

## **Reorganization of the 2017 Surface Water Engineering Standards**

The 2017 update to the Surface Water Engineering Standards was a major update to adopt the Ecology 2014 revision to the Stormwater Management Manual for Western Washington. This caused a major reorganization of the surface water engineering standards. The description below describes how the surface water engineering standards have been organized and changed from the 2016 standards.

Chapter 1 General Requirements (pages increased from 6 pages to 31 pages)

- Acknowledged in Section D1-01 “General” that the city has adopted the 2014 state stormwater manual.
- Added a new section D1-02 “Site Planning and Analyses” (8 pages). This information must be collected in the beginning of a project. This will be a major change in how property are developed or re-developed. The section goes over the different layers of information and provides a good example of this information in Figure 1.2
- Added a new section D1-03 “Determining Minimum Requirements” (6 pages). This section outlines six steps to follow when determining the minimum requirements.
- Added new section D1-04 “Minimum Requirements for New and Redevelopment.” This section outlines through flow charts the steps to determine the minimum requirements for new and redeveloped properties. This section covers the minimum requirements for flow control, water quality treatment and flow control, wetlands protection and operation and maintenance. (21 pages)
- Moved old Section D1-05 Definitions to Appendix D-1
- Moved old Section D1-06 References and Abbreviations to Appendix D-1
- Retained old Section D1-04 “Governmental Agency Requirements” and called it D1-05

Chapter D2 renamed this chapter “Plan and Report Submittal” (pages increased from 25 to 30 pages)

- Added new section D2-05 “Submittal Requirements” (~1.5 pages)
- Added new section D2-06 “Submittal Documents”. This section references a ‘Site Assessment and Planning Packet’ (Appendix D-2) that summarizes existing and proposed site land cover areas. This template helps demonstrate compliance with the requirement to minimize impervious area, loss of vegetation, and stormwater runoff.
- The standard notes that were in old section D2-07.2 have been reorganized and included in Appendix D-4. (~4 pages)
- Added new section D2-06.4 “Storm Drainage Report” that describes what materials are needed in a storm drainage report (5 pages)
- Added a new section D2-06.5 “Geotechnical/Hydrogeologic Report” (2 pages) This section describes what analyses are required, the geotechnical information required for

infiltration BMPs and the information required for a simplified infiltration assessment and a standard infiltration assessment.

- Added new section D2-06.6 “Other Reports” ( one paragraph)
- Updated Section D2-07.0 “As Built Documentation” to include on-site BMP information
- Made minor revisions to Section D2-08.0 “Operation and Maintenance Manual.”

Chapter D3 Hydrologic Analysis. - This chapter was updated to be in conformance with the 2014 Ecology stormwater manual.

- Retained old Sections D3-01 and old Section D3-02.
- Renamed chapter D3-03 from “Summary of Design Flow” to “Design Flows” and provided design flow guidance in separate sub-sections for Conveyance sizing, on-site stormwater management, flow control and water quality
- Renamed old section D3-04 “Minimum Impervious Areas” to “Minimum Impervious Areas For Model Input” and rewrote the text.
- Moved most of old section D3-05 “Flow Control Exemptions” to D1-04.2 (G)
- Retained old Section D3-06 “Soil Types” and added more information into Table 3.6 including USDA Texture, surficial permeability, symbol slope, category, erosion hazard and runoff rate. .

Chapter D-4 renamed this chapter “Conveyance System Analysis and Design “

This chapter is not provided in the Ecology manual and the majority of this chapter has been adapted from 2016 King County Surface Water Manual

- Retained old sections D4-01 “General”, D4-02 “Outfalls and Discharge Locations” & D4-03 “Off-site Capacity Analysis”.
- Moved old section D4-08 “Easement Requirements” to section D4-04.
- Moved old Section D4-04 “Conveyance Systems” is moved to section D4-05 and is the same content as old section D4-04 except
  - move old sections D4-06.9 “Non-Gravity Systems (pumps” to sections D4-05.11
  - Move old section D4-06.10”Non-Gravity Systems (pumps) for Properties where 100% Lot Coverage is Allowed by the City’s Land Use Code” to Section D4-05.12.
- Moved old section D4-05 “Manholes, Catchbasins and Inlets” to sections D4-06.
- Moved old section D4-06 “Flow Control” to chapter D5-04.4.
- Moved old section D4-07 “Setback Requirements” to Chapter D-5-05.3.
- Moved old section D4-08 “Easement Requirements” to section D4-04
- Moved old section D4-09 “Pipe Coverings and Encasement” to section D4-07

Chapter D-5 Stormwater BMP Design is a new chapter that addresses design of all stormwater BMPs. The chapter is organized as follows:

- Section D5-03.1 - Describes the steps required to select appropriate BMPs after the minimum requirements (MR) for On-site Stormwater Management (MR #5), Flow Control (MR #7), and/or Runoff Treatment (MR #6) have been determined using Chapter D1. This section is organized into the following sub-sections:
  - Section D5-03.1 provides information on how to determine if dispersion is a feasible stormwater management practice for the project.
  - Section D5-03.2 provides information on how to determine if infiltration is a feasible stormwater management practice for the project.
  - Section D5-03.3 discusses the process for selecting On-site Stormwater Management BMPs to satisfy MR #5. See also the LID BMP Infeasibility Criteria in Appendix D-9, which shall be evaluated and documented as part of the Site Assessment and Planning Packet submittal per Chapter D2.
  - Section D5-03.4 discusses the process for selecting Water Quality Treatment BMPs to satisfy MR #6.
  - Section D5-03.5 discusses the process for selecting Flow Control BMPs to satisfy MR #7.

Section D5-04 provides descriptions and criteria for designing BMPs to meet the On-site Stormwater Management, Water Quality Treatment, and Flow Control requirements of the project.

#### Chapter D6 Materials

- Moved old chapter D7 (Materials) in its entirety
  - Renamed old section D7-05 “Flow Control- Infiltration Systems” was renamed D6-05
  - Added one paragraph to the section.
- Added one bullet to Chapter D6-02.3 F to read “ Triple wall corrugated polypropylene is approved for use in culvert and storm drainage applications in 12 to 42-inch diameters”

#### Chapter D7 Methods of Construction

- Moved old chapter D8 “Methods of Construction” in its entirety.

#### Chapter D8 Natural Systems

- Moved old chapter D9 (Natural Systems) in its entirety.

#### APPENDICES

- Replaced old Appendix D-1 “Standard Details” with a new Appendix D-1 entitled “Definitions, References and Abbreviations”.
  - Moved “Definitions” from old section D1-02 and eliminated duplicate definitions provided in the Surface Water Code.

- Moved old section D1-03 “References” to Appendix D-1
- Replace old Appendix D-2 “Drafting Standards” with a new Appendix D-2 “Site Assessment and Planning Packet”
- Retain old Appendix D-3 “Title Block” in its entirety.
- Replace old Appendix D-4 “Surface Water Approved Material List” with a new Appendix D-4 entitled “Standard Notes”
  - Reorganize the “Storm Drainage General plan notes” from old section D2-07.2
- Moved old Appendix D-2 “Drafting Standards” to Appendix D-5
- Moved old appendix D-4 “Approved Materials List” to Appendix D-6
- Moved old appendix D-3 “Reference Standards” to Appendix D-7 -
- Moved old Appendix D-1 “Standard Details” to Appendix D-8
  - The “Standard Details have been modified to conform to the 2014 DOE manual. Refer to the “Summary of 2017 Updates for Surface Water Standard Details Appendix D-8 Document” for all of the changes.
- D-9 LID BMP Infeasibility Criteria. A new appendix summarizing the infeasibility criteria as described in the DOE manual.
- D-10 Infiltration Testing. A new appendix adapted from Seattle and Kitsap County Storm water manual.

## Summary of 2017 Update to Surface Water Engineering Standards

2016 Surface Water Engineering Standards	2017 Surface Water Engineering Standards	Revision
		Replace 2016 with 2017 in document and all details.
Section D2-07(23), D4-04.9, D8-10	Section D2-07(23), D4-04.9, D8-10	Change language - Video specifications update (too many to include in spreadsheet)
D6-02.3 (F)	D6-02.3 (F)	Triple wall corrugated polypropylene pipe is approved for use in culvert and storm drainage applications in 12 to 42-inch diameters
D8-10	D8-10	Update section to reflect modern technology and City requirements
Appendix 4 - page A(D4-3)	Appendix 4 - page A(D4-3)	Add supplier "D&L Foundry & Supply" to Manhole frames and covers and Catch basin frames and covers
2-07.1(A)	2-07.1(A)	Change language – Asbuilt standards (too many to include in spreadsheet)
N/A	Detail D-3A	Added Detail titled “Catch basin type 1-P” for use in conjunction with Detail D-42.
Detail D-4	Detail D-4	Corrected typo in Note 9
Detail D-5	Detail D-5	Modified note 4 to read, “Slab opening 24 “Diam.” Details; remove references to square openings.
Detail D-25	Detail D-25	Modified note 1 to read, “Maximum width of trench at top of pipe * 36 inch for pipe up to and including 18” nominal diameter*, and modify the trench detail to show benching on both sides trench.
Detail D-30	Detail D-30	Replace “Rip Rap” with “Quarry Spalls”, two places.
Detail D-30A	Detail D-30A	Replace “Rip Rap” with “Quarry Spalls”, two places.
Detail D-31	Detail D-31	Modify Note 12 to read, “Prior to startup detention pipe shall pass leakage test – see section D7-06.4”
Detail D-42	Detail D-42	Added to dimensions at the bottom of the drawing, replace “30” or 34” “22” X 26” outside 30” X 34”
Detail D-46	Detail D-46	<p>Change “Foundation Gravel” to “Foundation Material” on all four cross sections: under Rigid Pipe Bedding Delete ,”Or other material if Specified” from the fourth dimension note; under Flexible Pipe Bedding delete ”Or other material if Specified” from the third dimension note; Under Detention Pipes with underdrains change the first dimension note to read “Compacted Backfill (Compacted Density per Standard detail D-25”;</p> <p>Modify Note 1 to read “Maximum width of trench at top of pipe: - 36” for pipe up to and including 18 “ nominal diameter. – nominal diameter plus 18” for pipe larger than 18” nominal diameter.</p>

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		Modify note 2 to read “ Excavate unstable material down to firm soil and replace with foundation material per section 0-03.17, foundation material, class A or class B”
Detail D-47	Detail D-47	Note 3; replace “Bubber” with “Rubber”.
Detail D-59	Detail D-59	<p>Replace in details “6” Quarry Rock” with “Quarry Spalls” in two places; Replace in notes “Rip Rap” with “Quarry Spalls” in three places.</p> <p>Note 2. Replace “9-13.1” with “9-13.6”</p>
Detail NDP-1	Detail NDP-1	<p>Lower detail replace “D6-04.5” with “D6-05”. Modify Hatching in both detail to be visible.</p> <p>Note 1. Replace “Ecology” with “DOE” and Unbold all text.</p>
Detail NDP-2	Detail NDP-2	<p>Note 4.A. replace “MR-5 only” with “onsite stormwater management MR-5”, at end of sentence add “, MR-1”.</p> <p>Note 5 replace “D6-04 herein” with “D6-05”.</p> <p>Note 7 modify to read “Vegetation: A. Floor of planting island shall be herbaceous, emergent, shrubs and ground cover”, replace “Appendix 3” with “Appendix 1”, delete “or rain garden handbook for homeowners for a plant list”, replace “2005” with “2012”.</p> <p>Note 9 add space after “MR-7)”.</p> <p>Note 10 Replace “0.25” with “0.30”, Delete “NDP chapter and”.</p> <p>Delete note 6, renumber remaining accordingly including references in detail.</p> <p>Detail – Delete line showing the water surface in two places, Delete “Minimum 1’ to high groundwater table, Nov. – May” in two places.</p>
Detail NDP-3	Detail NDP-3	<p>Note 1B; delete “see chapter D6-05 for materials.”</p> <p>Note 2B; delete “, 4” min. for simplified” 2C delete “, see D6-04 materials”</p>

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		<p>Note 3; Modify to read “Liner may be added in field as directed by the engineer per Volume V Chapter 4.4 of the DOE manual.”</p> <p>Note 4A; delete “NPD materials,” replace “4” with “5”. Delete 4B, and renumber 4C to become 4B, and delete “of engineered.”</p> <p>Note 6; delete “NPD materials,” replace “4” with 5”</p> <p>Detail; remove lines showing water table, two places, remove text “minimum 1’ depth to high groundwater table, Nov. – May” two places.</p> <p>Modify detail so notes are in one continuous list.</p>
Detail NDP-4	Detail NDP-4	<p>Change the detail title to “Bioretention Planter- with Underdrain”</p> <p>Note 1B, delete “simplified: 4” Engineered”;</p> <p>Note 2C; delete from “See D6-04 materials”;</p> <p>Note 4A; modify to read “Size per chapter D1-05”; Delete old note 4B and rename old note 4C to 4B and modify it to read Depth 12”-48”;</p> <p>Note 6; modify to read “ Growing medium: Bioretention soil mix per chapter D6-05.”;</p> <p>Note 7A; modify to read “Plant with zone 1 or 2 herbaceous, emergent, shrubs or ground cover.”, replace “”appendix 3” with “appendix 1”, replace “2005” with “2012”, delete “or “raingarden handbook for homeowners”.</p> <p>In detail mask partially hidden text “retention zone”, on left hand side replace “2” – 4”” with “2””, delete “(see note 1B)”</p>
Detail NDP-4A	Detail NDP -4A	<p>Note 2B, delete, “simplified: 4” Engineered.””</p> <p>Note 3B, replace “2”” with “4”, delete “, 4” min. for simplified”; Note 3C delete “see D6-04 materials”</p> <p>Note 5A; delete “NDP materials.”, replace “04” with “05”.</p>

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		<p>Delete note 5 B” and renumber notes 5C and D, Note 5B, delete “of engineered.”</p> <p>Note7; delete “NDP materials,”, replace “04” with “05”.</p> <p>Note 8A; modify to read “Plant with zone 1 or 2 herbaceous, emergent, shrubs or ground cover.”, replace “”appendix 3” with “appendix 1”, replace “2005” with “2012”, delete “or “raingarden handhook for homeowners”.</p> <p>Note 11; replace “D4-07” with “D4-05”.</p> <p>Mask text in detail “”retention zone”</p>
Detail NDP-5	Detail NDP-5	<p>Change detail title to “Bioretention Planter – Underdrain Overflow Connected to Storm System</p> <p>Note 1B, delete, “simplified: 4” Engineered:””</p> <p>Note 2B, delete “simplified: 4” Engineered:””</p> <p>Note 4A; replace “NPD materials, chapter D6-04” with “Engineered plans”. Delete 4B, and renumber 4C to become 4B, and delete “of engineered.”</p> <p>Note 6; delete “NDP materials.”, replace “04” with “05”. modify to read “Plant with zone 1 or 2 herbaceous, emergent, shrubs or ground cover.”, replace “”appendix 3” with “appendix 1”, replace “2005” with “2012”, delete “or “raingarden handhook for homeowners”.</p> <p>Modify the overflow plumbing in detail to be similar to NDP-4.</p>
Detail NDP-6	Detail NDP-6	Remove from the cross section the dimensions “6”-12”” and replace with “Ponding Zone Depth Varies”
Detail NDP-7	Detail NDP-7	Remove from the cross section the dimensions “6”-12”” and replace with “Ponding Zone Depth Varies”; change the leader note to read Atrium grate (See Chapter D6)
Detail NDP-8	Detail NDP-8	<p>Note 1. Delete “or meets flow controls standard”.</p> <p>Cross section labeled “infiltration”, replace “0.25” and with “0.30”;</p> <p>Cross section labeled “Partial Infiltration or Flow Through” relabel to “ Bioretention with underdrain” and modify the</p>

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		text below the subtitle “0.25 inch/hr.” to “0.30 inch/hr.” and add to the end of sentence “or per engineers design”.
Detail NDP-9	Detail NDP-9	<p>Modify detail A; modify “Ponding zone” to, “Ponding zone Depth Varies”; replace “Detention filter layer” with “Bioretention soil mix layer, depth varies”; below text “(optional) add “depth varies”; delete vertical dimensions and dimension arrows from left side of detail; move notes “detail A notes” move under detail “A”.</p> <p>Cross section labeled “Offset observation port”; replace “rain garden” with “bioretention”, and move label under detail.</p> <p>Modify masking so text is clear in 2 places.</p>
Detail NDP-10	Detail NDP-10	Replace the label in the two leader lines under section B-B “Rain Garden” with ”Bioretention”.
Detail NDP-11	Detail NDP-11	<p>Change detail title to “Porous Asphalt or Pervious Concrete Pavement Section”;</p> <p>Modify note 1 to read “Permeable pavement within the city right-of-way requires approval by the city when placed beneath a traveled way. These guidelines provide minimum material depths. The structural capacity of pavement sections when subject to vehicular loads depends on several factors and must be designed by a licensed professional engineer.;</p> <p>Notes 2 and 6; replace “Pervious asphalt” with “Porous asphalt”.</p> <p>Note 7 replace “NDP Chapter D6-04” with “ Chapter D-06.5”</p> <p>Top right of detail next to leader, Replace “pervious” with “Porous”, after “asphalt or” add “Permeable”.</p>
Detail NDP-12	Detail NDP-12	<p>Change detail title to “Permeable Paver Systems”.</p> <p>Modify the subtitle to the top cross section to “Concrete Block or paver Systems”.</p> <p>Note 4 replace “2005” with “2012”.</p> <p>Note 5 replace “NDP Chapter D6-04” with “Chapter D-06.5”.</p>

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		Note 6 after the last sentence add, “Follow manufacturers specifications.”
Detail NDP-13	Detail NDP-13	<p>Change detail title to “Permeable Pavement Sidewalk in Planting Strip”.</p> <p>Note 1 replace “Pervious” with “permeable”</p> <p>Add Note 2 “Root barrier as necessary as directed by the Engineer.”</p> <p>In three places on the detail with leader, replace “pervious” with “permeable”.</p>
Detail NDP-14	Detail NDP-14	<p>Change detail title to “Permeable Pavement Sidewalk”.</p> <p>In the two subtitles, replace “Pervious” with “Permeable”.</p> <p>Add new note 4, “Root Barrier as necessary as determined by the engineer.”</p> <p>In two locations in the details for leader line notes replace “chapter D6-04” with “chapter D6-05”</p>
Detail; NDP-15	Detail NDP-15	<p>Change detail title to “Check dam and interceptor for permeable pavement on slopes”</p> <p>Detail, replace in four locations “pervious” with “permeable”.</p>
Detail NDP-16	Detail NDP-16	<p>Change detail title to “Observation Port for permeable pavement”</p> <p>Delete all notes and heading “notes:”</p> <p>In one place detail replace “pervious” with “permeable”; delete “4” CSTC” and associated dimension arrows; remove text and leader line with text “4” crushed surface... detail TE-11”; revise the leader line note pointing to the reservoir course to read “See NPD materials D6-05”.</p>
Detail NDP-17	Detail NDP-17	Change detail title to “Observation port covers for permeable pavement”.
Detail NPD-18	Detail NPD-18	Note 2., delete “herein”, replace “D6-04” with “D6-05”
Detail NPD-19	Detail NPD-19	Note 2., delete “herein”, replace “D6-04” with “D6-05”
Detail NPD-20	Detail NPD-20	Note 3., delete “herein”, replace “D6-04” with “D6-05”
Detail NDP-22	Detail NDP-22	Note 1., replace “30” with 10’.

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Detail NDP-25	Detail NDP-25	<p>Detail subtitle “Plan View” list of changes from left to right; change outfall detail, add “(note 4)” under “10’ min”, Replace “connection” with “outfall”, replace “solid wall 4” PVC pipe” with “solid wall 4” PVC pipe (SDR 35)”, under catch basin add arrow pointing left and wording “UB permit inspection” under arrow, replace “roof” with “see note 5”.</p> <p>Detail subtitle “profile view” list of changes from left to right; add dimension, text, and leaders “10’ min. (note 4)”, delete text “6” min.”, associated dimension arrow, upward slope ground surface, delete “top of drain pipe joint 1’ above ground elevation” and leader, replace “bend if needed” with “4” PVC (SDR 35)”, replace “5’ min (varies per setback requirements)”, with “10’ min., add dimension and leaders to downspout tie-in to CB “3”min”, delete dimension below roof downspout and leaders “1””, replace text “type 1 catch basin in roadway or residential yard drain per standard detail NPD-24 in yards” with text “type 1 catch basin in roadway or residential yard drain”.</p> <p>Detail subtitle “Section A-A” list of changes from left to right, under “filter fabric” add text “ (3 sides)”, change ground from upsloping to level on each side of detail, show fabric on top and both sides of trench.</p> <p>Add note 4., “dimension varies per setback requirements”</p> <p>Add note 5., “maximum 5,000 sf roof area per 10’ of perforated pipe”</p>