BOROUGH OF CONSHOHOCKEN
MONTGOMERY COUNTY, PENNSYLVANIA

ORDINANCE NO. _____

AN ORDINANCE OF THE BOROUGH OF CONSHOHOCKEN, MONTGOMERY COUNTY, COMMONWEALTH OF PENNSYLVANIA, AMENDING THE CODE OF ORDINANCES OF THE BOROUGH OF CONSHOHOCKEN, CHAPTER 22 *SUBDIVISION AND LAND DEVELOPMENT,* PART 4 *DESIGN STANDARDS*, BY REPEALING SECTION 410 *DRAINAGE* IN ITS ENTIRETY AND REPLACING IT WITH A NEW SET OF PROVISIONS; REPEALING PRIOR INCONSISTENT ORDINANCES OR PARTS OF ORDINANCES; PROVIDING A SEVERABILITY CLAUSE; AND SETTING AN EFFECTIVE DATE.

WHEREAS, the Borough Council of the Borough of Conshohocken is duly empowered by the Borough Code to enact certain regulations relating to the public health, safety and welfare of the citizens of the community of the Borough of Conshohocken; and

WHEREAS, the Pennsylvania Municipalities Planning Code, 53 P.S. § 10101, *et seq.* grants authority to Borough Council to regulate subdivision and land development within the Borough of Conshohocken, 53 P.S. § 10501;

WHEREAS, Borough Council has adopted a subdivision and land development ordinance and codified same at Chapter 22 *Subdivision and Land Development* of the Borough's Code of Ordinances;

WHEREAS, Borough Council is authorized to amend the Borough's Subdivision and Land Development Ordinance through enactment of an ordinance amendment, 53 P.S. § 10505;

WHEREAS, concurrently herewith, Borough Council is amending Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances in order to effectuate amendments thereto for the purposes set forth therein, including specifically to ensure that the Borough's stormwater management regulations are consistent with the Pennsylvania Department of Environmental Protection's Model Ordinance pursuant to the Borough's Small Municipal Separate Storm Sewer System (MS4) Permit, and desires to amend the Subdivision and Land Development Ordinance to be consistent with such amendment, with the advice of the Borough Engineer;

WHEREAS, Borough Council has determined that it is in the best interests of the citizens of Conshohocken Borough, and those doing business in the Borough, to amend the Borough's Subdivision and Land Development Ordinance as set forth herein.

NOW THEREFORE, be it **ORDAINED AND ENACTED** by the Borough Council of the Borough of Conshohocken as follows:

SECTION 1.

Chapter 22 *Subdivision and Land Development* of the Borough's Code of Ordinances is hereby amended by repealing the current provisions of Section 410 *Drainage* in its entirety and replacing it with the following provisions:

§22-410 Drainage.

The applicant shall provide stormwater management in accordance with the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances, and as follows:

1. Purpose.

   A. The objective of stormwater management is to prevent or mitigate the adverse impacts related to the conveyance of excessive rates and volumes of stormwater runoff. Further, the objectives of stormwater management propose to maintain, as nearly as possible, natural runoff flow characteristics, either by augmenting the infiltration process or by temporarily storing stormwater for release at controlled rates of discharge and/or intercepting runoff to reduce accelerated erosion and sedimentation.

   B. Applicants shall construct and/or install stormwater management facilities, on site and off site, as necessary to meet the stormwater management design and criteria provided by these and other Borough of Conshohocken requirements and to:

      (i) Permit unimpeded flow of natural watercourses.

      (ii) Ensure adequate drainage of all low points along the lines of streets.

      (iii) Intercept stormwater runoff along streets at intervals related to the extent and grade of the area drained.

      (iv) Provide positive drainage away from on-site sewage disposal and structures.

(v) Remove surface water from the bottom of vertical grades, lead water from springs, and avoid excessive use of cross-gutters at street intersections and elsewhere.

(vi) Ensure that the peak volume and rate of discharge from the development site is no greater than prior to development.

(vii) Prevent erosion damage by controlling the rate and velocity of runoff discharge to watercourses, avoid increasing the occurrence of streambank overflow, and satisfactorily carry off, detain or retain, and control the rate of release of stormwater.

(viii) Preserve bridges, culverts, and similar structures by suppressing the new peak discharges created by new alteration or development of land.

2. Applicability.

A. All regulated activities and all activities that may affect stormwater runoff are subject to regulation by this Section and the requirements of the *Borough of Conshohocken Stormwater Management Ordinance,* codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances, which is included in these regulations by reference. Activities subject to these regulations include:

(i) Land development.

(ii) Subdivision.

(iii) All sites of 0.5 acres or more.

(iv) Agricultural operations.

(v) Construction of new or additional impervious surfaces.

(vi) Construction of new buildings or additions to existing buildings.

(vii) Nursery operations.

(viii) Redevelopment.

(ix) Diversion or piping of any natural or man-made stream channel.

(x) Installation of stormwater systems or appurtenances thereto.

(xi) Alteration of the natural hydrologic regime.

(xii) Nonstructural and structural stormwater management best management practices (BMPs) or appurtenances thereto.

B. Stormwater management design and criteria such as stormwater runoff peak volume and rate requirements, runoff calculation methodology, stormwater management plan requirements, operations and maintenance requirements, storm sewer system design, stormwater BMP design, etc., shall be as described in this Section and the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances.

C. The standards contained in this section shall apply as minimum design standards; however, federal, state, and other Borough of Conshohocken regulations may impose additional standards subject to their jurisdiction. The more stringent requirements of this section, federal, state, and other Borough of Conshohocken regulations shall apply to any activity which requires compliance. Permits and approvals issued pursuant to this Section 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. Additional studies and higher levels of control than the minimum provided in these and other requirements may be required by Borough Council to ensure adequate protection to life and property.

D. Earth disturbance activities and associated stormwater management controls are also regulated under existing state law and implementing regulations. This section shall operate in conjunction with those parallel requirements; the requirements of this section shall be no less restrictive in meeting the purposes of this section than state law.

E. No associated construction activities within the Borough of Conshohocken shall commence until the requirements of this Section and all other applicable stormwater management criteria are met.

F. All best management practices (BMPs) used to meet the requirements of federal, state, and Borough of Conshohocken regulations shall conform to the state water quality requirements and any more stringent requirements as set forth by the Borough.

G. Retention of existing watercourses and natural drainage features.

(i) If an applicant concentrates dispersed stormwater flow or redirects stormwater flow to exit at another location on the property, the applicant is responsible for constructing an adequate stormwater conveyance system on the adjacent property and on all downstream properties until a natural outfall is reached. The natural outfall shall have sufficient capacity to receive the stormwater without deterioration of the facility and without adversely impacting property in the watershed. This natural outfall may be a river, creek or other drainage facility so designated by the Borough of Conshohocken for the proposed system.

(ii) Whenever a watercourse, stream or intermittent stream is located within a site, it shall remain open in its natural state and location and shall not be piped.

(iii) No stormwater runoff or natural drainage shall be so diverted as to overload existing drainage systems (including existing stormwater management facilities) or create flooding.

(iv) Borough Council may require an applicant to provide a permanent easement along any watercourse located within or along the boundary of any property subject to the regulations of this Section. The purpose of any such easement shall be for the maintenance of the channel of any watercourse; and the terms of the easement shall prohibit excavation, the placing of fill or structures and any alterations which may adversely affect the watercourse. The applicant will retain the easement until such time as one of the following is accomplished:

(a) The easement is offered for dedication by the applicant and accepted by the Borough of Conshohocken.

(b) If an easement acceptable to the Borough is established, the maintenance shall then be the responsibility of the individual lot owners over whose property the easement passes. For land developments, the maintenance shall then be the responsibility of the owner.

(c) A homeowners' association or other approved legal entity, approved by the Borough of Conshohocken, assumes responsibility for the maintenance of the development, including the retention of the watercourse easement.

3. Site Drainage Plan requirements. The following site drainage plan materials shall be submitted to the municipality in a format that is clear, concise, legible, neat and well organized; otherwise, the site drainage plan shall not be accepted for review and shall be returned to the applicant:

A. General

(i) Provide a narrative including a description of the project, erosion and sedimentation control, stormwater control for both during and after construction, operation and maintenance requirements for each facility with the

responsible party, and expected project schedules.

(ii) If the subdivision or land development is to be developed in stages, provide a general drainage plan for the entire subdivision or land development with the first stage, and appropriate development stages for the drainage system shall be indicated, in accordance with Pennsylvania Department of Environmental Protection's Rules and Regulations, Title 25, Chapter 102, as last revised.

(iii) Proof of required permits or approvals under applicable state or federal regulations, including but not limited to PennDOT, Montgomery County Conservation District, PADEP NPDES permit for stormwater discharges from construction activities, and other PADEP permits.

B. Plans and Calculations

(i) Plan requirements from Sections §22-304 and §19-401.

(ii) Tax parcel number.

(iii) Total acreage of the parcel(s) and area to be disturbed.

(iv) Existing and proposed two foot contours, based on established elevations or the U.S.G.S. datum, and all bodies of water, physical features, underground utilities, proposed changes to land surface and vegetative cover, areas to be cut and filled, and as required by subdivision and land development regulations.

(v) Pre- and post-development mapping of all drainage areas (for each point of interest, inlet, roof drain, etc.), watershed areas, and floodplains in which the project is located.

(vi) Complete hydrologic and hydraulic computations for all storm sewer and stormwater management techniques, facilities, and BMPs.

(vii) Complete drainage systems, including storage facilities where required and identification of all existing drainage features which are to be incorporated in the design.

(viii) Identification and delineation of all soil classifications with the site, based on the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/) or a signed and sealed report from a qualified professional licensed in the Commonwealth of Pennsylvania.

(ix) Identification of all infiltration test and soil boring locations.

(x) Stormwater management facilities and BMPs, and appurtenances with related details, calculations, assumptions, criteria used in design.

(xi) Existing and proposed rights-of-way and easements, including provisions for permanent access or maintenance easements for all physical SWM BMPs as necessary to implement the Operation and Maintenance (O&M) requirements.

4. Storm sewer system design. Storm sewer systems shall be required to be constructed by the applicant in any area from which the surface or subsurface drainage could impair public safety or cause physical damage to adjacent lands or public property. The system shall be designed to collect water at the bottom of all vertical grades, immediately upgrade of all street intersections, and other areas where excessive flow may occur. The system shall lead water from springs and avoid excessive use of cross-gutters at street intersections and elsewhere.

A. All storm sewer system design shall be based on gravity flow using the rational formula:

Q=CiA, where:

Q = Discharge/Rate of flow in cubic feet per second.
C = Runoff coefficient.
I = Intensity of rainfall in inches per hour.
A = Watershed area in acres.

(i) Runoff coefficients (C) for both existing and proposed conditions for use in the Rational Method shall be consistent with Table 1 in Appendix A of the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* at the Borough's Code of Ordinances.

(ii) The intensity of the storm shall be based on the one-hundred-year frequency storm with the inlet time of concentration equal to the storm duration for any given point. The elevation of the hydraulic gradient at any point in the storm sewer system shall be below the surface of the ground during the one-hundred-year storm event.

(iii) The rainfall data shall be obtained from the latest version of the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, rain data corresponding to the Conshohocken station for the precipitation intensity using the upper bound of the ninety-percent confidence interval for the various return period storms. If a hydrologic computer model is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. This data may also be directly retrieved from the NOAA Atlas 14 website: http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html

(iv) A minimum five minute time of concentration shall be used. Where supported by the drainage area and related plans and calculations, longer times of concentration for channel and pipe flow

may be computed using Manning's equation and utilizing roughness coefficients consistent with Table 2 in Appendix A of the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances.

B. Storm sewer pipe

(i) The minimum slope of any pipe shall be 0.5 percent.

(ii) The minimum allowable pipe size is 18 inches. Where pipe cover is restricted, equivalent elliptical pipe may be used in lieu of circular pipe.

(iii) All storm sewer pipes shall be reinforced concrete pipe, smooth lined high-density polyethylene, or other pipe material as may be approved by the Borough Engineer.

(iv) Storm sewer pipes shall have a minimum cover of 24 inches. Greater cover shall be provided where recommended by the pipe manufacturer.

(v) Backflow preventers shall be provided where necessary to prevent backwater from a watercourse from flowing into the storm sewer system.

C. Inlets and manholes.

(i) Inlets, manholes, and related tops, covers, grates, and frames shall conform to Pennsylvania Department of Transportation specifications. The type to be used shall depend on the particular application.

(ii) Sufficient inlets shall be located and constructed so as to collect all of the flow in the contributory drainage area. Spread of runoff in gutters shall not exceed eight feet in width or 1/2 of the travel lane, whichever is lesser, during a ten-year

storm event. Calculations of inlet capacities shall be in accordance with Pennsylvania Department of Transportation guidelines.

(iii) The gutter of all inlets shall be set not less than two inches, nor more than four inches, below the gutter grade. The surface of the paving adjacent to the inlets shall be constructed to blend into the lowered gutter grade at the inlet in such a manner that sudden drop-off or dip at the inlet will not be created.

(iv) Where surface water is collected from two directions at one street corner, inlets shall be placed at or near the tangent points of both ends of the radius. The use of an inlet in the radius shall not be allowed.

(v) Abrupt changes in direction or slope of storm sewer pipe shall be avoided. An inlet or manhole shall be provided at all points where there is a horizontal deflection, change in grade, transition in pipe size, and convergence of two or more influent pipes.

(vi) The spacing of inlets and manholes shall not exceed a maximum distance of 400 feet along any one continuous line. Inlets shall be provided in lieu of manholes where they will serve a useful purpose.

D. Drainage channels and swales.

(i) The design standards for drainage channels and swales shall follow the PADEP Erosion and Sediment Pollution Control Manual, latest edition (PA E&S Manual) as a minimum guide.

(ii) All drainage channels and swales shall be design to carry the peak flow from the one-hundred-year design storm with a minimum six inches of freeboard.

(iii) All drainage channels and swales shall be designed to prevent erosion of the channel bed and bank areas and provide suitable

stabilization to prevent erosion. The maximum permissible flow velocity shall not exceed those outlined in Table 6.4 Maximum Permissible Velocities (ft/sec) of Channels Lined with Vegetation and its additional notes of the PA E&S Manual.

(iv) Design shall be based on the Manning equation and utilize roughness coefficients consistent with Table 2 in Appendix A of the *Borough of Conshohocken Stormwater Management Ordinance,* codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances.

(v) Drainage channels and swales shall be designed to conform, wherever possible, to the adjacent average ground conditions. This means that the channel or swale should not be projecting excessively above the surrounding ground or placed excessively below the surrounding ground.

(vi) Drainage channels and swales shall have a maximum side slope of three horizontal to one vertical and shall have adequate slope protection as required by the Borough Engineer.

(vii) No open watercourses shall be permitted within the rights-of-way of any street or alley.

E. Endwalls. Endwalls conforming to Pennsylvania Department of Transportation specifications shall be installed on all influent and effluent pipes.

F. Bridges and culverts. Single opening culverts are desirable. The design of all bridges and culverts shall be such as to minimize the probability of debris accumulation. Bridges and culverts shall be designed to meet current Pennsylvania Department of Transportation standards to support expected loads and carry the peak flow from a one-hundred-year design storm. They shall be constructed for the full width of the right-of-way.

G. Roof drains and sump pumps.

(i) Roof drains and sump pumps shall discharge to a stormwater BMP wherever feasible. Where it is more advantageous to connect to streets or sewers, connections may be permitted on a case-by-case basis as determined by the Borough.

(ii) Roof drain and sump pump pipes shall not discharge water over a sidewalk but shall extend under the sidewalk to the gutter.

(iii) A solid lid cleanout shall be provided for all roof drains and sump pumps, located within the lot between the contributing building or structure and the right-of-way.

5 Stormwater BMP design. Whenever an increase in runoff volume and/or rate would occur as the result of regulated activities, the applicant will be required to provide permanent stormwater management BMPs to attain zero increase in runoff and address the requirements of this Section, the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances, and any other requirements of the Borough of Conshohocken, except as may otherwise be exempted.

A. Storage requirements.

(i) The storage requirements of all stormwater BMPs shall be computed in accordance with the requirements of the *Borough of Conshohocken Stormwater Management Ordinance*, codified at Chapter 19 *Stormwater Management* of the Borough's Code of Ordinances, and must be submitted to the Borough Engineer for review and, when required, to the Montgomery County Conservation District, Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Transportation, and/or other agencies.

(ii) The volume of storage provided shall be no less than the total additional volume of runoff due to regulated activities based on a one-hundred-

year frequency twenty-four-hour duration storm. Except in the case where 1,000 square feet or less of impervious area is being added to the site, an additional storage allowance of 218 cubic feet must be provided to compensate for sediment accumulation.

(iii) In addition to the permanent storage facilities, the applicant must provide adequate erosion and sedimentation control measures in accordance with the Pennsylvania Clean Stream Act, and Pennsylvania Department of Environmental Protection Rules and Regulations, Title 25, Chapter 102, as last revised.

(iv) The design of any stormwater storage facility shall be verified by routing the design storm hydrographs using the Storage-Indication Method. A storage versus elevation versus discharge curve shall be included, along with a routing of the post-development one-hundred-year storm.

(v) The maximum one-hundred-year water surface elevation associated with each BMP shall be calculated and shown to be contained within the provided storage volume of the BMP.

(vi) All aboveground storage areas must be located outside of the one-hundred-year floodplain. All underground storage areas must be located a minimum of 24 inches above the groundwater and seasonal high water table elevations.

(vii) All stormwater BMPs shall be designed with an overflow or spillway which safely permits the passing of runoff greater than that occurring during the post-development one-hundred-year design storm in a non-erosive manner. The overflow or spillway shall be set above the maximum proposed ponding depth for the one-hundred-year storm.

(viii) All stormwater BMPs shall be designed to completely dewater the stored water volume

within 72 hours from the end of the design storm, with the exception that an underground Managed Release Concept BMP shall dewater within 7 days from the end of the design storm and other longer dewatering times as permitted by the "Pennsylvania Stormwater Best Management Practices Manual," December 2006, as amended (PA BMP Manual) for non-open air BMPs.

B. BMPs which may be used to meet the applicable standards are described in this Section and the Volume Peak Rate Reduction by Infiltration BMPs, Volume Peak Rate Reduction BMPs, and the Non-Structural BMP credits sections from the PA BMP Manual. Any selected BMP must meet or exceed these standards and shall incorporate sound and accepted engineering principles and practices.

(i) No more than 25 percent of volume reduction may be met through non-structural BMP credits. In order to permit utilization of the volume reduction credit, a completed copy of the related checklist from the PA BMP Manual must be provided to demonstrate that the selected non-structural BMP is applicable to the project.

(ii) An impermeable liner is required where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required.

C. Design criteria for infiltration BMPs. Infiltration BMPs shall be designed in accordance with the design criteria and specifications in the PA BMP Manual and shall meet the following the minimum requirements:

(i) A detailed infiltration testing and soils evaluation of the project site shall be performed by the applicant to determine and support the suitability of all infiltration BMPs. The evaluation shall meet the following requirements:

(a) The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, hydrologic soil

groups, depth to limiting zones, karst/susceptibility to sinkhole formation, subgrade stability, and natural and man-made features within the site to determine general areas of suitability for infiltration practices.

(b) Provide field tests, such as double-ring infiltrometer or hydraulic conductivity tests, at the level of the proposed infiltration surface (bottom surface of the infiltration facility) to determine the appropriate hydraulic conductivity rate. Percolation tests will not be accepted for infiltration BMP design purposes.

(c) A minimum depth of 24 inches shall be provided between the bottom of an infiltration BMP and the top of bedrock, seasonal high water table, groundwater, or other limiting zone.

(d) An infiltration rate sufficient to accept the additional stormwater load and dewater completely as determined by field tests. A minimum infiltration rate of 0.2 inches/hour is required and then a minimum safety factor of 2 should be applied for design purposes (e.g., for soil which measured 0.4 inch/hour, the BMP design should use 0.2 inch/hour). Greater safety factors may be required by the Borough Engineer based on the site conditions.

(e) Design the infiltration structure based on field-determined capacity at the level of the proposed infiltration surface and based on the applied safety factor.

(ii) The maximum side slopes of an aboveground infiltration BMP shall be three horizontal to one vertical. Every effort should be made to blend aboveground storage areas into the natural topography of its surroundings.

(iii) Infiltration BMPs shall have a bottom slope of no greater than 1% but shall preferably have a level bottom.

(iv) The infiltration system shall have positive overflow controls to prevent storage within one foot of the finished surface elevation above the facility.

(v) Surface inflows shall be designed to prevent direct discharge of sediment into the infiltration system.

(vi) A minimum of 10 feet of undisturbed fill or compacted impermeable material shall separate the foundation wall of any building and an infiltration BMP.

(vii) A minimum of 50 feet of undisturbed fill or compacted impermeable material shall separate water supply wells and an infiltration BMP.

(viii) A minimum of 50 feet shall separate a septic system disposal area and an infiltration BMP unless specific circumstances allow for a reduced separation distance.

D. Design criteria for underground BMPs. Underground BMPs shall be designed in accordance with the design criteria and specifications in the PA BMP Manual and shall meet the following the minimum requirements:

(i) Underground BMPs shall have a bottom slope of no greater than 1% but shall preferably have a level bottom.

(ii) At a minimum, the top and sides of the underground BMP shall be wrapped in a non-woven geotextile which provides separation between the storage volume and the surrounding materials. Providing non-woven geotextile on the bottom of the underground BMP is optional and shall be determined by a qualified professional based on site conditions. Where required due to the possibility of

groundwater contamination, an impermeable liner will be accepted in place of the non-woven geotextile.

(iii) A minimum of one foot of cover shall be provided, measured from the top of the system to the finished surface elevation.

(iv) Storage within the aggregate, soil, or other material above and surrounding the underground BMP shall not be considered in the calculation of the underground BMP storage volume.

(v) Maintenance access to permit long-term operation and maintenance shall be incorporated into the design.

(vi) Where an underdrain is provided, a separate maintenance cleanout and minimum 6 inch deep stone envelope wrapped in geotextile shall be provided.

E. Design criteria for bioretention BMPs. Bioretention BMPs, including rain gardens, shall be designed in accordance with the design criteria and specifications in the PA BMP Manual and shall meet the following the minimum requirements:

(i) All concentrated discharges directed to a bioretention facility shall be conveyed through a pretreatment filter strip. The filter strip shall be designed to reduce the incoming velocities and to filter out coarser sediment particles. Examples of pretreatment filter strips include sand or gravel diaphragms, grass swales, sand filters, stone check dams, etc.

(ii) All bioretention facilities shall incorporate a mix of trees, shrubs, and/or herbaceous plants. Plant species shall be native and selected based on the ability to tolerate stresses such as pollutants, variable soil moisture, and ponding fluctuations.

(iii) A minimum planting soil bed depth of two feet

for herbaceous plants and three feet for trees and shrubs shall be provided. Planting soil shall be capable of supporting healthy vegetative cover.

(iv) All bioretention facilities shall incorporate an organic mulch layer. The organic mulch layer shall be standard landscape style, single or double, shredded hardwood mulch or chips. The mulch layer shall be well-aged, uniform in color, and free of other materials such as weed seed, soil roots, etc. The mulch layer shall be applied to maximum depth of three inches. Grass clippings shall not be used as mulch material.

(v) The maximum side slopes of bioretention BMPs shall be three horizontal to one vertical.

(vi) A minimum grade of 2% shall be maintained for areas of sheet flow. For channel flow, a minimum grade of 1% shall be maintained. For bioretention facilities relying on infiltration for drainage, rather than sheet or channel flow, a level bottom is permitted.

(vii) Bioretention facilities with an aboveground ponding depth greater than 2.5 feet during any post-development design storm, or as directed by the Borough Engineer based on the storage volume, shall be designed in accordance with the requirements of §22-410.5.F.

F. Design criteria for aboveground basins. Aboveground basin BMPs shall be designed in accordance with the design criteria and specifications in the PA BMP Manual and shall meet the following the minimum requirements:

(ii) Whenever possible, the side slopes and basin shape shall conform to the natural topography. When such design is impractical, the construction of the basin shall utilize slopes as flat as possible to blend the structure into the terrain. The maximum side slopes of the earthen basin embankments shall be three horizontal to one vertical.

(ii) A minimum grade of 2% shall be maintained for areas of sheet flow. For channel flow, a minimum grade of 1% shall be maintained. For basins relying on infiltration for drainage, rather than sheet or channel flow, a level bottom is permitted.

(iii) The top or toe of any slope shall be located a minimum of five feet from any property line.

(iv) A minimum 10 foot wide flat area shall be provided at the top of the basin berm.

(v) The maximum permitted aboveground ponding depth during any post-development design storm is 5 feet.

(vi) If permanent ponds are used, the applicant shall demonstrate that such ponds are designed to protect the public health and safety.

(vii) All aboveground basins shall be provided with a primary outlet and emergency spillway.

(viii) A cutoff trench shall be provided along the center line of any dam or earth fill embankments. The trench shall have a bottom width of not less than four feet, but adequate to allow use of equipment necessary to obtain proper compaction. Side slopes of the cutoff trench shall be no steeper than 1:1 ratio. The trench shall be filled with successive thin layers of relatively impervious material, each layer being thoroughly compacted.

(ix) All basin embankments shall be placed in lifts not to exceed eight inches in thickness and each lift shall be compacted to a minimum of 95% of modified proctor density as established by ASTM D-1557. Prior to proceeding to the next lift, the compaction shall be checked by a soils engineer hired by the applicant. Compaction tests shall be run on the leading and trailing edge of the berm along with the top of the berm. Verification of required compaction shall be

submitted to the Borough prior to utilization of any aboveground basin for stormwater management.

G. Primary spillway/Outlet pipes.

(i) The sizing of the outlet pipe shall be based on the post-construction one-hundred-year storm without utilizing the emergency spillway.

(ii) The pipe barrel and riser shall be solidly attached and placed on a firm foundation. The fill material around the primary spillway shall be placed in 4-inch lifts and compacted to at least the same density as the adjacent embankment.

(iii) All outlet pipes through a basin berm shall be reinforced concrete pipe with watertight joints.

(iv) Anti-seep collars shall be installed around the pipe barrel within the normal saturation zone of the basin berms and shall be poured in place.

(a) The anti-seep collars and their connections to the pipe barrel shall be watertight.

(b) The anti-seep collars shall extend a minimum of two feet beyond the outside of the principal pipe barrel.

(c) The maximum spacing between the collars shall be 14 times the minimum projection of the collar measured perpendicular to the pipe.

(d) A minimum of two anti-seep collars shall be installed on each outlet pipe.

(v) All outlet pipes shall have endwalls and energy dissipating devices (riprap, end sills, etc.) designed in accordance with the Pennsylvania Department of Environmental Protection's *Erosion and Sediment Pollution Control Program Manual* No. 363-2134-008, as amended and updated (PA E&S Manual).

H. Emergency spillways.

(i) The minimum capacity of the emergency spillway shall be the peak flow rate into the BMP from the post-development one-hundred-year design storm. In no case shall the emergency spillway be utilized in the design routing of the post-development one-hundred-year storm.

(ii) Whenever possible, the emergency spillway shall be constructed on undisturbed ground. The emergency spillway shall not discharge over earthen fill and/or easily eroded material. Emergency spillways constructed on undisturbed ground may be constructed of reinforced vegetated earth with supporting calculations. All other spillways shall be constructed of concrete, riprap, concrete checkerblocks, or similar materials approved by the Borough Engineer.

(iii) All emergency spillways shall be constructed to protect against erosion. The construction material of the emergency spillways 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, at a minimum, extend to the toe of the berm embankment.

(iv) The minimum freeboard through any emergency spillway shall be one foot; freeboard is defined as the difference between the design flow elevation through the spillway and the elevation of the top of the BMP or berm. Six inches, minimum, is required between the post-construction one-hundred-year water surface elevation in a basin and the emergency spillway crest. The minimum depth of an emergency spillway shall be two feet.

I. Sediment basins and sediment traps for sediment control during construction shall be designed in accordance with the PA E&S Manual.

SECTION 2. REPEALER

Any and all other Ordinances or parts of Ordinances in violation or in conflict with the terms, conditions and provisions of this Ordinance are hereby repealed to the extent of such irreconcilable conflict.

SECTION 3. SEVERABILITY CLAUSE

The terms, conditions and provisions of this Ordinance are hereby declared to be severable, and, should any portion, part or provision of this Ordinance be found by a court of competent jurisdiction to be invalid, non-enforceable or unconstitutional, the Council hereby declares its intent that the Ordinance shall have been enacted without regard to the invalid, non-enforceable, or unconstitutional portion, part or provision of this Ordinance.

SECTION 4. EFFECTIVE DATE

This Ordinance shall become effective as provided under the Borough Code, 8 Pa.C.S. § 101, et seq.

ORDAINED and **ENACTED** an ordinance of the Borough of Conshohocken this _____ day of _____, 2022.

BOROUGH OF CONSHOHOCKEN

_____
COLLEEN LEONARD, COUNCIL PRESIDENT

ATTEST:

_____
SECRETARY

Approved this _____ day of _____,
2022

_____

YANIV ARONSON, MAYOR