APPENDIX III

CITY OF CAMDEN
CAMDEN COUNTY, NEW JERSEY
MUNICIPAL STORMWATER MANAGEMENT PLAN

NJPDES Permit No.: NJ0141852

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the City of Camden ("the City") to address stormwater related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, storm water quantity, and storm water quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land or increase impervious surface by one-quarter (¼) acre or more. Theses standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

Based on available information the City has a combined total of less than one (1) square mile of vacant or agricultural lands. Therefore a "build-out" analysis is not required.

Goals

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project.
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage.
- Minimize pollutants in storm water runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- Protect public safety through the proper design and operation o storm water basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Stormwater Discussion

Land developments can dramatically later the hydrologic cycle (see Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can t5ransport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal waste, and leakage and war from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into steams and becomes food for the aquatic community.

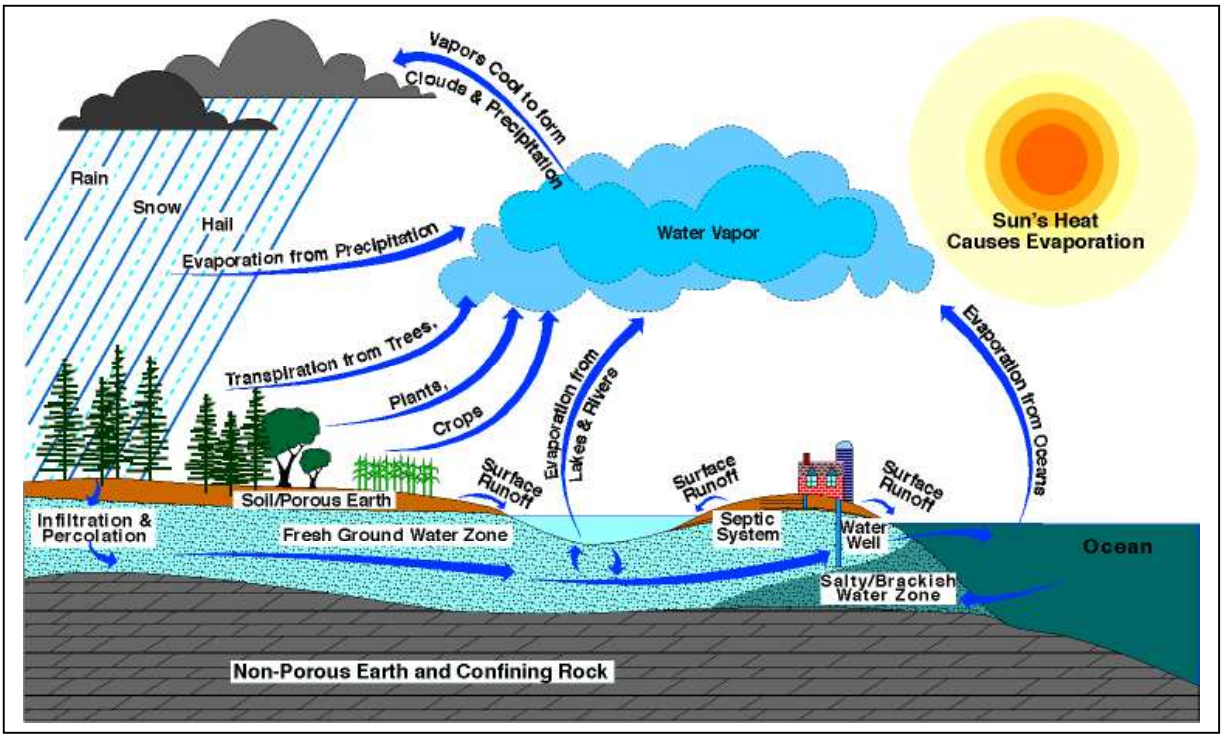

Figure 1 - Hydrologic Cycle

Background

The City of Camden is located on the banks of the Delaware and Cooper Rivers in southern New Jersey. It is situated just across the Delaware River from Philadelphia, Pennsylvania. Camden borders Collingswood, Gloucester City, Haddon City, Pennsauken, and Woodlynne.

According to the United States Census Bureau, the city has a total area of 10.4 square miles (27 km^2); 8.8 square miles (23 km2) of it is land and 1.6 square miles (4.1 km2) of it is water. The total area is 15.03% water.

As of the U.S. 2000 Census, the city had a total population of 79,904 which is a -9.3 % population growth rate since 1990. The population density is approximately 9,057.0 people per square mile (3,497.9/km^2).

The City wastewater collection is a combined sewer system (i.e., sanitary and stormwater flow in the same pipe), with eight pump stations. According to available records there is approximately 150 miles of combined sewers of which approximately ninety-three percent (93%) was installed prior to 1930. There also is approximately 25 mile of sanitary sewers and 5 miles of storm sewers.

The water system for the City of Camden serves an estimated population of 54,000 (City area west of Cooper River). The remaining population not serviced by the City water system, receives water from New Jersey American Water Company, a privately owned regional water utility.

Manufacturing and related land uses account for one third of Camden's nine square miles, and brownfields constitute more than half of all industrial sites in the City. Over the past half-

century, Camden has followed the trend of many major industrial cities in suffering considerable disinvestment and economic decline. Abandoned industrial sites contain chemicals, transformers, and other contaminants that pose significant threats to human health. Contamination of soil and groundwater is suspected at many of these sites.

More recently, however, Camden has begun to attract significant public and private reinvestment and redevelopment. Efforts to redevelop neighborhoods and commercial corridors, rebuild infrastructure, and support the growth of the city's major institutional anchors has been increased over recent years. In addition, the Camden Waterfront has been transformed by numerous entertainment venues and attractions and the arrival of market rate housing and commercial development. , bold across the city

The foundation of Camden's economy is its institutional anchors. Camden is home to three (3) universities, a medical school, three (3) regional hospitals, as well as county, state and federal government facilities. Camden's institutional base also includes major international corporations, including Campbell Soup Company and L3 Communications and a host of local and regional service and manufacturing companies. The Port of Camden is one of the most productive ports in the world, receiving cargo from hundreds of international and domestic ships each year. The city will rely on these core entities to continue its expansion.

The City is located in Water Management Area. (WMA) 18 which includes the Cooper River, Big Timber, Mantua, Newton, Oldmans, Pennsauken, Pompeston, Raccoon, Repaupo and Woodbury Creeks, as well as Baldwin Run, Swede Run and Maple Swamp. This management area covers all of parts of Burlington, Camden and Gloucester Counties, including 68 municipalities encompassing 391 square miles. The City contains portions of the following three Hydrologic Unit Code (HUC14) areas: 02040202110050, 02040202110060, 02040202120090. A map of these HUC14 areas is included in Appendix C.

The New Jersey Department of Environmental Protection (NJDEP) has established any Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sties throughout the state of New Jersey. These sites are sampled for benthic macro invertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macro invertebrate community dynamics. There are no AMNET monitoring sites within the City.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. There are approximately seventy (70) Water Quality Monitoring Stations (i.e., USGS-NWIS, STORET, WQDE) in the City.

A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as storm water and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream

corridors, retrofitting storm water systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed. Cooper River is listed as non-attaining for pesticides, heavy metals, and organic compounds. Newton Creek is listed as non-attaining for heavy metals, pesticides, coliform (E. coli.).

In addition to water quality problems, the City has exhibited severe water quantity (flooding) problems primarily due to insufficient system capacity and/or operation. The City sewer system is primarily a combined sewer system (i.e., sanitary and storm waters are conveyed in the same pipe). Flooding can occur due to insufficient downstream sewer capacity or failure of tide gates to open during moderate/severe rainfall events due to high tide conditions (water level of receiving water is higher than tide gate effluent point).

The high imperviousness of the City has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on in stream habitat during the summer months. Maps of the groundwater recharge areas, wellhead protection areas, existing land use (2002), and existing zoning are located in Appendix C.

According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) Well in New Jersey that delineates the horizontal extent of ground water captured by a pumping well at a specific rate over a two, five and twelve-year period of time for unconfined well. The confined wells have a fifty foot radius delineated around each well serving as the well protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations (see NJAC 7:10-11.7(b)1).

WHPA delineation is conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP. The Well Head Protection Areas are shown in figure 6. Most residents of the City have potable water wells.

There are approximately 175 sites (149 active, 25 pending) within the City listed in the "Known Contaminated Sites in New jersey Report" last updated 2001. It is important that contaminants not be recharged into groundwater supplies. This report is available on-line at http:www.state.nj.us/dep/srp/kcs. It is important to note these sites since they may impact the selection of best management practice for stormwater runoff in the immediate vicinity of areas of contaminated soils and groundwater.

In addition to the rivers and streams that run through and along the City, there are wetlands at various locations throughout. A map depicting major wetlands in the City is located in Appendix C. They provide flood storage, non point pollutant removal and habitat for fauna and flora.

Design and Performance Standards

The City will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C.7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5-8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. Maintenance agreements for stormwater management measures will include and enforcement clause stating that if the responsible part does not perform required maintenance, then the City may perform such maintenance and bill the responsible party. In additions, the City will require all responsible parties to submit annual statement (via certified mail) every April documenting the operation and maintenance of their facilities. The ordinances and this Stormwater Management Plan will be submitted to the Camden County for review and approval within 12 months of the adoption of this Stormwater Management Plan.

During construction, City inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

Plan Consistency

The City is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the City; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) or any TMDLs at this time. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any update to the RSIS.

The City Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey' Soil Erosion and Sediment Control Standards. During construction, City inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies in the local Soil Conservation District.

Nonstructural Stormwater Management Strategies

The City has developed its Stormwater Management Ordinance to incorporate nonstructural stormwater management strategies. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

Land Use/Build-Out Analysis

Based on available information the City has a combined total of less than one (1) square mile of vacant or agricultural lands. Therefore a Land Use/Build-Out Analysis is not required.

Mitigation Plans

New Jersey's stormwater management regulations allow a municipality to grant a variance or exemption from the stormwater management measure design and performance standards if the municipality has a Mitigation Plan. The purpose of the Mitigation Plan is to enable approval of an otherwise acceptable development that cannot achieve the stormwater management design and performance standards. By allowing the developer to provide equivalent stormwater mitigation in the same drainage area for the same standard (i.e. groundwater recharge, water quality or water quantity) a variance can be granted.

Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area as the proposed development.
2. The mitigation project must provide an equivalent amount of mitigation for the stormwater design and performance standard for which the variance or exemption is being sought. For Example, if a variance of the water quality standard is sought, then the mitigation must address water quality.
3. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapter 8 and 9 of the NJDEP Stormwater BMP Manual. Maintenance agreements shall include and enforcement provision.

Process for Selecting and Approving Mitigation Projects

Developers seeking a variance or exemption from the stormwater management design and performance standards are encouraged to discuss potential mitigation projects with the City early in the development application process. The developer may propose a specific mitigation project that meets the criteria or may select an appropriate project that meets the criteria from specific projects identified by the City.

If the City grants a variance or exemption from the stormwater design and performance standards that will be offset by a mitigation project, the City shall submit a written report describing the variance or exemption and the required mitigation to the County Review Agency (Camden County Planning Board) and to the NJDEP.