PARKING LOT STORAGE

(Permanent Practice)

Definition

Providing temporary surface storage and controlled release of stormwater runoff on paved (impervious) parking areas or within parking lot landscaped islands.

Purpose

To reduce the adverse impact of runoff from impervious parking surfaces on receiving waters.

Conditions Where Practice Applies

Where portions of large, paved parking lots can be temporarily used for stormwater storage without significantly interfering with normal vehicle and pedestrian traffic. Shopping centers and large employee parking areas are likely places for use of this measure. Wherever parking lot landscaped islands are required.

Planning Considerations

Paved parking areas can have a significant impact on downstream receiving waters. The impervious surface which often replaces natural vegetative cover causes increases in the volume and peak rate of runoff and also provides a place for traffic-generated residues and airborne pollutants to accumulate and become available for washoff.

Detention of stormwater on paved parking surfaces or within recessed landscaped islands is a technique used to deal primarily with the problem of increased runoff peaks from relatively minor storms. This practice in itself can also contribute to a decrease in nonpoint source pollution for the following reasons:

1 . In areas where storm and sanitary sewers are combined, the reduction in peak runoff rate can contribute to a reduction in the frequency and magnitude of sewer overflows and treatment requirements.

2. In areas without combined sewers, the reduction in runoff peak can contribute to decreased stream channel erosion and subsequent sediment pollution downstream.

3. By temporarily impounding runoff, there is an increased opportunity for particulate matter to settle out.

4. The first flush or shock loading effect of the polluted runoff on the treatment plant is decreased because the stormwater is released over a longer period of time.

5. By placing raised storm sewer inlets in recessed landscaped areas, some infiltration and settling will occur before the stormwater is removed by the storm sewer.

Parking lot impounding is usually accomplished by using specifically designed or modified inlet structures which cause stormwater to temporarily pond in specially graded areas of a parking lot.

The effectiveness of parking lot storage for nonpoint source pollution control can be increased by routing impounded water over infiltration areas and/or trenches. An easy way of promoting infiltration is to place raised storm sewer inlets within recessed landscaped areas. Curb cuts will allow runoff to enter the mini-retention/detention area where infiltration can occur before the stormwater rises to the elevation of the inlet. Infiltration allows a certain amount of the impounded water to be purified by the soil. Before using infiltration techniques in conjunction with parking lot storage, a determination must be made as to the possible effect upon groundwater. The Exfiltration Trench practice contains relevant information on this topic. Other infiltration practices such as concrete grid and modular pavement, grassed waterway, and diversion can also be used in conjunction with parking lot storage to reduce nonpoint source pollution.

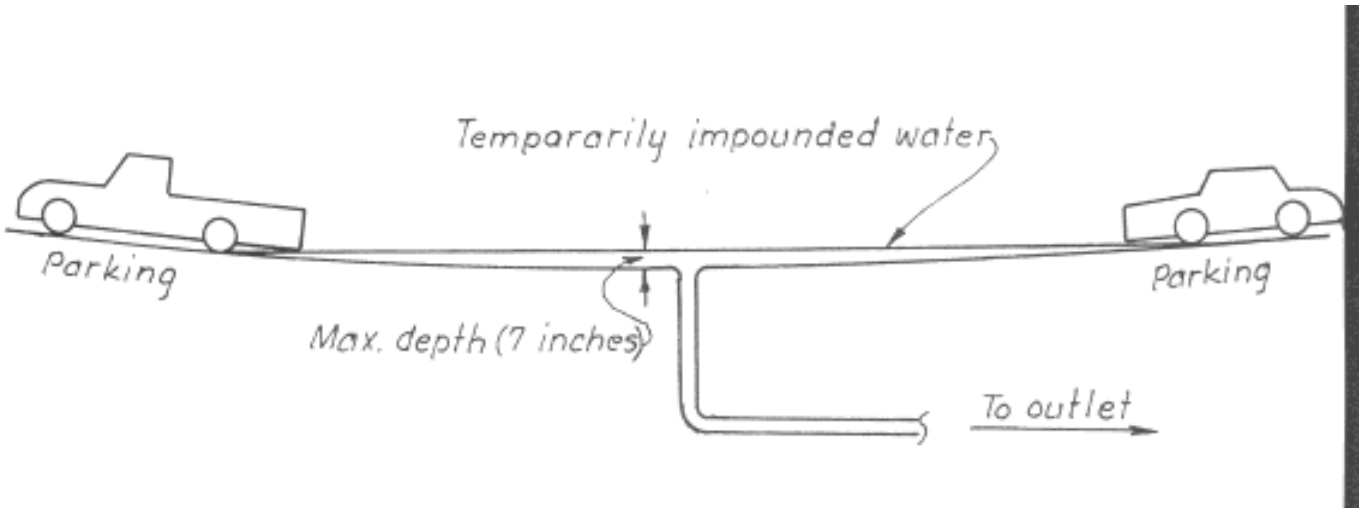

Figure 4-115 Typical section of parking lot storage.

Design Criteria

Criteria for the design of parking lot storage systems should follow local guidelines, if available, or may use the following as design guidelines.

1. Storage Volume and Release Rate: Design of the storage volume and release rate is dependent upon the purpose of the system. In parking lot detention systems the storage volume is usually limited by the size and grade of the parking lot and the proximity of impounding area(s) to structures and traffic routes. There will seldom be enough storage volume to control moderate or major flooding downstream unless additional storage volume is provided.

   A slow release rate (0.1 inch per day to 1 inch per day) is desirable for nonpoint source pollution reduction. Detention times in excess of 30-40 hours are most effective for pollution reduction but not desirable on a parking surface. A good alternative to design the parking lot storage system in conjunction with a subsurface detention system such as exfiltration trenches. The subsurface system can be designed to collect a small initial volume of runoff while the surface impounding system can be designed to control a specific design storm at a pre-development level.

2. Minimum Slope: The storage area should have at least 0.5 percent slope toward the outlet to assure complete drainage following a storm.

3. Maximum Depth: The maximum depth of water within the impoundment area is not recommended to exceed 7 inches.

4. Location: The portion(s) of the parking lot where runoff storage is planned should be located so that there will be minimum interference with pedestrian and vehicular traffic during a storm. Remote perimeter areas of large parking lots are usually best suited.

5. Overflow: The parking lot storage system should be designed so that overflow from storms larger than the design storm will not cause excessive damage or inconvenience. Specifically, there should be no potential for flooding of nearby buildings, major thoroughfares or other important facilities.

6. Warning Signs: Impoundment areas should be well marked with signs or pavement markings advising users to avoid these areas during storms in order to protect their vehicle brake linings from wetting and to prevent inconvenience to themselves.

Maintenance

Discharge control structures should be inspected periodically and following each storm. Accumulated debris and litter should be removed as necessary to assure proper functioning and stormwater release.

Parking lot surfaces must be cleaned following storms to provide a reasonable level of pollution control and reduce accumulation of litter, debris, traffic-generated residues, and other nonpoint source pollutants. Sweeping or vacuuming is recommended.

Plans and Specifications

Plans for installing parking lot storage shall be in keeping with this standard to accomplish its intended purpose. Construction Specifications shall conform to the installation specifications of the manufacturer and be compatible with work on the parking lot, storm drain outlet, and any other work affecting this practice.

Parking Lot Storage
Design Form

Location: _____ (Street), _____ (City), _____ (County)

Planned construction date: _____, Ending date _____

Collection area: _____ sq ft, No. of outlets _____

Planned water depth (max) _____ inch, Detention time (max) _____ hour

Discharge rate: _____ cfs, Pipe diameter _____ inch

Discharge location: _____

Additional Notes: _____

_____

_____

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_____

Sketch of buildings, impoundment areas, discharge system, and outlet location.