

CHAPTER 5

POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT PROGRAM

The purpose of the Post-Construction Storm Water Management in New Development and Redevelopment Program (Post-Construction Program) is to address storm water runoff from all new development and redevelopment projects that result in a land disturbance of one acre or more and smaller projects that have the potential to discharge pollutants to the MS4.

The Post-Construction Program implements the following control measures to minimize storm water impacts to the MEP and ensure permanent controls are in place for applicable projects:

1. Revise the *Storm Water Permanent BMPs Manual* (Appendix E.1) to include low impact development (LID) requirements.
2. Review and accept plans for projects to ensure that appropriate permanent BMPs (PBMPs) have been included in the project design and bid package.
3. Use the AMS to track the inspection frequency and maintenance of PBMPs.
4. Provide education and outreach materials to parties applying for DOT-HWYS' permits on the selection, design, installation, operation, and maintenance of storm water BMPs, structural controls, PBMPs, and LID practices.
5. Provide annual training for DOT-HWYS staff and contractors responsible for inspecting PBMPs and LID practices.

The Post-Construction Program is administered in accordance with the MS4 Permit requirements outlined in Table 5-1.

Table 5-1. MS4 Permit Requirements for the Post-Construction Program

MS4 Permit Reference	SWMPP Section
<p><i>Part D.1.e The Permittee shall further develop, implement, and enforce a program to address storm water runoff from all (i.e., both private and public) new development and redevelopment projects that result in a land disturbance of one (1) acre of more and smaller projects that have the potential to discharge pollutants to the DOT-HWYS' MS4. The Permittee's program must ensure that permanent controls are in place to prevent or minimize water quality impacts to the MEP. Review and update as necessary the criteria defining when and the types of permanent post-construction BMPs, including among other thing LID techniques, must be included in a project design to address storm water impacts and pollutants of concern. For State waters on the State CWA Section 303(d) list or State established and EPA approved TMDLs, the pollutants of concern to be targeted shall include the parameters causing impairment. Consideration shall also be provided for trash reduction techniques as to comply with its short and long term plans as required in Section D.1.(f)(1)(v). The program shall include, at a minimum, the following elements:</i></p>	<p>Section 5.1 Section 5.2</p>

MS4 Permit Reference	SWMPP Section
<p>Part D.1.e.(1) Standards Revision – <i>The Permittee shall revise its standards for addressing post-construction BMPs to include Low Impact Development (LID) requirements. Within six (6) months of the effective date of this permit, the Permittee shall submit to DOH for review and acceptance, a plan for requiring LID in the standards to the MEP, including revision to the plan review and inspection checklist to include LID. LID refers to storm water management practices which seek to mimic a site’s predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. The standards shall ensure that the management practices are prioritized to favor infiltration, evapotranspiration, or harvesting/reuse of stormwater followed by other practices that treat and release stormwater. The standards shall be applicable to all construction projects disturbing at least one (1) acre and smaller projects that have the potential to discharge pollutants to the DOT-HWYS’ MS4. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment. The plan for the implementation of LID provisions in the DOT-HWYS’ standards shall include at a minimum the following:</i></p> <ul style="list-style-type: none"> • <i>Criteria for requiring implementation.</i> • <i>Investigation into the development of quantitative criteria for a specific design storm to be managed by LID techniques. Examples of design storm requirements include: 24-hour, 85% storm through infiltration; on-site management of the first inch of rainfall within a 24-hour period; retention of the 100-year, 2-hour storm; or on-site management of the 24-hour, 95% storm.</i> • <i>Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements.</i> • <i>When a LID waiver is granted, alternatives such as offsite mitigation and/or non-LID treatment control BMPs could be required.</i> <p><i>A draft of the revised Standards shall be submitted to the DOH in accordance with Part A.6. for review and acceptance within 12 months after the effective date of this permit and include at a minimum the above. Within 18 months after the effective date of this permit, subject to adoption by rulemaking or other equivalent process, the revised Standards shall be submitted to the DOH in accordance with Part A.6. To the extent that the revised Standards have not been adopted, the Permittee shall submit a compliance schedule for adoption, which shall not exceed 24 months after the effective date of this permit.</i></p>	<p>Section 5.1</p>
<p>Part D.1.e.(2) Review of Plans for Post-Construction BMPs – <i>For design-bid-build projects, the Permittee shall not advertise any construction project nor award any construction contract until the project design has been reviewed and accepted to ensure that appropriate permanent post-construction BMPs, which include LID practices upon adoption into its Standards, have been included in the project design and are included in the bid package to ensure compliance with this part of the permit. For design-build projects, the Permittee shall review and approve the project design the same as for design-bid-build projects prior to implementation. No project shall proceed without the inclusion of appropriate permanent post-construction BMPs unless a waiver is granted by DOT-HWYS based on specific documentation demonstrating that such post-construction BMPs are not feasible. Project documents for projects that will include installation of permanent post-construction BMPs shall also include appropriate requirements for their future continued maintenance.</i></p>	<p>Section 5.2</p>

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MS4 Permit Reference	SWMPP Section
<p>Part D.1.e.(3) BMP, Operation and Maintenance, and Inspection Database - The Permittee shall implement its Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum:</p> <ul style="list-style-type: none"> • Type and number of LID practices • Type and number of Source Control BMPs • Type and number of Treatment Control BMPs • Latitude/Longitude coordinates of controls using Global Positioning Systems (GPS) and NAD83 or other Datum as long as the datum remains consistent • Photographs of controls • Operation and maintenance requirements • Frequency of inspections • Frequency of maintenance <p>All stormwater treatment and LID BMPs shall be inspected at least once a year for proper operation; maintenance shall be performed as necessary to ensure proper operation.</p>	Section 5.3
<p>Part D.1.e.(4).(i) Project Proponents - The Permittee shall provide education and outreach material for those parties who apply for DOT permits (i.e., developers, engineers, architects, consultants, construction contractors, excavators, and property owners) on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs, and LID practices. The outreach material may include a simplified flowchart for thresholds triggering permits and requirements, a list of required permits, implementing agencies, fees, overviews, timelines and a brief discussion of potential environmental impacts associated with storm water runoff.</p>	Section 5.4
<p>Part D.1.e.(4).(ii) Inspectors - All Permittee staff and those contractors under DOT-HWYS contract responsible for inspecting permanent post-construction BMPs and LID practices shall receive annual training.</p>	Section 5.5



Hydrodynamic separators (left) and storm catch basin filter systems (right) trap trash, debris, and sediment before it can enter the MS4 and be discharged to the ocean.

5.0 Program Organization

To fulfill the requirements of the MS4 Permit and the Consent Decree, the following organizational structure has been established for the Post-Construction Program.

Post-Construction Program

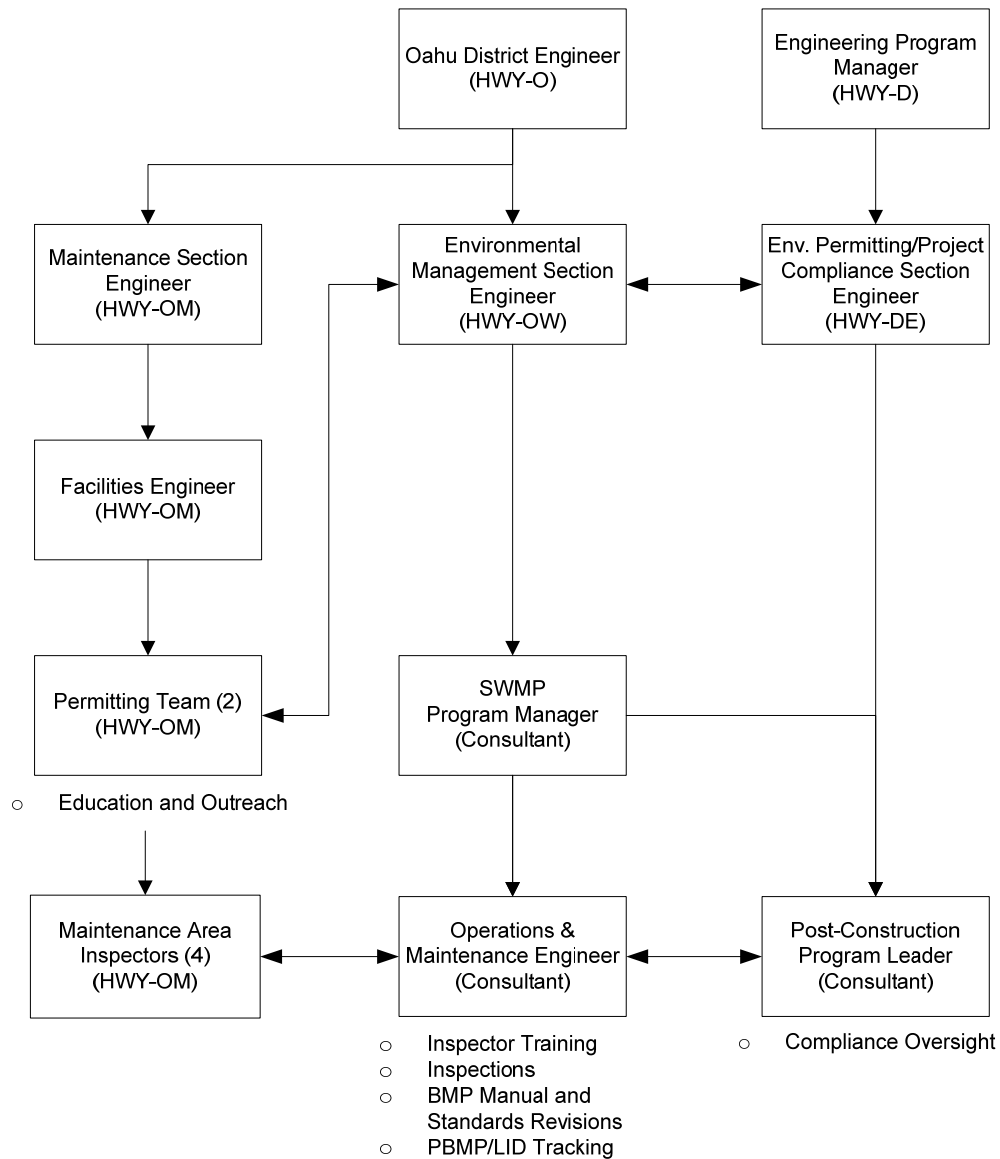


Figure 5-1. Post-Construction Program Organizational Chart
(Note: The number in parenthesis indicates the number of individuals involved.)

5.1 Low Impact Development

The Low Impact Development Center defines LID as, “The concept of employing principles such as preserving and recreating natural landscape features and minimizing imperviousness.” Site developments result in land use and land cover changes that alter the natural hydrology of an area. LID techniques are storm water management practices that seek to mimic a site’s predevelopment hydrology by minimizing disturbed areas and impervious cover, and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source.

Part D.1.e.(1) of the MS4 Permit requires DOT-HWYS to revise its standards for addressing post-construction BMPs to include LID requirements. DOT-HWYS’ standards for post-construction storm water management in new development and significant redevelopment areas are established in the *Storm Water Permanent BMPs Manual (Permanent BMPs Manual)*. DOT-HWYS revised the *Permanent BMPs Manual* to include LID requirements and submitted it to DOH within 18 months of the effective date of the MS4 Permit, along with a compliance schedule for the adoption of these standards. The compliance schedule requires adoption of the revised standards within 24 months of the effective date of the MS4 Permit.

The revised standards include the following information regarding LID requirements and techniques:

- Criteria for requiring implementation;
- Quantitative criteria for a specific design storm to be managed by LID techniques;
- Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements; and
- Alternatives that may be required when a LID waiver is granted, such as offsite mitigation and/or non-LID treatment control BMPs.

As shown in Figure 5-2, the Operations and Maintenance Engineer, Post-Construction Program Leader, and Environmental Permitting and Project Compliance Section (HWY-DE) Engineer are responsible for revising the standards and ensuring their adoption in accordance with the compliance schedule.

Post-Construction Program

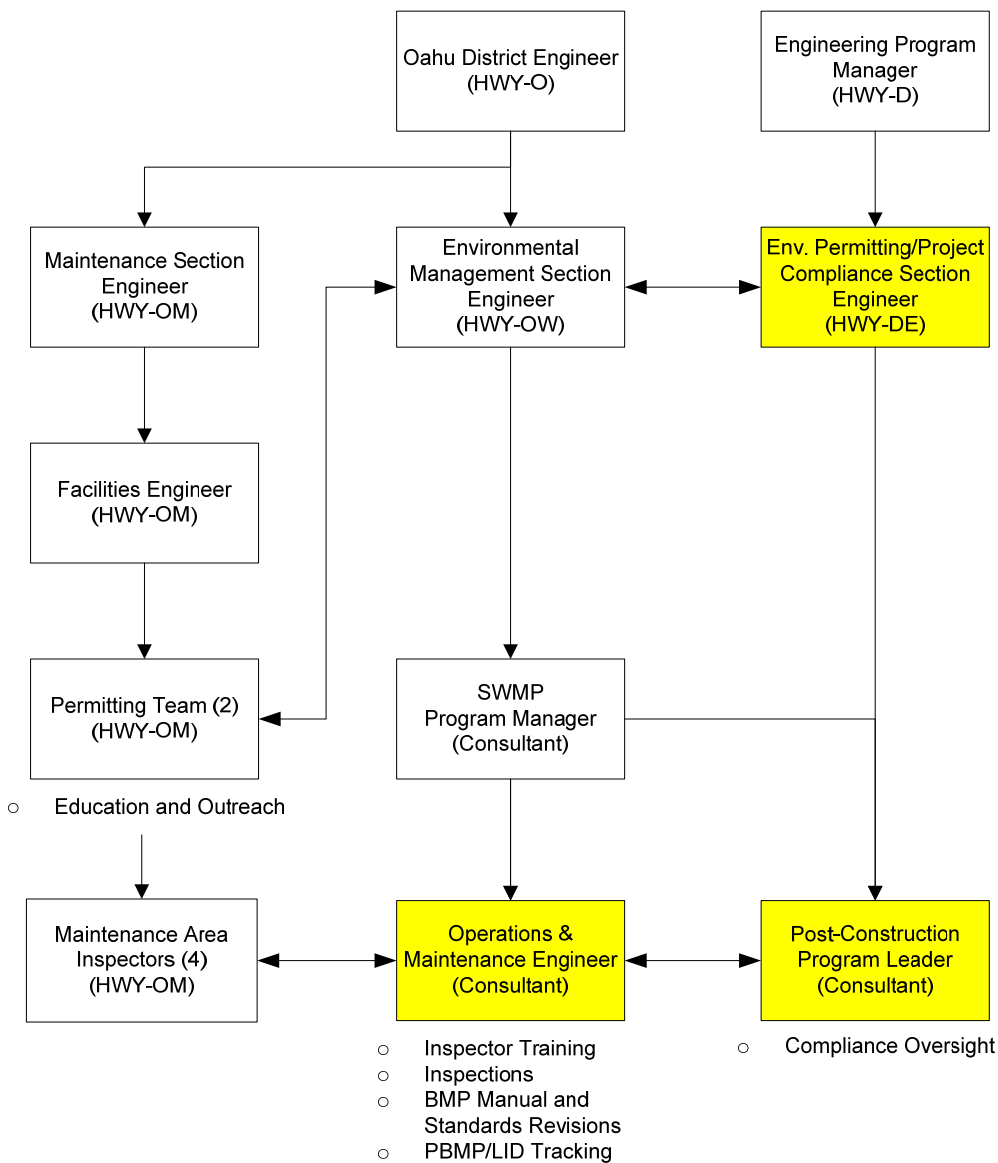


Figure 5-2. Post-Construction Program Organizational Chart for Roles and Responsibilities Related to Standards Revisions

5.2 Project Plan Review

In accordance with Part D.1.e.(2) of the MS4 Permit, DOT-HWYS reviews non-exempt contract construction project plans using a plan review checklist to ensure that appropriate PBMPs, including LID practices, have been included in the project design in accordance with the standards and criteria set forth in the *Permanent BMPs Manual*. DOT-HWYS reviews and updates the criteria defining when and what types of PBMPs must be included in project designs, as necessary. For projects within TMDL watersheds and/or watersheds containing CWA Section 303(d) listed waterbodies, the appropriate PBMPs shall be selected to target the pollutants causing impairment.

DOT-HWYS does not advertise or award any construction contract until the project plans have been reviewed and accepted to ensure the appropriate PBMPs have been included in the project design and bid package. DOT-HWYS does not allow any project to proceed without the inclusion of appropriate PBMPs, unless a waiver is granted based on specific documentation demonstrating that such PBMPs are not feasible.



Vegetated buffers trap sediment and reduce storm water runoff by providing opportunities for storm water infiltration.

As depicted in Figure 5-3, the Environmental Permitting and Project Compliance Section Engineer is responsible for overseeing the review of non-exempt contract construction project plans.

Post-Construction Program

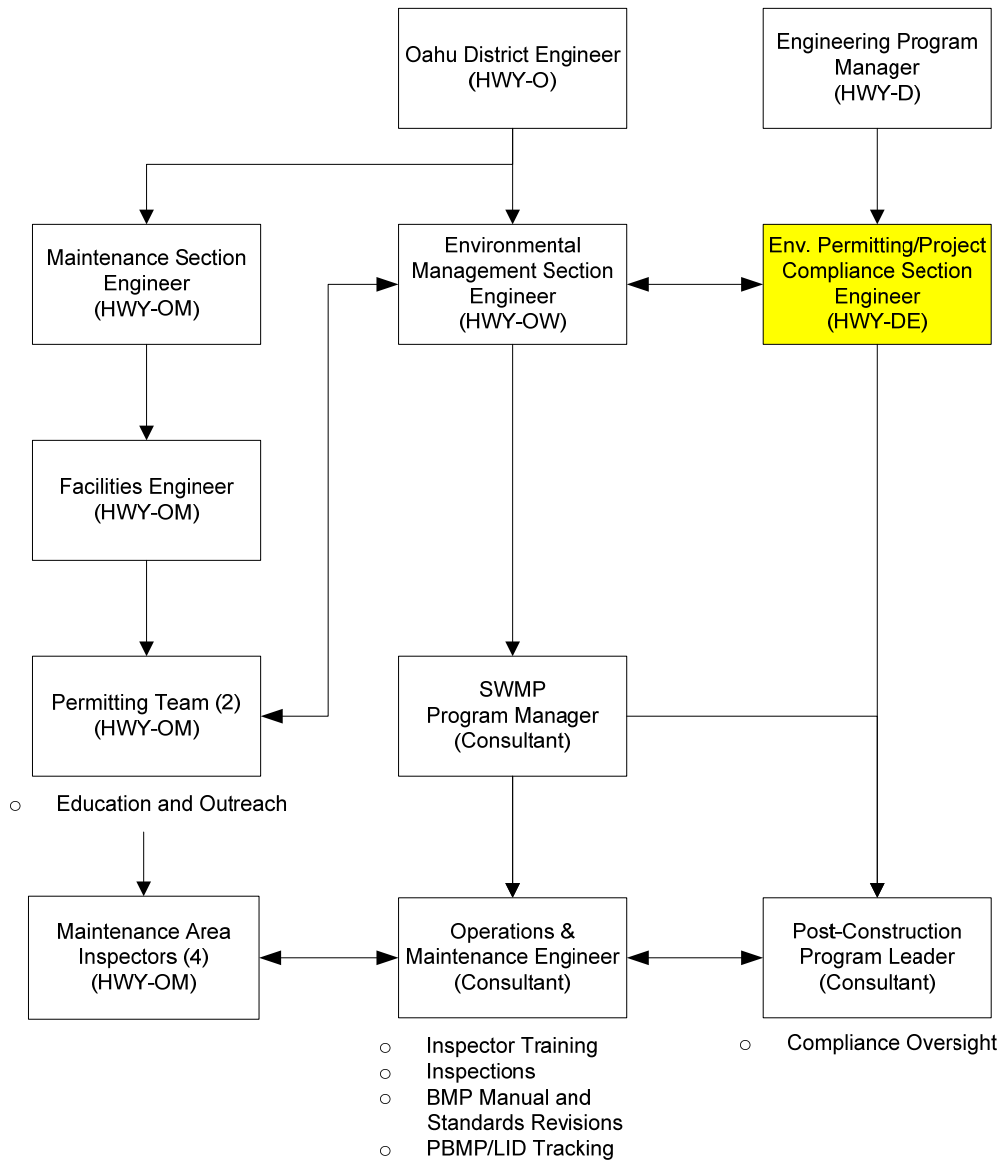


Figure 5-3. Post-Construction Program Organizational Chart for Roles and Responsibilities Related to Project Plan Review

5.3 Tracking PBMPs

In accordance with Part D.1.e.(3) of the MS4 Permit, DOT-HWYS uses the AMS to track the following information for projects with PBMPs:

- Project information (e.g., project name, owner, location, start/end date, etc.);
- Type and number of LID practices;
- Type and number of source control BMPs;
- Type and number of treatment control BMPs;
- Latitude/longitude coordinates using GPS;
- Photographs of controls;
- Operation and maintenance requirements;
- Frequency of PBMP inspections; and
- Frequency of PBMP maintenance.

Projects that include PBMPs must also include appropriate requirements for their continued future maintenance. All storm water treatment and LID BMPs required by DOT-HWYS are inspected at least once a year for proper operation. Maintenance is performed as necessary to ensure proper operation.



Constructed bioswales provide a location for storm water to collect and infiltrate through an engineered soil matrix before entering an under drain system that connects to the MS4.

As shown in Figure 5-4, the Operations and Maintenance Engineer is responsible for maintaining information on the AMS for projects with PBMPs and LID practices. The Maintenance Area Inspectors and the Operations and Maintenance Engineer inspect storm water treatment and LID BMPs installed by DOT-HWYS.

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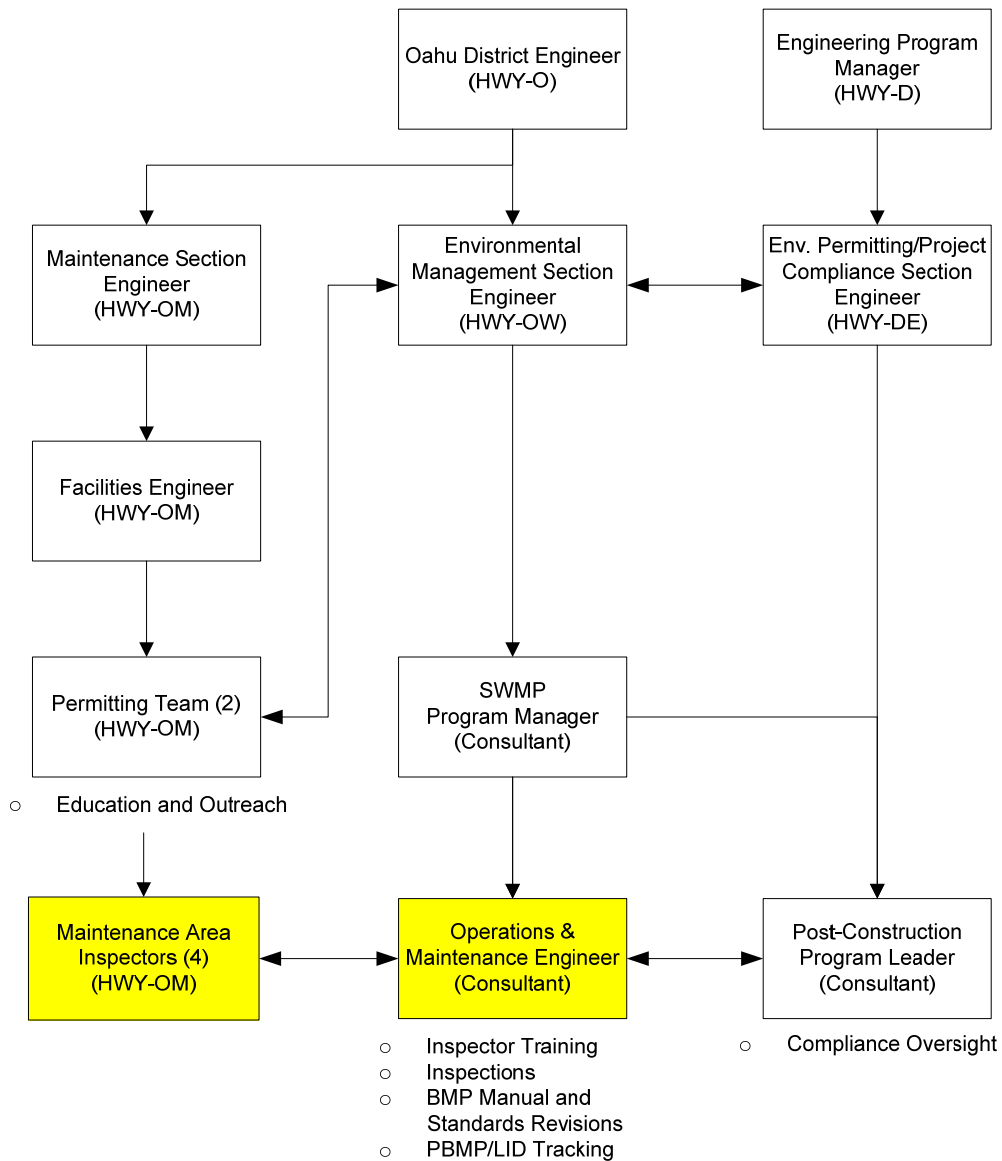


Figure 5-4. Post-Construction Program Organizational Chart for Roles and Responsibilities Related to Tracking and Inspecting PBMPs

5.4 Education and Outreach

In accordance with Part D.1.e.(4).(i), DOT-HWYS provides materials through its district offices, design office, and www.stormwaterhawaii.com in order to educate DOT-HWYS' permit applicants (i.e., developers, engineers, architects, consultants, construction contractors, excavators, and property owners) regarding the selection, design, installation, operation, and maintenance of PBMPs. The objective is to ensure applicants understand DOT-HWYS' standards for storm water controls. DOT-HWYS also provides training to permit applicants preceding significant changes to storm water standards, on an as-needed basis.



The Kakoi Rain Garden at the DOT-HWYS office is a Low Impact Development Best Management Practice.

The Permitting Team and the Environmental Permitting and Project Compliance Section Engineer are responsible for distributing education and outreach materials to DOT-HWYS' permit applicants, as depicted in Figure 5-5.

Post-Construction Program

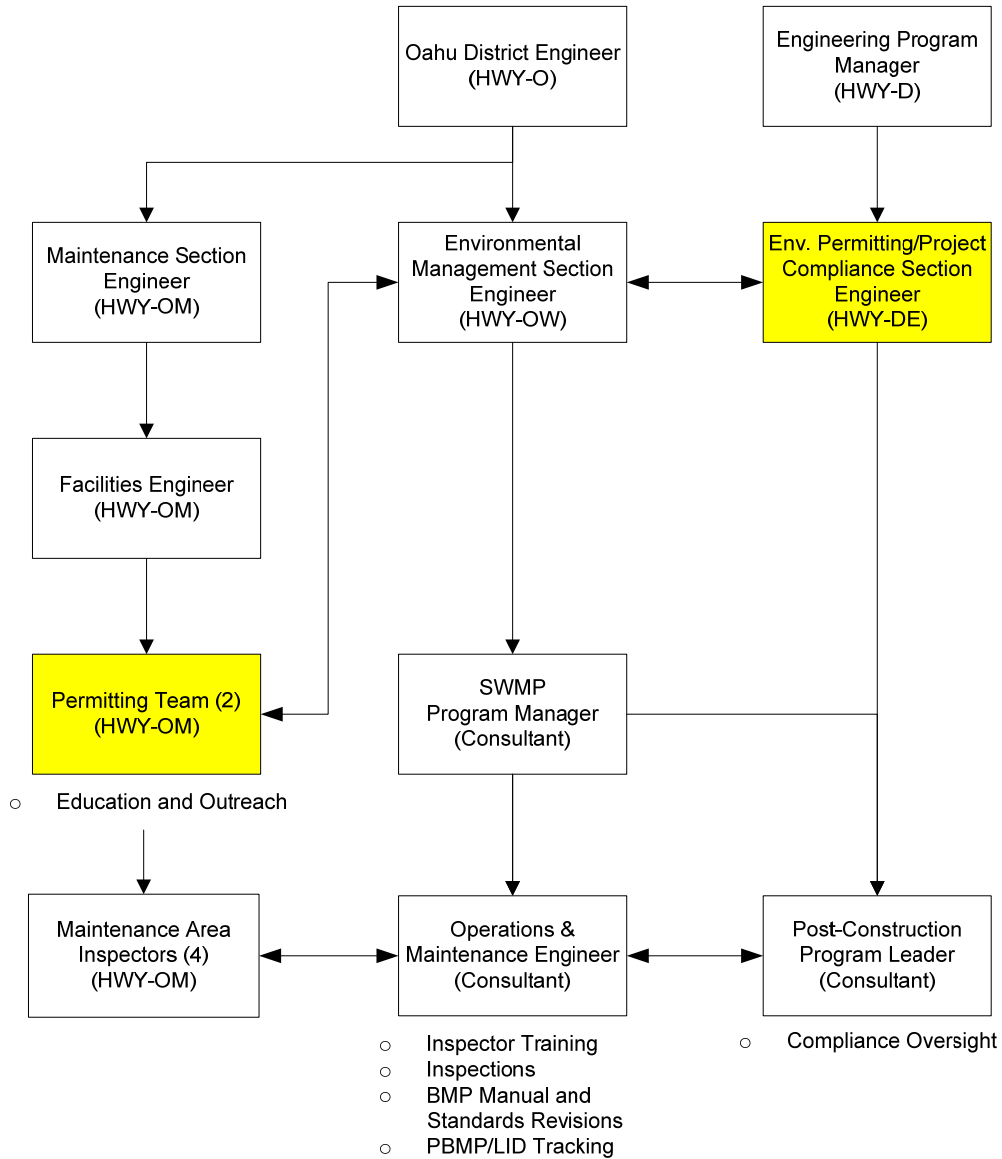


Figure 5-5. Post-Construction Program Organizational Chart for Roles and Responsibilities Related to PBMP Education and Outreach

5.5 Training

In accordance with Part D.1.e.(4).(ii) of the MS4 Permit, DOT-HWYS provides annual training to all DOT-HWYS' staff and contractors responsible for inspecting PBMPs. The training covers inspection and maintenance procedures and provides feedback to DOT-HWYS that is used to refine and improve the PBMP operations and maintenance program. PBMP inspection and maintenance training is conducted by the Operations and Maintenance Engineer, as depicted in Figure 5-6.

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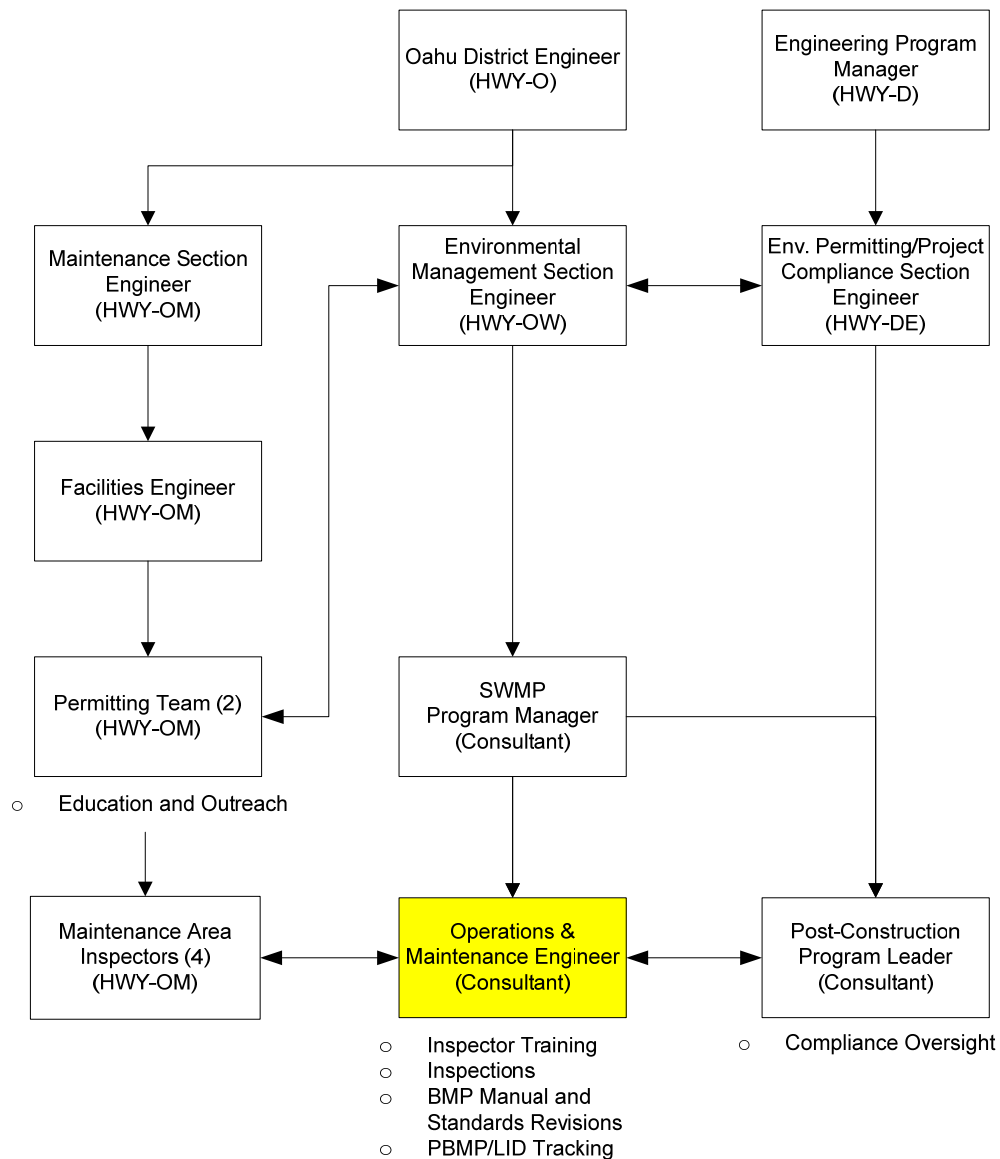


Figure 5-6. Post-Construction Program Organizational Chart for Roles and Responsibilities Related to Inspection and Maintenance Training

5.6 Monitoring Program Effectiveness

Table 5-2 provides measurable standards/milestones for the BMPs discussed in this chapter and DOT-HWYS' strategy for monitoring the effectiveness of their implementation.

Table 5-2. Standards/Milestones for the Post-Construction Program

Section	BMP	Standard/Milestone	Monitoring Effectiveness
5.1	Low Impact Development	<ul style="list-style-type: none"> Revise the <i>Permanent BMPs Manual</i> to include LID requirements. Submit the revised standards and a compliance schedule to DOH. 	<ul style="list-style-type: none"> Milestone completed on 4/27/2015.
5.2	Plan Review	<ul style="list-style-type: none"> Review and approve non-exempt contract construction project plans to ensure that appropriate PBMPs, including LID practices, have been included in the project design. 	<ul style="list-style-type: none"> Document project plan review using the plan review checklist. Maintain completed plan review checklists in project files.
5.3	Tracking PBMPs	<ul style="list-style-type: none"> Use the AMS to track projects with PBMPs in accordance with Part D.1.e.(3) of the MS4 Permit. 	<ul style="list-style-type: none"> Confirm that all PBMPs have been entered into the AMS.
5.4	Education for Permit Applicants	<ul style="list-style-type: none"> Provide education and outreach material for those parties who apply for DOT permits on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs and LID practices. 	<ul style="list-style-type: none"> Ensure that education materials cover all required elements and are distributed to the appropriate parties during design review and permitting processes.
5.5	Training	<ul style="list-style-type: none"> Provide annual training for DOT-HWYS' staff and contractors responsible for inspecting PBMPs and LID practices. 	<ul style="list-style-type: none"> Maintain sign-in sheets of all training attendees.