City of Long Beach
Department of Development Services
Building and Safety Bureau

Guidelines for Storm Water Infiltration

Information Bulletin

BU-035

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This information bulletin provides guidelines for the design and acceptance of facilities to infiltrate storm water into the ground. Projects subject to the requirements of the Standard Urban Storm Water Mitigation Plan ("SUSMP") or the Low Impact Development ("LID") ordinance are required to infiltrate storm water runoff when geotechnically feasible. Infiltration facilities that are adjacent to buildings/structures are therefore required to be evaluated by a soils engineer. The findings of the soils engineer shall be contained in a report to be reviewed Building and Safety and/or Public Works plan review staff. The purpose of the soils engineer's evaluation is to prevent the infiltration of storm water from aggravating any soil or bedrock condition which could result in slope instability, settlement of footings, surcharge of retaining walls, or contributing water to subsurface de-watering devices such as basement or retaining wall backdrains.

DEFINITIONS

For the purpose of this bulletin, the following terms are defined:

1. ***Homogeneous Soils*** are soils with no discernable layering, structure, fabric, texture, or changes in soil type, either vertically or horizontally, that could affect the rate or direction of water movement.

2. ***Infiltration Facilities*** are the devices used to introduce storm water into the ground. They may consist of gravel filled pits, trenches, dry wells, or various pre-manufactured products placed in the earth. Also known as infiltration BMPs (Best Management Practices), the different types are further defined in the City of Long Beach's LID BMP Handbook available from the Department of Development Services' website.

3. ***Zone of Saturation*** is the soil mass beneath an infiltration facility where the air voids in the soil have become filled with water.

I. GENERAL REQUIREMENTS

1. A soils report is required to evaluate the effects of any proposed storm water infiltration into the ground and the pertinent recommendations shall be made a part of the approved plan.

   Exception: Where the infiltration facility is a minimum of 15 feet from all buildings, retaining walls, or property lines and whenever there is a basement beneath the building, the horizontal distance between a building and the infiltration facility is greater than 15 feet plus the depth of the basement, a soils report is not required.

2. Storm water infiltration is not allowed in areas that can possibly contribute to any groundwater that may affect the stability of slopes, either on, adjacent to, or distant from the site.

3. Storm water infiltration is not allowed on any site where the water may saturate soils that are subject to liquefaction.

II. MINIMUM DESIGN REQUIREMENTS

The following design guidelines shall be considered as minimum requirements on sites where infiltration is found acceptable by the soils engineer. Subject to the findings of the soils investigation report, additional setbacks or design considerations may be required.

1. Water infiltration into the ground should occur a minimum of 10 feet above the groundwater table.

2. The distance between the infiltration facility and the adjacent private property line shall be a minimum of 10 feet. Where buildings, subterranean walls or deep basements exist on the adjacent property, a greater setback or deeper infiltration system may be required to comply with the criteria in this bulletin.

3. Foundations shall be set back a minimum of 10 feet from the infiltration facility and the bottom of the footing shall be a minimum of 10 feet from the expected zone of saturation.

   Note: The boundary of the zone of saturation in homogenous soils may be assumed to project downward from the top of the permeable portion of the infiltration facility at gradient of 1:1 or flatter, as determined by the soil engineer.

4. Infiltration facilities shall not be located on a slope with a gradient greater than 20% (5:1 horizontal to vertical).

5. Infiltration facilities shall be located so that soils supported by retaining and basement walls are not saturated.

6. Dry wells adjacent to buildings shall be cased to a depth where the potential saturation zone is at least 10 feet from any footing. The annular space around the casing shall be sealed to prevent water from raising up the outside of the casing.

7. Dry wells beneath buildings shall be cased to a depth where the potential saturation zone is a minimum of 10 feet from any footing and 10 feet beneath the bottom of any floor slab. The annular space around the casing shall be sealed to prevent water from raising up the outside of the casing.

8. No infiltration facility shall be placed to infiltrate water into fill material.

   Exception: Infiltration into soils placed as fill material may be allowed where the soil engineer can demonstrate that there will be no adverse effect on the integrity or stability of the fill. However, saturation of fill beneath a building shall not be allowed. Additionally, where adverse perched water conditions will be created along the contact of the fill and underlying soils or in layers of differing soil types within the fill, infiltration shall not be allowed.

9. Grassy swales shall be located a minimum 5 feet from any building and property line and should drain at a minimum 2% gradient with no check dams. Where check dams are constructed, the swale shall have the same setbacks from buildings and property lines as other infiltration facilities.

10. The infiltration facility shall be designed to overflow to the street in the event that the drainage capacity is exceeded or in case of future failure to adequately infiltrate.

11. Porous concrete or similar permeable hardscape materials are allowed to be used only where they will be subject to incidental rainfall and not where they would be subject to a concentrated flow of water such as from roof downspouts. Any hardscape design that impedes the flow of water over the ground surface is not acceptable.

III. SOILS REPORT CONTENT

When required by Section I Item 1, the soils engineer is to determine whether the site is suitable or unsuitable for the proposed infiltration facility. The soils report shall identify any soil/geologic conditions that could be adversely affected by water or that could influence the movement of water and make appropriate recommendations. The report shall be submitted along with the construction documents for review and approval prior to the issuance of any permit.

A. Reports For Sites Suitable For Infiltration

1. The soils report shall contain an opinion that the site is suitable for the proposed infiltration facility without increasing the potential for settlement of structures or adversely affecting retaining/basement walls located either on or adjacent to the subject site. The report shall contain the following:

    a. Map showing the locations of the proposed storm water infiltration facility and all adjacent structures, either on or adjacent to the site.

    b. A finding as to the potential for creating perched water conditions that may adversely affect structures.

    c. A finding as to the influence of the infiltration facility on the existing retaining walls. Infiltration facilities shall be located so that soil supported by retaining/basement walls is not saturated.

    d. A finding as to the presence of expansive soils and influence of the infiltration on behavior of these soils in view of soil structure interaction.

    e. A finding as to the susceptibility for hydro-consolidation, possibly resulting in distress to structures.

    f. A finding as to the susceptibility for any ground settlements due to soil saturation from infiltration, possibly resulting in distress to structures.

2. The conclusions of the report shall include:

    a. An opinion as to whether the site is suitable for stormwater infiltration.

    b. An opinion that the infiltration of the stormwater will not result in ground settlement that could affect structures, either on or adjacent to the site.

c. An opinion that the infiltration of the stormwater will not result in soil saturation that could affect retaining/basement structures.

B. Reports For Sites Not Suitable for Infiltration

1. The soils report shall provide the reason why infiltration is not recommended. Reasons for finding the site not suitable may include, but need not be limited to, the following:

   a. Depth to groundwater is less than 10 feet from the bottom of the infiltration pit/trench/well.

   b. Impervious soils or bedrock with low infiltration rates.

   c. Findings that infiltration and soil saturation may cause settlement of the existing/proposed foundations or saturation of soil supported by retaining (basement) walls.

   d. Infiltration water may saturate soils subject to liquefaction.

   e. Site is composed of fill material that is unacceptable for infiltration and the depth to acceptable natural soil is excessive.