

TABLE 1.1
APPLICATION OPPORTUNITIES OF VARIOUS SWM ALTERNATIVES

P - Primary application
✓ - Additional potential application

CONTROL MEASURES		RANGE OF APPLICATIONS			
1	SOURCE CONTROLS (BEGINNING OF DRAINAGE SYSTEM)	LOT LEVEL / SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Storm Drain Flushing	P		P	- catch-basin cleaning, street cleaning
	Catch Basin Cleaning	P		✓	- storm drain flushing, street cleaning
	Street Cleaning	P			- storm drain flushing, catchbasin cleaning
	Control of Road De-Icers	P			
	Control of Fertilizers and Pesticides	P			- flow reduction, water conservation
	Enforcement of Anti Litter and Discharge By-Law (stoop & scoop)	P			- pollution prevention – control street sweeping, catch-basin-cleaning
	Water Conservation	P		✓	- pollution prevention controls, plant health care programs, naturalization and xeriscaping
	Erosion and Sediment Control	P		✓	- storm drain flushing, catch-basin and street cleaning
	Used Oil Recycling	P			- pollution prevention, drainage system control
	Household Hazardous Waste Collection	P			- solid waste program, sewer use by-law enforcement, used oil recycling
	Safer Alternative Products	P			- fertilizers, pesticides, litter, hazardous waste, alt products, leaf clearing
	Materials Storage Controls	P			- pollution prevention & control, environmental management system, spill control, building codes, fire codes
	Vehicle Use Reduction	P			- pollution prevention & control, energy & traffic reduction programs
	Pool Drainage	P			- pollution prevention
	Spills Control	P			- oil/grit separators
	Leaf Clearing and Removal	P			- street sweeping, pollution prevention & control, environmental management system
	Modifying Engineering Standards	P	P	P	- alternate conveyance controls, at source controls (storm gardens, surface storage infiltration)

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1	SOURCE CONTROLS	LOT LEVEL / SOURCE	CONVEYANCE	END-OF-PIPE	OVERLAPS WITH OTHER FACILITIES
	Cross Connection Control Program	P	P		- sewer system operations, downspout disconnection by-law, sewer rehabilitation
	Roof Leader Disconnection	P			- lot level storage infiltration, weeping tiles / foundation drains
	Foundation Drain Disconnection	P			- sump pumps, roof leader disconnection, illicit connections
	Lot Level Storage /Infiltration Systems (Rear Yard Ponding)	P			- reduced lot grading, soakaway pits, infiltration trenches/basins, storm gardens
	Lot Grading	P			- soakaway pits, lot level storage/infiltration - engineering standards
	Catch-basin Restrictors/Inlet Controls	P	✓		- parking lot storage, storm sewer orifices
	Porous Pavement	P	✓		- soakaway pits, dry ponds, vegetative filter strips, lot level depressions
	Soakaway Pits	P	✓		- reduced lot grading, infiltration trenches/basins, lot level storage/infiltration
	Backyard Swales	P	✓		- roadside ditches, grassed swales, roof leader disconnection, reduced lot grading, soakaway pits, vegetative filter strips, lot level depressions
	Vegetative Filter Strips	P	✓		- roadside ditches, grassed swales, backyard swales, roof leader disconnection, reduced lot grading, soakaway pits, lot level depressions
	Stream and Valley Corridor Buffer Strips	P	✓		- vegetative buffer strips
	Bioretention Areas	P	✓	✓	- filler strips, buffers
	Rooftop Storage and Rooftop Gardens	P			- storage only: superpipes, parking lot storage, inlet controls (road storage); Gardens: urban forest, enhanced vegetation
	Enhanced Yard Vegetation and Storm Gardens	P			- filler strips, buffers, urban forest
	Urban Forest	P	✓		- filler strips, buffers, bioretention areas, enhanced vegetation and storm gardens, rooftop gardens
	Oil/Grit Separators	P	✓	✓	- filler strips, buffers, bioretention areas
	Superpipes (on-site application)	P	✓		- pretreatment measures (swales, filter strips, sand filters); source /end-of-pipe (filters/ponds)

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1	SOURCE CONTROLS	LOT LEVEL / SOURCE	CONVEYANCE	END-OF-PIPE	OVERLAPS WITH OTHER FACILITIES
	Superpipes (on-site application) con't				- parking lot storage rooftop storage, rear yard storage
	Ex-Situ Biological Leachate Treatment Technologies	P			
	Ex-Situ Physical Chemical Leachate Treatment Technologies	P			
	Co-Metabolic, Enhanced Biodegradation, Natural Attenuation	P			
	Air Sparging, Bioslurping, Dual Phase Extraction, Fluid/Vapour Extraction, Stream Flushing/Stripping, In-Well Air Stripping	P			
	Natural Attenuation	P			
	Waterloo Barrier	P			- slurry wall
	Slurry Wall	P			- Waterloo barrier
	Pump and Disposal	P			- pump & on-site treatment prior to disposal
	Surface Capping	P			
	Bioventing, Enhanced Bioremediation, Land Treatment, Natural Attenuation	P			
	Electrokinetic Separation, Soil Flushing, Soil Vapour Extraction, Solidification/Stabilization	P			

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2	CONVEYANCE CONTROL (PART OF FLOW CONVEYANCE)	LOT LEVEL / SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Sewer Rehabilitation	✓	P		- I/I controls, downspout and foundation drains disconnection, exfiltration systems, oil/grit separators, catch-basin controls, sewer and catch-basin cleaning & maintenance, sewer flushing
	Sewer Rehabilitation – Lining Technologies	✓	P		- all other sewer rehabilitation methods
	Stream Corridor Measures	✓	P		- erosion & sedimentation control, tree plantings, bank protection, stream corridor measures, grassed swales, channel reconstruction, retention ponds
	Channel Modification		P	✓	- buffer strips, natural channel, restoration, stream meander restoration, slope regrading, low flow channel restoration, floodplain restoration, valley wall protection, maintenance of hydraulic connections
	Bank Protection	✓	P		- stream rehabilitation, softer engineering approach, buffer strips, tree plantings/urban forests, constructed wetlands, bank protection, stream corridor measures
	Sewer Rehabilitation – Internal Grouting	✓	P		- all other sewer rehabilitation methods
	Manhole Rehabilitation – Non-Structural	✓	P		- sewer rehabilitation technologies
	Sewer Replacement	✓	P		- capacity increase
	In-Line / Off-Line Storage		P	✓	- sewer replacement
	Real Time Control		P	✓	- conveyance, system capacity increase, in-line capacity increase
	Sewer Separation	✓	P		- full/partial sewer separation
	Roadside Ditches	✓	P		- grassed swales, infiltration trenches
	Grassed Swales	✓	P		- roadside ditches, backyard swales, roof-leader disconnection, reduced lot grading, soakaway, vegetative filter strips, lot level depressions
	Pervious Technologies – Pervious Pipe Systems	✓	P		- catch-basins, swales, buffer strips, porous pavement, infiltration trenches, pervious catch-basins
	Pervious Technologies – Pervious Curb and Gutter System	✓	P		- infiltration trenches, porous pavement, infiltration trenches, pervious catch-basins

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	Pervious Technologies – Pervious Catchbasins	✓	P		- pervious pipe systems, swales, buffer strips, infiltration trenches, porous pavement

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3	END-OF-PIPE CONTROLS (END OF DRAINAGE SYSTEM)	LOT LEVEL / SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Sediment Management		✓	P	- control of road sanding, erosion and sediment control, tree plantings, bank protection, stream corridor measures, grassed swales, channel reconstruction, retention ponds
	Upgrade / Retrofit Existing Treatment Facilities	✓ *		P	- dissolved air flotation, swirl concentrators, vortex separators, physical/ chemical, disinfection
	Increase Treatment Capacity	✓		P	- dissolved air flotation, swirl concentrators, vortex separators, disinfection, screening, sedimentation
	Diversion		✓	P	- increased treatment capacity, retrofitting/upgrading treatment facilities, storage
	Screening	✓		P	- swirl concentrators, high rate setting devices
	Disinfection			P	- dissolved air flotation, swirl concentrators, vortex separators, physical/chemical, screening, storage
	Physical / Chemical	✓		P	- increased treatment capacity , upgrading/retrofitting treatment facilities, disinfection
	High Rate Treatment Devices	✓		P	- physical / chemical dissolved air flotation, disinfection, increased treatment capacity
	Dissolved Air Flootation	✓		P	- physical / chemical disinfection, swirl concentrators, vortex separators, increased treatment capacity
	Enclosed Beach Areas			P	- flow through balancing method, extend outfall further into the lake
	Floatable Control	✓ *		P	- high rate setting devices, stormceptor, screening
	Dry Pond	✓		P	- rooftop storage, parking lot storage, superpipes
	Wet Ponds	✓		P	- constructed wetlands, hybrid wetponds/wetlands
	Tank / Tunnel	✓	✓	P	- swirl concentrators, high rate settling devices, open tanks/lagoons, wet ponds

* includes industrial, commercial, institutional, control/treatment systems

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3	END-OF-PIPE CONTROL con't (END OF DRAINAGE SYSTEM)	LOT LEVEL / SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Open Tank / Lagoon	✓	✓	P	- subsurface tank/tunnel, wetponds, wetlands, high rate treatment, solids separators (swirl concentrator, fluidsep)
	Extended Outfalls		✓	P	
	Constructed Wetlands	✓	✓	P	- wetponds, hybrid wetponds/wetlands
	Hybrid Wet Ponds / Wetlands	✓	✓	P	- constructed wetlands, wetponds
	Filters	✓		P	- bioretention, filters
	Living Machines / Solar Aquatics	✓	✓	P	- packed sewage treatment plants, constructed wetlands
	Dunkers Flow Balancing System			P	

CONTROL MEASURES		RANGE OF APPLICATIONS			
4	MANAGEMENT / OPERATION	LOT LEVEL/ SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Public Education	P	✓	✓	- fertilizers, pesticides, litter, hazardous waste, alt products, leaf clearing
	Business Education and Awareness				- hazardous waste reduction, spills control, material storage control, use of alternative products
	Yellow Fish Road Program	P			- drainage system control

CONTROL MEASURES		RANGE OF APPLICATIONS			
5	SPECIAL MEASURES (HABITAT ENHANCEMENT)	LOT LEVEL/ SOURCE	CONVEYANCE	END-OF- PIPE	OVERLAPS WITH OTHER FACILITIES
	Fish Movement / Barrier Alteration				- co-requirement of other measures
	Aquatic Habitat Enhancement / Instream Practices				- stream rehabilitation, softer engineering approach, buffer strips, tree plantings/urban forests, constructed wetlands, bank protection, stream corridor measures

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