

# CERTIFICATION FOR INSPECTION AND MAINTENANCE OF STORMWATER BMPS

Maine Department of Environmental Protection

DEPLW1115 -12/2009

Municipalities that are regulated under the Maine's Municipal Separate Storm Sewer Systems ("MS4") program require that the person who conducts post-construction inspections of Stormwater Best Management Practices (BMPs) at the facilities in their town be qualified as a Post-Construction Stormwater Inspector and must demonstrate the following competencies:

- The understanding of the design and performance requirements of stormwater management BMPs as specified by the permit standards as found in the Maine Stormwater Management Law, Chapter 500 and in the Maine's Stormwater BMP Manual.
- Qualifications:
  - a. A college degree in environmental or civil engineering and is a professional engineer with at least three years of experience designing, evaluating or inspecting stormwater management facilities; or
  - b. A college degree in an environmental science or civil engineering, or comparable expertise, and has demonstrated a practical knowledge of stormwater hydrology and stormwater management techniques, including the maintenance requirements of Stormwater BMPs, and has the ability to determine if these structures are performing as intended. This qualification must be accompanied by two professional references to be valid; or
  - c. The successful completion of a DEP test on inspecting and maintaining stormwater BMPs. Note: successful completion requires a score greater than 85% (65 correct answers out of 75). The applicant may resubmit his test provided that at least 30 days has passed.

*Note:* Regulated MS4 municipalities may be more restrictive in their requirements.

## Useful Background Information

State of Maine Stormwater Management Rules and Site Location of Development Law

<http://www.maine.gov/dep/land/stormwater/index.html>

Maine Stormwater Best Management Practices Manual

<http://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html>

Maine Erosion and Sediment Control BMPs

<http://www.maine.gov/dep/land/erosion/escbmps/index.html>

Maine Municipal Separate Stormwater Sewer Systems (MS4s) Program

<http://www.maine.gov/dep/land/stormwater/MS4.html>

EPA guidance document, National Management Measures to Control Nonpoint Source Pollution from Urban Areas (November 2005, EPA-841-B-05-004)

[http://www.epa.gov/owow/nps/urbanmm/pdf/urban\\_ch11.pdf](http://www.epa.gov/owow/nps/urbanmm/pdf/urban_ch11.pdf)

Center for Watershed Protection under STP Maintenance Resources

<http://www.stormwatercenter.net/>

Any other information pertaining to the operation and maintenance of BMPs may be appropriate but common sense is necessary. Contact Marianne Hubert at (207)215-6485 with your questions.

**CERTIFICATION FOR INSPECTION AND MAINTENANCE OF BMPS  
ANSWER SHEET**

<b>Name:</b>	<b>Date:</b>
<b>Company:</b>	
<b>Address:</b>	
<b>Email Address:</b>	<b>Phone #:</b>

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
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CERTIFICATION FOR INSPECTION AND MAINTENANCE OF STORMWATER BMPS  
TEST QUESTIONS

Department of Environmental Protection

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*This is a multiple-answer test but there is only one correct answer for each question.*

*Chose the answer that is most correct!*

Send or fax the answer sheet to:

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1. As slopes get steeper, the length of buffers must generally be:
  - A. Shorter
  - B. Longer
  - C. Buffer length does not need to be adjusted with slope
  - D. None of the above
  
2. Forested buffers benefit water quality by:
  - A. Slowing surface water down so it loses energy and drops sediment
  - B. Providing shade for the waterbody, which lowers water temperatures
  - C. Providing habitat for fish when trees from the buffer fall into the water
  - D. All of the above
  
3. Trees should never be removed from a forested buffer area:
  - A. True
  - B. False
  
4. Streams flowing through forests are usually \_\_\_\_\_ than streams in non forested areas
  - A. Deeper
  - B. Faster moving
  - C. Richer in habitat
  - D. Narrower
  
5. The 50% rule of thumb states that:
  - A. Buffers are only needed on 50% of streams
  - B. Buffers are needed on slopes 50% or greater
  - C. No more than 50% of the trees in a buffer should be cut in any year
  - D. None of the above
  
6. Dredging a wetpond is necessary for it to operate as designed if:
  - A. Slope stabilization vegetation is lost
  - B. Invasive plants take over
  - C. Sediment accumulation reduces storage volume
  - D. Debris block the outlet structure
  
7. What are the visual signs that indicate the need for wetpond rehabilitation?
  - A. A high permanent pool level several days after a storm
  - B. A permanent pool level below the gravel bench

- C. Aquatic plants are growing out into the center of the pond
  - D. All the above
8. A wetpond outlet structure must be maintained or replaced if:
- A. It is totally clogged with leaf litter
  - B. The pipe is eroding out
  - C. The structure is floating
  - D. All the above
9. A clogged orifice within a wetpond's outlet control structure will cause:
- A. Water to back-up into the inlet pipe preventing adequate up-gradient drainage
  - B. Overtopping of the pond's emergency spillway
  - C. An increase in the drawdown time of the channel-protection volume through the wetpond's underdrained gravel trench outlet
  - D. All the above
10. There is evidence of soil piping along the wetpond's outlet pipe and you will report that:
- A. It is bad construction
  - B. It is bad engineering design
  - C. It is a lack of maintenance
  - D. Repairs are necessary
11. What is acceptable stabilization on a pond embankment?
- A. Regularly mowed grass with some bare spots
  - B. Riprap with emergent trees and shrubs
  - C. Weedy meadow grass
  - D. Purple loosestrife, it is invasive but pretty
12. What are the key areas of a wetpond that must be inspected?
- A. The plunge pool and the forebay
  - B. The outlet structure and level spreader
  - C. The downstream and upstream faces of the embankment
  - D. All the above
13. A wetpond has obviously lost capacity. As an inspector, what do you need to do?
- A. Report it to the owner and include a description/photographs in the inspection report
  - B. Instruct the owner to plan on maintenance
  - C. Consider that it will be acceptable for several more years
  - D. A and B**
14. As an inspector, what will potentially be the most irritating aspect(s) of inspecting a wetpond?
- A. The access is overgrown with vegetation or non-existent
  - B. The embankment is too steep to access the outlet structure
  - C. There is no legal access easement
  - D. All of the above
15. A beaver lodge is apparent against the embankment of the pond. What do you do?
- A. Take a photo of the little fellow
  - B. Recommend trapping and ask for the fur
  - C. Recommend the installation of a beaver deceiver

- D. Recommend that all nearby trees are removed to eliminate the food source
16. What must be included in an inspection report?
- A. A list of the problems found and the needed corrective actions
  - B. Photographs
  - C. A letter stating that the site was visited and inspected
  - D. All the above
17. Who can identify problems with a BMP?
- A. A professional engineer
  - B. Municipal CEO or road maintenance crew
  - C. The owner of the facility or a concerned neighbor
  - D. All the above
18. What is the most important item when inspecting a wetpond?
- A. Hip boots to go in the water to check the outlet for clogging
  - B. Engineered design and drawings for the wetpond
  - C. The name of the contractor who built the structure
  - D. A flashlight to see into the riser structure
19. What is the most critical operational feature of an infiltration basin after 5 years?
- A. That bare ground be visible to allow good infiltration between the plants
  - B. That the accumulated sediments are not impacting the infiltration rate
  - C. That the outlet structure is free flowing and clear of debris
  - D. That a good growth of cattails has taken hold in the basin
20. What must be provided in a report for a site that contains multiple BMPs?
- A. Whether the roadside swales are stable, vegetated and free from debris
  - B. The name of the maintenance contractor for the facility
  - C. Whether buffers were altered
  - D. All the above
21. What may be required maintenance of ditches on a 5-10 year cycle?
- A. Mow ditch and clear culvert outlets of debris
  - B. Remove collected sediment and reestablish the vegetative cover if necessary
  - C. Remove false berms along road shoulder
  - D. All the above
22. What should be done when small trees are growing on the embankment of a wetpond?
- A. Do nothing, it is stable and not interfering with anything
  - B. Use a backhoe and remove the stumps
  - C. Cut the down trees to at or near ground level
  - D. Use lots of herbicide and leave the trees in place
23. When should the maintenance of a stormwater BMP include a DEP permit modification?
- A. When reforming a ditch
  - B. When removing sediment from a filter basin and replacing the filter media
  - C. When replacing a failed outlet structure to the original design specifications
  - D. When re-orienting a pond's discharge outlet to prevent reoccurring erosion

24. The Maine erosion control law requires that all chronic erosion problems be addressed:
- A. Everywhere in the state of Maine by 2010
  - B. Only in most-at-risk lake watersheds
  - C. Only during construction
  - D. It is no longer applicable
25. How can you determine whether a filter basin isn't draining properly?
- A. Staining of the filter media by anaerobic decomposition
  - B. Checking 2 days after a rain event for standing water
  - C. The basin is full of water and there is no discharge from the underdrain pipe
  - D. All the above
26. What needs to be done when there is siltation within a filtration basin?
- A. Excavate and replace all the filter media
  - B. Rake the sediments
  - C. If it isn't draining properly, roto-till the surface and reestablish a grass cover
  - D. Cover the sediment with mulch
27. Your client is purchasing a new facility that has a DEP permit and the former owner never maintained any of the BMPS. What needs to be done?
- A. Compare the engineering design approved by the DEP with the facility built on the site
  - B. Evaluate all BMPs for their presence and effectiveness
  - C. Request a certification from the former owner that all BMPs are functioning as intended prior to purchase
  - D. All of the above
28. An infiltration basin is right in the middle of the development and the owner is parking all his mowing equipment within the structure. As an inspector, what do you do?
- A. Don't worry about it since it is only used in the summertime
  - B. Report it on your inspection report
  - C. Recommend the owner to establish a new equipment storage location.
  - D. B and C
29. What is the rehabilitation for a filter basin that is overgrown with woody vegetation?
- A. Use herbicides
  - B. Do nothing as it is well vegetated and can function several more years
  - C. Remove woody vegetation manually using a hand-held brush cutter, chainsaw, string trimmer or shear/clipper
  - D. Replace the filter media
30. No vegetation is growing within a filter media basin. What needs to be done?
- A. Remove and replace the full thickness of the media
  - B. Roto-till, seed and mulch the filter media surface
  - C. Do nothing as it is draining well
  - D. Apply some fertilizer
31. Based on the DEP permit, the project was never completed. What needs to be done?
- A. Report only on the existing conditions
  - B. Ignore it, the permit is still current
  - C. Instruct the owner that future construction may need a new DEP permit.

- D. A and C
32. The stormwater management rules require that 5, 10, 15.... years from the permit date, a project must be recertified and that a report be provided to the DEP identifying that
- A. All areas of the project are stable and erosion free
  - B. All stormwater management structures are maintained and operating as designed
  - C. That a maintenance log is kept up-to-date and maintenance actions followed through.
  - D. All the above
33. Each facility owner should be able to produce a maintenance plan and keep an inspection maintenance log of the facility for the last 3 years.
- A. True
  - B. False
34. Why must BMPs be maintained?
- A. Because the DEP requires it
  - B. Because without maintenance, BMPs will eventually fail
  - C. Because winter sand is known to clog BMPs
  - D. All the above
35. As an inspector, what is the most common maintenance issue you may experience?
- A. Difficulty cleaning the BMP without the expense of complete renovation
  - B. Lack of ability to see if the system is full
  - C. Lack of understanding by owner concerning maintenance
  - D. All the above
36. Why must a wetpond be maintained?
- A. To increase its storage volume and decrease its pollutant removal efficiency
  - B. To re-establish its storage volume and increase its pollutant removal efficiency
  - C. To provide habitat for the bugs and bunnies
  - D. None of the above
37. Pre-treatment devices are important because:
- A. They are designed to self-clean during a very large storm
  - B. They can be designed to remove several pollutants such as sediment, oil and grease
  - C. They are designed to by-pass when the structure is full
  - D. All the above
38. A BMP operation and maintenance plan:
- A. Lists all BMPs and their installation cost
  - B. Should outline labor requirements and maintenance frequency
  - C. Is of no concern to the owner and is only needed for the DEP Permit
  - D. All the above
39. A BMP maintenance plan:
- A. Should be specific to the project
  - B. Should specify inspection frequency and anticipated BMP maintenance requirements
  - C. Should be understood and endorsed by the owner
  - D. All the above

40. The maintenance needs for a large parking lot should include:
- A. Sweeping the parking lot with a vacuum sweeper at least once per year
  - B. Nothing, rain and snow melt will wash them clean
  - C. Sweeping the sediments to an unused corner and left there
  - D. Using only salt, to cut down on the sediments and eliminate sweeping requirements
41. The long-term plan for meadow buffers includes?
- A. That they revert to forest over time
  - B. That grass is mowed no shorter than 6 inches and not more often than twice a year
  - C. That they will be a habitat for wildlife
  - D. All the above
42. Culverts should have:
- A. Both ends hidden by tree growth
  - B. An outlet that is above its plunge pool so it can clear itself of sediments
  - C. No sediment within the structure and with both ends stabilized with either riprap or vegetation
  - D. All the above
43. The 5-year recertification requires that:
- A. All stormwater BMPs are stable and operating as intended
  - B. All stormwater BMPs have been upgraded and replaced
  - C. All stormwater BMPs are constructed as designed
  - D. All the above
44. The 5-year recertification of stormwater management structures:
- A. Should be conducted independent of discussions with area residents to avoid bias
  - B. Should include field reconnaissance to identify drainage patterns
  - C. Can be completed at an off-site location with the benefit of Google and published resource data
  - D. Has been simplified through Chapter 500 Regulations
45. Water quality enhancements as required by Chapter 500 Regulations:
- A. Reduce the hydraulic head required for the systems to function
  - B. Present challenges to design due to hydraulic head limitations some of which can be met through innovative designs
  - C. Require the groundwater table to be lowered
  - D. Save money and allow development density to be increased
46. Stormwater systems design requires:
- A. Geotechnical input to the design process
  - B. Soil Scientist input to the design process
  - C. Client input into the solution
  - D. All of the above
47. Filter BMPs must be designed for winter conditions because:
- A. Freezing is not a concern due to global warming and climatic change
  - B. They need a forebay for storage of winter sand to prevent sediment from entering into the treatment basin

- C. Freezing is not important if the area is used for snow storage since the snow will insulate the system
  - D. It is a challenge that is of concern to the designer only
48. Chapter 500 compliant stormwater systems:
- A. Often require special provisions for bypass during construction
  - B. Have reduced life cycle costs since O&M is essentially eliminated
  - C. Are of concern since they promulgate West Nile virus
  - D. All of the above
49. What qualifications should a stormwater inspector have?
- A. Professional engineering license, degree in environmental science, or other demonstrated training or experience as approved by the municipality or permit writer
  - B. Practical knowledge of erosion control practices and stormwater hydrology
  - C. Ability to read, understand, and articulate permit conditions to owner and operator concerning BMP deployment and stormwater management
  - D. All of the above
50. In general, the best time to conduct a BMP inspection is?
- A. In the winter time
  - B. At a prearranged time of the day and week agreeable to all parties
  - C. Preferably during or shortly after a rain event
  - D. All the above
51. When should inspections be performed?
- A. When there is no snow on the ground
  - B. At the request of the owner, operator or developer
  - C. Over several visits if necessary
  - D. All the above
52. Whom does the stormwater inspector answer to?
- A. The owner or contract writer
  - B. The site contractor and the design engineer because their craftsmanship may be commented on
  - C. The DEP under the 5-year recertification requirement
  - D. All the above
53. Choose all that apply to being a stormwater inspector?
- A. An inspector does not need a CPESC or a P.E. license
  - B. The inspector decides which BMPs are in compliance and which BMPs require maintenance
  - C. The inspector should offer maintenance guidance to the owner or operator
  - D. All of the above.
54. Which of the following treatment process in a wetpond insures that the discharge will be at or near ambient soil temperatures?
- A. Sedimentation action
  - B. Filtration action through soil into tile pipes
  - C. Biological metabolic action
  - D. Various chemical reaction actions

55. Which type of embankment cracking is most critical to dam safety?
- A. Longitudinal – along the length of the dam
  - B. Transverse – perpendicular to the CL of the dam
  - C. Transverse – along the CL of the principal spillway
  - D. All the above
56. Which embankment seepage problem is important to embankment stability?
- A. Softness on lower portions of the downstream slope of the dam
  - B. Boils or underwater “ant hills” at the downstream toe
  - C. Sink holes around the outside of the intake structure, or anywhere along the upstream face of the dam
  - D. All of the above
57. What is the proper micro-topography of a buffer?
- A. Flow paths within the buffer that will converge after 200 feet
  - B. A buffer that is sufficiently steep so that runoff will never have a chance to pool
  - C. A surface floor where the flows will remain well distributed
  - D. Multiple channels where runoff can concentrate
58. Level spreaders discharging to a buffer should:
- A. Allow overflow at the end of the spreader
  - B. Be made of riprap, the larger size the better
  - C. Be on the contour line and level
  - D. All the above
59. A roadside buffer adjacent to the down gradient side of the road:
- A. Disperses runoff from the ditch
  - B. Cannot be on a slope steeper than 20 % or in wetland
  - C. Is sized is based on soil type
  - D. All the above
60. The proper design for a ditch turnout buffer is:
- A. To treat up-gradient areas at the end of a road cross culvert
  - B. To not size it based on soil type
  - C. To size it based on the length of road draining to it
  - D. To have it drain to a wetland
61. Pollutants of concern at a facility may include:
- A. Trash and litter
  - B. Fugitive dust and soil
  - C. Oil dripping from construction equipment
  - D. All the above
62. What is considered a non-stormwater discharge?
- A. Snow melt saturated with salt and sand
  - B. Truck washing
  - C. Sheet flow across a commercial business’ parking lot
  - D. Roof runoff onto the landscape of a building’s foundation
63. Stormwater underdrained basins are useful for?

- A. Snow storage during the winter and a playground in the summer
  - B. Detaining water so it has time to drop its sediment load
  - C. Filtering runoff through a very specific filter media
  - D. All the above
64. Oil/water booms are observed within catchbasins, what do you do?
- A. Remove them and toss them in the trash because the site was built 5 years ago
  - B. Do nothing because they must be there for a good purpose
  - C. Document occurrence on the inspection and notify the owner that the DEP has requirements for proper disposal
  - D. Remove them and replace them
65. Proper Catch basin maintenance should include:
- A. Vacuuming sediments when there is a visible accumulation
  - B. Annual inspections
  - C. Proper disposal of sediments and other contents in accordance with State law
  - D. All the above
66. Winter sand should be removed annually and disposed of appropriately:
- A. From parking lots and access road
  - B. From within roadside ditches
  - C. Along road shoulders
  - D. All the above
67. What is required to fix an obvious slump along a wetpond embankment?
- A. Over-excavate the slump and replace with compacted material containing a lot of fines
  - B. Add riprap on top and remove the sediments from the buffer below
  - C. Dump a truck load of fill and cover with mulch and seed
  - D. Do nothing, it is bound to reach an equilibrium
68. For the 5-year maintenance recertification:
- A. The erosion control law does not apply
  - B. Problems encountered should not be reported, it may make the design engineer look bad
  - C. Both A and B
  - D. None of the above
69. Following your report, the responsibility of the owner is to:
- A. Fix all identified problems
  - B. Report to the DEP the outcome of the inspection
  - C. Continue routine inspections and maintenance and keep a log
  - D. All the above
70. What are the functions of a buffer?
- A. Intercept and uptake of runoff
  - B. Provide green space
  - C. Reduce the velocity of stormwater runoff and increase the quality of stormwater runoff
  - D. All of the above
71. What is not an appropriate stormwater treatment buffer?
- A. An area down gradient of a road that has been deeded as a buffer

- B. A buffer that is not identified on the project's design plans
  - C. A buffer which receives less than 150 feet of sheet flow through a development
  - D. An area down gradient of a water quality designed level spreader
72. Your client is purchasing a new facility that has a DEP permit and the former owner never maintained the BMPS. What is your first step?
- A. Compare the engineering design as approved by the DEP with what is found on site
  - B. Drain the wetponds to inspect outlets and remove sediments
  - C. Sweep parking lot and clean catchbasins
  - D. All the above.
73. What needs to be done when there is visible siltation downgradient of a level spreader?
- A. Remove as much of the sediment as possible and mulch.
  - B. Ignore the sediments as the downgradient buffer is performing as designed
  - C. Fix erosion problems upgradient if necessary, collect and remove as much of the sediment as possible and reestablish a vegetated cover
  - D. Remove the level spreader
74. The spillway on the berm of a wetpond always seems to be running. Is this a problem?
- A. Yes, the outlet structure has collapsed or failed
  - B. No, the plans indicate that it is the only outlet
  - C. Yes, the drainage to the pond has been altered and the pond is receiving more flow than designed for
  - D. All the above
75. Why am I trying to obtain this certification as a qualified post construction stormwater inspector?
- A. to meet the requirement of the Stormwater management rules, Chapter 500
  - B. To gain training certification credits for my professional license
  - C. To meet the conditions of the MS4 program and to be able to inspect facilities in municipalities requiring this certification
  - D. All the above