

City of Bend



Water Advisory Group

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Location: Hybrid Meeting

In-person: City of Bend Water Services Department, Deschutes Conference Room,
62975 Boyd Acres Road

Online: [Microsoft Teams Meeting Link](#)

Date: January 8, 2024

Time: 11am-12:30pm

Speakers: Lori Faha, City of Bend Environmental Resources Manager
Austin Somhegyi, Stormwater Master Plan Project Manager
Trista Kobluskie, Stormwater Master Plan Consultant Lead
Aubrie Koenig, Facilitator

Meeting Agenda

Purpose: Discuss potential strategies to address drainage and development density.

1. **Welcome & Introduction – 5 mins**
2. **Stormwater 'Drainage & Density' Policy Discussion – 75 mins**
 - a. Introduce stormwater considerations given development infill (see attached background)
 - MS4 permit requirements
 - Development trends (smaller lots, less space for natural systems, redevelopment)
 - Summary of previous WAG/UPAG/SPAG related discussions
 - Stormwater Master Plan policy opportunities
 - Definitions (onsite, regional, public, private)
 - b. Which tools for which development types
 - Discuss different types/sizes of development and which stormwater management methods could/should apply
 - c. Discussion questions:
 - What are your concerns about drainage and development density?
 - What new tools could be effective to help manage stormwater with smaller lot sizes and less available vegetated area?
 - Should there be options for combining private and public stormwater, and who should pay & maintain them?
3. **Summary & Closing – 5 mins**

WAG Meeting Roadmap *draft*



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February 5, 2025 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	FEB 2025 WAG MEETING: Stormwater Master Plan Project Priorities <ul style="list-style-type: none">Summarize results from draft CIP prioritization <p><i>Outcome: Feedback on project prioritization 'tie breakers.'</i></p>
March 5, 2025 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	MARCH 2025 WAG MEETING: Water Conservation Program Performance Measures <ul style="list-style-type: none">Describe current program metricsSummarize analysis to select program focus areas & metricsDiscuss potential priorities for 2025 <p><i>Outcome: Understanding of how water conservation benefits are measured.</i></p>
April 2, 2025 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	APRIL 2025 WAG MEETING: Water Conservation Marketing & Customer Class Water Use Goals <ul style="list-style-type: none">Discuss program marketingDiscuss water use goals by customer class <p><i>Outcome: Input on key program messaging and performance metrics.</i></p>
May 7, 2025 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	MAY 2025 WAG MEETING: Draft Stormwater Master Plan & Stormwater Standards Updates <ul style="list-style-type: none">Share overview of draft Stormwater Master PlanDiscuss updates to stormwater standards <p><i>Outcome: Feedback on master plan and new standards.</i></p>
June 2025	Field Trip

Accessible Meeting Information

This meeting/event location is accessible. Sign language interpreter service, assistive listening devices, materials in alternate format such as Braille, large print, electronic formats, or any other accommodations are available upon advance request. Please contact Lori Faha at lfaha@bendoregon.gov or (541) 317-3025; Relay Users Dial 7-1-1. Providing, at least, 3 days' notice prior to the event will help ensure availability.



City of Bend Utility Public Advisory Group – Background Information for April 5, 2023 Meeting

Below is a brief summary of past work on stormwater program issues, especially the “drainage and density” topic. Also included are some definitions and photos to provide background for our next UPAG meeting.

Previous Stormwater PAG Discussions on Stormwater Drainage & Density

In 2017 the City of Bend Stormwater Public Advisory Group began to focus discussion on stormwater and Bend’s increase in size and density. The Stormwater PAG input was designed to inform direction and development of updates to the Stormwater Master Plan and development standards/codes. Between 2017 and 2018 the Stormwater PAG helped develop the following:

- Strengths-Weaknesses-Opportunities-Threats/Constraints (SWOT) analysis and comparison table for on-lot, neighborhood/streetside, & regional scale stormwater management scenarios
- Identification of study needs and recommendations on specific topics

2018-2022 Drainage and Density Progress

- A few developments were approved with mixed stormwater drainage (private drainage conveyed through ROW to regional facilities)
- 2020 Infiltration Study to inform appropriate facilities and the Stormwater Master Plan
- LID Site Planning Preparation- initial reviews of other jurisdictions’ design manuals
- Pervious Pavement- initial research and review of design guidelines
- Gap analysis- compared new DEQ permit requirements for development vs. existing City requirements

Current Regulatory Definitions

Green Infrastructure (GI): is a specific type of stormwater control using vegetation, soils, and natural processes to manage stormwater. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems designed to mimic nature by reducing and/or storing stormwater through infiltration, evaporation, and transpiration. At the site level, such measures may include the use of plant or soil systems, permeable pavement or other pervious surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters. At the scale of city or county, green infrastructure refers to the patchwork of natural areas that provides flood protection and natural processes that remove pollutants from stormwater.

Low Impact Development (LID): is a stormwater management approach that seeks to mitigate the impacts of increased runoff and stormwater pollution using a set of planning, design and construction approaches and stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater, and can occur at a wide range of landscape scales (i.e., regional, community and site). Low impact development is a comprehensive land planning and engineering design approach to stormwater management with a goal of mimicking the pre-development hydrologic regime of urban and developing watersheds.

Impervious Surface: is any surface resulting from development activities that prevents the infiltration of water. Common impervious surfaces include: building roofs; traditional concrete or asphalt paving on walkways, driveways, parking lots, gravel lots and roads; and heavily-compacted earthen materials.

Have you run in to any challenges or barriers in implementing LID or Green Infrastructure in development?



Townhomes on Reed Market Rd, Bend



Townhomes on Empire Blvd, Bend



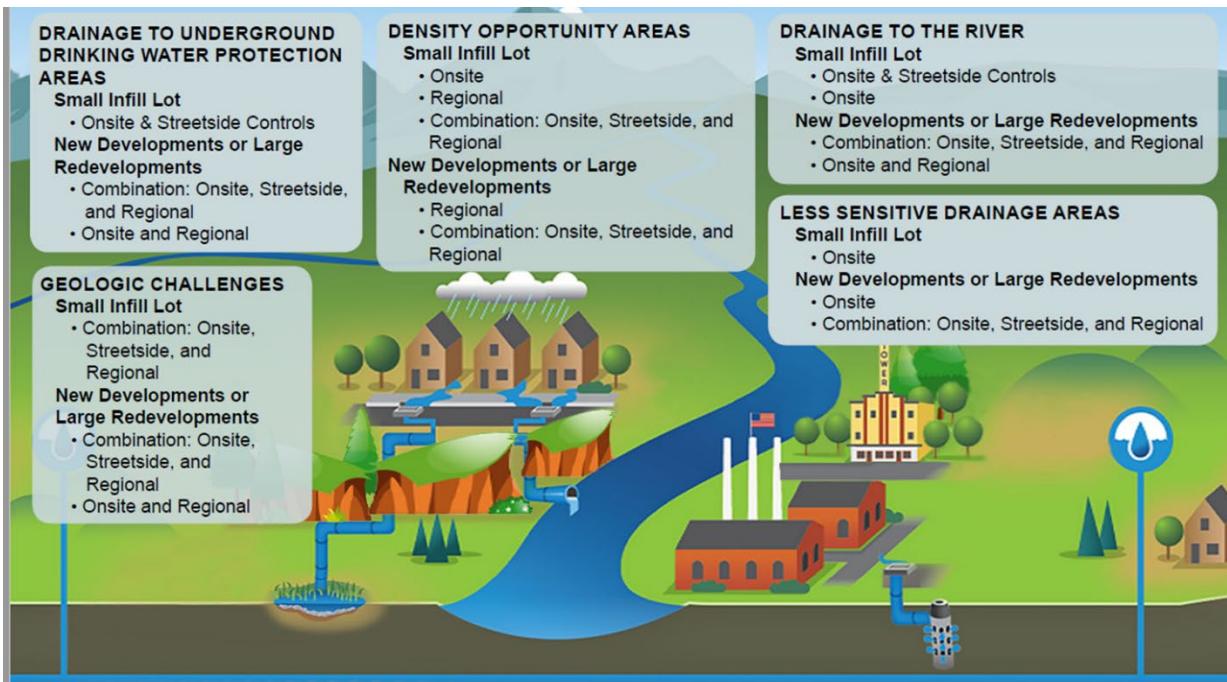
12th Ave green street- Portland



Walkway swale along riverside homes, Bend



Bend Park and Recreation District green roof, Bend



Stormwater Public Advisory Group Recommendations - Fall 2018

The City of Bend Stormwater Public Advisory Group has been focused over the last 18 months on how best to handle stormwater with increasing density as needed to meet State land use goals related to UGB expansion, and as the City becomes more urbanized. The following represent the results of prioritization exercises in a perfect world without additional complications, regulatory requirements, competing needs, etc. To that end, the PAG recognizes the need for and highly prioritizes flexibility especially for last lot small infill projects.



Glossary of Terms -

ONSITE CONTROLS seek to increase permeability, reduce impervious surface area and directly connected impervious areas to increase retention and detention through such practices as (a) reduced building and (b) parking footprints, (c) rain gardens, (d) disconnected downspouts, (e) permeable pavement or decks/benches, (f) green roofs, (g) cisterns, (h) underground injection controls.



NEIGHBORHOOD STREETSIDE CONTROLS are controls in the public right of way or private streetside designed either to retain or detain stormwater to reduce the amount or rate of runoff.

These may include (a) green streets bioinfiltration, planter boxes, (b) filter strips, or underground injection controls.



REGIONAL (SUBDIVISION) CONTROLS are designed to take, detain/retain the stormwater from multiple lots through a retention or detention basin or swale.



Accommodation Information for People with Disabilities

To obtain this information in an alternate format such as Braille, large print, electronic formats, etc. please contact Utility Department at: (541) 317-3000 ext. 2, utilities@bendoregon.gov, Relay Users Dial 7-1-1.



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Utilities Public Advisory Group

Stormwater Topic Slides

April 5, 2023 • 11 am–12:30 pm • Zoom Meeting

Lori Faha, P.E., Environmental Resources Manager

Dan Denning, Water Conservation Program Manager

Elisabeth O'Keefe, Stormwater Program Manager

Aubrie Koenig, Facilitator

Prior Work Will Inform Stormwater Updates

Past Work:

- The previous Bend Stormwater PAG discussed in detail the complexity of “drainage and density” issues in 2017-2022 (*per emailed attachment*)
- Technical work needs were identified and some progress made by the City on research, compiling gaps/needs for standards updates

Next Steps:

- Program/standards/codes updates to ensure permit compliance, and reporting steps and timing to DEQ in updated iSWMP
- Create reasonable and sustainable methods for accommodating drainage and density that:
 - Continues to prioritize onsite stormwater management
 - Provides simple tools and pathways for small and infill projects

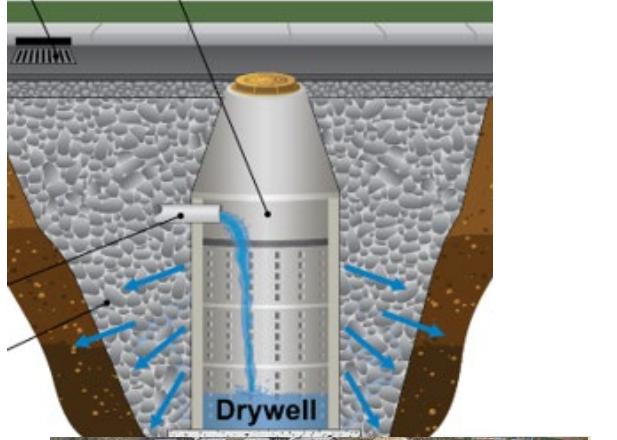


Stormwater terms

Green infrastructure

Low impact development

Pervious and impervious



Green Infrastructure



- *a specific type of stormwater control using vegetation, soils, and natural processes to manage stormwater*
- *mimics nature by reducing and/or storing stormwater through infiltration, evaporation, and transpiration*
- *provides flood protection and natural processes that remove pollutants from stormwater*

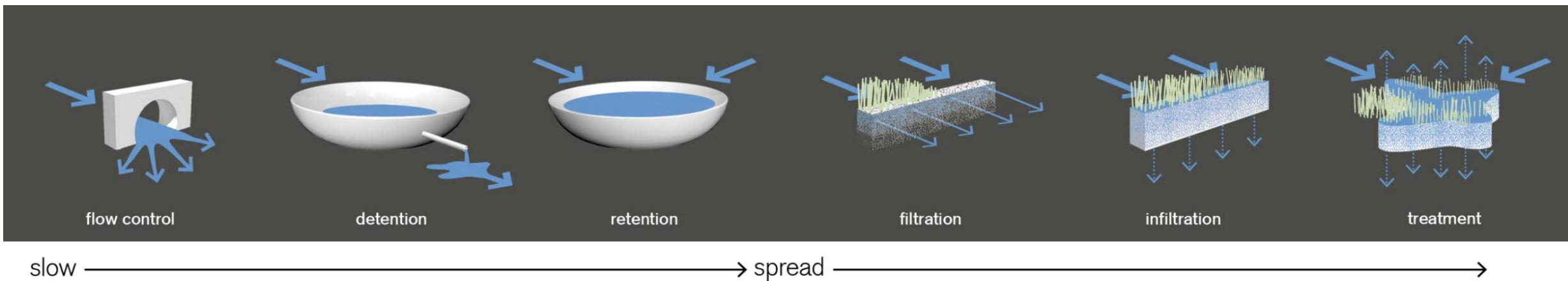
*a drywell could also be considered part of a green infrastructure toolkit



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Low Impact Development

- *a comprehensive land planning and engineering design approach to stormwater management with a goal of mimicking the pre-development hydrologic regime of urban and developing watersheds*
- *promotes the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater*



flow control: The regulation of stormwater runoff flow rates.

detention: The temporary storage of stormwater runoff in underground vaults, ponds, or depressed areas to allow for metered discharge that reduce peak flow rates.

retention: The storage of stormwater runoff on site to allow for sedimentation of suspended solids.

filtration: The sequestration of sediment from stormwater runoff through a porous media such as sand, a fibrous root system, or a man-made filter.

infiltration: The vertical movement of stormwater runoff through soil, recharging groundwater.

treatment: Processes that utilize phytoremediation or bacterial colonies to metabolize contaminants in stormwater runoff.

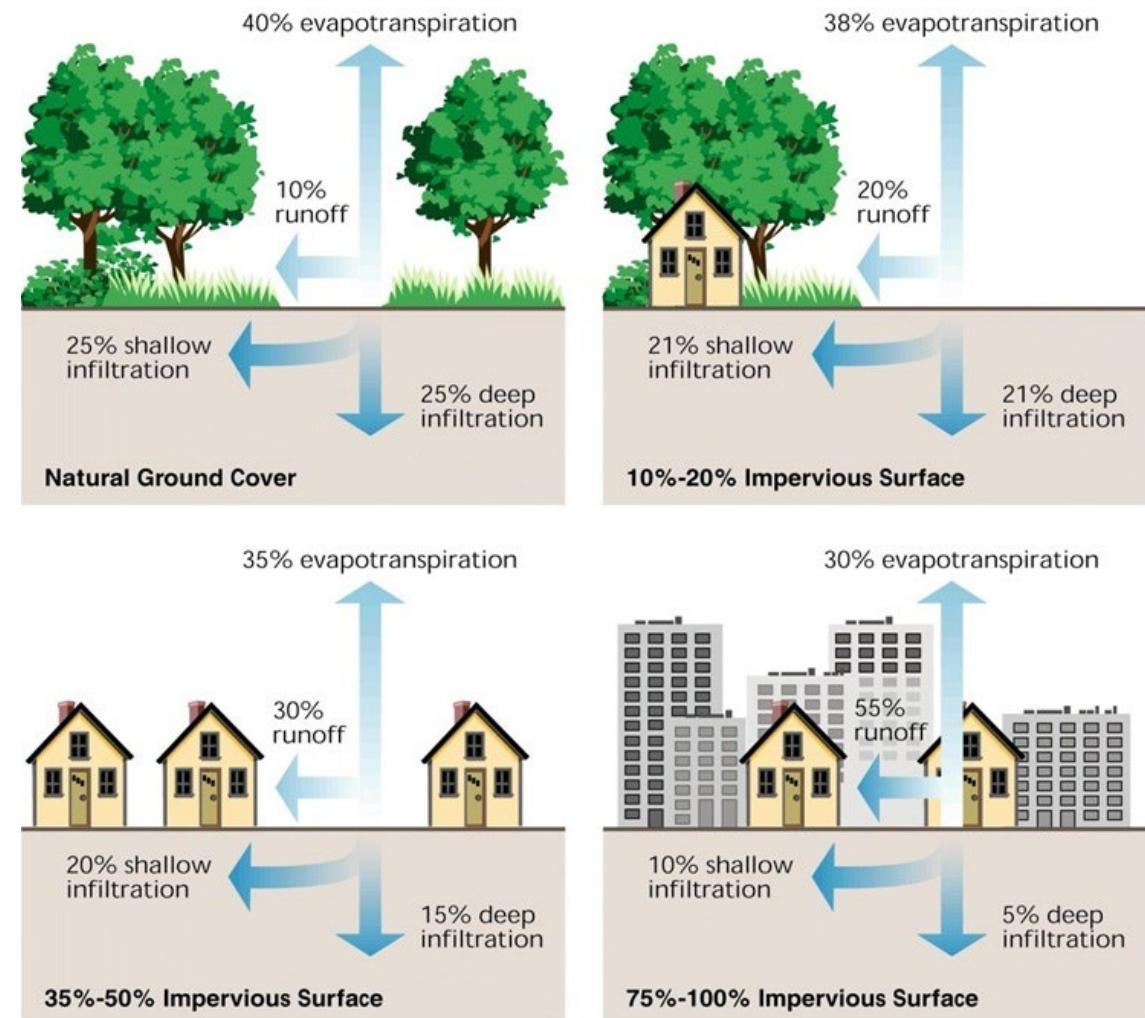


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University of Arkansas Low Impact Development: a design manual for urban areas (2010)

Pervious vs Impervious

- **Impervious surface** is any surface resulting from development activities that **prevents the infiltration of water**.
- Common impervious surfaces include: building roofs; traditional concrete or asphalt paving on walkways, driveways, parking lots, gravel lots and roads; and heavily-compacted earthen materials.



Stream Corridor Restoration: Principles, Processes and Practices (FISRWG 1998)



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Stormwater and development

Current Typical Requirements

Development must retain all stormwater onsite

Street/ROW systems are designed to handle ROW runoff plus the front 20' of adjacent lots

UIC's (drywells with pretreatment from sedimentation manholes) typical in most ROW areas and many private sites

SF lots typically just use surface retention in the landscape

A few master planned developments send some "private" runoff into private or public ROW systems

Upcoming Changes/Needs



Apply standards to smaller sites (5000 sf impervious area threshold, no exemptions)

Increased density, less available pervious areas ("drainage and density")

Apply standards to re-development (replacement of existing impervious)

Create hierarchy for standards – first manage onsite, then if needed have options for offsite stormwater management

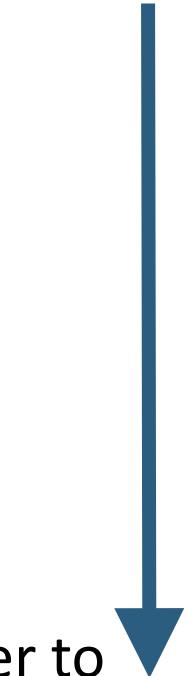
Consider impacts of more frequent, short duration, high intensity storms



Approaches to drainage and density

A potential stormwater hierarchy:

1. All onsite disposal
2. 25-yr storm onsite, 100-year overflow to ROW
3. Partial onsite (WQ storm?), remainder to “subdivision level” facility
4. All stormwater managed at “subdivision level”
5. Partial (or none) onsite, remainder to ROW or public regional facility



*When to allow
moving down
the hierarchy?*



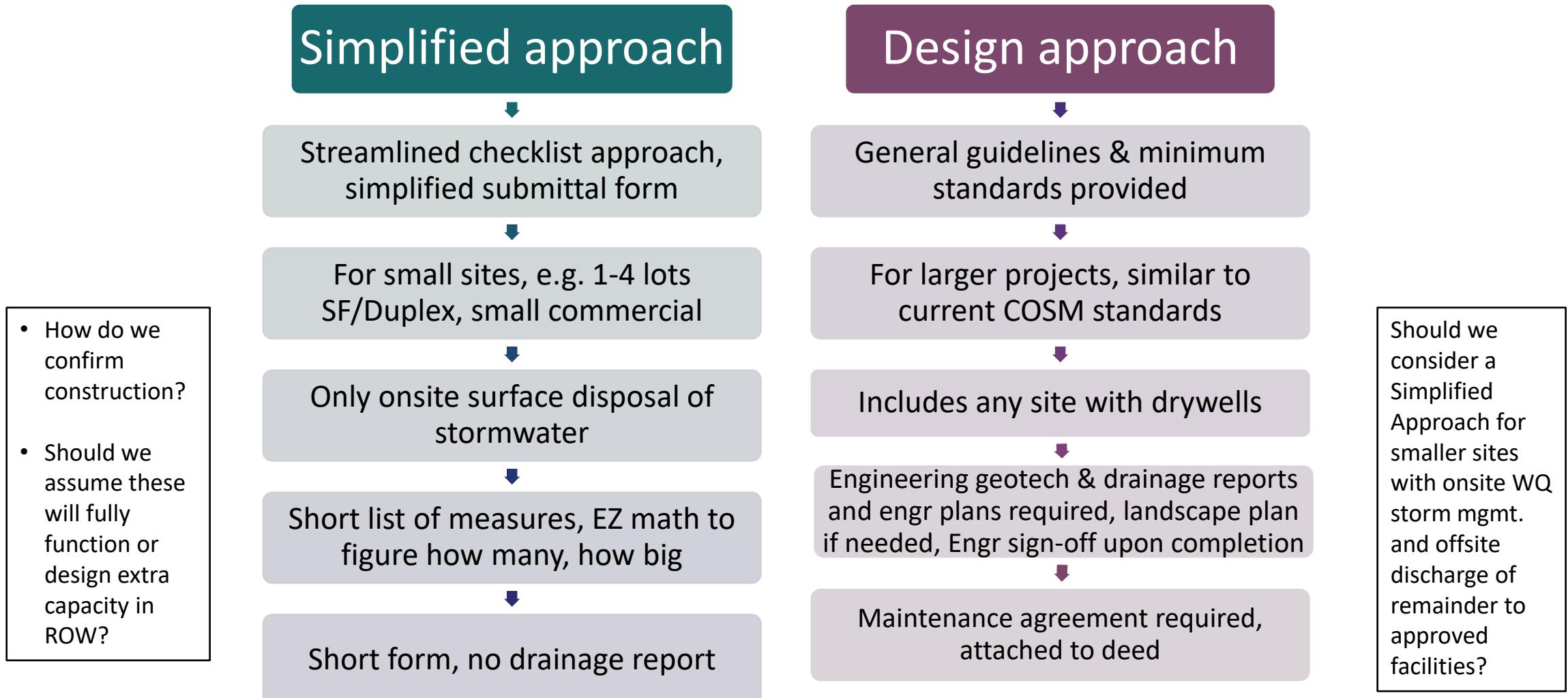
Townhomes- Empire Blvd



Townhomes- Reed Market



Should we add a Simplified Approach?



Stormwater maintenance responsibilities



Current Pathways

- Property owner manages onsite
- Public ROW managed separately
- Some master plan developments: private & public conveyance in ROW, but managed onsite.
 - Ex: Luderman Crossing Development

Upcoming Changes/Needs

- Public/private regional facilities?
- Planning & standards for redevelopment areas such as City Core Area
- Determine who manages co-mingled storm facilities
 - If we publicly maintain – how to fund
 - Can we depend on HOA's and others to maintain long term?



Luderman Crossing Development

Developer gave up two lots for regional drainage facilities.

- Reduced the number of drywells by half, installing private collection systems for roof runoff.
- Subdivision is designed to keep the 100-year storm event onsite.
- HOA maintains



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UPAG focus questions



- Are you aware of challenges or barriers in implementing LID or Green Infrastructure in development?
- Under what scenarios should offsite drainage be an option for development projects?
- What factors should be considered when determining ongoing maintenance responsibility for structural stormwater facilities (private, commercial, & comingled)?
- What areas of training are lacking for permitting, design and/or maintenance of stormwater measures?

