



# Hydromodification Management Requirements

Information for Developers, Builders and Project Applicants

Updated May 2010

## What is Hydromodification?

When undeveloped land is covered with buildings and pavement, it causes more stormwater runoff to flow into creeks at faster rates. This may result in creek channel erosion, as well as flooding, habitat loss, and, in some cases, property damage. These development-induced changes to the natural hydrological processes and runoff characteristics are called hydromodification.



Example of creek bank erosion

In the past, creek bank erosion was addressed by constructing engineered channels. But this created new problems for salmon and other migratory fish, and in some locations resulted in excessive sedimentation in the channels, requiring costly maintenance.



Example of an engineered channel

## What is Hydromodification Management (HM)?

New hydromodification management (HM) techniques focus on retaining, detaining or infiltrating runoff so that post-project flows and durations match pre-project conditions. Since 2007, HM has been required in susceptible areas across the Bay Area.

## Does My Project Need HM?

HM requirements apply if a project creates and/or replaces one acre or more of impervious surface, is located in a susceptible area (generally areas west of El Camino Real), AND increases impervious surface over pre-project conditions. The San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) has prepared an HM Control Area Map, to identify susceptible areas (see link to the New Development webpage, on back page.) SMCWPPP is a program of the San Mateo City/County Association of Governments that helps municipalities to comply with the Municipal Regional Stormwater Permit, which applies to all municipalities within San Mateo County.

Please note that projects that require HM controls typically also require water quality treatment, described in a stormwater quality requirements flyer (available at SMCWPPP's New Development webpage).

## What Are the HM Requirements?

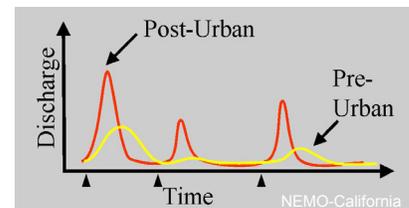
If the HM requirements apply to your project, you will need to incorporate appropriate HM controls in the project design. These controls can be categorized as:

- Hydrologic source controls (site designs) to reduce runoff,
- Flow duration controls to temporarily detain runoff, and
- In-stream measures, where conditions allow.

## Hydrologic Source Controls

Hydrologic source controls are design techniques that minimize and/or slow the rate of stormwater runoff from the site. These techniques may also be called site design measures or low impact development (LID). Examples include:

- Reduce impervious surfaces,
- Drain rooftop downspouts to pervious areas,
- Use alternatives to standard surfaces, such as pervious paving or green roofs, and
- Rainwater harvesting and use.



Pre- and post-urban hydrographs show how runoff rates and volumes increase with impervious area.

## Flow Duration Controls

Flow duration controls are structures designed to detain excess runoff that remains following the use of hydrologic

source controls. They have specialized outlets to gradually discharge stormwater to waterways at a level below the “critical flow” that would cause creek channel erosion. Flow duration controls are generally project-specific on-site controls. Examples of flow duration controls include:

- Extended detention basins,
- Wet ponds, and
- Underground tanks or vaults.

Flow duration controls are designed so that the post-project stormwater discharge rates and durations match the pre-project rates and durations from 10 percent of the pre-project 2-year peak flow up to the pre-project 10-year flow. Projects that require flow duration controls typically also require water quality treatment controls (see flyer on stormwater quality requirements, referenced under “For More Information”). If feasible, combining flow duration and water quality treatment into one facility will reduce the land area needed for stormwater management.



*Ungrouted modular pavers are an example of a hydrologic source control (Source: Portland, OR).*

### **New Requirements for Low-Impact Development**

Starting December 1, 2011, stormwater treatment requirements must be met using evapotranspiration, infiltration,

and/or rainwater harvesting and reuse, if feasible. More information is provided in a flyer on stormwater quality requirements (see “For More Information”). Integrating these low impact development (LID) designs into the site plan helps reduce changes in the site's hydrology. For projects in which it is feasible to meet stormwater treatment requirements with infiltration, evapotranspiration, and/or rainwater harvesting, it may be possible to design smaller flow duration control facilities.



*Detention pond provides stormwater treatment and hydromodification management.*

### **Bay Area Hydrology Model**

The design of flow duration controls is based on hydrologic simulation modeling. To help applicants with this, SMCWPPP worked with the Santa Clara Valley Urban Runoff Pollution Prevention Program and the Alameda Countywide Clean Water Program to develop the Bay Area Hydrology Model (BAHM). On-site and regional control measures designed appropriately using the BAHM and local requirements will meet HM requirements in the Municipal Regional Stormwater Permit. The BAHM and its user's manual can be downloaded at [www.bayareahydrologymodel.org](http://www.bayareahydrologymodel.org)

### **In-Stream Measures**

In-stream measures, or a combination of in-stream measures and on-site controls, may be allowed where erosive flows exist and there is excessive sediment, deposition, erosion, or a hardened channel. In-stream measures involve modifying the receiving creek channel to reduce the potential for erosion and sedimentation.

### **Maintaining HM Controls**

HM controls and stormwater treatment measures need ongoing maintenance to keep working properly. During project review, applicants must prepare a maintenance plan and enter into an operation and maintenance agreement with the municipality to identify and record the party responsible for long-term maintenance of HM controls and stormwater treatment measures.

### **For More Information:**

- SMCWPPP: 650/363-4305, [www.flowstobay.org](http://www.flowstobay.org).  
For the New Development page, click on “Business,” then “New Development.”
  - ⇒ Click on “local permitting agency” for phone numbers of local stormwater programs.
  - ⇒ For the HM Control Area map, scroll to “Hydromodification Management Control Area Map.”
  - ⇒ For flyer on stormwater quality requirements, scroll to “Changes to Stormwater Quality Requirements.”
- Regional Water Board staff: 510/622-2300.