

**Table 2.1.3-1 Structural Control Screening Matrix**

Category	STORMWATER TREATMENT SUITABILITY					WATER QUALITY PERFORMANCE				SITE APPLICABILITY				IMPLEMENTATION CONSIDERATIONS							
	On-Site Stormwater Controls	Water Quality Protection	Streambank Protection	On-Site Flood Control	Downstream Flood Control	TSS/ Sediment Removal Rate	Nutrient Removal Rate (TP/TN)	Bacteria Removal Rate	Hotspot Application	Drainage Area (acres)	Space Req'd (% of tributary imp. Area)	Site Slope	Minimum Head Required	Depth to Water Table	Residential Subdivision Use	High Density/Ultra Urban	Capital Cost	Maintenance Burden			
<b>Bioretention Areas</b>	Bioretention Areas	P	S	S	-	80%	60%/50%	-	☑	5 max***	5%	6% max	5 ft	2 feet	☑	☑	Moderate	Moderate			
<b>Channels</b>	Enhanced Swales	P	S	S	S	80%	25%/40%	-	☑	5 max	10-20%	4% max	1 ft	below WT	☑		High	Low			
	Channels, Grass	S	S	P	S	50%	25%/20%	-		5 max						☑		High	Low		
	Channels, Open	-	-	P	S	-	-	-			5 max	10-20%	4% max			☑		Low	Low		
<b>Chemical Treatment</b>	Alum Treatment System	P	-	-	-	80%	80%/60%	90%		25 min	None				☑	☑	High	High			
<b>Conveyance Components</b>	Culverts	-	-	P	S	-	-	-							☑	☑	Low	Low			
	Energy Dissipation	-	P	S	S	-	-	-							☑	☑	Low	Low			
	Inlets/Street Gutters	-	-	P	-	-	-	-							☑	☑	Low	Low			
	Pipe Systems	-	P	P	P	-	-	-							☑	☑	Low	Low			
<b>Detention</b>	Detention, Dry	S	P	P	P	65%	50%/30%	70%	☑		2 - 3%	15% across pond	6 to 8 ft	2 feet	☑		Low	Moderate to High			
	Detention, Extended Dry	S	P	P	P	65%	50%/30%	70%	☑		2 - 3%	15% across pond	6 to 8 ft	2 feet	☑		Low	Moderate to High			
	Detention, Multipurpose Areas	-	P	P	P	-	-	-				160 max			☑	☑	Low	Low			
	Detention, Underground	-	P	P	P	-	-	-				160 max				☑	High	Moderate			
<b>Filtration</b>	Filter Strips	S	-	-	-	50%	20%/20%	-		2 max***	20-25%				☑	☑	Low	Moderate			
	Organic Filters	P	-	-	-	80%	60%/40%	50%		10 max***	2-3%					☑	High	High			
	Planter Boxes	P	-	-	-	80%	60%/50%	-			6%					☑	Low	Moderate			
	Sand Filters, Surface/ Perimeter	P	S	-	-	80%	50%/25%	40%	☑	10 max***/ 2 max****	2-3%	6% max	5 ft/ 2 to 3 ft	2 feet		☑	High	High			
	Sand Filters, Underground	S	-	-	-	80%	50%/25%	40%	☑	5 max	None					☑	High	High			
<b>Hydrodynamic Devices</b>	Gravity (Oil-Grit) Separator	S	-	-	-	40%	5%/5%	-		1 max***	None					☑	High	High			
<b>Infiltration</b>	Downspout Drywell	P	-	-	-	80%	60%/60%	90%							☑	☑	Low	Moderate			
	Infiltration Trenches	P	S	-	-	80%	60%/60%	90%		5 max	2-3%	6% max	1 ft	4 feet	☑	☑	High	High			
	Soakage Trenches	P	S	-	-	80%	60%/60%	90%		5 max	27' per 1000 sq.ft. impervious of area	6% max	1 ft	4 feet	☑	☑	High	High			
<b>Ponds</b>	Wet Pond	P	P	P	P	80%	50%/30%	70%*	☑		2-3%	15% max	6 to 8 ft	2 feet, if hotspot or aquifer	☑		Low	Low			
	Wet ED Pond	P	P	P	P	80%	50%/30%	70%*	☑	25 min**								☑		Low	Low
	Micropool ED Pond	P	P	P	P	80%	50%/30%	70%*	☑	10 min**								☑		Low	Moderate
	Multiple ponds	P	P	P	P	80%	50%/30%	70%*	☑	25 min**								☑		Low	Low
<b>Porous Surfaces</b>	Green Roof	P	S	-	-	-	-	-	☑							☑	High	High			
	Modular Porous Paver Systems	S	S	-	-	**	80%/80%	-		5 max	Varies					☑	Medium	High			
	Porous Concrete	S	S	-	-	**	50%/65%	-		5 max	Varies				☑	☑	High	High			
<b>Proprietary Systems</b>	Proprietary Systems ****	S	S	S	S	****	****	****		****	****				****	****	****	****			
<b>Re-Use</b>	Rain Harvesting	P	-	-	-	-	-	-							☑	☑	Low	High			

☑ -Meets suitability criteria  
P - Primary Control, meets suitability criteria  
S - Secondary Control, can be incorporated into the structural control in certain situations  
\* Provides less than 80% TSS removal efficiency. May be used in pretreatment and as part of a "treatment train"  
\*\* Smaller area acceptable with adequate water balance and anti-clogging device  
\*\*\* Drainage area can be larger in some instances  
\*\*\*\* The application and performance of specific commercial devices and systems must be provided by the manufacturer and should be verified by independent third-party sources and data  
1 Porous surfaces provide water quantity benefits by reducing the effective impervious area  
2 Due to the potential for clogging, porous surfaces should not be used for the removal of sediment or other coarse particulate pollutants  
**Table 3.1.3-1 Structural Control Screening Matrix**

Wetlands	Wetlands, Stormwater	P	P	P	P	80%	40%/30%	70%*	<input checked="" type="checkbox"/>	25 min	3-5%	8% max	3 to 5 ft (shallow) 6 to 8 ft (pond)	2 feet, if hotspot or aquifer	<input checked="" type="checkbox"/>		Moderate	Moderate
	Wetlands, Submerged Gravel	P	P	S	-	80%	50%/20%	70%	<input checked="" type="checkbox"/>	5 min			2 to 3 ft	below WT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate	High

Table 2.1.3-1 Structural Control Screening Matrix

Category	On-Site Stormwater Controls	PHYSIOGRAPHIC FACTORS			Soils	SPECIAL WATERSHED CONSIDERATIONS		
		Low Relief	High Relief	Karst		High Quality Stream	Aquifer Protection	Reservoir Protection
<b>Bioretention Areas</b>	Bioretention Areas	Several design variations will likely be limited by low head		Use poly-liner or impermeable membrane to seal bottom	Clay or silty soils may require pretreatment	Evaluate for stream warming	Needs to be designed with no exfiltration (i.e. outflow to groundwater)	
<b>Channels</b> Channels, Grass	Enhanced Swales	Generally feasible however slope <1% may lead to standing water in dry swales	Often infeasible if slopes are 4% or greater				Hotspot runoff must be adequately treated	Hotspot runoff must be adequately treated
	Channels, Open							
<b>Chemical Treatment</b>	Alum Treatment System							
<b>Conveyance Components</b>	Culverts							
	Energy Dissipation							
	Inlets/Street Gutters							
	Pipe Systems							
<b>Detention</b>	Detention, Dry		restricted Embankment heights	Require poly or clay liner, Max ponding depth, Geotechnical tests	Underlying soils of hydrologic group "C" or "D" should be adequate to maintain a permanent pool. Most group "A" soils and some group "B" soils will require a pond liner.			
	Detention, Extended Dry							
	Detention, Multipurpose Areas							
	Detention, Underground		GENERALLY NOT ALLOWED					
<b>Filtration</b>	Filter Strips							
	Organic Filters							
	Planter Boxes							
	Sand Filters, Surface/Perimeter	Several design variations will likely be limited by low head		Use poly-liner or impermeable membrane to seal bottom	Clay or silty soils may require pretreatment	Evaluate for stream warming	Needs to be designed with no exfiltration (i.e. outflow to groundwater)	
	Sand Filters, Underground							
<b>Hydrodynamic Devices</b>	Gravity (Oil-Grit) Separator							
<b>Infiltration</b>	Downspout Drywell	Minimum distance to water table of 4 feet		GENERALLY NOT ALLOWED	Infiltration rate > 0.5 inch/hr			
	Infiltration Trenches	Minimum distance to water table of 2 feet	Maximum slope of 6% Trenches must have flat bottom	GENERALLY NOT ALLOWED	Infiltration rate > 0.5 inch/hr		Maintain safe distance from wells and water table. No hotspot runoff	Maintain safe distance from bedrock and water table. Pretreat runoff
	Soakage Trenches	Minimum distance to water table of 4 feet	Maximum slope of 6% Trenches must have flat bottom	GENERALLY NOT ALLOWED	Infiltration rate > 0.5 inch/hr			
<b>Ponds</b>	Wet Pond	Limit maximum normal pool depth to about 4 feet (dugout)  Providing pond drain can be problematic	Embankment heights restricted	Require poly or clay liner  Max ponding depth  Geotechnical tests	"A" soils may require pond liner  "B" soils may require infiltration testing	Evaluate for stream warming	May require liner if "A" soils are present  Pretreat hotspots  2 to 4 ft separation distance from water table	
	Wet ED Pond							
	Micropool ED Pond							
	Multiple ponds							
<b>Porous Surfaces</b>	Green Roof							
	Modular Porous Paver Systems							
	Porous Concrete							
<b>Proprietary Systems</b>	Proprietary Systems *							

-Meets suitability criteria

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1 Porous surfaces provide water quantity benefits by reducing the effective impervious

<b>Re-Use</b>	Rain Harvesting							
<b>Wetlands</b>	Wetlands, Stormwater Wetlands, Submerged Gravel		Embankment heights restricted	Require poly-liner Geotechnical tests	"A" soils may require pond liner	Evaluate for stream warming	May require liner if "A" soils are present Pretreat hotspots 2 to 4 ft separation distance from water table	