

**TOWNSHIP OF SALFORD  
COUNTY OF MONTGOMERY  
COMMONWEALTH OF PENNSYLVANIA.**

**ORDINANCE NO. 140**

**AN ORDINANCE** regulating the management of stormwater runoff from earth disturbance activities; defining those activities; setting standards for stormwater management; providing for the use of Best Management Practices in control of stormwater runoff; adopting procedures for the submission of Drainage Plans and their review; authorizing the setting of fees for such review; coordinating the activities under this Ordinance with provisions of the Salford Township Zoning Ordinance and Subdivision and Land Development Ordinance; and providing penalties for the violation thereof.

***Section 101. Purpose***

The purpose of this ordinance is to promote health, safety, and welfare within Salford Township through provisions designed to:

- A. Promote alternative project designs and layout that minimizes impacts to surface and ground water.
- B. Promote nonstructural Best Management Practices.
- C. Minimize increases in stormwater volume.
- D. Minimize impervious surfaces.
- E. Manage accelerated runoff and erosion and sedimentation problems at their source by regulating activities that cause these problems.
- F. Utilize and preserve the existing natural drainage systems.
- G. Encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality.
- H. Address the quality and quantity of stormwater discharges from the development site.
- I. Maintain existing flows and quality of streams and watercourses.
- J. Preserve and restore the flood-carrying capacity of streams.
- K. Provide proper maintenance of all permanent stormwater management facilities.
- L. Provide performance standards and design criteria for watershed-wide stormwater management and planning.

***Section 102. Statutory Authority***

Salford Township is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978 32 P.S., P.L. 864 (Act 167) Section 680.1 et seq., as amended, the "Stormwater Management Act,".

Activities listed in this section.

The following activities are defined as "Regulated Activities" and shall be regulated by this Ordinance:

- A. Land development.
- B. Subdivision.
- C. Construction of new or additional impervious or semipervious surfaces (driveways, parking lots, patios, tennis courts, etc.).
- D. Construction of new buildings or additions to existing buildings.
- E. Diversion or piping of any natural or man-made stream channel.
- F. Installation of BMPs and/or stormwater management facilities or appurtenances thereto.
- G. Stormwater management and erosion and sedimentation control during construction activities

#### ***Section 104. Repealer***

Any ordinance or ordinance provision of Salford Township inconsistent with any of the provisions of this ordinance is hereby repealed to the extent of the inconsistency only.

#### ***Section 105. Severability***

Should any section or provision of this ordinance be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

#### ***Section 106. Compatibility With Other Ordinance Requirements***

Approvals issued pursuant to this ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance.

### **ARTICLE II. DEFINITIONS**

For the purposes of this chapter, certain terms and words used herein shall be interpreted as follows:

- A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
- B. The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.
- C. The word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity.
- D. The words "shall" and "must" refers to items which are mandatory; the words "may" and "should" refer to items which are permissive.
- E. The words "used or occupied" include the words "intended, designed, maintained, or arranged to be used, occupied, or maintained.

**Accelerated Erosion** The removal of the surface of the land through the combined action of man's activity and the natural processes at a rate greater than would occur because of the natural process alone.

**Agricultural Activities** The work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

**Alteration** As applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also the changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

**Applicant** A landowner or applicant who has filed an application for approval to engage in any Regulated Activities.

**As-Built Drawings** Those maintained by the contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These, or a copy of the same, are turned over to the Engineer at the completion of the project.

**Base Flow** The portion of stream flow that is sustained by groundwater discharge.

**Bioretention** A stormwater retention area which utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

**BMP (best management practice)** Stormwater structures, facilities and techniques to control, maintain or improve the quantity and quality of surface runoff. The *PA Stormwater Best Management Practices Manual* may be referenced for specific BMP practices.

**Cistern** A reservoir or tank for storing rainwater.

**Conservation District** The Montgomery County Conservation District.

**Culvert** A structure with appurtenant works which carries a stream under or through an embankment or fill.

**Dam** An artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid, or a refuse bank, fill or structure for highway, railroad or other purposes which does or may impound water or another fluid or semifluid.

**DEP** The Pennsylvania Department of Environmental Protection.

**Designee** The agent of Salford Township involved with the administration, review or enforcement of any provisions of this ordinance by contract or memorandum of understanding.

**Design Professional (Qualified)** A Pennsylvania Registered Professional Engineer.

**Design Storm** The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24-hours), used in the design and evaluation of stormwater management systems.

**Detention Basin** An impoundment structure designed to manage stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

**Diffused Drainage Discharge** Drainage discharge not confined to a single point location or channel, such as sheet flow or shallow concentrated flow.

**Disturbed Areas** Unstabilized land area where an earth disturbance activity is occurring or has occurred.

**Development Site** The specific tract of land for which a regulated activity is proposed.

**Downslope Property Line** That portion of the property line of the lot, tract, or parcels of land being developed located such that all, or a portion of, overland or pipe flow from the site would be directed towards it.

**Drainage Conveyance Facility** A stormwater management facility designed to transmit stormwater runoff and shall include streams, channels, swales, pipes, conduits, culverts, storm sewers, etc.

**Drainage Easement** A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

**Drainage Plan** The documentation of the stormwater management system, to be used for a given development site, the contents of which are established in Section 403.

**Earth Disturbance** A construction or other human activity which disturbs the surface of land, including, but not limited to, clearing and grubbing, grading, filling, excavations, embankments, land development, agricultural activities, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials, or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

**East Branch Study** Perkiomen Creek Act 167 Stormwater Management Plan.

**Emergency Spillway** A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

**Encroachment** A structure or activity that changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water.

**Erosion** The movement of soil particles by the action of water, wind, ice, or other natural forces.

**Erosion and Sediment Pollution Control Plan** A plan that is designed to minimize accelerated erosion and sedimentation.

**ERSAM** Existing Resource and Site Analysis Map, developed by the Applicant's engineer.

**Exceptional Value Waters** Surface waters of high quality which satisfy Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards, § 93.4b(b) (relating to antidegradation).

**Existing Conditions** The initial condition of a project site prior to the proposed construction. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower curve numbers or Rational "C" values. See discussion in Section 309.

**Flood** A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

**Floodplain** Any land area susceptible to inundation by water from any natural source or delineated as a special flood hazard area on the applicable National Flood Insurance Program Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA). Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Dept. of Environmental Protection (DEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

**Floodway** The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed—absent evidence to the contrary—that the floodway extends from the stream to 50 feet from the top of the bank of the stream. The Township, at its discretion, may require a drainage study or model in order to show more accurate boundaries.

**Forest Management/Timber Operations** Planning and activities necessary for the management of forest land. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation, and reforestation.

**Freeboard** A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.

**Grade** A slope, usually of a road, channel, or natural ground specified in percent and shown on plans as specified herein.

**(To) Grade** to finish the surface of a roadbed, top of embankment, or bottom of excavation.

**Groundwater Recharge** Replenishment of existing natural underground water supplies.

**HEC-HMS** The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS).

**High Quality Waters (HQ)** Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, § 93.4b(a).

**Hydrologic Regime (natural)** The hydrologic cycle or balance that sustains quality and quantity of storm water, baseflow, storage, and groundwater supplies under natural conditions.

**Hydrologic Soil Group** A classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

**Impervious Surface** A surface that prevents the percolation of water into the ground such as building rooftops, pavement, sidewalks, driveways and compacted earth or turf.

**Impoundment** A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

**Infiltration** The passing of stormwater through the soil from the surface.

**Infiltration Structures** A structure designed to direct runoff into the ground (e.g., french drains, seepage pits, seepage trench).

**Inlet** A surface connection to a closed drain. The upstream end of any structure through which water may flow.

**Land Development** (1) The improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving: (i) a group of two or more residential or nonresidential buildings, whether initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure; or (ii) the division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features. (2) A subdivision of land. (3) Development in accordance with Section 503(1.1) of the Pennsylvania Municipalities Planning Code Act of 1968 (Act 247).

**Limiting zone** A soil horizon or condition in the soil profile or underlying strata which includes one of the following:

- (i) A seasonal high water table, determined by direct observation of the water table or indicated by soil mottling.
- (ii) A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.
- (iii) A rock formation, other stratum or soil condition which is so slowly permeable that it effectively limits downward passage of effluent.

**Main Channel** Any stream segment or other runoff conveyance facility used as a reach (i.e., any section with uniform natural and/or physical characteristics) in the Perkiomen Creek hydrologic model.

**Manning Equation (Manning formula)** A method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. "Open channels" may include closed conduits so long as the flow is not under pressure.

**Municipality** Salford Township, Montgomery County, Pennsylvania.

**Natural Hydrologic Regime** (see hydrologic regime)

**Nonpoint Source Pollution** Pollution that enters a body of water from diffuse origins in the watershed and does not result from confined or discrete conveyances.

**NRCS** Natural Resources Conservation Service (previously SCS - Soil Conservation Service).

**Open Channel** A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full.

**Outfall** Point where water flows from a conduit, stream, or drain.

**Outlet** Points of water discharge from a stream, river, lake, tidewater or artificial drain.

**Parent Tract** The parcel of land from which a land development or subdivision originates.

**Peak Discharge** The maximum rate of stormwater runoff from a specific storm event.

**Penn State Runoff Model (calibrated) (PSRM)** The computer based hydrologic modeling technique which has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

**Pipe** A culvert or similar structure (including appurtenances) that conveys stormwater.

**Predevelopment** Undeveloped/Natural Condition.

**Pretreatment** Techniques employed in stormwater BMPs to provide storage or filtering to help trap coarse materials and other pollutants before they enter the system.

**Rational Method** A rainfall-runoff relation used to estimate peak flow.

**Recharge Area** Undisturbed surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the underground and groundwater.

**Re<sub>v</sub> (Recharge Volume)** That portion of stormwater runoff volume created by a regulated activity which is required to be recharged using infiltration BMPs.

**Record Drawings** Original documents revised to suit the as-built conditional and subsequently provided by the Engineer to the client. The Engineer takes the contractor's as-builts, reviews them in detail with his/her own records for completeness, then either turns these over to the client or transfers the information to a set or reproducible, in both cases for the client's permanent records.

**Redevelopment** The construction, alteration, or improvement exceeding 5,000 square feet of land disturbance performed on sites with existing development.

**Regulated Activities** Actions or proposed actions that have an impact on stormwater runoff and that are specified in Section 103 of this ordinance.

**Release Rate** The post development peak rate of stormwater discharge expressed as a percentage of predevelopment peak rate of discharge.

**Retention Basin** An impoundment in which stormwater is stored and not released during the storm event. Stored water may be released from the basin at some time after the end of the storm.

**Return Period** The average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the 25-year return period rainfall would be expected to recur on the average of once every 25 years.

**Riser** A vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

**Runoff** Any part of precipitation that flows over the land surface.

**Sediment Basin** A barrier, dam, or retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water.

**Sediment Pollution** The placement, discharge, or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of the DEP Erosion and Sediment Pollution Control Program manual.

**Sedimentation** The process by which mineral or organic matter is accumulated or deposited by the movement of water.

**Seepage Pit, Trench, or Bed** An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the ground.

**Sheet Flow** Runoff that flows over the ground surface as a thin, even layer, not concentrated in a channel.

**Soil-Cover Complex Method** A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).

**Source Water Protection Area (SWPA)** The zone through which contaminants are likely to migrate and reach a drinking water well or surface water intake.

**Special Protection Watersheds** Watersheds for which the receiving waters are exceptional value (EV) or high quality (HQ) waters.

**Spillway** A conveyance that is used to pass the peak discharge of the maximum design storm controlled by the stormwater facility.

**Storm Sewer** A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

**Stormwater** The total amount of precipitation reaching the ground surface.

**Stormwater Management District** Those subareas identified and mapped in the East Branch Study in which some type of detention is required to meet the plan requirements and the goals of this Ordinance (See definition of East Branch Study)

**Stormwater Management Facility** Any structure, natural or man-made, that, due to its condition, design, or construction conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.

**Stormwater Management Plan** The plan prepared by the applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this ordinance.

**Stream** A natural watercourse.

**Stream Buffer** The land area adjacent to each side of a stream, essential to maintaining water quality measured 150 feet from the top of the bank.

**Stream Enclosure** A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this Commonwealth.

**Subarea** The smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

**Subdivision** The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition of the court for distribution to heirs or devisees, transfer of ownership or building or lot development provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

**Swale** A low lying stretch of land which gathers or carries surface water runoff.

**Timber Operations** See Forest Management.

**Time-of-Concentration (T<sub>c</sub>)** The time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

**Watercourse** A river, brook, creek, or a channel or ditch for water, whether natural or manmade with perennial or intermittent flow.

**Waters of the Commonwealth** Any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth of Pennsylvania.

**Wetland** Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, ferns, and similar areas.

**WQv (Water quality volume)** The storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site that is produced from 90 percent of the average annual rainfall.



### ARTICLE III. STORMWATER MANAGEMENT

#### *Section 301. Requirements Applicable to All Stormwater Management Systems*

- A. All regulated activities that do not fall under the exemption criteria shown in Section 402 shall submit a drainage plan to Salford Township for review. This criterion shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas, whether new or existing, to be paved for foot or vehicular traffic with gravel or crushed stone shall be assumed to be impervious for the exemption criteria.
- B. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this ordinance.
- C. The Drainage plan must be designed consistent with the sequencing provisions of Section 302 to ensure maintenance of the natural hydrologic regime and to promote groundwater recharge and protect groundwater and surface water quality and quantity. The Drainage plan designer must proceed sequentially in accordance with requirements of this Ordinance Article given below.
- D. The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the affected property owner(s) and shall be subject to any applicable discharge criteria specified in this ordinance.
- E. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding, or other harm will result from the concentrated discharge.
- F. Whenever a watercourse is located within a development site, it shall remain open in its natural state and location and should not be piped, impeded, or altered (except for road and other utility crossings). It is the responsibility of the developer to stabilize existing eroded stream/channel banks.
- G. Where a development site is traversed by watercourses drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement.
- H. Work within natural drainageways shall be subject to approval by the municipality and the DEP through the Joint Permit Application process, or, where deemed appropriate by DEP, through the General Permit process.
- I. Any stormwater management facilities regulated by this ordinance that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by DEP through the Joint Permit Application process, or, where deemed appropriate by DEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the applicant or his agent to show that the land in question cannot be classified as wetlands; otherwise approval to work in the area must be obtained from DEP.
- J. Any stormwater management facilities regulated by this ordinance that would be located on or discharge into state highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

- K. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., is required to reduce the size or eliminate the need for detention facilities.
- L. Roof drains must not be discharged to streets or roadside ditches or connected to sanitary or storm sewers. Overland flow and infiltration/percolation of stormwater shall be promoted where site conditions allow.
- M. **Special Protection Watersheds.** The following special requirements apply for watersheds draining to high quality (HQ) and exceptional value (EV) waters: The temperature and quality of water and streams that have been declared as exceptional value and high quality are to be maintained as defined in Chapter 93, Water Quality Standards, Title 25 of Pennsylvania Department of Environmental Protection Rules and Regulations. Temperature sensitive BMPs and stormwater conveyance systems are to be used and designed with storage pool areas and supply outflow channels and should be shaded with trees. This will require modification of berms for permanent ponds and the relaxation of restrictions on planting vegetation within the facilities, provided that capacity for volumes and rate control is maintained. At a minimum, the southern half on pond shorelines shall be planted with shade or canopy trees within 10 feet of the pond shoreline. In conjunction with this requirement, the maximum slope allowed on the berm area to be planted is 10 to 1. This will lessen the destabilization of berm soils due to root growth. A long-term maintenance schedule and management plan for the thermal control BMPs is to be established and recorded for all development sites. Landowner or management entity shall provide yearly reports to the Township by a Registered Professional Engineer or Certified Soil Scientist on the operation of such Management Plan, and may be required to pay a fee, set by the Township, for the administration of such report. Township shall have the right to order corrections made in the operation or conduct of the plan if it finds that the goals of the plan are not met.
- N. All stormwater runoff shall be pretreated for water quality prior to discharge to surface or groundwater as required by section 303 of this ordinance .

***Section 302. Nonstructural Project Design (Sequencing to Minimize Stormwater Impacts)***

- A. The design of all Regulated Activities shall include the following steps in sequence to minimize stormwater impacts.
  - 1. The applicant is required to find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of waters of the Commonwealth, and must maintain as much as possible the natural hydrologic regime of the site.
  - 2. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes, and other municipal requirements.
  - 3. All practicable alternatives to the discharge of stormwater are presumed to lessen the adverse impact on quantity and quality of waters of the Commonwealth unless otherwise demonstrated.
- B. The applicant shall demonstrate that they designed the Regulated Activities in the following sequence to minimize the increases in stormwater runoff and impacts to water quality:
  - 1. Prepare an Existing Resource and Site Analysis Map (ERSAM), showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, flood plains, stream buffer zones, hydrologic soil groups A, B, C, and D, any existing recharge areas and any other requirements outlined in the Salford Township Subdivision and Land Development ordinance. Establish stream buffer according to recommended criteria or applicable ordinances.

2. Prepare a draft project layout avoiding sensitive areas identified in section 302.B.1 and minimizing total site earth disturbance as much as possible. The ratio of disturbed area to the entire site area and measures taken to minimize earth disturbance shall be included in the ERSAM.
3. Identify site specific existing conditions drainage areas, discharge points, recharge areas, and hydrologic soil groups A and B.
4. Evaluate Nonstructural Stormwater Management Alternatives (See Appendix B, Table B-6).
  - a. Minimize earth disturbance
  - b. Minimize impervious surfaces
  - c. Separate or divide large impervious surfaces.
5. Satisfy water quality objective (Section 303).
6. Satisfy groundwater recharge (infiltration) objective (Section 304) and provide for stormwater treatment prior to infiltration.
7. Satisfy streambank erosion protection objective (Section 305)
8. Conduct a predevelopment runoff analysis.
9. Prepare final project design to maintain predevelopment drainage areas and discharge points, to minimize earth disturbance and impervious surfaces. The Plan shall reduce runoff to the maximum extent possible.
10. Conduct a proposed conditions runoff analysis based on the final design and to meet the release rate, overbank flow and extreme event requirements (Section 306).
11. Manage any remaining runoff through treatment prior to discharge, as part of detention, bioretention, direct discharge or other structural control.

### **Section 303. Water Quality (volume WQv)**

In addition to the performance standards and design criteria requirements of this Article, the applicant SHALL comply with the following requirements regarding water quality volume (WQv.)

- A. Adequate storage and treatment facilities shall be provided to capture and treat stormwater runoff from developed or disturbed areas. The Recharge Volume computed under Section 304 may be a component of the Water Quality Volume if the applicant chooses to manage both components in a single facility. If the Recharge Volume is less than the Water Quality Volume, the remaining Water Quality Volume may be captured and treated by methods other than recharge/infiltration BMPs. The required Water Quality Volume (WQv) is the storage capacity needed to capture and to treat a portion of stormwater runoff from the developed areas of the site produced from 90 percent of the average annual rainfall (P).
- B. To achieve this goal, the following calculation formula shall be used to determine the water quality storage volume, (WQv), in acre-feet of storage:

$$\text{WQv} = \{(P)(Rv)(A)\}/12 \quad \text{Equation: 303.1}$$

WQv = Water Quality Volume (acre-feet)

P = Rainfall Amount equal to 90% of events producing this rainfall (in)

A = Area of the project contributing to the water quality BMP (acres)

$R_v = 0.05 + 0.009(I)$  where  $I$  is the percent of the area that is impervious surface (impervious area/ $A \times 100$ )

The  $P$  value to be utilized to meet this requirement is 1.95 inches.

B. Design of BMPs used for water quality control shall be in accordance with design specifications outlined in the *Pennsylvania Stormwater Best Management Practices Manual*. The following factors SHALL be considered when evaluating the suitability of BMPs used to control water quality at a given development site:

1. Total contributing drainage area.
2. Permeability and infiltration rate of the site soils.
3. Slope and depth to bedrock.
4. Seasonal high water table.
5. Proximity to building foundations and well heads.
6. Erodibility of soils.
7. Land availability and configuration of the topography.
8. Peak discharge and required volume control.
9. Stream bank erosion.
10. Efficiency of the BMPs to mitigate potential water quality problems.
11. The volume of runoff that will be effectively treated.
12. The nature of the pollutant being removed.
13. Maintenance requirements.
14. Creation/protection of aquatic and wildlife habitat.
15. Recreational value.
16. Enhancement of aesthetic and property value.

C. To accomplish the above, the applicant shall submit original and innovative designs to the municipality for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (best management practices).

#### ***Section 304. Groundwater Recharge (Infiltration)***

A. Infiltration BMPs shall meet the following minimum requirements:

Regulated activities will be required to recharge (infiltrate) a portion of the runoff created by the development as part of an overall stormwater management plan designed for the site. The volume of runoff to be recharged shall be determined from sections 304.A.2.a. or 304.A.2.b. depending upon demonstrated site conditions.

1. Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:
  - a. A minimum depth of 24 inches between the bottom of the BMP and the limiting zone. If the existing conditions do not meet this criterion, an alternative infiltration method shall be provided, acceptable to the Township Engineer.
  - b. An infiltration and/or percolation rate sufficient to accept the additional stormwater load and drain completely as determined by field tests conducted by the applicant's design professional.

- c. The recharge facility shall be capable of completely infiltrating the recharge volume within four days (96 hours).
  - d. Pretreatment shall be provided prior to infiltration.
  - e. The requirements for recharge are applied to all disturbed areas, even if they are ultimately to be an undeveloped land use such as grass, since studies have found that compaction of the soils during earth disturbance reduces their infiltrative capacity.
2. The recharge volume ( $Re_v$ ) shall be computed by first obtaining the infiltration requirement using methods in either section 304.A.2.a. or 304.A.2.b. then multiplying by the total proposed impervious area. The overall required recharge volume for a site is computed by multiplying total impervious area by the infiltration requirement.
- a. NRCS Curve Number (CN) equation.

The following criteria shall apply.

The NRCS runoff shall be utilized to calculate infiltration requirements (P) in inches.

For zero runoff:  $P = I \text{ (Infiltration)} = (200 / CN) - 2$

where:  $P = I$  = infiltration requirement (inches)

CN = SCS(NRCS) curve number of the existing conditions contributing to the recharge facility

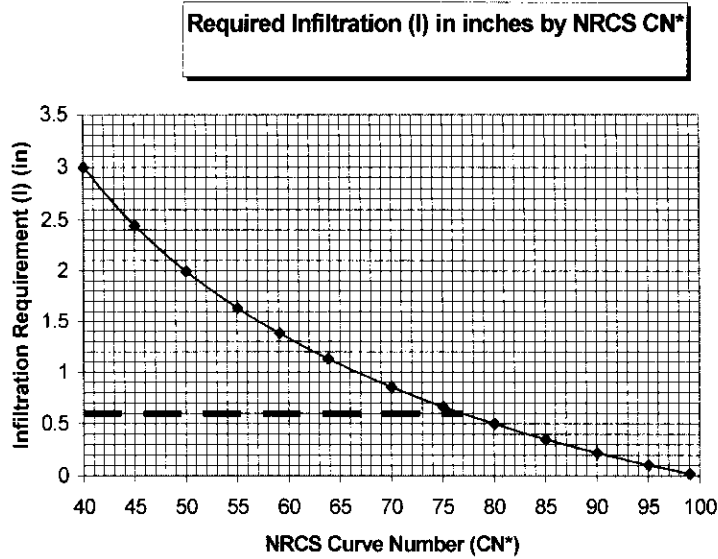
This equation can be displayed graphically in, and the infiltration requirement can also be determined from Figure 304-1.

The recharge volume ( $Re_v$ ) required would therefore be computed as:

$Re_v = I * \text{impervious area (SF)} / 12 = \text{Cubic Feet (CF)}$

**Error! Figure 304-1. Infiltration Requirement Based upon NRCS Curve Number.**

**Comment [DL1]:** Need to have original file in order to correct.



b. Annual Recharge Water Budget Approach.

It has been determined that infiltrating 0.6 inches of runoff from the impervious areas will aid in maintaining the hydrologic regime of the watershed. If the goals of Section 304.A.2.a cannot be achieved, then 0.6 inches of rainfall shall be infiltrated from all impervious areas, up to an existing site conditions curve number of 77. Above a curve number of 77, Equation 304.1 or the curve in Figure 304.1 should be used to determine the Infiltration requirement.

where:  $I = 0.6$  inches

The recharge volume ( $Re_v$ ) required would therefore be computed as:

$$Re_v = I * \text{percent impervious area (SF)} / 12 = (\text{CF})$$

The recharge values derived from these methods are the minimum volumes the Applicant must control through an infiltration/recharge BMP facility. However, if a site has areas of soils where additional volume of infiltration can be achieved, the applicant is encouraged to recharge as much of the stormwater runoff from the site as possible.

B. The general process for designing the infiltration BMP shall be:

A detailed soils evaluation of the project site shall be required to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified applicant and, at a minimum, address soil permeability, depth to bedrock, and subgrade stability.

1. Analyze hydrologic soil groups as well as natural and man-made features within the watershed to determine general areas of suitability for infiltration practices.
  2. Provide field tests, such as double ring infiltration tests at the level of the proposed infiltration surface to determine the appropriate hydraulic conductivity rate.
  3. Design the infiltration structure for the required storm volume based on field determined capacity at the level of the proposed infiltration surface.
  4. Where the recharge volume requirement cannot be physically accomplished due to the results of the field soils testing, supporting documentation and justification shall be supplied to the municipality with the drainage plan.
  5. If on-lot infiltration structures are proposed by the applicant's design professional, it must be demonstrated to the municipality that the soils are conducive to infiltrate on the lots identified.
- C. Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. Extreme caution shall also be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. Extreme caution shall be exercised where infiltration is proposed in source water protection areas. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and perform a hydrogeologic justification study if necessary. The infiltration requirement in High Quality/Exceptional Value waters shall be subject to the DEP's Title 25: Chapter 93 Antidegradation Regulations. The municipality may require the installation of an impermeable liner in BMP and/or detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by Salford Township.
- D..Salford Township shall require the applicant to provide safeguards against groundwater contamination for uses which may cause groundwater contamination, should there be a mishap or spill.
- E. Recharge/infiltration facilities shall be used in conjunction with other innovative or traditional BMPs, stormwater control facilities, and nonstructural stormwater management alternatives.

#### ***Section 305. Stream Bank Erosion Requirements***

- A..In addition to the water quality volume, to minimize the impact of stormwater runoff on downstream streambank erosion, the requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour design storm to the existing conditions 1-year flow using the NRCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) so that the proposed conditions 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility.)
- B. Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation. Orifices smaller than 3 inches diameter are not recommended. However, if the Design Engineer can provide proof that the smaller orifices are protected from clogging by use of trash racks, etc., smaller orifices may be permitted. Trash racks are required for any primary orifice.

### **Section 306. Stormwater Management Districts with Direct Discharge**

Development sites which can discharge directly to the East Branch or West Branch Perkiomen Creek main channel, directly to its major tributaries, or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or tributary) may do so without control of proposed conditions peak rate of runoff greater than the 5-year storm.

- A. These sites shall comply with the water quality, groundwater recharge, and streambank erosion criteria in Sections 303, 304, and 305 of this Ordinance.
- B. If the proposed conditions runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the increased peak flows or will be provided with improvements to furnish the required capacity.
- C. If storms greater than the 2-year storm cannot be conveyed to the stream or watercourse in a safe manner, the proposed conditions peak rate of runoff must be controlled to the existing conditions peak rate (i.e., 25-year proposed conditions flows to 25-year existing conditions flows) for the specified design storms.
- D. Standards for managing runoff are shown below. Development sites must control post-development condition runoff rates to pre-development condition runoff rates for the design storms as follows:

<b>Design Storm</b> <b>Post-development conditions</b>	<b>Design Storm</b> <b>Pre-development conditions</b>
2-year	1-year
5-year	5-year

### **Section 307. Stormwater Management District Implementation Provisions (Performance Standards)**

- A. General—Proposed conditions peak rates of runoff from any regulated activity shall meet the peak release rates of runoff prior to development for the design storms.
- B. Off-Site Areas—The portion of runoff from off-site areas that drain through a proposed development site are not required to be reduced to the site's release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.
- C. Site Areas—Where the area of a site being impacted by a proposed development activity differs significantly from the total site area, only the proposed disturbed area utilizing stormwater management measures shall be subject to the management district criteria. Unimpacted or undisturbed areas that do not flow into or are bypassing the stormwater management facilities would not be subject to the criteria.
- D. "Downstream Hydraulic Capacity Analysis"—Any downstream capacity hydraulic analysis conducted in accordance with this ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:
  - 1. Natural or man-made channels or swales must be able to convey the increased runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the Department of Environmental Protection's *Erosion and Sediment Pollution Control Program Manual*.



2. Natural or man-made channels or swales must be able to convey increased 25-year return period runoff without creating any hazard to persons or property.
3. Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with the Department of Environmental Protection's Chapter 105 regulations (if applicable) and, at minimum, pass the increased 25-year return period runoff.

E. **Regional Stormwater Management Facilities Alternatives**—For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective applicants. The design of any regional control facility must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional control facility would be determined on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the stormwater management plan. It is a requirement that, even if regional facilities are proposed for the water quantity control, that the water quality, streambank erosion, and recharge criteria be accomplished on-site, or as close to the source of the runoff as possible.

### ***Section 308. Design Criteria for Stormwater Management Facilities***

- A. Any stormwater facility located on state highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).
- B. Any stormwater management facility (i.e., detention basin BMP) designed to store runoff and requiring a berm or earthen embankment required or regulated by this ordinance shall be designed to provide an emergency spillway to handle flow up to and including the 100-year proposed conditions. The height of embankment must be set as to provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the 100-year proposed conditions peak inflow. Should any stormwater management facility require a dam safety permit under Title 25, Environmental Protection, Chapter 105, Dam Safety and waterway management, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than 100-year event.
- C.
  1. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands as directed in DEP Chapter 105 regulations (as amended or replaced from time to time by DEP), shall be designed in accordance with Chapter 105 and will require a permit from DEP. Any other drainage conveyance facility that does not fall under Chapter 105 regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm with a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway.
  2. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm with a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway.
- D. Any drainage/conveyance facility and/or channel that does not fall under Chapter 105 Regulations, must be able to convey, without damage to the drainage structure or roadway, runoff from the 10-year design storm. Conveyance facilities to or exiting from stormwater management facilities (i.e., detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.

- E. Storm sewers must be able to convey proposed conditions runoff from a 10-year design storm without surcharging inlets, where appropriate.
- F. Adequate erosion protection shall be provided along all open channels, and at all points of discharge.
- G. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The municipality shall reserve the right to disapprove any design that would result in the creation of, exacerbation of, or continuation of an adverse hydrologic or hydraulic condition within the watershed.

### ***Section 309. Calculation Methodology***

Stormwater runoff from all development sites shall be calculated using either the rational method or a soil cover complex methodology as described below.

- A. Any stormwater runoff calculations shall use generally accepted calculation technique that is based on the NRCS soil cover complex method. Table 309-1 summarizes acceptable computation methods. It is assumed that all methods will be selected by the applicant based on the individual limitations and suitability of each method for a particular site.

The Rational Method is recommended for drainage areas under 100 acres.

- B. All calculations consistent with this ordinance using the soil cover complex method shall use the appropriate design rainfall depths for the various return period storms. If a hydrologic computer model such as HEC-1 or HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours.
- C. Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from TR55. For the purposes of existing conditions flow rate determination, undeveloped land shall be considered as "meadow" in good condition, unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e., forest.) For areas of prior mining disturbance (i.e. strip mining, mine spoil areas, etc.), the designer must locate the affected mining area. The appropriate curve number or Rational 'C' value shall then be used.
- D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the Design Storm Curves from PA Department of Transportation Design Rainfall Curves (1986) (Figures B-2 to B-3). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of *Urban Hydrology for Small Watersheds*, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation.
- E. The designer shall consider that the runoff from proposed sites graded to the subsoil will not have the same runoff conditions as the site under existing conditions even if topsoiled and seeded. The designer may increase their proposed condition CN or C value to reflect proposed soil conditions.
- F. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational method shall be obtained from the PennDOT Design Manual.
- G. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determine the capacity of open channels, pipes, and storm sewers. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this ordinance using any generally accepted hydraulic analysis technique or method.

- H. The design of any stormwater detention facilities intended to meet the performance standards of this ordinance shall be verified by routing the design storm hydrograph through these facilities.

**Table 309-1. Acceptable Computation Methodologies For Stormwater Management Plans**

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
HEC-1, HEC-HMS	U.S. Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of a Hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.
Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling (1889)	For sites less than 20 acres, or as approved by the Municipality and/or Township Engineer.
Other Methods	Varies	Other computation methodologies approved by the Municipality and/or Township Engineer.

**Section 310. Stormwater Detention and Retention Facilities**

- A. Stormwater Detention and retention facilities shall meet the following minimum design/construction standards:
1. Detention basins shall be designed to facilitate regular maintenance, mowing and periodic silt removal and re-seeding. Shallow broad basins are preferred to steep sided basins.
  2. The maximum slope of the earth and detention basin embankment shall be 3 to 1 with the exception that any slope to be maintained by the Township shall be 4 to 1. The toe of any slope shall be located a minimum of five feet from a property line. Whenever possible, the side slope and basin shape shall conform to the natural topography
  3. If retention basins are used, the applicant shall demonstrate that such ponds are designed to protect public health, safety and welfare.
  4. Fences may be required for any detention or retention basins where there is a permanent water surface or conditions warrant.

5. The minimum top width of the detention basin berm shall be 10 feet. A cut-off trench (keyway) of relative impervious material shall be provided beneath all embankments requiring fill material. The keyway shall be a minimum 8 feet wide, minimum 3 feet deep and have 1 to 1 side slopes.
6. In order to ensure proper drainage on the basin bottom, a minimum grade of 2% shall be maintained for sheet flow. Where a slope of 2% cannot be maintained, infiltration channels or trenches will be required and shall be constructed between all basin inlets and the basin outlet.
7. All detention and retention basin embankments shall be placed in 8 inch maximum lifts to a minimum dry density of 95%. Prior to proceeding to the next lift, compaction shall be checked by the Township Engineer or an approved soils engineer who shall provide the Township Engineer with a written report. Compaction tests shall be performed using the modified proctor method in accordance with ASTM D-1557. Compaction tests shall be run on the leading and trailing edge as well as the top of the berm.
8. Emergency overflow facilities shall be provided for detention facilities to accommodate runoff in excess of design flows. Whenever possible, emergency spillways for the detention basins shall be constructed on undisturbed ground. Emergency spillways shall be constructed of concrete pavers, gabions or other similar materials approved by the Township Engineer. All emergency spillways shall be constructed so that the detention basin berm is protected against erosion. The minimum capacity of all emergency spillways shall be the peak flow rate of the one-hundred-year design storm after development. The construction material of the emergency spillway shall extend along the upstream and downstream berm embankment slopes. The upstream edge of the emergency spillway shall be a minimum of three feet below the spillway crest elevation. The downstream slope of the spillway shall extend to the toe of the berm embankment. The emergency spillway shall not discharge over earthen fill or easily erodible material.
9. The minimum freeboard shall be 1 foot.
10. Anti-seep collars shall be installed around the pipe barrel within the normal saturation zone of the detention basin berms. The Anti-seep collars and their connections to the pipe barrels shall be watertight. The Anti-seep collars shall extend a minimum of 2 feet beyond the outside of the principle pipe barrel. The maximum spacing between collars shall be 14 times the minimum projection of the collar measured perpendicular to the pipe. A minimum of 2 Anti-seep collars shall be installed on each outlet pipe.
11. All outlet pipes through the basin berm shall be reinforced concrete pipe, designed to withstand the loading caused by a fully saturated berm and shall have watertight joints using O-ring joint pipe. Outlet pipe shall be backfilled with material acceptable to the Township Engineer.
12. The invert of the inlet pipe(s) into a basin shall be 6 inches above the basin floor or lining so that it can adequately drain after rainstorms. Inlet pipe(s) shall discharge to areas of the basin that slope toward the outlet structure.
13. Energy dissipaters and/or level spreaders shall be installed at points where pipes or drainageways drain to or from the basin. Energy dissipaters shall comply with the Montgomery County Soil Conservation District/Department of Environmental Protection

criteria. NCRS Energy dissipating device calculations shall be submitted for Township Engineer review and approval.

14. Inlet and outlet structures shall be located at a maximum distance from one another in order to promote water quality benefits. The Township Engineer may require sediment trap devices for entrapping sediments carried in stormwater if sufficient separation of inlet and outlet structures cannot be achieved.
15. A perforated riser or similar sediment control device shall be provided at each outlet of all detention basins during construction for sediment control. The riser shall be constructed of metal or concrete. The riser shall extend to a maximum elevation of 1 foot below the crest elevation of the emergency spillway. The perforated riser shall be designed so that the rate of outflow is controlled by the pipe barrel through the basin berm when the depth of water within the basin exceeds the height of the riser. Circular perforations with a maximum diameter of 1 inch shall be spaced 12 inches vertically. The horizontal spacing shall be in accordance to DEP Soil Erosion and Sedimentation Control Manual Specifications. The perforations shall be cleanly cut and shall not be susceptible to enlargement. All metal risers shall be suitable coated to prevent corrosion. A trash rack or similar appurtenance shall be provided to prevent debris from entering the pipe. All risers shall have a concrete base attached with a watertight connection. The base shall be of sufficient weight to prevent flotation of the riser. An anti-vortex device consisting of a thin vertical plate normal to the base and berm shall be provided at the top of the riser. Unless this structure is part of the permanent outlet control, it shall be removed from the site when the site has been adequately stabilized as determined by the Township Engineer.
16. All drainage channels shall be designed to prevent erosion of the bed and banks. The maximum permissible flow velocity shall not exceed the design requirements outlined in the current Design Manual, published by the Pennsylvania Department of Environmental Protection. Suitable stabilization shall be provided where required to prevent erosion of the drainage channels.
17. Any vegetated drainage channel requiring mowing of the vegetation shall have a maximum grade of 3 horizontal to 1 vertical on those areas to be mowed.
18. Because of the critical nature of vegetated drainage channels, the design of all vegetated channels shall, as a minimum, conform to the design requirements outlined in the current Design Manual, published by the Pennsylvania Department of environmental Protection.

#### ***Section 311. Stormwater Conveyance System***

Wherever possible, stormwater conveyance will be designed using Best Management Practice Facilities. When this is not possible, the following criteria shall be used:

##### **A. General**

1. Storm sewers, culverts, bridges and related installations shall be provided to:
  - a. Permit unimpeded flow of natural watercourses and in such a manner as to protect the natural character of the watercourses and to provide regulated discharge;
  - b. Ensure adequate drainage of all low points along the line of streets; and

- c. Intercept stormwater runoff along streets at intervals reasonably related to the extent and grade of the area drained and to prevent substantial flow of water across intersections.
2. All storm sewer system components shall conform to current PennDOT standards.
3. Drainage structures, which drain watershed areas in the excess of one-half square mile (320 acres) or which have a span of 8 feet or more, shall be designed for a maximum expected runoff as calculated using the Soil Conservation Service Technical Release 55. Urban Hydrology for Small Watersheds (less than 2000 acres).
4. If a water obstruction permit is required, the design shall accommodate a one-hundred-year storm.
5. The length of the culvert or width of the bridge shall be as wide as the R-O-W width of the roadway approaches.

B. Storm sewer design and construction requirements

1. Minimum pipe size is 18 inches.
2. Minimum pipe slope shall be 0.5 percent.
3. Minimum drop across junctions shall be 2 inches. At changes in pipe diameter, pipe crowns shall be matched at junctions (manhole, inlet or junction box)
4. Maximum distance between junctions shall be 300 feet.
5. Runoff to proposed storm sewers and inlets shall be calculated using the Rational Method.
6. The time of concentration shall be assumed 5 minutes for pipes under 30 inches. For pipes 30 inches or greater, the calculated time of concentration can be utilized.
7. The time of concentration to inlets for grate capacity calculations shall be assumed 5 minutes.
8. All storm sewer pipes shall be designed at a minimum to accommodate a minimum of a 10 year storm.
9. All storm sewer pipes at inlets in sump condition shall be designed to accommodate the 50 year storm.
10. Notwithstanding items 8., and 9., above, The 100 year storm shall be transported to the basin. The plans shall reflect this requirement as required by the Township Engineer.
11. All inlets in sump condition shall be 6 foot inlets or dual 4 foot inlets, as needed.
12. All storm sewer systems shall be analyzed for both inlet and outlet control (including tailwater effects) by using the equations and nomographs as shown in the FHA's Hydraulic Design Manual. In lieu of this, computer programs that calculate the actual hydraulic grade line for the

storm sewer system can be used, provided that all losses (friction, bend, junction, etc.) are taken into account. Documentation for the program must be submitted for approval.

13. Minimum cover over pipes is 2 feet to outside of pipe bell.
14. Inlet capacities shall be calculated using PennDOT or manufacturer's nomographs. Documentation for manufacturer's nomograph must be provided to the Township Engineer.

C. Shoulders in cut areas (without swales).

1. Water flowing along the shoulder shall not encroach more than two-thirds the shoulder width during a 25 year frequency storm of 5 minute duration.
2. The maximum velocity as determined by Manning's Equation shall not exceed the allowable velocities for the specific type of shoulder material.
3. Inlets shall be provided to control the shoulder encroachment and water velocity.

D. Swales adjacent to shoulders.

1. Swales in cut areas shall be designed to prevent the passage of water on the cartway during a 25 year frequency storm of 5 minute duration.
2. The maximum velocity as determined by Manning's Equation shall not exceed the allowable velocities for the specific type of shoulder material.

E. Curbed sections.

1. The maximum encroachment of water on the roadway pavement shall not exceed 4 inches in depth at the curb during a 25 year frequency storm of 5 minute duration.
2. Inlets shall be provided to control the encroachment of water on the pavement.

F. Inlets, general.

1. At street intersections, inlets shall be placed in the tangent portion, rather than the curved portion, of the curbing.
2. If the capacity of the shoulder, swale, curb section or depressed median section exceeds the assumed inlet capacities, the inlet capacities shall govern the spacing of inlets.
3. If the capacity of the shoulder, swale, curb section or depressed median section is less than the inlet capacities, then the shoulder, swale, curb section or depressed section capacity shall govern the spacing of inlets.

### ***Section 312. Erosion and Sedimentation Requirements***

- A. Whenever the vegetation and topography are to be disturbed, such activity must be in conformance with Chapter 102, Title 25, Rules and Regulations, Part I, Commonwealth of Pennsylvania, Department of Environmental Protection, Subpart C, Protection of Natural Resources, Article II, Water Resources, Chapter 102, "Erosion Control," and in accordance with regulations of the Montgomery County Conservation District.
- B. Additional erosion and sedimentation control design standards and criteria that must be applied where infiltration BMPs are proposed shall include the following:
  - 1. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity.
  - 2. Infiltration BMPs shall not receive runoff until the entire contributory drainage area to the infiltration BMP has received final stabilization.

## **ARTICLE IV. DRAINAGE PLAN REQUIREMENTS**

### ***Section 401. General Requirements***

For any of the activities regulated by this ordinance, final approval of subdivision and/or land development plans, the issuance of any Zoning Permit, or the commencement of any land disturbance activity may not proceed until the applicant or his/her agent has received written approval of a drainage plan from Salford Township. In accordance with provisions of the Salford Township Subdivision and Land Development Ordinance, The Township may require financial guarantees for the commencement of such activities as part of a Construction Improvement Agreement. In the case of a Preliminary Plan of Subdivision or Land Development, the Township may, at its option, accept a preliminary drainage plan which in the opinion of the Township Engineer is sufficiently detailed as to show that the Final Drainage Plan will, when completed, meet all requirements of this Ordinance. In such a case, any approval given to the Preliminary Subdivision or Land Development Plan shall be considered to be conditioned upon the approval of a Final Drainage Plan, whether or not specifically so-stated in the approval.

### ***Section 402. Exemptions***

Any regulated activity that meets the exception criteria in the following table is exempt from the drainage plan submission requirement of this ordinance. These criteria shall apply to the total development even if development is to take place in phases. The date of this ordinance adoption shall be the starting point from which to consider tracts as "parent tracts" in which future subdivisions and respective impervious area computations shall be cumulatively considered. These criteria shall not apply to additions or accessory uses to single-family dwellings except in the VCR District.

### ***Section 403. Drainage Plan Contents***

The drainage plan shall consist of all applicable calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosion and sediment pollution control plan by title and date. The cover sheet of the computations and erosion and sediment pollution control plan shall refer to the associated maps by title and date. All drainage plan materials shall be submitted to Salford Township in a format that is clear, concise, legible, neat, and well organized; otherwise, the drainage plan will be disapproved and returned to the applicant.

The following items shall be included in the drainage plan:



A. General

1. General description of project.
2. General description of permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.
3. Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.
4. An erosion and sediment control plan, including all reviews and approvals by the Conservation District.
5. Individual home construction shall provide a general description of non-point source pollution control on a smaller scale.

B. Plans

Whenever a proposed Subdivision or Land Development shall require the submission of a Drainage Plan, such Drainage Plan shall be submitted to the Township Planning Commission in conjunction with, and as part of, the Subdivision or Land Development Plans. Plan(s) of the project area shall be submitted on 24-inch x 36-inch sheets and shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Montgomery County. In addition to, and as an expansion of, the requirements for Preliminary and Final Plan submission as listed in the Salford Township Subdivision and Land Development Ordinance, the contents of the Plan(s) shall include, but not be limited to:

1. Existing and proposed contours at intervals of 2 feet. In areas of steep slopes (greater than 15 percent), 5-foot contour intervals may be used.
2. Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.
3. The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines.
4. An overlay showing soil names and boundaries.
5. Proposed changes to the land surface and vegetative cover, including limits of earth disturbance and the type and amount of impervious area that would be added.
6. Proposed structures, roads, paved areas, and buildings.
7. On the key plan shall be shown all existing man-made features beyond the property boundary that would be affected by the project.
8. Location of all open channels.
9. Overland drainage paths.
10. Graphically represent a minimum 15 foot access easement originating from a public right-of-way to the stormwater management facility for the purpose of ingress and egress.

11. A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off-site. All off-site facilities shall meet the performance standards and design criteria specified in this ordinance.
12. A statement, signed by the landowner, acknowledging the stormwater management system to be a permanent fixture that can be altered or removed only after approval of a revised plan by Salford Township, which shall be recorded with the record plan and which shall be applicable to all future landowners.
13. The following signature block for the design engineer:

“(Design Engineer), on this date (date of signature), hereby certifies that the drainage plan meets all design standards and criteria of the Salford Township Stormwater Management Ordinance.”
14. A statement for completion by Township Engineer that plan has been reviewed and no revisions are recommended.
15. All plans shall include a plan note stating that Salford Township shall have the right to enter private property to inspect and repair, if necessary, any stormwater management facility
16. All plans shall note that the stormwater management facilities are a permanent part of the development and shall not be removed, altered, or modified. Evidence shall be provided that this condition is recorded as an impediment on the deed to each individual property.

#### C. Supplemental Information

1. A written description of the following information shall be submitted.
  - a. The overall stormwater management concept for the project designed in accordance with Section 302.
  - b. Stormwater runoff computations as specified in this ordinance.
  - c. Stormwater management techniques to be applied both during and after development.
  - d. Expected project time schedule.
  - e. Development stages (project phases) if so proposed.
  - f. An operation and maintenance plan in accordance with Section 702 of this ordinance.
2. A soil erosion and sediment pollution control plan, where applicable, including all reviews and approvals from Montgomery County Conservation District.
3. The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing municipal stormwater collection system that may receive runoff from the project site.
4. A Highway Occupancy Permit from the PennDOT District Office when the use of a PennDOT storm drainage system is proposed.

#### D. Stormwater Management Facilities

1. All stormwater management facilities must be located on a plan and described in detail.
2. When groundwater recharge methods such as seepage pits, beds, or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.
3. All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

#### **Section 404. Plan Submission**

For all activities regulated by this ordinance, the steps below shall be followed for submission. For any activities that require a DEP Joint Permit Application and regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of DEP's Rules and Regulations, require a PennDOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, the proof of application for that, the permit(s) shall be part of the plan. The plan shall be coordinated with the state and federal permit process.

- A. The drainage plan shall be submitted by the applicant as part of the preliminary plan submission for the regulated activity.
- B. In association with any other Subdivision and Land Development Plans, a minimum of four (4) copies of the drainage plan shall be submitted.
- C. Distribution of the drainage plan will be as follows:
  - 1. Two (2) copies to the Municipality accompanied by the requisite municipal review fee, as specified in this ordinance.
  - 2. Two (2) copies to the Township Engineer.
  - 3. One (1) copy retained by Applicant with Township Planning Commission comments.

#### **Section 405. Drainage Plan Review**

- A. The Township Engineer shall review the drainage plan for consistency with the Salford Township Stormwater Management Ordinance.
- B. The Township Engineer shall review the drainage plan for any subdivision or land development against the Salford Township subdivision and land development ordinance provisions not superseded by this ordinance.
- C. For activities regulated by this ordinance, the Township Engineer shall notify Salford Township in writing, whether the drainage plan is consistent with the Stormwater Management Ordinance. Should the drainage plan be determined to be consistent with the Stormwater Management Ordinance, the Township Engineer will forward a review letter to the applicant with a copy to Salford Township.
- D. Should the drainage plan be determined to be inconsistent or noncompliant with the Stormwater Management Ordinance, the Township Engineer will forward a letter to Salford Township with a copy to the applicant citing the reason(s) for the inconsistency or noncompliance. Any drainage plans found inconsistent or noncompliant may be revised by the Applicant and resubmitted for reevaluation. Salford Township will not grant approval to the proposal until its drainage plan is deemed consistent with this ordinance.
- E. For regulated activities requiring a DEP Joint Permit Application with the Corps of Engineers, the Township Engineer shall notify DEP whether the drainage plan is consistent with the Salford Township Stormwater Management Ordinance and forward a copy of the review letter to Salford Township and the applicant.
- F. Salford Township shall not approve any subdivision or land development for regulated activities specified in Sections 104 of this ordinance if the drainage plan has been found to be inconsistent with the Stormwater Management Ordinance, as determined by the Township Engineer.
- G. The applicant shall be responsible for completing record drawings of all stormwater management facilities included in the approved Drainage plan. The record drawings and an explanation of any

discrepancies from the design plans shall be submitted to the Township Engineer for final approval. In case of construction on a state highway, or where drainage shall be conveyed on a State right-of-way, Salford Township shall not approve the record drawings until Salford Township receives a copy of an approved highway occupancy permit from the PennDOT District Office, and any applicable permits from DEP.

- H. Salford Township's approval of a drainage plan shall be valid for a period not to exceed five (5 years). This five-year time period shall commence on the date that Salford Township signs the approved drainage plan. If construction of stormwater management facilities included in the approved drainage plan have not been completed, or if completed and record drawings of these facilities have not been approved within this five-year time period, then Salford Township may consider the drainage plan withdrawn and may revoke any and all permits. Drainage plans that are considered disapproved by Salford Township shall be resubmitted in accordance with Section 407 of this ordinance. Resubmitted Plans shall be subject to all regulations in force at the time of resubmission.

***Section 406. Modification of Plans***

A modification to a submitted drainage plan for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or redesign of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the drainage plan as determined by the Township Engineer, shall require a resubmission of the modified drainage plan consistent with Section 404 of this ordinance and be subject to review as specified in Section 405 of this ordinance.

A modification to an already approved or disapproved drainage plan shall be submitted to Salford Township, accompanied by the applicable fee. A modification to a drainage plan for which a formal action has not been taken by Salford Township shall be submitted to Salford Township, accompanied by the applicable review fee.

***Section 407. Resubmission of Disapproved Drainage Plans***

A disapproved drainage plan may be resubmitted, with the revisions addressing the Township Engineer's concerns documented in writing addressed to Salford Township in accordance with Section 404 of this ordinance and distributed accordingly and be subject to review as specified in Section 405 of this ordinance.

## **ARTICLE V. INSPECTIONS**

### ***Section 501. Schedule of Inspections***

- A. The Township Engineer or his/her municipal assignee shall observe all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Township Engineer.
- B. During any stage of the work, if the Township Engineer determines that the permanent stormwater management facilities are not being installed in accordance with the approved Stormwater Management Ordinance, Salford Township shall revoke any existing permits until a revised drainage plan is submitted and approved, as specified in this ordinance.

## **ARTICLE VI. FEES AND EXPENSES**

### ***Section 601. General***

The fee required by this ordinance is the review fee. The review fee shall be established by Salford Township to defray review costs incurred by Salford Township and the Township Engineer. All fees shall be paid by the applicant.

### ***Section 602. Salford Township Drainage Plan Review Fee***

Salford Township shall establish a review fee schedule by resolution of Salford Township Board of Supervisors based on the Township's costs for reviewing drainage plans. Salford Township shall periodically update the review fee schedule to ensure that review costs are adequately reimbursed.

### ***Section 603. Expenses Covered by Fees***

The fees required by this ordinance shall at a minimum cover:

- A. Administrative costs.
- B. The review of the drainage plan by Salford Township and the Township Engineer.
- C. The inspection of stormwater management facilities and drainage improvements during construction.
- D. The final observation upon completion of the stormwater management facilities and drainage improvements presented in the drainage plan.
- E. Any additional work required to enforce any permit provisions regulated by this ordinance, correct violations, and ensure proper completion of stipulated remedial actions.

## **ARTICLE VII. MAINTENANCE RESPONSIBILITIES**

### ***Section 701. Performance Guarantee***

The applicant shall provide a financial guarantee to Salford Township for the timely installation and proper construction of all stormwater management controls as required by the approved Salford Township Stormwater Management Ordinance equal to the full construction cost of the required controls.

### ***Section 702. Maintenance Responsibilities***

- A. The drainage plan for the development site shall contain an operation and maintenance plan prepared by the applicant and approved by the Township Engineer. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to insure proper operation of the facility(ies).
- B. The drainage plan for the development site shall establish responsibilities for the continuing

operating and maintenance of all proposed stormwater control facilities, consistent with the following principles:

1. In the instance of developments which include public improvements that are to be dedicated to Salford Township, stormwater control facilities may be owned and maintained by an appropriately established Homeowners Association in lieu of municipal ownership/maintenance, however, the designated owner(s) of the facility(ies) must be recorded on the final development plan.
  2. If a development site is to be maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities may be the responsibility of the owner or private management entity, however, the designated owner(s) of the facility(ies) must be recorded on the final development plan.
- C. Salford Township, upon recommendation of the Township Engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the drainage plan.

***Section 703. Maintenance Agreement for Privately Owned Stormwater Facilities***

- A. Prior to final approval of the site's stormwater management plan, the applicant shall sign and record the maintenance agreement contained in Appendix A which is attached and made part hereof, covering all stormwater control facilities that are to be privately owned.
- B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities. The maintenance agreement shall be subject to the review and approval of Salford Township.

***Section 704. Municipal Stormwater Maintenance Fund***

- A. Persons installing stormwater management facilities and best management practices shall be required to pay a specified amount to Salford Township Stormwater Maintenance Fund to defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:
1. Stormwater management facilities and best management practices shall be privately owned and maintained, the interest of the deposit shall cover the cost of periodic inspections performed by Salford Township, as estimated by the Township Engineer.
- B. If a stormwater management facilities and/or best management practices facility is proposed that also serves as a recreation facility (e.g., ballfield, lake), Salford Township may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purpose.

## ARTICLE VIII. ENFORCEMENT AND PENALTIES

### ***Section 801. Right-of-Entry***

Upon presentation of proper credentials, duly authorized representatives of Salford Township may enter at reasonable times upon any property within Salford Township to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this ordinance.

### ***Section 802. Notification***

In the event that a person fails to comply with the requirements of this ordinance, or fails to conform to the requirements of any permit issued hereunder, Salford Township shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and state that the violator has thirty (30) days to correct these violation(s). Failure to comply within the time specified shall subject such person to the penalty provisions of this ordinance. All such penalties shall be deemed cumulative and shall not prevent Salford from pursuing any and all remedies allowed by Law. It shall be the responsibility of the owner of the real property on which any regulated activity is proposed to occur, is occurring, or has occurred, to comply with the terms and conditions of this ordinance.

### ***Section 803. Enforcement***

Salford Township is hereby authorized and directed to enforce all of the provisions of this ordinance. All inspections regarding compliance with the drainage plan shall be the responsibility of the Township Engineer or other qualified persons designated by Salford Township.

A. A set of design plans approved by Salford Township shall be on file at the site throughout the duration of the construction activity. Periodic inspections may be made by Salford Township or designee during construction.

B. Adherence to Approved Plan

It shall be unlawful for any person, firm or corporation to undertake any regulated activity under Section 103 on any property except as provided for in the approved drainage plan and pursuant to the requirements of this ordinance. It shall be unlawful to alter or remove any control structure required by the drainage plan pursuant to this ordinance or to allow the property to remain in a condition which does not conform to the approved drainage plan.

C. At the completion of the project, and as a prerequisite for the release of the performance guarantee, applicant shall:

1. Provide a certification of completion from an engineer, verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.
2. Provide a set of as-built (record) drawings.
3. After receipt of the certification by Salford Township, a final inspection shall be conducted by the Township Engineer or designated representative to certify compliance with this ordinance.

D. Suspension and Revocation of Permits

1. Any permit issued under this ordinance may be suspended or revoked by the governing body for:
  - a. Noncompliance with or failure to implement any provision of the permit.
  - b. A violation of any provision of this ordinance or any other applicable law, ordinance, rule, or regulation relating to the project.

- c. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, creates pollution or which endangers the life or property of others.
- 2. A suspended permit shall be reinstated by the governing body when:
  - a. The Township Engineer or a designee has inspected and approved the corrections to the stormwater management and erosion and sediment pollution control measure(s), or the elimination of the hazard or nuisance, and/or;
  - b. The governing body is satisfied that the violation of the ordinance, law, or rule and regulation has been corrected.
  - c. A permit that has been revoked by the governing body cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this ordinance.

***Section 804. Public Nuisance***

- A. The violation of any provision of this ordinance is hereby deemed a public nuisance.
- B. Each day that a violation continues shall constitute a separate violation.

***Section 805. Penalties***

- A. Anyone violating the provisions of this shall be subject to a fine of not more than Six Hundred Dollars (\$600.00) for each violation, recoverable with costs. Each day that the violation continues shall be a separate offense.

In addition, Salford Township, through its solicitor may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this ordinance. Any court of competent jurisdiction shall



have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

**Section 806. Appeals**

- A. Any person believing himself to be aggrieved by any action of Salford Township or its designee may appeal to Salford Township's Zoning Hearing Board within thirty (30) days of that action.
- B. Any person aggrieved by any decision of Salford Township's Zoning Hearing Board may appeal to the Court of Common Pleas of Montgomery County within thirty (30) days of the Township decision.

Enacted this 12 day of June, 2008

**BOARD OF SUPERVISORS OF SALFORD TOWNSHIP**

BY: Charles W. Loughery

Charles W. Loughery, Chairman

BY: Lawrence C. Anderson

Lawrence C. Anderson, Vice Chairman

BY: Barbara Lynch

Barbara Lynch

Attest: William McLaughlin

(TOWNSHIP SEAL)