

IX. PUBLIC UTILITIES

A. Introduction

A primary purpose for including a public utilities chapter in a Master Plan is a concern for the public health and safety. A potable water supply is the most fundamental need of a community coupled with a wastewater disposal and treatment system. Once these systems are established, the increased density within which a community's population may reside creates an increased demand for water supply and infrastructure for fire suppression purposes. Over the past century, other utilities such as electricity and natural gas have also become basic necessities for heating and lighting homes and businesses. Communications utilities which were once novelties when first introduced, are now standard elements of households and vital components of commerce. In looking ahead to the future growth and development of the community, and to maintaining the quality of life for current residents and corporate citizens alike, it is important to understand the source, distribution, and expansion capacity of utility systems which provide service to the Town.

While water and sewer systems are more traditionally provided by a municipal or regional governmental entity, other utility systems are traditionally provided by public utility companies. As a provider of water and sewer systems, the Town of Salem has the ability and obligation to plan for these systems. With regard to other public utility systems, it is important for the Town to learn about each company's plans, and to apprise these companies about the Town's goals and plans for future growth.

B. The Water System

1. Introduction

Salem's municipal water system was authorized by the State Legislature in 1901, and in 1905 a bond issue was authorized at Town Meeting to acquire a private water company that had been supplying water from Canobie Lake to parts of the community since 1889. In its early years, the system was gravity fed to areas at elevations lower than the lake, but in 1924 the Howard Street water tower and a pumping station were added to improve the distribution of water and expand the potential service area. A chlorination system was added in 1932.

The Town is effectively a water district and its legal limits of service are the boundaries of the community. However, with maintenance and modest expansion to accommodate additional users, the system that was put in place in the 1920's continued to serve the central portion of the Town for almost a half century before the construction of the Lawrence Road water tower opened an extensive additional area of the community to potential water service. More recently, a third tower was added on Spicket Hill and water extensions are planned for North Salem, particularly around Arlington Pond, and Canobie Lake. The challenge for the Town, should it wish to truly serve all potential users within its boundaries, is not just the continued expansion of capital improvements to the distribution system, but the need to conserve and augment its sources of water supply.

2. Water Supply and Treatment

As previously noted, the Town's first and continuing source of water supply is Canobie Lake. A small watershed, the majority of which lies in the Town of Windham, it solely supported the user demand until augmented by two wells in the late 1970's and early 1980's. These wells, the Turner and Donigian Wells, are on leased land and while the leases are still in effect, the wells are no longer in service. The former was found to have excessive hardness while the latter has a limited yield. Having experienced water shortages during drought conditions, the Town established an emergency connection to the water system of neighboring Methuen, Massachusetts. Past studies of the Town's water system have suggested purchasing water on a continuous basis from Methuen, but in recent times of high demand, the Methuen water treatment facility has surpassed its rated capacity. The most recent action taken by the Town to augment its source of water supply has been to construct a pipeline to transfer water from Arlington Mill Reservoir to the Town's Water Treatment Facility at Canobie Lake, adding a substantial volume of water to the Town's supply for a seven month period, from October to April each year. Tables IX-1 and IX-2 contain data relative to the capacities and current usage of Salem's water supplies.

TABLE IX-1
Salem's Water Supplies: Size and Capacity

Source	Watershed Area (acres)	Surface Water Area (acres)	Safe Yield (mgd)	Average Daily Yield (mgd)	Drought of Record Yield (mgd)
Canobie Lake	1,491.2	373.4	1.33	2.01	0.79
Arlington Pond	15,449.6	265.9	na	na	na

TABLE IX-2
Annual Water Usage, 1998-1999

Year	Pumped from Canobie Lake	% of Total	Pumped from Arlington Pond	% of Total	Total Annual Usage
1998	533 mg	63%	312 mg	37%	845 mg
1999	502.4 mg	57.7%	367.7 mg	42.3%	870.1 mg

In order to comply with the federal Safe Drinking Water Act, the Town constructed the water treatment facility on the shores of Canobie Lake in 1995. Table IX-3 provides pertinent capacity and demand data for the facility. While Canobie Lake is subject to restrictions on the recreational use of the water, Arlington Pond has no limitations. Both Canobie Lake and Arlington Pond are surrounded by intensive residential land use which rely on subsurface disposal systems. In 1997, the Town commissioned the Lakes Area Infrastructure Study in large part to determine the feasibility of extending the municipal sewer system, as well as the municipal water system to service the existing seasonal and permanent residences surrounding Arlington Pond as well as those around the Salem side of Canobie Lake. The extension of the municipal sewer system will eliminate the use of all subsurface disposal systems in these areas, thereby removing the potential for contamination of the water supply from disposal system failures.

TABLE IX-3
Water Treatment Facility Capacity and Production - 1999

Canobie Lake Water Treatment Facility	Capacity	Annual Average Daily Consumption	Maximum Daily Consumption
	6 mgd	2.3 mgd	4.88 mgd

3. Water Distribution and Storage

The Town of Salem operates and maintains 154 miles of water mains and the three water storage towers on Howard Street, Lawrence Road, and Spicket Hill. Exhibit 1 displays the key features of the current distribution system together with planned system improvements. The mains within the distribution system range in size from 4 inches to 16 inches in diameter. The relevant data for the water towers is contained in Table IX-4:

TABLE IX-4
Water Storage Facilities

Water Storage Facility	Year Built	Capacity	Overflow Elevation
Howard Street	1980	1.5 mg	346.5 ft
Lawrence Road	1974	1.5 mg	346.5 ft
Spicket Hill	1998	1.5 mg	346.5 ft

The distribution system covers approximately 57% of the Town in area, and serves an estimated 62% of the population. There are 5,755 residential water meters but some meters are for multi-family structures and for a manufactured housing parks, so that the number of dwellings served exceeds the number of residential meters. There are also 796 non-residential metered services in the system.

4. Planned System Expansions

Based on the 1997 Lakes Area Infrastructure Study, over the next five years some 33.5 miles of water mains will be added to the system. Seasonal and year round residences adjacent to Canobie Lake and Arlington Pond, as well as Millville Pond and Shadow Lake, together with other residential areas in North Salem will be added to the system as the Town proceeds with its Capital Improvements Program. These planned service expansion areas are displayed on Exhibit 5. No additional storage facilities were deemed necessary to support this expansion of the water system.

5. Identified System Concerns

One problem identified during the preparation of this Master Plan is that of sufficient water pressure on a continuing basis in order to support fire suppression in the area of Industrial Way, Northwestern Drive, and Commercial Drive. The existing Manor Parkway Booster Station can not always maintain the proper pressure, and the need for modification of the station and its service area bears investigation.

The greatest issue facing the Salem water system is the need to conserve the current supply and to seek new sources of supply in order to support the increased demand from system users, and to allow more users to be added to the system. This is an issue within Rockingham County as well, and emergency interconnections between communities are recommended at the regional level while the new sources are being sought, and conservation and protection measures are being implemented. In Salem, current supplies are estimated to meet the demand through the year 2020. The most recent study of the water system recommends the evaluation of groundwater supplies and the consideration of more aggressive conservation measures. If drought conditions occur again, having faced water shortages in the past the Town is prepared, and there is an emergency water usage policy in place which takes effect in accordance with the decline in water level in Canobie Lake.

Finally preserving the quality of the Town=s water supplies is as critical as maintaining an adequate source of supply. The recreational use restrictions for Canobie Lake have not changed for many years, and should be reviewed and revised as necessary to insure, insofar as possible, against contamination from such recreational use.

6. Non-municipal Water Supply

Those properties that are not connected to the Town's water system are dependent on private wells as a source of potable water. While some of these wells will be supplanted as the municipal system is expanded, other will be used as a water source for the foreseeable future. In recognition of this, the Town has implemented a Wellhead Protection Program.

C. The Sanitary Sewer System

1. Introduction

Salem first began to develop a sanitary sewer system in the 1960's, and constructed its own sewerage treatment facility on South Broadway. The Town has since purchased the right to pipe its sewage to the Greater Lawrence Treatment Facility and in 1987 discontinued the use of the local treatment facility. The south central area of Salem is currently served by the system and expansions are planned for North Salem, particularly around Arlington Pond, and Canobie Lake. There is adequate treatment capacity available to serve the entire community should the Town choose to extend service mains to the portion of the Town that remains unsewered. In 1981, the Town actually did develop and adopt a townwide preliminary buildout plan for the sewer system.

2. Collection and Treatment

The sanitary sewer system currently serves approximately 34% of the Town in area and an estimated 40% of the population. Ten pumping or lift stations are included in the system together with related sections of force mains in an otherwise gravity flow system consisting of 56 miles of sewer mains. A wastewater treatment capacity of 5 million gallons daily (mgd) was purchased from the Greater Lawrence Sanitary District and the Town currently has a mean daily flow of 2.3 mgd to the Treatment Facility. Exhibit 6 displays the key features of the current collection system together with planned system improvements.

3. Planned System Expansions

As previously mentioned in the analysis of the water system, the 1997 Lakes Area Infrastructure Study calls for extending some 42 miles of sewer mains and adding nine pumping stations over the next five years. Seasonal and year round residences adjacent to Canobie Lake and Arlington Pond, as well as Millville Pond and Shadow Lake, together with other residential areas in North Salem will be added to the system as the Town proceeds with its Capital Improvements Program. A key element of the proposed system is that around the lakes and ponds where a gravity sewer would be very difficult and expensive to install, a low-pressure system will be constructed with individual grinder pumps provided to each residence. These planned service expansion areas are displayed on Exhibit 6.

Another major system improvement is the proposed West Side Interceptor which will link the existing mains on Keewaydin Drive and Stiles Road to the existing system on Cross Street, thereby eliminating two pumping stations and a section of force main in Keewaydin Drive. Most

importantly, this improvement will restore capacity to the system serving the industrial areas of west Salem.

4. Identified System Concerns

The westerly side of Canobie Lake which lies in the Town of Windham is surrounded by seasonal and year round residences much like the Salem side and all of these residences are dependent on subsurface disposal systems. Windham has a reservation of 300,000 gallons per day at the Greater Lawrence Treatment Facility but currently provides no collection system in the Town. In the interest of preserving and protecting the water quality of Canobie Lake, the Town of Salem should consider approaching the Town of Windham relative to the extension of the sewer system all the way around Canobie Lake in order to eliminate the use of subsurface disposal systems proximate to the lake.

D. The Stormwater Drainage System

The municipal stormwater drainage system consists of approximately 450 culverts and a limited number of closed drainage systems which are located in residential as well as commercial and industrial areas of Salem. These closed drainage systems are comprised of catch basins and manholes linked by mains to outfalls. A Master Drainage Study was commissioned in 1988 which identified capacity and maintenance deficiencies, and contained recommendations for upgrading and replacement of one-third of the culverts. An inspection and maintenance program for the stormwater drainage system was also recommended. Retention and detention basins were cited as important to future development as was the protection of the natural stormwater storage capacity of floodplains and wetlands. Subsequent to the receipt of the Study, the Town has closely followed its prescriptions. An update of that study would assist the Town in measuring its progress on system maintenance as well as provide a contemporary assessment of the system's condition and capacity.

E. Electrical Service

Residences and businesses in Salem receive electric service from Granite State Electric Company (GSEC) which also services the Town of Pelham and parts of Windham, Derry, and Atkinson. GSEC residential and overall electric rates have been among the lowest in the State. While GSEC controls transmission and distribution facilities, it has no generating plants in the area. All areas of Salem have electric service and the Company monitors the demand in order to plan system improvements to meet any increases in demand. Recently, GSEC has installed a new 23 KV transmission line parallel to an existing line along Route 28 from the Massachusetts border to the Depot. A new substation is under construction on Hampshire Road as is the expansion of an existing substation on Trolley Lane. Most new development can be accommodated by the existing system although a development with a substantial demand could necessitate system additional improvements.

F. Natural Gas Service

Northern Utilities supplies natural gas to Salem and a number of its neighboring communities in Rockingham County. The sources of supply for natural gas are recently expanded regional transmission pipelines which pass through Salem and are ultimately connected to gas production facilities in Canada or that are otherwise remote to the region. While natural gas contributes less to meeting the New England regional energy demand as a proportion of all energy sources than it does at a national level, the improved transmission facilities and sources of supply should allow for the expansion of the use of natural gas in southern New Hampshire.

G. Communications Utilities

The range of communication services through both hard wire and wireless modes has expanded dramatically in the past few years and appears that it will continue to do so. Traditional telephone service continues along with cable television, but to these have been added broadband internet service and cellular phone service. The demand for these services has been escalating from both businesses and residents and the combination thereof - the home business.

In Salem as elsewhere in the United States, while many companies provide traditional telephone service, Verizon operates and maintains the hardwired distribution system of poles, wires, transformers, and switching equipment. In contrast, in the wireless communication system, there are several providers who maintain communication towers and related equipment.

With the recent merger of AT&T and MediaOne, the hardwired cable television system is the primary source of broadband internet service.

H. Public Utility Recommendations

XImplement more extensive water conservation measures in order to gain the maximum safe, long term utilization of the Town=s existing sources of water supply

XContinue to seek additional sources of potable water to augment the Town=s existing supplies

XReview and revise, as necessary, the recreational use restrictions on Canobie Lake in order to ensure adequate protection of the water quality

XInitiate a study, and take action accordingly, of the Manor Parkway Booster Station and its service area in order to resolve problems associated with inconsistent water pressure

XContinue with the implementation of the Lakes Area Infrastructure Plan until all recommended improvements are completed

Public Utilities

XConstruct the West Side Interceptor

XInitiate negotiations with the Town of Windham to extend sewer service to properties in Windham on the westerly side of Canobie Lake in order to eliminate the use of subsurface disposal systems proximate to the Lake

XUpdate the Master Drainage Study and continue to implement the recommendations of the same

XFacilitate continuing communication and cooperation with non-municipal public utilities in order to ensure the adequacy and expansion capability of their respective services in order to meet the demands of both current and future residents and businesses in Salem

Supporting Studies and References

XComprehensive Economic Development Strategy (CEDS), Rockingham County, NH; Rockingham Economic Development Corporation; September, 2000.

XComprehensive Source Development and Conservation Plan, Town of Salem NH; SEA Consultants, Inc.; 1996.

XLakes Area Infrastructure Study, Town of Salem NH (Draft Report); SEA Consultants, Inc.; December, 1997.

XTown of Salem New Hampshire Master Drainage Study; Weston & Sampson Engineers, Inc.; November, 1988.

XWater Supply Options for the Town of Salem, New Hampshire; G & Underwood Engineers, Inc.; June, 1986.

XWater System Master Plan for Salem, New Hampshire; SEA Consultants, Inc.; January 20, 1992.

XInterview with M. Joseph Geary, Utilities Manager, Salem Public Works Department, on October 26, 2000.

XInterviews with Rodney A. Bartlett, Director, Salem Public Works Department, on August 15 and 23, 2000.

XTelephone interview with Bill Beaupre of Granite State Electric, on October 23, 2000.