



**Maryland**  
Department of  
the Environment

Wes Moore, Governor  
Aruna Miller, Lt. Governor

Serena McIlwain, Secretary  
Suzanne E. Dorsey, Deputy Secretary

**Alternative/Innovative Technology List of Approved Stormwater Practices (As of May 2024)**

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
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**Environmental Site Design (ESD) - Alternative Surfaces<sup>2</sup>**

Aqua Bric/Bio-Pave	Interlocking Paving System	Filtterra Bioretention Systems	E	APRP	3 /19/2013
AquaLok Panels	Green Roof/ Rainwater Harvesting	FGP Enterprises, LLC	E	AGRE, MRWH	6 /20/2012
Belgard Permeable Pavers	Permeable Paver	Oldcastle Architectural	E	APRP	2 /15/2019
Carlisle Traditional Garden Roof System	Green Roof	Carlisle Syntec Systems	E	AGRE	5 /4 /2020
Clay Brick Pavers	Permeable Pavement	The Brick Industry	E	APRP	8 /12/2013
Columbia Green Technologies Green Roof Systems	Green Roof System	Columbia Green Roof Technologies	E	AGRE	9 /2 /2016
COREgravel	Reinforced Turf	Core Systems	E	ARTF	3 /12/2013

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
EcoCline Living Roof System	Green Roof	Furbish Company	E	AGRE, AGRI	2 /25/2013
Eco-Roof	Green Roof System	Eco-Roofs, LLC	E	AGRE	4 /18/2014
EZ Roll Grass and Gravel Pavers	Reinforced Turf	NDS, Inc.	E	ARTF	3 /12/2013
Grasscrete	Reinforced Turf	Storm-Services, LLC	E	ARTF	12/3 /2012
Green Roof Outfitters Modular Roof System	Modular Green Roof	Green Roof Outfitters, LLC	E	AGRE	11/20/2014
GRO 2+1	Green Roof	Green Roof Outfitters	E	AGRE	1 /6 /2021
GRO Classic	Green Roof	Green Roof Outfitters	E	AGRE, AGRI	1 /6 /2021
GRO FeatherWeight	Green Roof	Green Roof Outfitters	E	AGRE	1 /6 /2021
GRO Waterhog	Green Roof	Green Roof Outfitters	E	AGRE	1 /6 /2021
GRO Waterhog XL	Green Roof	Green Roof Outfitters	E	AGRE	1 /6 /2021
Henry Green Roof Products	Green Roof System	Henry Company	E	AGRE	2 /5 /2016

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Hydropack Green Roof System	Green Roof	Vegetal i.D. Inc.	E	AGRE	9 /10/2015
Hydrotech Green Roofing System	Green Roof System	American Hydrotech, LLC	E	AGRE	1 /9 /2015
KBI FlexiPave	Permeable Pavement	K.B. Industries	E	APRP	5 /17/2017
LiveRoof Hybrid Green Roof System	Green Roof	LiveRoof Global, LLC	E	AGRE	2 /28/2017
MP Eco-Grid	Reinforced Turf System	USA EcoSystems	E	ARTF	1 /22/2015
Nicolock Pavers	Permeable Paver	Nicolock Paving Stones	E	APRP	8 /3 /2012
No Fault/Smarte Surface	Permeable Surfaces	Human & Rohde	E	APRP, ARTF	6 /1 /2007
Omni Ecosystems Comprehensive Green Roof	Green Roof	Omni Ecosystems	E	AGRE	4 /4 /2018
PaveDrain	Permeable Pavement	Ernest Maier, Inc.	E	APRP	3 /29/2012
PaverGuide	Base/Storage Reservoir for Permeable Pavers	PaverGuide, Inc.	E	APRP	8 /29/2016
Power Block	Permeable Paving Block	ACF Environmental	E	APRP	4 /4 /2018

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
StormCap™	Green Roof	Flex Membrane International /Stormwater Capture Co.	E	AGRE	7 /21/2017
Stormcrete	Permeable Pavement	Porous Technologies, LLC	E	AGRE	12/9 /2014
Unilock Permeable Interlocking Concrete Paver (PICP)	Permeable Interlocking Concrete Paver	Unilock	E	APRP	7 /14/2020
Unilock Permeable Pavers	Permeable Paving Blocks	Unilock	E	APRP	9 /27/2019
Vista 4" Module	Green Roof	Green Roof Outfitters	E	AGRE	4 /19/2022
Vista 4" Lite Module	Green Roof	Green Roof Outfitters	E	AGRE	4 /19/2022
Vista 6" Module	Green Roof	Green Roof Outfitters	E	AGRE	4 /19/2022
Vista 8" Module	Green Roof	Green Roof Outfitters	E	AGRE	4 /19/2022
VR Max Vegetated Roof System	Green Roof	Tremco Incorporated	E	AGRE	11/4 /2016

### Environmental Site Design (ESD) - Micro-Scale Practices<sup>2</sup>

AquaLok GLU	Rainwater Harvesting	FGP Enterprises, LLC	E	MRWH	1 /7 /2014
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Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
ArborFlow™ Bioretention Treepit System	Bioretention Treepit System	GreenBlue Urban	E	MMBR, FBIO	12/17/2019
Bio-Pod	Permeable Pavement/Vault System	Rotondo Env. Solutions, LLC, Oldcastle	E	MMBR, FBIO	12/7 /2018
Filterra Plus	Enhanced Fast Flow (Bioretention) filter	Contech Engineered Solutions	E	MMBR, FBIO	6 /3 /2020
FocalPoint Bioretention Systems	Bioretention	ACF-Convergent Alliance	E	MMBR, FBIO	9 /8 /2016
Modular Wetland System - Linear	Bioretention/Micro-Bioretention/Submerged Gravel Wetland	Modular Wetland Systems, Inc.	E	MMBR, MSWG, FBIO	9 /8 /2015
Rotondo StormGarden Filter	Bioretention System	Rotondo Env. Solutions, LLC	E	MMBR, FBIO	9 /18/2020
Silva Cell Pavement System	Bioretention/Pavement System	DeepRoot Green Infrastructure LLC	E	MMBR, FBIO	6 /16/2017
StormTreat System	Submerged Gravel Wetland & Bioretention/Filter	StormTreat Systems, Inc.	E	MSGW, MMBR, FBIO	5 /15/2017

### Erosion & Sediment Control Practices<sup>3</sup>

SiltShield Sediment & Erosion Control BMP	Silt Fence Substitute	SiltShield, LLC	T	ESSF	5 /6 /2020
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Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
SMARTfence42	Silt Fence Substitute	Friendly Environmental	T	ESSS	10/7 /2019

#### ESD Components (Water Quality)<sup>4</sup>

EcoPure BioFilter	Bioretention System	Advanced Drainage Systems, Inc.	E	MMBR, FBIO	2 /22/2023
Filtrerra Bioretention System	Bioretention	Filtrerra Bioretention Systems	E	MMBR, FBIO	2 /22/2013

#### Pretreatment Practices<sup>5</sup>

ACF Trash Guard Plus	Trash and Debris Screen	ACF Environmental	X	XOTH	9 /25/2017
ADS/Hancor WQU	Hydrodynamic Device	ADS Hancor	X	XOGS	3 /25/2008
Aqua Swirl	Hydrodynamic Device	AquaShield, Inc.	X	XOGS	5 /5 /2006
BaySaver	Hydrodynamic Device	BaySaver, Inc.	X	XOGS	6 /11/2002
BaySaver Barracuda	Hydrodynamic Device	BaySaver Technologies, Inc.	X	XOGS	2 /27/2018
BaySeparator	Hydrodynamic Device	BaySaver Technologies, Inc.	X	XOGS	8 /10/2011
Cascade Separator	Hydrodynamic Device	Contech Engineered Solutions, LLC	X	XOGS	12/17/2021

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
CDS Oil / Grit Separator	Hydrodynamic Device	CDS Technologies, Inc	X	XOGS	8 /15/2003
Contech Stormceptor	Hydrodynamic Device	Contech Engineered Solutions, LLC	X	XOGS	9 /13/2021
CrystalClean Separator	Hydrodynamic Device	CrystalStream Technologies	X	XOGS	5 /30/2013
Downstream Defender	Hydrodynamic Device	Hydro International	X	XOGS	5 /4 /2004
FirstDefense	Hydrodynamic Device	Hydro International	X	XOGS	11/30/2004
FlexStorm	Catch Basin Insert	Nyloplast	X	XOGS, CBC	5 /17/2011
Flo-Gard	Inlet Filter	Oldcastle Precast	X	XOTH	8 /19/2010
FloGard Dual Vortex Separator (DVS)	Hydrodynamic Device	Oldcastle Precast	X	XOGS	3 /25/2008
Flo-Guard Plus	Catch Basin Insert	Oldcastle	X	XOGS, CBC	3 /27/2007
PRETX Pretreatment Inlets	Hydrodynamic Device	Convergent Water Technologies	X	XOGS	2 /2 /2022
SAFL Baffle	OGS/Filter System	Upstream Technologies	X	XOGS	3 /12/2013

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
StormBasin	OGS/Filter	Fabco Industries, Inc.	X	XOGS	2 /13/2012
Stormceptor	Hydrodynamic Device	Imbrium Systems Corporation	X	XOGS	4 /16/2001
StormPro	Hydrodynamic Device	Environment 21, LLC	X	XOGS	2 /7 /2017
Storm-Pure	Catch Basin Insert	Nyloplast	X	XOGS, CBC	11/20/2006
StormSack	Catch Basin Insert	Fabco Industries, Inc.	X	XOGS, CBC	2 /13/2012
StormSafe	Vault/Filter System	Fabco Industries, Inc.	X	XOGS	2 /13/2012
StormTank StormShield	Vault/Filter System	Brentwood Industries, Inc.	X	XOGS	3 /5 /2014
Suntree Nutrient Separating Baffle Box	Hydrodynamic Device	Suntree Technologies	X	XOGS	9 /8 /2016
Terre Kleen	Hydrodynamic Device	Terre Hill Concrete Products	X	XOGS	3 /28/2005
Ultra-Urban Filter	Catch Basin Insert	Abtech Industries	X	XOGS, CBC	2 /15/2005
Up-Flo Filter	Catch Basin Insert	Hydro International	X	XOGS, CBC	2 /6 /2007



Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
V2B1 Hydrodynamic Separator	Hydrodynamic Device	Environment 21	X	XOGS	10/6 /2010
Vortechs & Vort Sentry	Hydrodynamic Device	Vortechnics, Inc.	X	XOGS	6 /1 /2004
Vortfilter	Cartridge Filter	Vortechnics, Inc.	X	XOGS	1 /6 /2005

### Redevelopment & MS4 Retrofit Practices<sup>6</sup>

Aqua-Ponic Stormwater Biofiltration System	Fast Flow Filter/Hydroponic Biofilter	AquaShield, Inc.	S	FBIO, XOTH	7 /11/2022
BeeMats Floating Treatment Wetlands	Floating Treatment Wetland	Steve Beeman	A	XFTW	11/15/2019
Floating Treatment Wetlands	Modular Wetland	BlueWing Env. Solutions	A	XFTW	3 /8 /2012
Kraken Membrane Filtration System (Kraken Filter)	Membrane (Structural) Filter	Bio Clean Environmental Services	X	FSND	4 /11/2018
Wetland Mod	Multi-Cell OGS/Bioretention Alternative	Contech Engineered Solutions	X	FBIO, XOGS, XOTH	2 /6 /2024

### Structural Practices<sup>7</sup>

Aqua Filter	Cartridge Filter	AquaShield, Inc.	S	FUND	6 /23/2003
BayFilter	Cartridge Filter	BaySaver Technologies, Inc.	S	FUND	10/12/2006

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
CDS Media Filtration System	Cartridge Filter	CDS Technologies, Inc	S	FUND	12/30/2004
Jellyfish Filter	Cartridge Filter	Imbrium Systems Corporation	S	FUND	3 /12/2012
MagnaPod Sand Filter System (w/infiltration)	Underground Sand Filter System	Rotondo Environmental Solutions	S	FSND, FUND	12/22/2020
PerkFilter	Cartridge Filter	Oldcastle Precast	S	FUND	9 /16/2015
Sorbitive Filter	Filter	Imbrium Systems Corporation	S	ND, FUND, FP	9 /11/2009
Stormfilter	Cartridge Filter	Stormwater Management, Inc.	S	FUND	4 /11/2005
UrbanGreen	Filter	Contech Construction Products, Inc.	S	FBIO	6 /3 /2009

### System Components<sup>8</sup>

American Wick Drain	Underdrain Alternative	American Wick Drain	C	XOTH	4 /6 /2015
Blu-X	CMAC System	EmNet	C	XOTH	3 /18/2019
EverGuard & EverGuard Extreme TPO	Green Roof Liners (TPO)	GAF	C	AGRE, AGRI	1 /29/2018

Practice Name	Practice Type	Manufacturer	BMP Category	BMP Code <sup>1</sup>	Approval Date
HydroBlox	Drainage/Conveyance Alternative	HydroBlox Technologies, Inc.	C	XOTH	5 /31/2016
Opti RTC Continuous Monitoring and Adaptive Control (CMAC)	CMAC System	OptiRTC, Inc.	C	XOTH	1 /27/2016
PhosphoSorb Media	Filtering Media	ConTech Construction	C	FUND	11/18/2011
Smart Stormwater Management (aka, SmartSWM)	CMAC System	Century Engineering	C	XOTH	9 /13/2018
smartPOND (CMAC)	CMAC System	ACF Environmental-Convergent Alliance	C	XOTH	12/4 /2019
Sorbitive Media	Filtering Media	Imbrium Systems Corporation	C	ND, FPER, FO	10/21/2009
StormKeeper Chamber and Sediment Strip	Storage Tank w/Filter	Lane Enterprises, LLC	C	XFLD	4 /19/2022
StormTank	Storage Tank	Brentwood Industries	C	XFLD	11/6 /2008
StormTech Isolator	Storage Tank	StormTech, LLC	C	XFLD	11/7 /2007

Please contact each vendor/manufacturer for approval letters and more specific product information for each of the above-listed practices. Any formal request to MDE concerning an alternative/innovative technology should be submitted to MDE's Sediment, Stormwater, and Dam Safety Program, 1800 Washington Boulevard, Baltimore, MD 21230. If there are any questions concerning these practices, please contact the Maryland Department of the Environment, Water Management Administration at 410-537-3543 or at [www.mde.maryland.gov](http://www.mde.maryland.gov).



# Maryland

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### NOTES:

- 1. Code used to identify best management practice (BMP) type in the Department's MS4 Geodatabase (see below).**
- 2. Environmental Site Design (ESD) Practices:** In Maryland, ESD must be used to the maximum extent practicable (MEP) to reduce runoff and mimic natural hydrology in both new development and redevelopment applications. The use of ESD planning techniques and practices must be exhausted before any approved structural practices may be used. Practices that are designed and constructed to the methods and specifications found in Chapter 5 of the Maryland Stormwater Design Manual, Volumes I and II (the Manual, MDE, 2000 & 2009) may be considered as ESD. Practices that deviate from these methods and specifications may be classified as ESD if they mimic natural conditions and meet the General Performance Standards listed in Chapter 1 of the Manual.
- 3. Erosion and Sediment Control Practices:** These are temporary practices that are used to prevent erosion and control sediment during construction.
- 4. ESD Components (Water Quality):** These stormwater treatment practices may be used in new development, redevelopment or retrofitting applications only as part of a system of practices that meet the ESD to MEP mandate. These practices generally provide water quality treatment while allowing water to pass through at a high rate. As a result, they do not provide channel protection, and thus they may not be used as standalone ESD practices.
- 5. Pretreatment Practices:** In new development and redevelopment applications in Maryland, pretreatment practices may be used for pretreating runoff prior to a system of acceptable ESD and/or structural (see Ch. 5 and 3 of the Manual, respectively) water quality practices. Additionally, these practices may be used as alternative measures in redevelopment applications if the local approval authority determines that impervious area reduction and ESD have been implemented to the MEP. Finally, these practices may be used to prevent trash and litter from entering existing storm drain systems to meet local restoration and water quality initiatives if accepted locally.
- 6. Redevelopment and MS4 Retrofit Practices:** These stormwater treatment practices may not be used in new development applications, but may be used in redevelopment applications or to address total maximum daily loads (TMDLs) and restoration requirements found in local National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permits. These practices must conform to the guidance, design criteria, and methods described in the Department's *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated Guidance for National Pollutant Discharge Elimination System Stormwater Permits (2021)*.
- 7. Structural Practices:** Stormwater treatment practices that are not considered as ESD may be used to treat stormwater runoff from new development and redevelopment applications after all reasonable efforts to use ESD have been exhausted. These practices must either be designed and constructed to the methods and specifications found in Chapter 3 of the Manual or meet the General Performance Standards listed in Chapter 1 of the Manual.
- 8. System Components:** These are practices that do not provide water quality treatment.



**BMP Code Key**

<b>BMP CODE</b>	<b>BMP TYPE</b>
Alternative Surfaces (A)	
AGRE	Green Roof – Extensive
AGRI	Green Roof – Intensive
APRP	Permeable Pavements
ARTF	Reinforced Turf
Nonstructural Techniques (N)	
NDRR	Disconnection of Rooftop Runoff
NDNR	Disconnection of Non-Rooftop Runoff
NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)	
MRWH	Rainwater Harvesting
MSGW	Submerged Gravel Wetlands
MILS	Landscape Infiltration
MIBR	Infiltration Berms
MIDW	Dry Wells
MMBR	Micro-Bioretention
MRNG	Rain Gardens
MSWG	Grass Swale
MSWW	Wet Swale
MSWB	Bio-Swale
MENF	Enhanced Filters

<b>BMP TYPE CODE</b>	<b>BMP TYPE</b>
Ponds (P)	
PWED	Extended Detention Structure, Wet
PWET	Retention Pond (Wet Pond)
PMPS	Multiple Pond System
PPKT	Pocket Pond
PMED	Micropool Extended Detention Pond
Wetlands (W)	
WSHW	Shallow Marsh
WEDW	ED – Wetland
WPWS	Wet Pond – Wetland
WPKT	Pocket Wetland
Infiltration (I)	
IBAS	Infiltration Basin
ITRN	Infiltration Trench
Filtering Systems (F)	
FBIO	Bioretention
FSND	Sand Filter
FUND	Underground Filter
FPER	Perimeter (Sand) Filter
FORG	Organic Filter (Peat Filter)
FBIO	Bioretention
Open Channels (O)	
ODSW	Dry Swale
OWSW	Wet Swale

BMP TYPE CODE	BMP TYPE
Other Practices (X)	
XDPD	Detention Structure (Dry Pond)
XDED	Extended Detention Structure, Dry
XFLD	Flood Management Area
XFTW	Floating Treatment Wetland
XOGS	Oil Grit Separator
XOTH	Other
Erosion and Sediment Control Practices	
ESSF	Silt Fence
ESSS	Super Silt Fence