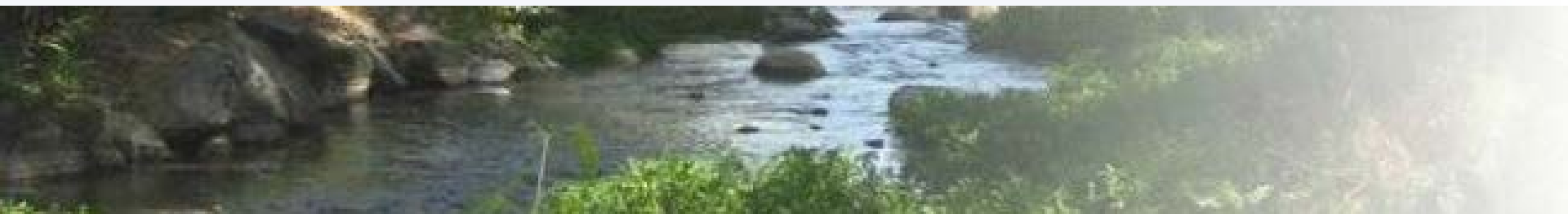


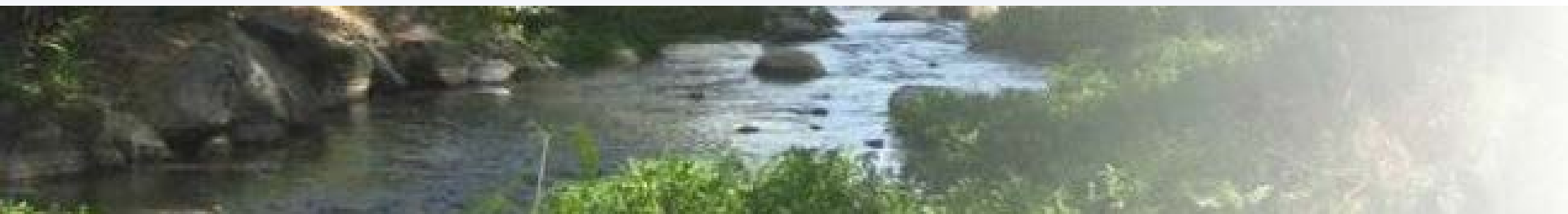
LID for Small Projects and Requirements of the Municipal Regional Stormwater Permit

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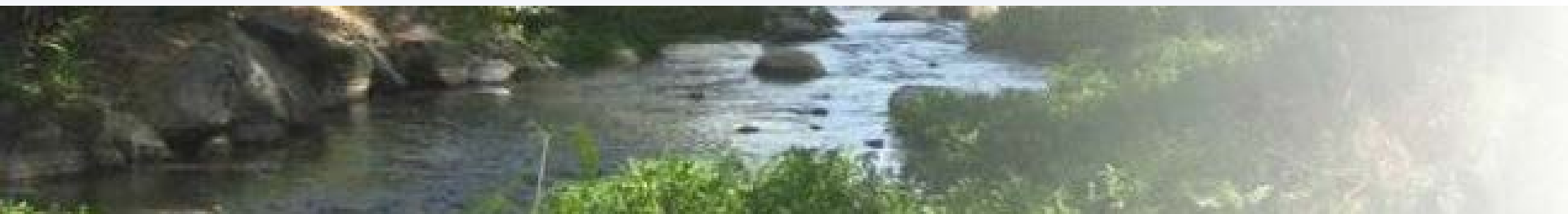
Outline of Presentation

- LID for Small Projects
 - Special Considerations for small projects
 - Reduce impervious surfaces
 - Direct runoff to landscaping
 - Alternative driveway designs
- Municipal Regional Stormwater Permit
 - New requirements for small projects
 - Requirements for larger projects



Special Considerations for Small Projects

- Common constraints
 - Do I have space for the recommended setbacks?
 - Clay soils and a small lot – will my yard be soggy all winter?
 - Can I build it on steep slope?
 - What can I do on a budget?
- We'll consider these constraints as we discuss the LID features shown in the following slides.

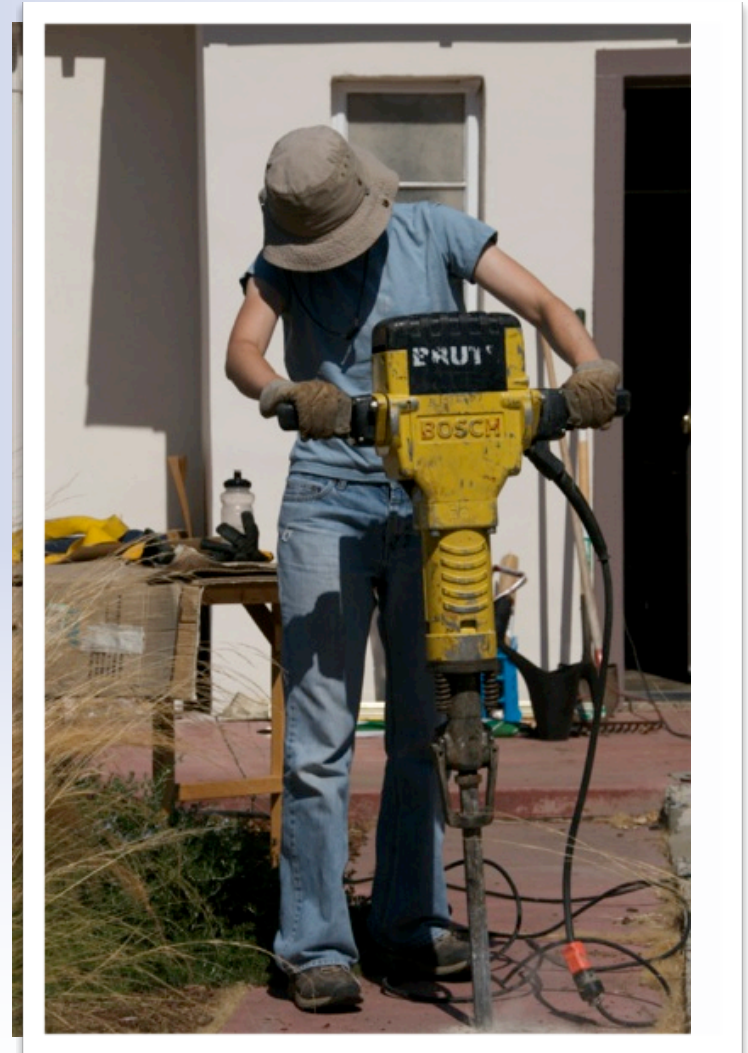


Reduce Impervious Surfaces

- Replace unnecessary hardscape with water-wise native or climate adapted landscaping.

Common Constraints

| | | |
|----------------------------|---|-----|
| Setbacks needed? | ☺ | No |
| Need well-drained soil? | ☺ | No |
| Prohibited on steep slope? | ☺ | No |
| Cost? | ☺ | Low |



Reduce Impervious Surfaces



Jensen Residence, San Jose: BEFORE

- Not shown: Concrete walkway to front door
Concrete planting strip

Reduce Impervious Surfaces



Jensen Residence, San Jose: Breaking up concrete

Reduce Impervious Surfaces



Jensen Residence, San Jose: Path for stepping stones

Reduce Impervious Surfaces



Jensen Residence, San Jose: Sheet mulching the lawn

Reduce Impervious Surfaces



Jensen Residence, San Jose: AFTER

Direct Runoff to Landscaping

- Direct runoff from roof, patio, driveway or walkways to landscaping (instead of a direct connection to the storm drain).
- 2:1 ratio of impervious to pervious surface recommended.
- Do not allow water to pond near buildings

Common Constraints

| | | |
|----------------------------|----|-------|
| Setbacks needed? | ☹️ | Maybe |
| Need well-drained soil? | 😊 | No |
| Prohibited on steep slope? | ☹️ | Maybe |
| Cost? | 😊 | Low |



Options to Control Erosion from Roof Runoff



Splash block



Rain chain



Gravel area under a gutterless roof

Two-Track Driveway (conventional concrete)



Common Constraints

| | | |
|----------------------------|---|--------|
| Setbacks needed? | 😊 | No |
| Need well-drained soil? | 😊 | No |
| Prohibited on steep slope? | 😐 | Maybe |
| Cost? | 😐 | Medium |

Pervious Driveway Options

Common Constraints

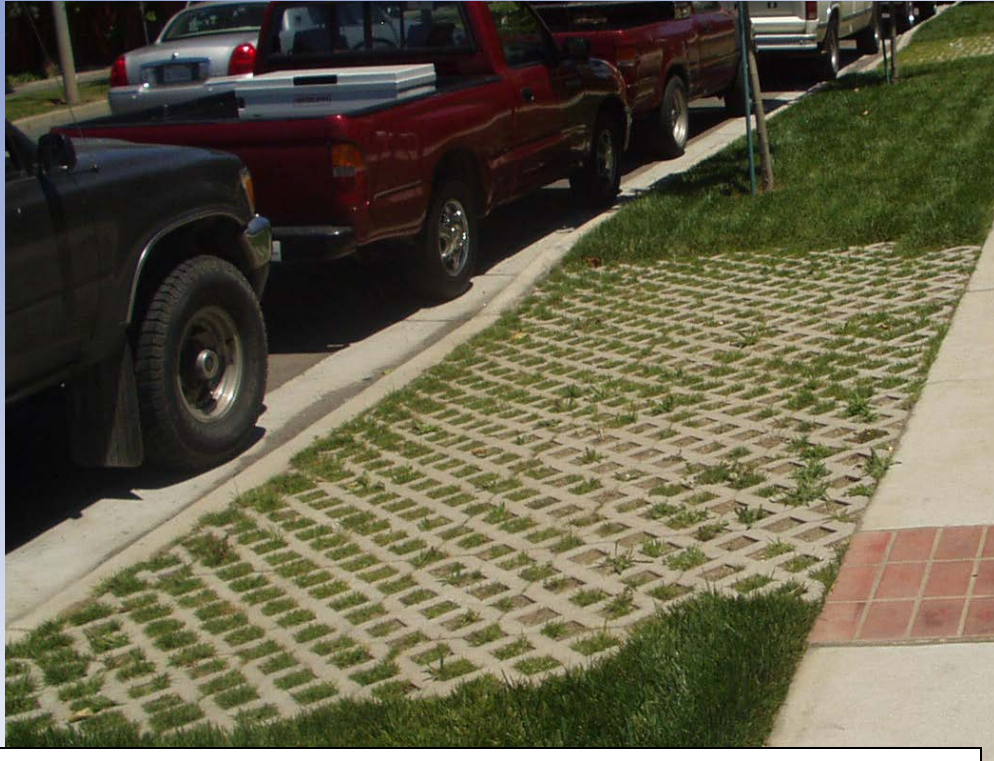
| | | |
|----------------------------|---|----------------|
| Setbacks needed? | 😊 | No |
| Need well-drained soil? | 😊 | No |
| Prohibited on steep slope? | 😞 | Yes |
| Cost? | 😞 | Medium to High |

Pervious Driveway Options



- Pervious concrete driveway at the Packard garage site, Palo Alto

Pervious Driveway Options



Concrete open-celled paving grid



Close-up

Pervious Driveway Options



Open joint pavers

Pervious Driveway Options



Plastic grid filled with gravel
(two-track design)



Close-up of "Gravel Pave"
plastic grid

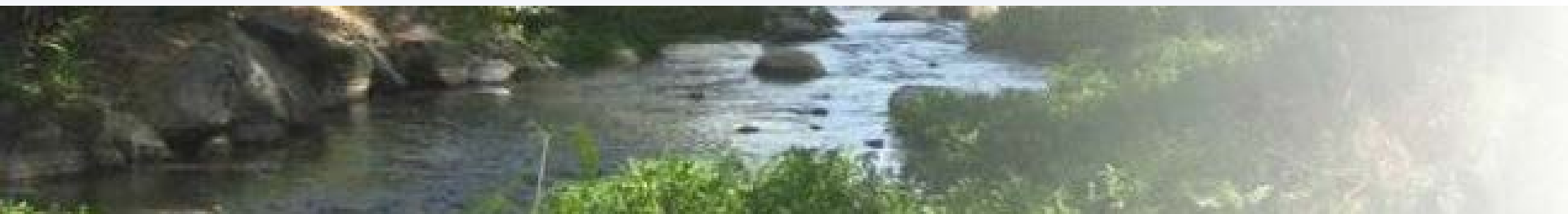
Municipal Regional Stormwater Permit (MRP)

- The MRP applies to over 70 municipalities in the Bay Area
- Applies to all municipalities in San Mateo County, including unincorporated County
- Includes requirements for certain development projects
 - New requirements for small projects
 - Requirements for larger projects



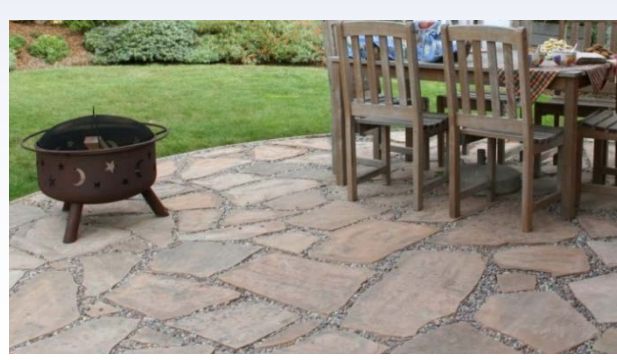
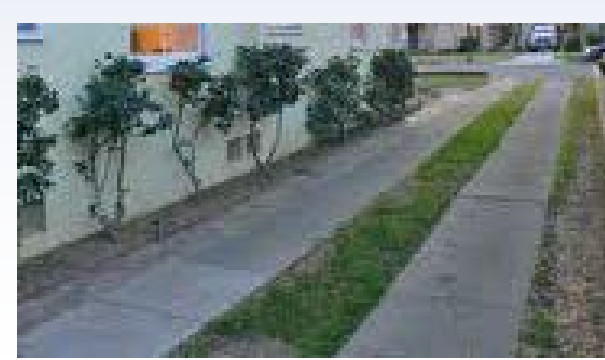
New MRP Requirements

- Apply to individual single family home projects that create and/or replace 2,500 square feet or more of impervious surface.
- Apply to other types of projects that create and/or replace 2,500 to 10,000 square feet of impervious surface.
- Effective December 1, 2012
- A fact sheet on the new requirements is available.



What Are the New Requirements?

- Applicable projects must incorporate at least one of 6 LID “site design measures”:
 - What are site design measures?
 - Project features that reduce impervious surfaces, reduce directly-connected impervious surfaces, or preserve the natural landscape.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 1. Direct roof runoff into cisterns or rain barrels and use rainwater for irrigation or other non-potable use.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 1. Direct roof runoff onto vegetated areas.
 2. Direct roof runoff onto vegetated areas.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 3. Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 4. Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 5. Construct sidewalks, walkways, and/or patios with permeable surfaces.



What Are the New Requirements?

- Applicable projects must incorporate at least one of the following 6 LID “site design measures”:
 6. Construct bike lanes, driveways, and/or uncovered parking lots with permeable surfaces.



Municipal Regional Stormwater Permit Requirements for Larger Projects

- Apply to projects that create and/or replace 10,000 sq. ft. or more of impervious surface.
- Apply to Special Land Use Categories that create and/or replace $\geq 5,000$ sq.ft. of impervious surface:
 - Restaurants
 - Gas stations
 - Auto service facilities
 - Parking lots (stand-alone or part of another use)
- Do NOT apply to individual single family homes.

What Are the Requirements for Larger Projects?

- Applicable projects must incorporate all of the following 3 types of LID features:
 1. Select appropriate LID “site design measures”
 - Project features that reduce impervious surfaces, reduce directly-connected impervious surfaces, or preserve the natural landscape.



Example of Site Design Measure: Pervious paving.

What Are the Requirements for Larger Projects?

- Applicable projects must incorporate all of the following 3 types of LID features:
 2. Select appropriate LID “source controls”
 - Project features that control sources of pollutants.



Example of Source Control: Reduce use of pesticides and quick release fertilizer by selecting water-wise native and climate-adapted plants.

What Are the Requirements for Larger Projects?

- Applicable projects must incorporate all of the following 3 types of LID features:
 3. Select appropriate LID “treatment measures”
 - Rainwater harvesting and use, infiltration, evapotranspiration, or, if those are infeasible, biotreatment.



Example of Biotreatment: Bioretention area

How Does Biotreatment Work?

- Stormwater filters through a layer of fast-draining, engineered biotreatment soil.
- Natural processes remove pollutants as water filters through the soil.
- An underdrain is provided below the biotreatment soil layer.
- Stormwater is cleaner when it enters the underdrain and flows to a creek or other receiving water.



Underdrain is shown before the biotreatment soil is added.

One Last Requirement for Larger Projects: Hydromodification Management (HM)

- HM controls erosive flows from development projects.
- HM requirements apply to projects that:
 - Create and/or replace 1 acre or more of impervious surface;
 - Are located in an area where creeks are susceptible to development-induced erosion;
 - Increase the amount of impervious surface above pre-project levels.



Example of creek erosion

What are the Hydromodification Management (HM) Requirements?

- Temporarily detain water on the site, and release the water slowly, so that:
 - Post-project rates and volumes of stormwater match pre-project levels for range of storms that have a probability of occurring every 2 to 10 years.



Example of detention basin

For More Information...



- www.mywatershedwatch.org/pollutiontips.html gives tips on preventing pollution of local creeks and the Bay.
- www.bayfriendly.org provides Bay-Friendly Landscaping guidance to reduce waste and prevent pollution.
- Info on rain barrel systems:
http://www.sanfranciscuito.org/runoff/techniques/Rainbarrel_Workshop.htm.

For More Information...



- City of Portland, OR, flyer on disconnecting your downspout:
www.portlandonline.com/bes/index.cfm?c=31870
- Flyer on new stormwater requirements for small projects AND four fact sheets on site design measures:
www.flowstobay.org/bs_new_development.php
(scroll down to "Stormwater Requirements for New Development/Redevelopment")

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