

# **PUBLIC UTILITIES**

## **I. INTRODUCTION**

This portion of the Comprehensive Plan includes a planning-level review of the:

- Wastewater Treatment/Sanitary Sewer System
- Municipal Water System
- Municipal Storm Water System; and
- Public Utilities Policies and Recommendations.

## **II. SANITARY SEWER SYSTEM**

The Alexandria Lakes Area Sanitary District provides municipal sanitary sewer services to the City of Alexandria and portions of adjacent townships. The ALASD, a special purpose regional sewer authority, was created by the state legislature in 1971. The Alexandria Lakes Area Sanitary District is comprised of seven local units of government (six townships and the City of Alexandria). The ALASD is governed by a Board with representation from each unit of government based on area population. The Board appoints a manager to administer and operate the sanitary sewer district on a daily basis.

The wastewater treatment system was placed into service in 1977. The ALASD system provides service to 9,400 accounts in 2007 and has a 100 square mile service area (including land and water), serving a population estimated at 22,500. Sewer rates are \$3.54/1,000 gallons for metered customers or a flat monthly charge of \$16.00 for single-family dwellings.

### **A. Summary of Existing Facilities**

The existing sanitary sewer facilities can be divided into two distinct components: the sewage collection system and the wastewater treatment plant. Map 8-1 depicts the current sanitary sewer collection and disposal system and is located at the end of this Chapter.

Planning for lateral sewer (i.e. collection system) is the responsibility of each unit of government. The sanitary sewer collection system within the City of Alexandria was placed into service at various times. The collection system extends to nearly all homes and businesses in the City and in the past has met demand. The sanitary sewer collection system includes a network of collection pipes with several lift stations scattered throughout the City. Improvements have been done as required to maintain the system. Limited design standards for new collection system placement are included in the City's subdivision ordinance. ALASD design standards for new collection system lines are the 10 State Standards, the Standard Utilities Specification as published by the City Engineers Association of Minnesota, special conditions and local requirements approved by the ALASD.

A mechanical activated wastewater treatment plant is located in the southwest corner of the City, just east of the Nevada Street and west of the airport. The plant was constructed in 1976 and placed into service in 1977. The mechanical treatment facility removes solids, organic compounds, nutrients and pathogens that have a degrading effect on natural water systems. The plant was designed for dry weather flow of 3.8 million gallons per day and wet weather flow of 4.8 million gallons per day. In 2006, an average of 2.7 to 2.8 million gallons per day was treated. The plant is currently operating at approximately at capacity of design but meeting permit limits. The wastewater treatment process consists of several steps as follows:

1. Preliminary treatment consisting of automatic screening and grit removal from raw wastewater.

2. Primary treatment is carried out in two 45-foot diameter concrete clarifier tanks and removes sediments from the wastewater.
3. Secondary treatment utilizes an activated sludge process which uses bacteria to convert non-settleable organic substances into oxidized products which settle into floc.
4. Tertiary treatment involves removal of remaining nutrients through a dual-media filter process.
5. Chlorination disinfects the wastewater prior to discharge.

A few private septic systems are located within the City's corporate limits. The ALASD has policies in effect which regulate abandonment of individual sewage treatment systems in accordance with Minnesota Rules Chapter 7080.

**B. Summary of Proposed Facilities**

ALASD is currently in the process of improving, replacing and adding equipment to increase the capacity of its facility from 3.75 million gallons of wastewater per day to 4.7 million gallons a day in order to accommodate Alexandria's future growth. The average daily flow of wastewater to the facility has increased from about 2.5 million gallons per day in 2002 to 2.9 million gallons in 2005. The project is expected to be complete in 2008. The completed wastewater treatment system has adequate capacity to service 2030 growth projections. New equipment is also being installed in the primary clarifiers as well as updating a centrifuge operation which converts biosolids from liquid to solid matter.

**D. Maintenance of the Sanitary Sewer System**

Lift stations are inspected annually with repair and replacement as needed. All lines are jetted or flushed at least once every five years. Clay tile sewer lines are jetted annually. Sewer and manholes are repaired or replaced as needed based on annual inspections. Routine maintenance and repair expenses are funded through an annual repair and replacement fund. Capital expenses are addressed in a seven year capital improvement fund and paid for through an Enterprise Operating Fund, the Repair and Replacement Fund or bonding.

**E. Recommendations**

1. The City shall provide maximum communication, cooperation and assistance to ALASD to ensure beneficial planning and development of facilities which provide a continued high level of service.
2. The City shall actively involve ALASD in planning for the future development of the City. Development meetings early in the subdivision process should be pursued.
3. The City and ALASD shall strive to cooperatively seek the most cost-effective and highest quality means of satisfying community needs relating to wastewater treatment.

**III. WATER**

**A. Existing Water System**

The existing water supply and distribution system was placed into service in the early 1900's. Historically, the distribution system has met Alexandria's water demands. Improvements have been performed as required to maintain the system. Because the City's topography is relatively level, the system operates under one pressure zone at 60-70 pounds-per-square inch.

Alexandria Light and Power presently obtains its raw water supply from seven (7) wells (numbers 7,8,9,10,11,12 and 13), all of which draw water from a glacial drift aquifer at depths of greater than 82 feet below the surface. The wells supply a combined firm capacity of 3,000 gallons per minute (gpm) or 2.74 million gallons of water per day. Raw water quality is generally good, although quite hard and high in iron and manganese. In 1984, volatile organic compounds (VOC's) were detected in raw water from Wells 4, 6A, and 7A (these wells have since been retired). The source of the VOC's was most likely petroleum (gasoline) contamination and solvent contamination (possibly related to disposal of dry cleaning or parts cleaning solvents) in the area of downtown Alexandria. There are several known petroleum release sites near downtown and on record with the Minnesota Pollution Control Agency.

A 3.2 million gallon water treatment was placed into service in 1997. The facility has four operating cells which primarily remove iron and manganese. The plant efficiently recovers backwash water by piping it into a settling tank where 90 percent of it is recovered. By reclaiming this water, an extra 10 million gallons of water is conserved per year. Prior to 1997, the two old filter plants had the capacity to treat only 2.8 million gallons of water per day and the backwash water had to be dumped. The plant filters and purifies approximately 1.3 million gallons each day. The treatment facility has been designed to accommodate four (4) more treatment cells giving the treatment facility the capability of servicing the City of Alexandria and 'chain of lakes' area at up to 5.1 million gallons-per-day.

Existing water storage facilities in the City of Alexandria consist of four elevated storage facilities which provide for gravitational distribution throughout the City and one underground storage facility. The elevated facilities are the 3M tower (400,000 gallons), Nokomis tower (300,000 gallons), Elm Street tower (150,000 gallons) and Industrial Park Tower (750,000 gallons). A 640,000-gallon concrete underground storage plant is located at the treatment system facility. The Victoria Heights tower has been abandoned and the Elm Street tower is currently receiving minimum maintenance and is scheduled for removal in 2008. There is not a re-use plan for the areas the towers currently occupy.

The existing water distribution system in the City of Alexandria consists of a network of mains ranging in size from four to sixteen inches in diameter. The mains are primarily constructed of cast iron and ductile iron pipe with newer sections consisting primarily of PVC pipe. Trunk lines consist primarily of ten and twelve inch mains which run north-south though the length of the City. A twelve inch trunk line is located between Lark Street and Nokomis Street on 12<sup>th</sup> Avenue. Twelve inch mains also extend to Voyager School and south from the 3M tower to the south end of the City including a crossing of Interstate 94. A twelve inch main was placed in 2<sup>nd</sup> Avenue as a part of the reconstruction project. The sanitary water system is illustrated in Map 8-2, following this Chapter.

ALP has implemented five and ten-year Capital Improvement Plans. Elements included in the CIP's are load management, high efficiency water heater rebates, fluorescent bulb recycling, water heater blankets, energy audits, customer site visits and capacitor studies. Maintenance and reconstruction expenses such as renewals and replacements are allotted for in the annual budget.

## **B. Water Utility Plans**

Alexandria Light and Power is in the process of completing a Water System Master Plan which should be finalized by the close of 2007.

The City of Alexandria has also adopted the first phase of a Wellhead Protection Plan. The purpose of a Wellhead Protection Plan is to ensure the current and future safety of the City's

drinking water supply and should include the following elements as required by the Minnesota Department of Health:

1. The delineation of the wellhead protection area and the drinking water supply management area.
2. An assessment of the vulnerability of the drinking water supply management area.
3. A review of expected changes to the physical environment, land use and surface and ground water sources.
4. A plan for the management of the wellhead protection area.
5. A plan to monitor the adequacy of wellhead protection measures and a plan to implement the wellhead protection plan.

### **Recommendations**

1. The City should update the subdivision ordinance to reference ALP design standards for water distribution systems.
2. The City shall provide maximum communication, cooperation and assistance to ALP to ensure beneficial planning and development of facilities which provide a continued high level of service.
3. The City shall actively involve ALP in planning for the future development of the City.
4. The City and ALP shall strive to cooperatively seek the most cost-effective and highest quality means of satisfying community needs relating to water supply.
5. The City should update references to Water Supply and Distribution Plans, Wellhead Protection Plans and aquifer analysis as approved by ALP.

## **V. STORM WATER UTILITY**

### **A. Existing Storm Water Facilities**

According to the 1996 National Water Quality Inventory, stormwater runoff is a leading source of water pollution. Stormwater runoff can harm surface waters such as rivers, lakes, and streams which in turn cause or contribute to water quality standards being exceeded. The City of Alexandria is committed to preserving its natural resources as evidenced by its review of storm water drainage issues and its desire to educate the public on issues relative to surface water quality.

Alexandria's Storm Water facilities include a combination of storm sewer trunk lines, pipes, channels, manholes, overland drainage ways, catch basins and ponds. A map illustrating Alexandria's storm sewer system is attached as Map 8-3.

### **B. Storm Water Plans**

As of the drafting of the Comprehensive Plan, the City of Alexandria has not adopted a comprehensive surface water management plan. The surface water management plan would be used to guide the development and expansion of the City's drainage system in a cost-effective

manner that preserves existing water resources. Possible goals of the surface water management plan include, but are not limited to: assessment of the current system; the identification of an ultimate storm drainage system for the entire City; reduction of public expenditures necessary to control excessive volumes and rates of runoff; flood prevention especially those urban in nature; identification of current and future drainage patterns; protection and enhancement of the areas natural habitat; promotion of ground water recharge; definition of all drainage outlets and reduction in erosion from surface flows.

However, in 2007 the City prepared a Storm Water management Prevention Program (SWPPP), through the management of municipal separate storm sewer systems (MS4s). Alexandria is a Designated MS4 which is defined as: any MS4 outside of urbanized areas that have been designated by the MPCA for permit coverage under Minn. R. Ch 7090 required to obtain a NPDES/SDS stormwater permit. MS4s designated by rule are cities and townships with a population of at least 10,000; and cities and townships with a population of at least 5,000 and discharging or the potential to discharge to valuable or polluted waters. These Designated MS4s were required to obtain permit coverage by February 15, 2007. MS4s are required to develop and implement a SWPPP to reduce the discharge of pollutants from their storm sewer system to the maximum extent practicable. The SWPPP must cover six minimum control measures:

- Public education and outreach;
- Public participation/involvement;
- Illicit discharge, detection and elimination;
- Construction site runoff control;
- Post-construction site runoff control; and
- Pollution prevention/good housekeeping.

The MS4 must identify best management practices (BMPs) and measurable goals associated with each minimum control measure. An annual report on the implementation of the SWPPP must be submitted each year.

### **C. Lake Winona TMDL Study**

In 1972 Congress passed the Clean Water Act (CWA), which developed standards for water quality and established programs to enact these standards. The Federal EPA, through the CWA, developed a total maximum daily load (TMDL) program to address impaired waters. Minnesota, through the Minnesota Pollution Control Agency (MPCA), is mandated to adopt and implement this program. The TMDL process involves four phases: 1) assessment and listing, 2) TMDL study, 3) implementation plan development and implementation, and 4) effectiveness monitoring. The TMDL study is a written plan that analyzes the problem and determines how water quality standards will be attained. A TMDL study identifies both point and non-point sources of each pollutant that fails to meet water quality standards.

Lake Winona was identified as being an impaired water due to excess nutrients. The project time frame is expected is from January 2006 to January 2009. Following the determination of excess nutrient impairment for Lake Winona as measured by in-lake concentrations of phosphorus, chlorophyll a and water clarity, a TMDL plan will be prepared that will result in an allocation of nutrients allowed for most sources within the watershed of Lake Winona.

### **D. Maintenance and Continuation of the Storm Water System**

Storm water pipes are currently replaced in coordination with other street and utility projects. Storm water ponds, their inlets and outlets are maintained by Public Works staff. The City has two street sweepers and completes the sweeping on a routine schedule.

The City also has a Storm Water Utility Committee comprised of six members appointed by the City Council for two year terms and three staff ex-officio members serving in an advisory capacity. In 2005, the Storm Water Utility Committee mapped all the storm water problem areas. The following proposed Phase I storm utility projects have been identified for a 15-year timeframe:

1. Dakota Street Mechanical Treatment System
2. Nevada Lane Water Quality Pond
3. SW Storm Sewer Improvements
4. Bethany Home Mechanical Treatment System
5. 8<sup>th</sup> Avenue Mechanical Treatment System
6. Knute Nelson Field Mechanical Treatment System
7. Birch Avenue Water Quality Pond
8. North Lake Victoria Mechanical Treatment System
9. North Lake Victoria Water Quality Pond
10. Nokomis Street Water Quality Pond

#### **E. Storm Water Fees**

Existing (2007) storm water fees per month per parcel are \$2.50 for single family residential, \$1.25 for duplex and \$26.92/acre for commercial users, including public and government.

The Storm Water Utility Committee met also recommends a 5-year capital improvement budget for the funds. The items for 2007 are: a) SW Storm Sewer Improvements, b) \$100,000 annual project funding, c) maintenance, and f) equipment replacement.

#### **Recommendations**

1. To protect and perpetuate the City's natural resources and because surface water management planning will be a significant investment, it is recommended the City continue to include a comprehensive surface water management plan funding line within a capital improvement program. The development of a surface water management plan should be initiated by the Storm Water Utility Committee and planning staff. It is expected the surface water management plan would be developed by a certified engineer and approved by the Department of Natural Resources. Implementation of the surface water management plan would be achieved with assistance from the City Engineer, Planning Commission and City Council.
2. The City should proceed with the minimum control measures of the MS4 implementation plan.
3. It is also recommended the City also update zoning and subdivision ordinances to include standards pertaining to on-site storm water management and erosion control plan approval processes for all commercial/industrial land disturbing activities and new residential subdivisions.
4. Educate citizens and decision-makers on the economic values of clean water resources in sustaining the local tourism industry and maintaining property values by attendance at trainings/conferences and publication of BMP's on the website, newsletters, etc.
5. Promote and regulate the use of erosion and sediment control and other best management practices to reduce the amount of sediment and nutrients entering watercourses from commercial and residential areas.