Managing Stormwater on Your Site

For Commercial, Institutional, Industrial, and Large Residential Development

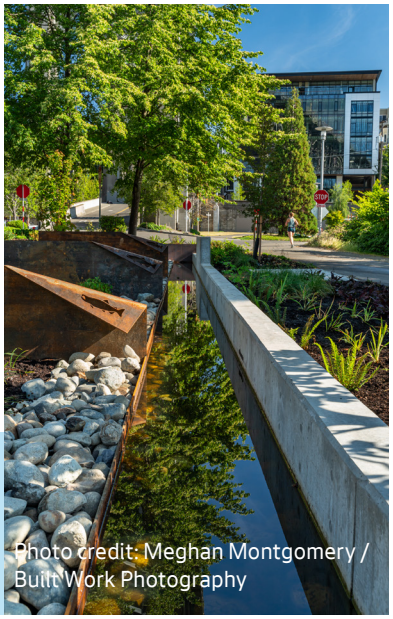
Implementation Guide for Projects in Seattle

Polluted stormwater runoff to our lakes, rivers, and creeks is one of the leading sources of pollution in the Puget Sound region. The City of Seattle Stormwater Code guides private development in managing stormwater on the project site, which starts with the On-site Stormwater Management (OSM) requirement.

Why is OSM required?

Seattle was an early adopter of OSM, requiring its use for most construction projects starting with the 2009 Stormwater Code. The Washington State Department of Ecology's municipal stormwater permit also now requires that new and redevelopment projects in Seattle use OSM practices to manage stormwater on site. There are several key reasons for this:

- In an urban environment like Seattle, every storm washes pollution from rooftops, roads, and other hard surfaces into local creeks, rivers, lakes, and the Puget Sound.
- Stormwater runoff from hard surfaces flows more quickly to creeks than it used to when the area was forest or pasture land, leading to eroded channels and degraded habitat.
- OSM practices can control rain from smaller, more frequent storms by slowing stormwater flows, removing pollutants, and recharging groundwater through infiltration.



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*For improved design integration and cost-effective implementation of the stormwater code, **incorporate OSM EARLY** in the site layout and design process (see roadmap, p4).*

What's the difference?

OSM
On-site Stormwater Management

GSI
Green Stormwater Infrastructure

LID
Low Impact Development

Seattle's **On-site Stormwater Management (OSM)** requirement was formerly referred to as "Green Stormwater Infrastructure (GSI) to the Maximum Extent Feasible " in the Stormwater Code. In other parts of Washington, the term Low Impact Development (LID) is used. In general, OSM, GSI, and LID all describe the same concept: utilizing vegetation, soils, and natural processes like infiltration to manage water and create healthier urban environments by mimicking how forests (or pastures) manage rainwater. Examples of OSM practices include bioretention, permeable pavement, vegetated roofs, and rainwater harvesting.

Meeting Code Requirements with OSM

Seattle code requires developers to manage stormwater and increase landscape coverage through **four key requirements:**

1 On-site Stormwater Management (OSM)

Control small storms using OSM practices to remove stormwater pollutants and protect streams from erosion

OSM helps to meet other requirements, see 2 3 4

2 Flow Control (FC)

Control big storms to prevent flooding and protect streams from erosion

OSM can reduce the required flow control sizing or eliminate the need for detention vaults/chambers

3 Water Quality (WQ) Treatment

Remove stormwater pollutants to protect streams, lakes and the Puget Sound

OSM provides WQ treatment benefits

4 Green Factor

Increases stormwater evaporation, transpiration, and infiltration through required landscaping coverage

OSM practices include vegetation that can count towards Green Factor requirements

OSM can drive much of the landscape approach for urban development, often providing enough on-site vegetation to substantially support meeting ***Seattle Green Factor*** and other sustainability certifications (see next page).

Common Developer Questions

1. Can we meet OSM code requirements by building a large detention vault?

No, detention vaults, chambers, or pipes by themselves cannot meet code requirements unless you demonstrate that OSM practices are infeasible/ insufficient to meet requirements on your site.

2. Why do we have to do OSM for small direct discharge projects when water quality is not a requirement?

All projects have a cumulative impact, conveying pollutants to the city's waterbodies. While not all surfaces are considered "pollutant-generating" under the stormwater code, all surfaces are subject to atmospheric deposition of pollutants and contribute pollutants to our waters. OSM can remove pollutants and protect downstream waterways. OSM also slows flows (see #3).

3. Why do we have to do OSM in a Flow Control Exempt basin?

All projects have a cumulative impact, conveying more flow to the city's storm pipes. OSM can slow flows, reduce flooding, and build resilience in the city's drainage system. In addition to Flow Control, pollution reduction is a primary goal of OSM (see #2).

4. If we are using a vault to meet flow control requirements in a combined sewer area, why do we also have to use non-infiltrating bioretention? Flow control is already provided, and treatment isn't required in combined sewer areas.

Vaults sized for Flow Control manage large storm events, while OSM practices manage small storm events. Bioretention, when maximized on the site, may help reduce the size of your vault.

5. My site is below the size threshold, so why should I consider optional OSM?

OSM is important and beneficial regardless of the size of the project. On small sites, OSM may simplify drainage infrastructure and add aesthetic value to the site.

OSM Design Solutions Can Meet Multiple Code Requirements

Here are some stormwater design strategies commonly used in commercial, institutional, industrial, and large residential development. When compared to traditional "grey" options (such as detention vaults), OSM options will satisfy more code requirements.

	Common Stormwater Design Options to Meet Code*	OSM (List approach)	Flow Control	Water Quality Treatment (Basic)	Water Quality Treatment (Enhanced)	Water Quality Treatment (Phosphorus)	Green Factor**
Green Options	Infiltrating Bioretention	✓	✓	✓	✓	✓	✓
	Rainwater Harvesting	✓	✓				✓
	Permeable Pavement Facility	✓	✓	✓	✓	✓	✓
	Permeable Pavement Surface	✓	✓	✓	✓		✓
	Non-Infiltrating Bioretention	✓	✓	✓	✓		✓
	Vegetated Roof	✓	✓				✓
	Trees	✓	✓				✓
Grey Options	Detention Pipe		✓				
	Detention Vault/Chamber		✓				
	Detention Cistern		✓				

✓ Meets code ✓ Some limitations apply - Refer to City Code or Stormwater Manual for details

OSM design solutions can meet multiple code requirements

Refer to Stormwater Manual for complete OSM list, selection process, and infeasibility criteria.

***Green Factor requirements vary based on project zoning. See the **Seattle Green Factor** web page for more information.*

A Roadmap to Successful OSM Implementation and Code Compliance

The following strategies can help you meet code while maximizing benefits on your site and downstream.


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(1) Integrate OSM design early in your project

- OSM is required for most projects.
- It pays to think about OSM as early as possible. Early incorporation of OSM allows a more seamless integration with the building or site design that is aesthetic, functional, and multi-purpose.
- OSM can count towards other City code and sustainability requirements, including Green Factor landscape requirements.
- OSM can reduce the size or eliminate the need for a detention vault/chamber/pipe to meet Flow Control requirements.

(2) Utilize at-grade solutions to treat stormwater

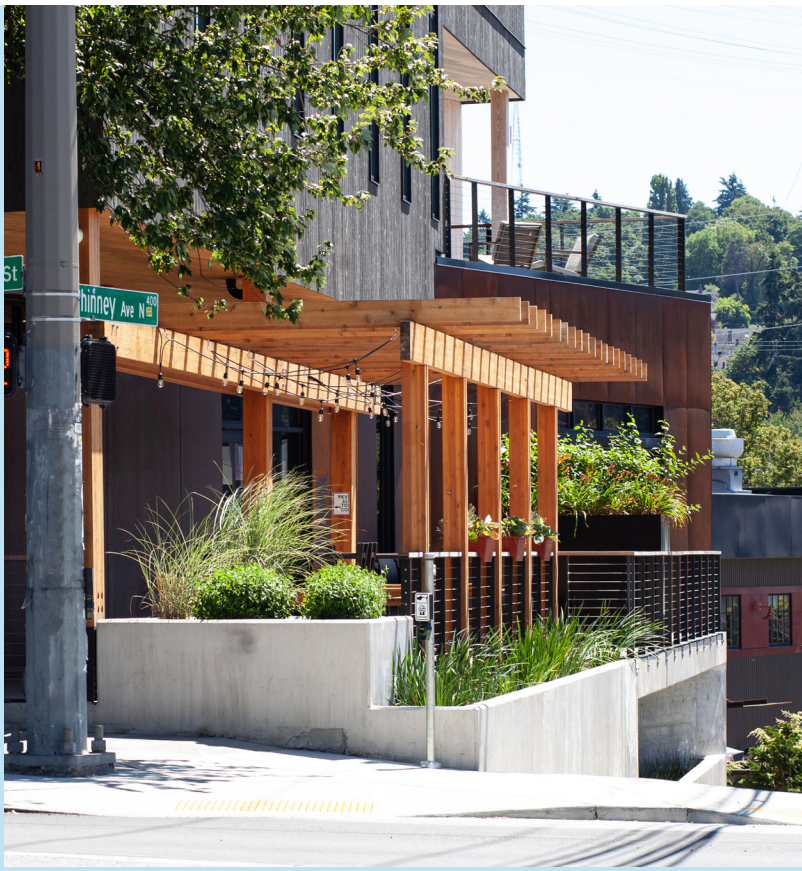
- Examples: Bioretention, rain gardens.
- At-grade solutions are typically less complicated and less costly than solutions located over structures.
- At-grade solutions maximize visibility and public benefit.
- Improves access to vegetation for ongoing maintenance.

(3) Plan for trees at grade or over structure where possible

- Trees are effective at catching, soaking up, and evaporating stormwater.
- Retaining existing trees also contributes to OSM requirements and Green Factor requirements.

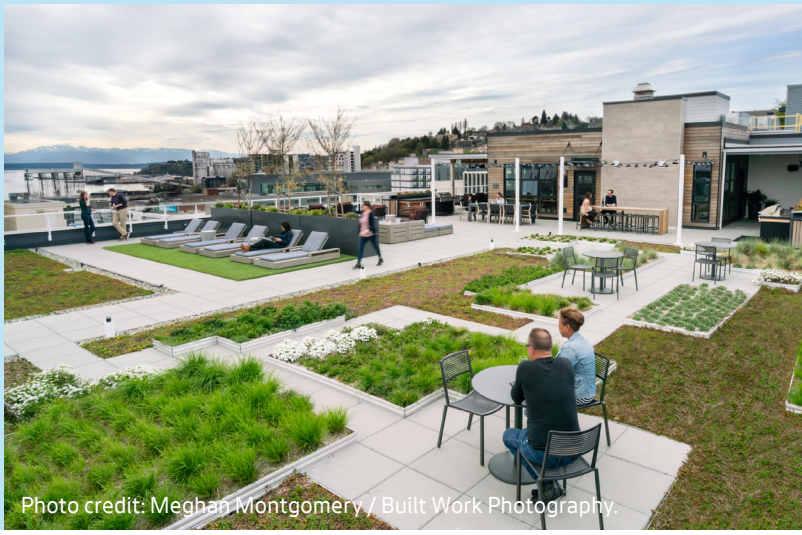
(4) Maximize opportunities to locate bioretention planters where most feasible

- Closed-bottom planters can be located at grade or on top of below-grade parking structures, often without increasing the structure's carrying capacity.
- Bioretention planters can often manage much more stormwater per square foot than other practices (such as vegetated roofs), and therefore can be more cost effective.
- Plan for routing downspouts to planters through building walls or on the building's exterior.



(5) Utilize roof space for a vegetated roof installation

- Vegetated roofs that are visible to building users provide a desirable amenity and are attractive to potential tenants.
- Prioritize visible roof areas (typically lower or podium areas) for improved access to vegetation for ongoing maintenance.
- Vegetated roofs can offer insulating value to a building and reduce heating/cooling loads.



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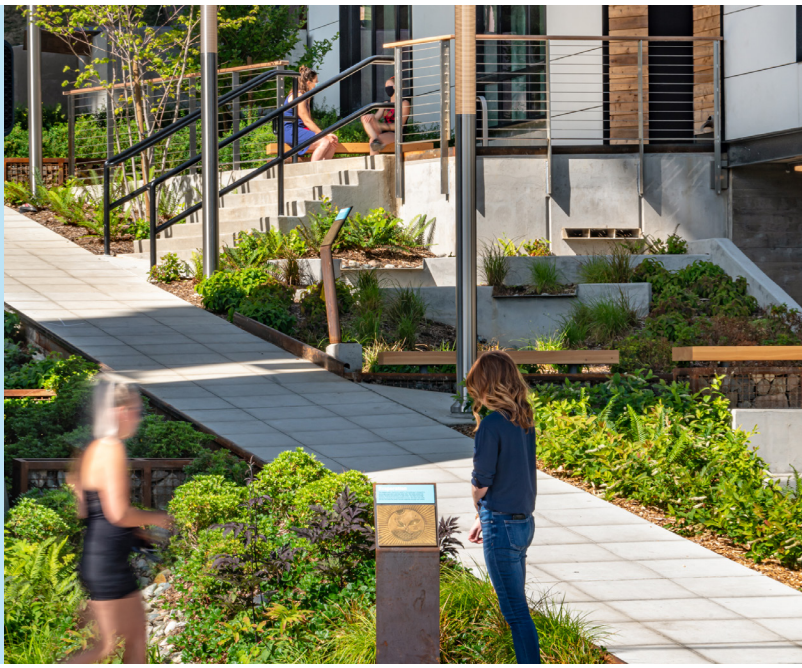
(6) Simplify site drainage and reduce connections

- For example, slope roof areas to the perimeter of the building rather than using internal roof drains.
- Simplified site drainage streamlines consultant coordination between mechanical, civil architecture, and landscape architecture teams.

(7) Get recognized - OSM can be an attractive site amenity

- OSM amenities can be installed along building frontages and in open spaces to add interest for building occupants and visitors.
- Educational signage is an easy way to convey social and environmental benefits of OSM installations to the public, future tenants, or property owners.
- OSM installations may count towards certification programs such as Salmon-Safe, the Living Building Pilot Program, and LEED.



(8) Integrate with landscaping maintenance plan

- Once established, vegetated OSM installations typically don't require more or different maintenance than other site landscaping elements (e.g., weeding, debris removal).
- OSM is a part of the building infrastructure. Regular inspections for plant health, drainage issues, or removal of debris will support overall system health and function.