Fact Sheet

Portland Harbor: Catch Basins

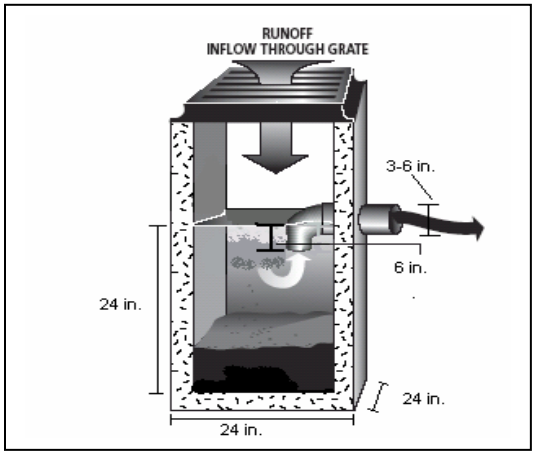
The purpose of this fact sheet is to provide basic information on catch basin design, effectiveness and sediment sampling.

A catch basin is an inlet to a storm drain system that typically includes a grate where stormwater enters, and a sump to capture sediment, debris and associated pollutants.

Catch basins are designed specifically for capturing and conveying stormwater. It is important to note, that although catch basins often have sumps for the collection of sediment, the actual design specifications and placement of catch basins are not based on expected sediment load.

Design

Trapped catch basins, commonly referred to as Lynch-style catch basins, are constructed of concrete, cast iron or steel. According to the 1997 City of Portland Uniform Plumbing Code §1108.0 - .5, catch basins must adhere to the design specifications in the drawing below:



Standard Lynch-style catch basin

Typically, on private commercial or industrial sites, there is no standard for the placement of catch basins. Stormwater drain systems are often installed based on the best professional judgment and experience of the design engineer.

The estimated peak stormwater flow rate dictates the number of catch basins needed on a site. The percent impervious surface, slope, average rainfall and rainfall intensity are all factors in calculating the peak flow rate. Catch basins are designed to hold water below the one-quarter bend outlet pipe or elbow pipe. The pipe is also referred to as a 90 degree invert.
Standing water allows some larger sediments to settle out. Any oil or grease washed into the basin will float to the top of the water level, above the elbow pipe. The catch basin is only effective for oil and grease separation if the water level is maintained above the elbow pipe intake.

Effectiveness

There are several factors that contribute to the capture efficiency of catch basins. These include: catch basin placement, catch basin design; maintenance frequency; flow rate; pollutant loading and particle size.

The sump in a catch basin captures settleable solids under low flow conditions. According to information obtained from EPA, catch basins are typically best at removing particles greater than 0.04 inches (approximately 1millimeter in diameter). They are not designed to remove total suspended solids or soluble pollutants.

There is limited data on the effectiveness of Lynch style standard catch basins to capture Total suspended solids. Several studies indicate total suspended solids may be reduced by about 20 percent in some catch basins.

Re-suspension and discharge of sediments previously collected in a catch basin is a potential problem during large storm events or first flush scenarios.

Catch basin efficiency can be improved by frequent maintenance, implementation of best management practices or with the use of catch basin inserts.

Maintenance

Maintaining catch basins is critical to effectiveness. A catch basin should be cleaned when the amount of sediment is greater than one third the distance between the bottom of the basin and the water line. It is recommended that catch basins draining industrial areas be cleaned once per month or more frequently if sediment accumulates above the one third threshold.

A study of 60 catch basins draining industrial land in Alameda County, California showed that monthly cleaning of catch basins at industrial sites increased the total pounds of collected sediment from 30 pounds when cleaned annually

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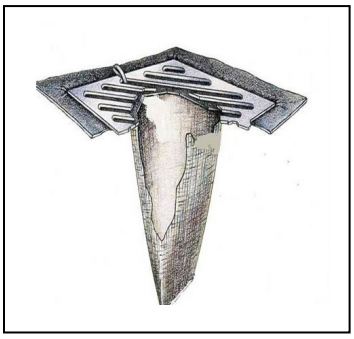
to 180 pounds when cleaned monthly. For more information on catch basin maintenance, see the City of Portland Bureau of Transportation fact sheet titled, "Catch Basin Care" at: www.portlandoregon.gov/transportation/article/319801

Best management practices

Implementation of best management practices, such as frequent sweeping and covering material storage and manufacturing areas help to reduce sediment and pollutants from getting into stormwater conveyance systems. Best management practices recommended by DEQ are available on our website at: http://www.oregon.gov/deq/FilterDocs/IndBMP021413.pdf.

Catch basin inserts

Sediment and pollutant loading can be reduced using a catch basin insert. Many different styles of catch basin inserts are available. Some provide oil absorbent strips while others just provide sediment capture. Generally, the capacity of inserts is much less than that of the actual basin, which means more frequent maintenance is required. The advantage to using an insert is that a greater amount of sediment is expected to be captured. In addition, the maintenance is much simpler since most inserts can be removed and disposed of by hand. It is recommended that inserts without overflow slots be used to provide for maximum efficiency. The method of sediment disposal depends on whether the captured sediment is contaminated. For more information, see DEQ's fact sheet "How to Determine if Your Waste is Hazardous"



Catch Basin Insert

Stormwater Management Manual

All projects within the City of Portland, including industrial sites, developing or redeveloping over 500 square feet of impervious surface, or existing properties proposing new stormwater discharges off site are subject to the requirements of the Bureau of Environmental Services Stormwater Management Manual. The manual requires 70 percent removal of total suspended solids from 90 percent of the average annual runoff. A site may achieve this level of removal by many different means. For more details, please refer to the 2016 Portland Stormwater Manual at: https://www.portlandoregon.gov/bes/64040.

Catch basin sediment sampling

Sampling and analysis of stormwater solids is typically required at Portland Harbor upland sites. This helps to characterize and evaluate the stormwater pathway and to determine if source control measures are required to prevent contaminants from impacting the river and its sediments.

Sampling of catch basin sediments can provide a time-integrated indication of contaminants that may be or may have been transported to the river. Catch basin sample analyses protocols are based on a comprehensive review of potential contaminant sources, available in-water sediment data, and other available data. Sampling should be conducted according to a DEQ approved work plan based on DEQ's Guidance for Evaluating the Stormwater Pathway at Upland Sites.

What to look for when assessing a catch basin:

- The presence and size of the sump;
- The outlet location and type;
- The pollutant loading potential of the area drained;
- The use of catch basin inserts and frequency of replacement;
- The schedule of catch basin maintenance;
- Other implemented best management practices; and
- Available storm water monitoring data and catch basin sediment data.

For more information

If you have questions regarding Portland Harbor stormwater issues, please contact your DEQ Cleanup project manager for more information, or contact Alex Liverman, DEQ's Portland Harbor Stormwater Coordinator at 503-229-5080 or liverman.alex@deq.state.or.us

Alternative formats

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.