CHARACTERIZATION AND ASSESSMENT OF THE DUCK POND RUN WATERSHED

ACKNOWLEDGEMENTS

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Cover photo: SBMWA bacteria sampling Site DPR1, located just upstream of where Duck Pond Run crosses North Post Road in West Windsor Township

EXECUTIVE SUMMARY

The results of this characterization and assessment represent an opportunity to properly plan the landscape of the Duck Pond Run Watershed in an environmentally responsible way and to work proactively to protect water quality. Overall, waterways are experiencing moderate degradation due to sedimentation in Duck Pond Run and stormwater is impacting the health of waterways. Sedimentation is partly due to the makeup of the underlying soils and geology. While this condition is natural, many other factors are amplifying this problem. Population increases in the Duck Pond Run Watershed and associated land use changes are adding to the amount of impervious surfaces, which augment the frequency and intensity of stormwater, flooding, and erosion. The following recommendations are summarized in Appendix M.

PLANNING FUTURE GROWTH

Finding 1:

Populations in Duck Pond Run Watershed's West Windsor Township, like the rest of New Jersey, are on the rise. The population went from 16,021 residents in 1990 to 21,907 in 2000, increasing by 36.7% in just ten years. From 1986 to 2002, developed lands increased from 932.9 acres to 1,632.6 acres, a gain of 75.0%. Developed areas are on the increase at the expense of the remaining active agriculture and wetlands in the Watershed. (See Landscape section for more information.)

Recommendations:

- If not already completed, an up-to-date buildout analysis for West Windsor Township should be conducted. This will allow for predictions of future growth and where current policies could lead. Regulations could be evaluated to determine if they are protective enough for preserving environmental quality.
- One way to balance the population growth with increased development is to plan for and maintain areas as town centers. These areas can be planned as mixed-use developments (projects that integrate different land uses such as restaurants, residences, offices, and parks) or low impact developments (ecologically friendly site development and stormwater management that aims to mitigate impacts to air, water, and land) for maximum benefit.
- Duck Pond Run Watershed contains many critical habitats for a variety of threatened and endangered species (Figure 5). Critical habitats cover 47.5% (1,742 acres) of the Duck Pond Run Watershed. Many of these critical areas are adjacent to existing developments, putting them under development pressure. Since much of the critical habitats exist in the wetland areas, they should currently be protected from development; however a significant portion exists on current agricultural lands. It is important to protect and preserve these farmlands, maintaining them as such, which can be done by encouraging land owners to participate in the New Jersey Farmland Preservation Program, as well as by working with regional land conservation groups to preserve key tracts of land. West Windsor Township should review and reconsider their zoning to coincide with these environmentally important areas, restricting development and fragmentation of these habitats. Also, open space preservation can use critical habitat data as a tool to plan where efforts can be focused.

- When evaluating rezoning and alternative planned developments, accurate scientific information on the carrying capacity of available water supplies, sewer systems, and other infrastructure needs to be considered, in addition to the goals and objectives of the municipality's Master Plan. It is highly recommended that West Windsor consider participating in SBMWA's Project for Municipal Excellence. Through this program, SBMWA works individually with each municipality to review the current Master Plan and ordinances, compare these documents to the goals and objectives of each decision-making committee, and provide recommendations of next steps to take to bring these goals and documents into harmony. SBMWA then follows up with the municipality to implement those recommendations deemed the highest priority by municipal officials.
- The designated sewer service area that covers all of the Duck Pond Run Watershed increases the potential for development to occur, if it hasn't occurred already (Figure 14). West Windsor Township needs to preserve lands in their designated sewer service area, reducing development pressure. Preservation can occur via conservation easements, open space acquisitions, and environmentally sensitive zoning.
- An increase in impervious cover is occurring in the Duck Pond Run Watershed as development continues along with the resultant decrease in agricultural lands and wetland areas. Consequently, water quality is being affected and will continue to be a concern. One way to protect water quality is by decreasing the rate of conversion of wetlands and agricultural lands through participation in the New Jersey Farmland Preservation and Green Acres Programs, as well as by working with regional land conservation groups to preserve key tracts of land. Adopting and enforcing a stream corridor ordinance and protecting riparian areas through conservation easements would also benefit the Watershed.
- Riparian corridors are being increasingly encroached upon for development in the Duck Pond Run Watershed. These areas are particularly sensitive to land use changes, as they are the natural buffers that protect the stream itself from a variety of pollutant sources. Placement of new construction in the Duck Pond Run Watershed needs to be sensitive to, or avoid altogether, the riparian corridors in order to maintain ecological integrity. Adopting and enforcing a stream corridor ordinance can achieve this goal.
- Planting trees not only minimizes impervious cover, but also has been proven to have financial benefits. According to a University of Pennsylvania study, tree planting raised property values 10% in general and raised values in urban areas as much as 30%, where trees were planted in otherwise vacant city lots (River Network, 2008). Seattle estimated that increasing tree canopy from 18 to 30% would yield more than $44 million in annual benefits, including stormwater mitigation, air cleaning, carbon sequestration, energy savings, aesthetics, and other values (River Network). West Windsor should consider a tree planting program throughout the Township.

Applicable BMPs and Mitigation Approaches:

- To determine which environmental resources exist in West Windsor, the Township should update the Natural Resources Inventory originally

conducted in 1979 and revised in 2000. Such an inventory would document the location and extent of environmentally important and sensitive areas that should be taken into account when determining where development or increased impervious surfaces are to be placed as well as where preservation efforts should be prioritized.

- To minimize the impacts of development, West Windsor Township could conduct a study of the existing public transportation system, encourage its use, and suggest changes that may make it more usable.
- The LEED (Leadership in Energy and Environmental Design) Program for existing and new development should be encouraged by West Windsor for any proposed development or redevelopment. LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. For more information on the LEED Program, visit the website (http://www.usgbc.org/) of the U.S. Green Building Council, which developed the Program.
- Before a property can be developed, the owner is required by federal and state law to determine whether wetlands are present. The owner submits a Letter of Interpretation (LOI) Application to NJDEP, which includes wetland delineation maps, soil data, and plant and wildlife reports. A copy of each LOI application is kept at the municipal hall. It is very important for the Township to review these LOI Applications and have elected or appointed officials walk the site in question to confirm that their understanding of the wetland area agrees with the property owner's delineation. If the Township notices a discrepancy, they can request that NJDEP come to the site and verify or modify the wetland delineation. When NJDEP approves the LOI Application, this officially determines the wetland classification and its boundaries and buffer size and becomes very difficult to amend. In turn, this can affect where and how large of a footprint the development can have.
- NJDEP also encourages public comment on the wetland permit applications. West Windsor Township should be aware of any pending permits, review them, and provide comments to be able to protect their natural resources and have more control over development.
- West Windsor Township can also provide input to NJDEP on wetland mitigation decisions, which require compensation for freshwater wetland disturbances by requiring developers working under individual permits to create at least two acres of wetland for each acre disturbed. This same level of mitigation is required for General Permit (GP) 2 (underground utility lines), GP4 (hazardous site investigation and cleanup), GP5 (landfill closures), and GP27 (redevelopment areas). There is a proposal under consideration at the State level to expand mitigation requirements to also include GP6 (isolated wetlands), 10A and 10B (minor road crossings), GP11 (outfalls), GP18 (dam repair), and GP21 (above ground utility lines).

Applicable Model Ordinances:

- The adoption or enforcement of an Impervious Cover Limitation Ordinance applicable to new developments could significantly slow the

effects of development and protect high groundwater recharge areas. Princeton and East Amwell Townships have adopted variations on this ordinance, with Princeton limiting impervious cover to an acceptable flat percentage, while East Amwell's stronger ordinance for the Sourlands region imposes a sliding scale percentage depending on the size of the lot involved. An existing ordinance that encompasses both of these variations is in effect in New Castle County, Delaware. This ordinance caps the acceptable impervious surfaces at 20% while imposing a sliding scale impervious cover reduction for any redevelopment depending on the lot size. New Castle County's overlay ordinance for water resource protection areas is found within Article 10 (Environmental Standards) or Section 40.10.380 and can be found at http://www.co.new-castle.de.us/CZO/nccportal.asp.

- Consider creating an ordinance to require the installation of pervious pavement for redevelopment projects. This would serve to actually reduce the impacts of impervious cover. One approach is to mandate the use of pervious pavement for driveways, walkways, and other paved areas such as parking lots. Bethany Beach in Delaware has such an ordinance, which can be found at http://www.townofbethanybeach.com/documents/500/PourSurfOrd.pdf. A second approach is to make the requirements of a "Low-Impact Development" (LID) Ordinance that incorporates LID techniques into a land development ordinance. Many cities across the country are finding that integrating LID into their existing infrastructure is a cost saving solution to NPS pollution. Portland Oregon found that by combining residential downspout disconnection with LID (their "Green Streets" program), they saved 40% compared to the cost of comparable streets with conventional stormwater gutters and sewers (River Network (2008). The Town of Warsaw, Virginia enacted a mandatory LID Ordinance, which can be viewed at http://www.riverfriends.org/LinkClick.aspx?fileticket=VlaUwo%2fvYtQ%3d&tabid=86&mid=425.
  Although this ordinance does not specifically refer to pervious pavement, that is one of the potential methods for maintaining the pre-development volume of runoff. An incentive-based rather than mandatory approach used by some communities, such as the City of Fitchburg, Wisconsin, is to charge stormwater utility fees to private property owners based on the amount of impervious area on a site. These fees pay for the City's stormwater management program. Property owners can apply for credit on their stormwater bill for properly functioning on-site stormwater management BMPs, beyond what is required by City Ordinance. One such BMP includes pervious pavement. Fitchburg's Stormwater Utility Credit and Rebate application form can be viewed at http://www.city.fitchburg.wi.us/files/2550961.pdf.
- The adoption and enforcement of a stream corridor ordinance will prevent further development in this key area while preserving the riparian corridor. West Windsor Township has protective language included in the land use element of the Master Plan. To give added protection, West Windsor Township should consider establishing a separate stream corridor

ordinance. SBMWA's model stream corridor ordinance is included in Appendix H and can be found at http://www.thewatershed.org/managing_resources.php?id=C0_45_32 (click on "Model Stream Corridor Ordinance"). SBMWA is available to assist West Windsor with ordinance creation through the Program for Municipal Excellence. Some townships in New Jersey are also incorporating critical areas into their stream corridor ordinances, making them much stronger. West Windsor Township should consider including such language in their ordinance.

Finding 2:

Impervious cover prevents the movement of water into the soil. The Duck Pond Run Watershed has an average impervious cover of 16.6%, however many areas are rated at 26% and above (Figure 19). An impervious coverage between 10 and 25% results in the loss of sensitive elements from the stream system while those areas with an impervious cover greater than 25% experience a shift to poor stream conditions that includes diminished aquatic diversity, water quality, and habitat function. West Windsor officials also need to be aware that much of the underlying soils in the Duck Pond Run Watershed are moderately to highly erodible and also have slow to very slow infiltration rates, which result in high to very high surface runoff in this region. Water quality impacts due to the erodible nature of the soils in this region have been noted. (See Land Use and Water Quality sections for more information.)

Recommendations:

- Increasing impervious cover will only exacerbate water quality problems by increasing the frequency and intensity of storm flows and flooding, while also increasing the NPS pollution contributions. West Windsor Township needs to incorporate innovative ways to plan developments including low impact development, re-zoning (changing zoning classifications to permit development that is less dense or restrictive), mixed-use development (projects that integrate different land uses, such as restaurants, residences, offices, and parks), conservation design (placing a development on the least environmentally restrictive portion of a property; incorporating water recycling, energy efficiency, and sustainably produced materials into building design), and town-center designation (centralized growth areas through incentives, allows for developing at higher densities). These methods enable West Windsor to accommodate growth occurring throughout the Watershed while significantly reducing the harm from such development. Redeveloping existing urban land uses will also help to maintain or reduce current amounts of impervious cover in those areas.

Applicable BMPs and Mitigation Approaches:

- Disconnect downspouts from stormwater systems at all municipal properties and encourage businesses and residents to do the same. Downspouts should be directed either into a vegetated bed or a rain barrel. Among other things, water from a rain barrel can be used to water nearby vegetated beds, rinse garden tools or muddy boots, or wash the car. Portland Oregon found that the combination of residential downspout

disconnection and the incorporation of green stormwater measures on all street projects could save 40% compared to the cost of comparable streets with conventional gutters and sewers (River Network, 2008).

- Install vegetated filters next to roads and sidewalks, enabling the stormwater to enter as sheet flow. This will remove suspended sediments and other pollutants from stormwater runoff as well as encourage infiltration and the reduction in stormwater volumes entering waterbodies or stormwater systems. (See the NJ Stormwater Best Management Practices Manual, NJDEP, 2004c.)

Applicable Model Ordinances:

- The adoption or enforcement of an Impervious Cover Limitation Ordinance applicable to new developments could significantly slow the effects of development. Princeton and East Amwell Townships have adopted variations on this ordinance with Princeton limiting impervious cover to an acceptable flat percentage while East Amwell's stronger ordinance for the Sourlands region imposes a sliding scale percentage depending on the size lot involved. To see an ordinance that includes both of these variations, see New Castle County, DE's overlay ordinance as noted on pages 75-76.
- Consider creating an ordinance to require the installation of pervious pavement for redevelopment projects. This would serve to actually reduce the impacts of impervious cover. For more information, see the references to model pervious pavement ordinances in the model ordinance section on page 76.

PROTECTING & MAINTAINING GROUNDWATER RESOURCES

Finding 1:

There are nine known contaminated sites (KCSs) in the 5.7 square mile Duck Pond Run Watershed. One of the sites is a RCRA site listed on the 2008 Corrective Action Baseline, which includes USEPA's highest priority sites. (See Known Contaminated Sites section for more information on each KCS and how they affect groundwater.) Any of this contamination could percolate through the soil or within groundwater into Duck Pond Run which flows into the D&R Canal, a public drinking water supply. Because of its connection to a drinking water supply, Duck Pond Run was identified as a candidate for C1 designation. It is vitally important to protect this source of drinking water.

Recommendation:

- The large number of KCSs in the Duck Pond Run Watershed warrants that the potentially responsible parties and NJDEP remediate any contamination present, particularly at the RCRA site.
- Until remediation is complete, all parties should monitor, as required, to ensure that contamination is contained and that the potential water supply it feeds and the surrounding areas are protected from potential groundwater contamination.
- There is one WHPA in the Duck Pond Run Watershed in close proximity to five public non-community drinking water wells (Figure 25). This

WHPA is important as there is the potential for groundwater contamination due to its proximity to the RCRA-level KCSs (American Cyanamid Agricultural Research, American Cyanamid Company, BASF Corporation, and American Cyanamid South Facility). These sites are located within Tier 2 of the public non-community water supply wellhead protection areas. Because of their proximity to a WHPA, these KCSs need to be the top priorities for remediation in the Duck Pond Run Watershed. Special attention needs to be given to the monitoring of these sites to ensure that public safety is maintained.

- Townships should keep a list of KCSs attached to property record cards to ensure that if a property is sold at a tax sale, the status is made known to the purchaser.

Applicable BMPs and Mitigation Approaches:

- Potentially responsible parties should work with NJDEP to ensure that the appropriate actions are taken to fully remediate the contamination.

Applicable Model Ordinances:

- West Windsor can adopt an ordinance requiring that site plan approval be conditioned upon an applicant providing a completed Phase I Environmental Site Assessment Report when a KCS is sold. If the Phase I report recommends a Phase II Environmental Site Assessment Report, the Phase II report must be done at the request of the purchaser, NJDEP, or other authorized party, if not already completed.
- The creation and implementation of an ordinance to provide wellhead protection to the delineated WHPAs by West Windsor Township will ensure that groundwater is protected from possible contamination. Rocky Hill has successfully enacted a wellhead protection ordinance and Montgomery Township's has been adopted pending NJDEP approval. Examples of model ordinances for wellhead protection include SBMWA's *Ordinance Implementation: Wellhead Protection* document that can be downloaded from www.thewatershed.org/images/uploads/Wellhead_Ordinance_Implementation_Package.pdf and a Hunterdon County Environmental Toolbox model, which can be found at http://www.co.hunterdon.nj.us/planning/ordinances/toolbox/Environmental_Toolbox-Well_Head.pdf.

Finding 2: Much of the Duck Pond Run Watershed (42.2%) contains areas with high groundwater recharge. Between 1986 and 1995 Duck Pond Run lost 21.6% of its groundwater recharge capability due to continued development in high groundwater recharge areas. This is the largest loss in groundwater recharge capability of all subwatersheds within the Millstone Watershed during this time period (NJWSA, 2002). Groundwater recharge areas need to be protected by ordinances or preserved by the Township to restrict development in these areas. West Windsor should use high groundwater recharge areas, in addition to critical habitat data, when setting priorities for additional open space preservation. Reduced development in the high groundwater recharge

areas will aid in ensuring that plentiful supplies of water are available for the future and that streams will continue to flow. (See Water Supply section for more information.)

Recommendations:

- Municipalities could institute an educational campaign directed at all property owners on the effects of pesticide use on surface and groundwater. Property owners could be encouraged to minimize pesticide use and to join SBMWA's River-Friendly Program for guidance as to how to reduce pesticide use and find less toxic alternatives, thus minimizing groundwater contamination in high recharge areas. SBMWA works with property owners, providing recommendations for actions to improve land stewardship practices. The River-Friendly Program focuses on water quality, water quantity, wildlife and habitat enhancement, and education components, all geared towards reducing NPS pollution. For more information on the River-Friendly Program, please visit http://www.thewatershed.org/river_friendly_program.php.
- West Windsor Township should limit increases in impervious surfaces in the Watershed in order to prevent costly mitigation efforts to restore recharge areas in the future. (See Planning Future Growth's applicable Model Ordinances in Finding 1, page 76.) The existence of trees can affect property values, according to a University of Pennsylvania study, which found that tree planting raised property values 10% and could raise urban property values as much as 30% when otherwise vacant lots are planted (River Network, 2008).
- West Windsor Township should prioritize land in high recharge areas for preservation and protection. As an example, identifying lands located above high recharge areas that are also riparian areas and critical habitats for threatened and endangered species (Figure 24) could be one way to target land for preservation. Friends of West Windsor Open Space (FOWWOS) has compiled a list of high priority properties for preservation, which is included in Appendix I.
- Since some of the high groundwater recharge areas are located on agricultural lands in West Windsor Township, the municipality needs to encourage best management practices (BMPs) regarding the use of chemicals (especially harmful chemicals like pesticides) in the agricultural areas above groundwater recharge zones to prevent possible contamination. Farmers also need to review and evaluate the many options available to reduce their pesticide use in such areas. For example, participation in the New Jersey Conservation Reserve Enhancement Program (CREP) can help farmers reduce impairment from agricultural water runoff sources in an effort to improve water quality along both impaired and unimpaired New Jersey streams through BMPs. CREP is administered through the New Jersey Natural Resources Conservation Service (NRCS). For more information about New Jersey CREP, please visit http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep.

Applicable BMPs and Mitigation Approaches:

- To ensure that groundwater and aquifers maintain adequate water supply, West Windsor Township can require the use of stormwater BMPs, such as nonstructural measures including swales and disconnected impervious cover and, when necessary, structural measures such as infiltration ponds and basins in new developments. These ponds are lined with permeable soils and materials that allow water to slowly release back into the ground. Other stormwater BMPs that address infiltration include bioretention basins, pervious pavement (see above), vegetated swales, and vegetated filters to capture discharge as sheet flow (NJDEP, 2004c). BMPs such as these should be implemented at each new development or redevelopment project. However, each site is unique. For information on the use of BMPs under the New Jersey stormwater management rules, see SBMWA's document, *New Jersey's Nonstructural Stormwater Strategies Point System – A Primer*, available at http://www.thewatershed.org/info/2007NSPS primer.pdf (SBMWA, 2007c).
- In order to minimize the use of pesticides and reduce the harmful effects on people and the environment, New Jersey requires Integrated Pest Management (IPM) to be used in each public, private, and charter school. IPM does not prohibit the use of pesticides, but advocates using the most effective, least-risk option. Pesticides are only used as the last resort under IPM. To further strengthen this policy and protect people and the environment, West Windsor Township could join 53 other Boroughs, Townships, and Cities by enacting a resolution requiring IPM to be used in parks and on other municipal properties. In addition to parks, municipal right-of-ways such as roadsides, drainage ditches, swales, and bridge culverts could be included in the municipal IPM program. An example of a model IPM resolution drafted by New Jersey Environmental Federation can be found at: http://cleanwateraction.org/njef/pfzresolution.pdf. A resolution such as this could be used to support adoption of an IPM ordinance, which results in a much stronger policy.
- Another program that works with farmers to minimize pesticide contamination is the New Jersey River-Friendly Farm Program, which seeks to recognize farms that voluntarily implement best management practices to minimize impacts on the environment, protect water resources, and improve the sustainability and efficiency of the farm itself. It was developed in response to water quality concerns in the Raritan River which is a source of drinking water to over a million people. For more information and an application form, please access the River-Friendly Farm website at: http://njriverfriendlyfarm.org. The benefits of becoming a River-Friendly Certified Farm include public recognition for implementing and maintaining stewardship practices, availability of funding sources to implement conservation practices, new marketing strategies using a River-Friendly Farm label, free technical assistance from a conservation planner, improved water quality in streams while maintaining productive farmland, more efficient use of fertilizers and pesticides, and a healthier soil structure.

Applicable Model Ordinances:

- West Windsor Township should adopt and enforce an Impervious Cover Limitation Ordinance for new developments and consider creating an ordinance requiring pervious pavement installation for all redevelopments. (See model ordinance section in Planning Future Growth's Finding 1 on pages 75-76 for more details.)
- To limit the likelihood of inadvertent exposure to pesticides and the resulting health risks, there are numerous configurations of ordinances enacted in New Jersey relating to advance notification of applications. For example, Old Bridge Township in Middlesex County adopted an ordinance requiring notification via a newspaper ad whenever pesticides are to be applied on a community-wide or area-wide basis. Similar ordinances have been enacted in the Townships of West Milford (Passaic County), Vernon (Sussex County), and Hanover (Morris County), and in the Boroughs of Bernardsville, Cresskill, and Tenafly. New York State has taken the notification laws to an even stricter level. The State authorizes local county laws that require commercial applicators to provide written notice to all occupants within 150 feet of the application site, as well as requiring residents applying pesticides on their own private property to post lawn signs if the application covers more than 100 square feet. Information on New York's Neighbor Notification Law, including the text for the law and the NY Department of Environmental Conservation implementing regulations, as well as a list of New York counties that have opted into the law can be found at: http://www.dec.state.ny.us/website/dshm/pesticid/neighbor.htm. A citizens' guide to the New York State pesticide notification laws can be found at: http://www.oag.state.ny.us/environment/pesticide_guide.html. Notification laws could also require all applicators to provide information on the amount and type of pesticide applied within the municipality. West Windsor should consider enacting some version of the pesticide application notification ordinance.
- To protect critical areas, an ordinance could be passed that would prohibit pesticide use in specific zones such as forests or stream corridors. Many towns in Maine have enacted variations on this theme. For a listing of the different types of municipal pesticide ordinances and the Maine Townships that have adopted them, see http://www.maine.gov/agriculture/pesticides/pdf/municipal_list.pdf. An example of an ordinance adopted by Wells, Maine, which includes language restricting pesticide applications within the special Branch Brook Aquifer Protection District, is found within its Land Use Ordinance at http://www.e-codes.generalcode.com/codebook_frameset.asp?ep=fs&t=ws&cb=1006_A. The section of the code that applies is 145-31.G.2. To find it, open the table of contents and click on the "+" sign in front of "Part II – General Ordinances", "Chapter 145: Land Use", and "Article V". Then click on "145-31."
- To prohibit fertilizer applications in certain circumstances that would directly affect water quality, such as during a runoff event, West Windsor could adopt the NJDEP's Fertilizer Application Model Ordinance. This model ordinance can be found at http://www.state.nj.us/dep/

watershedmgt/DOCS/TMDL/Fertilizer%20Application%20Model%20Ordinance.pdf. The model ordinance could also be modified to create a new ordinance prohibiting pesticide applications under similar circumstances.

- Several counties and townships have implemented variations on IPM policies restricting the application of pesticides to very limited circumstances, sometimes referred to as Pesticide-Free Zones (PFZs). For example, Burlington County has established an IPM plan for county parks that permits the use of only two types of chemical pesticides. Some townships in New Jersey, including Brick, Chatham, Wall, Irvington, and Ocean City have passed resolutions creating PFZs. NJ Environmental Federation has created a model IPM resolution that includes the designation of PFZs on certain public properties. Clifton, Pine Beach, and Hazlet have all adopted resolutions based on this model resolution can be found at: http://cleanwateraction.org/njef/pfzresolution.pdf.

PROTECTING WATER QUALITY

Finding 1: The nature of geology has a large influence on the water resources and environmental quality of the Duck Pond Run Watershed, which straddles the Piedmont and Coastal Plain Physiographic Provinces (Figure 8). The majority of the Watershed consists of Piedmont geology typified by sandstones, siltstones, and shales. The southeastern section of the Watershed is made up of Coastal Plain geology consisting of unconsolidated sediments, which has two major implications from the standpoint of water resources. First, streams and rivers of the Coastal Plain are typified by large amounts of alluvial sediment (considering their shallow gradients and relatively sluggish flows) because of the erodibility of the underlying deposits. The soils are easily eroded and carried to other areas of the Watershed. Second, the lack of cementation of the buried sediments means that the sandy units retain a high porosity, making them very productive aquifers. (See Geology and Soils sections for more information.) In either physiographic province, geology, soils, aquifers, and groundwater recharge are all closely linked.

Recommendations:

- Found within the Piedmont Province, the Stockton Formation, consisting of coarse-grained sandstones, is one of the higher yielding bedrock aquifer systems in the Millstone Watershed. Within the Coastal Plain, the Potomac and Magothy Formations form the Potomac-Raritan-Magothy (PRM) aquifer and is the most prolific in the Duck Pond Run Watershed. Both of these aquifers are susceptible to groundwater contamination because of their widespread exposure and high sand content. Their outcrop areas should be considered when prioritizing areas for protection. This factor could be included with high groundwater recharge areas, riparian areas, and critical habitats when setting priorities for additional open space preservation (see recommendation for Finding 2 in Maintaining Groundwater Resources, page 80).
- The Stockton, Potomac, and Magothy Formations and their related aquifers should be considered when making municipal decisions about

approving proposed development locations and how strict to be about the related stormwater management practices. Increasing urbanization also increases the amount of impervious cover. This has the effect of decreasing the amount of water flowing into aquifers by diverting precipitation over the landscape to streams and not downward into the soil. Placement of new development, and therefore impervious cover, outside of areas that have high value for recharging aquifers will help to maintain water levels for drinking, irrigation, and industrial use.

Applicable BMPs and Mitigation Approaches:

- West Windsor Township could strengthen their stormwater management plans for areas where the Stockton, Potomac, and Magothy Formations outcrop (see Figures 9 and 10). To protect these susceptible aquifer recharge areas, West Windsor could require extensive use of stormwater BMPs for both new developments and redevelopments. Stormwater BMPs that address infiltration include infiltration ponds and basins, bioretention basins, pervious pavement (see page 76), vegetated swales, and vegetated filters to capture discharge as sheet flow (NJDEP, 2004c).

Applicable Model Ordinances:

- West Windsor Township should enact a strong Stream Corridor Ordinance to protect water quality. Currently the Township includes language within the Master Plan encouraging stream corridor protection, but no action is required. SBMWA's model stream corridor ordinance is included in Appendix H and can be found at http://www.thewatershed.org/managing_resources.php?id=C0_45_32 (click on "Model Stream Corridor Ordinance"). SBMWA is available to assist West Windsor with ordinance creation through the Project for Municipal Excellence.

Finding 2: Much of the Duck Pond Run Watershed is classified as having hydrologic soil group B, covering 1,318.1 acres out of a total of 3,668.7 acres (35.9%) in the entire watershed. Hydrologic soil group B represents soils with moderate infiltration and surface runoff rates and consists of moderately fine- to coarse-textured soils. Most of this hydrologic soil group underlies the urban developed and agricultural areas in West Windsor Township. The second most common hydrologic soil group in the Duck Pond Run Watershed is group C, covering 29% of the Watershed and representing slow infiltration rates. Runoff from these soil groups will be high due to these moderately fine or fine-textured soils' slow infiltration rates.

Most of the Duck Pond Run Watershed is also assessed as having moderate K-factors, or moderate soil erodibility. However some key areas of highly erodible soils, totaling 34% of the Watershed, are scattered throughout but are particularly found adjacent to riparian areas. These areas have the greatest potential for benefit from soil conservation practices and the greatest likelihood for harm from construction and development.

Based upon visual assessment data and observations during biological assessments, the most likely stressor affecting the macroinvertebrate communities in Duck Pond Run is heightened sedimentation. The cause of this problem may be due to the soil composition and moderate to high erodibility of the Duck Pond Run Watershed itself, which is exacerbated by the high amount of developed lands in the Watershed. The nature of the soils in the Duck Pond Run Watershed is an important factor impacting water quality of Duck Pond Run, especially macroinvertebrate communities and their habitats. (See Water Quality and Soils sections for more information.)

Recommendation:

- Because municipalities rely on their local Soil Conservation Districts (SCDs) to enforce the soil erosion and sediment control regulations, SCDs need to be aware of the characteristics of a site's underlying soils when they review and enforce plans to control and manage soils during construction activities.
- Infiltration rates for water entering the ground in the Duck Pond Run Watershed are moderate to slow. This has the potential to produce a high amount of runoff from storm events. This stormwater runoff needs to be controlled or managed by West Windsor Township so that it does not degrade water quality or increase the potential for flooding and erosion.
- According to the New Jersey stormwater regulations, West Windsor should have already mapped all of their stormwater outfalls. These maps should be on file at the Township Engineer's Office. If not completed, this mapping should be done.
- Maintenance of soil integrity in areas with highly erodible soils can be done by encouraging environmentally friendly construction, properly implementing soil and erosion control BMPs, encouraging forested areas, and increasing or creating riparian buffer zones. Streambank stabilization and planting projects should be encouraged wherever streambanks are actively eroding along Duck Pond Run or its tributaries. Prior to implementation, a thorough scientific assessment should be done to ensure the appropriate location of restorations and methods used.
- Farms located within these areas could greatly benefit by working with NJ Natural Resources Conservation Service (NRCS) to implement soil conservation practices through one of their conservation programs, which provides both financial and technical assistance. For more information about these NJ NRCS conservation programs and for links to more details, please visit www.nj.nrcs.usda.gov/programs/#Other%20Programs. For a comprehensive guide to all the various state and federal grant programs for farmers and other landowners, visit https://www.njaudubon.org/Conservation/PDF/IncentiveGuide.pdf for the "Guide to Conservation Incentive Programs For New Jersey Landowners and Farmers", published by the New Jersey Audubon Society. It includes information on Conservation Reserve Enhancement Program (CREP), the Landowner Incentive Program (LIP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), Grassland Reserve Program (GRP), and others.

- Create an educational campaign so that farmers, businesses, and residents are aware of programs in which they can participate to improve water quality, i.e. NRCS and various River-Friendly programs. Duck Pond Run was identified as a candidate for C1 designation because it flows into a water supply source. SBMWA encourages NJDEP to reconsider this nomination and accept it as a C1 waterway to aid in protecting the riparian corridors and maintaining the vegetated cover that stabilizes the soils. C1-designated waterways are afforded a higher level of protection from development while minimizing impacts from stormwater runoff; providing floodwater storage, erosion control, and groundwater recharge; and maintaining biological habitats and diversity. West Windsor should actively support this nomination in order to move along the NJDEP acceptance process. The NJDEP Bureau of Water Quality Standards and Assessment is responsible for overseeing the Surface Water Quality Standards, which include stream designations such as C1. The Bureau can be reached at (609) 777-1753 and more information is available at http://www.state.nj.us/dep/wms/bwqsa/.
- Headwater residents, businesses, and West Windsor Township municipal officials need to be particularly aware of their roles in impacting and improving water quality in this Watershed. The prevention and minimization of NPS pollution is important everywhere along streams, but particularly in the headwaters. Property owners along streams should consider participating in SBMWA's River-Friendly Certification Program to reduce their contribution to NPS pollution. SBMWA works with property owners and provides recommendations for actions to improve land stewardship practices. The Program focuses on water quality, water quantity, wildlife and habitat enhancement, and education components, all geared towards reducing NPS pollution in different ways. For more information on SBMWA's River-Friendly Program, please visit http://www.thewatershed.org/river_friendly_program.php

Applicable BMPs and Mitigation Approaches:

There are many stormwater best management practices that could be implemented in the Duck Pond Run Watershed to reduce the sediment contribution from stormwater runoff. Such BMPs could also reduce the frequency of flooding, erosion potential, and other pollutant loads. For a detailed listing of potential BMPs, refer to the New Jersey Stormwater Best Management Practices Manual (NJDEP, 2004c).

- The new NJDEP Stormwater Management Rules (N.J.A.C. 7:8) state several requirements for large new developments and redevelopments focusing on minimizing disturbances and impervious surfaces, increasing groundwater recharge, reducing peak flows, and reducing pollutants (such as suspended sediment) carried by stormwater. Key BMPs that increase infiltration and filter out sediments include infiltration basins, bioretention basins, pervious pavement (see above), vegetated swales, and vegetated filters to capture discharge as sheet flow (NJDEP, 2004c). BMPs such as these should be implemented on each new development or redevelopment project. However, each site is unique. For information on the use of BMPs

under the New Jersey stormwater management rules, see SBMWA's document, *New Jersey's Nonstructural Stormwater Strategies Point System – A Primer*, available at http://www.thewatershed.org/info/2007NSPSprimer.pdf (SBMWA, 2007c).

- The implementation of stormwater BMP retrofits in areas being redeveloped, or on municipal properties, could result in cleaner water in Duck Pond Run and its tributaries. In this case, existing stormwater management BMPs can be improved to better protect downstream waterbodies. Vegetating existing swales or detention/retention basins located near Duck Pond Run or its tributaries is one example of a low-cost method that can result in positive changes.
- Since some of this region is still farmland and many farms are located near streams and in highly erodible areas, farms need to investigate the use of BMPs to help alleviate sediment loads into area streams. The NRCS works with farmers to fund and implement such BMPs through several different conservation programs. For more information about these New Jersey NRCS conservation programs and for links to more details, please visit www.nj.nrcs.usda.gov/programs/#Other%20Programs. For a comprehensive guide to all the various state and federal grant programs for farmers and other landowners, visit https://www.njaudubon.org/Conservation/PDF/IncentiveGuide.pdf for the "Guide to Conservation Incentive Programs For New Jersey Landowners and Farmers", published by the New Jersey Audubon Society. It includes information on Conservation Reserve Enhancement Program (CREP), the Landowner Incentive Program (LIP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), Grassland Reserve Program (GRP), and others.
- Farmers could also get free assistance for soil loss management through the River-Friendly Farm Program administered by North Jersey Resource Conservation and Development Council (see applicable BMP within Finding 2 of the Protecting and Maintaining Groundwater Resources section on page 81; and http://njriverfriendlyfarm.org).
- Streambank restorations and reforestations are excellent BMPs to increase infiltration of stormwater, filter out pollutants such as sediment and nutrients, stabilize barren soils, reduce sediment erosion, and with time reduce stream temperatures through the creation of shaded areas which results in improved in-stream habitat. Seattle Washington estimated that increasing tree canopy from 18 to 30% would result in more than $44 million in annual benefits, including stormwater mitigation, air cleaning, carbon sequestration, energy savings, aesthetics, and other values (River Network, 2008). Streambank restorations and reforestations should be pursued whenever possible for stream reaches along Duck Pond Run and its tributaries showing signs of erosion and/or minimal vegetation.
- Retrofitting detention and retention basins could significantly alleviate sediment and nutrient loads as well as reduce bacteria contributions carried as NPS pollution via stormwater flows. Techniques for creating detention and retention basins have improved significantly over the years. The older,

conventional mowed basins with paved channels for low flow stormwater conveyance are providing minimal benefits. The Township should consider retrofitting such basins by removing the concrete low flow channel, constructing earthen berms to slow the rate of flow allowing more pollutants to settle and filter out, and planting native plants to reduce stormwater volumes.

- To help alleviate any heightened sedimentation of waterways within Duck Pond Run Watershed, municipalities should work with the appropriate Soil Conservation District to ensure that proper measures are taken to contain sediment at construction sites. In 2006 the Soil Conservation District (SCD) became responsible for ensuring that even small projects, in most cases 5,000 square feet (0.115 acres) or more of soil disturbance, meet the standards for soil erosion and sediment control in New Jersey. Best management practices, such as constructing silt fences and covering stockpiles of soil, should be properly installed and maintained for the duration of construction activities. More information on the New Jersey SCDs and their regulations is available at http://www.state.nj.us/agriculture/divisions/anr/nrc/conservdistricts.html.

Applicable Model Ordinances:

- An ordinance incorporating soil protection will help protect streamside and other vegetation and minimize materials washing into streams and degrading habitat and water quality. For example, a stormwater management ordinance (SMO) can address the protection of soils from damage during stormwater runoff. Model SMOs are available from Hunterdon County (http://www.co.hunterdon.nj.us/pdf/stormwater/HCETModelOrdinanceFINALNov05.pdf) and from NJDEP (http://www.njstormwater.org/tier_A/pdf/NJ_SWBMP_D.pdf).
- Stream corridor ordinances also establish protections favorable for soil retention within a riparian buffer. SBMWA recently revised its model stream corridor ordinance. It is included in Appendix H and can be accessed on the web at: http://www.thewatershed.org/managing_resources.php?id=C0_45_32 (click on "Model Stream Corridor Ordinance"). SBMWA is available to assist West Windsor with this ordinance creation through the Program for Municipal Excellence.
- A tree protection ordinance protects the soil structure supporting the trees from being damaged during construction. Since trees stabilize the soil, this would reduce erosion. Such an ordinance also protects the root zone from compaction during construction activities. For tree protection ordinance guidelines, see the University of Georgia's *Natural Resource Conservation: Components of a Tree and Landscape Ordinance, Part II*, which can be found at http://pubs.caes.uga.edu/caespubs/horticulture/resource-conservation4.htm (Section 4: Tree Protection Standards). Or see Penn State's *A Guide to Preserving Trees in Development Projects* at http://pubs.cas.psu.edu/freepubs/pdfs/uh122.pdf.
- The Township could require phasing for construction through its addition to a soil management ordinance. This would dramatically reduce disturbed soil exposure times and prevent erosion problems. Construction phasing

disturbs only one portion of a site at a time with subsequent phases starting after the completion and stabilization of earlier phases. It would also lessen the compaction of soils because heavy equipment would be confined to areas for shorter periods of time. Sample language can be found within an EPA model erosion and sediment control ordinance, within the Design Requirement section, which can be found at http://www.epa.gov/owow/nps/ordinance/mol2.htm. Although it can be difficult to establish specific phasing requirements in an ordinance that can be applicable to plans in general, performance standards for phasing can be established although this requires oversight and enforcement. For example, an ordinance enacted in Plumstead Township, PA includes the following language: "The maximum bare earthen area (without vegetative cover) shall not exceed 5 acres or 20% of the total area of the site at any one time (whichever is greater). Maximum time of exposure for bare areas shall be 10 days before stabilization measures must be implemented." The Plumstead ordinance can be found within Chapter 22, Part 10 at http://www.e-codes.generalcode.com/codebook.frameset.asp?t=tcfull (click on "Chapters" and on "22").

- A woodlands protection ordinance protects soil post-construction and preserves woodlands when land is being developed. The best way to prevent sedimentation in streams is to keep soil anchored on land with the roots of trees, shrubs, and native vegetation. Preserving established woodlands is one of the first lines of defense for good soil management. Another result of enforcing this type of ordinance is to filter out sediments and pollutants from stormwater flow before reaching waterbodies, reducing soil erosion in the streams, and moderating temperature by providing shade and windbreaks. Chatham Township has such an ordinance, which can be viewed at: http://www.chathamtownship.org/ORDINANCE_2005-023.pdf. The Hunterdon County Environmental Toolbox also contains a model woodlands protection ordinance that can be found at: http://www.co.hunterdon.nj.us/planning/ordinances/toolbox/Environmental_Toolbox-Woodlands.pdf.
- Adoption of an afforestation ordinance would also protect streams from additional sedimentation resulting from development. An afforestation ordinance requires developers to plant trees and shrubs to create a woodlands habitat, regardless of the amount of tree removal from the site. The Hunterdon County Environmental Toolbox (http://www.co.hunterdon.nj.us/planning/toolbox.htm#ordinances) refers to one such ordinance, within its Woodland Conservation section, adopted by Washington Township in Mercer County (Ordinance 103.53, Natural and Cultural Resource Conservation ordinance). This Washington Township ordinance requires that for most zoning districts, a site development plan must "provide a minimum of 20% of the tract area in forest, if less than 60% of the predevelopment site is woodlands and provide a minimum of 40% of site in forest, if greater than 50% of the predevelopment site is in woodlands either through conservation or through afforestation.…"

Finding 3: The visual assessment information, biological data, and bacteria monitoring results show that there are impacts to water quality, mostly stemming from the high amount of developed land in the Duck Pond Run Watershed. Because of its connection to a drinking water supply, Duck Pond Run was identified as a candidate for C1 designation. It is vitally important to protect this source of drinking water.

Recommendations:

- In order to accurately assess the environmental health of Duck Pond Run, long-term trends in water quality need to be determined. Currently, there is insufficient monitoring data (biological or chemical) on the water resources in this region, especially basic water quality information for many of the area's tributaries, which have an impact on the Duck Pond Run itself. Intensive monitoring at many sites along Duck Pond Run and its tributaries needs to occur to determine the stream's health. It would be beneficial to conduct additional bacteria monitoring along Duck Pond Run, both at the four established sites documented in this report and, if access could be approved, upstream and downstream of tributaries and in areas where the sewer lines closely parallel Duck Pond Run. Additionally source-tracking bacteria samples taken at the four established sites could determine whether the sources of bacteria are from humans or animals. For example the ratio of fecal coliform to fecal strep can indicate whether the source is human or animal, although there is a large range considered inconclusive as well.
- Point source dischargers in the Duck Pond Run Watershed need to operate within the guidelines of their active permits in order to maintain the water quality of Duck Pond Run as it exists today (Figure 6 and Point Source Dischargers Section).
- Creating or increasing buffer areas along streams serves to filter out pollutants, including bacteria; encourage recharge; and minimize flooding from stormwater flow. Therefore, streambank stabilization and streamside planting projects should be encouraged wherever possible. Creating vegetated areas adjacent to impervious areas also helps to increase infiltration and filter out pollutants (vegetated filters). Vegetating along streams and urban areas has an economic benefit as well. A University of Pennsylvania study found that tree planting raised property values, and Seattle estimated that increasing tree canopy from 18 to 30% would result in more than $44 million in annual benefits, including stormwater mitigation, air cleaning, carbon sequestration, energy savings, aesthetics, and other values (River Network, 2008).
- Since everyone contributes to NPS pollution, everyone must be involved in its reduction. The only way to successfully and comprehensively tackle the enormous NPS problem is to work one-on-one with individual property owners and help them target the most appropriate ways to reduce their contribution. Education alone is not sufficient. SBMWA's River-Friendly Program is geared towards doing just that: working directly with individual homeowners, businesses, golf courses, municipalities, schools,

and other landowners to help them reduce their contribution to NPS pollution (SBMWA, 2002). The River-Friendly Program simultaneously works on improving water quality management, enhancing wildlife and habitat, and conserving water. Some sample goals include creating an Integrated Pest Management plan to reduce herbicide and fertilizer use, reducing mowed areas, buffering waterbodies, increasing wildlife and native habitat areas, planting rain gardens, and installing rain barrels. In addition, the program has an education component in which participants either hold a forum to educate others and/or attend educational classes themselves. Each individual property owner has an impact on water quality and the environment, but when the even larger cumulative effect is apparent from all property owners, it can inspire the individuals to change their land stewardship practices to be more environmentally-friendly while still looking good. West Windsor should encourage their residents and businesses to participate, while serving as a role model by enlisting the municipal properties in the River-Friendly Program.

- Anecdotal evidence indicates that even though West Windsor has a Pet Waste Ordinance enacted (Chapter 150, Article IV of the Code of the Township of West Windsor, NJ), many residents, possibly thinking that they are complying, are picking up the pet waste and then discarding it down storm drains. As a result, despite best intentions, pet waste is still reaching streams in the Township and polluting the waters. This could explain some of the bacteria problems in Duck Pond Run. The Township should institute an educational campaign so residents understand what a storm drain is and the benefits of proper pet waste disposal. Part of the education could include an analysis using dog license data to estimate the number of dogs within the Township and the amount of waste produced per day to emphasize the importance of picking up after pets.

Applicable BMPs and Mitigation Approaches:

There are many stormwater best management practices that could be implemented in the Duck Pond Run Watershed to reduce bacteria and other pollutant contributions carried by stormwater runoff. Such BMPs could also reduce sediment loads, the frequency of flooding, and erosion potential. For a detailed listing of potential BMPs, refer to the New Jersey Stormwater Best Management Practices Manual (NJDEP, 2004c).

- The 2004 NJDEP Stormwater Management Rules (N.J.A.C. 7:8) state several requirements for large new developments and redevelopments focusing on minimizing disturbances and impervious surfaces, increasing groundwater recharge, reducing peak flows, and reducing NPS pollutants. Key BMPs that increase infiltration and filter out pollutants include infiltration and bioretention basins, pervious pavement, vegetated swales, and vegetated filters to capture discharge as sheet flow (NJDEP, 2004c). BMPs such as these should be implemented at each new development or redevelopment project. However, each site is unique. For information on the use of BMPs under the New Jersey stormwater management rules, see SBMWA's document, *New Jersey's Nonstructural Stormwater Strategies Point*

System – A Primer, available at http://www.thewatershed.org/info/2007NSPSprimer.pdf (SBMWA, 2007c).

- The implementation of stormwater BMP retrofits in areas being redeveloped or on municipal properties could result in cleaner water in Duck Pond Run and its tributaries. In this case existing stormwater management BMPs can be improved to better protect downstream waterbodies. The older, conventional mowed basins with paved channels for low flow stormwater conveyance are providing minimal benefits. Retrofitting existing stormwater detention or retention basins to increase stormwater infiltration could reduce the volume of stormflows in streams while filtering out pollutants such as bacteria before reaching the stream. An example of an existing detention basin that could benefit from a retrofit is the large one behind the Le Parc development. The Township should consider retrofitting such basins by removing the concrete low flow channel, constructing earthen berms to slow the rate of flow allowing more pollutants to settle and filter out, and planting native plants to reduce the stormwater volumes. Vegetating existing swales located near Duck Pond Run and its tributaries is another example of a low-cost method that can result in positive changes.
- Existing stormwater BMPs within areas not planned for redevelopment could also be retrofitted to make them more effective, for example those on municipal properties.
- Areas with agricultural land use (Figure 15) could contribute high bacteria levels if livestock are allowed stream access or if stormwater runs through pastures en route to streams. This stormwater flow could also pick up and carry fertilizers, pesticides, and sediment to the stream. The farms within Duck Pond Run Watershed should be encouraged to use BMPs to reduce agricultural NPS pollution and improve water quality. Various programs administered by NRCS work with farmers to fund and implement such BMPs. The River-Friendly Farm Program also works with farmers on these issues. For more information on the various programs, please see the listings included in the applicable Recommendations and BMPs bullets within Finding 2 of Protecting Groundwater on page 80 and within Finding 2 of Protecting Water Quality on pages 85 and 86-87.

Applicable Model Ordinances:

- Since the Duck Pond Run Watershed is already highly developed, West Windsor needs to incorporate improved stormwater management to help reduce the loadings of nonpoint source pollutants into the stream and to protect areas currently exhibiting low levels of pollutants. Each municipality was required by the New Jersey Phase II Stormwater Regulations to adopt a stormwater management plan by the spring of 2005 and to adopt a municipal stormwater control ordinance by the spring of 2006. The Township has already incorporated a Stormwater Management Plan into the Master Plan (Section XII; http://www.westwindsornj.org/MasterPlan/Section%2012/Section%2012.pdf). And West Windsor Township has already adopted a Stormwater Control Ordinance (Chapter 200, Article XXI of the Code of the Township of West Windsor, NJ) as

well as a pet waste ordinance (Chapter 150, Article IV of the Code of the Township of West Windsor, NJ). They can be viewed at: http://www.e-codes.generalcode.com/codebook_frameset.asp?t=tc&p=1666%2D200%2Ehtm%23ArticleXXI&cn=917&n=[1][144][797]. West Windsor Township needs to be diligent in enforcing these ordinances.

- Stream corridor ordinances, impervious surface ordinances, woodlands protection ordinances, afforestation ordinances, soil management ordinances, tree protection ordinances, phased construction, and soil protection ordinances are all beneficial in dealing with NPS pollution (see above for more details).
- NJDEP has also created a Stream Buffer Conservation Zone Model Ordinance. This ordinance deals with the conservation, disturbance, restoration, and management of existing stream buffers for all waterbodies within a municipality. It can be found online at: http://www.state.nj.us/dep/watershedmgt/DOCS/pdfs/StreamBufferOrdinance.pdf. SBMWA's recently revised model stream corridor ordinance can be accessed on the web at: http://www.thewatershed.org/managing_resources.php?id=C0_45_32 (click on "Model Stream Corridor Ordinance"). SBMWA is available to assist West Windsor with ordinance creation through the Project for Municipal Excellence.
- For those areas of West Windsor still utilizing septic systems, there are several septic related ordinances that could help to improve the health of the Watershed. Several townships within the Millstone Watershed have septic ordinances that provide the buyer rights to have the current owner confirm a working septic system prior to purchase. And the Association of New Jersey Environmental Commissions (ANJEC) has a model ordinance that mandates inspection upon sale or transfer of property, as well as every three years. This ensures that failing septic systems are replaced or repaired when property changes hands. A copy of this model ordinance can be obtained from https://www.anjec.org/html/ord-modelseptic.htm. Doylestown, PA has an ordinance on the books requiring regular inspection, reporting, and pumping of septic systems. Regular pumping prolongs the life of septic systems and regular inspection identifies failing septics at an earlier stage to prevent long-term bacterial contributions. A copy of this septic system maintenance ordinance (Article III On-Lot Sewage Disposal Systems [Adopted in 2001 by Ordinance Number 299] of Chapter 136 (Sewers) of the Doylestown General Code) can be found at http://www.e-codes.generalcode.com/codebook_frameset.asp?t=tc&p=1312%2D136%2Ehtm&cn=420&n=[1][97]. Montgomery Township, NJ has a similar septic maintenance and inspection ordinance which can be accessed at http://70.168.205.112/montgomery_nj/lpext.dll?f=templates&fn=site_main-j.htm&2.0 (Chapter BH:XIII of the Board of Health Code, Sections BH:13-8 and 13-9). Although the entire Duck Pond Run Watershed is in a designated sewer service area, there may be older homes still utilizing septic systems that could benefit from these suggested ordinances as well as the septic service area within West Windsor outside of the Duck Pond Run Watershed.

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