2006 STORM DRAIN MASTER PLAN UPDATE
ADDENDUM NO. 5
INFILTRATION STANDARDS

General

The goal of this Infiltration Standard is to provide an alternative design tool, where appropriate, to reduce peak flows and to meet Best Management Practice (BMP) criteria for new development and redevelopment projects in the City of Manteca, while also protecting groundwater quality.

Small Parcel Infill

Due to capacity limitations within the South San Joaquin Irrigation District's outfall conveyance systems, new development is required to install detention basins and positive control. For new and redevelopment infill projects within areas where no basin is available, the cost of basins, pump stations, and control systems is prohibitive for small parcel development. The goal of this Small Parcel Infill Section is to provide a way for small infill development and redevelopment projects to occur. This Section shall apply only to projects within the direct discharge area delineated in Exhibit B, and not discharging into systems that are currently over capacity as determined by the Director of Public Works.

Peak runoff is defined as Q=CIA, where Q is the peak runoff, C is the runoff coefficient, I is the intensity, and A is the area. Small infill projects shall minimize peak runoff by utilizing systems approved by the City of Manteca that will reduce the runoff, or they shall install a detention basin and control system.

For projects where these standards are used and where the composite runoff coefficient times the area of the parcel (CA) is equal to or less than 0.75, the runoff will be considered part of the City of Manteca base flow, and no basin or control system will be required. Any project where the final CA is greater than 0.75 shall install a detention basin and control system.

Infiltration System Limitations

Infiltration systems shall not be installed unless approved by the Director of Public Works. Infiltration systems shall not be installed where the bottom of the infiltration system is less than 10 feet above the groundwater, or where dewatering systems are used to lower the groundwater level. Infiltration systems shall be installed in the property they are serving, with the exception of residential infiltration systems which may be linked together. Infiltration systems shall not receive discharge from other properties or the following water shed types:

- Parking lots, roadways, driveways, or any other areas intended for vehicle access or parking.

- Industrial or commercial sites where hazardous spills may occur or where a high risk of pollutants exists.

- City right-of-way.

Commercial property owners need to be aware that a change in use to a high pollutant risk business (outdoor material handling and storage, nurseries, garden centers, etc.) may require abandonment of the infiltration system and installation of a detention system. For this reason it is advised to only install infiltration systems where business use will not be changed to a higher risk business.

Runoff Coefficent Reduction

When determining the composite runoff coefficient for the total project site, the runoff coefficient for the area served by the infiltration system meeting these requirements may be reduced to 0.10.

Infiltration System Design

Infiltration systems shall be designed according to the following criteria:

- The capacity of the system shall be designed to store the runoff from one (1) , 10-year, 48-hour storm, utilizing the volume formula for detention basins. Surface type runoff coefficients shall be used. The volume of the storage system may include collection conduits. The volume of the system shall be calculated with no allowance for infiltration.

- The high water level in the storage system shall be a minimum of one (1) foot below the lowest grade elevation of the property served.

- The area draining to the infiltration system shall be graded such that ponding will not exceed six (6) inches before overland flow to the City storm drain system will occur. Building pads shall be a minimum of 12" above top of curb. In no area shall ponding be less than six (6) inches below the finished floor level before overland flow occurs.

- The infiltration surface of the system, defined as the area within the boundaries of the maximum water surface, must be able to infiltrate the design volume within 48 hours.

- The infiltration rate shall be determined by conducting infiltration tests per the table below. The average infiltration rate shall be calculated from the test results as described below. The infiltration rate as recommended in the soils report shall be used. Where multiple systems are being designed in a single parcel, the aggregate area of all systems shall be used to determine the number of tests required. Where

multiple small parcels (less than 14,520 sq. ft. each) are being developed as one project, as in a residential subdivision, one test per parcel will be acceptable provided there are a minimum of 2 adjacent parcels that will be used for the average infiltration rate.

Minimum	Maximum	Requirement
0 Sq. Ft.	21,780 Sq. Ft.	2 tests
21,781 Sq. Ft.	43, 560 Sq. Ft.	3 tests
43,561 Sq. Ft.	or greater	3 tests per acre

- The bottom of the system shall be at least 10 feet above the ground water table. (CASQA Handbook recommends minimum 3 meters above groundwater)

- Open drain inlets shall not be allowed. Rainwater shall enter the storage system through infiltration, or through filtered inlets. Drain inlets other than landscaped infiltration areas shall be marked "Infiltration System – No Dumping". Filters shall be marked "WARNING – failure to filter runoff may result in damage to the Infiltration System.". The City of Manteca will maintain a list of approved inlet manufacturers.

- Minimum ten (10) foot setback from single story structures or as required by a structural or geotechnical engineer. Minimum setbacks from multi story structures shall be determined by a structural or geotechnical engineer.

- Minimum ten (10) foot setback from property lines, except for residential projects where the infiltration system is located within the front yard building setback area, provided that a ten (10) foot setback is maintained from all structures.

- Minimum one hundred and fifty (150) foot setback from any drinking water supply well.

- Maintenance of the infiltration system and inlets are the responsibility of the owner or developer. An agreement is required between the owner or developer and the City of Manteca which gives the City the authority to inspect the system, and to cause repairs or maintenance to be done on the system, in the event that the owner or developer does not complete said work at the City's request. The owner or developer will be responsible for the cost of any such work.

- Piping systems from the inlets to the infiltration storage area shall be a minimum of four (4) inches in diameter for residential and eight (8) inches in diameter for commercial systems, and shall have cleanouts installed meeting the requirements of the Uniform Plumbing Code.

- One or more simple observation wells shall be installed in each storage system. The observation well may be made of PVC perforated pipe, minimum 4 inch diameter,

extending to within 4 inches of the lowest point in the storage system and shall have a locking cover. The cover shall be labeled "Infiltration System Monitoring Well". (See attached detail sheet)

- Both personnel and vehicular access to the infiltration system is required for maintenance purposes.

- Where a commercial kitchen hood exhausts onto a roof, the roof drainage shall be treated with an approved treatment system to remove oil and grease before entering the infiltration system. (See City approved list of devices)

- The infiltration system shall not be put into use until the drainage area contributing to it has been stabized with landscape, or other means, to prevent sediment from being washed into it.

Infiltration System Performance

Infiltration systems may be checked in order to verify that the system is working. If it is found that water levels in the system are not dropping at a sufficient rate to infiltrate the volume in 72 hours the system shall be rehabilitated.

Infiltration System Operation, Maintenance and Rehabilitation

The design of the infiltration system shall include provisions for operation, maintenance and rehabilitation. An Operation and Maintenance manual and a Rehabilitation plan shall be submitted to the City for approval, and the owner shall enter into a maintenance and rehabilitation agreement with the City of Manteca.

INFILTRATION TEST STANDARD FOR UNDERGROUND SYSTEMS

These standards are a modification of the Falling Head Percolation Test Procedure, USEPA, Onsite Wastewater and Disposal Systems, 1980.

Step A. Initial Screening

Initial screening identifies the potential for using infiltration methods at a site and identifies the potential location of the site for infiltration devices. The purpose of the initial screening is to determine if installation of an infiltration system is feasible on the site and to determine where field work may be needed for subsequent field verification. The initial screening shall determine the following:

1. Relevant land use information for the site and adjacent parcels.

2. Property boundary lines and setback distances.

3. Existing and proposed buildings and setback distances.

4. Presence of areas with potential vulnerable groundwater.

5. Drinking water well locations where within 150 feet and setback requirements.

6. Historical depth to groundwater (this will be verified in Step B).

7. Presence of flood plain.

8. Presence of soil and/or groundwater contamination.

Step B. Infiltration Testing

Before any infiltration test is made, the water table elevation shall be determined, and a bore log with soil types shall be created.

Each test shall be conducted according to the following steps:

1. Each test shall be made in a pit terminating a minimum of ten feet above the water table and in undisturbed soil. The bottom of the pit shall be at the proposed bottom elevation of the infiltration system.

2. The diameter of the bore pit shall be six (6) inches, dug or bored. Two (2) inches of gravel shall be placed in the bottom of the hole to protect the bottom from scouring action when water is added.

3. The test hole shall be refilled at least twice after the water surface elevation drops to one foot above the bottom of the pit and then allowed to soak overnight. Infiltration rate measurements shall be taken on the day following the saturation process.

4. Water level readings shall be taken at 30-minute intervals beginning at five feet above the bottom of the test hole to one foot above the bottom before refilling. Design shall be based on rates taken at three feet from the bottom, and the test shall be repeated until successive rates do not vary more than twenty percent. The slowest rate measured within $\pm$6" of the three foot level shall be considered as the rate of infiltration for that test hole.

Step C. Design of the Infiltration System

1. The infiltration system shall be designed to meet the above Standards.

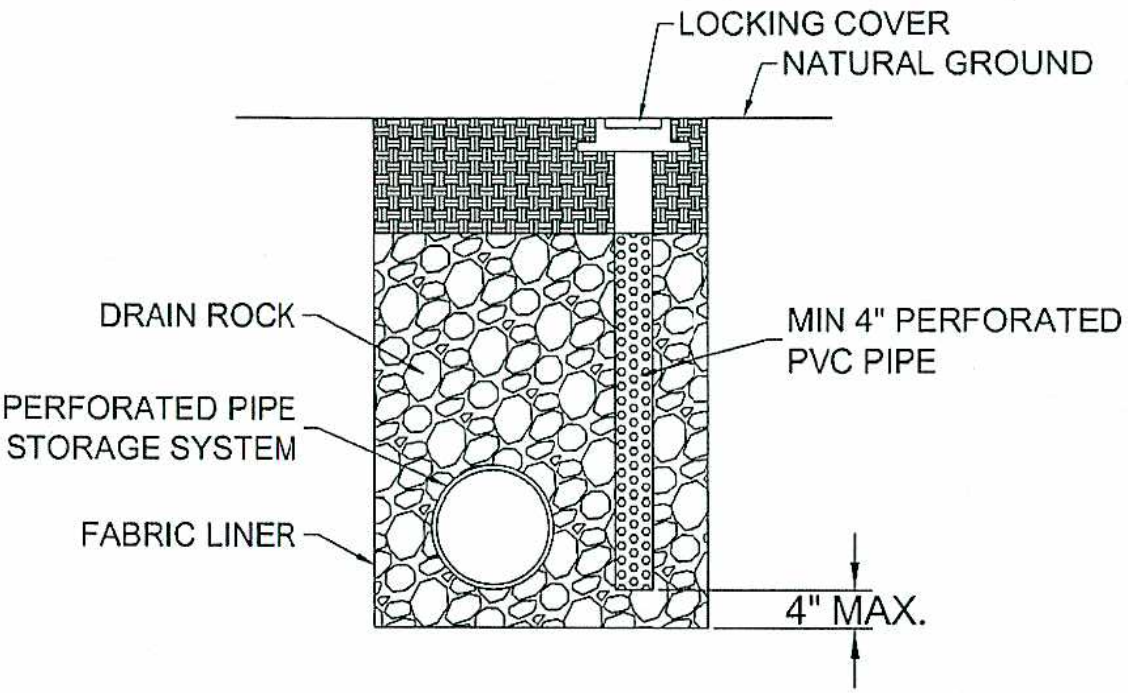
Step D. Report and Approval

1. A report and the proposed infiltration system design calculations and plans shall be submitted to the City of Manteca. The report and plans shall include all of the information that was recorded in steps A through C above.

2. Approval of the infiltration system proposal shall be obtained from the City of Manteca Public Works Department.

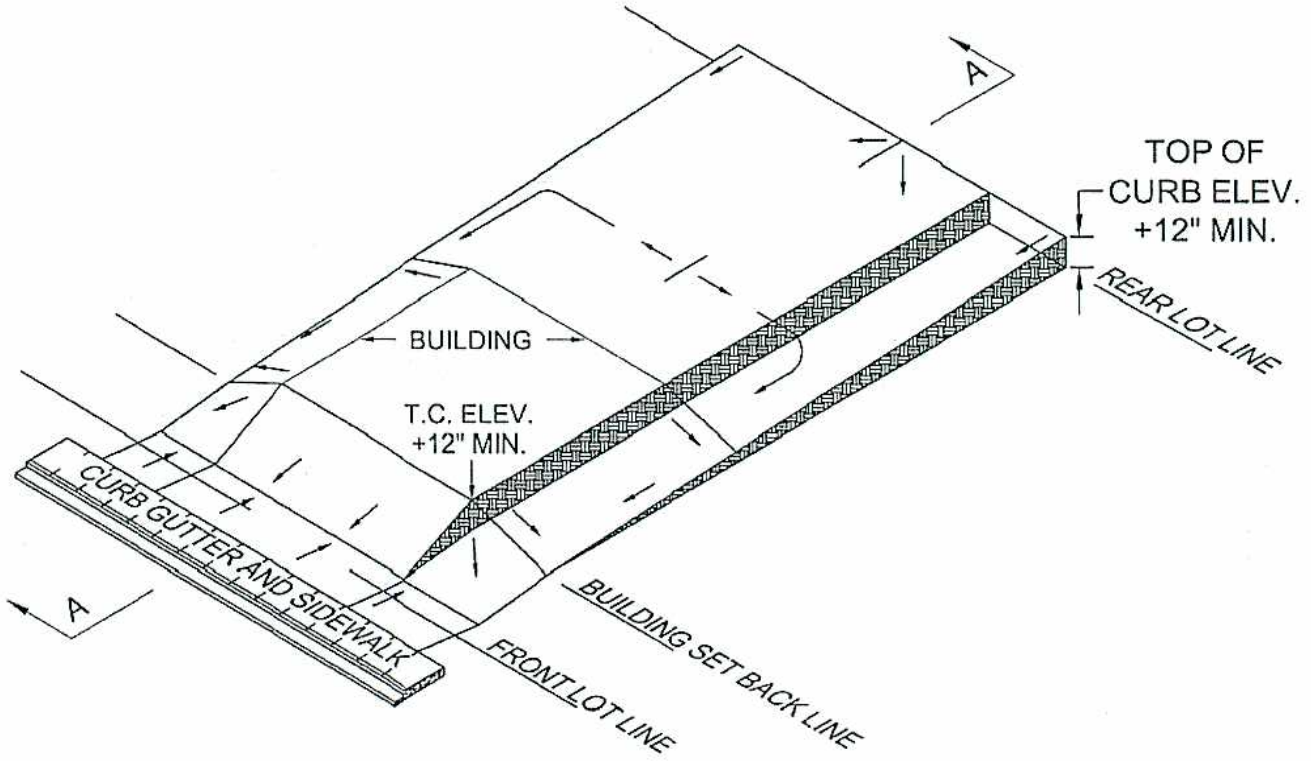
Required Qualifications

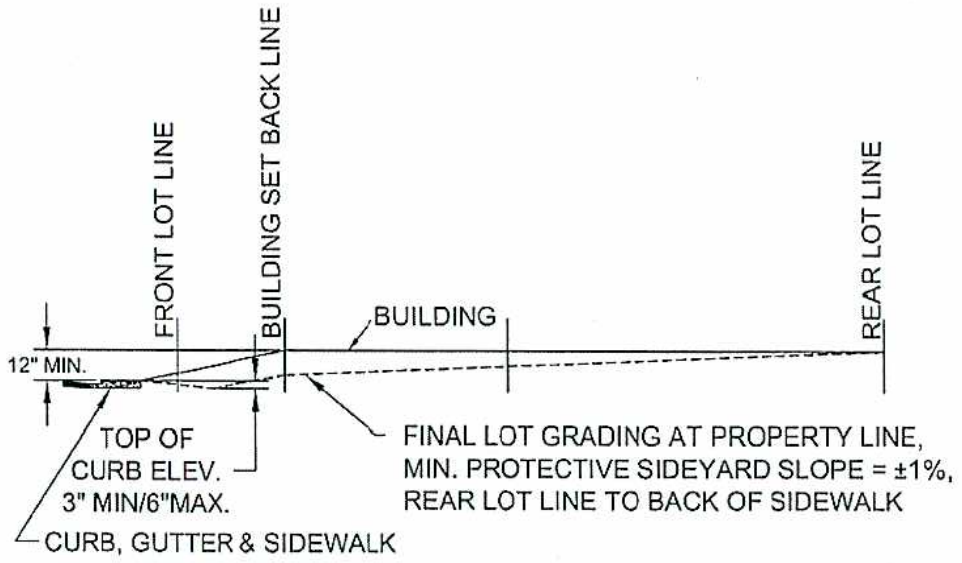
Individuals performing and completing the above testing shall be a licensed civil or geotechnical engineer acceptable to the City of Manteca.



NO.	REVISED	BY

DRAWN BY:	S. FOX	INFILTRATION SYSTEM MONITORING WELL	APPROVED BY:
CHECKED BY:	J. PODESTA	CITY OF MANTECA	DIRECTOR OF PUBLIC WORKS
SCALE:	NONE	DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 1
			DATE: OCT. 2006





SECTION A-A

NO.	REVISED	BY

DRAWN BY: S. FOX
CHECKED BY: J. PODESTA
SCALE: NONE

LOT GRADING FOR SMALL PARCEL INFILL STANDARDS

CITY OF MANTECA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY:

DIRECTOR OF PUBLIC WORKS

DRAWING NO. 1

DATE: OCT. 2006

CITY OF MANTECA

PUBLIC WORKS DEPARTMENT

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OCTOBER 2, 2006

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EXHIBIT B