



City of Los Angeles Standard Urban Stormwater Mitigation Plan Infiltration Requirements & Guidelines

Background

Since the enactment of the Clean Water Act in 1987 and the adoption of the first County of Los Angeles, National Pollutant Discharge Elimination System (NPDES) permit in 1990, it has been the intent of the Regional Water Quality Control Board (RWQCB) to minimize the impacts of storm water and urban runoff on the receiving water bodies by reducing the amount of storm water runoff. To this end, the NPDES permit requires that permittees establish regulations and policies to maximize the percentage of pervious surfaces to allow percolation of storm water into the ground and to minimize the quantity of storm water directed to impervious surfaces and the municipal separate storm sewer system (MS4). As such, the City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division, has established these infiltration guidelines which delineate the requirements and limitations of storm water infiltration and specify the order of preference for providing Standard Urban Stormwater Mitigation Plan (SUSMP) improvements as required by the NPDES permit.

Prioritization of BMP Selection

The order of preference specified below shall be followed in determining the appropriate type of SUSMP improvement for the project site.

1. Infiltration Systems (Design based on the volume of storm water)
2. Bio-Filtration/Retention Systems (Design based on flow of storm water)
3. Storm Water Capture and Re-Use (Optional. Subject to County Health Dept approval)
4. Mechanical/Hydrodynamic Units
5. Combination of Any of the Above

Infiltration systems are the preferred types of SUSMP improvements as they provide for percolation and infiltration of the storm water into the ground, which not only reduces the volume of storm water runoff entering into the MS4, but in some cases, can contribute to groundwater recharge.

If storm water infiltration is not possible based on one or more of the following project site conditions listed below, the developer shall utilize the next type of SUSMP improvement in the order specified above.

Infiltration Restrictions

In most cases, project sites containing any one of the following conditions shall not be required to utilize infiltration as part of their drainage system.

1. Building sites located in the City of Los Angeles designated “Landslide” or “Hillside Grading” areas as specified by the Department of City Planning’s Zone Information and Map Access System (ZIMAS).
2. Sites with shallow, low permeability or impervious soils (silt, clay or bedrock) within 5 feet of existing grade.*
3. Sites with groundwater within 10 feet of existing grade.*
4. Site soils with a moderate or high potential for liquefaction.*
5. Sites with a slope steeper than 20% (5:1, horizontal to vertical) as determined by the City of Los Angeles, Department of Building and Safety.
6. Sites with soil and/or groundwater contamination. **
7. Sites with existing or removed underground storage tanks. **
8. Locations consisting of heavy industrial uses such as uses specified in the “M” zones of the L.A. City Planning and Zoning code, including but not limited to vehicle or equipment maintenance yards, hazardous material storage, slaughter houses, etc.

* Soil type, depth of groundwater, and liquefaction potential of the project site shall be documented by an approved geotechnical report signed by a California Certified Engineering Geologist or Geotechnical Engineer. See note at bottom of this document for geotechnical report requirements.

**The presence of soil and/or groundwater contamination and/or the presence of existing or removed underground storage tanks shall be documented by California Environmental Quality Act (CEQA) or National Environmental Policy Act (NEPA) environment reports, approved geotechnical reports, permits on file with the City, or a review of the State of California’s Geotracker website.

If the project site is a good candidate for storm water infiltration, the following requirements and guidelines shall be adhered to for the design of the infiltration system.

Infiltration Requirements

1. Minimum site soil percolation rate shall be 0.5 inches per hour. Soils with a percolation rate of less than 0.5 in/hr may utilize a bio-filtration system that includes an under drain system to prevent extended ponding.
2. The minimum distance between the bottom of the infiltration trench to the historic high groundwater level shall be 10 feet.
3. The minimum setback of the infiltration system from the site property lines shall be equal to or greater than the depth of the infiltration trench measured from finished grade. Where subterranean walls or deep basements exist on the adjacent property, a greater setback or deeper infiltration system may be required.
4. Infiltration trenches shall be set back from any building or structure a minimum of 10 feet or a minimum distance as specified by the project geotechnical engineer and/or structural engineer of record or as required by the Department of Building and Safety.
5. An overflow drain that conducts the overflow drainage to the street, per the requirements of Chapter 70 of the Los Angeles City Building Code, shall be provided for all infiltration systems.
6. To determine water levels to demonstrate adequate functionality or maintenance needs, install an observation well consisting of a vertical, 4 to 6-inch diameter PVC, perforated pipe within the infiltration system. The well shall terminate at the ground surface with a lockable, removable cap.
7. Infiltration systems shall not be located in primary structural compacted fill. Location and type of compacted fill shall be verified by an approved, certified compaction report signed by a registered geotechnical engineer.
8. Infiltration systems located in the Valley District region of the City will be required to be approved by the Upper Los Angeles River Area Watermaster. Contact Mark Mackowski at (213) 367-0896 or at mark.mackowski@ladwp.com

Geotechnical Report Requirements

As determined by the City of Los Angeles, Department of Building and Safety, Grading Division, a geotechnical report may be required for projects that will incorporate infiltration as part of the drainage system. Geotechnical reports shall be signed by a professional Geotechnical Engineer licensed in the State of California and/or a Certified Engineering Geologist.

Where Building and Safety determines that a geotechnical report is required, the report shall be reviewed and approved by the Grading Division and shall contain the following information/recommendations:

- a. Site soil classifications in accordance with the Unified Soil Classification System.
- b. Potential for liquefaction of site soils.
- c. Depth of the historic high ground water level at the project site.
- d. Infiltration rate and specification of test method and procedures used to determine the infiltration rate.
- e. Analysis of the potential that perched water conditions could be created by the operation of the infiltration system.
- f. Statement regarding the effects of infiltration on foundation settlement.
- g. Statement regarding the effects of infiltration on hydrostatic pressure.

Infiltration Trench Sizing and Design Guidelines

An infiltration trench consists of a long, channel area in the ground composed of gravel and rock for detention of storm water prior to infiltration into the ground. Runoff is stored in the void space between the rocks and infiltrates through the bottom and sides of the trench into the soil matrix.

The following guidelines shall be implemented for the design of infiltration trenches:

1. Provide a pre-screening method as part of the infiltration system in order to reduce the sediment load in the infiltrating storm water to reduce clogging of the infiltration system.

Examples of pre-screening methods include:

- a. Vegetated planter with soil placed directly above gravel of infiltration trench.
 - b. Grass swales conducting flow from impervious areas to infiltration trench.
 - c. Catch basin filter inserts for flow conducted through a catch basin to infiltration trench.
 - d. Roof down spout filters for storm water flowing directly from down drain spouts into an infiltration trench.
 - e. Hydrodynamic separators.
 - f. Oil absorbent socks.
2. Specify rock size to be between 3/4-inch to 3-inches in diameter.
 3. Provide a non-woven geo-textile fabric on all sides and bottom of the trench.
 4. The depth of the infiltration trench shall be a minimum of 2 feet and a maximum of 8 feet.

5. Determine the size of the infiltration trench using the following equations:

$$D = (T \times I) / (12 \times F \times V_R)$$

$$A_m = WQV / D$$

Where:

D = Trench Depth (ft)

T = Drawdown Time (hours) which is assumed to be 48 hours

I = Infiltration Rate (inches/hour)

F = Infiltration Factor of Safety - to be as follows:

- Without site specific boring and infiltration tests, use F = 10
- With site specific borings, but no infiltration tests, use F = 6
- With site specific infiltration test, but no borings, use F = 5
- With both site specific boring and infiltration test, use F = 3

V_R = Void Ratio (use 0.40 for gap graded gravel)

A_m = Minimum Surface Area of the infiltration trench (ft²)

WQV = Storm Water Runoff Quantity Volume (ft³)

Note: Infiltration rates shall be determined by in-ground, site specific infiltration tests or can be based on laboratory tests conducted on soil samples collected during the exploratory work for a site specific geotechnical report.

Where no site specific borings and/or no percolation test results are provided, the developer may provide information on the general soil characteristics of the project site based upon a previous geotechnical report on file with the Department of Building and Safety for an adjacent property within one-quarter (1/4) mile of subject site. Percolation rates can be based on the soil types specified by the site specific geotechnical reports or the reports of adjacent lots as indicated above, or may be determined by a site specific percolation test.