Chapter IX.13

WASTEWATER MANAGEMENT PLAN
FOR
SALEM COUNTY, NEW JERSEY
LOWER DELAWARE WATER QUALITY MANAGEMENT PLANNING AREA

SALEM CITY CHAPTER

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I. INTRODUCTION

This chapter represents the Salem City portion of the Salem County WMP. The Salem County WMP has been submitted to the New Jersey Department of Environmental Protection for approval so that it may be incorporated into the Lower Delaware Water Quality Management Plan via the Plan Amendment Procedure (N.J.A.C 7:15).

The sewer service area for the City of Salem encompasses approximately 1,818 acres of area and serves a small portion of adjacent municipalities. The area includes the majority of the City of Salem (1,761 acres), and the remaining smaller portions from the adjacent municipalities of Alloway, Lower Alloways Creek, Quinton, Elsinboro, and Mannington Townships.

The City of Salem is located in the Delaware River Drainage Basin and lies within the Lower Delaware Water Quality Management Planning Area. The Planning Area is not located within the jurisdiction of the Pinelands Commission nor is it located within the Coastal Area Facility Review Act (CAFRA) area.

The City of Salem is bounded by five (5) municipalities including Pennsville Township (to the north-west), Mannington Township (to the north-east), Quinton Township (to the south-east), Lower Alloways Creek Township (to the South), and Elsinboro Township (to the south-west). Salem City encompasses a total area of 1,761 acres (2.8 square miles) including approximately 153.9 acres of which is surface water (ponds, lakes, reservoirs) and 16.7 miles of streams (shown in Map No.1) flowing in the municipality. This municipality has been developed extensively in area north of Grieves Parkway, and west of Keasbey Street and has one of the highest population densities in Salem County (approximately 1,838 people/sq mi), according to (2010) U.S. Census data. The remaining land area for future development consists of infill parcels and larger parcels to the south of Grieves Parkway.

Salem City has a population of 5,146 persons. The municipality's population trend over the last decade can be seen as a –1.21% decline in population each year (-12.1% over ten years), according to the most recent (2010) U.S. Census data. Table 1.1 is a summary of the historic population and trends for the City of Salem. In terms of population change over the next three decades, increases in population within Salem City are expected to be minimal according to the most recent study by the South Jersey Transportation Planning Organization, prepared in 2011. A summary of the SJTPO projected population can be found below in Table 1.2:

Table 1.1: Salem City- Historic Population

Year	Population	Population Change	
		#	avg yearly %
1980	6,959		
1990	6,883	-76	-0.11%
2000	5,857	-1,026	-1.49%
2010*	5,146	-711	-1.21%

~Source: U.S. Census Bureau, *2010 U.S. Census

Table 1.2: Salem City- Projected Population

Year	Population	Population Change	
		#	avg yearly %
2010	5,146		
2020	5,068	-78	-0.15%
2030	5,104	36	0.07%
2040	5,139	35	0.07%

~Source: SJTPO, 2011

A. STATUS OF PREVIOUS APPROVED WMPS

The City of Salem has submitted several Wastewater Management Plans (WMP's) / Amendments since 1994. These amendments have included proposed expansions to the sewer service area for the purpose of including specific sites within Alloway Township, Elsinboro Township, Lower Alloways Creek Township, Quinton Township and Mannington Township.

The current WMP in effect for the City of Salem is an amendment to the Lower Delaware WQMP, which was adopted on September 24, 2003. The enclosed plan reflects current zoning with proposed sewer service areas consistent with the Municipality's Master Plan. The City of Salem has been incorporated within the overall Salem County Wastewater Management Plan. The proposed Salem County WMP and this chapter, upon adoption, supercedes previous plans and will remain in force and in effect until the expiration date noted in the Chapter 1, Salem County Summary.

B. OVERVIEW OF CURRENT WASTEWATER SERVICES

The City of Salem community wastewater system serves approximately 7,494 persons within their sewer service area according to current municipal data. This equates to 11.3 percent of the total Salem County population (66,083 persons, 2010 U.S. Census) being served by the wastewater treatment plant.

Sewer service areas may include industrial businesses that discharge process wastewater to the collection system for treatment by a facility not owned by that business. The existing sewer service limits, delineated on Map No.2, are serviced by the Salem Wastewater Treatment Plant and were derived from existing sanitary sewer infrastructure currently constructed and/or approved.

Areas served by the Salem WWTP include the City of Salem, and designated areas within Alloway Township, Lower Alloways Creek Township, Quinton Township, Elsinboro and Mannington Township located in Salem County, New Jersey. The facilities served by the Salem WWTP within Alloway Township, Lower Alloways Creek Township, Elsinboro Township, Quinton Township and Mannington Township are further defined within those municipal chapters respectively and clearly identified on the mapping provided in those chapters

C. OVERVIEW OF CURRENT WATER SERVICES

The City of Salem community water supply system serves approximately 6,197 persons within their sewer service area according to current NJDEP data. This equates to 9.4 percent of the total Salem County population (66,083 persons, 2010 U.S. Census) being served by the water treatment plant. The water service area includes the City of Salem, and designated areas within Elsinboro Township, Quinton Township and Mannington Township located in Salem County, New Jersey. The facilities served by the Salem water supply system within adjacent municipalities are further defined within those municipal chapters respectively and clearly identified on the mapping provided.

The City of Salem owns and operates its own potable water supply system. The public is presently serviced from three (3) ground water wells located throughout the municipality and two (2) surface water supply sources located in Quinton and Alloway Townships. Wells No.2, No.6 and No.7 withdraw water from the Mt. Laurel-Wenonah Aquifer (MLW). In addition, surface water sources are withdrawn from Elkinton Pond in Alloway Township, and Laurel Lake in Quinton. Generally, sanitary sewer service is available where potable water service is currently in place. Map No.1 depicts the areas actively served by existing public water supply facilities. As with sewer service, "actively served" means that the distribution lines exist and that the property either is connected or has all regulatory approvals necessary to be connected with no further review.

D. OVERVIEW OF ENVIRONMENTAL, AND LOCAL CONSIDERATIONS TO WASTEWATER SERVICES

Wastewater Management Planning is part of the continuing planning process required by the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.) and Section 208 of the federal Clean Water Act. The intent of the continuing planning process is to align federal, state, regional and local land use planning to ensure that these land use plans do not conflict with each other.

The provision of environmental infrastructure, in particular centralized sewer service, has a profound influence on development patterns and intensity. The wastewater management planning process is intended to assign an appropriate wastewater management treatment alternative to geographic areas based on environmental sensitivity and other land use planning objectives such as regional center-based development or farmland preservation. The extension of public sewers into areas designated for protection by federal, state, regional or local land use plans would be inconsistent with those protection objectives.

The adopted Water Quality Management Planning Rules (N.J.A.C. 7:15) generally exclude the extension of sewer service into large contiguous areas, defined as 25 acres or more, of wetlands, category one water buffers, Natural Heritage Priority Sites and/or endangered and threatened species habitat. The extension of sewer service into these areas would encourage their development and thus conflict with the Department of Environmental Protection's statutory mandate to protect these resources.

It should be noted that under limited circumstances environmentally sensitive areas that meet the 25 acre threshold may be included in the sewer service area as necessary to preserve the investment in projects having already received certain local and State approvals, to relate sewer service areas to recognizable geographic features, or to accomplish center based development proposed by the local land use planning authority and approved by the Department of Environmental Protection through the plan endorsement process. Additional local land use planning objectives used in delineating appropriate areas for public sewer service are discussed in this municipal chapter.

E. OVERVIEW OF MAJOR WATER RESOURCE MANAGEMENT ISSUES

A majority of the City of Salem is served by potable water and sanitary sewer service. The municipality has not identified any issues regarding water quality, water supply or concerns with non-sewered areas.

F. OVERVIEW OF FUTURE WASTEWATER SERVICES

The City of Salem has identified the future sewer service area necessary to implement a portion of the goals and objectives of the City's Master Plan. Those areas have been reduced to account for the environmental constraints pertaining to wetlands, the habitats of Threatened and Endangered Species, Riparian Corridors, and C-1 Waters. The proposed Sewer Service Area is identified on Map No.3.

The proposed future sewer service areas delineated on Map No.3 consist of proposed future areas outside the existing sewer service area. The remaining areas, not designated as a sewer service area will continue to be serviced by Individual Subsurface Sewerage Disposal Systems (ISSDS's) with wastewater flows less than or equal to 2,000 gpd.

Based on the environmental and local land use planning objectives discussed above, Map No.2 and Map No.3 identify areas presently served by public sewers and the appropriate areas to be served by public sewers in the future. These maps also identify sites that are served by an on-site treatment works, if applicable, that are regulated under a New Jersey Pollutant Discharge Elimination System permit. Each sewerage treatment plant authorized under this plan to accept and treat wastewater from its corresponding sewer service area has an accompanying facility table that provides information concerning that facility's owner, operator, permitted flow, existing flow, remaining permitted flow, and projected build-out flow summarized by municipality.

Based on the build-out analysis of each sewer service area and the existing permitted capacity of the sewage treatment plants identified in this plan, sufficient wastewater treatment capacity exists to accommodate the Future Wastewater Service Area (FWSA). Future expansion of the identified treatment works is not currently required to meet the future wastewater generation needs of the municipality.

G. SUMMARY OF SIGNIFICANT ACTIONS

Amendments to the Water Quality Management Planning Rules adopted on July 7, 2008, 40 N.J.R. 4000(a), necessitated a modification to certain sewer service areas based on environmental sensitivity and local planning objectives as described in this document. In accordance with the regulatory requirements, undeveloped lands within the existing sewer service area have been removed based on the limits of environmental constrained areas. In addition, areas have been added based on local planning objectives and an environmental sensitivity assessment. Maps No.2 and No.3 reflect the changes in sewer service area as a result of this wastewater management plan.

1. All areas not proposed to be included within the sewer service area in this WMP will be served by ISSDS's with 2,000 gpd or less flows.

II. EXISTING INFRASTRUCTURE AND TREATMENT FACILITIES

A. EXISTING AREAS SERVED BY WASTEWATER FACILITIES

Map No. 2 depicts the areas actively served by existing wastewater facilities, and the facilities tables in Chapter 7 (VII) provide detailed information on each facility. As with sewer service, the term "actively served" means that the collection lines exist and that the property either is connected or has all regulatory approvals necessary to be connected.

B. MAJOR TRANSMISSION PIPING AND PUMPING STATIONS

The City of Salem owns and operates one WWTP and a series of pump stations, and force mains used to convey wastewater flow to the WWTP. The sanitary sewer collection system in Salem is owned and maintained by the Authority. There are approximately 21.25 miles of sanitary sewer main and 2.0 miles of forced main with pipes ranging in size from 6 inches to 24 inches in diameter within the municipal boundary. The City of Salem currently owns and operates four (4) pump stations located on Oak Street, Magnolia Street, Walnut Street and Grieves Parkway. All flow is conveyed to the Salem WWTP for treatment.

C. EXISTING ON-SITE, NON-INDUSTRIAL WASTEWATER FACILITIES

These facilities serve single developments, sites or other properties under single ownership, but do not treat industrial flows. These facilities typically provide wastewater treatment for apartment complexes, commercial properties and businesses where regional sewerage is not available. Table 2.C.1 lists all existing on-site, non-industrial treatment facilities that discharge 2,000 gallons per day or more of domestic wastewater and are regulated under a NJPDES permit. The Wastewater Facilities Tables provided in Chapter 7 (VII) list all existing on-site, non-industrial treatment facilities that discharge 2,000 gallons per day or more of domestic wastewater and are regulated under a NJPDES permit.

Table 2.C.1: Non-Industrial NJPDES Wastewater Facilities

Municipal Map Designation	Facility Name	NJPDES Permit Number	Discharge Type (Groundwater or Surface Water)	Facility Table Number
42	Salem City WWTP	NJ0024856	DSW	42

D. EXISTING INDUSTRIAL WASTEWATER FACILITIES

Some industrial land uses have independent wastewater treatment facilities that treat and discharge manufacturing process waste or sanitary sewage, rather than other types of effluent such as non-contact cooling water. They may be discharged to ground water or to surface water. Table 2.D.1 lists all existing industrial treatment works that discharge 2,000 gallons per day or more of process and wastewater and are regulated under a NJPDES permit. The Wastewater Facilities Tables provided in Chapter 7 (VII) list all existing industrial treatment facilities that discharge 2,000 gallons per day or more of domestic wastewater and are regulated under a NJPDES permit.

Table 2.D.1: Industrial NJPDES Wastewater Facilities

Municipal Map Designation	Facility Name	NJPDES Permit Number	Discharge Type (Groundwater or Surface Water)	Facility Table Number
43	Salem City WTP	NJ0035742	DSW	43

E. GENERAL WASTEWATER MANAGEMENT AREAS FOR SEPTIC SYSTEMS

Generally, remaining areas of a municipality, not otherwise designated as service areas for treatment facilities requiring a NJPDES permit, are included within a general wastewater management area for septic systems and other small treatment works that treat less than 2,000 gallons per day of wastewater and discharge to ground water.

F. EXISTING AREAS SERVED BY PUBLIC WATER SUPPLY FACILITIES

The City of Salem community water supply system serves approximately 6,197 persons within their sewer service area according to current NJDEP data. The water service area includes the City of Salem, and designated areas within Elsinboro Township, Quinton Township and Mannington Township located in Salem County, New Jersey. Map No.1 depicts the areas actively served by existing public water supply facilities. As with sewer service, "actively served" means that the distribution lines exist and that the properly either is connected or has all regulatory approvals necessary to be connected with no further review.

The City of Salem is presently serviced from three (3) ground water wells located within the municipality and two (2) surface water supply sources located in Quinton and Alloway Townships. Wells No.2, No.6 and No.7 withdraw water from the Mt. Laurel-Wenonah Aquifer (MLW). Generally, sanitary sewer service is available where potable water service is currently in place.

The following Table 2.F.1 summarizes each public community water supply facility currently serving the municipality. The franchise areas are depicted on MapNo.1.

Table 2.F.1: Existing Water Supply Wells

Well Permit Number	Well Designation	Pump Capacity (gpm)	Aquifer
5000000042	2	500	MLW
3000014867	6	250	MLW
3000015191	7	350	MLW
WSIN75171	Laurel Lake	3,000	Surface Water
WSIN788420	Elkinton Pond	4,160	Surface Water

III. ENVIRONMENTAL AND OTHER LAND FEATURES

A full description of the mapping of environmental features for the County can be found in Chapter I of this report. This section includes a summary of the environmental features and public open space for the municipality that were taken into account when preparing the mapping. These features are significant to wastewater management planning for three reasons: they may influence the delineation of sewer service areas, they may reduce the potential future wastewater generation due to existing regulatory programs, or they may be subject to federal grant limitations that prohibit the extension of sewer service into these areas. Some of this mapping has been used in the development of a map of environmentally sensitive areas where the extension of sewer service areas is restricted **(see Delineation of Sewer Service Areas, below).**

Development in areas mapped as wetlands, flood prone areas, designated river areas, or other environmentally sensitive areas may be subject to special regulation under Federal or State statutes or rules. Interested persons should check with the Department of Environmental Protection for the latest information. Depiction of environmental features is for general information purposes only, and shall not be construed to define the legal geographic jurisdiction of such statutes or rules.

The following environmental features have been identified within the County map set:

A. Surface Waters and Classifications—Refer to Map No.5A of County map set
B. Riparian Zones -- Refer to Map No.5C of County map set
C. Flood Prone Areas – Refer to Map No.5A of County map set
D. Freshwater Wetlands -- Refer to Map No.5B of County map set
E. Coastal Wetlands –Refer to Maps 5A and 5B of County map set
F. Public Open Space and Recreation Areas –Refer to Map No.5B of County map set
G. Preserved Agricultural Areas and Other Conservation Easements on Private Lands – Refer to Map No.5C of County map set
H. Suitable Habitat for Threatened and Endangered Species – Refer to Maps 5B and 5C
I. Natural Heritage Priority Sites –Refer to Map No.5C of County map set

IV. DELINATION OF SEWER SERVICE AREAS AND PLANNING INTEGRATION

The results of the environmental analyses, summarized in Section III above, provide justification for the established service area delineations by demonstrating consistency with all applicable NJDEP requirements and criteria. This WMP chapter provides the most current planning efforts within the municipalities WMP planning area.

The WQMP rules NJAC 7:15-5.22 require coordination with and solicitation of comments or consent from certain agencies, entities and plans, and consistency with other plans. These requirements are addressed in the Chapter 1, Salem County Summary within this document.

This chapter provides the method used to delineate future sewer service areas based on the mapping of significant environmentally sensitive areas, and consistency with other regional plans.

A. ENVIRONMENTALLY SENSITIVE AREAS

Under the Water Quality Management Planning Rules, large contiguous environmentally sensitive areas, generally defined as 25 acres or greater in size should be excluded from sewer service areas except under certain circumstances such as providing service to development that has already secured prior approvals or center based development approved by the Department of Environmental Protection through the Plan Endorsement process. Maps 5A, 5B and 5C, of the County map set, reflect the final results for the mapping of environmentally sensitive areas, based on the information described above and the WQMP rules. These maps were created using the following process:

1. Identify areas (to the extent that GIS interpretations are available) where pre-existing grant conditions and requirements (from Federal and State grants or loans for sewerage facilities) provide for restriction of sewer service to environmentally sensitive areas, and then delete areas (if any) where a map revision or grant waiver has been approved by USEPA. Note: pre-existing grant conditions and requirements (from Federal and State grants or loans for sewerage facilities) which provide for restriction of sewer service to environmentally sensitive areas are unaffected by adoption of this WMP and compliance is required.

2. Merge the GIS layers for wetlands, Category One riparian zones, Natural Heritage Priority Sites, and Threatened and Endangered Species habitats, and any others used by the County areas into a single composite GIS coverage.

3. Correct the composite areas by eliminating areas designated as urban in the most recent land use land cover layer (2002) to address land use/land cover modifications that have occurred since the environmental feature layers were prepared.

4. Identify and delete any composite areas less than 25 acres in size from the map of environmentally constrained areas. The resulting map shows the final environmentally sensitive areas, which is used to eliminate the potential for sewer service areas except where sewer service already exists, or exceptions are allowed for infill development or approved endorsed plans. It is noted for public information purposes that the excluded areas will be protected through other NJDEP regulatory programs such as the Flood Hazard Area Control Act and Freshwater Wetlands Act rules, and may be protected by municipal ordinances as well.

B. SEWER SERVICE AREAS IN ENVIRONMENTALLY SENSITIVE AREAS

The WQMP rules allow for inclusion of environmentally sensitive areas under limited conditions. The following modifications were considered for the WMP:

1. Where a development has secured approval under the Municipal Land Use Law and possesses a valid wastewater approval, the site may be included in the sewer service area if consistent with that valid wastewater approval. This information was gathered in consultation with municipalities.
2. Where a project has an approved site-specific water quality management plan and wastewater management plan amendment from the Department the project may be included in the wastewater management plan consistent with that approved site specific amendment for a period of six years from the date the amendment was adopted. The general locations of these developments are indicated on Map No.3, if applicable, and are keyed to a list of qualifying developments in each municipal chapter.
3. Where environmentally sensitive areas are bordered on either side by areas with existing sewer service, and where the infill development would generate 2,000 gpd or less of sewage based on existing zoning and where the area to be included does not include habitat critical to the recovery potential or the survival of a local population of an endangered or threatened species.
4. Where sewer service is necessary to support for center based development under an "endorsed plan" (through the State Planning Commission relative to the State Development and Redevelopment Plan) and would not remove habitat critical to endangered or threatened species. Where such modifications have been made, they are noted in the individual municipal chapters.
5. Where necessary to create a linear boundary that related to recognizable geographic features and would not remove habitat critical to the recovery potential or the survival of a local population of an endangered or threatened species. Where necessary to create a linear boundary that related to recognizable geographic features and would not remove habitat critical to the recovery potential or the survival of a local population of an endangered or threatened species.

C. EXCEPTIONS TO THE USE OF GEOGRAPHIC OR POLITICAL BOUNDARIES

The existing Sewer Service Area boundary was derived from existing sanitary sewer infrastructure currently constructed or approved. These boundaries hold tightly to the geographical boundary of the municipality. No exceptions were made for the delineations used in this WMP. Environmentally constrained areas that were identified through the process have been removed within the sewer service area boundary, where applicable.

V. FUTURE WASTEWATER DEMAND AND FACILITIES

Proposed future sanitary sewer flows conveyed to the Salem City WWTP projected under build-out conditions were evaluated based on two sets of data; sanitary flows projected within the existing sewer service area and proposed flows for the future sewer service area. Future flows within the existing sewer service area utilize a "parcel based" method for calculating the flows of infill development. Whereas, future sanitary flows within the expanded sewer service area utilize a "zoning based" method for calculating the build-out. The build-out data is then converted to a projected future wastewater flow by applying the planning flow criteria from N.J.A.C. 7:14A based on the type of development projected.

All projected flows were separated into residential, commercial, and industrial components. Total projected build-out flow for residential, commercial and industrial development was determined based on the available developable land and current zoning ordinances for the municipality within areas proposed as the future sewer service area. Environmental constraints with required buffers were also considered and indicated within the Mapping section of this report.

For example, single-family residential development is assumed to consist of houses having three or more bedrooms per house, and each projected new house is multiplied by 300 gallons per day to predict the future wastewater generated. For non-residential land uses the anticipated floor area is multiplied by 0.1 gallon per day to predict future wastewater generation. A more detailed explanation of build-out flow calculations and criteria used is provided in the tables below.

The build out in the non-sewer service area was calculated by applying the zoning over all undeveloped land except polygons too small to support additional development. The number of residential units and non-residential floor area were then multiplied by the wastewater planning flow estimates in either N.J.A.C. 7:14A or 7:9A as appropriate.

The build out method used for the wastewater demand was also used to predict future water supply demand, except that the flow multiplier used to predict future water supply demand is slightly higher than that used for wastewater demand. The results of the analysis are presented within this chapter and in the facilities tables found in the appendices at the end of this document.

A. MUNICIPAL ZONING AND COMPOSITE ZONING

The municipal zoning information provided below is specific to this chapter. Because municipal zoning ordinances are not uniform in their nomenclature or definitions, a composite zoning map has not been developed. Table 5.B.1 below identifies the zoning specific to this chapter which has been utilized for the associated build-out analyses.

"SSA Developable Area" includes both undeveloped and underdeveloped parcels within the future wastewater service area. "Undeveloped" parcels are those where no development exists and the land has not been restricted from development through dedicated open space or agricultural preservation programs. "Underdeveloped" parcels are those where some level of development exists, but at a density less than allowed by zoning and where deed restrictions do not prevent further development.

Table 5.A.1: Summary of Salem City Municipal Zones

Zone Name	Zone Description	Municipal Area (ac)	SSA Developable Area (ac)
C-1	RETAIL COMMERCIAL	44.02	0.41
M-1	LIGHT MANUFACTURING	30.52	13.64
M-2	GENERAL MANUFACTURING	101.82	1.71
PA	PLANNED APARTMENT OVERLAY DISTRICT	390.95	3.55
C-2	GENERAL COMMERCIAL	40.15	0.22
R-1	RESIDENTIAL	840.96	26.35
R-2	RESIDENTIAL	290.61	15.55
RLC	RESIDENCE-LIMITED COMMERCIAL	40.50	1.44

B. EXISTING WASTEWATER FLOWS

The existing wastewater flows conveyed to the Salem WWTP were calculated based on flows metered by City of Salem. The present average annual wastewater flow for 2010 is 0.696mgd. The present average flow includes residential, commercial and industrial flows as well as an I/I component.

The following Table 2.B.1 summarizes the permitted wastewater treatment plant capacity and associated average daily flows for 2010.

Table 5.B.1: Wastewater Treatment Plant Capacity and Flows 2010

WWTP	NJPDES Permit No.	Permitted Capacity (mgd)	Average Daily Flow 2010 (mgd)	Build-Out Projection (mgd)
Salem WWTP	NJ0024856	1.40	0.696	0.378

Included within the above existing wastewater flows and projections are connections located within Alloway Township, Lower Alloways Creek Township, Quinton Township, Elsinboro and Mannington Township. The flows from these connections are identified within the specific municipal chapter or facilities tables provided within Chapter 7 (VII) of this report. Monthly wastewater flow data for 2010 is identified in Table 2.F.2 below.

Table 5.B.2: Existing Wastewater Flows

Month		Monthly Avg. (mgd)	Estimated Monthly Avg. (mgd)	
			Salem City	Contributing Municipalities
Jan-10		1.031	0.859	0.172
Feb-10		1.036	0.844	0.192
Mar-10		1.176	0.979	0.197
Apr-10		0.949	0.753	0.196
May-10		0.655	0.524	0.131
Jun-10		0.500	0.396	0.104
Jul-10		0.454	0.333	0.121
Aug-10		0.464	0.340	0.124
Sep-10		0.430	0.312	0.118
Oct-10		0.588	0.438	0.150
Nov-10		0.533	0.392	0.141
Dec-10		0.530	0.394	0.136
Yearly Average	**(mgd)**	**0.696**	**0.547**	**0.148**
	(mgm)	**21.155**	**16.592**	**4.508**
	(mgy)	**253.858**	**199.105**	**54.101**

C. SEWER SERVICE AREA BUILD-OUT ANALYSIS

The build-out of the existing sewer service area consisted of evaluating residential, commercial and industrial flow projections to the extent of development that could occur according to applicable zoning in developable areas. The projections are based on the potential for development of existing infill lots within areas zoned for each use and the most current land use regulations for the municipality. Generally, infill development of the existing sewer service area was prepared utilizing a "parcel based" build-out approach.

The total number of potential units within each residential, commercial and industrial district was then multiplied by the maximum percent building coverage specified in the zoning ordinances to reach a maximum building area at build-out. Residential flows were projected assuming 300gpd / dwelling unit. Commercial and Industrial flows were projected assuming 0.10 gpd/sq.ft. of building area.

Table 5.C.1 summarizes the build-out flow projections for the existing sewer service area. In addition, the table reflects a breakdown of the acreage of land available for development (i.e., either undeveloped or underdeveloped, and not constrained due to environmentally sensitive areas) within each general zone of the municipality, based on the build-out analysis.

Table 5.C.1: Sewer Service Area Build-Out Projections

Zone	Developable Acres	Potential Units	Average Daily Flow (GPD)	Total ADF (GPD)
	See Note (a)	*See Note (b)*	*See Note (c)*	*See Note (d)*
C-1	0.41	3	220	660
C-2	0.22	1	220	220
M-1	36.92	163	220	35,860
M-2	16.73	59	220	12,980
PA	3.55	34	300	10200
R-1	184.10	941	300	282,300
R-2	17.98	106	300	31,800
RLC	1.44	12	300	3,600
			TOTAL	**377,620 gpd** **0.378 mgd**

The notes referenced below are indicated in the above table.

Notes:

(a) "Developable Acres" represents the available acreage per zone of the entire City in accordance with the current Salem City Master Plan.

(b) "Potential Units" represent the number of remaining units that may be constructed within each zone within the existing sewer service area.

(c) Average Daily Flow has been calculated based on current NJDEP regulations.

- Residential Zones R-1, R-2, PA and RLC Average Daily Flow based on 300 gpd established for 3 or more bedroom dwellings.
- Commercial Zones C-1 and C-2 Average Daily Flow Based on 0.1 gal/SF established for 2,160 SF Offices and Retail Stores (60% coverage of 3,600 SF).
- Manufacturing M-1 and M-2 Average Daily Flow Based on 0.1 gal/SF established for 2,160 SF Offices and Retail Stores (60% coverage of 3,600 SF).

(d) TOTAL ADF represents the remaining potential build-out within the sewer service area. Individual parcels with less than the minimum lot size for each zone have not been assessed an average daily flow value.

D. FUTURE SEWER SERVICE AREA BUILD-OUT ANALYSIS

Generally, the future sewer service area build-out is prepared utilizing a "zoning based" build-out approach. The build-out of future sewer service areas typically consists of evaluating residential, commercial and industrial flow projections to the extent of development that could occur according to applicable zoning in developable areas, which are outside of the existing SSA.

The City of Salem's existing sewer service area extends to the municipal boundary. All proposed flows for the City of Salem, included as part of this WMP submission, are identified within section 5.C. above.

E. FUTURE WASTEWATER OUTSIDE OF SEWER SERVICE AREAS

Generally, the default wastewater management alternative to support development in areas that are not designated as sewer service area is discharge to groundwater less than 2,000 gallons per day. A nitrate dilution analysis for septic systems is typically performed, in similar fashion to that conducted for sewer service areas, except that environmentally sensitive areas are not removed prior to performing the build out analysis. The intent of this analysis is to assess the available dilution on a HUC 11 basis used to establish the maximum number of units that can be built in a watershed and continue to meet the regulatory nitrate target.

The City of Salem's existing sewer service area extends to the municipal boundary. Consequently, the nitrate dilution analysis necessary for assessing the future wastewater outside of a sewer service area was not prepared as the defined SSA reflects all lands within the municipal boundary with the exception of environmentally constrained areas.

VI. ANALYSIS OF CAPACITY TO MEET FUTURE WASTEWATER NEEDS

This section of the wastewater management plan analyzes whether there is sufficient wastewater treatment capacity to meet the needs of the Municipality based on the projections described above.

A. ADEQUACY OF SEWAGE TREATMENT PLANT CAPACITY

Table 6.A.1 provides a comparison of existing wastewater treatment capacity with existing and future flow demands within the municipality. The final column determines whether existing capacity is or is not adequate for the projected flows.

Table 6.A.1: Wastewater Treatment Plant Capacity							
Treatment Works	**Permit No.**	**Current Treatment Capacity (mgd)**	**Average Daily Flows 2010 (mgd)**	**Existing SSA Build-Out Projection (mgd)**	**Proposed SSA Build-Out Projection (mgd)**	**Contributing SSA Build-out (mgd)**	**Remaining Treatment Capacity (mgd)**
Salem WWTP	NJ0024856	1.4	0.696	0.064	0.314	0.136	0.190

The total treatment capacity for the sanitary sewer system that serves the municipality (1.40 mgd) is greater than the projected flows necessary to support the combination of existing demands and proposed development (1.21 mgd). The calculations were based on the proposed build-out projections and average daily flow values utilized within the regulations for each type of development. Based on the analysis presented above, sufficient wastewater treatment capacity exists to accommodate the currently proposed FWSA**.**

Included within the summaries above of "Average Daily Flows" and "Contributing SSA Build-out" are existing contributions and proposed contributions from connections to the Salem City sewerage system that are located within Alloway Township, Elsinboro Township, Mannington Township, and Quinton Township. Table 6.A.2 provides a breakdown of the total flow projection from existing and proposed build-out for each of these municipalities. Refer to respective municipal chapters and corresponding water build-out analyses for detailed information on these contributing areas.

Table 6.A.2: Wastewater Build-out in Contributing Municipalities					
Treatment Works	**Total Build-out by Municipality (mgd)**				
	Salem City	**Alloway**	**Elsinboro**	**Mannington**	**Quinton**
Salem WWTP	0.378	0.034	0.000	0.0050	0.097

B. ADEQUACY OF DILUTION TO MEET FUTURE NON-SEWER SERVICE AREA DEMAND

Generally, a wastewater estimation tool, provided by the Department is used to compare existing zoning to the available nitrate dilution within each HUC11 in an effort to determine whether adequate dilution is available to meet future non-sewer service area demands. However, as indicated above, the nitrate dilution analysis necessary for assessing the future wastewater outside of a sewer service area was not prepared as the defined SSA reflects all lands within the municipal boundary with the exception of environmentally constrained areas.

VII. FUTURE WATER SUPPLY AVAILABILITY

The purpose of the Depletive/Consumptive Water Use Analysis is to determine if there is sufficient water supply to serve the proposed development of the municipality. The analysis should compare the build-out water supply need with the existing permitted water allocation. To complete the objective of this analysis, water allocation and drinking water demand within the existing sewer service area were compared. A build-out projection of the proposed sewer service area was then prepared to determine the additional water demands that may result. These demands were also compared to the water allocation to verify whether sufficient water supply exists to serve the proposed development. The information provided was made available by the Salem Water Department or obtained from DEP online sources. The comparison of water allocation and projected build-out for the proposed sewer service area are summarized in the section below.

A. SUFFICIENCY OF WATER SUPPLY

The City of Salem's current water allocation and existing average water demands are identified in Section 2 of this municipal chapter. Development of vacant land was the predominant factor in determining future water supply needs. Further, because external market and economic forces, such as interest rates, are a dominant factor in determining the rate of construction, this analysis assesses the ability to provide potable water while protecting surface and ground water quality for the entire projected build-out allowable by zoning.

Proposed daily demands required to support development within the future sewer service area utilized the same method of analysis as was performed for the sanitary sewer analysis. Future demands are generally evaluated and projected based on two sets of data; water demands projected within the existing sewer service area and proposed water demands for the expanded sewer service area. Future water demands within the existing sewer service area utilize a "parcel based" method for calculating the demand of infill development. Whereas, future water demands within the expanded sewer service area utilize a "zoning based" method for calculating the demand.

Flows were evaluated based on current zoning of identified developable land. All projected flows were separated into residential, commercial, and industrial components. Total projected build-out flow for residential, commercial and industrial development was determined based on current zoning ordinances for the municipality within areas proposed as the future sewer service area. Environmental constraints with required buffers were also considered and indicated within the Mapping section of this report.

Proposed daily demands were evaluated and projected based on two sets of data. This included identified developable land within the existing sewer service area or infill development as well as proposed future development within the expanded sewer service area. The summaries for each of these sets of data are provided below.

1. Existing Sewer Service Area: Water Build-out Analysis

The build-out of the sewer service area consisted of evaluating residential, commercial and industrial flow projections to the extent of development that could occur according to applicable zoning in developable areas. The projections are based on the potential for development of existing infill lots within areas zoned for each use and the most current land use regulations for the municipality. Generally, infill development of the existing sewer service area was prepared utilizing a "parcel based" build-out approach.

The total number of potential units within each residential, commercial and industrial district was then multiplied by the maximum percent building coverage specified in the zoning ordinances to reach a maximum building area at build-out. Residential flows were projected assuming 400gpd / dwelling unit. Commercial and Industrial flow flows were projected assuming 0.125 gpd/sq.ft. of building area.

Table 7.A.1.1 summarizes the build-out flow projections for the existing sewer service area. In addition, the table reflects a breakdown of the acreage of land available for development (i.e., either undeveloped or underdeveloped, and not constrained due to environmentally sensitive areas) within each general zone of the municipality, based on the build-out analysis.

TABLE 7.A.1.1: SSA Water Supply Build-Out Projections

Zone	Developable Acres	Potential Units	Average Daily Flow (GPD)	Total ADF (GPD)
	See Note (a)	*See Note (b)*	*See Note (c)*	*See Note (d)*
C-1	0.41	3	270	810
M-1	0.22	1	270	270
M-2	36.92	163	270	44,010
PA	16.73	59	270	15,930
C-2	3.55	34	400	13,600
R-1	184.10	941	400	376,400
R-2	17.98	106	400	42,400
RLC	1.44	12	400	4,800
			TOTAL	**497,410 gpd**
				0.497 mgd

The notes referenced below are indicated in the above table.

Notes:

(a) "Developable Acres" represents the available acreage per zone of the entire City in accordance with the current Salem City Master Plan.

(b) "Potential Units" represent the number of remaining units that may be constructed within each zone within the existing sewer service area.

(c) Average Daily Flow has been calculated based on current NJDEP regulations.

- Residential Zones R-1, R-2, PA and RLC Average Daily Flow Based on 400 gpd established for 3 or more bedroom dwellings.
- Commercial Zones C-1 and C-2 Average Daily Flow Based on 0.125 gal/SF established for 2,160 SF Offices and Retail Stores (60% coverage of 3,600 SF).
- Manufacturing M-1 and M-2 Average Daily Flow Based on 0.125 gal/SF established for 2,160 SF Offices and Retail Stores (60% coverage of 3,600 SF).

(d) TOTAL ADF represents the remaining potential build-out within the existing sewer service area. Individual parcels with less than the minimum lot size for each zone have not been assessed an average daily flow value.

2. Future Sewer Service Area: Water Build-out Analysis

Generally, the future sewer service area build-out is prepared utilizing a "zoning based" build-out approach. The build-out of future sewer service areas typically consists of evaluating residential, commercial and industrial flow projections to the extent of development that could occur according to applicable zoning in developable areas, which are outside of the existing SSA.

The City of Salem's existing sewer service area extends to the municipal boundary. All proposed water demands for the City of Salem, included as part of this WMP submission, are identified within section 5.A.1 above.

3. Analysis of Water Capacity to Meet Supply Needs

This section of the wastewater management plan analyzes whether there is sufficient potable water treatment capacity to meet the needs of the Municipality based on the projections described above. This requires a comparison of the projected future demand to the existing capacity of the water supply system.

Table 7.A.3.1 provides a comparison of existing water allocation with existing and future flow demands within the municipality. The final column determines whether existing capacity is or is not adequate for the projected daily demands. Where capacities are inadequate, the issue is addressed in later sections. Details of the projections are included within the appendices and municipal chapters, which also address any needs for new or expanded treatment facility discharges.

Table 7.A.3.1: Water Supply Capacity							
Water System	**Permit No.**	**Current Water Allocation (mgm)/(mgy)**	**Average Demand 2010 (mgm)/(mgy)**	**Existing SSA Build-Out Projection (mgm)/(mgy)**	**Proposed SSA Build-Out Projection (mgm)/(mgy)**	**Contributing SSA Build-out (mgm)/(mgy)**	**Remaining Water Allocation (mgm)/(mgy)**
Salem Water Dept.	WAP020001	93.00/ 900.00	24.03 /288.38	15.445/ 183.81	0.167 / 1.964	39.64 / 474.15	63.36/ 425.85

The total monthly water allocation for the Salem City water distribution system, (93.00 mgm/900 mgy), is greater than the water supply necessary to support existing demands and proposed development within the combined sewer service area of Salem City and adjacent municipalities that are supplied by the Salem City WT. The projected calculations were based on the proposed build-out projections and average daily demand values utilized within the regulations for each type of development. Based on the analysis presented above, Sufficient water supply exists to accommodate the currently proposed Sewer Service Area.

Included within the summaries above of "Average Demand" and "Contributing SSA Build-out" are existing demands and proposed demands from connections to the Salem City Water Department system within contributing sewer service areas. These connections are located within Alloway Township, Elsinboro Township, Mannington Township, and Quinton Township.

Table 7.A.3.2 provides a breakdown of the total flow projection from existing and proposed build-out for each of these municipalities. Please refer to respective municipal chapters and corresponding water build-out analyses.

Table 7.A.3.2: Water Supply Build-out In Municipalities With Contributing SSA					
Water System	**Total Build-out by Municipality (mgm) / (mgy)**				
	Salem City	**Alloway**	**Elsinboro**	**Mannington**	**Quinton**
Salem City Water	15.445/ 183.81	0.00/0.00	0.00/0.00	0.167 / 1.964	0.00/0.00

B. EXISTING PUBLIC WATER SUPPLY ALLOCATION AND DAILY DEMANDS

The City of Salem currently has an average daily usage of approximately 0.790 million-gallons/day based upon the 2010 calendar year. The peak annual and monthly water demand over a period of 5 years between 2006 through 2010, occurred in 2006. The reduction in average demand, over the last few years, is partially due to the enforcement of water restrictions and water conservation appurtenances in residential and commercial buildings and improvements/replacements within the system's infrastructure.

The following Table 7.B.1 summarizes current water allocation diversion limits permitted for the public community water system.

Table 7.B.1: Water Allocation and Demand 2010				
Water Company	**Permit No. / Program Interest ID**	**Water Allocation (mgm) / (mgy)**	**Average Demand (mgm) / (mgy)**	**Build-Out Projection (mgm) / (mgy)**
Salem City Water Department	5290 / WAP020001	93.00 / 900.00	24.03 / 288.38	15.612 / 183.814

The following Table 7.B.2 summarizes historical daily, monthly and annual water demands currently supplied by the public community water system. The districts and franchise areas are depicted on Map No.1.

Table 7.B.2: Annual Water Demand Summary					
Year	**Annual Demand Total (mgy)**	**Average Daily Demand (mgd)**	**Average Monthly Demand (mgm)**	**Peak Monthly Demand (mgm) / (Month)**	
2006	371.384	1.017	30.949	39.338	June
2007	351.831	0.964	29.319	34.350	July
2008	351.570	0.963	29.298	32.915	July
2009	272.205	0.746	22.684	25.300	October
2010	288.383	0.790	24.032	29.245	August

VIII. MAPPING REQUIREMENTS

A. BASIS FOR SERVICE AREA DELINEATIONS

The results of the required environmental analyses, summarized in Section III and the delineation of the sewer service areas identified in section IV above provide justification for the established service area delineations by demonstrating consistency with all applicable NJDEP requirements and criteria. The Salem WMP provides the most current planning efforts within the Sewer Service Area.

The Salem City proposed Sewer Service Area encompasses the future sewer service area necessary to implement the goals and objectives of the municipality. Those areas have been reduced to account for the buffer requirements regarding wetlands, the habitats of Threatened and Endangered Species and Riparian Corridors.

The proposed Salem City Sewer Service Area does not contain any areas located within the Pinelands. Areas located within the watershed of a Fresh Water One (FWl) stream, as classified in the Surface Water Quality Standards, and/or that have Class I-A ground water (Ground Water of Special Ecological Significance), as classified in the Ground Water Quality Standards, are identified as "Non-degradation water areas based

on the Surface Water Quality Standards at NJ.A.C. 7:9B, and/or the Ground Water Quality Standards at NJ.A.C. 7:9-6." Areas so designated are included on Map No.3. Non-degradation water areas shall be maintained in their natural state (set aside for posterity) and are subject to restrictions.

B. MAPPING CLASSIFICATION

The mapping for this municipal chapter of the WMP was created by using available data from NJDEP, online GIS data sets and has been prepared in accordance with NJDEP WMP guidelines. The maps included within this submission reflect the requirements for preparing a Water Quality Management Plan Amendment. Five (5) maps with specific features have been provided. Supplemental maps have been included to clarify information in an effort to clearly depict the required information. Each map has been provided with a complete and readily understandable legend. All 30" x 42" maps have been developed using New Jersey Department of Environmental Protection Geographic Information System digital data at a scale of 1" = 1 mile'. Additional 11" x 17" maps have been provided within each report for convenience. The maps are classified below:

1. MAP NO.1: WMP MUNICIPAL MAP/WATER INFRASTRUCTURE

The map depicts the municipal boundary as well as the potable water infrastructure, if applicable. The map also includes HUC-11's, and existing water service infrastructure. Map No.1 shows areas of the municipality that lay within the Hackensack Meadowlands District, Pinelands Areas, Pinelands National Reserves, or franchise areas.

2. MAP NO.2: EXISTING FACILITIES & SERVICE AREAS

The map depicts the existing wastewater service area. This map also identifies the present extent of actual sewer infrastructure within the municipal boundary of Salem City, including all sewer department buildings, existing NJPDES facility (WWTP) locations, pump stations, force mains, and gravity sewers. All areas outside the existing sewer service area are served by ISSDS with wastewater planning flows of less than or equal to 2,000 gpd.

3. MAP NO.3: PROPOSED FACILITIES & SERVICE AREAS

The map illustrates the wastewater service areas, non-degradation areas, pumping stations, major interceptors and trunk lines, which are proposed to exist in the future. The boundaries of future service areas coincide with recognizable geographic or political features (i.e., roads, lot lines, zoning area boundaries, water bodies). The proposed future infrastructure and facilities are also depicted on the map. The existing infrastructure and facilities from Map No.2 are also included in this map.

4. MAP NO.4: SALEM CITY ZONING MAP

The map depicts the current zoning of Salem City. The zoned minimum lot acreage for Commercial, Industrial and Residential areas within the WMP proposed Sewer Service Area indicated in Table 8.B.4.1 below were utilized to determine calculated flows within the future sewer service area.

Table 8.B.4.1: Zoning Regulations

Zone	Zone Title	Minimum Lot Area	Minimum Lot Width	Minimum Lot Depth	Minimum Front Yard Setback	Minimum side yard setback	Minimum rear yard setback	Maximum Building Height	Maximum Building Coverage	Maximum Lot Coverage
C-1	Retail Commerical	3,600 sqft w/ Residential							60%	
M-1	Light Manufacturing	3,600 sqft w/ Residential							60%	
M-2	General Manufacturing	3,600 sqft w/ Residential							60%	
PA	Planned Apartment Overlay District	1 BR 3,500 sqft / 2 BR 4,000 sqft / 3+ BR 4,500 sqft						S Story		
C-2	General Commercial	3,600 sqft w/ Residential							60%	
R-1	Residence	7,200 sqft							30%	
R-2	Residence	3,600 sqft							60%	
RLC	Residence- Limited Commercial	3,600 sqft w/ Residential							60%	

5. MAP NO.5A: ENVIRONMENTAL FEATURES (REFER TO COUNTY MAP)

The map depicts environmental features indicated in N.J.A.C. 7:15-5.17 including major drainage basin boundaries (U.S.G.S. Hydrologic Unit Code (HUC) 11 Watersheds), CAFRA boundary and flood prone areas (FEMA). Map No.5A shows any New Jersey and Federal Wild and Scenic Rivers, FW 1-Trout Production or FW 2 Trout Production or farmlands preservation areas. Streams with FW2-NTC1/SE1 and FW2-NT/SE1 ranking are also shown.

6. MAP NO.5B: ENVIRONMENTAL FEATURES (REFER TO COUNTY MAP)

The map depicts environmental features indicated in N.J.A.C. 7:15-5.17 including wetlands, required wetlands buffers, public open space and recreation areas greater than or equal to (10) ten acres. Additional information including major drainage basin boundaries (U.S.G.S. hydrologic unit code (HUC) 11 watersheds), landscape project areas for grasslands, emergent and forested areas with rankings of 3, 4 and 5 are also shown. MapNo.5B shows any New Jersey and Federal Wild and Scenic Rivers, FW 1 Trout Production or FW 2 Trout Production or farmlands preservation areas.

7. MAP NO.5C: ENVIRONMENTAL FEATURES (REFER TO COUNTY MAP)

The map depicts environmental features indicated in N.J.A.C. 7:15-5.17 including the natural heritage priority sites for threatened and endangered species. Landscape Project Areas for Forested Wetlands and Bald Eagle Foraging are shown on this map. Map No.5C shows any New Jersey and Federal Wild and Scenic Rivers, FW 1-Trout Production or FW 2 Trout Production or Farmlands Preservation areas. C-1 water bodies are identified on the map as well. Sewer service areas are excluded from the 300ft buffers of C-1 water bodies and on all tributaries within the HUC 11 watershed.