\$4.00
9" A.C.	SF	\$4.50
10" A.C.	SF	\$5.00
11" A.C.	SF	\$5.50
7" A.B.	SF	\$1.40
9" A.B.	SF	\$1.80
11" A.B.	SF	\$2.20
Sawcut	LF	\$1.00
A.C. dike	LF	\$5.00

UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS		
Description	Unit	Unit Price
Grind	SF	\$0.25
Fog seal	SF	\$0.20
Slurry	SF	\$0.50
2" AC Overlay	SF	\$0.85
Street lights		
100-watt	EA	\$2,000.00
150-watt	EA	\$2,200.00
200-watt	EA	\$3,000.00
Street lights (200 watt)	EA	\$3,000.00
Elect panel	EA	\$1,500.00
Installation of pumps	EA	varies depending on the pump size
Miscellaneous		
Street name sign	EA	\$250.00
Traffic sign	EA	\$250.00
Stop sign with street name sign and striping	EA	\$500.00
Traffic signal	EA	\$250,000.00
Fiber conduit	EA	\$12,500.00
Delineators	EA	\$200.00
Bike path	LF	\$12.50
Street monument	EA	\$250.00
Survey monument	EA	\$500.00
Timber barricade	EA	\$1,500.00
Landscape with irrigation	SF	\$6.00
6" high fencing	LF	\$25.00
Fencing removal	LF	\$5.00
Masonry wall	LF	\$60.00
Retaining wall	LF	\$90.00
Cobblestone (grouted)	SF	\$12.00

Please note the unit prices will be reviewed annually and will be adjusted at a minimum to reflect inflation as reported in the Engineer News Record (ENR).