

6. OPTIONAL MEASURES



At the Tier A Municipality's discretion, the stormwater program may also include Optional Measures, which are best management practices that are not implemented for Statewide Basic Requirements or Additional Measures, but that prevent or reduce the pollution of the waters of the State. These Optional Measures (OMs) are voluntary best management practices (BMPs) that may further enhance a Tier A Municipality's stormwater program and may target a specific pollutant of concern or problem affecting the municipality. The SPPP should include any Optional Measures

that the Municipality plans on implementing, along with an implementation schedule. If a municipality does not implement an Optional measure identified in its SPPP, the municipality will not be considered in violation of the permit.

Suggested Optional Measures

A Tier A Municipality may elect to implement one or more of the following Optional Measures, for which additional information may be found on the following pages:

- Wildlife Management (see pages 2 – 7);
- Total Maximum Daily Load (TMDL)- As an Optional Measure (see page 7);
- Retrofit of Existing Stormwater Management Measures (see pages 7 – 8);
- Road De-icing (see pages 8 – 11);
- Adoption of Abandoned Stormwater Management Facilities (see page 11);
- Planting of Native Vegetation in Existing Landscapes (see page 11);
- Road Erosion Control (see pages 11 - 12);
- Refuse Container/ Dumpster Ordinance (see page 12 – 13); and
- Digital Mapping (see pages 13 – 15).

A Tier A Municipality is not limited to these topics noted and may develop an OM on its own if the municipality believes that the OM will help to reduce or prevent the pollution of the waters of the State. Whenever an OM is implemented, it should be reviewed periodically to check its effectiveness. If the desired results are not being accomplished, the OM should either be improved, modified or abandoned.

Wildlife Management

A Wildlife Management OM focuses on the effects of a particular species. For example, the Canada goose (*Branta canadensis*) is probably the most commonly recognized bird in New Jersey, which currently is home to approximately 85,000 geese. When this population is viewed as an average number of Canada geese per unit area, New Jersey is the state with the highest density, namely 12 birds per square kilometer.

Today, the Canada geese population is broken down into two distinct groups: the migratory population and the resident population. Currently, the migratory population is below management objectives and thus, is still strictly protected by the U.S. Fish and Wildlife Service and the 1916 Migratory Bird Treaty. The resident population increased rapidly during the 1990's and peaked during 2000. After 2000, with the expansion of hunting opportunities, increases in nest and egg treatment, as well as round-up and cull operations, the resident population has decreased and remained stable the past few years. Population growth is not the major issue. It is not what geese take from their environs, but rather what they leave behind. The average Canada goose produces two to four pounds of droppings a day. These droppings can contain salmonella bacteria that persist (in wet droppings) for up to one month. Pathogens from goose droppings can cause water quality problems, including noxious algal blooms, beach closings and the spread of fowl-related diseases. When geese droppings enter the water, the nutrient level increases. This can lead to excessive plant and algal growth, which is directly related to a loss of habitat and wildlife, including eutrophication and fish kills. Eutrophication can permanently change the character of a lake by increasing the organic content, eventually converting it into marsh and land areas.

Many beach closings have also been attributed to geese. When an excessive number of geese congregate near a beach or waterway, their fecal matter can sometimes overload the normal capacity of that land area to absorb natural wastes, and thus degrade the water quality and require the area to be closed to the public.

Finally, geese can be responsible for the spread of some fowl-related diseases. Among these are as viral, bacteria and parasitic diseases to which only waterfowl are susceptible.

A Canada Geese Wildlife Management OM would, therefore, address the concerns triggered by the Canada geese in New Jersey and the impacts they have on the environment. The OM would consider their dietary needs, habitat and breeding activity:

- Canada geese are grazers; their diet consisting mainly of grasses and other green vegetation.
- Canada geese tend to be attracted to urban sites with short lawns and they will almost always choose fertilized lawns over unfertilized lawns. For these reasons, geese are often found congregating on golf courses, school grounds, playgrounds, sports fields and any other well-manicured lawn.
- Canada geese nest in the spring and nesting sites are usually surrounded by, or very close to, water.
 - Water provides the geese with access to food, drink and an escape from predators.
 - Nesting females also tend to use the same nesting site year after year, which makes it difficult to remove them once they breed in an area.
 - Once a year the geese begin a complete molt of their flight feathers. During this period, the geese will be unable to fly, thus making it necessary for them to be in areas near water with a close food source.

Management of problems associated with Canada geese requires development of an integrated damage management program that includes a variety of safe, practical, effective and legal techniques. Depending on the severity of the problem, non-lethal or lethal methods may be chosen. The management control methods listed below are only recommendations and may be implemented as needed. However, using two or more of the following techniques will provide better results than relying on just one method.

Non-Lethal Control Measures

1. Barriers

Barriers can be effective in small areas where the geese tend to walk from their feeding source to the water. A low fence or other barrier, such as high vegetation, that prevents the geese from easily moving from grassy areas to the water may be all that is needed to solve the problem. Fencing works best during the summer molt when the birds cannot fly into the water, should be 3-5 feet tall and installed during February-March to deter geese from the area prior to nesting and molting. The barriers may either be permanent or temporary.

2. Mylar Tape

Mylar is a thin reflective tape that is usually silver on one side and red on the other. It is available in various widths, but is most commonly applied in suburban goose management situations as a perimeter fence using ½" inch width tape stapled to stakes around the boundary of the protected area. Tape should be twisted and somewhat slack to permit movement. Tape is stapled to wooden stakes, which are pushed into the ground so the tape is approximately 2' above the surface of the ground. Wider widths (6 inches) are more typically used on farms, golf courses and other large acreage areas. With both widths, reinforce the ends and attachment points with strapping tape to reduce shredding and tearing. The effectiveness of mylar tape varies greatly and may be most effective when it is strung as a single line fence to guide geese towards alternate loafing areas. If no such areas exist nearby, mylar tape may be ineffective in deterring geese.

3. Scare Decoys

Scare decoys, such as the Dead Canadian Goose, will discourage geese from nesting or feeding near a body of water. This method is typically most effective where the problem area is small in size.

4. Repellants

Repellants are substances that can be sprayed on the lawn to deter the geese by making the grass taste bad to them. There are two chemical formulations registered with the USEPA as Canada goose taste repellents: anthraquinone and methyl anthranilate (MA).

- Anthraquinone is an active ingredient in the product Flight Control®. Flight Control PLUS is a spray applied to the grass that is offensive to geese, thus denying them their food source (www.flightcontrol.com).
- MA is a non-toxic taste aversion agent that renders food (grass) unpalatable to geese. Prior to using MA products, confer with the manufacturer to determine appropriate mowing, watering, and application scheduling (www.rejexit.com). Before this method is used, however, local regulations must be checked to ensure use near ponds or wetlands is permissible.

5. Sound Deterrents

Sound deterrents must be in place early in the season to be effective. Sound deterrents may be as simple as banging on ordinary pots and pans, or as complex as postil-launched pyrotechnics, firecrackers or liquid propane gas cannons. To be most effective, the sound deterrents should go off under the birds as they land. Sound deterrents are the best option for large-scale geese problems but may not be suitable for residential or public areas. Additionally, a permit to discharge a firearm may be required.

6. Visual Deterrents

Visual deterrents include items such as balloons, streamers, flags, scarecrows, lasers and beacon lighting. Large red, white, yellow or mylar balloons have been proven to be most effective. The balloons should be filled with helium and tethered on a monofilament line to scare the geese. To increase the balloons' effectiveness, large eyespots may be drawn on them. Any visual deterrent used should be moved periodically to make sure that the geese don't become accustomed to them.

7. Hazing

Hazing the geese includes chasing the geese from any area where they are not welcome. People or livestock herding dogs that are trained to chase geese can be used for hazing. Although no Federal/State permit is required to use dogs to harass geese, the dog's handler is responsible for maintaining control of the dog. If the dog inadvertently harms or kills a goose, the handler is liable for violations of Federal and State laws. This method provides effective control in areas where noise and appearance are important considerations.

8. Education

Educating the public is a very important part of wild geese management. Many times, people attract large number of these birds to an area by feeding them, which then encourages the geese to stay. An educational program should cover the following topics:

- The harmful effects of feeding geese (e.g., geese should not eat bread);
- The ideal habitat of the Canada goose; and
- What the public can do to make their properties less attractive to the geese:
 - Access to these ponds should be limited.
 - a. In the springtime, the ponds may be fenced off, or high vegetation may be allowed to grow around the pond.
 - b. If the pond has an aerator, it should be turned off in the wintertime to allow the pond to freeze over.
 - Old goose nests or old goose nest platforms should be removed. No permit is required to remove these.

Lethal Control Measures

1. Hunting

Sport hunting may reduce overall resident Canada goose populations and may reduce goose damage to tolerable levels in some site-specific areas. Several states, including New Jersey, currently have a hunting season for Canada geese.

There are presently three hunting seasons for Canada geese in New Jersey:

- September Season, open statewide during the entire month (15 daily*, 30 possessions**), where
 - * “Daily bag limit” means the maximum number of migratory game birds of a single species or combination (aggregate) of species permitted to be taken by one person in any one day during the open season in any one specified geographic area for which a daily bag limit is prescribed; and
 - ** “Possession limit” means the maximum number migratory game birds of a single species or a combination of species permitted to be possessed by any one person when lawfully taken in the United States in any one specified geographic area for which a possession limit is prescribed;
- Regular Season, open in three statewide zones with differing dates (generally 1 week in late November and 1 or 2 weeks in late December-early January) (3 daily, 6 possessions); and
- Special Winter Season, open in two separate zones during mid-January through mid-February (5 daily, 10 possessions).

More information can be found on this topic by visiting the New Jersey Fish and Wildlife webpage (www.njfishandwildlife.com) or by contacting the NJDFW (Bureau of Wildlife) office in Trenton (609-292-6685).

Waterfowl hunters must consult and comply with all regulations contained in the current NJ Fish and Game Digest which is currently available online at <http://www.njfishandwildlife.com/als/websalesintro.htm>. The current rules require waterfowl hunters to possess a NJ Waterfowl Stamp, a NJ Firearms Purchaser Identification Card and an HIP (Harvest Information Program) number which can be obtained online at <http://www.njfishandwildlife.com/als/websalesintro.htm> or from a licensing agent using the new Integrated Electronic Licensing System (IELS) or by calling the toll-free New Jersey telephone sales line at 888-277-2015. Additionally, the hunters must check and comply with State laws and county and municipal ordinances that control possession and use of firearms, hunting and creation of noise, and access onto private lands (if applicable).

2. Reproductive Control

Reproductive control can be accomplished through other activities authorized in a Federal/State permit. The permit registration process for conducting Canada goose nest and egg destruction and treatment can be accessed through USFWS at <https://epermits.fws.gov/eRCGR/geSI.aspx>. Landowners, public land managers and local governments may register at the above website to obtain federal authorization to destroy the eggs. Registration is annual and takes place between January 1 and June 30 of the year for which an entity is registered. All employees or agents who may conduct

the work on the behalf of a landowner, public manager or local government must also be registered. All listed registrants must be 18 years or older to conduct work. Active nests and eggs can only be taken between March 1 and June 30 of the year for which an entity is registered. All registered entities must return to the website by October 31 to report the number of nests with eggs that were destroyed for that year. The date (month) and location (county) for each nest must also be reported. It is required that all registrants report, even if there is “no activity” (no nest/eggs destroyed). Registrants with outstanding reports will not be able to register for future seasons.

Depending on the exact problem situations, goose nests and eggs are either removed, destroyed (buried) or treated and returned to the nest. Removal of nests is intended to deter the geese from nesting in the same area again. Treatment of eggs is typically done where the current number of geese is tolerable; however, additional birds would not be. Treatment or removal of eggs will not reduce the overall goose population but may slow its growth and make adult geese (not attached to goslings) more responsive to harassment. Additionally, fewer geese will be associated with a given property throughout the spring/summer. Approved treatment of eggs to arrest their development and eliminate hatching and production of goslings consists of shaking, puncturing or oiling the eggs. Treated eggs are returned to the nest and the adult geese remain attached to the nest site.

- Egg addling means that the eggs are shaken to mix up the contents, or a small hole is poked in the shell so that the inside can be stirred up. Both methods will destroy the egg, making sure it does not hatch.
- Egg oiling involved rubbing a thin layer of oil on the outside of the entire shell. This prevents the egg from “breathing” and suffocates it.
- Replacing the real eggs with wooden or other artificial eggs may also be effective. Remember, if the eggs are simply removed, the geese will just lay more. If the eggs are replaced with artificial eggs, though, the geese will continue to incubate them as if they were real.

The costs associated with implementing this Optional Measure can be highly variable, depending on the method(s) chosen and the frequency at which they must be repeated. Additionally, some of the options are more time consuming or require special permits, which may add to the pre-existing cost of the actual control measure.

While it is difficult to quantify the benefits an area will receive through managing geese population, it is reasonable to assume that any reductions will have a positive effect on the environment. The amount of benefits received will depend on the severity of the problem, the method(s) chosen to control the goose populations and how frequently the control methods are repeated. For more information on any of the methods listed above or other methods that are available visit, <http://www.nj.gov/agriculture/pdf/managingcanadagoosedamage.pdf>.

Geese Management Resources

More information on this topic can be found at:

<http://www.state.nj.us/agriculture/pdf/managingcanadagoosedamage.pdf>
<http://www.state.nj.us/agriculture/pdf/nestandeggpamphlet.pdf>
<http://www.state.nj.us/agriculture/pdf/pyrotechnicsforbirdmanagement.pdf>
<http://www.nj.gov/dep/dsr/trends/pdfs/wildlife-canada.pdf>

http://www.njfishandwildlife.com/waterfowl_info.htm
<http://www.njfishandwildlife.com/artmigratory17.htm>

If a Total Maximum Daily Load (TMDL) has identified fecal matter in the receiving waters in or around a Tier A municipality, the Department suggests creating stronger measures. For further information and guidance regarding TMDLs, a “TMDL Look-Up Tool” is currently available at <http://www.nj.gov/dep/dwq/msrp-tmdl-rh.htm>.

Total Maximum Daily Loads (TMDLs) - As an Optional Measure

The Tier A Municipality is required to identify and develop opportunities to address specific sources of pollutants to waterbodies with adopted or approved TMDLs. To do this, it is important to review each TMDL document and understand the pollutant of concern and potential sources. Many TMDL documents include tables with specific potential sources of the pollutant of concern and potential actions to reduce the pollutant loading to the waterbody. In addition, the Department has developed a “tool-box” of potential pollutant sources and potential responses for many common stormwater pollutants. This “tool-box” can be found at <http://www.nj.gov/dep/dwq/pdf/10-21-16-tmdl-tool-box.pdf>. Strategies to address specific sources of stormwater related pollutants found in the implementation section of an approved or adopted TMDL or those identified by the Tier A Municipality must be incorporated in the SPPP as an Optional Measure as per Part IV.C.2.a.iv of the Tier A Municipal Stormwater General Permit.

To illustrate how a municipality may identify optional measures for reducing pollutant loadings to a TMDL-affected waterbody, consider a municipality that has identified an applicable TMDL for total phosphorus. The municipality would first refer to the implementation section of the TMDL for any specific strategies listed therein. Next, the Tier A Municipality would identify potential sources of phosphorus, which may include pet and wildlife waste or illicit discharges, among many other possibilities. If pet and wildlife waste are identified as a potential problem, the municipality may choose to reduce the input of pollutants through public education and ordinance enforcement. This could include installing signs in parks and residential areas informing the public of the importance of cleaning up pet waste and not feeding wildlife. In addition, local police or another municipal authority may occasionally patrol parks to enforce the ordinances. After identifying potential strategies to address the pollutant of concern in the TMDL, the Tier A Municipality must incorporate those strategies as an optional measure. As another example, if illicit discharges are identified as a potential pollutant source, the municipality must develop more thorough measures for tracing and eliminating discharges or opt to increase fines and penalties for illegally connecting to the storm sewer system. Additionally, if, for example, a waterbody in the municipality had an adopted or approved TMDL for total suspended solids, the municipality may be able to identify old stormwater management basins and retrofit them to increase pollutant removal.

For further information and assistance regarding TMDL permit requirements, see “*Chapter 4.2: Total Maximum Daily Loads (TMDLs)*” of this guidance document.

Retrofit of Existing Stormwater Management Measures

Historically, developments were constructed with stormwater management facilities that were either intended to convey stormwater from the development site as fast as possible, or were only designed to provide detention to reduce flooding from large storm events. As a result, many existing developments discharge stormwater to MS4s without providing sufficient water quality treatment or groundwater recharge to meet current requirements or standards. In many cases, these existing BMPs can be retrofitted to provide immediate water quality benefits.

Retrofitting can be defined as expanding, modifying, or otherwise upgrading existing stormwater management measures. Examples of retrofitting include soil amendments to promote infiltration, modification of outlet structures to reduce peak flow rates and installation of trash racks to reduce the discharge of solids and floatables. As such, retrofitting stormwater management measures can increase groundwater recharge and reduce some of the adverse stormwater quantity and quality impacts caused by existing land developments. Another important benefit of retrofitting stormwater management facilities is the opportunity to correct site nuisances, maintenance problems, and aesthetic concerns. It can help a community address a particular stormwater quantity or quality problem that has developed or to resolve a problem that has been identified or required in a regional plan or TMDL.

Three important factors must be considered, aside from basic considerations such as need and cost, when evaluating retrofit possibilities: health and safety; effectiveness; and maintenance. For more information on this topic, refer to Chapter 8 of the *New Jersey Stormwater Best Management Practices Manual* available online at http://www.njstormwater.org/bmp_manual2.htm or contact the Bureau of Nonpoint Pollution Control. See http://www.nj.gov/dep/dwq/msrp_managers.htm for a list of specific points of contact for each Tier A Municipality.

Road De-icing

Road de-icing is a common practice during and after winter storms. It involves applying rock salt (NaCl) or other types of de-icing materials to lower the freezing temperature of precipitation, thereby allowing the frozen precipitation to melt and make roadways safer for travel during inclement weather. Excessive use of de-icers can be environmentally detrimental due to increasing sediment loads and soluble materials entering surface and ground water. The excessive use of de-icers may adversely affect roadside vegetation, pollute waterways and/or groundwater, as well as adversely affect aquatic life or cause corrosion.

The use of road salt is a public safety issue as well as a water quality issue. None of the recommendations here are to be construed as advocating the reduction of de-icing efforts to the point of jeopardizing public safety. Rather, most are simple techniques that can be easily integrated into existing de-icing practices that can reduce the impact on surface and ground water quality, as well as other environmental impacts.

Road salts were identified in the early 1970's as a pollutant source after high levels of sodium, calcium and chloride were found in public water supply wells. Aside from contaminating portable surface ground water, high levels of sodium chloride can kill roadside vegetation, impair aquatic ecosystems and corrode infrastructure such as bridges, roads and stormwater management devices. Application of typical de-icers and alternative de-icers should be considered when formulating a de-icing policy. New, safer alternatives are being developed that may lessen our dependence on traditional de-icers. Alternative de-icing materials and techniques should be considered whenever possible.

Application of De-icing Materials

In general, the DEP promotes the smart use of salt and other de-icing materials. This concept encourages municipalities, commercial facilities and others to consider a wide range of options when formulating a management policy on the application of de-icing materials. These de-icing policies should take into consideration storm characteristics, roadway conditions, road characteristics, the type and availability of equipment and the availability and need of alternative de-icing practices. Salt application should be reduced and alternative de-icing practices should be incorporated in environmentally sensitive areas,

areas that drain to surface drinking water sources (reservoirs) and groundwater recharge areas (e.g., ground water supply wells and wellhead protection areas). Reduced application rates may also be considered on secondary roads or on other low traffic density roads. Another environmental concern is when excess de-icing materials are inadvertently deposited on the ground. If possible at the time, the operator should shovel the material back in the truck. If that is not possible at that time, the operator or permittee should return as soon as conditions allow and collect that material so that it does not enter the surface or ground waters of the state.

One of the most effective means in preventing over-application is the use of calibrated spreaders, which ensure delivering de-icing materials at a predetermined optimal application rate. Automated controls on spreaders are recommended to ensure a consistent and correct application. The spreader should be calibrated prior to a snow storm event and periodically during the snow seasons, regardless of whether automatic or manual controls are used. A regular schedule of maintenance for snow removal equipment (including salt spreaders) should be incorporated into a snow management policy. Poor maintenance of the snow removal equipment is often responsible for excessive salt use. Guidelines for the calibration of spreaders and determination of application rates are given in the EPA document [*Manual for De-icing Chemicals Application Practices*](#).

Salt application is recommended for snowfalls of less than two inches and for road surfaces with packed snow already on the road surfaces. A management policy of salting of roadways should consider factors such as length and duration of the snowfall and initial conditions of the roadways that will be salted. The salting of road surfaces after the snow has accumulated will only result in the applied rock salt being removed with the snow when the roadway is plowed.

De-icing Materials and Alternatives

In most instances, winter de-icing materials consist of rock salt (NaCl) or a combination of rock salt and sand. The effectiveness of this mixture is significantly reduced at temperatures below 25 degrees Fahrenheit. As a result, it is not practical to increase the amount of rock salt when spreading below this minimum temperature limit. At temperatures lower than 25 degrees Fahrenheit, rock salt can be applied with calcium chloride (CaCl), which increases the effectiveness of the de-icer at temperatures down to -25 degrees Fahrenheit.

Various mixtures of sodium chloride, calcium chloride and sand can be used depending on the sensitivity of the area. Pre-mix is 3.5 parts sodium chloride and 1-part calcium chloride by weight. Use of higher ratios of calcium salts is recommended environmentally since calcium poses fewer problems than sodium.

New de-icing materials are periodically developed which are more environmentally friendly and can be used in sensitive areas or as an alternative to traditional de-icers. In some instances, the costs of these new materials are prohibitive on a large-scale basis, but they could be used in smaller target areas. A list of common de-icing materials and comments regarding their use is provided below.

One of the best alternative to de-icing materials is sand. Sand has no de-icing properties, but when used as a mix with rock salt, it can be helpful in areas where increased traction is needed and a reduction of rock salt is desired. Ash and cinders are another low-tech alternative to calcium chloride. While using sand, gravel, ash and cinders reduce the amount of sodium, these materials have their own environmental problems; specifically, they cause sedimentation and increased suspended solids in receiving waters.

NOTE: Although a list of de-icing materials is provided below, this is for informational purposes only and the New Jersey Department of Environmental Protection does not specifically promote the use of any specific de-icing products.

- Calcium Chloride:
 - Has a lower freezing point than rock salt;
 - Absorbs moisture readily and stays on the pavement longer than rock salt; and
 - Is used in “wetting” of roadways prior to snowfall.
- Calcium Magnesium Acetate:
 - Is less effective than rock salt; and
 - Is better environmentally than rock salt.
- Magnesium Chloride:
 - Is as effective as calcium chloride in adhering to the road surface; and
 - Has a freezing temperature comparable to calcium chloride.
- Potassium Acetate:
 - Does not contain chloride, which can be toxic to plants and aquatic life;
 - Does not cause corrosion; and
 - Has a low environmental impact.
- Potassium Chloride:
 - Is similar in performance and cost to calcium chloride and magnesium chloride; and
 - Contains chloride, which can be toxic to plants and aquatic life.
- Urea:
 - Is less corrosive than rock salt; and
 - Has little to no effect on roadside vegetation.

Reduction of the Application of De-icing Materials

Remote sensors along roadways can be used to determine which parts of roadways have ice on them. Some sensors can detect ice as thin as 0.005 inches. Using this technology could enable the effective delivery of de-icing material to sections of roadway that need it most rather than spreading on the entire roadway.

Structural controls are another way to reduce over-application of de-icing materials. Snow fences are used to keep snow from being blown into drifts on roadways. Studies show that fences minimize costs associated with snow clearing, reduce the formation of compacted snow and reduce the need for de-icing chemicals. Mechanical snow removal costs approximately 100 times more than trapping snow with fences.

Adoption of Abandoned Stormwater Management Facilities

Stormwater management facilities, such as stormwater management basins, grass swales and dry wells, are stormwater BMPs that are used to reduce flooding, improve stormwater runoff quality, promote

groundwater recharge or convey stormwater runoff. Stormwater management facilities are frequently used to comply with municipal, county or state design and performance standards.

After construction, ownership of stormwater management facilities is often transferred from the developer to a private owner such as a homeowner's association, a retail management company or a commercial facility. Often, private owners lack the knowledge, desire or funds to maintain stormwater runoff control facilities. Subsequently, the lack of maintenance results in decreased efficiency and other problems. This Optional Measure encourages the Tier A Municipality to take over the operation and maintenance of unmaintained stormwater management facilities.

Planting of Native Vegetation in Existing Landscapes

For new development and redevelopment projects, the Stormwater Management rules require low maintenance landscaping that encourages the retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides. The Department recommends that, as an Optional Measure, the Tier A Municipality incorporates these same concepts into its own existing developed areas and open space and provides incentives for other property owners to do the same. Planting native (or well-adapted) trees and shrubs in a watershed can help restore a healthy stream environment. Plantings help to improve local water quality by preventing erosion, slowing stormwater runoff and provide food and shelter for wildlife. New Jersey Watershed Ambassadors can help organize and implement volunteer plantings. Information on the New Jersey Watershed Ambassadors program may be found at <http://www.nj.gov/dep/wms/bears/amicorps.htm>. For more information on landscaping and native species, see Chapter 7 of the New Jersey *Stormwater Best Management Practices Manual* available online at http://www.njstormwater.org/bmp_manual2.htm.

Road Erosion Control

New Jersey has approximately 35,600 miles of roads and more highways, per square mile, than any other state. Erosion along these streets, highways and other roads contributes suspended solids, sediment and other materials and pollutants to storm sewer systems and waterways.

Vegetative cover (including the root system) plays an important role in preventing erosion by:

- Shielding the soil surface from the impact of falling rain drops and flowing water;
- Reducing the velocity of runoff;
- Maintaining the soil's capacity to absorb water; and
- Holding soil particles in place.

In addition, vegetative cover may also be effective at removing heavy metals from runoff. However, relying upon vegetation to control erosion may require frequent monitoring, especially in the early stages when new vegetation is being established. Standards for vegetative cover, as well as other stabilization practices are found in the *Standards for Soil Erosion and Sediment Control in New Jersey* (N.J.A.C. 2:90-1), which can be found online at <http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf>.

Sedimentation or deposition of material eroded by runoff from roads and roadsides may have significant impacts on water quality, and when not maintained, roadside erosion can significantly contribute to the

pollutant loading of stormwater runoff. Sedimentation not only causes an increase of municipal costs for ditch, culvert and catch basin cleaning, it is also one of the major contributors of pollution to our nation's waters. Sedimentation can lead to a decrease in water carrying and storage capacities of streams and reservoirs, as well as destroy fish and other aquatic habitats. For example, sedimentation can fill the pores between gravel and cobble stream bottoms, greatly decreasing the spawning areas for many fish species (including native trout) and the habitat for benthic macroinvertebrates, which serve as food for many fish species.

The Department is recommending that, as an Optional Measure, the Tier A Municipality develops a program to detect and repair erosion along the streets (including roads and highways) operated by the municipality and to regularly inspect and maintain the stability of shoulders, embankments, ditches and soils along these streets to ensure that they are not eroding and contributing to the sedimentation of receiving waters. This recommendation for road erosion control is limited to streets, shoulders, embankments, ditches and soils for which the Tier A Municipality has, alone or in conjunction with other persons or entities, primary management and operational decision-making authority. In some instances, these areas may not include the entire municipally owned right-of-way. Any repairs should be made in accordance with the *Standards for Soil Erosion and Sediment Control in New Jersey*, as referenced above.

Refuse Container/ Dumpster Ordinance

The way we design and maintain our dumpsters can have a direct effect on our storm sewers. During a rain storm, dumpsters with missing drain plugs, or rusted out areas, that have no lid or cover above, can discharge liquid onto the ground and into our storm sewers and waterways. The Department recommends that, as an Optional Measure, all refuse containers and dumpsters that are owned and operated by the Tier A Municipality be in good shape (no rusted-out bottoms) and have lids to ensure both that wind does not blow the contents out of the dumpsters onto the ground and that rain does not saturate the contents. It is essential to have working lids on dumpsters to keep stormwater from coming into contact with the source material, in this case, garbage, thereby adding to the pollutant loading to waters of the State.

Through an employee training program, employees responsible for the removal of garbage or other refuse can be trained to ensure that dumpsters owned, or in most cases leased by the Tier A Municipality, have the lids properly closed after the removal of garbage. In addition, the municipality can also implement a system where employees and/or civilians can report dumpsters that are not in working condition (missing or non-functioning lids), rusted (leaking) and overflowing (improperly sized dumpsters).

Digital Mapping

The Tier A MS4 NJPDES permit requires the Tier A Municipality to complete and maintain an outfall pipe map showing the location of the end of all MS4 outfall pipes, owned and operated by the Tier A Municipality, that discharge to a surface water body (e.g., a lake, ocean or stream, including an intermittent stream), as well as the location and name of the surface water bodies receiving discharges from MS4 outfall pipes.

To assist the Tier A Municipality with the required collection of location information of inspected facilities, the Department has developed a voluntary, free to use application, or "app." This application allows a permittee to inventory and map stormwater facilities at its convenience. The Department anticipates that the app will be expanded in future versions to allow the user to document additional information, including records of maintenance actions. When the expanded app is available, a permittee may be able

to use the app to demonstrate compliance with the maintenance requirement in the Tier A MS4 NJPDES permit. A permittee will need to possess an ArcGIS Online license to access this application. A permittee who currently possesses an ArcGIS Desktop License will have an ArcGIS Online license as part of that software package. The Department will provide complimentary licenses for use by each permittee, as well as training sessions for any permittee who requests.

The following is an example of the user interface that has been designed for this application.

1. The user can locate the required stormwater facilities (“features”) through any of the following methods where one must be selected:

- desktop collection;
- mapping grade global positioning system (GPS);
- mobile device;
- mobile device GPS paired;
- recreational grade GPS; and
- survey grade GPS.

2. A description of the main features and basic attributes to be collected during the inventory process is as follows:

- Outfall Pipes

To collect outfall pipe information, the user must choose “outfall pipe” as the feature class so that the necessary attributes can be selected. The user can then choose the outfall pipe type, owner type and method of data collection. An example of how the attributes and domains for the outfall pipe feature class will appear are as follows in the table below:

Feature Class	Attribute	Domains
Outfall Pipe	Outfall Pipe ID	<i>DEP Generated</i>
	County	<i>DEP Generated</i>
	Municipality	<i>DEP Generated</i>
	Road Name	<i>DEP Generated</i>
	Owner Type	County
		Federal Government
		Municipality
		Private
		School District
		State
		Other

		Unknown
	Discharge Code	R9
		R10
		R11
		R12
	NJPDES No.	<i>DEP Generated</i>
	Outfall Type	Channelized flow
		Concrete headwall
		Ditch
		Flared end section
		Grass swale
		Pipe
		Pipe in headwall
		Other

- Stormwater Management Basin

To collect stormwater management basin information, the user must choose “stormwater management basin” as the feature class so that the necessary attributes can be selected. The user can then choose the stormwater management basin type, owner type and method of data collection.

- Subsurface Infiltration / Detention System

To collect subsurface infiltration/detention system information, the user must choose “subsurface infiltration/detention system” as the feature class so that the necessary attributes can be selected. The user can then choose the subsurface infiltration/detention system type, owner type and method of data collection.

- Manufactured Treatment Device

To collect manufactured treatment device information, the user must choose “manufactured treatment device” as the feature class so that the necessary attributes can be selected. The user can then choose the manufactured treatment device type, owner type and method of data collection.

- Green Infrastructure

To collect green infrastructure information, the user must choose “green infrastructure” as the feature class so that the necessary attributes can be selected. The user can then choose the green infrastructure type, owner type, and method of data collection.

- Storm Drain Inlet

To collect storm drain inlet information, the user must choose “storm drain inlet” as the feature class so that the necessary attributes can be selected. The user can then choose the inlet type, owner type and method of data collection.

- Other Components

While creating an inventory using this application, the Tier A Municipality is strongly encouraged to capture additional information about components of the MS4 system in order to optimize operation and maintenance activities. This information is best managed using an electronic database; and, as previously noted, it is anticipated that future versions of this app will be expanded to accept more detailed information collection. Also, inspection notes, such as facility condition, maintenance activity, date of inspection, evidence of flooding and photographs can be tracked in a municipal stormwater database. This would be useful to the municipality and its Stormwater Coordinator for:

- ☐ overseeing and prioritizing operation and maintenance of its own infrastructure;
- ☐ ensuring proper operation and maintenance of infrastructure not owned or operated by the municipality; and
- ☐ collecting and reporting statistical information necessary to complete the Annual Report required by this Tier A MS4 NJPDES permit.

The Department is currently in the process of creating an in-depth guidance document for this MS4 mapping and inventory application that will help teach permittees how to use this application to its full potential. Please see http://www.nj.gov/dep/dwq/msrp_map_aid.htm for more information.