

Ecology Stormwater Manual Revisions: What They Mean for You

APWA-WA Spring Conference 2024



Agenda



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1. Introduction
2. Types of Manual Changes
3. Path to Implementing New Manuals & Permits
4. Significant Changes Review, Discussion, & Examples of Application
5. Conclusion

Ecology SW Manual Revisions

How will these changes impact your projects and programs?

- Purpose of Presentation:
 - Identify manual changes that will affect local agency stormwater programs and designers.
 - Discuss the practical application of manual changes on design projects.



Manual Changes

Consistency Edits

Minor Edits

Significant Changes

Western Washington (WWA)

- [Chart Of Changes: 2019 - 2024 SWMMWW \(wa.gov\)](#)
- [Crosswalk: 2019 - 2024 SWMMWW](#)
- [2024SWMMWW - Executive Summary of the 2024 Revisions \(wa.gov\)](#)

Eastern Washington (EWA)

- [2024SWMMEW - Chart Of Changes: 2019 - 2024 SWMMEW \(wa.gov\)](#)
- [2024SWMMEW - Crosswalk: 2019 - 2024 SWMMEW](#)
- [2024SWMMEW - Executive Summary of the 2024 Revisions \(wa.gov\)](#)

Manual Changes

Consistency Edits

- EWA & WWA Consistency in Language and Organization of Manuals
- Goal is to Make Guidance Easier to Follow for All Involved
- Intentional Differences are Preserved

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For example...

WWA Current Language

“Enhanced
Treatment”

EWA Current Language

“Metals
Treatment”

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For example...

WWA Current Language

“Enhanced
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EWA Current Language

“Metals
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***NEW** Consistent Language*

“Metals
Treatment”

Manual Changes

Consistency
Edits

Minor
Edits

Significant
Changes

Manual Changes

Minor Edits

- Usability Enhancements
 - Embrace online user
 - Consolidate repetitive information
 - Revise text for clarity
 - Reordering sections for better flow

Manual Changes

Consistency
Edits

Minor
Edits

Significant
Changes

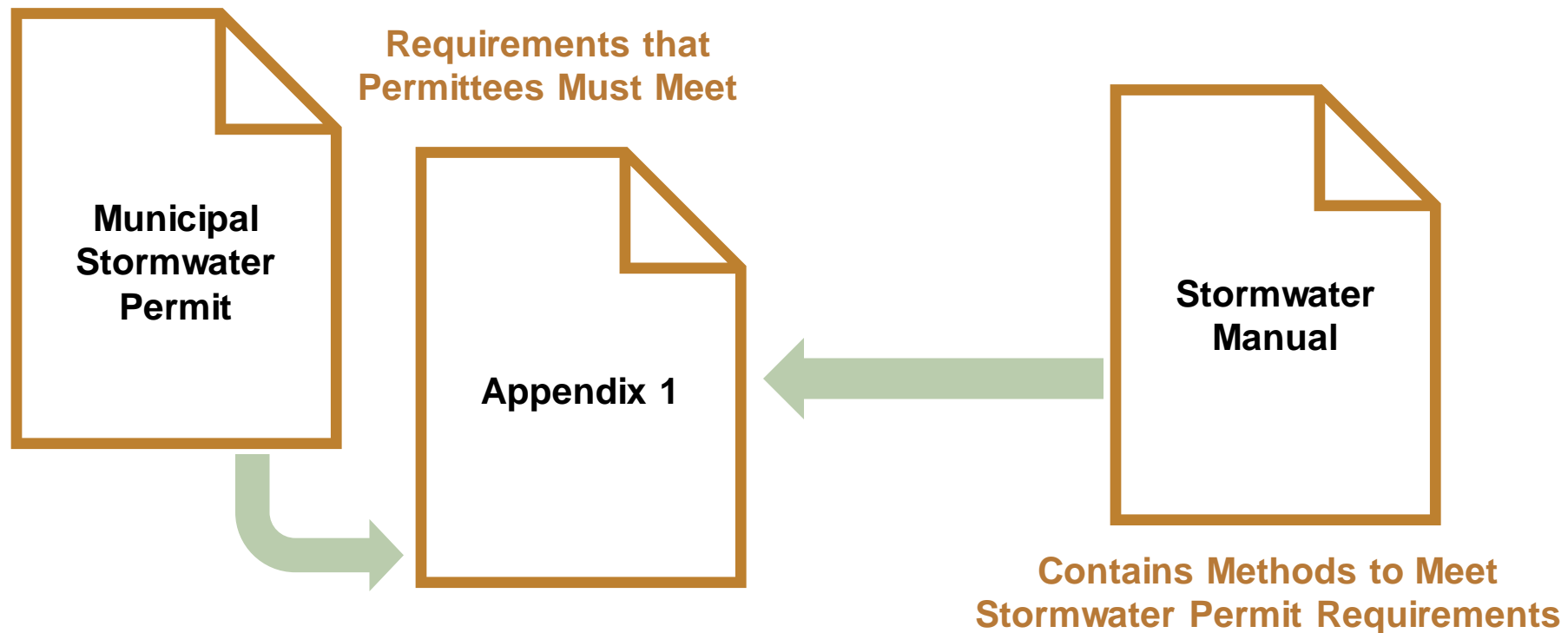
Manual Changes

Significant Changes

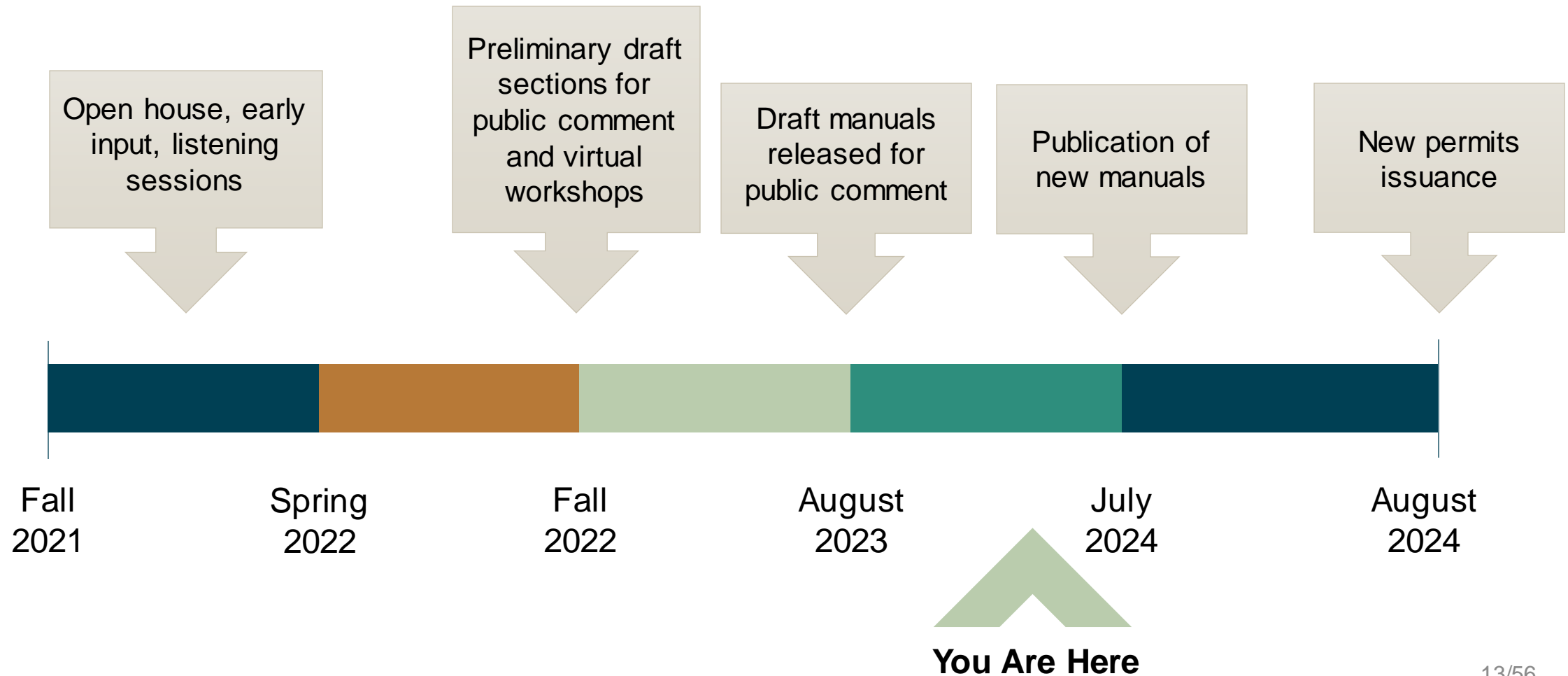
- Pavement Maintenance Project and Underground Utility Project Exemptions
- New Development and Redevelopment Project Thresholds
- MR8- Wetland Hydroperiod Changes
- BMP T7.30 Bioretention
- Climate Change Guidance
- Nutrients
- Toxic Organics
- Source Control BMPs - PCB Edits
- UIC Wells
- Light Rail

Stormwater Manual and Municipal Stormwater Permits

How do the Municipal Stormwater Permits Relate to the Manuals?



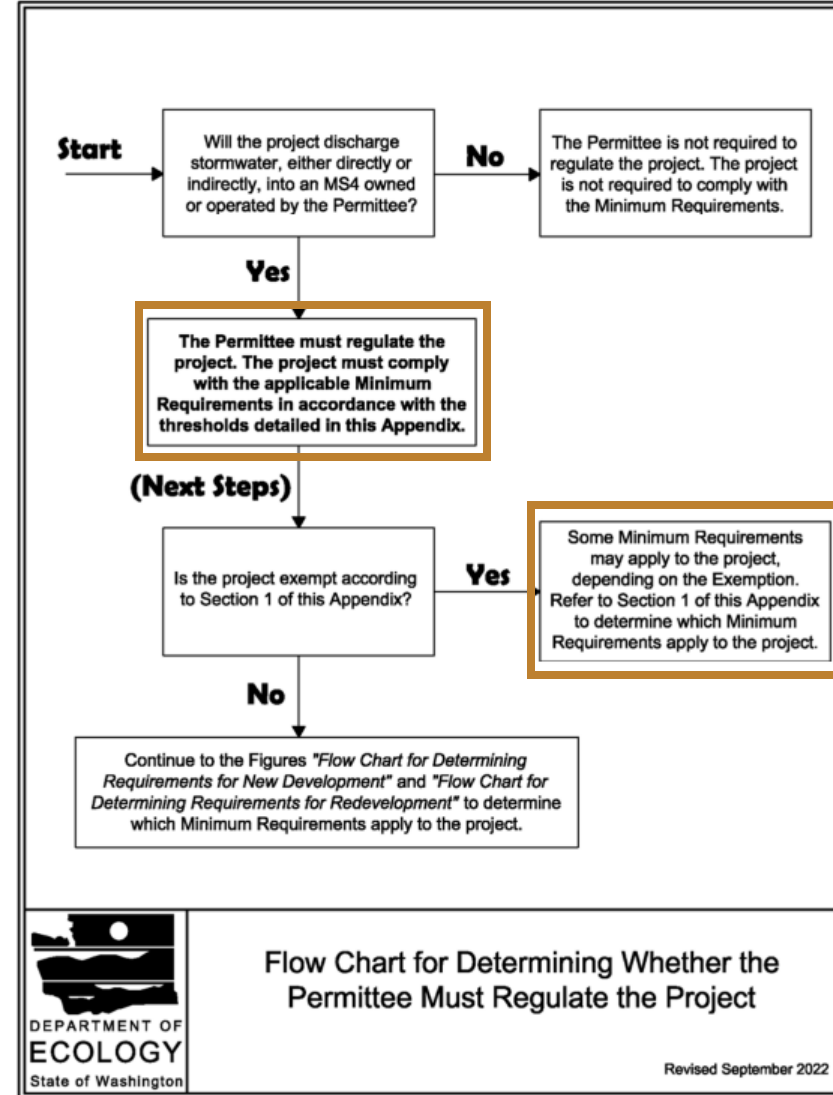
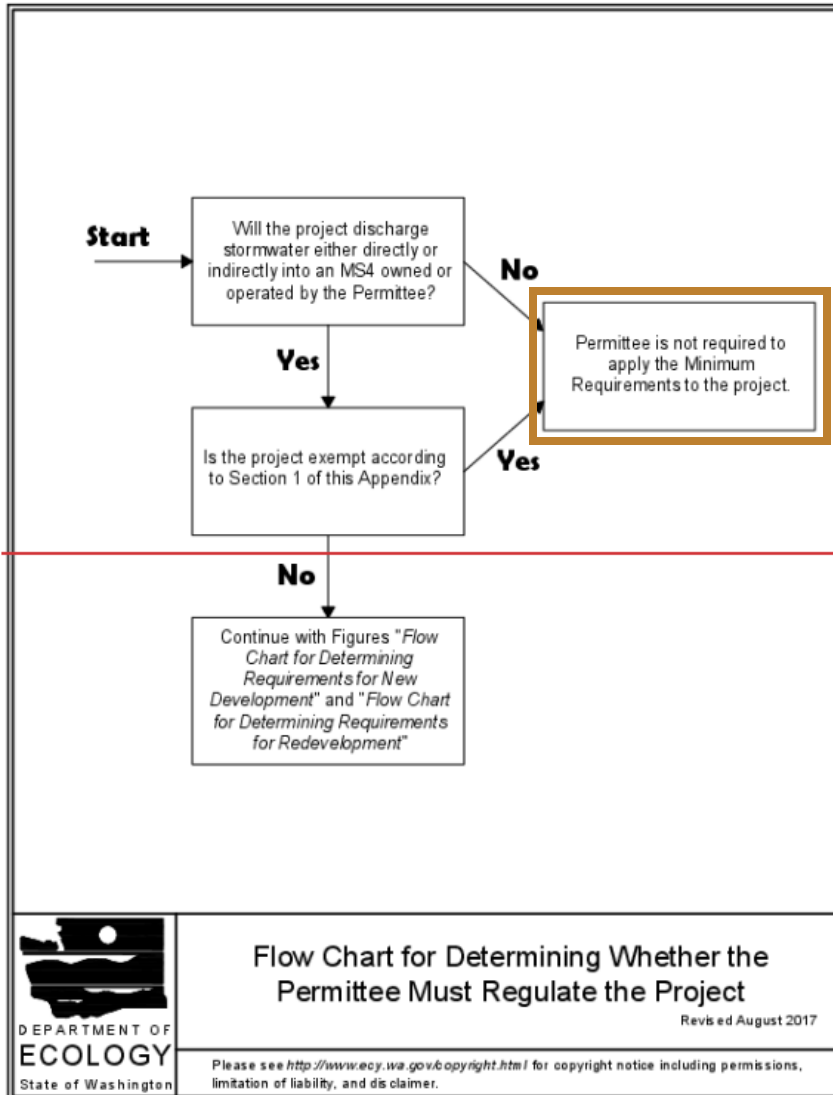
Path to New Manuals



Minimum Requirements (MR) Core Elements (CE)

- MR1 (CE1): Preparation of a Stormwater Site Plan
- MR2 (CE2): Construction Stormwater Pollution
- MR3 (CE3): Source Control of Pollution
- MR4 (CE4): Preservation of Natural Drainage Systems and Outfalls
- MR5: On-Site Stormwater Management
- MR6 (CE5): Runoff Treatment
- MR7 (CE6): Flow Control
- MR8 (CE8): Wetlands Protection
- MR9 (CE7): Operations and Maintenance

Applicability



Significant Changes

- Pavement Maintenance Project and Underground Utility Project Exemptions
- New Development and Redevelopment Project Thresholds

Pavement Maintenance Project and Underground Utility Project Exemptions

Pavement Maintenance Projects

The following pavement maintenance ~~practices~~projects are exempt from all Minimum Requirements:

- pothole and square cut patching,
- overlaying existing asphalt or concrete pavement with bituminous surface treatment (BST or “chip seal”), asphalt, or concrete without expanding the area of coverage,
- shoulder grading,
- reshaping/regrading drainage systems,
- crack sealing, and
- ~~resurfacing with in-kind material without expanding the road prism,~~
- ~~pavement preservation activities that do not expand the road prism, and~~
- vegetation maintenance.

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

The following pavement maintenance practices are not categorically exempt, and are subject to the Minimum Requirements that are triggered when the thresholds identified for new or redevelopment projects are met per Section 3. Applicability of the Minimum Requirements.

- Removing and replacing an asphalt or concrete pavement to base course or lower, or repairing the pavement base: except for a project consisting only of pothole or square cut patching: These are considered replaced hard surfaces.
- Extending the pavement edge ~~without increasing the size of the road prism~~, or paving graveled shoulders: These are considered new hard surfaces.
- Resurfacing by upgrading from dirt to gravel, a bituminous surface treatment (“chip seal”), asphalt, or concrete; upgrading from gravel to chip seal, asphalt, or concrete; or upgrading from chip seal to asphalt or concrete: These are considered new impervious surfaces.

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

Pavement Maintenance Project and Underground Utility Project Exemptions

Underground Utility Projects

This exemption may only be applied to an entire project. The entire project must be for the sole purpose of installing, maintaining, and/or upgrading an underground utility, involving only the trenching necessary for the underground utility work (including any over-excavating necessary for the utility trench). Underground utility projects do not involve redevelopment work beyond the utility work. Projects that are not solely for underground utility work are not exempt from the Minimum Requirements, and must consider any underground utility work areas within the project as new or replaced hard surfaces when determining the applicable Minimum Requirements.

Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics are only subject to 4.1 Minimum Requirement #1: Preparation of a Stormwater Site Plan and 4.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan (SWPPP).

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

For Example...	
Roadway regrading and trenching for installation of stormwater system	Not Exempt
Trenching for water main maintenance – full project scope	Exempt

New Development and Redevelopment Project Thresholds

WWA

Updated threshold for
Redevelopment projects
(road-related and
non-road-related)

EWA

Added minimum thresholds for
new and redevelopment projects
so that small projects would not
need to apply CEs.

Added Guidance

Local jurisdictions can help
determine if a redevelopment
project is considered “commercial”
or “industrial”.

New Development and Redevelopment Project Thresholds

WWA

Updated threshold for
Redevelopment projects
(road-related and
non-road-related)

New Development and Redevelopment Project Thresholds

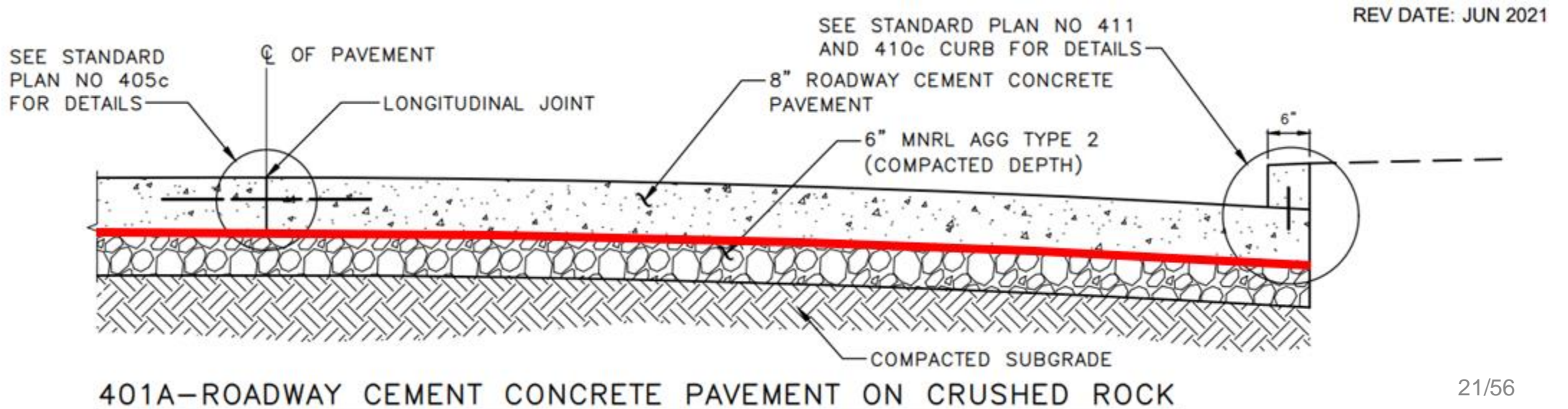
Replaced hard surface

For structures, the removal ~~and replacement of hard surfaces~~ down to (i.e. exposing the top of) the foundation ~~and replacement~~. For other hard surfaces, the removal down to (i.e. exposing the top of) bare soil or base course and replacement.

Replaced impervious surface

For structures, the removal ~~and replacement of impervious surfaces~~ down to (i.e. exposing the top of) the foundation ~~and replacement~~. For other impervious surfaces, the removal down to (i.e. exposing the top of) bare soil or base course and replacement.

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase I Municipal Stormwater Permit



New Development and Redevelopment Project Thresholds

Road-related Redevelopment Projects

3.4 Additional Requirements for Redevelopment

Road-related projects shall comply with all ~~the~~ Minimum Requirements for the new and replaced hard surfaces ~~(including pavement, shoulders, curbs, and sidewalks) and~~ and the converted vegetation areas if:

- the new plus replaced hard surfaces total 5,000 square feet or more, and
- the new plus replaced hard surfaces total 50% or more of the existing hard surfaces within the Site.

Important!
New + Replaced

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

New Development and Redevelopment Project Thresholds

Other Redevelopment Projects

Other types of redevelopment projects shall comply with all the Minimum Requirements for the new and replaced hard surfaces and the converted vegetation areas if either of the two thresholds below are crossed:

- Threshold 1:

- the total of new plus replaced hard surfaces is 5,000 square feet or more, and
 - For commercial or industrial projects: the valuation of the proposed improvements, including interior improvements, exceeds 50% of the assessed value of the existing Project Site improvements.
 - For all other projects: the valuation of the proposed improvements, including interior improvements, exceeds 50% of the assessed value of the existing Site improvements.

- Threshold 2 (for commercial or industrial sites only):

- the new plus replaced hard surfaces total 50% or more of the existing hard surfaces within the Site.

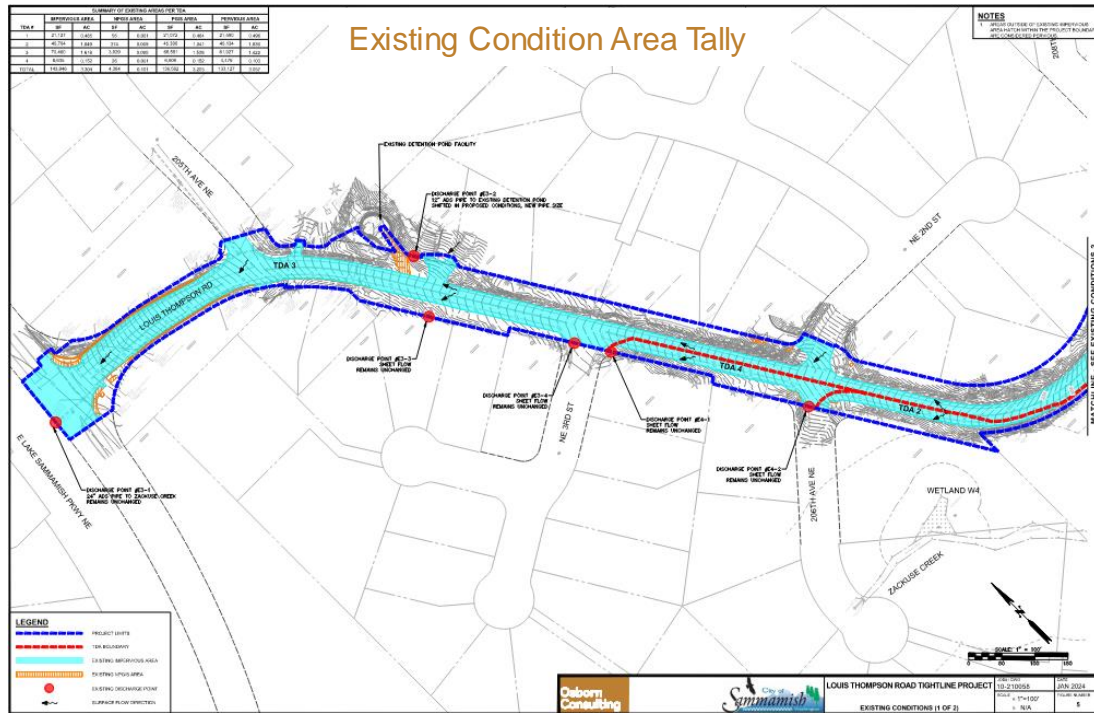
The Permittee/local jurisdiction may exempt or institute a stop-loss provision for redevelopment projects from compliance with Minimum Requirement #5, #6, #7, and/or #8 as applied to the replaced hard surfaces if the Permittee/local jurisdiction has adopted a plan and a schedule that fulfills those requirements in regional facilities.

~~The Permittee may grant a variance/exception to the application of Minimum Requirement #7 to replaced impervious surfaces if such application imposes a severe economic hardship. See Section 6. Exceptions/Variances.~~

Source: APPENDIX 1 - Minimum Technical Requirements for New Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

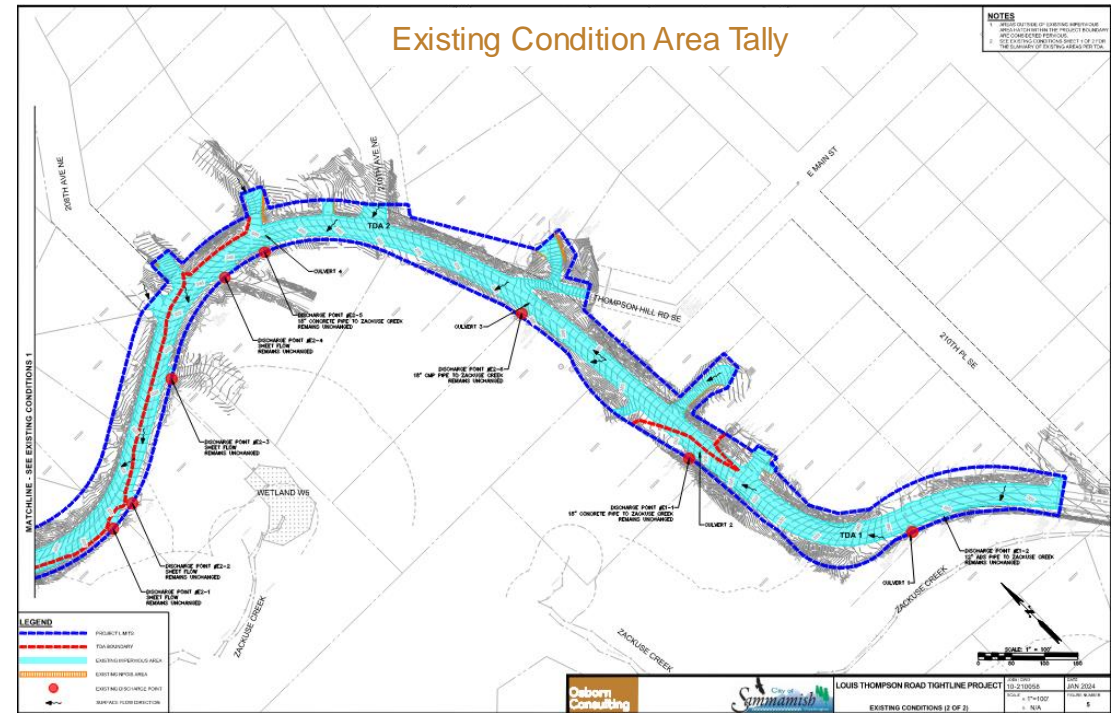
New
Threshold

New Development and Redevelopment Project Thresholds



Existing Condition

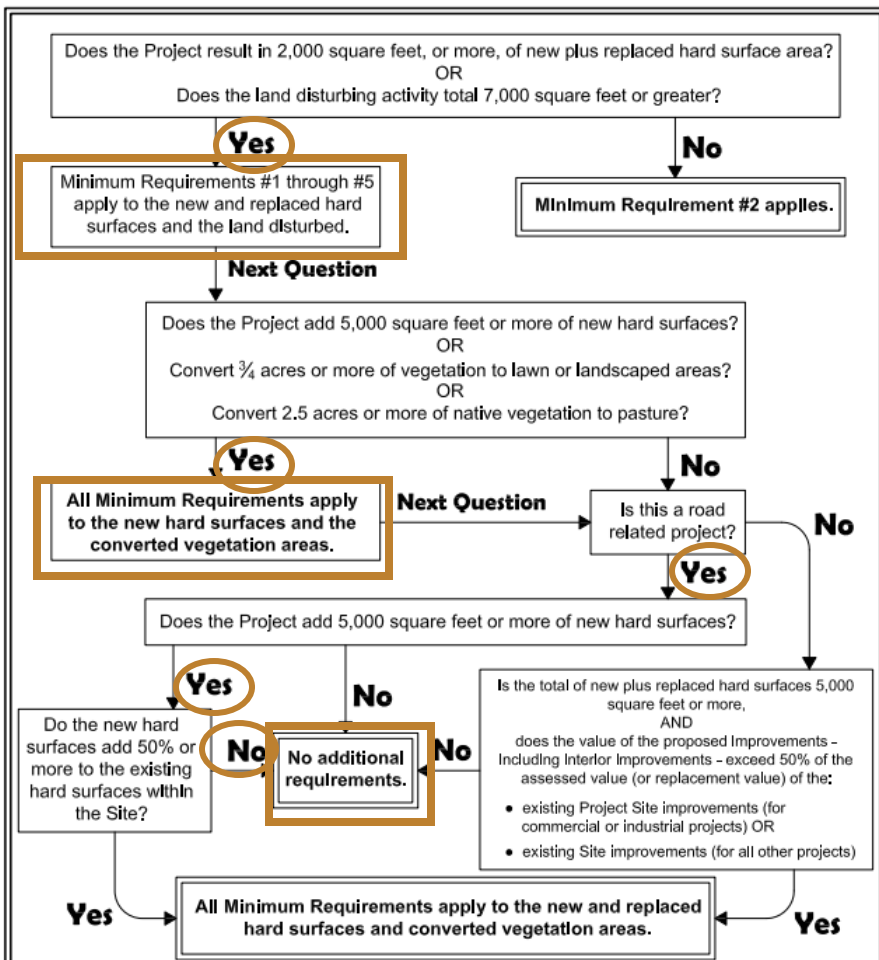
- Ditches and culverts
- No sidewalk, bike lane, curb ramps
- Narrow shoulders at locations
- AC water main



Proposed Condition

- New stormwater system
- Sidewalk, bike lane, curb ramps
- Shoulder widening and overlay
- Driveway regrading
- New water main

New Development and Redevelopment Project Thresholds



Targeted Surfaces

TDA#	Existing Hard Surfaces (SF)	New Hard Surfaces (SF)	Replaced Hard Surfaces (SF)	New PGHS (SF)	Replaced PGHS (SF)
1	19,127	4,277	8,384	682	8,329
2	40,704	8,707	9,968	2,460	9,737
3	65,480	13,475	20,582	2,403	20,247
4	4,635	-	-	-	-
Total	129,946	26,459	38,934	5,545	38,313



Flow Chart for Determining Requirements for Redevelopment

Revised March 2019

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New Development and Redevelopment Project Thresholds

MR6: Runoff Treatment (2019 SWMMWW)

TDA Thresholds

- TDAs that have a total of 5,000 square feet or more of pollution-generating hard surface (PGHS), or
- TDAs that have a total of 3/4 of an acre or more of pollution-generating pervious surfaces (PGPS) – not including permeable pavements, and from which there will be a surface discharge in a natural or man-made conveyance system from the site.

*Thresholds not exceeded
for any TDA*

TDA#	New PGHS (SF)
1	682
2	2,460
3	2,403
4	-
Total	5,545

New Development and Redevelopment Project Thresholds

MR7: Flow Control

(2019 SWMMWW)

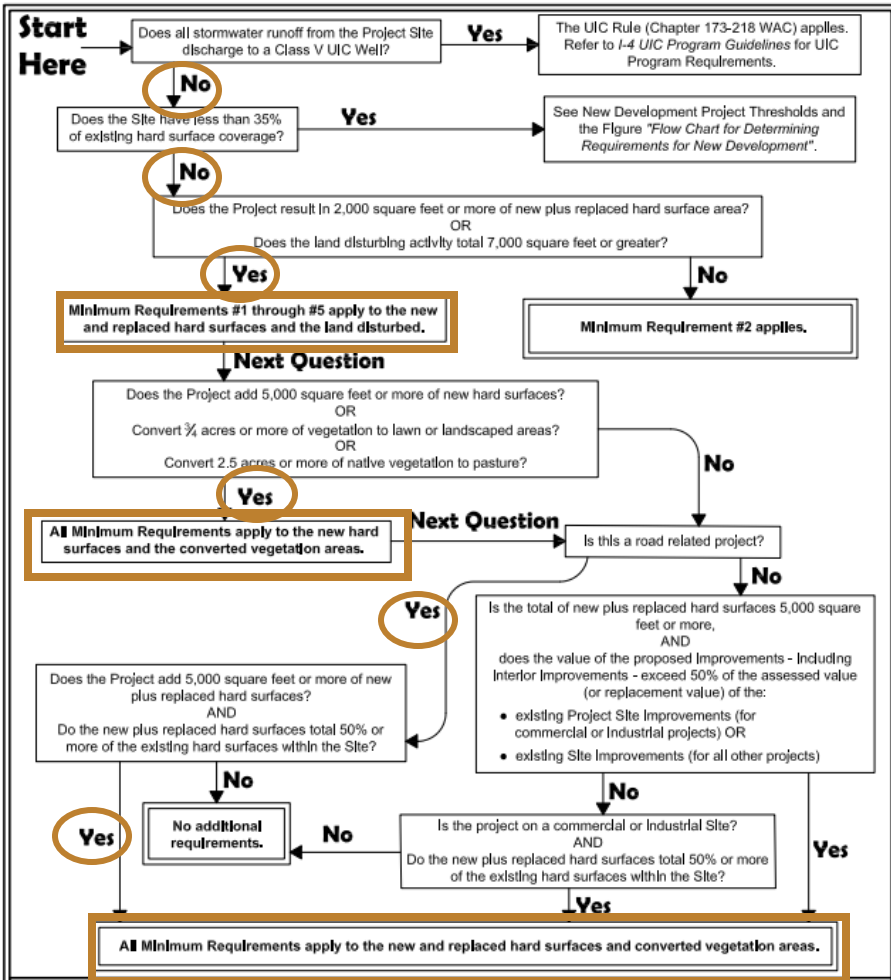
TDA Thresholds

- TDAs that have a total of 10,000 square feet or more of effective impervious surfaces, or
- TDAs that convert ¾ acres or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture, and from which there is a surface discharge in a natural or man-made conveyance system from the TDA, or
- TDAs that through a combination of effective hard surfaces and converted vegetation areas cause a 0.15 cubic feet per second (cfs) or greater increase in the 100-year flow frequency as estimated using an approved continuous simulation model and 15-minute time steps.

Threshold exceeded for TDA 3

TDA#	New Hard Surfaces (SF)
1	4,277
2	8,707
3	13,475
4	-
Total	26,459

New Development and Redevelopment Project Thresholds



Targeted Surfaces

TDA#	Existing Hard Surfaces (SF)	New Hard Surfaces (SF)	Replaced Hard Surfaces (SF)	New PGHS (SF)	Replaced PGHS (SF)
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Total	129,946	26,459	38,934	5,545	38,313

$65,393 / 129,946 = 50.3\%$

New Development and Redevelopment Project Thresholds

MR6: Runoff Treatment

The following TDAs require construction of Runoff Treatment BMPs. If a TDA meets any either of the following thresholds, Runoff Treatment BMPs are required. The project proponent must demonstrate that the TDA does not meet either of the following thresholds for Runoff Treatment BMPs to not be required for that TDA.

- TDAs that have a total of ~~5~~2,000 square feet or more of pollution-generating hard surface (PGHS), or
- TDAs that have a total of 3/4 of an acre or more of pollution-generating pervious surfaces (PGPS) – not including permeable pavements, and from which there will be a surface discharge in a natural or man-made conveyance system from the site.

Important!
2,000 SF of PGHS

Source: APPENDIX 1 - Minimum Technical Requirements for New
Development and Redevelopment – Draft 2024 Phase II WWA Municipal Stormwater Permit

New Development and Redevelopment Project Thresholds

MR6: Runoff Treatment (2024 SWMMWW)

TDA Thresholds

- TDAs that have a total of 2,000 square feet or more of pollution-generating hard surface (PGHS), or
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Thresholds for 3 TDAs

TDA#	New PGHS (SF)	Replaced PGHS (SF)
1	682	8,329
2	2,460	9,737
3	2,403	20,247
4	-	-
Total	5,545	38,313

New Development and Redevelopment Project Thresholds

MR7: Flow Control

(2024 SWMMWW)

TDA Thresholds

- TDAs that have a total of 10,000 square feet or more of effective impervious surfaces, or
- TDAs that convert ¾ acres or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture, and from which there is a surface discharge in a natural or man-made conveyance system from the TDA, or
- TDAs that through a combination of effective hard surfaces and converted vegetation areas cause a 0.15 cubic feet per second (cfs) or greater increase in the 100-year flow frequency as estimated using an approved continuous simulation model and 15-minute time steps.

*Threshold exceeded
for TDA 3*

TDA #	New Hard Surfaces (SF)	Replaced Hard Surfaces (SF)
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2	8,707	9,968
3	13,475	20,582
4	-	-
Total	26,459	38,934

New Development and Redevelopment Project Thresholds

MR6: Runoff Treatment

2019 SWMMWW

2024 SWMMWW

No Requirement

TDA#	New PGHS (SF)	Replaced PGHS (SF)
1	682	8,329
2	2,460	9,737
3	2,403	20,247
4	-	-
Total	5,545	38,313

MR7: Flow Control

2019 SWMMWW

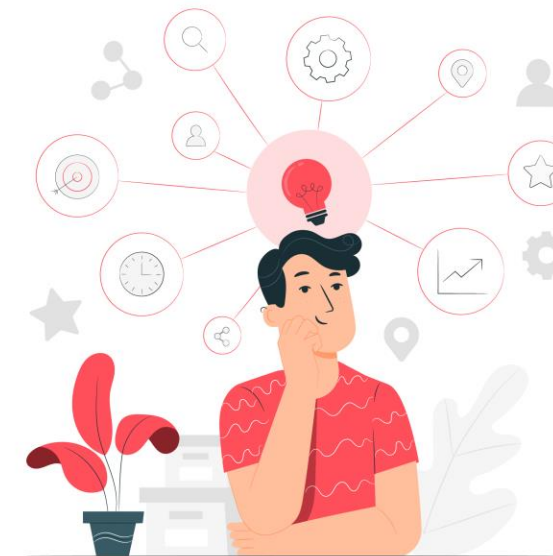
2024 SWMMWW

TDA#	New Hard Surfaces (SF)
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Summary & Recommendations

- Summary
 - Significant adjustment to thresholds for road-related redevelopment projects
 - More projects may target new + replaced hard surfaces
 - Additional project cost (more/larger BMPs, property acquisition, etc.)
 - Clarifications for project exemptions (pavement maintenance and underground utility)
 - Clearer distinction between exempt and non-exempt projects
 - Addition of a Minimum Requirement for underground utility projects
 - Lower threshold for MR6
 - Additional project cost
- Recommendations
 - Discuss/investigate applicability of new requirements
 - Timeline
 - Project type, area tallies, etc.
 - Consider new thresholds in planning efforts
 - Especially important for road-related projects
 - Include in considerations in CIP budgets
 - Regional Facilities
 - Consider these changes in planning for regional facilities



Significant Changes

- MR8 – Wetland Hydroperiod Changes
- BMP T7.30 Bioretention
- Climate Change Guidance
- Nutrients
- Toxic Organics
- Source Control BMPs – PCB Edits
- UIC Wells

MR8- Wetland Hydroperiod Changes

- Use with Method 2 (WWHM, MGSFlood)
- The new standard increases the allowable mean monthly discharge for the winter months from 15%+/- to 20%+/-
- The new standard also creates an allowable exception with an alternate calculation for Summer

*****Mean Monthly Wetland Inflow (cfs) *****
 Must be within 15% for each Month

Month	Predeveloped	Postdeveloped	Percent Difference
Winter Oct	3.107E-03	3.689E-03	18.76%
Nov	8.634E-03	8.894E-03	3.01%
Dec	9.959E-03	9.710E-03	-2.50%
Jan	9.852E-03	9.460E-03	-3.98%
Feb	9.311E-03	8.876E-03	-4.67%
Mar	7.778E-03	7.400E-03	-4.87%
Apr	5.362E-03	5.093E-03	-5.02%
May	3.019E-03	2.906E-03	-3.76%
Jun	2.072E-03	2.006E-03	-3.15%
Summer Jul	1.283E-03	1.244E-03	-3.00%
Aug	1.035E-03	1.070E-03	3.34%
Sep	1.251E-03	1.531E-03	22.37%

Annotations:

- ← Failing under 2019 std, passing in 2024 (points to Oct)
- ← Failing under 2019 std, but now have an option in 2024 (points to Sep)

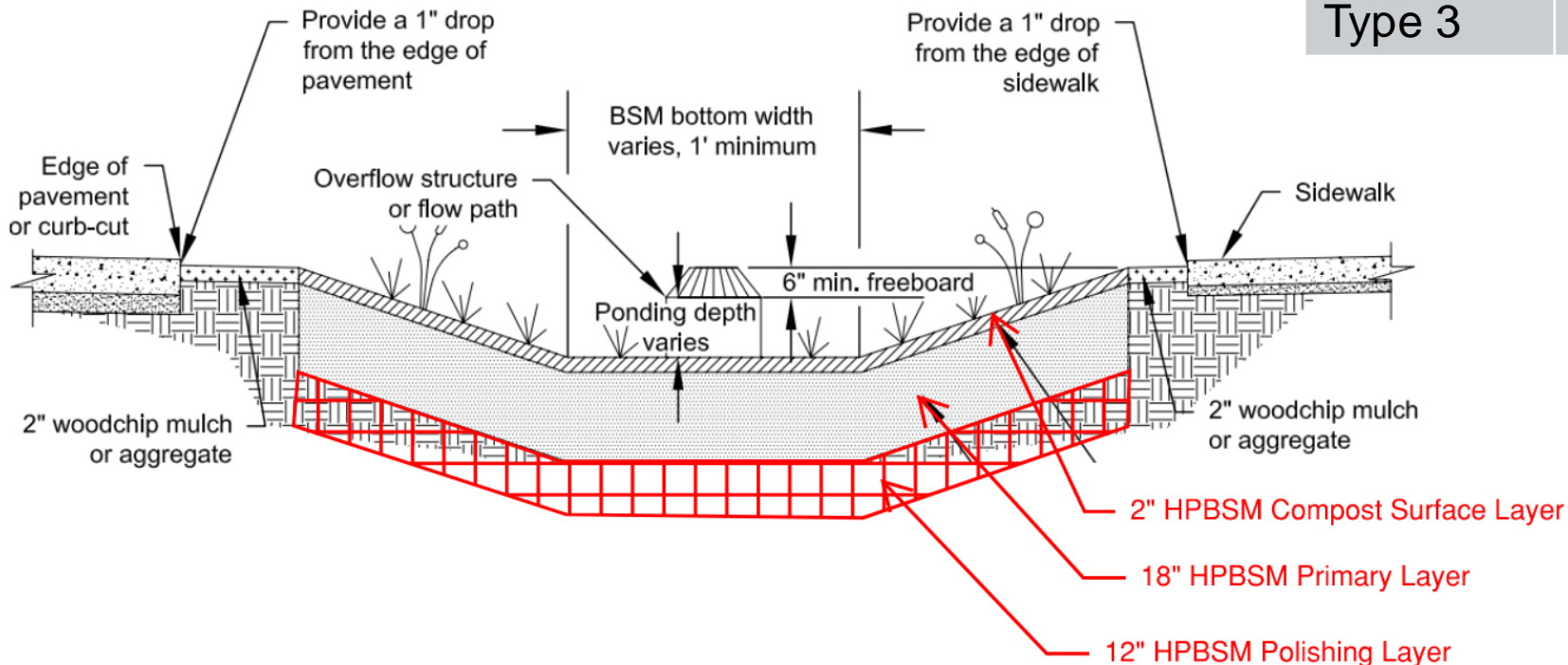
MR8- Wetland Hydroperiod Changes

- Summer Allowable Exemption Calculation:
 1. Calculate Mean Monthly Water Level Fluctuation
 - Requires contour data or wetland storage data
 2. Determine allowable Monthly WLF based on the ratio of project area to wetland basin
 3. Compare calculated WLF to allowable WLF

BMP T7.30 Bioretention

- New High Performance Bioretention Soil Media Added

HPBSM Type	Compost Layer	Primary Layer	Polishing Layer
Type 1	No	Yes	No
Type 2	No	Yes	Yes
Type 3	Yes	Yes	Yes



BMP T7.30 Bioretention

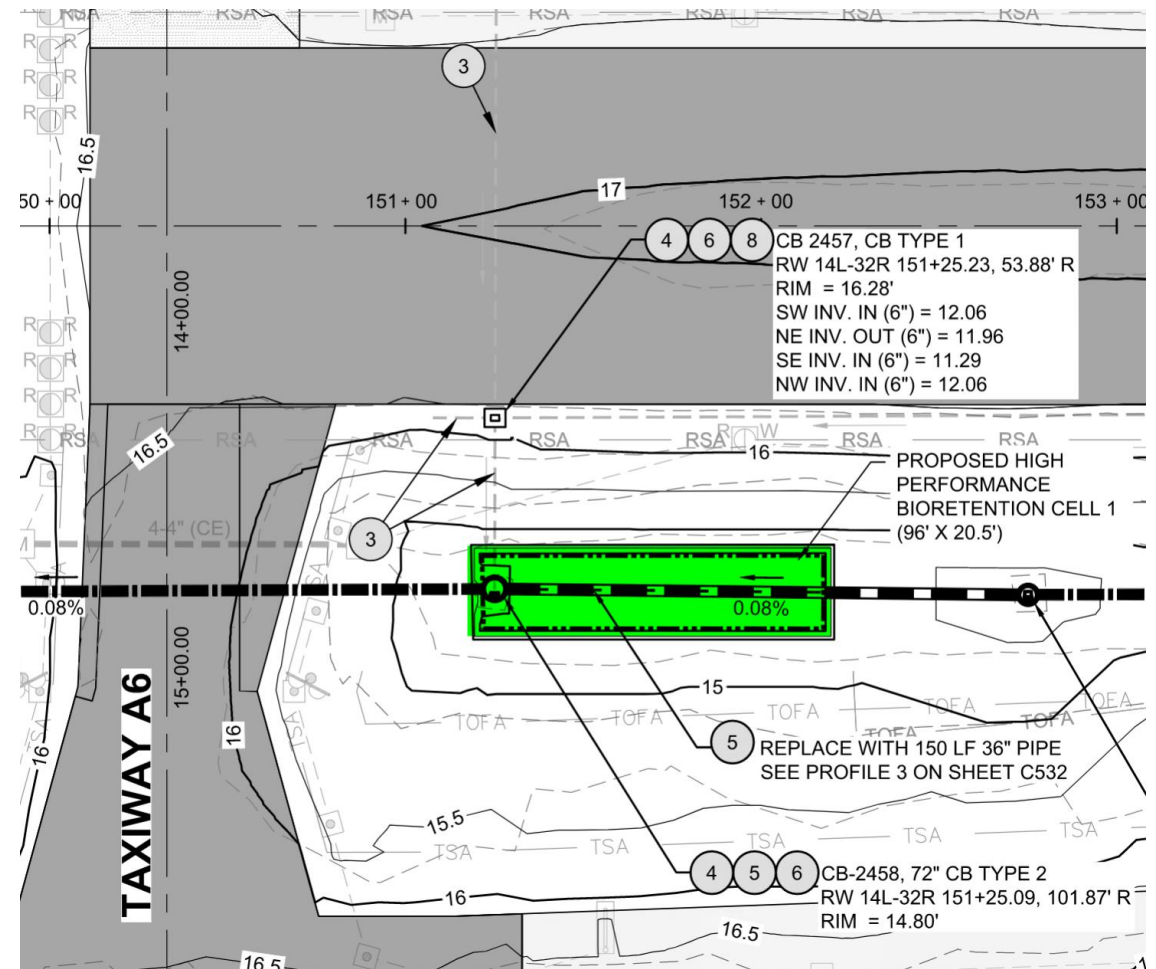
Soil Media	Basic Treatment	Metals Treatment	Phosphorus Treatment	Can be used within ¼ Mile of Phosphorus Sensitive Waters?
Standard Bioretention Mix	Yes	Yes	No	No
Custom Mix	Yes	Yes	No	No
HPBSM Type 1	Yes	Yes	No	No
HPBSM Type 2	Yes	Yes	Yes	Yes
HPBSM Type 3	Yes	Yes	Yes	Yes

New use case in 2024 Manual



BMP T7.30 Bioretention

- Application Example: King County International Airport Taxiway
 - Site requiring metals treatment under the King County Manual.
 - Few options with site conditions
 - HPBSM met the treatment requirements and could be adapted to meet FAA Safety Requirements



Climate Change Guidance

- Ecology continues to assess how to approach climate change impacts
- No new regulations
- Jurisdictions can consider increasing Flow Control BMP sizing requirements
 - Based on local precipitation models
 - Historic models with a larger storm, an upsizing factor, or upscaling design storm
 - Seattle has a 158-year Design Time Series that includes consideration of flooding

Table I-1.1: Future Hydrologic Projections

Category	Variable	Summary messages	Future projections
Precipitation	Annual precipitation	Annual changes vary by models, from drier (negative %) to wetter (positive %)	-4 to +14% ^A
	Seasonal precipitation	Decrease in summer	- 30 to -6% ^A
		Increases in winter, spring and fall	+2 to +7% ^A

Climate Change Guidance

- Recommendations include
 - Planning for extreme events
 - Apply LID in place where possible
 - Maintain natural ecosystem as much as possible
 - Site regional facilities in vulnerable areas
- Additional Recommendations
 - [Climate Impacts Group \(uw.edu\)](http://uw.edu)
 - [Stormwater Climate Resiliency – Washington Stormwater Center \(wastormwatercenter.org\)](http://wastormwatercenter.org)

Nutrients

- Additional information on sources and impacts of Nitrogen and Phosphorus on surface water were added to the manual
- Source Control BMPs Recommended:
 - [S430 BMPs for Urban Streets](#)
 - [S108 BMPs for Correcting Illicit Discharges to Storm Drains](#)
 - [S440 BMPs for Pet Waste](#)
 - [S443 BMPs for Fertilizer Application](#)
- Proper use of Construction runoff BMPs

Toxic Organics

**Rubber
Preservatives
(6PPD-q)**

**Polycyclic Aromatic
Hydrocarbons
(PAHs)**

**Polychlorinated
Biphenyls
(PCBs)**

Toxic Organics

Rubber Preservatives (6PPD-q)

- Very hot topic that the public is aware of with ongoing research
- Found in tires
- Significantly toxic to salmon
- Preliminary results of studies of HPBSMs showing positive treatment results

Toxic Organics

**Rubber
Preservatives
(6PPD-q)**

**Polycyclic Aromatic
Hydrocarbons
(PAHs)**

**Polychlorinated
Biphenyls
(PCBs)**

Toxic Organics

Polycyclic Aromatic Hydrocarbons (PAHs)

- Ubiquitous in stormwater
- Most commonly identified in sediment

Toxic Organics

**Rubber
Preservatives
(6PPD-q)**

**Polycyclic Aromatic
Hydrocarbons
(PAHs)**

**Polychlorinated
Biphenyls
(PCBs)**

Toxic Organics

Polychlorinated Biphenyls (PCBs)

- Considered a significant toxin in Puget Sound
 - Impacting Salmon and Southern Resident Killer Whales

Source Control BMPs - PCB Edits

The following Source Control BMPs have been updated to include guidance for preventing pollution from PCBs in building materials:

- [S424 BMPs for Roof / Building Drains at Manufacturing and Commercial Buildings](#)
- [S431 BMPs for Washing and Steam Cleaning Vehicles / Equipment / Building Structures](#)
- [S438 BMPs for Construction Demolition](#)
- [S451 BMPs for Building Repair, Remodeling, Painting, and Construction](#)

UIC Wells

- Guidance added for deep UIC wells in
 - Sensitive groundwater areas
 - Wellhead Protection areas
 - Allowable activities draining to UIC wells and conditions

Type of Activity Draining to the Deep UIC Well	UIC well location within 100 feet	UIC well location within 6-month time of travel
Multi-unit residential roof runoff	Prohibited	a
Commercial/Municipal roof runoff (no emissions)	Prohibited	a,b
Commercial/ Municipal roof runoff (with emissions)	Prohibited	Prohibited
Residential driveways	Prohibited	Prohibited
Vegetated areas (parks, school fields, etc.)	Prohibited	a,b,c,d

**Snip of New Table
Important to Review**

- a. Hydrogeologic Study
- b. Site-specific analysis that demonstrates the proposed discharge will comply with groundwater quality standards
- c. Stormwater Pollution Prevention Plan
- d. Integrated landscape management plan
- e. Must apply for, and be issued, a state waste discharge permit

Summary & Recommendations

• Summary

- New wetland hydroperiod standard increases the allowable mean monthly discharge for the winter months from 15%+/- to 20%+/- and creates an allowable exception for summer
- New high performance bioretention media can treat Phosphorous
- New/updated guidance for
 - Climate change
 - Sources and impacts of Nitrogen and Phosphorous
 - Toxic Organics
 - Source Control BMPs – PCBs
 - UIC Wells

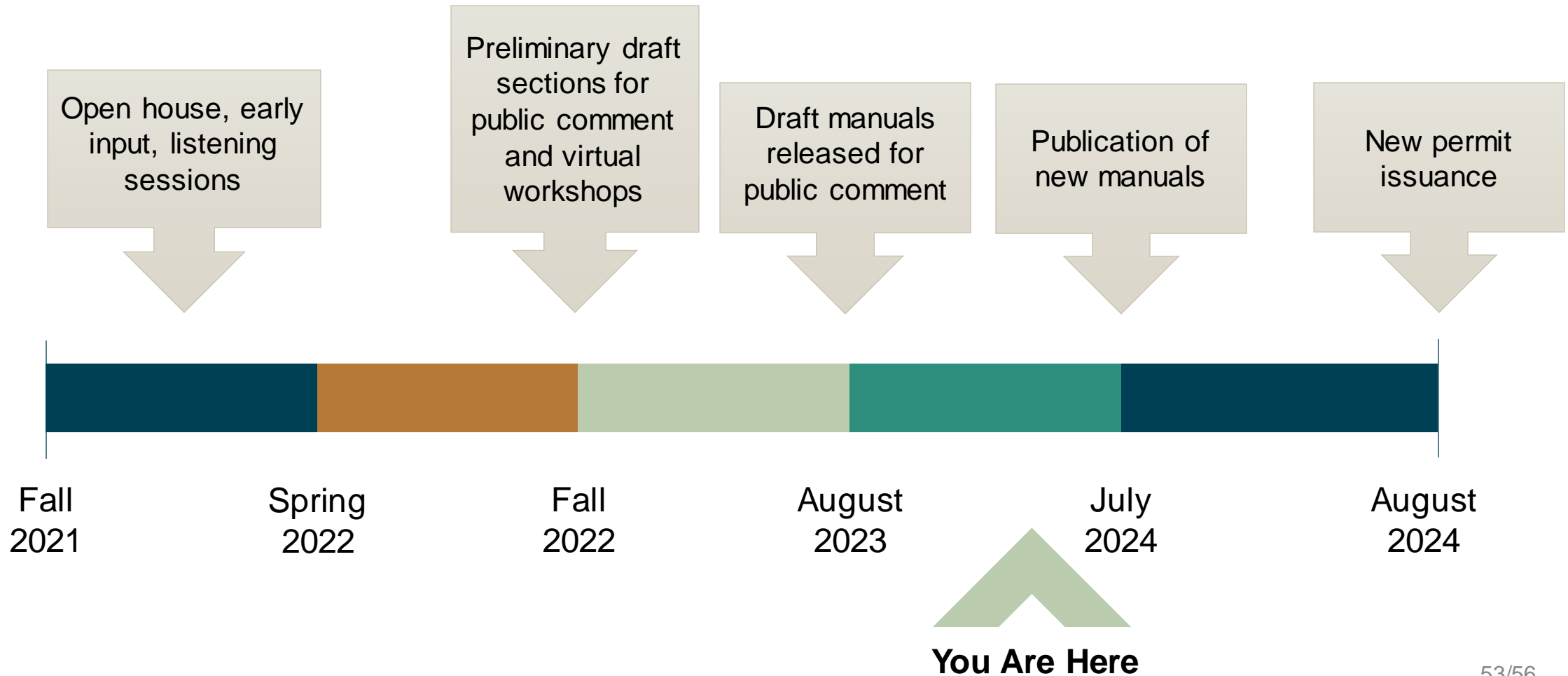
• Recommendations

- Review wetland criteria
 - Identify additional data collection that may be needed early
- Consider bioretention when identifying WQ BMPs at new locations
- Keep an eye out for requirements related to Climate Change and new toxins
 - Include these items within design considerations wherever possible



Conclusion

Conclusion



Conclusion



Stay Informed



Discuss



Plan



Apply

Conclusion



Q&A