

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

	Cost		Hours	
	Low	High	Low	High
Annual	\$4,420	\$9,620	36	76
One-Time	\$28,000	\$59,600	158	386
Intermittent	\$0	\$40,100	0	320
Total*	\$42,400	\$96,200	338	766
*Without Intermittent Costs				

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Rural																
							One Time Costs				Annual/Ongoing Costs				Number of Years	Total Costs/Hours							
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost			Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period					
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High				
1					Inventory Sanitary Sewer Overflows	2.3.4.4																	
1.1	Admin	120 days	One-time		Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in last 5 years. Include location, discharge to surface water or MS4, dates & time of each known SSO occurrence, volume, description of occurrence including cause, completed & planned mitigation & corrective measures with dates.	2.3.4.4 b	0	24	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,880	0	24				
1.2	Admin		Annual	x	Update inventory annually and report in annual report.	2.3.4.4 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0				
1.3	Admin		Intermittent	x	Provide oral notice to EPA within 24 hours upon becoming aware of an SSO to the MS4. Provide written notice to EPA & MassDEP within 5 days, include inventory information.	2.3.4.4 c	0	0	\$0	\$0	0	4	\$0	\$0	5	\$0	\$2,400	0	20				
2					Develop Outfall Interconnection Inventory	2.3.4.5																	
2.1	Admin/Tech	1 year	One-time		Identify each outfall & interconnection discharging from MS4, record location & condition. Include: unique identifier, receiving water, date of most recent inspection, dimensions, shape, material, lat/long, physical condition & indicators of non-stormwater discharges.	2.3.4.5 c	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0				
2.2	Admin		Annual	x	Update inventory annually to include data collected from monitoring program.	2.3.4.5 b	0	0	\$0	\$0	0	16	\$0	\$0	5	\$0	\$9,600	0	80				
2.3	Maint	5 years	One-time		Physically label all MS4 outfall pipes.	2.3.4.5 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0				
3					System Mapping	2.3.4.6																	
3.1	Tech	2 years	One-time with annual upkeep		Develop a revised map of system showing outfalls & receiving waters (required by MS4 2003 permit), pipes, open channel conveyances, catch basins, manholes, interconnections, municipally-owned structure BMPs, and receiving waters by name (include indication of all impairments from 303(d) and 305(b) list). Map can be produced by hand or computer-aided methods.	2.3.4.6 a i & 2.3.4.6 a ii	60	180	\$0	\$500	0	0	\$0	\$0	0	\$7,200	\$22,100	60	180				
3.2	Tech	2 years	One-time		Delineate catchment areas for each MS4 outfall or interconnection.	2.3.4.6 a i	10	10	\$0	\$0	0	0	\$0	\$0	0	\$1,200	\$1,200	10	10				
3.3	Tech	2 years	One-time with annual upkeep		Where available, include municipal sanitary sewer system & municipal combined sewer system.	2.3.4.6 a ii	0	20	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,400	0	20				
3.4	Tech	Not Required	Not Required		Recommended mapping elements - storm sewer material, size & age; sanitary sewer system material, size & age; properties served by septic (when sewer & septic exist); areas where MS4 could receive flow from septic systems (e.g., areas with poor soils, or high groundwater elevations); seasonal high water table elevation impacting sanitary alignments; topography; orthophotography; alignments; locations of illicit discharges	2.3.4.6 a iii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0				
3.5	Tech		Intermittent		Update mapping as necessary to reflect newly discovered information & required corrections or modifications.	2.3.4.6 b	0	0	\$0	\$0	0	20	\$0	\$0	5	\$0	\$12,000	0	100				
3.6	Admin		Annual	x	Report on progress of map in annual report.	2.3.4.6 c	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0				

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No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4					Written IDDE Program	2.3.4.7													
4.1	Admin	Required by 2003 Permit	One-time		Develop and adopt a regulatory mechanism providing legal authority to municipality to regulate illicit discharges.	2.3.4.7 a	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.2					Assessment & Priority Ranking of Catchments	2.3.4.7 b													
4.2.1	Tech	1 year initial, update	One-time		Assess and classify each catchment into one of 4 possible categories (Excluded, Problem, High Priority, Low Priority)	2.3.4.7 c i													
4.2.2	Tech	1 year initial, update annually	One-time		Priority rank each catchment within each category (except those "excluded") using 8 factors (past complaints, poor dry weather receiving water quality, density of generating sites (e.g., car dealers, car washes, gas stations, garden centers, industrial, manufacturing), age of surrounding development & infrastructure, sewer conversion, historic combined sewer, density of aging septic systems, culverted streams. May also consider drinking water supplies, shell fishing areas, beaches or recreation waters, impaired waters.	2.3.4.7 c ii & iii	16	24	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$2,880	16	24
4.2.3	Tech		Annual	x	Update assessment & priority ranking annually based on results of screening and new information and include in annual report. Include listing of all catchments and results of ranking, summary of evidence of known or suspected illicit discharges and SSOs by catchment, corrective measures taken or planned, schedule for completing and verifying measures correcting the confirmed illicit discharges and SSOs.	2.3.4.7 c iii	0	0	\$0	\$0	0	16	\$0	\$0	5	\$0	\$9,600	0	80
4.3					Outfall and Interconnection Screening and Sampling	2.3.4.7 d													
4.3.1	Tech	1 year	One-time		Develop written procedure for screening and sampling of outfalls - include sample collection, use of field kits, storage and conveyance of samples. Adopt a screening and sampling protocol consistent with EPA New England Bacterial Source Tracking Protocol (Draft 2012) (Appendix I).	2.3.4.7 d i & ii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.3.2	Tech	3 years	One-time cost spread over a 3-year period		Perform dry weather screening of every outfall (if inaccessible, proceed to first accessible upstream structure) when and how prescribed; identify in annual report any follow-up needed. Begin investigations within 15 months of effective date.	4.7 d iii & 2.3.4	25	25	\$540	\$540	16	24	\$0	\$0	5	\$13,140	\$17,940	105	145
4.3.2.A			Intermittent		Perform follow-up sampling to identify source if outfall sample comes back dirty.	2.3.4.2 a	0	0	\$0	\$0	0	16	\$0	\$284	5	\$0	\$11,019	0	80
4.3.3	Tech	10 years	One-time cost spread over a 10-year period		Perform wet weather screening for outfalls with identified System Vulnerability Factors.	7 d iv & 2.3.4.7	5	15	\$177.39	\$532.17	0.00	0	\$0	\$0	0	\$777	\$2,332	5	15
4.3.4	Tech	see dry & wet weather screening	One-time		Sample dry and wet weather flows for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 d v	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.3.5	Admin		Annual	x	Report screening data annually; identify any follow-up needed. Include date, outfall ID, location, weather conditions, precipitation in previous 48 hours, field screening parameter results, and results of all analyses.	2.3.4.8 a & 4.3.b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

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No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.4					Catchment Investigation Procedure	2.3.4.7 e													
4.4.1	Tech	1 year	One-time		Develop written Catchment Investigation Procedure including review of maps and historic records; a manhole inspection methodology; and procedures to isolate and confirm sources of illicit discharges. Include in written IDDE Plan.	2.3.4.7 e	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.2	Tech	1 year initial, update annually	One-time		Review sanitary sewer and storm sewer construction plans for each catchment. Identify and record the presence of System Vulnerability Factors: history of SSOs; areas that could readily result in SSOs; inadequate sanitary sewer level of service; common or twin-invert manholes serving storm & sanitary alignments; common trench construction serving both storm & sanitary; crossing of storm & sanitary; sanitary sewer with possible underdrain; sanitary sewer defects areas formerly served by combined sewer; sanitary sewer & storm drain infrastructure greater than 40 years old	2.3.4.7 e i	16	40	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$4,800	16	40
4.4.3	Admin		Annual	x	Document and annually report presence or absence of the 12 System Vulnerability Factors for each catchment.	2.3.4.7 e i	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.4	Tech		One-time cost spread over a 10-year		Perform dry weather investigation of key junction manholes by opening and inspecting for visual and olfactory evidence of illicit connections.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	10	20	\$500	\$750	0	0	\$0	\$0	0	\$1,700	\$3,150	10	20
		3 years			*In a minimum of 80% of the MS4 area serviced by Problem Catchments within 3 years and 100% within 5 years	2.3.4.8 c i					0	0			0	\$0	\$0	0	0
		5 years			*For all catchments where sampling indicates sewer input within 5 years	2.3.4.8 c ii					0	0			0	\$0	\$0	0	0
		10 years			*In 40% of all area served by all MS4 catchments within 5 years and in 100% of 4 area in 10 years	2.3.4.8 c iii					0	0			0	\$0	\$0	0	0
4.4.5	Tech	see catchment investigation schedule			Sample dry flows at key junction manholes for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	0	0	\$142	\$213	0	0	\$0	\$0	0	\$142	\$213	0	0
4.4.6	Tech	see wet weather screening			Perform wet weather screening for outfalls with identified System Vulnerability Factors. Sample for same parameters as dry weather flows.	2.3.4.7 d iv & 2.3.4.7 ii b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.7	Admin		Annual	x	Track progress of Catchment Investigations in each annual report.		0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

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No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs				Total Costs/Hours				
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.5					Written IDDE Plan	2.3.4.7													
4.5.1	Technical	1 year	One-time		Develop written IDDE plan documenting SSOs, outfall/interconnection inventory, statement of program responsibilities, prioritization, outfall screening, catchment investigation procedures, procedures to isolate and verify sources, procedures for removal and confirmation, procedures and schedule for follow-up screening and illicit discharge/SSO prevention procedures.	2.3.4.7	16	48	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$5,760	16	48
4.5.2	Admin		Intermittent		Upon detection of an illicit discharge, identify and notify all responsible parties and require immediate cessation. Should be eliminated within 60 days of identification, or if longer, a schedule developed and report dates of identification and schedules for removal in the permittee's annual reports.	2.3.4.2 a	0	0	\$0	\$0	0	8	\$0	\$0	5	\$0	\$4,800	0	40
4.5.3	Tech		Intermittent		Implement measures to control non-stormwater discharges if they add significant pollution.	2.3.4.3	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.5.4	Tech		One-time		Define or describe indicators for tracking program success. Should include measures that demonstrate efforts to locate illicit discharges, the number of SSOs and illicit discharges identified and removed, the percent and area in acres of the catchment area served by the MS4 evaluated using the catchment investigation procedure, and volume of sewage removed. Include in IDDE Plan.	2.3.4.9	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6					Removal and Confirmation	2.3.4.7 f													
4.6.1	Admin		Annual	x	For each confirmed illicit discharge or SSO, include in the annual report the location of the discharge and its source, a description of the discharge, method and date of discovery, date of elimination, mitigation or enforcement action, and estimate volume removed.	2.3.4.7 f	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6.2	Tech	1 year from removal	Intermittent		Within one year of illicit discharge removal, perform confirmatory screening; wet (if System Vulnerability Factors present), dry or both.	2.3.4.7 f	0	0	\$0	\$0	0	16	\$0	\$56.76	5	\$0	\$9,884	0	80
4.7					Follow-up Screening	2.3.4.7 g													
4.7.1	Tech	5 years after catchment investigation	Intermittent		Upon completion of catchment investigations and illicit discharge removal and confirmation (if necessary), the catchment outfall or interconnection shall be scheduled for follow-up screening within five years.	2.3.4.7 g	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0
4.8					Training														
4.8.1	Admin/Tech		Annual		Provide annual training to employees involved in IDDE program.	2.3.4.10	0	0	\$0	\$0	20	20	\$100	\$500	5	\$12,500	\$14,500	100	100
4.8.2	Admin		Annual	x	Include type and frequency of training in the annual report.	2.3.4.10	0	0	0	0			0	0		\$0	\$0	0	0
TOTAL FOR FIVE YEARS (W/O Intermittent Costs)																\$42,400	\$96,200	338	766

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Task Description and Cost Breakdown

	Cost		Hours	
	Low	High	Low	High
Annual	\$5,380	\$12,500	44	100
One-Time	\$87,600	\$274,000	586	2010
Intermittent	\$0	\$104,000	0	820
Total*	\$103,000	\$317,000	806	2510
*Without Intermittent Costs				

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Suburban										Total Costs/Hours			
							One Time Costs				Annual/Ongoing Costs						Total Cost Over 5-Year Permit Period			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period		
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High	
1					Inventory Sanitary Sewer Overflows	2.3.4.4														
1.1	Admin	120 days	One-time		Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in last 5 years. Include location, discharge to surface water or MS4, dates & time of each known SSO occurrence, volume, description of occurrence including cause, completed & planned mitigation & corrective measures with dates.	2.3.4.4 b	0	24	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,880	0	24	
1.2	Admin		Annual	x	Update inventory annually and report in annual report.	2.3.4.4 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0	
1.3	Admin		Intermittent	x	Provide oral notice to EPA within 24 hours upon becoming aware of an SSO to the MS4. Provide written notice to EPA & MassDEP within 5 days, include inventory information.	2.3.4.4 c	0	0	\$0	\$0	0	4	\$0	\$0	5	\$0	\$2,400	0	20	
2					Develop Outfall Interconnection Inventory	2.3.4.5														
2.1	Admin/Tech	1 year	One-time		Identify each outfall & interconnection discharging from MS4, record location & condition. Include: unique identifier, receiving water, date of most recent inspection, dimensions, shape, material, lat/long, physical condition & indicators of non-stormwater discharges.	2.3.4.5 c	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0	
2.2	Admin		Annual	x	Update inventory annually to include data collected from monitoring program.	2.3.4.5 b	0	0	\$0	\$0	0	16	\$0	\$0	5	\$0	\$9,600	0	80	
2.3	Maint	5 years	One-time		Physically label all MS4 outfall pipes.	2.3.4.5 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0	
3					System Mapping	2.3.4.6														
3.1	Tech	2 years	One-time with annual upkeep		Develop a revised map of system showing outfalls & receiving waters (required by MS4 2003 permit), pipes, open channel conveyances, catch basins, manholes, interconnections, municipally-owned structure BMPs, and receiving waters by name (include indication of all impairments from 303(d) and 305(b) list). Map can be produced by hand or computer-aided methods.	2.3.4.6 a i & 2.3.4.6 a ii	130	1440	\$0	\$4,000	0	0	\$0	\$0	0	\$15,600	\$176,800	130	1440	
3.2	Tech	2 years	One-time		Delineate catchment areas for each MS4 outfall or interconnection.	2.3.4.6 a i	80	80	\$0	\$0	0	0	\$0	\$0	0	\$9,600	\$9,600	80	80	
3.3	Tech	2 years	One-time with annual upkeep		Where available, include municipal sanitary sewer system & municipal combined sewer system.	2.3.4.6 a ii	0	20	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,400	0	20	
3.4	Tech	Not Required	Not Required		Recommended mapping elements - storm sewer material, size & age; sanitary sewer system material, size & age; properties served by septic (when sewer & septic exist); areas where MS4 could receive flow from septic systems (e.g., areas with poor soils, or high groundwater elevations); seasonal high water table elevation impacting sanitary alignments; topography; orthophotography; alignments; locations of illicit discharges	2.3.4.6 a iii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0	
3.5	Tech		Intermittent		Update mapping as necessary to reflect newly discovered information & required corrections or modifications.	2.3.4.6 b	0	0	\$0	\$0	0	40	\$0	\$0	5	\$0	\$24,000	0	200	
3.6	Admin		Annual	x	Report on progress of map in annual report.	2.3.4.6 c	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0	

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No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4					Written IDDE Program	2.3.4.7													
4.1	Admin	Required by 2003 Permit	One-time		Develop and adopt a regulatory mechanism providing legal authority to municipality to regulate illicit discharges.	2.3.4.7 a	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.2			Assessment & Priority Ranking of Catchments				2.3.4.7 b												
4.2.1	Tech	1 year initial, update	One-time		Assess and classify each catchment into one of 4 possible categories (Excluded, Problem, High Priority, Low Priority)	2.3.4.7 c i													
4.2.2	Tech	1 year initial, update annually	One-time		Priority rank each catchment within each category (except those "excluded") using 8 factors (past complaints, poor dry weather receiving water quality, density of generating sites (e.g., car dealers, car washes, gas stations, garden centers, industrial, manufacturing), age of surrounding development & infrastructure, sewer conversion, historic combined sewer, density of aging septic systems, culverted streams. May also consider drinking water supplies, shell fishing areas, beaches or recreation waters, impaired waters.	2.3.4.7 c ii & iii	24	40	\$0	\$0	0	0	\$0	\$0	0	\$2,880	\$4,800	24	40
4.2.3	Tech		Annual	x	Update assessment & priority ranking annually based on results of screening and new information and include in annual report. Include listing of all catchments and results of ranking, summary of evidence of known or suspected illicit discharges and SSOs by catchment, corrective measures taken or planned, schedule for completing and verifying measures correcting the confirmed illicit discharges and SSOs.	2.3.4.7 c iii	0	0	\$0	\$0	0	24	\$0	\$0	5	\$0	\$14,400	0	120
4.3			Outfall and Interconnection Screening and Sampling				2.3.4.7 d												
4.3.1	Tech	1 year	One-time		Develop written procedure for screening and sampling of outfalls - include sample collection, use of field kits, storage and conveyance of samples. Adopt a screening and sampling protocol consistent with EPA New England Bacterial Source Tracking Protocol (Draft 2012) (Appendix I).	2.3.4.7 d i & ii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.3.2	Tech	3 years	One-time cost spread over a 3-year period		Perform dry weather screening of every outfall (if inaccessible, proceed to first accessible upstream structure) when and how prescribed; identify in annual report any follow-up needed. Begin investigations within 15 months of effective date.	4.7 d iii & 2.3.4	200	200	\$1,604	\$1,604	24	40	\$0	\$0	5	\$40,004	\$49,604	320	400
4.3.2.A			Intermittent		Perform follow-up sampling to identify source if outfall sample comes back dirty.	2.3.4.2 a	0	0	\$0	\$0	0	48	\$0	\$851	5	\$0	\$33,057	0	240
4.3.3	Tech	10 years	One-time cost spread over a 10-year period		Perform wet weather screening for outfalls with identified System Vulnerability Factors.	7 d iv & 2.3.4.7	40	120	\$1,419	\$4,257	0.00	0	\$0	\$0	0	\$6,219	\$18,657	40	120
4.3.4	Tech	see dry & wet weather screening	One-time		Sample dry and wet weather flows for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 d v	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.3.5	Admin		Annual	x	Report screening data annually; identify any follow-up needed. Include date, outfall ID, location, weather conditions, precipitation in previous 48 hours, field screening parameter results, and results of all analyses.	2.3.4.8 a & 4.3.b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

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No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.4					Catchment Investigation Procedure	2.3.4.7 e													
4.4.1	Tech	1 year	One-time		Develop written Catchment Investigation Procedure including review of maps and historic records; a manhole inspection methodology; and procedures to isolate and confirm sources of illicit discharges. Include in written IDDE Plan.	2.3.4.7 e	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.2	Tech	1 year initial, update annually	One-time		Review sanitary sewer and storm sewer construction plans for each catchment. Identify and record the presence of System Vulnerability Factors: history of SSOs; areas that could readily result in SSOs; inadequate sanitary sewer level of service; common or twin-invert manholes serving storm & sanitary alignments; common trench construction serving both storm & sanitary; crossing of storm & sanitary; sanitary sewer with possible underdrain; sanitary sewer defects areas formerly served by combined sewer; sanitary sewer & storm drain infrastructure greater than 40 years old	2.3.4.7 e i	16	40	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$4,800	16	40
4.4.3	Admin		Annual	x	Document and annually report presence or absence of the 12 System Vulnerability Factors for each catchment.	2.3.4.7 e i	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.4	Tech		One-time cost spread over a 10-year		Perform dry weather investigation of key junction manholes by opening and inspecting for visual and olfactory evidence of illicit connections.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	80	160	\$500	\$750	0	0	\$0	\$0	0	\$10,100	\$19,950	80	160
		3 years			*In a minimum of 80% of the MS4 area serviced by Problem Catchments within 3 years and 100% within 5 years	2.3.4.8 c i					0	0			0	\$0	\$0	0	0
		5 years			*For all catchments where sampling indicates sewer input within 5 years	2.3.4.8 c ii					0	0			0	\$0	\$0	0	0
		10 years			*In 40% of all area served by all MS4 catchments within 5 years and in 100% of 4 area in 10 years	2.3.4.8 c iii					0	0			0	\$0	\$0	0	0
4.4.5	Tech	see catchment investigation schedule			Sample dry flows at key junction manholes for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	0	0	\$2,271	\$3,406	0	0	\$0	\$0	0	\$2,271	\$3,406	0	0
4.4.6	Tech	see wet weather screening			Perform wet weather screening for outfalls with identified System Vulnerability Factors. Sample for same parameters as dry weather flows.	2.3.4.7 d iv & 2.3.4.7 ii b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.7	Admin		Annual	x	Track progress of Catchment Investigations in each annual report.		0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs				Total Costs/Hours				
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.5					Written IDDE Plan	2.3.4.7													
4.5.1	Technical	1 year	One-time		Develop written IDDE plan documenting SSOs, outfall/interconnection inventory, statement of program responsibilities, prioritization, outfall screening, catchment investigation procedures, procedures to isolate and verify sources, procedures for removal and confirmation, procedures and schedule for follow-up screening and illicit discharge/SSO prevention procedures.	2.3.4.7	16	48	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$5,760	16	48
4.5.2	Admin		Intermittent		Upon detection of an illicit discharge, identify and notify all responsible parties and require immediate cessation. Should be eliminated within 60 days of identification, or if longer, a schedule developed and report dates of identification and schedules for removal in the permittee's annual reports.	2.3.4.2 a	0	0	\$0	\$0	0	24	\$0	\$0	5	\$0	\$14,400	0	120
4.5.3	Tech		Intermittent		Implement measures to control non-stormwater discharges if they add significant pollution.	2.3.4.3	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.5.4	Tech		One-time		Define or describe indicators for tracking program success. Should include measures that demonstrate efforts to locate illicit discharges, the number of SSOs and illicit discharges identified and removed, the percent and area in acres of the catchment area served by the MS4 evaluated using the catchment investigation procedure, and volume of sewage removed. Include in IDDE Plan.	2.3.4.9	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6					Removal and Confirmation	2.3.4.7 f													
4.6.1	Admin		Annual	x	For each confirmed illicit discharge or SSO, include in the annual report the location of the discharge and its source, a description of the discharge, method and date of discovery, date of elimination, mitigation or enforcement action, and estimate volume removed.	2.3.4.7 f	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6.2	Tech	1 year from removal	Intermittent		Within one year of illicit discharge removal, perform confirmatory screening; wet (if System Vulnerability Factors present), dry or both.	2.3.4.7 f	0	0	\$0	\$0	0	48	\$0	\$170	5	\$0	\$29,651	0	240
4.7					Follow-up Screening	2.3.4.7 g													
4.7.1	Tech	5 years after catchment investigation	Intermittent		Upon completion of catchment investigations and illicit discharge removal and confirmation (if necessary), the catchment outfall or interconnection shall be scheduled for follow-up screening within five years.	2.3.4.7 g	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0
4.8					Training														
4.8.1	Admin/Tech		Annual		Provide annual training to employees involved in IDDE program.	2.3.4.10	0	0	\$0	\$0	20	20	\$100	\$500	5	\$12,500	\$14,500	100	100
4.8.2	Admin		Annual	x	Include type and frequency of training in the annual report.	2.3.4.10	0	0	0	0			0	0		\$0	\$0	0	0
TOTAL FOR FIVE YEARS (W/O Intermittent Costs)																\$103,000	\$317,000	806	2510

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

	Cost		Hours	
	Low	High	Low	High
Annual	\$7,300	\$16,800	60	136
One-Time	\$190,000	\$644,000	1280	4810
Intermittent	\$0	\$193,000	0	1520
Total*	\$207,000	\$700,000	1580	5490
*Without Intermittent Costs				

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Urban												
							One Time Costs				Annual/Ongoing Costs				Number of Years	Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost			Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
1.1	Admin	120 days	One-time		Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in last 5 years. Include location, discharge to surface water or MS4, dates & time of each known SSO occurrence, volume, description of occurrence including cause, completed & planned mitigation & corrective measures with dates.	2.3.4.4 b	0	24	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,880	0	24
1.2	Admin		Annual	x	Update inventory annually and report in annual report.	2.3.4.4 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
1.3	Admin		Intermittent	x	Provide oral notice to EPA within 24 hours upon becoming aware of an SSO to the MS4. Provide written notice to EPA & MassDEP within 5 days, include inventory information.	2.3.4.4 c	0	0	\$0	\$0	0	4	\$0	\$0	5	\$0	\$2,400	0	20
2					Develop Outfall Interconnection Inventory	2.3.4.5													
2.1	Admin/Tech	1 year	One-time		Identify each outfall & interconnection discharging from MS4, record location & condition. Include: unique identifier, receiving water, date of most recent inspection, dimensions, shape, material, lat/long, physical condition & indicators of non-stormwater discharges.	2.3.4.5 c	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
2.2	Admin		Annual	x	Update inventory annually to include data collected from monitoring program.	2.3.4.5 b	0	0	\$0	\$0	0	16	\$0	\$0	5	\$0	\$9,600	0	80
2.3	Maint	5 years	One-time		Physically label all MS4 outfall pipes.	2.3.4.5 b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
3					System Mapping	2.3.4.6													
3.1	Tech	2 years	One-time with annual upkeep		Develop a revised map of system showing outfalls & receiving waters (required by MS4 2003 permit), pipes, open channel conveyances, catch basins, manholes, interconnections, municipally-owned structure BMPs, and receiving waters by name (include indication of all impairments from 303(d) and 305(b) list). Map can be produced by hand or computer-aided methods.	2.3.4.6 a i & 2.3.4.6 a ii	200	3600	\$0	\$10,000	0	0	\$0	\$0	0	\$24,000	\$442,000	200	3600
3.2	Tech	2 years	One-time		Delineate catchment areas for each MS4 outfall or interconnection.	2.3.4.6 a i	200	200	\$0	\$0	0	0	\$0	\$0	0	\$24,000	\$24,000	200	200
3.3	Tech	2 years	One-time with annual upkeep		Where available, include municipal sanitary sewer system & municipal combined sewer system.	2.3.4.6 a ii	0	20	\$0	\$0	0	0	\$0	\$0	0	\$0	\$2,400	0	20
3.4	Tech	Not Required	Not Required		Recommended mapping elements - storm sewer material, size & age; sanitary sewer system material, size & age; properties served by septic (when sewer & septic exist); areas where MS4 could receive flow from septic systems (e.g., areas with poor soils, or high groundwater elevations); seasonal high water table elevation impacting sanitary alignments; topography; orthophotography; alignments; locations of illicit discharges	2.3.4.6 a iii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
3.5	Tech		Intermittent		Update mapping as necessary to reflect newly discovered information & required corrections or modifications.	2.3.4.6 b	0	0	\$0	\$0	0	60	\$0	\$0	5	\$0	\$36,000	0	300
3.6	Admin		Annual	x	Report on progress of map in annual report.	2.3.4.6 c	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4					Written IDDE Program	2.3.4.7													
4.1	Admin	Required by 2003 Permit	One-time		Develop and adopt a regulatory mechanism providing legal authority to municipality to regulate illicit discharges.	2.3.4.7 a	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.2					Assessment & Priority Ranking of Catchments	2.3.4.7 b													
4.2.1	Tech	1 year initial, update	One-time		Assess and classify each catchment into one of 4 possible categories (Excluded, Problem, High Priority, Low Priority)	2.3.4.7 c i													
4.2.2	Tech	1 year initial, update annually	One-time		Priority rank each catchment within each category (except those "excluded") using 8 factors (past complaints, poor dry weather receiving water quality, density of generating sites (e.g., car dealers, car washes, gas stations, garden centers, industrial, manufacturing), age of surrounding development & infrastructure, sewer conversion, historic combined sewer, density of aging septic systems, culverted streams. May also consider drinking water supplies, shell fishing areas, beaches or recreation waters, impaired waters.	2.3.4.7 c ii & iii	24	60	\$0	\$0	0	0	\$0	\$0	0	\$2,880	\$7,200	24	60
4.2.3	Tech		Annual	x	Update assessment & priority ranking annually based on results of screening and new information and include in annual report. Include listing of all catchments and results of ranking, summary of evidence of known or suspected illicit discharges and SSOs by catchment, corrective measures taken or planned, schedule for completing and verifying measures correcting the confirmed illicit discharges and SSOs.	2.3.4.7 c iii	0	0	\$0	\$0	0	40	\$0	\$0	5	\$0	\$24,000	0	200
4.3					Outfall and Interconnection Screening and Sampling	2.3.4.7 d													
4.3.1	Tech	1 year	One-time		Develop written procedure for screening and sampling of outfalls - include sample collection, use of field kits, storage and conveyance of samples. Adopt a screening and sampling protocol consistent with EPA New England Bacterial Source Tracking Protocol (Draft 2012) (Appendix I).	2.3.4.7 d i & ii	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.3.2	Tech	3 years	One-time cost spread over a 3-year period		Perform dry weather screening of every outfall (if inaccessible, proceed to first accessible upstream structure) when and how prescribed; identify in annual report any follow-up needed. Begin investigations within 15 months of effective date.	4.7 d iii & 2.3.4	500	500	\$4,726.35	#####	40	60	\$0	\$0	5	\$88,726	\$100,726	700	800
4.3.2.A			Intermittent		Perform follow-up sampling to identify source if outfall sample comes back dirty.	2.3.4.2 a	0	0	\$0	\$0	0	96	\$0	#####	5	\$0	\$66,115	0	480
4.3.3	Tech	10 years	One-time cost spread over a 10-year period		Perform wet weather screening for outfalls with identified System Vulnerability Factors.	7 d iv & 2.3.4.7	100	300	\$3,547.79	#####	0.00	0	\$0	\$0	0	\$15,548	\$46,643	100	300
4.3.4	Tech	see dry & wet weather screening	One-time		Sample dry and wet weather flows for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 d v	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.3.5	Admin		Annual	x	Report screening data annually; identify any follow-up needed. Include date, outfall ID, location, weather conditions, precipitation in previous 48 hours, field screening parameter results, and results of all analyses.	2.3.4.8 a & 4.3.b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs					Total Costs/Hours			
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.4					Catchment Investigation Procedure	2.3.4.7 e													
4.4.1	Tech	1 year	One-time		Develop written Catchment Investigation Procedure including review of maps and historic records; a manhole inspection methodology; and procedures to isolate and confirm sources of illicit discharges. Include in written IDDE Plan.	2.3.4.7 e	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.2	Tech	1 year initial, update annually	One-time		Review sanitary sewer and storm sewer construction plans for each catchment. Identify and record the presence of System Vulnerability Factors: history of SSOs; areas that could readily result in SSOs; inadequate sanitary sewer level of service; common or twin-invert manholes serving storm & sanitary alignments; common trench construction serving both storm & sanitary; crossing of storm & sanitary; sanitary sewer with possible underdrain; sanitary sewer defects areas formerly served by combined sewer; sanitary sewer & storm drain infrastructure greater than 40 years old	2.3.4.7 e i	40	60	\$0	\$0	0	0	\$0	\$0	0	\$4,800	\$7,200	40	60
4.4.3	Admin		Annual	x	Document and annually report presence or absence of the 12 System Vulnerability Factors for each catchment.	2.3.4.7 e i	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.4	Tech	One-time cost spread over a 10-year			Perform dry weather investigation of key junction manholes by opening and inspecting for visual and olfactory evidence of illicit connections.	2.3.4.7 e ii a & 2.3.4.8 c i,j,i,iii	200	400	\$500	\$750	0	0	\$0	\$0	0	\$24,500	\$48,750	200	400
		3 years			*In a minimum of 80% of the MS4 area serviced by Problem Catchments within 3 years and 100% within 5 years	2.3.4.8 c i					0	0			0	\$0	\$0	0	0
		5 years			*For all catchments where sampling indicates sewer input within 5 years	2.3.4.8 c ii					0	0			0	\$0	\$0	0	0
		10 years			*In 40% of all area served by all MS4 catchments within 5 years and in 100% of 4 area in 10 years	2.3.4.8 c iii					0	0			0	\$0	\$0	0	0
4.4.5	Tech	see catchment investigation schedule			Sample dry flows at key junction manholes for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 e ii a & 2.3.4.8 c i,j,i,iii	0	0	\$8,515	\$12,772	0	0	\$0	\$0	0	\$8,515	\$12,772	0	0
4.4.6	Tech	see wet weather screening			Perform wet weather screening for outfalls with identified System Vulnerability Factors. Sample for same parameters as dry weather flows.	2.3.4.7 d iv & 2.3.4.7 ii b	0	0	0	0	0	0	0	0	0	\$0	\$0	0	0
4.4.7	Admin		Annual	x	Track progress of Catchment Investigations in each annual report.		0	0	0	0	0	0	0	0	0	\$0	\$0	0	0

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	One Time Costs				Annual/Ongoing Costs				Total Costs/Hours				
							Hours		Fixed Cost		Hours per Year		Additional Fixed Cost		Number of Years	Total Cost Over 5-Year Permit Period		Total Hours Over 5-Year Permit Period	
							Low	High	Low	High	Low	High	Low	High		Low	High	Low	High
1					Inventory Sanitary Sewer Overflows	2.3.4.4													
4.5					Written IDDE Plan	2.3.4.7													
4.5.1	Technical	1 year	One-time		Develop written IDDE plan documenting SSOs, outfall/interconnection inventory, statement of program responsibilities, prioritization, outfall screening, catchment investigation procedures, procedures to isolate and verify sources, procedures for removal and confirmation, procedures and schedule for follow-up screening and illicit discharge/SSO prevention procedures.	2.3.4.7	16	48	\$0	\$0	0	0	\$0	\$0	0	\$1,920	\$5,760	16	48
4.5.2	Admin		Intermittent		Upon detection of an illicit discharge, identify and notify all responsible parties and require immediate cessation. Should be eliminated within 60 days of identification, or if longer, a schedule developed and report dates of identification and schedules for removal in the permittee's annual reports.	2.3.4.2 a	0	0	\$0	\$0	0	48	\$0	\$0	5	\$0	\$28,800	0	240
4.5.3	Tech		Intermittent		Implement measures to control non-stormwater discharges if they add significant pollution.	2.3.4.3	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.5.4	Tech		One-time		Define or describe indicators for tracking program success. Should include measures that demonstrate efforts to locate illicit discharges, the number of SSOs and illicit discharges identified and removed, the percent and area in acres of the catchment area served by the MS4 evaluated using the catchment investigation procedure, and volume of sewage removed. Include in IDDE Plan.	2.3.4.9	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6					Removal and Confirmation	2.3.4.7 f													
4.6.1	Admin		Annual	x	For each confirmed illicit discharge or SSO, include in the annual report the location of the discharge and its source, a description of the discharge, method and date of discovery, date of elimination, mitigation or enforcement action, and estimate volume removed.	2.3.4.7 f	0	0	\$0	\$0	0	0	\$0	\$0	0	\$0	\$0	0	0
4.6.2	Tech	1 year from removal	Intermittent		Within one year of illicit discharge removal, perform confirmatory screening; wet (if System Vulnerability Factors present), dry or both.	2.3.4.7 f	0	0	\$0	\$0	0	96	\$0	\$340.59	5	\$0	\$59,303	0	480
4.7					Follow-up Screening	2.3.4.7 g													
4.7.1	Tech	5 years after catchment investigation	Intermittent		Upon completion of catchment investigations and illicit discharge removal and confirmation (if necessary), the catchment outfall or interconnection shall be scheduled for follow-up screening within five years.	2.3.4.7 g	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0
4.8				Training															
4.8.1	Admin/Tech		Annual		Provide annual training to employees involved in IDDE program.	2.3.4.10	0	0	\$0	\$0	20	20	\$100	\$500	5	\$12,500	\$14,500	100	100
4.8.2	Admin		Annual	x	Include type and frequency of training in the annual report.	2.3.4.10	0	0	0	0			0	0		\$0	\$0	0	0
TOTAL FOR FIVE YEARS (W/O Intermittent Costs)																\$207,000	\$700,000	1580	5490

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Notes	Supporting Documentation
1					Inventory Sanitary Sewer Overflows	2.3.4.4		
1.1	Admin	120 days	One-time		Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in last 5 years. Include location, discharge to surface water or MS4, dates & time of each known SSO occurrence, volume, description of occurrence including cause, completed & planned mitigation & corrective measures with dates.	2.3.4.4 b	Most communities should know where their SSOs are located. Assume 24 hours for a consultant to compile existing SSO information and prepare a map. Note for many communities, this will be zero.	WV estimate
1.2	Admin		Annual	x	Update inventory annually and report in annual report.	2.3.4.4 b	Will be minimal. See Annual Report cost breakdown.	WV estimate
1.3	Admin		Intermittent	x	Provide oral notice to EPA within 24 hours upon becoming aware of an SSO to the MS4. Provide written notice to EPA & MassDEP within 5 days, include inventory information.	2.3.4.4 c	May not be required at all. Community dependent. Assume 4 hours for correspondence and brief letter report. Assume 1 notification per year over length of permit term.	WV estimate
2					Develop Outfall Interconnection Inventory	2.3.4.5		
2.1	Admin/Tech	1 year	One-time		Identify each outfall & interconnection discharging from MS4, record location & condition. Include: unique identifier, receiving water, date of most recent inspection, dimensions, shape, material, lat/long, physical condition & indicators of non-stormwater discharges.	2.3.4.5 c	Inventory will be compiled from combination of mapping and outfall screening performed under other PAIs, therefore no cost carried here.	WV estimate
2.2	Admin		Annual	x	Update inventory annually to include data collected from monitoring program.	2.3.4.5 b		WV estimate
2.3	Maint	5 years	One-time		Physically label all MS4 outfall pipes.	2.3.4.5 b	Removed from permit.	WV estimate
3					System Mapping	2.3.4.6		
3.1	Tech	2 years	One-time with annual upkeep		Develop a revised map of system showing outfalls & receiving waters (required by MS4 2003 permit), pipes, open channel conveyances, catch basins, manholes, interconnections, municipally-owned structure BMPs, and receiving waters by name (include indication of all impairments from 303(d) and 305(b) list). Map can be produced by hand or computer-aided methods.	4.6 a i & 2.3.4.6 a i	Low cost is for generation of a paper map using existing available maps (e.g., subdivision maps) and uses the high end of CWP hours. The map may not be 100% accurate and could be missing some structures if done this way. High costs assumes 2 field personnel at 25 structures per day. Also assumes another 2 hours per field day to pull data into GIS and map. Assume rental fee of \$50/day for GPS unit. This also covers catchment investigations under PAI 4.4.4. See 4.3.2. for field investigation cost.	CWP IDDE manual - 1 week to 4 weeks to gather outfall mapping information; 20 (paper) to 40 (GIS) hours to produce map. So total of between 60 and 200 hours. Estimate: \$50,000 for 2,000 structures. \$250,000 for 75 outfalls.
3.2	Tech	2 years	One-time		Delineate catchment areas for each MS4 outfall or interconnection.	2.3.4.6 a i	Assumed number of catchment areas, same number as outfalls. Assume delineation of 20 outfalls per day in GIS.	Holyoke: \$17,000 for 75 outfalls.
3.3	Tech	2 years	One-time with annual upkeep		Where available, include municipal sanitary sewer system & municipal combined sewer system.	2.3.4.6 a ii	Not required to map these from scratch, just include what it already mapped. Assume 0 for communities with nothing in GIS, minimal cost to overlay existing GIS layers with MS4 info.	WV estimate
3.4	Tech	Not Required	Not Required		Recommended mapping elements - storm sewer material, size & age; sanitary sewer system material, size & age; properties served by septic (when sewer & septic exist); areas where MS4 could receive flow from septic systems (e.g., areas with poor soils, or high groundwater elevations); seasonal high water table elevation impacting sanitary alignments; topography; orthophotography; alignments; locations of illicit discharges	2.3.4.6 a iii	Not Required so No Cost	WV estimate
3.5	Tech		Intermittent		Update mapping as necessary to reflect newly discovered information & required corrections or modifications.	2.3.4.6 b	Varies depending on the amount of new construction per year. Assume 0-60 hours per year to update map in GIS with new subdivision information.	Reese: 60 hours per year at \$50/hour.
3.6	Admin		Annual	x	Report on progress of map in annual report.	2.3.4.6 c	See Annual Report cost breakdown	WV estimate

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Notes	Supporting Documentation
1					Inventory Sanitary Sewer Overflows	2.3.4.4		
4					Written IDDE Program	2.3.4.7		
4.1	Admin	Required by 2003 Permit	One-time		Develop and adopt a regulatory mechanism providing legal authority to municipality to regulate illicit discharges.	2.3.4.7 a	Required under 2003 Permit and should already be implemented.	Reese: 20 hours to adopt a generic ordinance for a town with 10,000 population. CWP IDDE Manual 51,000.
4.2			Assessment & Priority Ranking of Catchments			2.3.4.7 b		
4.2.1	Tech	1 year initial, update	One-time		Assess and classify each catchment into one of 4 possible categories (Excluded, Problem, High Priority, Low Priority)	2.3.4.7 c i	Cost to delineate under PAI 3.2. Will depend on availability of classification factor information. Assume 24 hours minimum to collect data, develop a matrix and rank catchments. Increase up to 60 hours for more complex data.	WV estimate
4.2.2	Tech	1 year initial, update annually	One-time		Priority rank each catchment within each category (except those "excluded") using 8 factors (past complaints, poor dry weather receiving water quality, density of generating sites (e.g., car dealers, car washes, gas stations, garden centers, industrial, manufacturing), age of surrounding development & infrastructure, sewer conversion, historic combined sewer, density of aging septic systems, culverted streams. May also consider drinking water supplies, shell fishing areas, beaches or recreation waters, impaired waters.	2.3.4.7 c ii & iii		
4.2.3	Tech		Annual	x	Update assessment & priority ranking annually based on results of screening and new information and include in annual report. Include listing of all catchments and results of ranking, summary of evidence of known or suspected illicit discharges and SSOs by catchment, corrective measures taken or planned, schedule for completing and verifying measures correcting the confirmed illicit discharges and SSOs.	2.3.4.7 c iii	Varies depending on the amount of construction or newly identified outfalls per year and the amount of updated screening information. Assume 0-40 hours per year to update ranking with new information.	WV estimate
4.3			Outfall and Interconnection Screening and Sampling			2.3.4.7 d		
4.3.1	Tech	1 year	One-time		Develop written procedure for screening and sampling of outfalls - include sample collection, use of field kits, storage and conveyance of samples. Adopt a screening and sampling protocol consistent with EPA New England Bacterial Source Tracking Protocol (Draft 2012) (Appendix I).	2.3.4.7 d i & ii	Covered under 4.5.1.	Haverhill: \$4,200.
4.3.2	Tech	3 years	One-time cost spread over a 3-year period		Perform dry weather screening of every outfall (if inaccessible, proceed to first accessible upstream structure) when and how prescribed; identify in annual report any follow-up needed. Begin investigations within 15 months of effective date.	4.7 d iii & 2.3.4	Field mapping and dry weather sampling assumes 2 personnel per day at an average of 16 outfalls per day (based on CEI experience of performing outfall investigations). Equipment/lab includes one-time purchase of a multi-meter and field kits/lab tests for remaining parameters. Note: field efforts from PAI 2.1 combined with this PAI. Assume additional 40-80 hours for mapping and report preparation, which would include reporting for items PAI 4.3.2, 4.3.3 and 4.4.4.	CWP IDDE Manual - 20K-52.2K per 20 samples for analysis only. Low assumes in-house analysis for Flow Chart Method & high assumes contracted lab analysis of 11 parameters. CWP's inspection costs were based on value of stream extraction.
4.3.2.A			Intermittent		Perform follow-up sampling to identify source if outfall sample comes back dirty.	2.3.4.2 a	Permit just says to find source and remove. Assume there will be some follow-up sampling to do this. Assume a field crew of 2 people for 8 hours to investigate each incident, with up to 6 incidents per year. Assume an additional 5 samples per incident to help identify the source.	WV estimate
4.3.3	Tech	10 years	One-time cost spread over a 10-year period		Perform wet weather screening for outfalls with identified System Vulnerability Factors.	7 d iv & 2.3.4.7	Low assumes SVF applying to 25% of outfalls, high assumes 75%. Assume 5 outfalls per person per day. Note there can be substantial variation when performing wet weather sampling. To be completed as catchment investigations are completed, so assumed it was spread evenly over 10 years (e.g., represents half the total cost will occur in the first five years). Annual reporting and mapping costs included under PAI 4.3.2.	WV estimate
4.3.4	Tech	see dry & wet weather screening	One-time		Sample dry and wet weather flows for ammonia, chlorine, conductivity, salinity, E coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 d v	Included in 4.3.2 and 4.3.3.	WV estimate
4.3.5	Admin		Annual	x	Report screening data annually; identify any follow-up needed. Include date, outfall ID, location, weather conditions, precipitation in previous 48 hours, field screening parameter results, and results of all analyses.	2.3.4.8 a & 4.3.b	Costs included in other tasks.	WV estimate

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

No.	Type of Action	Time from Effective Date	Frequency	Permit Deliverable	Illicit Discharge Detection and Elimination Requirement	Reference	Notes	Supporting Documentation
1					Inventory Sanitary Sewer Overflows	2.3.4.4		
4.4					Catchment Investigation Procedure	2.3.4.7 e		
4.4.1	Tech	1 year	One-time		Develop written Catchment Investigation Procedure including review of maps and historic records; a manhole inspection methodology; and procedures to isolate and confirm sources of illicit discharges. Include in written IDDE Plan.	2.3.4.7 e	Costs included under PAI 4.3.1	WV estimate
4.4.2	Tech	1 year initial, update annually	One-time		Review sanitary sewer and storm sewer construction plans for each catchment. Identify and record the presence of System Vulnerability Factors: history of SSOs; areas that could readily result in SSOs; inadequate sanitary sewer level of service; common or twin-invert manholes serving storm & sanitary alignments; common trench construction serving both storm & sanitary; crossing of storm & sanitary; sanitary sewer with possible underdrain; sanitary sewer defects areas formerly served by combined sewer; sanitary sewer & storm drain infrastructure greater than 40 years old	2.3.4.7 e i	Assume 16 hours for rural communities with no sewer to assess system vulnerability factors. Assume 40 hours for towns with sewer.	WV estimate
4.4.3	Admin		Annual	x	Document and annually report presence or absence of the 12 System Vulnerability Factors for each catchment.	2.3.4.7 e i	See Annual Report cost breakdown	WV estimate
4.4.4	Tech		One-time cost spread over a 10-year		Perform dry weather investigation of key junction manholes by opening and inspecting for visual and olfactory evidence of illicit connections.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	If a Town's system has not yet been mapped and will be through field mapping, then the costs will be covered under PAI 3.1. If the system is already mapped and only need to perform the catchment investigation, then use this cost. Costing assumes 20% of catch basins are KIMs as a low, or 3 per outfall for a high and covers investigation of all, which needs to be spread over 10 year period based on prioritization. Assume 30 structures per day with 2 field personnel. Additional annual reporting covered under PAI 4.3.2. Assume some additional funding for travel time and miscellaneous equipment.	WV estimate
		3 years			*In a minimum of 80% of the MS4 area serviced by Problem Catchments within 3 years and 100% within 5 years	2.3.4.8 c i		
		5 years			*For all catchments where sampling indicates sewer input within 5 years	2.3.4.8 c ii		
		10 years			*In 40% of all area served by all MS4 catchments within 5 years and in 100% of 4 area in 10 years	2.3.4.8 c iii		
4.4.5	Tech	see catchment investigation schedule			Sample dry flows at key junction manholes for ammonia, chlorine, conductivity, salinity, E.coli (freshwater) or enterococcus (saline or brackish), surfactants, and temperature. All analyses with the exception of indicator bacteria can be performed with field test kits or field instrumentation.	2.3.4.7 e ii a & 2.3.4.8 c i,ii,iii	Assumed 10% would have dry weather flows (same assumption as flowing outfalls) and applied per sample costs, with purchase of meter covered under outfall screening and sampling.	WV estimate
4.4.6	Tech	see wet weather screening			Perform wet weather screening for outfalls with identified System Vulnerability Factors. Sample for same parameters as dry weather flows.	2.3.4.7 d iv & 2.3.4.7 ii b	Included in 4.3.3.	WV estimate
4.4.7	Admin		Annual	x	Track progress of Catchment Investigations in each annual report.		See Annual Report cost breakdown	WV estimate

Minimum Measure #3: IDDE

Task Description and Cost Breakdown

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