November 4, 2026 • 11 a.m.–12:30 p.m.

Hybrid Meeting • MS Teams or Public Works Headquarters Building Roundabout Room

Water Advisory Group

Elisabeth O'Keefe, Stormwater Program Manager • Aubrie Koenig, Facilitator

Purpose and Agenda

Introduce Central Oregon Stormwater Manual (COSM) update process. Share and discuss stormwater-related residential code updates.

1. Welcome and Introductions
2. Stormwater Management Program
   - Introduce COSM update
   - Discuss residential code updates
3. Discussion and Feedback
4. Summary and Closing



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October meeting reflections

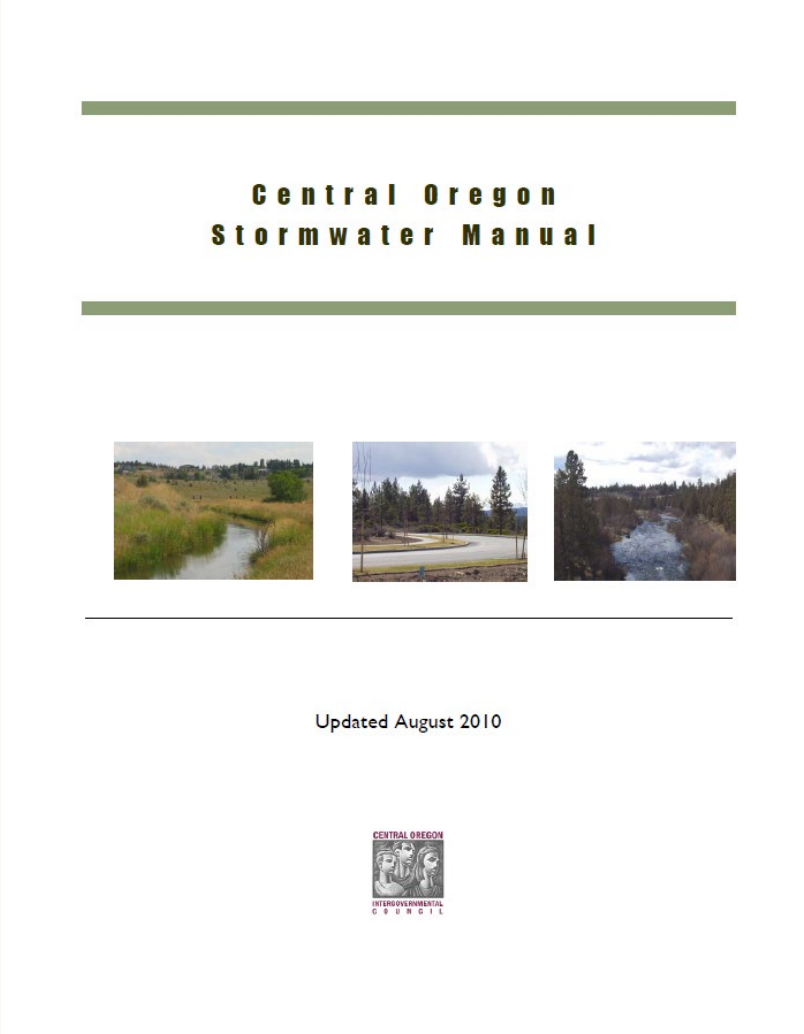
Outback Facility Expansion feedback:

- Interest areas:
  - Costs and funding for project
  - Reliability of water supply and what risks our system faces
  - Environmental considerations, especially related to in stream water rights
- Effective messages:
  - Benefits of gravity-flow surface water compared to groundwater (energy and cost savings)
  - How pre-treatment improves supply reliability and water quality (in layperson terms!)
  - Energy resilience and efficiency benefits and potential cost recovery from in-conduit hydro
  - Background of in stream water rights and uses (no additional water diversion)

Central Oregon Stormwater Manual (COSM) Update

Background

- Created in 2010
- Used regionally to provide engineers, developers, builders and agencies clear guidance and design standards on stormwater conveyance and treatment systems appropriate to Central Oregon climate, hydrogeology and geology
- Developed with:
  - Crook County
  - Deschutes County
  - City of Bend
  - City of Madras
  - City of Prineville
  - City of Redmond
  - City of Sisters
  - Central Oregon Intergovernmental Council



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Background cont.

- Bend uses the COSM for stormwater standards. The water quality design storm is the 6-month 24-hour storm, and the flow control storm is the 25-year 24-hour storm.
- The design storm precipitation depths are based on NOAA Atlas 2, which was last updated in 1973 based on data from the 1960s.
- Studies and climate models indicate storms are expected to become more severe in central Oregon.

TABLE 5-5
24-HOUR STORM DEPTHS FOR SELECTED AREAS
(INCHES)

AREA	6-MONTH[1]	2-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
Bend	1.0	1.5	2.0	2.5	2.8	3.0
LaPine	1.1	1.6	2.25	2.6	2.9	3.0
Madras	0.8	1.2	1.8	2.1	2.3	2.6
Prineville	0.8	1.2	1.7	2.0	2.2	2.4
Redmond	0.7	1.0	1.5	1.8	2.0	2.2
Sisters	1.2	1.8	2.5	2.8	3.0	3.5

[1]Calculated as 2/3 of the 2-year, 24-Hour storm depth

Source: NOAA Atlas 2, Volume X

COSM Update Timeline

- Bend, Redmond, Sisters, and Deschutes County currently working on finalizing an IGA by the end of 2026 with COIC managing and coordinating.
- Project kickoff estimated in early 2027 that will include 2 months of scoping followed by hiring a technical consultant for the engineering work.
- Estimated project timeline 18 months – 2 years (completion in fall/winter of 2028).
- WAG will be updated throughout the process and included for feedback.

What COSM update topics most interest you?

- Prior WAG topics of interest:
  - Drywell design standards, including maximum capacity limit
  - Drywell testing methods
  - Design storm standards
  - Stormwater facility design template updates
  - Other?

Additional topics:

- Guard rails on infiltration near steep slopes, foundations, or other areas that may pose risk to structures
- Guidance on emerging stormwater facility types (stormwater trees, deep drywells)
- Clarify drainage and disposal requirements in and around truck bays and trash enclosures
- Soil media composition for infiltration facilities

Stormwater Program Update-Drainage & Density

Background- Needs and Objectives

With increasing density, staff and the community have observed the need for:

- How to fit storm facilities on small lots
- Providing more stormwater options to developers
- Preventing downstream impacts from on-site stormwater facilities
  - Local flooding (street, neighbors)
  - Erosion
- Alternatives for areas with low infiltration
- Allowing or requiring centralized stormwater facilities that serve a whole neighborhood



This infiltration swale should be setback both from the foundation and property line.

Drainage and Density Pathways

Neighborhood

2 or More Residential Lots

Presumptive: Fully comingled system

- Public and private drainage is collected and discharged into a combined system.

OR

Deviation 1: Partially comingled system

- Some public and private drainage is collected and discharged into a combined system.
- Some private drainage is managed independently on private property.

OR

Deviation 2: Separate public and private systems

- All public drainage is managed by a public system.
- All private drainage is managed independently on private property.

Ownership:

Is City ownership the default?

Multifamily & Non-Residential

5+ Residential Units, Commercial and Industrial

Requirement: Separate public and private systems

- All Public Drainage is managed by a public system.
- All Private Drainage is managed independently on private property.

Fee In-Lieu:

Would the City collect a fee in-lieu for use of existing system?

Residential "Infill"

1-4 Residential Units (One Lot)

Option 1: Separate public and private systems

- All public drainage is managed by a public system.
- All private drainage is managed independently on private property.

OR

Option 2: Partially comingled system.

- Some public and private drainage is collected and discharged into a combined system.
- Some private drainage is managed independently on private property.
- Feasibility analysis may be used to direct drainage to existing public system.

OR

Option 3: Fully comingled system

- Public and private drainage is collected and discharged into a combined system.
- Feasibility analysis may be used to direct drainage to existing public system.

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Residential Subdivision Development Approach 1

Single-Developer Delivery Model

- One developer manages the project from land use approval through home construction.
- Enables coordinated planning of lots, roads, utilities, drainage, and stormwater facilities.
- Reduces barriers to implementing centralized stormwater management systems.
- Encourages integrated stormwater treatment because a single entity bears the cost of all drainage infrastructure.
- Often results in more efficient and unified stormwater facility design and construction.

- *Under Approach #1 centralized stormwater management solutions are generally easier to implement and can be more cost-effective than distributed approaches.*



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Residential Subdivision Development Approach 2

Developer-to-Builder Lot Sale Model

- Developer completes land use approvals, subdivision infrastructure, and platting, then sells finished lots to individual builders.
- Home construction is completed by multiple builders after lots are sold.
- Creates an economic incentive for distributed, lot-scale stormwater management.
- Can result in a less integrated stormwater management approach across the subdivision.

- *Under approach #2 stormwater facility costs are shifted to individual builders, reducing the developer's incentive to construct centralized facilities.*



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Drainage and Density Update

- April 2026:
  - Topic last discussed with WAG
  - COBA meeting
- May 2026: City and consultant engineering feedback meeting in
- July-October: Internal cross-department presentations with management and further staff discussions
- January 2027: Bend Municipal Code Title 16 updates to clearly define stormwater management options for residential subdivisions



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Bend Municipal Code (BMC) Title 16 Updates

Title 16: Grading, Erosion Control, Stormwater, Illicit Discharge, Tree Protection, and Wells

Goal: to clearly lay out the various stormwater management options for residential developments and specify requirements referenced in the Bend Development Code.

City Council review and approval - January 2027

- Addresses the drainage and density "neighborhood pathway" for residential subdivisions.
- Applicable to residential developments requiring land use approval.
- Does not address "infill pathway" for developments that only require a building permit. (For example: single lot, not subdividing, partitioning, or doing a middle housing land division to separate ownership to child lots.)

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BMC Title 16 Draft Text (16.15.030)

C.3 is new text to clarify details needed in drainage submittal plans

16.15.030 Drainage Submittal Review and Approval Process

C. *Applicant's Responsibilities.*

3. As part of its drainage submittal, an applicant must submit to the City plans that illustrate the following information:

1. Site plan that shows property lines and easements, existing and/or proposed.
2. Existing and finished grade topographic lines with elevation labels.
3. Existing structures and impervious surfaces. These include, but are not limited to, walls, buildings, driveways, walkways, etc.
4. All proposed structures and impervious surface improvements.
5. Location and sizing of stormwater facilities, and location and method of stormwater conveyance. Retention of stormwater on private lots will be required unless approved plans illustrate stormwater conveyance, and capacity, for facilities in the right-of-way or other private property with a stormwater easement.

BMC Title 16 Draft Text (16.15.040 d)

16.15.040 Post-Construction Performance Standards for Stormwater Management

d. Residential, commercial, institutional or industrial developments may apply stormwater management standards described in this ~~chapter~~ title to a common plan of land development as a whole if the development is appropriately ~~master~~ planned, and has formal arrangements for stormwater drainage across multiple properties under land division approval. Prior to final plat approval, individual residential lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered a single land development project. Commercial, institutional, and industrial developments shall not discharge stormwater into the right-of-way or City owned stormwater facilities.

BMC Title 16 Draft Text (16.15.040 A)

16.15.040 Post-Construction Performance Standards for Stormwater Management.

A. *General Post-Construction Performance Standards*.

Post-construction stormwater BMPs shall adhere to the following performance standards:

6. Stormwater facilities within residential subdivisions that serve multiple lots and/or a combination of lots and roadways shall be ~~on a lot owned and maintained by an entity of common ownership, unless an alternative arrangement is approved by the City. Stormwater facilities located on individual lots shall be maintained by the lot owner or, at the discretion of the City, be placed within an easement and maintained by an entity of common ownership.~~ installed in accordance with one of the options stated below, determined and approved during land division under BDC section 4.2.300 A.

a. The following options are available:

i. Installed within the public right--of--way and owned and maintained by the City.

ii. Installed on a lot owned by a private owner which may include an entity of common ownership and placed within a City stormwater easement that is owned and maintained by the City and made accessible to City maintenance personnel and equipment.

iii. Installed on individual lots and maintained by the lot owner.

b. Facilities installed under subsections (A)(6)(a) (i) and (A)(6)(a)(, ii)of this section cannot accept drainage from the following:

1. Non-residential developments;

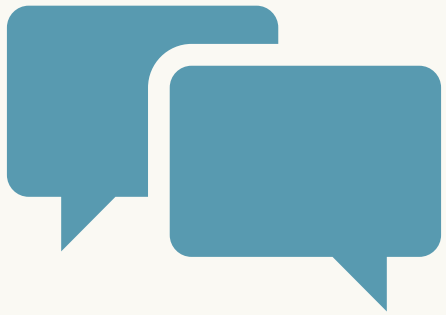
2. Residential developments with one or more shared trash collection areas that accommodate a 2-yard dumpster or larger; or

3. Residential developments with onsite parking lots, except for single-unit dwellings, accessory dwelling units, or middle housing developments as defined in BDC Chapter 1.2

Middle housing *means duplexes, triplexes, quadplexes, cottage developments, and townhouses.*

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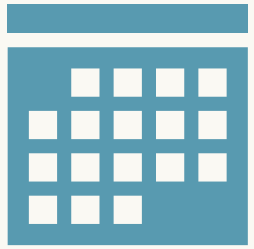
WAG Discussion Questions



- *Do you find the updated code language clear and easy to understand? What suggestions do you have to improve readability of the language?*
- *Are there ways to make the code requirements clearer and more objective?*

Discussion & Feedback

Look ahead



December 2, 2026: 100-Years of Water Campaign and WAG Year in Review

11 a.m.-12:30 p.m. Hybrid Meeting (Headquarters Building or MS Teams)

Spring 2027: Topics to be determined!

- January 6, 2027
- February 3, 2027
- March 3, 2027
- April 7, 2027
- May 5, 2027
- June 2, 2027

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Thank you!



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