

# Preparing Permit Application Submittals

## *In this Chapter:*

- ▶ *Outline of the development review process*
- ▶ *Step-by-step instructions for preparing C.3 stormwater submittals for planning and building permit applications*

## 3.1 The Development Review Process

The municipalities have integrated their review of post-construction stormwater controls into the development review process. If the C.3 requirements apply to your project, your planning permit application submittal must show how you have incorporated the required post-construction stormwater controls. Section 3.2 gives step-by-step instructions on how to do this, beginning at the earliest phases of project planning. Some smaller projects may not require planning permits; see Section 3.4 for **simple instructions for small sites**.



Preparing the preliminary design of stormwater controls simultaneously with the **preliminary site plan** and the landscaping plan is advised to achieve the following benefits:

- Maximize the stormwater benefits of project landscaping.
- Improve site aesthetics and produce a better quality project
- Speed project review times.
- Avoid unnecessary redesign.
- Reduce overall project costs.

Preparing the preliminary design of stormwater controls simultaneously with the **preliminary site plan** and the landscaping plan can help reduce overall project costs.

After the municipality issues your planning permit, you will need to incorporate the required stormwater information into your building permit application submittal. Section 3.3 gives step-by-step instructions for preparing this submittal. A simplified diagram of a sample development review process is shown in Figure 3-1. Please note that the actual development review process in any of the municipalities may differ from the example.

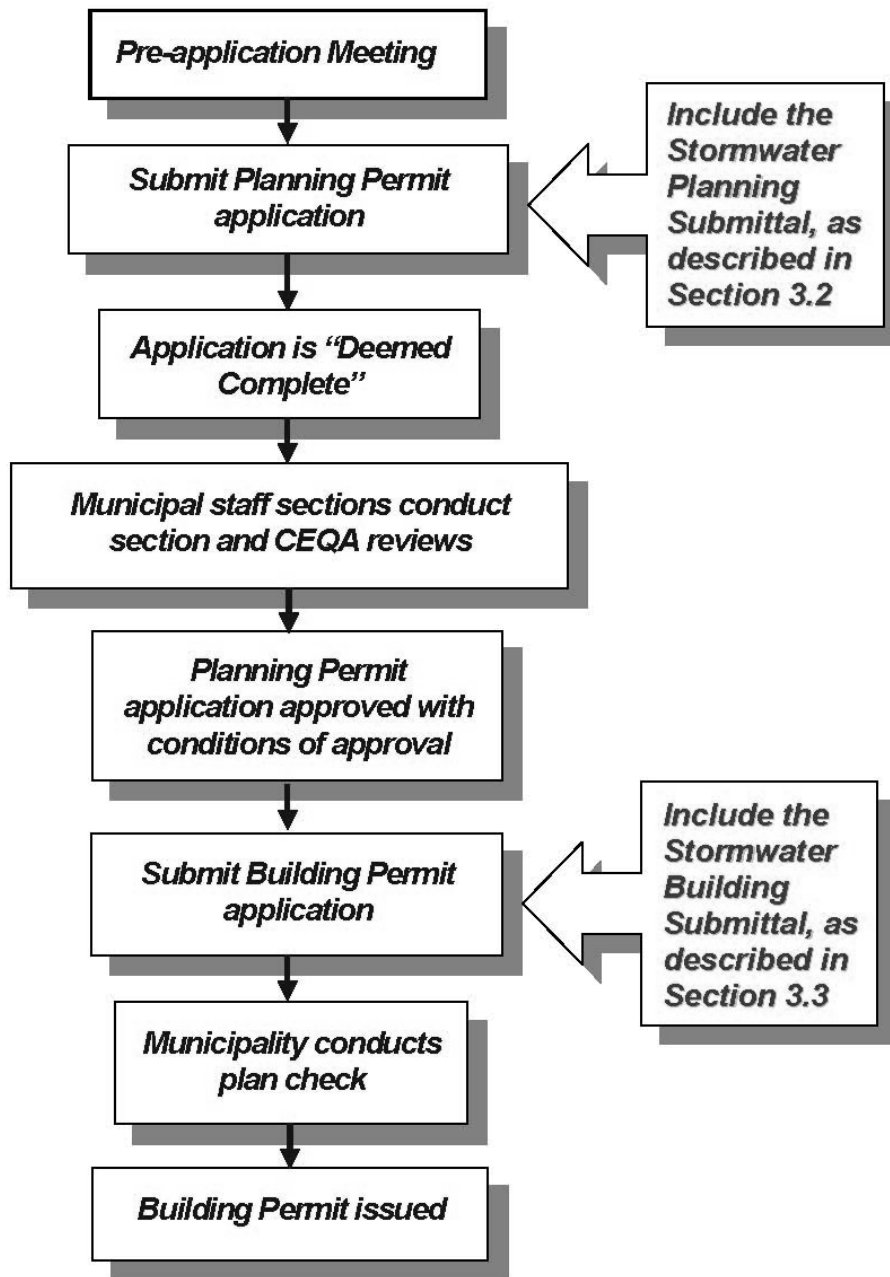


Figure 3-1: Sample Development Review Process

Although the development review process may vary from one municipality to the next, Figure 3-1 highlights the steps in the development review process where municipalities typically require submittals showing how your project incorporates post-construction stormwater controls. These submittals are incorporated into your planning permit and building permit applications. Remember that the C.3 submittals show how the project will

incorporate post-construction stormwater controls, to reduce pollutant loading and prevent increases in creek channel erosion **during the life of the project**. The municipality will require you to prepare separate documents to show how sedimentation and erosion will be controlled **during construction**. Sections 3.2 and 3.3 presents step-by-step instructions for preparing C.3 stormwater submittals for planning and building permit applications.

C.3 submittals show how the project will reduce pollutant loading and prevent increases in creek channel erosion during **long-term project operations**. You will need to prepare separate documents to show how sedimentation and erosion will be controlled during construction.

## 3.2 How to Prepare Planning Permit Submittals

The Countywide Program has developed two checklists that the municipalities may use to identify the requirements for post-construction stormwater controls that apply to your project at this phase in project development. The **NPDES Permit Compliance Checklist** may be used to identify specific requirements regarding the types of site designs, source controls, treatment measures and hydrograph modification measures that should be incorporated in the project. Municipal staff also use this checklist to identify erosion and sediment controls that will be required during construction of the project.

The **Planning Permit Submittal Checklist** is provided below to help identify the C.3 stormwater-related items that you will need to submit with your planning permit application. Please note that it's important to contact the planning staff of your local jurisdiction to discuss the specific requirements that may apply to your project. After you have a complete list of submittal requirements, you can use the Step-by-Step instructions in this section to prepare your submittal. Applicants with smaller projects (between 10,000 sq. ft. up to one acre) are encouraged to read Section 3.4, "**Simple Instructions for Small Sites**," before using the Step-by-Step instructions.



### 3.2.1 The Planning Permit Submittal Checklist

Table 3-1 presents a checklist of C.3 post-construction stormwater/low impact development information that is typically submitted with planning permit applications. Please note that if runoff from your site discharges directly to a creek or wetland without flowing through a municipality-owned storm drain, you may need to submit additional information. Municipal staff may use this checklist to determine whether your submittal is complete, or some jurisdictions may use a modified checklist. The items included in this checklist are important to demonstrate that your project will:



- Incorporate **site design measures** to reduce impervious surfaces, promote infiltration and reduce water quality impacts;
- Apply **source control measures** to keep pollutants out of stormwater runoff;
- Use stormwater **treatment measures** to remove pollutants from stormwater; and
- Where applicable, manage **hydromodification** (erosion-inducing flows) by reducing the rate and amount of runoff.

<b>Table 3-1: Planning Permit Submittal Checklist</b>			
<b>Required?<sup>1</sup></b>		<b>Information on Project Drawings</b>	<b>Corresponding Planning Step (Section 3.2)</b>
<b>Yes</b>	<b>No</b>		
<input type="checkbox"/>	<input type="checkbox"/>	Existing natural hydrologic features (depressions, watercourses, relatively undisturbed areas) and significant natural resources.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Soil types and depth to groundwater.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Existing and proposed site drainage network and connections to drainage offsite.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	For more complex drainage networks, show separate drainage areas in the existing and proposed site drainage network.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Existing condition, including pervious and impervious areas, for each drainage area.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Proposed pervious surfaces, including sensitive natural areas to be preserved and protected from development (for each drainage area).	Steps 2 and 3
<input type="checkbox"/>	<input type="checkbox"/>	Proposed site design measures to minimize impervious surfaces and promote infiltration <sup>2</sup> , which will affect the size of treatment measures.	Steps 3 and 4
<input type="checkbox"/>	<input type="checkbox"/>	Proposed impervious surfaces, e.g., roof, plaza, sidewalk, street, parking lot (for each drainage area).	Step 4
<input type="checkbox"/>	<input type="checkbox"/>	Proposed locations and approximate sizes of stormwater treatment measures and (if 1 acre or more of impervious surface is created) hydromodification management measures. Elevations should show sufficient hydraulic head for the treatment measures to work. <sup>2</sup>	Steps 5 - 9
<input type="checkbox"/>	<input type="checkbox"/>	Conceptual planting palette for stormwater treatment measures. <sup>2</sup>	Step 10
<input type="checkbox"/>	<input type="checkbox"/>	Pollutant source areas – including loading docks; food service areas; refuse areas; outdoor processes and storage; vehicle cleaning, repair or maintenance; fuel dispensing; equipment washing; etc. – and corresponding source controls from the local source control list.	Step 12
		<b>Written Information on Municipal Forms or in Report Format</b>	
<input type="checkbox"/>	<input type="checkbox"/>	Completed Impervious Surface Form (obtain copy of form from municipality).	Step 4
<input type="checkbox"/>	<input type="checkbox"/>	Completed Feasibility Screening Worksheet, and, if applicable, the completed Rainwater Harvesting Feasibility Worksheet, Infiltration Feasibility Worksheet, and/or Special Projects Worksheet (obtain from local agency).	Steps 5 and 6
<input type="checkbox"/>	<input type="checkbox"/>	Preliminary calculations for each treatment or hydromodification management measures.	Step 9
<input type="checkbox"/>	<input type="checkbox"/>	Preliminary maintenance plan for stormwater treatment measures.	Step 11
<input type="checkbox"/>	<input type="checkbox"/>	List of source control measures included in the project.	Step 12

<sup>1</sup> Every item is not necessarily required for a project. Municipal staff may check the boxes in the “Required” column to indicate items required for a project.  
<sup>2</sup> Site design and treatment measures that promote stormwater infiltration should be consistent with recommendations of the project geotechnical engineer based on the soils boring data, drainage pattern and the current requirements for stormwater controls.

### 3.2.2 Planning Permit Submittals: Step-by-Step

Step-by-step instructions are offered below to help incorporate post-construction stormwater controls into your project from the very beginning of permit planning. The step-by-step instructions are intended to help you **prepare the materials** you will need to submit along with the planning permit application.

#### *PLANNING PERMIT SUBMITTAL*

##### **Step 1: Collect Needed Information**

Collecting the appropriate information is essential to selecting and siting post-construction stormwater measures. A list of the most **commonly needed information** is provided below, but municipal staff may request additional information as well.

- Existing natural features, especially **hydrologic features** including creeks, wetlands, watercourses, seeps, springs, ponds, lakes, areas of 100-year floodplain, and any contiguous natural areas. This information may be obtained by site inspections, a topographic survey of the site, and existing maps such as US Geologic Survey (USGS) quadrangle maps, Federal Emergency Management Agency (FEMA) floodplain maps, US Fish and Wildlife Service (USFWS) wetland inventory maps, and the Oakland Museum of California Creek & Watershed Maps ([www.museumca.org/creeks](http://www.museumca.org/creeks)).
- Existing site **topography**, including the general direction of surface drainage, local high or low points or depressions, any steep slopes, outcrops, or other significant geologic features. This may be obtained from topographic maps and site inspections.
- **Existing site drainage.** For undeveloped sites, this would be identified based on the topographic information described above. For previously developed sites, information on drainage and storm drain connections may be obtained from municipal storm drain maps, plans for previous development, and site inspections.
- **Soil types** (including hydrologic soil groups) and **depth to groundwater.** If a soils report is not required for the project, planning-level information may be obtained from the Natural Resources Conservation Service (NRCS) Soils Survey. This information is used in determining the feasibility of onsite infiltration of stormwater. For additional information on soil types, see Appendix E – Infiltration Guidelines.
- **Existing impervious areas.** Measuring the area of existing impervious surface is necessary to calculate the amount of impervious surface that will be replaced. The countywide NPDES municipal stormwater permit requires that redevelopment projects that replace 50 percent or more of impervious surface treat the stormwater runoff from the entire site, not just the redeveloped area. If less than 50 percent of existing impervious surface is replaced, and the existing development was not subject to stormwater treatment measures, then only the affected portion must be included in treatment measure design.
- **Zoning** information, such as setback and open space requirements.

Review the information collected in Step 1. Identify the principal constraints on site design and stormwater treatment measure selection, as well as opportunities to reduce imperviousness and incorporate stormwater controls into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, steep slopes, geotechnical instability, high-intensity land use, heavy vehicular traffic, or safety

concerns. **Opportunities** for siting stormwater controls might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, landscape amenities including open space and buffers (which can double as locations for stormwater treatment measures) and differences in elevation (which can provide hydraulic head for moving stormwater runoff through treatment measures). Preparing a table or brief written summary of constraints and opportunities can prove helpful in selecting and siting stormwater controls.

Try this!



**Constraints** may include impermeable soils, high groundwater, steep slopes, or geotechnical instability.

**Opportunities** for siting stormwater controls may include existing natural areas, low areas, or landscaping.

#### PLANNING PERMIT SUBMITTAL

##### **Step 2: Minimize Site Disturbance and Protect Sensitive Areas**

Design the site layout to minimize changes to the natural topography. Using information collected in Step 1, identify any existing sensitive natural resources on the site to protect and preserve from development. These may include the following types of areas:

- Development should be set back from **creeks and riparian habitat** as required by the local jurisdiction. If your project involves impacts to creeks and riparian habitat, you will need to obtain approvals from a number of resource protection agencies, including but not limited to the San Francisco Bay Regional Water Quality Control Board and the California Department of Fish and Game. Guidance for obtaining these approvals is provided in San Mateo County's *Guide to Creek and Wetland Project Permitting*, at [http://www.flowstobay.org/pdfs/bmp/Construction%20Series/creek\\_wetland.pdf](http://www.flowstobay.org/pdfs/bmp/Construction%20Series/creek_wetland.pdf). Go to <http://sfep.abag.ca.gov/projects/JARPA/JARPA.html> for information on creek and wetland permits, and the required Joint Aquatic Resources Permit Application (JARPA).
- If the project includes **wetlands** subject to Section 404 of the federal Clean Water Act, or habitat for **special-status species** protected by federal or State laws, these areas should be indicated, and evidence should be provided to demonstrate compliance with the applicable laws. See the above reference to the *Guide to Creek and Wetland Project Permitting* and the JARPA website.
- The project will need to comply with any local tree preservation ordinances and other policies protecting **heritage or significant trees**. Mature trees offer substantial stormwater benefits, and their preservation is recommended, where feasible, even if it is not required by law.
- The project needs to comply with any local restrictions on development of **steep slopes** and soils that are susceptible to **erosion**. Even where not required by law, the avoidance of such areas is advisable in order to reduce stormwater impacts.

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##### **Step 3: Incorporate Site Design Measures**

Design the project to minimize the overall coverage of paving and roofs, with a special focus on reducing the amount of impervious area that is directly connected to the storm drain system. Using site design measures to reduce impervious surfaces on your site can **reduce the size of stormwater treatment measures** that you will need to install. But remember: even vegetated areas will generate some runoff. If runoff from landscaped areas flows to a stormwater treatment measure, that treatment measure will need to be

sized to handle these relatively small amounts of runoff, as well as runoff from impervious surfaces. Using self-treating areas (described below) can reduce the size of treatment measures even further.

Using site design measures to reduce impervious surfaces on your site can **reduce the size** of stormwater treatment measures that you will need to install.

Figure 3-2 provides an example of a site design measure. More photos of site design measures are in the countywide Guidebook of Post-Construction BMP Examples at: [www.flowstobay.org](http://www.flowstobay.org) (click on Business, then New Development, then scroll to Developments Protecting Water Quality: A Guidebook of Low Impact Development Examples). More information on site design measures is provided in Chapter 4, along with technical guidance for green roofs, pervious paving, unit pavers and turf block. A range of site design examples are described in the following list:

- Use **alternative site layout techniques** to reduce the total amount of impervious area. This may include designing compact, multi-story structures or clustering buildings. Some cities may allow narrow streets and (in very low-density neighborhoods) sidewalks on only one side of the street.
- **Minimize surface parking** areas, in terms of the number and size of parking spaces.
- Use **rainwater as a resource**. Capturing and retaining roof runoff in cisterns can be a practical way to reduce the amount of runoff from the site and store rainwater for use in on-site irrigation. Stormwater storage provided by cisterns may be used to reduce the amount of stormwater that must be treated and, where applicable, retained on-site to meet hydromodification management requirements.
- Use **drainage as a design element**. Bioretention areas, depressed landscape areas, vegetated buffers, and flow-through planters can serve as visual amenities and focal points in the landscape design of your site.
- **Maximize choices for mobility**. Motor vehicles are a major source of pollutants in stormwater runoff. Projects should promote, or at least accommodate, modes of transportation other than the automobile.
- Include alternative, pervious surfaces. **Green roofs** can partially or fully replace traditional roofing materials. **Pervious surfaces** such as crushed aggregate, turf block, unit pavers, or pervious paving may be appropriate for sidewalks, parking lots, and low-volume residential areas.
- Identify **self-treating areas**. Some portions of your site may provide “self-treatment” if properly designed and drained. Such areas may include conserved natural spaces, large landscaped areas, and areas of turf block. These areas are considered “self-treating” because infiltration and natural processes



Figure 3-2: Turf block fire access road, Santa Clara University, Santa Clara

that occur in these areas remove pollutants from stormwater. As long as the self-treating areas do **not receive runoff from impervious areas** on the site and integrated pest management is used, your drainage design may direct the runoff from self-treating areas directly to the storm drain system or other receiving water. More information on self-treating areas is given in Section 4.2.

- Direct **runoff to depressed landscaped areas**. You may be able to design an area within your site to function as a “self-retaining area” or “zero discharge area” in which the amount of stormwater runoff that is required to be treated is infiltrated or retained in depressed landscaped areas. A 2:1 ratio of impervious area to the receiving pervious area may be acceptable, where soils permit. Much higher ratios are possible if the runoff is directed to a bioretention area or other landscape-based treatment measures. More information is provided in Section 4.3.

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**Step 4: Measure Pervious and Impervious Surfaces**

Stormwater treatment is required for projects that create and/or replace **10,000 square feet or more** of impervious surface – with some exceptions that are listed in Chapter 2. Effective **December 1, 2011**, the threshold for requiring stormwater treatment is reduced from 10,000 to **5,000 square feet**, or more, of impervious surface for the following project categories: uncovered parking areas (stand-alone or part of another use), restaurants, auto service facilities<sup>1</sup>, and retail gasoline outlets. The 5,000 square foot threshold will not apply if a) the project was deemed complete on or before December 1, 2009, and the applicant has diligently pursued<sup>2</sup> the project; b) the project is deemed complete after December 1, 2009, but receives final discretionary approval before **December 1, 2011**; and/or c) it is a public project for which funding has been committed and construction is scheduled to begin by December 2, 2012.

Hydromodification management (HM) is required for projects that create and/or replace one acre or more of impervious surface, result in more impervious surface in the post-project condition than in pre-project conditions, AND are located in susceptible areas identified in the Hydromodification Management Susceptibility Map (see Appendix H). Chapter 7 describes this map and provides more information on HM.




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<sup>1</sup> Auto service facilities include the specific Standard Industrial Classification Codes, as follows:  
 5013: Wholesale distribution of motor vehicle supplies, accessories, tools, equipment, and parts.  
 5014: Wholesale distribution of tires and tubes for passenger and commercial vehicles.  
 7532: Repair of automotive tops, bodies, and interiors, or automotive painting and refinishing.  
 7533: Installation, repair, or sale and installation of automotive exhaust systems.  
 7534: Repairing and retreading automotive tires.  
 7536: Installation, repair, or sales and installation of automotive glass.  
 7537: Installation, repair, or sales and installation of automotive transmissions.  
 7538: General automotive repair.  
 7539: Specialized automotive repair such as fuel service, brake relining, front-end and wheel alignment, and radiator repair.

<sup>2</sup> Diligent pursuance may be demonstrated by the project applicant’s submittal of supplemental information to the original application, plans, or other documents required for any necessary approvals of the project by the reviewing jurisdiction.

As part of the planning permit application submittal, you will need to complete the **Impervious Surface Form** that is provided by the local jurisdiction. This form is used to calculate the amount of impervious surface that will be created and/or replaced, and determine whether treatment and/or HM measures are required. Impervious surfaces are those areas where development prevents water from infiltrating into the ground and results in runoff. Impervious surfaces include but are not limited to:

- Footprints of all buildings and structures and their eave overhangs, including garages, carports, sheds, etc.;
- Driveways, patios, parking lots, decking; and
- Streets and sidewalks.



Areas of pervious paving that are underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold at least the Provision C.3.d volume of rainfall runoff are not considered impervious surfaces, and are **excluded from the calculation of impervious surfaces**.



Projects that create **less than 10,000 square feet** of impervious surface need to include stormwater treatment measures (Steps 5, 6, and 7) to the maximum extent practicable – and the Provision C.3 numeric sizing criteria may not apply. Check with the local jurisdiction to determine whether Steps 5 through 7 will apply to your project.

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##### **Step 5: Determine if Special Projects LID treatment reduction credits apply**

LID treatment reduction credits can be applied to smart growth, high density or transit oriented development projects that meet specific criteria for the Special Projects included in Appendix J. Contact municipal staff to determine whether your project meets the criteria to be considered a Special Project.

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##### **Step 6: Determine if New Low Impact Development (LID) Requirements apply**

Stormwater treatment requirements must be met using evapotranspiration, infiltration, and/or rainwater harvesting and reuse. Where this is infeasible, biotreatment measures may be used. Refer to Appendix I for the feasibility worksheets and guidance based on regional criteria and procedures in order to determine feasibility at a site.

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##### **Step 7: Select Treatment/HM Measures**

Effective December 1, 2011, stormwater treatment must be accomplished with infiltration, evapotranspiration, and rainwater harvesting and use, unless this is infeasible, based on criteria provided in Appendix I, in which case landscape-based “biotreatment” measures may be used. **Chapter 6** provides technical guidance for specific types of stormwater treatment measures that are commonly used in San Mateo County. While other treatment measures may be approved, it may be possible to expedite the review of your project by closely following the guidance provided in Chapter 6.

Selecting the appropriate treatment measure(s) for a specific site is a matter of professional judgment. Some general factors to consider are offered below:

- Effective **December 1, 2011**, vault-based systems are allowed only in a limited number of locations and types of development (see Appendix J).
- Is **Hydromodification management** (HM) required? If your project needs to meet both treatment and HM requirements, to the extent feasible, it is recommended that stormwater control measures be designed to meet both treatment and HM needs. HM detention requirements are likely to exceed the volume required for treatment, and may also need to be coordinated with separate requirements for flood control detention.
- **Soil suitability.** Soils are classified into four hydrologic soil groups – A, B, C, and D – with the soils in each group having similar runoff potential under similar storm and cover conditions. Group A soils generally have the lowest runoff potential, and group D have the greatest.<sup>3</sup> Treatment measures that rely primarily on **infiltration**, such as infiltration trenches, are generally unsuitable for use in group D soils (clay loam, sandy clay and clay) and have the potential to fail in group C (silt loam) soils. Bioretention areas installed in group C and D soils typically require subdrains.
- **Site slope.** LID treatment measures need to be carefully selected and designed for use on steep slopes, because infiltration of stormwater runoff can cause geotechnical instability. Depending on site conditions, it may be possible to design **bioretention areas** using check dams for projects on sites with some slope constraints.
- Considerations for **larger sites.** Some sites may have sufficient space for stormwater runoff could be routed one or more cisterns and used for non-potable uses, such as irrigation or flushing toilets (**rainwater harvesting and use**). Alternatively, smaller stormwater treatment measures may be dispersed throughout the site.
- Consider **maintenance requirements.** The amount of maintenance that a stormwater treatment measure will require should be considered when selecting treatment measures. As described in Section 3.3, you will need to prepare and submit a **maintenance plan** for stormwater treatment measures with the building permit application. Section 8.2 provides information about the maintenance requirements for various treatment measures.
- **Avoid mosquito problems.** Mosquito control guidance provided in **Appendix F** needs to be implemented for all stormwater treatment measures, with special consideration given to treatment measures that are designed to include standing water. Underground mechanical systems can be particularly problematic because many retain water that is not visible from the surface. Project plans that include stormwater treatment measures (and their maintenance plans), are routed to the San Mateo County Mosquito Abatement District for review. You may consider consulting with Mosquito Abatement District staff for guidance.

Warning



Avoid



The **mosquito control guidance** (Appendix G) needs to be implemented for all stormwater treatment measures, especially treatment measures designed to include standing water.

<sup>3</sup> Details of this soil classification can be found in the National Soil Survey Handbook, Part 618.35 (USDA, 2006), <http://soils.usda.gov/technical/handbook>.

- Potential for **groundwater contamination**. Before selecting an infiltration device, such as an infiltration trench, infiltration basin, or French drain, review the infiltration considerations presented in **Appendix E** to protect groundwater from contamination by pollutants in stormwater runoff.

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##### **Step 8: Locate Treatment/HM Measures on the Site**

Review the existing and proposed site drainage network and connections to drainage offsite, which were collected in Step 1. Selecting appropriate locations for treatment and HM measures involves a number of important factors, including the following:

- **Design for gravity flow.** If at all possible, treatment/HM measures should be designed so that drainage into and out of the treatment measure is by gravity flow. This promotes effective, low-maintenance operation and helps avoid mosquito problems. Pumped systems can be feasible, but they are more expensive, require more maintenance, and can introduce areas with standing water that attract mosquito breeding.
- Determine **final ownership and maintenance responsibility**. All treatment measures should be available for ready access by maintenance workers, inspectors from the local municipality, and staff from the San Mateo County Mosquito Abatement District. If the property will be subdivided, be sure to locate shared treatment measures in a common, accessible area – not on a private residential lot.



Figure 3-3: *Playing Fields/Detention Area, Pacific Shores, Redwood City. (photograph from [www.pacificshores.com](http://www.pacificshores.com))*

- Incorporate **treatment measures in the landscape design**. Almost every project includes landscaped areas. Most zoning districts require a certain amount of open space, and some require landscaped setbacks or buffers. It may be possible to locate some or all of your projects' treatment/HM measures within required landscape areas.
- **Plan for maintenance.** Stormwater treatment measures will need to be accessible to the largest piece of equipment that will be needed for maintenance. For example, bioretention areas and vegetated buffer strips need access for the types of machinery used for landscape maintenance. Large extended detention basins need to have a perimeter access road accessible by heavy vehicles for sediment removal and control of emergent vegetation. Underground treatment measures and media filters may require special equipment for periodic cleanout and media replacement.



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##### **Step 9: Preliminary Design of Treatment/HM Measures**

Perform preliminary design of the stormwater treatment measures you have selected using the hydraulic sizing criteria in Section 5.1 and the technical guidance for specific types of

treatment measures in Chapter 6. The technical guidance in this handbook is compatible with the **Bay Area Hydrology Model** (BAHM), a tool for sizing HM measures, developed by SMCWPPP in cooperation with the Santa Clara Valley Urban Runoff Pollution Prevention Program and the Alameda Countywide Clean Water Program. The BAHM may be downloaded at [www.bayareahydrologymodel.com](http://www.bayareahydrologymodel.com). See Chapter 7 for more information on the BAHM and the design of HM measures.

Detailed construction drawings are typically not required for planning permit submittals, but drawings or sketches need to be included to illustrate the proposed design and sizing information based on runoff calculations.

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**Step 10: Consider Planting Palettes for Treatment Measures**

The selection of appropriate plant materials is an important part of designing a successful LID stormwater treatment measure. Plants need to be hardy, low-maintenance, and tolerant of saturated soils. Although irrigation systems are typically required for landscape-based stormwater treatment measures, selecting plants that can survive long periods with little or no rainfall will **help reduce irrigation requirements**. At the planning permit phase of the project a detailed planting plan is typically not required, but many municipalities require a conceptual planting palette. Appendix A provides guidance regarding the selection of plant materials for landscape-based treatment measures, including information about Bay-Friendly Landscaping. Bay-Friendly Landscaping Guidelines are available at [www.bayfriendly.org](http://www.bayfriendly.org).



Selecting plants that can survive long periods with little or no rainfall will **help reduce irrigation requirements**.

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**Step 11: Prepare a Preliminary Maintenance Plan (if required)**

A stormwater treatment measure maintenance plan describes how stormwater treatment measures will be maintained during the years and decades **after construction is completed**. In some cases a municipality may require the submittal of a preliminary maintenance plan as part of the planning permit submittal. Otherwise, a maintenance plan is required only as part of the building permit submittal. **Check with your local jurisdiction** regarding the requirements for your project.



A preliminary maintenance plan identifies the **proposed maintenance activities**, and the intervals at which they will be conducted, for each stormwater treatment measure included in the project. As part of the building permit submittal, applicants will also need to provide additional information that will be included in a maintenance agreement between the local municipality and the property owner. Chapter 8 provides more information about stormwater treatment measure operation and maintenance, including guidance on how to prepare a maintenance plan. Maintenance plan templates for various types of stormwater treatment measures are included in Appendix G.

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**Step 12: Use Applicable Source Control Measures**

Pollutants are generated by many activities that will occur after construction is completed. Each local jurisdiction has specific pollutant source control requirements for projects that include landscaping, swimming pools, vehicle washing areas, trash/recycling areas, and



other potential sources of pollutants. These requirements are identified in the agency's **Local Source Control Measures List**. Be sure to obtain the current list from your local jurisdiction. The lists typically focus on **structural source controls**: permanent features that are designed and constructed as part of a project, such as sanitary sewer connections for restaurant wash areas that are large enough to wash the largest piece of equipment. The municipality may also require your project to commit to implementing operational source controls: “good housekeeping” activities that must be conducted routinely during the operations phase of the project, such as street sweeping and cleaning storm drain inlets.



Your project will need to incorporate the applicable source controls for any project activity that is included in the local source control list. The following methods may be used to accomplish this.

- **Review** structural source controls in Part I of the local list and compare this list to your site plan. Identify any areas on the site that require structural source controls. Remember that some activities may not have been sited yet. For example, the Model List includes a requirement for enclosing and roofing refuse storage areas. If a designer was unaware of this requirement, it may not be shown on the project plans.
- **Incorporate** all the required structural source controls on your project drawings.
- **If required by the municipality**, prepare and submit a table, listing in three columns the potential sources of pollutants, the permanent source control measures, and any operational source control measures from Part II of the local list that apply to the project. Table 3-2 is a Table of Example Source Controls.

<b>Potential Source of Pollutants</b>	<b>Structural Source Controls</b>	<b>Operational Source Controls</b>
On-site storm drains	On-site storm drains shall be marked with the words “No Dumping! Flows to Bay” (or applicable water body) applied with thermoplastic.	All on-site storm drain inlets shall be cleaned at least once a year immediately prior to the rainy season.
Refuse areas	New or redevelopment projects, such as food service facilities, recycling facilities or similar facilities, shall provide a roofed and enclosed area for dumpsters and recycling containers. The area shall be designed to prevent water run-on to the area and runoff from the area and to contain litter and trash, so that it is not dispersed by the wind or runoff during waste removal.	None

*NOTE: This is included as an example only and is not intended for use in an actual submittal.*

*PLANNING PERMIT SUBMITTAL*

**Step 13: Coordinate with Other Project Requirements**

When submitting the C.3 stormwater drawings with the planning permit submittal, the stormwater site design, source control, treatment and HM measures may be shown on a separate stormwater plan, or combined with the site plan, landscaping plan, or drainage plan – depending on the complexity of the project. Whether plans are combined or separate, there are a number of issues that must be carefully coordinated with other aspects of the project design. Some typical coordination considerations are listed below.

- **Balance of Cut and Fill.** When calculating the overall project balance of cut and fill, be sure to include the excavation of stormwater treatment measures (including the need to replace existing clay soils with group A or B soils).
- **Soil Compaction during Construction.** Compaction from construction traffic can severely restrict the infiltration capacity of soils at your site. In the construction staging plan, protect and limit operation in those portions of the site that will be used for self-treatment or stormwater treatment measures that rely on infiltration.
- **Building Drainage.** Building codes require that drainage from roofs and other impervious areas be directed away from the building. The codes also specify minimum sizes and slopes for roof leaders and drain piping. Any stormwater measure located in or on the building, or that may affect building foundations, must be designed to meet the minimum building code requirements. Stormwater treatment measures are also required to meet the requirements for detention or flow described in Section 5.1.
- **Control of Elevations.** Getting runoff to flow from impervious surfaces to landscaped surfaces may require greater attention to detailed slopes and elevations in grading and landscaping plans. For example:



- **Provide Adequate Change in Elevation** between the pavement and vegetated areas. The landscaped area needs to be low enough so that runoff will flow into it even after the turf or other vegetation has grown up. If an adequate drop in elevation is not provided, runoff will tend to pond on the edge of the paved surface.
- **Provide for Differential Settlement.** While the soil in landscaped-based stormwater treatment measures and self-treating areas must be left loose and uncompacted, concrete structures (such as inlets and outlets) must be supported on a firm foundation. Otherwise they may settle more than the surrounding ground, creating depressions that can hold standing water and contribute to nuisances such as mosquito breeding.
- **Prevent Erosion.** There is potential for erosion to occur at points where the stormwater runoff flows from impervious areas into landscape-based treatment measures. Include in project plans any proposed erosion controls, such as cobbles or splash blocks.

- **Drainage Plans.** The local building or engineering department may require a drainage plan, which typically focuses on preventing street flooding during a 10-year storm and demonstrating that flooding from 100-year storms can be managed. To meet the drainage plan requirements it may be necessary to include **high flow bypasses** in the design of stormwater treatment measures, in order to route **flood flows** directly to the storm drain system. More information on this topic is provided in Section 5.6. Check with your local jurisdiction regarding the need to prepare a drainage plan, and whether it is required only as part of the building permit submittal, or if a preliminary drainage plan is needed with the planning permit submittal.



Figure 3-4: Cobbles help prevent erosion as stormwater enters treatment measure at Legacy Tech Park in San Jose. (Photo credit: RBF Consulting)

- **Signage for Traffic and Parking.** If your project includes depressed landscaped areas next to parking lots, driveways or roadways, it may be necessary to include bollards, striping or signs to guide traffic, particularly if curbs are designed to be flush with the pavement. Traffic striping may not be practical for permeable pavements such as crushed aggregate and unit pavers. In these areas signs and bollards may be needed to help direct traffic.

PLANNING PERMIT SUBMITTAL

**Step 14: Submit Planning Permit Application**

Assemble all the items listed in Table 3-1 that municipal staff indicates are required for your project, and include them as attachments to the planning permit application for your project.

### 3.3 How to Prepare Building Permit Submittals



Except for projects on small sites, the principal differences between planning permit submittals and building permit submittals are:

- Submit **construction level detail**, rather than preliminary plans;
- Changes are **highlighted and explained**, if plans differ from the planning permit submittal;
- **Detailed maintenance plans** are included, along with documentation to support the maintenance agreement.

The list of materials that may be required at this stage in the project is shown in Table 3-3, and brief step-by-step instructions follow.

If your project **does not require a planning permit**, your building permit application submittal will need to include some items from Tables 3-1 and 3-3.

BUILDING PERMIT SUBMITTAL

**Step 1: Update Project Documentation**

Information regarding the design of stormwater measures that was submitted with the planning permit application must be updated, as necessary, for submittal with the building permit application. Specific requirements may vary in the various jurisdictions, but this is anticipated to include the following:

- Incorporate all **stormwater-related conditions of approval** that were applied as part of planning permit approval.
- Highlight and explain any **other stormwater-related changes** that have been made since the planning review. This may include, but is not limited to, changes in the boundaries of sensitive areas to be protected, changes in the amount of impervious surface to be created/replaced, changes in the stormwater pollutant source areas, changes in the location or design of stormwater measures, etc.
- Prepare **construction level detail** for all stormwater measures included in the project.
- Prepare detailed **hydraulic sizing calculations** for stormwater treatment and HM measures, using the hydraulic sizing guidance provided in Section 5.1.
- Prepare construction-level **planting plans** for landscape-based stormwater treatment measures.

NOTE: Some **smaller projects** may not require a planning permit. If this is true for your project, your building permit application submittal will need to include items listed in both Table 3-1 and Table 3-3. Ask the building department staff to help you identify the specific items needed for your submittal.

Table 3-3: Building Permit Submittal Checklist			Corresponds to Building Step (Sect. 3.3)
Required?			
Yes	No	Information on Project Drawings	
<input type="checkbox"/>	<input type="checkbox"/>	Sensitive natural areas to be preserved and protected from development – highlighting any changes since the planning permit submittal.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Proposed impervious surfaces, e.g. roof, sidewalk, street, parking lot (for each drainage area)–highlight any changes since planning submittal.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Site design measures to minimize impervious surfaces and promote infiltration – construction level detail.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Construction level detail of stormwater treatment measures and (if 1 acre or more of impervious surface is created and/or replaced and not exempted) hydromodification management measures.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Pollutant source areas and corresponding structural source controls from local source control list – construction level detail.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Landscaping plan for stormwater treatment measures–construction level detail.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Letter- or legal-sized conceptual or site plan showing locations of stormwater treatment measures, for inclusion in the Maintenance Agreement.	Step 2
		<b>Written Information on Municipal Forms or in Report Format</b>	
<input type="checkbox"/>	<input type="checkbox"/>	Completed Impervious Surface Form, showing any changes since planning permit submittal.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Detailed hydraulic sizing calculations for each treatment and/or hydromodification management measure.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	List of source control measures included in the project, showing any changes since planning permit submittal.	Step 1
<input type="checkbox"/>	<input type="checkbox"/>	Detailed maintenance plan for stormwater treatment measures, including inspection checklists, as appropriate.	Step 2
<input type="checkbox"/>	<input type="checkbox"/>	A standard treatment measure O&M report form, to be attached to the Maintenance Agreement	Step 2

**BUILDING PERMIT SUBMITTAL**

**Step 2: Prepare Maintenance Documentation**



Property owners are responsible for assuring the long-term operation and maintenance of a project’s stormwater treatment measures, unless the applicable municipality approves other specific arrangements. Details may vary from one jurisdiction to another, but **maintenance agreements** generally require the property owner to assure that all stormwater treatment measures receive proper maintenance in accordance with an approved maintenance plan; that municipal, Water Board, and Mosquito Abatement District staff be granted access, as needed, to ensure proper maintenance and operation; and if the property owner fails to maintain the treatment measure, municipal staff be allowed, as its option, to enter the property, perform necessary emergency repairs, and charge the property owner for the

necessary emergency repairs. Project applicants are typically required to provide the following documentation to support the maintenance agreement:

- A **conceptual plan or site plan** that is legible on letter- or legal-sized paper (8.5-by-11 inches or 8.5-by-14 inches) and shows the locations of the stormwater treatment measures that will be subject to the agreement. **Some municipalities have specific requirements** for these plans, such as requiring a conceptual plan that includes only the stormwater treatment measures. If more than one stormwater treatment measure is used, the treatment measures should be numbered for ease of identification (for example, Bioretention Area 1, Bioretention Area 2, etc.)
- A **maintenance plan** that includes specific long-term maintenance tasks and a schedule. Section 8.2 provides guidance for preparing a maintenance plan, and Appendix G features maintenance plan templates to use when preparing a maintenance plan. If a preliminary maintenance plan was submitted with the planning permit application, this plan should be updated to respond to municipal staff comments and include a sufficient level of detail for implementation.
- A Standard Treatment Measure Operation and Maintenance **Inspection Report Form**, which some municipalities require the property owner to complete and submit to the municipality each year. The purpose of the annual report is to help the municipality verify that appropriate O&M is occurring. A template for preparing this report form is included in Appendix G.

#### BUILDING PERMIT SUBMITTAL

##### **Step 3: Submit Building Application**

Assemble all the items listed in Table 3-3 that municipal staff has indicated are required for your project, and include them as attachments to your building permit application.

## 3.4 Simple Instructions for Small Sites



Some developers of smaller projects may be less familiar with requirements to incorporate stormwater treatment measures. If you are a qualified engineer, architect or landscape architect, you may be able to prepare the entire C.3 submittal yourself. If not, you will probably need to hire a **qualified civil engineer, architect or landscape architect** to prepare the submittal – or at least some of the more technical aspects of the submittal. Some tips for smaller projects are provided below:



- **Review submittal checklists with municipal staff.** If your project does not require a planning permit, you will need to include in your building permit application submittal some of the items that are listed in Table 3-1 (Planning Permit Submittal Checklist) and some from Table 3-3 (Building Permit Checklist). But remember, not every item in the checklists is required for every project. Make an appointment with a member of the building department staff to sit down and go through the checklists with you, to give you a **reduced list** of the items you will need for your small site. And make sure to get the list in writing, so you can refer to it, if necessary, in future conversations with municipal staff. If your project requires a planning permit, use this same strategy to get a list of required items from the planning staff.
- **Maximize the use of site design measures.** The less impervious surface area on the site, the smaller your stormwater treatment measures will need to be. Chapter 4

lists many strategies for reducing impervious surfaces, and it offers guidance for using self-treating areas (for example, landscaped areas, areas paved with turf block, or green roofs) to further **reduce the size** of treatment measures. Beginning **December 1, 2012**, projects that create and/or replace at least 2,500 but less than 10,000 square feet of impervious surface will be required to incorporate site design measures, using specifications that will be included in Appendix L.

- **Use LID treatment measures.** Even on small sites, LID treatment measures are required, except for projects that may receive LID treatment reduction credits as a Special Project (described in Appendix K). Chapter 6 includes technical guidance for some treatment measures, such as bioretention areas, and flow-through planters, which are well suited for small sites in **densely developed areas**. Bioretention areas that maximize infiltration to the underlying soils are encouraged even if it is infeasible to infiltrate the C.3.d amount of runoff, if there are no conditions that would make infiltration unsafe. If infiltration is precluded due to on-site conditions (such as proximity to buildings, high groundwater or contaminated soils), flow-through planters may be a good option.
- **Avoid vault systems.** Beginning **December 1, 2011**, mechanical vault-based treatment may be allowed only for some special projects (criteria to be included in Appendix J, when available). However, these systems in general are not as effective nor as easy to maintain as landscape-based biotreatment measures. Remember that, after **December 1, 2011**, biotreatment will be allowed for projects in which infiltration, evapotranspiration and rainwater harvesting and use are infeasible.
- **Consider using simplified sizing methods.** The technical guidance in Chapter 6 includes simplified sizing methods for several types of stormwater treatment measures, including flow-through planters, and bioretention areas. The technical guidance for each of these treatment measures highlights the easy-to-follow calculations for sizing the treatment measures. Please note, however, that there is a trade-off for simplicity. The simplified sizing calculations may result in treatment measures that are conservatively large. If space is at a premium, it may be cost-effective to hire a civil engineer with experience sizing stormwater treatment measures and use the more detailed sizing calculations, in order to potentially reduce the amount of land needed for stormwater treatment.



Figure 3-5: Flow-through planters in a dense, urban setting (Source: City of Emeryville)

- **Use the planting guidance.** Appendix A provides guidance for selecting appropriate plantings for landscape-based stormwater treatment measures. Municipal staff will confirm that the plants included in your design meet the criteria set forth in this guidance.