

Application # _____
Date Application Rec'd ____/____/____ Fee Collected \$ _____
<i>(for office use only)</i>

**ALEXANDRIA TOWNSHIP  
STORM WATER PERMIT APPLICATION**

Applicant: _____
Street Address: _____
City: _____ State: _____ Zip: _____
Phone Number(s): _____
E-mail address: _____
Date: _____

**NOTE:** In cases where a common plan of development or sale involves little or no disturbance of soil prior to final approval of the development, but where impervious surfaces will necessarily be created for the intended use, the developer shall provide estimates of future impervious surfaces on each lot to determine whether they are subject to the requirements of Section 4.7 and other applicable requirements of this ordinance. At a minimum, the estimates shall conform to the guidelines in TR-55: Urban hydrology for Small Watersheds (NRCS, 1986). If the specific project is reasonably expected to involve greater disturbance than these guidelines, the greater amount of disturbance shall be used to determine whether the project is subject to Section 4.7 and other applicable requirements of this ordinance.

Please attach the following (Note: Incomplete applications will be returned to the applicant):

1. No application fee is required from Alexandria Township
2. Three (3) copies of Stormwater Management Plan, meeting all requirements of the State of Minnesota and the NPDES Phase II program and the Alexandria Township Stormwater Management Ordinance. Plan shall include the following minimum requirements:
3. Documentation that all other requirements of Section 4 of the Alexandria Township Stormwater Management Ordinance have been met (see attached for requirements of Section 4)

### **Information Required for Preliminary Plan**

- A. Location map. An 11'x17" map locating the site in relation to the surrounding area.
- B. Indicate north. Show the direction of north in relation to the site.
- C. Scale. Indicate scale in relation to the actual size of the site, usually in feet per inch.
- D. Benchmark. Show the established elevation affixed to a permanent object, which can be used to check grade.
- E. Plan preparer. Indicate the name and phone number of the individual or agency responsible for preparation of the plan.
- F. Contact person. Give the name and phone number of the individual responsible for plan implementation.
- G. Existing contours. Show existing two foot contours of the site extending at least 200 feet beyond the property boundaries.
- H. Final contours. Show all proposed changes to the existing contours due to land disturbance.
- I. Existing vegetation. Indicate existing woods, tree lines, cultivated areas, grass/hay fields, CRP, wetlands and other vegetative types.
- J. Soil types. Erosion control plans shall identify the boundaries of the soil types present on-site. This requirement shall apply only if infiltration is to be used for treatment.
- K. Disturbed area. Identify the disturbed acreage for each drainage area. Include roads and lot clearing.
- L. Utilities. Show the locations of storm sewer, sanitary sewer, water supply, electrical and other utilities in the area of the proposed development.
- M. Critical erosion areas. Identify areas susceptible to erosion during and after construction. Critical erosion areas are areas which are prone to accelerated erosion, areas which have slopes of 12% or greater, areas of long, continuous slopes or areas which contain erosive soils.
- N. Adjacent areas. Describe neighboring areas which could be affected by land disturbance.
- O. Identification of the party responsible for ongoing maintenance of any permanent facility. Maintenance may be by the Township after official acceptance by the Township Board, by a legally organized homeowner's association upon submittal of sufficient legal documentation that is approved by the Township Attorney, by a watershed district after official acceptance by the district, or by other means acceptable to the township.
- P. A brief written summary/drainage design report stating the intent, scope of work and system performance.

### **Information Required at Final Plan**

- A. Three (3) copies of MPCA "Application for General Stormwater Permit for Construction Activity" (MNR100001) as has been or will be submitted to the MPCA.
- B. Copy of final Storm Water Pollution Prevention Plan (SWPPP), as required by the State of Minnesota and the NPDES Phase II program.
- C. Soil types. Erosion control plans shall identify the boundaries of the soil types present on-site – if not previously submitted in the preliminary plan.
- D. Location of BMP. Indicate the location of erosion and sediment control practices proposed for the site.

- E. Implementation schedule. Outline the proposed order of land clearing, road installation and other aspects of construction and the anticipated timeline for each stage.
- F. Sediment pond. Show the location of any temporary pond to be used to collect sediment during construction.
- G. Temporary erosion control plan. Indicate how erosion on the site will be temporarily controlled until permanent erosion control can be implemented (seeding and mulching rates, sod installation, etc.)
- H. Financial Security for 125% of the estimated construction costs (including all labor costs and required temporary erosion control measures) or for three thousand dollars (\$3,000) per acre for the maximum acreage of soil that will be simultaneously exposed to erosion during the project's construction, whichever is more. The security must meet all requirements of Section 7 of this ordinance.
- I. All storm water management facilities shall have a plan of operation, maintenance and clean-out that assures continued effective removal of sediment carried in storm water runoff. This plan shall include a copy of legal documents assigning responsibility for maintenance of any permanent stormwater facilities or required drainage easements.
  - 1. All permanent drainage easements shall be indicated and recorded as required by the Zoning Administrator and shall ensure adequate access for maintenance purposes.
  - 2. If a storm water management plan involves directing some or all of the site's runoff, the applicant or his designated representative shall obtain from adjacent property owners any necessary easements or other property interests concerning the flowing of such water.
  - 3. Stormwater ponds will be located in a permanent easement. The easement will contain the 100-year post-development elevation, plus an additional 10 feet at a 10:1 slope or flatter. Access to the pond will also be in a permanent easement. Permanent easements for access to the pond will be looked at on an individual basis.
- J. A landscaping plan for any stormwater ponds and the surrounding area shall be prepared to indicate how aquatic and terrestrial areas will be stabilized and established with vegetation and how these areas will be maintained. The plan shall be prepared by a qualified professional and shall conform as much as possible or feasible with the recommendations contained in the most current version of the MPCAs "Minnesota Stormwater Manual" (Chapter 12-8 in Version 1.1).

**Section 4.0 Storm Water Management Plan.** Every applicant for a building permit, subdivision approval, or a permit to allow land disturbing activities must submit a storm water management plan to the Zoning Administrator. No building permit, subdivision approval (preliminary or final), or permit to allow land disturbing activities shall be issued until the Township approves this plan. At a minimum these pollution abatement control practices must conform to those in the current version of the Minnesota Pollution Control Agency's publication), "State of Minnesota Stormwater Manual"

4.1 General Policy on Storm Water Runoff Rates. Release rates from storm water treatment basins shall not increase over the predevelopment twenty-four (24) hour two (2) year, ten (10) year and one hundred (100) year peak storm discharge rates, based on the last ten (10) years of how that land was used. Also accelerated channel erosion must not occur as a result of the proposed activity.

For discharges to wetlands volume control is generally more important than discharge rate control.

4.2 The Storm Water Management Plan and the Grading Plan. The storm water management plan's measures and the limit of disturbed surface shall be marked on the approved grading plan.

4.3 Inspections of the Storm Water Management Plan's Measures. At a minimum, the developer or the developer's designated representative shall inspect the plan's measures for compliance with this ordinance weekly, and within twenty-four (24) hours after every storm or snow melt event large enough to result in runoff from the site (approximately 0.25 inches or more in twenty-four (24) hours). At a minimum, these inspections shall be done during active construction. The Township, or its designated representative, may make such inspections as it deems necessary to ensure compliance with the Plan's Measures.

The developer, or the developer's designated representative, shall notify the township when all required permanent stormwater controls have been installed and are ready for inspection (all disturbed areas have been stabilized). The Township shall inspect the completed permanent stormwater controls within ten (10) business days of receiving notification and issue written confirmation from the Township Engineer, or their designated representative, that all permanent stormwater controls have been installed according to the plan and the requirements of this ordinance. If deficiencies exist, the Zoning Administrator shall notify the developer of the deficiencies and shall not issue written approval of the controls until they have met all requirements.

4.4 (See first page of application form)

4.5 General Storm Water Management Plan Criteria. The plan shall address the following:

- A. No land disturbing activity shall result in active gully erosion or create negative off-site impacts.]
- B. No land disturbing activity shall result in an increase in channel erosion in any watercourse, whether permanent or intermittent, at any time during or following development.
- C. No land disturbing activity shall result in the creation of unstable slopes, which persist after the completion of the development.
- D. Permanent or temporary soil stabilization shall be applied to disturbed areas (areas where vegetation has been removed or where cuts have been made), as soon as possible, but not to exceed fourteen (14) days after a substantial portion of rough grading has been conducted unless an extension is granted by the Zoning Administrator. Soil stabilization measures shall be selected to be appropriate for the time of year, site conditions and estimated duration of use.
- E. Soil stockpiles shall be stabilized or protected with sediment trapping measures to prevent soil loss.
- F. A permanent vegetative cover shall be established on disturbed areas not otherwise permanently stabilized.
- G. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.

- H. Sediment basins and traps, perimeter dikes (for diversion), sediment barriers (silt fences) and other measures intended to trap sediment on-site shall be constructed prior to or concurrent with any grading and shall be functional before upslope land disturbance takes place. Earthen structures such as dams, dikes and diversions shall be seeded and mulched within fourteen (14) days of installation.
  - I. Storm water runoff from drainage areas with more than five (5) acres of disturbed area must pass through a temporary sediment trapping basin or other suitable sediment trapping facility.
  - J. Cut and fill slopes shall be designed and constructed in a manner which will minimize erosion. Slopes which will not be vegetated within one (1) year of construction shall be provided with additional slope stabilizing measures until the problem is corrected. Slopes that are found to be eroding excessively shall immediately be provided with additional slope stabilizing measures until the problem is corrected.
  - K. Properties and waterways downstream from development sites shall be protected from erosion due to increases in the volume, velocity and peak flow rate of storm water runoff.
  - L. All on-site storm water conveyance channels shall be designed and constructed to withstand the expected velocity of flow from a 100-year frequency storm without eroding.
  - M. Rip-rap shall be placed at culvert outfalls in accordance with applicable MnDOT standard specifications.
  - N. All storm sewer inlets which are made operable during construction shall be protected so that sediment laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.
  - O. Construction vehicles and other equipment shall be kept out of watercourses to the maximum extent possible.
  - P. Wherever construction vehicle access routes intersect paved public roads, provisions, such as rock construction entrances, shall be made to minimize the transport of sediment by runoff or vehicle tracking onto the paved surfaces.
  - Q. All temporary erosion and sediment control measures shall be properly disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed, unless otherwise authorized by the Zoning Administrator.
  - R. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to assure continued performance of their intended functions.
  - S. All permanent drainage easements shall be indicated and recorded as required by the Zoning Administrator and shall ensure adequate access for maintenance purposes.
  - T. A landscaping plan for any stormwater ponds and the surrounding area shall be prepared to indicate how aquatic and terrestrial areas will be stabilized and established with vegetation and how these areas will be maintained. The plan shall be prepared by a qualified professional and shall conform as much as possible or feasible with the recommendations contained in the "Minnesota Stormwater Manual, Version 1.1," Chapter 12-8 as revised from time to time.
- 4.6 Minimum Storm Water Management Measures and Related Inspections. These minimum control measures are required where bare soil is exposed:
- A. All storm water management measures must be designed, installed and maintained consistent with the most current Best Management Practices.
  - B. All grading plans must be reviewed by the Township for the effectiveness of erosion control measures in the context of site topography and drainage.
  - C. Sediment control measures must be properly installed by the builder before construction activity begins

- D. Diversion of channeled runoff around disturbed areas, if practical, or the protection of the channel.
- E. Easements. If a storm water management plan involves directing some or all of the site's runoff, the applicant or his designated representative shall obtain from adjacent property owners any necessary easements or other property interests concerning the flowing of such water.
- F. The scheduling of the site's activities to lessen their impact on erosion and sediment Creation, so as to minimize the amount of exposed soil.
- G. Generally, sufficient silt fence shall be required to hold all sheet flow runoff generated at an individual site, until it can either infiltrate or seep through silt fence's pores.
- H. For soil stockpiles greater than ten (10) cubic yards the toe of the pile must be more than twenty-five (25) feet from a road, drainage channel or storm water inlet. If such stockpiles will be left for more than seven (7) days, they must be stabilized with mulch, vegetation, tarps or other means.
  - 1. If for any reason a soil or non-soil stockpile of any size is located closer than twenty-five (25) feet from a road, drainage channel or storm water inlet, and will be left for more than seven (7) days, it must be covered with tarps or controlled in some other manner.
  - 2. All non-soil (clean sand, gravel, concrete or bituminous) must at a minimum have a silt fencing or other effective sediment control measures installed.
- I. All sand, gravel or other mining operations taking place on the development site shall apply for a Minnesota Pollution Control Agency National Pollutant Discharge Elimination System General Storm Water permit for industrial activities and all required Minnesota Department of Natural Resources permits.
- J. Temporary rock construction entrances, or equally effective means of preventing vehicles from tracking sediment from the site, may be required wherever vehicles enter and exit a site.
  - 1. Vehicle tracking of sediment from the site must be minimized by BMPs such as stone pads, concrete or steel wash racks, or equivalent systems. Street sweeping must be used if such BMPs are not adequate.
- K. Parking is prohibited on all bare lots and all temporary construction entrances, except where street parking is not available.
- L. Streets must be cleaned and swept whenever tracking of sediments occurs and before the site is left idle for weekends and holidays. A regular sweeping schedule should be established.
- M. Water (impacted by the construction activity) removed from the site by pumping must be treated by temporary sedimentation basins, geotextile filters, grit chambers, sand filters, up-flow chambers, hydro-cyclones, swirl concentrators or other appropriate controls. Such water shall not be discharged in a manner that causes erosion or flooding of the site, receiving channels, adjacent property or a wetland.
- N. All storm drain inlets must be protected during construction until control measures are in place with either silt fence or an equivalent barrier that meets accepted design criteria, standards and specifications as contained in the latest version of the Minnesota Pollution Control Agency's publication, ), "State of Minnesota Stormwater Manual"
- O. Excessive removal of topsoil from the project site is discouraged. Excessive removal of topsoil from the project's site can cause significant current and future soil erosion problems.
- P. Inspection and maintenance. All storm water management facilities must be designed to minimize the need of maintenance, to provide easy vehicle (typically ten (10) feet or wider) and personnel access for maintenance purposes and be structurally sound. These facilities must have a plan of operation and maintenance that ensures continued effective removal of the pollutants carried in storm water runoff and identifies the responsible party for performing any maintenance requirements. The Township or its designated representative may inspect all storm water

management facilities during construction, during the first year of operation and at least once **every five (5) years** thereafter. The Township will retain on file, at a minimum, the last three inspections.

1. Inspection and maintenance easements. It shall be the responsibility of the applicant to obtain any necessary easements or other property interests to allow access to the storm water management facilities for inspection and maintenance purpose.
- Q. Follow-up inspections may be performed by the Township on a regular basis to ensure that erosion and sediment control measures are properly installed and maintained. In all cases the inspectors will attempt to work with the applicant and/or builder to maintain proper erosion and sediment control at all sites.
1. In cases where cooperation is withheld, construction stop orders may be issued by the Township, until all erosion and sediment control measures meet specifications.
- R. All infiltration areas must be inspected to ensure that sediment from ongoing construction activities is not reaching infiltration areas, and that these areas are also being protected from soil compaction from the movement of construction equipment.

4.7 Permanent Storm Water Management Controls. The purpose of this Section is to prevent or reduce, to the most practicable extent, the effect or impacts of storm water runoff and to provide for the protection of public waters and natural and artificial water storage and retention areas within the Township. Further, this Section clarifies the performance standards as they pertain to standards and specifications for conservation practices and storm water planning activities.

- A. **Performance Standards:** Property storm water management practices shall be followed within the Township as described in this Section.
1. General Standards:
    - a). Soil laden runoff shall be treated before it is allowed to enter any water body. Preference shall be given to designs using surface drainage, vegetation and infiltration rather than buried pipes, manmade materials and facilities.
    - b). Storm water rate control. When one acre of new impervious surface is added a storm water management plan shall include the design of all storm water management facilities necessary to manage increased runoff so that the 2-year, 10-year and 100-year storm peak discharge rates from the property boundary do not exceed pre-development conditions and so that accelerated channel erosion on and off-site will not occur as a result of the proposed land disturbing or development activity. If a regional pond has been designated for this area the peak discharge rates may or may not apply.
    - c). The minimum design capacity of all drainage systems shall accommodate the runoff from a ten (10) year storm event. All drainage systems and facilities, shall be designed to withstand the runoff from the critical one hundred (100) year event or accumulative antecedent conditions without damage to the system or facility, downstream areas and without significant risk to human health and safety.
    - d). The applicant or their successors shall be responsible for the installation and maintenance of any temporary or permanent measures identified in the storm water management plan. At the time of completion of the development, those structures, measures and systems constituting the storm water runoff facility may be permanently maintained by the Township after official acceptance by the Township Board, by a legally organized homeowner's association, by a watershed district after official acceptance by the district or by other means acceptable to the Township.

- e). The applicant or their successors shall be responsible for the installation and maintenance of any temporary or permanent measures identified in the storm water management plan. At the time of completion of the development, those structures, measures and systems constituting the storm water runoff facility may be permanently maintained by the Township after official acceptance by the Township Board, by a legally organized homeowner's association, by a watershed district after official acceptance by the district or by other means acceptable to the Township.
- f). The applicant or their successors shall be responsible for the installation and maintenance of any temporary or permanent measures identified in the storm water management plan. At the time of completion of the development, those structures, measures and systems constituting the storm water runoff facility may be permanently maintained by the Township after official acceptance by the Township Board, by a legally organized homeowner's association, by a watershed district after official acceptance by the district or by other means acceptable to the Township.
- g). After approval of the storm water management plan, but prior to disturbing any soil, the applicant shall furnish the township with an acceptable financial guarantee as stipulated in Section 7 of this ordinance.
- h). Storm water volume control. For protection of downstream water bodies and properties that have had storm water issues due to a limited outlet or where there is no outlet, post development runoff volumes shall not exceed pre-development conditions. For protection of downstream water bodies, the most current Best Management Practices (BMPs) shall be employed to reduce the general impacts of runoff volume and rates. Development resulting in the creation of impervious surfaces must explicitly address the use of BMPs to limit the loss of pervious areas. BMPs to be evaluated shall include, but not be limited to, vegetated swales, pond outlets perched above ground water levels, roof drainage to pervious areas, depressed casual storage areas, minimization of the number and width of parking stalls "rural section" roads and road width minimization and mitigation of disturbed soils.
- i). Prevention of downstream nuisance and damage. When conditions do not permit post-development runoff volumes to safely pass downstream properties, the applicant shall provide a storm water pond to control the post development rates so downstream properties or water resources are not adversely affected.
- j). Storm water management facilities must be designed, installed and maintained consistent with the most current Best Management Practices.
- k). Developments shall be planned and conducted in a manner that will minimize the extent of disturbed area, runoff velocities, erosion potential and both reduce and delay runoff volumes. Disturbed areas shall be stabilized and protected and facilities or methods used to retain sediment on site.
- l). All storm water management facilities shall be designed to minimize the need for maintenance, to provide access for maintenance purposes and to be structurally sound. All storm water management facilities shall have a plan of operation, maintenance and clean-out that assures continued effective removal of sediment carried in storm water runoff. It shall be the responsibility of the applicant to obtain any necessary easements or other property interests to allow access to the storm water management facilities for inspection and maintenance purposes.

2. Specific Standards for Storm Water Conveyance and Rate Control Facilities.

- a). All storm water management calculations submitted to the Township for review as part of a storm water management plan shall include sufficient information for the Township to evaluate the changes to the storm water drainage characteristics within the watershed areas affected by the proposed land disturbing activity. The applicant shall include calculations which clearly show the effects of this development on the peak rate of discharge, the time of concentration, channel velocities and other potential drainage impacts to water and soil resources both on and off the development site. The Zoning Administrator may require the applicant to provide any additional information, calculations or data needed to complete the review of a storm water management plan.
- b). The storm water calculations submitted for review shall be based upon standard hydrological and hydraulic analysis methods that are acceptable to the Zoning Administrator. Calculations that are based upon unproven methodologies or apply proven methodologies incorrectly shall be determined by the Township to be unacceptable and shall be returned to the applicant for correction and be resubmitted.
- c). Acceptable hydrological methods and procedures to determine peak runoff discharge rates and runoff volumes for all development, except for street and highway pavement drainage systems, shall be the standard methods of the *Natural Resources Conservation Service SCS TR 55 and the SCS TR 20 methods* as defined in the current *Hydrology Guide for Minnesota*.
- d). Precipitation events for the Rational method shall be for the two (2), ten (10) and one hundred (100) year twenty-four (24) hour frequency storm events using the *U.S. Weather Bureau Technical Paper No. 40* rainfall intensity duration curves for a Type II rainfall distribution.
- e). Acceptable hydrological methods and procedures to determine peak runoff discharge rates for street and highway pavement drainage systems, inlet capacities and piped storm sewer systems shall be based upon the Rational method as defined in the current *Minnesota Department of Transportation Drainage Manual*.
- f). Where development site drainage discharges to an existing roadway, ditch, storm sewer or other public facility, the applicant shall provide, as part of the calculations, all survey, utility or other topographic data of the existing condition needed for the Zoning Administrator to determine that the proposed development does not impact or degrade any critical roadway element or negatively impact the safety, maintenance or function of the public facility.
- g). Drainage areas. Storm water management plans shall show existing and proposed drainage areas used for storm water analysis, including off-site portions of sub watersheds that are partly located on the property for which the plan is being prepared. Where drainage areas include runoff from off-site areas, those areas may be shown and measured from maps at larger scales (e.g. United States Geological Survey Quadrangle Maps) if better mapping is not reasonably available. In all drainage areas, the direction of flow for each area and the travel path used for determining the time of Concentration shall be shown. No direct entries for determining the time of Concentration shall be allowed without prior approval by the Zoning Administrator.
- h). Runoff curve numbers (RCN). Storm water management plans shall include a detailed breakdown of existing and proposed runoff curve numbers.
- i). Soil types. Storm water management plans shall identify the boundaries of the soil types present on-site and their hydrologic classification and acreage.

- j). Pre-development conditions. Appropriate runoff curve numbers from *Technical Release 55 – Urban Hydrology for Small Watersheds* shall be used to analyze pre-development conditions.
  - k). For evaluation of post-development runoff, drained hydric soils shall be assumed to revert to an undrained condition unless the applicant demonstrates that publicly owned and maintained drainage facilities will be adequate to maintain the drained condition.
  - l). Impervious coverage. Storm water management calculations shall list the new impervious area created in each sub watershed and shall include the assumptions and calculations used for determining impervious areas, such as house pad, driveway and outbuildings.
  - m). Runoff calculations. The applicant shall provide calculations for the two (2), ten (10) and one hundred (100) year peak discharge rates for each sub watershed comparing pre-development conditions and proposed post-development conditions.
  - n). Where pre-development conditions indicate no runoff, the infiltration capacity required elsewhere in this Ordinance may be used to demonstrate compliance with a no runoff requirement for the storm frequency and duration being considered.
  - o). Storm water management plans shall show preexisting drains and tile lines. Storm water facilities shall be designed assuming that tile lines will no longer function unless an easement is supplied for future maintenance and the applicant demonstrates that the tile line has design capacity and service condition that makes it a suitable component of the storm water management system.
  - p). Storm water management plans shall include an evaluation of landlocked lakes and ponds in the design analysis and demonstrate that the greatest flood (500 year event) will not result in damage to man-made structures, and/or provide a positive outlet.
  - q). Storm water management plans shall identify the location of conveyance systems and clearly identify all dimensions, cross sections and outlet elevations.
  - r). Storm water management plans shall include the locations of all property lines, lot lines, section lines and adjacent plats.
  - s). Storm water management plans shall contain information which clearly identifies all elevations and grades for streets, ditches, ponds, wetlands, lakes, pipe inverts and pipe outlets.
  - t). A written summary/drainage design report documenting the designer's intent, scope of work and system performance.
3. Specific Standards for Wet Detention Basins:
- a). All wet detention basins shall be designed and constructed in accordance with the Pitt method described in the MPCA Best Management practices.
  - b). All basins shall have a permanent pool length-to-width ratio of 3:1 or greater.
  - c). Side slopes should not exceed 4:1 (5:1 or flatter is preferred).
  - d). A minimum protective shelf extending ten feet into the permanent pool with a slope of 10:1.
  - e). Designs for wet detention basins shall include, but not be limited to, calculations for estimated inflow and outflow, permanent and temporary storage volumes, mean depth, outlet design, downstream stabilization, emergency spillways, basin profiles and basin cross sections.

- f). Stormwater ponds will be located in a permanent easement. The easement will contain the 100-year post-development elevation, plus an additional 10 feet at a 10:1 slope or flatter. Access to the pond will also be in a permanent easement. Permanent easements for access to the pond will be looked at on an individual basis.

4. Specific Standards for Volume Control

- a). Infiltration practices for control of storm water runoff volume shall be capable of infiltrating one-half (1/2) inch of runoff from all new impervious surfaces within the development within forty-eight (48) hours.
- b). Infiltration volume and facility sizes shall be calculated using the appropriate hydrologic soil group calculation and saturation infiltration rate from the table below. Documented site specific infiltration or hydraulic conductivity measurements may be used in place of the values in the following table, if approved by the Zoning Administrator. The goals of these BMPs are to minimize the amount of directly connected impervious surface created, to preserve the infiltration capacity of the soil and to incorporate practices into the design which are capable of allowing the infiltration of one-half (1/2) inch of runoff from impervious surfaces within forty-eight (48) hours.

**Soil Group Infiltration Rate (in/hr) Soil Texture**

- (1) 0.3 sandy, loamy sand or sand loam
- (2) 0.15 silt loam or loam
- (3) 0.07 sandy clay loam
- (4) 0.03 clay loam, silty clay loam, silty clay or clay

Source: Urban Hydrology for Small Watersheds (SCS, June 1986)

- c). Infiltration areas shall be limited to the horizontal areas subject to prolonged wetting.
- d). Areas of permanent pools tend to lose infiltration capacity over time and shall not be accepted as an infiltration practice.
- e). New constructed storm water outfalls to any public waters must provide for filtering or settling of suspended solids and skimming or surface debris before discharge.

4.8 Minimum Protection for Natural Wetlands.

- A. Runoff must not be discharged directly into wetlands without appropriate quality (i.e., treated) and quantity runoff control, depending on the individual wetland's vegetation sensitivity. See the current version of the Minnesota Pollution Control Agency's publication, "Storm-Water and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Storm-Water and Snow-Melt Runoff on Wetlands" for guidance. Other guidelines may be used, subject to approval by the Township.

4.9 Models/Methodologies/Computations. Hydrologic models and design methodologies used for the determining runoff characteristics and analyzing storm water management structures must be approved by the Township engineer. Plans, specifications and computations for storm water management facilities submitted for review must be sealed and signed by a registered professional engineer. All computations must appear in the plans submitted for review, unless otherwise approved by the Township engineer.