

EXHIBIT F

NEW GARDEN TOWN CENTER

Conceptual Stormwater Management Plan

Stormwater Management Design Criteria

The Stormwater Management Plan described herein will be developed by PREIT, and designed based upon the following publications and criteria:

- Code of the Township of New Garden, Chapter 170 Subdivision & Land Development Ordinance and Chapter 165 Stormwater Management Ordinance as amended by this document.
- "Urban Hydrology for Small Watersheds" (Technical Release No. 55), published by the United States Department of Agriculture, Soil Conservation Service, dated June 1986.
- "PA Stormwater Best Management Practices Manual", prepared by the Department of Environmental Protection, latest version.
- Pre-Development Drainage Plan dated 11/21/2006 published in Chester Valley Engineers, Inc report dated November 21, 2007 entitled Conceptual Stormwater Management Report

The Stormwater Management Plan will be designed to meet the following goals and guidelines:

Goals:

1. Protect stream channel morphology;
2. Maintain groundwater recharge;
3. Prevent downstream increases in flooding and bank erosion; and
4. Replicate the hydrology on site before development as specified herein.

Guidelines:

- ◆ Provide a storm drainage system that will safely convey the 25-year storm flow conditions (50-year storm at sump areas) to proposed stormwater management systems.
- ◆ Utilize additional flood relief channels to convey up to the 100-year storm without allowing this runoff to encroach upon other properties.
- ◆ Provide rate mitigation for post-developed storm runoff, as specified herein.
- ◆ Provide no net increase in the total volume of stormwater discharged from the site as a result of the 2-year storm.
 - ◆ In the event that on-site soils preclude infiltration of the 2-year storm, utilize best management practices which will capture and retain that volume underground for a minimum of 48 hours.
 - ◆ In lieu of providing this treatment volume, the Township may permit with approval from DEP, the stabilization of the receiving channels offsite down to the forebay of Somerset lake.
- ◆ Utilize a "treatment train" approach with redundant Best Management Practices (BMP's) adequately sized to provide pretreatment of the Water Quality Storm as defined by Chapter 165-11.C(1)(b) prior to surface or subsurface infiltration or detention.
- ◆ Stabilize all receiving channels on site and establish riparian buffers around them.
- ◆ Provide temporary and permanent measures for proper soil erosion and sediment control according to the Chester County Conservation District Soil Erosion and Sediment Control Standards and New Garden Township requirements.
- ◆ Commit to long term, periodic maintenance of all facilities.

Pre-Development Stormwater Management Runoff

The pre-development drainage pattern is broken down into four (4) individual watersheds. A brief summary of the watersheds is as follows: and illustrated on the Pre-Development Drainage Area Plan referenced above. Said Drainage Area Plan depicts the existing ground cover and soil types that will be used for stormwater analysis.

Watershed No. 1.0:

Pre-Development Watershed No. 1.0 (56.20-acres) drains to Study Point #1, which is located at the point where the unnamed stream crosses the western property line. This area consists of the residential lots north of Sheehan Road, the parcel between Gap Newport Pike (S.R. 0041) and Sheehan Road, portions of Gap Newport Pike (S.R. 0041) and Sheehan Road, and the easterly half of the parcel south of Gap Newport Pike (S.R. 0041). This watershed area generally drains towards the unnamed stream and eventually to Study Point #1.

Watershed No. 2.0:

Pre-Development Watershed No. 2.0 (80.50-acres) drains to Study Point #2, which is located at the point where the unnamed stream crosses the southern property line immediately north of the day camp. This area consists of residential lots southeast of the Gap Newport Pike (S.R. 0041) and Sunny Dell Road intersection, a small portion of off-site lawn areas west of Sunny Dell Road, and the westerly half of the parcel south of Gap Newport Pike (S.R. 0041). This watershed area generally drains towards the unnamed stream and eventually to Study Point #2.

Watershed No. 3.0:

Pre-Development Watershed No. 3.0 (4.60-acres) drains to Study Point #3, which is located at an existing culvert located southeast of the Gap Newport Pike (S.R. 0041) and Sunny Dell Road intersection. This area consists of a portion of a residential lot on Sunny Dell Road and the remaining portion of the watershed is lawn. This watershed area generally drains towards Sunny Dell Road to roadside swales and to Study Point #3.

Watershed No. 4.0:

Pre-Development Watershed No. 4.0 (13.15-acres) drains to Study Point #4, which is located at a point along the southern property line adjacent to Reynolds Road. This area consists of on-site land which drains towards Reynolds Road. This watershed area generally drains towards Reynolds Road to roadside swales and to Study Point #4.

Determination of Pre-Development Rate and Volume

Peak flows will be generated using the guidelines outlined in *Technical Release 55* (TR-55) issued by the Soil Conservation Service. Unit hydrographs, curve numbers (CNs), and times of concentration (TCs) will be determined in accordance with the TR-55 Handbook. A one hundred foot (100-ft) maximum distance for sheet flow will be used for this analysis.

Each watershed will be broken down into individual soil / cover combinations using the assumptions as prescribed in Ordinance Chapter 165 Section 165-11. B. (2) (a) and (b).

The composite curve number and the calculated time of concentration will be used to generate pre-development hydrographs and peak rates of flow for each watershed based on 24 hour rainfall amounts per the New Garden Township Stormwater Ordinance Chapter 165.

The pre-development volume will be calculated using the same values of curve numbers as above with the exception that all portions of the site which are existing impervious areas shall use an

assumed cover condition of pasture. In addition, the volume will be calculated for each unique combination of soil and cover and will not be composited.

As an alternative to ~~this~~ the above methodology, if it can be shown through field investigation that the actual runoff volume from the site is less than or equal to that which would be computed based on the existing cover conditions as shown on the Drainage Area Plan referenced above, then the predevelopment runoff volume shall be computed using the actual runoff condition calculated using the results of the field investigation. Conversely, if the field investigation shows that the actual runoff volume from the site is greater than that which would be computed based on ~~currently assuming current~~ existing (~~i.e. actual~~) conditions as shown on the Drainage Area Plan referenced above, then the predevelopment runoff volume shall be computed using a CN value based on existing land cover and soil types as shown on the referenced Plan. Field investigation techniques must be approved by the Township prior to collection of data and shall be carried out under the direction of a registered professional engineer. The results shall be published in report form subject to the review and approval by the township.

Post-Development Stormwater Management Runoff

PREIT proposes to construct stormwater management facilities throughout the various components of the Project. At least two detention basins and three subsurface pipe system are currently proposed to collect and control post-development stormwater runoff. Additional post-development best management practices are proposed throughout the Project to improve the water quality of the stormwater runoff.

Rate Mitigation: Surface detention facilities will be provided for the post-developed storm runoff which results from the 2, 10, 25, 50 and 100-year, 24-hour, S.C.S. Type II storm event. The post development peak discharge rates for all storms up to and including the 100 year event shall not exceed the predevelopment discharge rate.-

Volume Mitigation: There shall be no net increase in the total volume of stormwater discharged from the site for the two year 24 hour storm ("2 year storm water discharge delta"). In the event that the applicant can demonstrate through on-site soils evaluations and supporting engineering calculations that site conditions preclude the infiltration of the 2 year storm water discharge delta. Sufficient stormwater storage will be created below ground to accommodate the 2 year storm water discharge delta, which will be discharged slowly over a period of 48 hours. The discharge rate shall not exceed the stable capacity of the receiving stream.

As an alternative to providing this volume for infiltration or storage, the Township may allow the applicant to permanently stabilize the receiving stream offsite from the downstream property line to Somerset Lake. This effort would be subject to outside agency review, and coordinated with downstream property owners. Permanent stabilization measures would be designed per the guidelines noted below, and an easement extending along the length of the stream would be required. The Township will cooperate in the acquisition of all permits, authorizations, and easements in order to facilitate the stabilization of the stream, including off-site areas, if requested by PREIT, and at the expense of PREIT, including the condemnation of construction and maintenance easement(s) applicable to off-site areas.

Conceptual Post-Construction Best Management Practices

The following Best Management Practices are proposed to be implemented in connection with this Project. The order follows the path of runoff from point of contact with proposed surfaces through various pathways before leaving the site at the southern border of the site.

Housekeeping

All trafficked areas will be routinely swept according to the Operations and Maintenance Plan (see below), removing trash and accumulated sediment. At the same time all inlet sumps, bioretention areas and forebays will be inspected for debris and appropriate action taken to clear all primary interception points. Spills will be identified and remediated immediately.

Bioretention

Facilities which treat runoff by pooling water on the surface and promote filtering and settling of suspended solids as runoff percolates through an engineered medium will be provided throughout the parking areas. Vegetation will be established to filter and transpire runoff, and will be maintained as necessary. The planting medium will be underlain by a stone storage system and a network of pipes which will transfer the filtered runoff to other BMP's for storage and or infiltration.

These bioretention cells will be used to provide pretreatment for larger infiltration / underground storage systems. They will consist of depressed islands between parking bays planted with appropriate vegetation and will maintain a maximum hydraulic loading ratio of 5:1. They will be a minimum of eight (8) feet wide and will be designed per the PA BMP manual in terms of depth of the soil mix (certification to be submitted), underdrains and vegetation.

Water Quality Filters & Hydrodynamic Devices

Water Quality Filters and Hydrodynamic Devices designed to remove non point source pollutants from runoff will be installed to treat surface runoff where other means of treatment are not feasible.

Water quality inlets will be installed on a distributed basis to induce settling and filtration and remove particulate pollutants, including coarse sediment, oil and grease, litter and debris. Proprietary hydrodynamic devices will be utilized to address larger areas where it is not feasible to provide a distributed treatment approach, or hotspots such as storage areas for fertilizers and pesticides. These structural systems will act as part of a treatment train approach to provide redundancy to the pre-treatment of runoff prior to underground storage and infiltration, or to surface storage which may not provide adequate treatment alone.

Subsurface Infiltration Beds

Subsurface Infiltration Beds provide temporary storage and infiltration of stormwater runoff by placing storage media beneath the proposed surface grade. Pipe storage systems will be installed within the Town Center development and will consist of fully perforated pipe with clean-washed, uniformly graded stone aggregate on either side and beneath the system or an approved alternative. Stormwater runoff from the parking lot will be collected and pre-treated to the standards set by the PA BMP Manual before passing through a stormwater conveyance system and discharged into each system where it will be infiltrated. All underground storage systems will be outfitted with a positive release mechanism capable of completely de-watering the facility within 48 hours.

Subsurface testing shall be expanded to include all areas of the site where infiltration facilities may be feasible. The methodology for determining infiltration rates will follow the guidelines set forth in Chapter 165.11.C.(2) and the PA BMP Manual (Appendix C). Testing will conform to these specifications, including but not limited to:

- Deep test pits will be performed to document subsurface conditions and expose limiting factors. All pits will be logged by qualified personnel.
- Perc test holes must be scarified and pre-soaked, and supplemented with double ring infiltrometer testing. Refer to the PA BMP or DEP SEO Manual for detailed

- procedures, and apply an appropriate reduction rate.
- Soil testing shall be performed to an equivalent depth or elevation of the bottom of the proposed infiltration areas.
- A groundwater mounding analysis shall be prepared.

All results must be provided in a report with a narrative including background information such as geology and soils, type of equipment used and the testing/calculation methodology.

Underground storage systems will be installed on the eastern side to aid in recharging base flow to the unnamed tributary. If infiltration rates are proven to be low in this area, underground detention with a positive outfall will provide a cooler base flow to the unnamed tributary, and extend the overall time of concentration. The entire volume held in the underground detention area must be discharged over a 48-hour period. This BMP will also be utilized on the north side of S.R. 0041 for Retail F.

Naturalized Detention Basins

Shallow marsh systems planted with facultative vegetation, or Naturalized Detention Basins will be constructed to treat and mitigate parking lot runoff in accordance with PADEP Guidelines. The proposed basins will utilize extended detention along with interior vegetated berms to promote and increase detention time. The goal will be to provide a naturalized appearance with a meandering flowpath. Vegetation within the basin will consist of native grasses, wildflowers and shrubs designed by a Registered Landscape Architect experienced in the establishment of wetland and riparian ecosystems. The naturalized basin will not be routinely mowed so that natural vegetative conditions can be established which help to filter stormwater runoff. Establishment of the vegetation will be monitored for the first three years to replace plants which die, remove invasive species, and make adjustments in the grading as necessary to insure the system works as designed. Thereafter vegetation will be cut and removed on a yearly basis to remove accumulated bio-mass. Sediment forebays will be included and sized per the referenced literature, and planted to provide pretreatment, reduce runoff velocity and prevent soil erosion. Outlet structures shall be screened to prevent clogging and access will be provided to maintain all aspects of the basin's operation.

Riparian Buffer Restoration

Riparian Buffer Restoration will be provided along the unnamed stream on the eastern side of the property and along Broad Run on the western side. A riparian buffer is a protected area of trees and shrubs located adjacent to aquatic resources, such as streams, lakes, ponds, and wetlands. Riparian forests are the most beneficial zone of the buffer and provide the most ecological and water quality benefits, while zones of smaller more dense shrubs and herbaceous grasses provide benefits if adequate in width. A 75-foot buffer, measured from the top of the bank will be established on each side of the eastern tributary, while a minimum of 40 feet (designed to provide a similar degree of protection) will be provided on Broad Run on the western side. These will be designed by a qualified Landscape Architect and will take into account historical, current and proposed conditions. Riparian buffer restoration shall be coordinated with and completed following appropriate stream channel stabilization, as described below. Temporary measures shall remain in effect until the buffer plant material is well established.

Streambank Stability

All streams on the applicant's property will be assessed for stability. This assessment will be made in accordance with PADEP Keystone Stream Team Guidelines (current version) and provided in report form. The report shall identify any areas of unstable stream channel, and will recommend any remedial stabilization measures needed. Potential remedial stabilization measures will be proposed for a minimum of the bank full event and framed in a Natural Channel Design

perspective. PREIT will submit an application to the Commonwealth of Pennsylvania Department of Environmental Protection ("DEP") concurrently with an application for an NPDES permit (the latter of which may be submitted to the Chester County Soil Conservation District). Stream channel stabilization shall be initiated within thirty (30) days of the expiration of any appeal period following the issuance of a permit authorizing the work, or within thirty (30) days of the receipt of binding notice that no permit is required to authorize the work, and will complete the work necessary to effectuate stream bank stabilization prior to increasing site runoff due to construction activities.

Operations and Maintenance

An operations and maintenance manual will be prepared as approved by the Township incorporating maps, diagrams, and inspection criteria as well as schedules, maintenance requirements and operational standards. Reporting will take place quarterly for the first two (2) years, and annually thereafter and will be facilitated by checklists covering the specific requirements of each BMP. The checklists will include line items for inspection procedures and results, any remedial action taken, will be dated and signed by an owner's representative, and submitted in triplicate to the Township beginning three (3) months after notice of termination of the NPDES permit is submitted to DEP.