CHAPTER III: PUBLIC FACILITIES AND SERVICES

INTRODUCTION

Public facilities and services are of great importance to the general welfare of a community. Various levels of government or nonprofit private institutions either own or operate these facilities for the benefit of the community. Some of the services provided are necessities of life, such as sewer, storm sewer and water, whereas others substantially enhance the quality of life, such as schools, park and recreation facilities. Considering the continued population growth, rising living standards, increased leisure time and educational expectations, the City anticipates an increased demand for various types of public services within the planning period. Advance and systematic planning of these public facilities is essential to assuring that the City meets future demands.

SCHOOLS

BACKGROUND

The school system for the Aumsville area consists of three schools; Aumsville Elementary , Cascade Junior High and Cascade Senior High. Cascade Junior and Senior High are located four miles southwest of Aumsville, and are part of a rural school system, Cascade School District #5, serving six school districts. The schools in the district are Aumsville, Turner, Cloverdale, North Santiam, Marion and West Stayton.

Located in Aumsville, The Aumsville Elementary School was originally constructed on a 20-acre site with twelve classrooms to accommodate 300 students. By 1970, student enrollment reached 323. Four new classrooms were then added to accommodate 400 students. Again in 1974, four more classrooms were added to provide space for 500 students. By 1987 the enrollment had increased to 455. Due to increasing enrollment, the school decreased the grades it offered from K-6 to K-4. Even with this change, the enrollment has again risen to 498 in 1999, with an expected increase of 30 new students in the year 2000.

The plan for building a new school on the northern portion of the school grounds has been abandoned. In addition, the school district has gone out for a bond three separate times to raise money for increased capacity. Each time the bond has been rejected by the voters. The school district has no plans to repeat the bond election based on the lack of public support.

The land use plan allocates 27 acres for future school facilities and playground needs. This land is excluded from the city's buildable lands inventory, and is included in the 89 acres of public land listed on page one of the acknowledged urbanization element of this plan.

GOALS AND POLICIES

GOAL:

1) To insure that the school maintains and enhances quality educational opportunities.
2) Adequate access for pedestrians and bicycles be continually provided and planned.

OBJECTIVE: 1) Coordinate school facilities planning with land use planning to prevent overcrowding of the school and to avoid duplication of recreational activities.

POLICY:
1) Insure subdivision design allows for pedestrian access to school grounds.
2) Minimize vehicle and pedestrian traffic conflicts near school facilities.
3) Plan and develop school facilities expansion according to growth trends and projected population growth.
4) Support school revenue raising attempts to ensure the capacity to meet the needs of the city.
5) Maintain communication with school district concerning development projects that could impact school operations and functions.

PARKS AND RECREATION

BACKGROUND

The Aumsville park system consists of three parks totaling 9.26 acres. The playgrounds and recreation equipment of the Aumsville School is also available to the public and contributes approximately 9 acres of play area and open space to the community. The school also provides space for community meetings and sporting events. This land has not been included in the city's buildable lands inventory for goal 10 purposes, and is included in the 89 acres of public land listed on page one of the acknowledged urbanization element of this plan.

Located along 5th Street, Wildwood Park is .70 acres in area. Wildwood provides limited park service, yet fulfilling daytime recreation needs of the immediate area.

Porter Boone Park is located west of 11th Street and is nearly 4 acres in size. The community park backs up to Mill Creek where some picnicking facilities are provided. Dimensionally, the park is long and very narrow. Playground equipment is provided and maintained by the city and a combination basketball/tennis court was constructed in 1980.

In 1982, approximately 4.56 acres of land, located south of the existing Porter Boone Park, was donated to the city. The city has approved a master plan for its development as a city park and will seek grant funds to accomplish the physical development.

GOALS AND POLICIES

GOAL: 1) To conserve and protect the community's natural and scenic resources, and to provide for a variety of recreational needs of Aumsville's residents and visitors.

OBJECTIVE: 1) Prepare a recreation facility plan for the community park and seek federal and state funds for park development.

2) Develop a sitting park around the water tower at 5th and Church Streets.

POLICY:

1) Discourage dedication of parkland of less than one-half acre unless it is positioned on the edge of a subdivision and can be combined with adjoining vacant land as it develops.
2) Revenue produced for park purposes should be targeted for land acquisition and development of the community park.
3) Tree preservation and landscaping to separate conflicting uses and provide scenic and recreational opportunities is encouraged.
4) Flood hazard areas should be used to provide natural open space.
5) Promote use of a planned unit development concept where natural hazards occupy portions of a land development site.
6) New subdivisions may either dedicate land or pay money (in lieu of land) for the development of parks.
7) City shall encourage the development of private parks.

PUBLIC BUILDINGS AND SERVICES

In 1979 the Police Department Annex was constructed just north of the present City Hall, thereby relieving some space pressures. However, the structural size of the present City Hall still provides limited space for clerical personnel or an expansion of city services. As the city has constructed a community center for use as a combined council chamber/ community meeting place, it is recommended that the City develop a community center and the development of a sitting park around the water tower at 5th and Church streets. The area should serve as a focal point for future commercial development. Street improvements and landscaping earlier recommended would further complement attraction for the area.

The Aumsville Rural Fire Department does not anticipate additional facility needs in the city. Continued development in the Shaw area has already required the construction of a substation.

COMMUNITY APPEARANCE

Some degree of community attractiveness can result through implementation of the objectives and policies of this Comprehensive Plan, and use of the city's zoning and subdivision ordinances. However, the combined efforts with the community are required to enhance the aesthetics of Aumsville.

The attractiveness of the major streets within and entering the city can be enhanced through use of landscaping and tree planting. Both property owner pride and the city's use of its landscaping requirements can accomplish the goal.
Again, the street improvements, street landscaping and the addition of a fully developed park could provide the impetus for other aesthetic improvements. Community pride can transcend the maintenance of private property through city or a civic organization sponsorship of a local fix-up

and paint-up campaign in addition to the already city-sponsored clean-up week. Private and city participation in a Home Rehabilitation Program should provide incentive for an active housing-maintenance-awareness program in Aumsville.

The cumulative effect will be an individual's sense of place; a city that not only is home, but has places to shop, recreate and work in an attractive rural community.

GOALS AND POLICIES

GOAL: 1) To improve and enhance the community's appearance.

OBJECTIVE: 1) Develop beautification plans for downtown and residential areas.

2) Create mechanisms to ensure revitalization of the downtown and residential areas.

POLICIES: **1) Acquire funding and develops a downtown and street beautification plan.**

2) Create a committee responsible for spearheading the beautification of Aumsville.

3) Develop design guidelines for future development on Main Street.

SOLID WASTE DISPOSAL

It is important for the city to participate in a regional solid waste management program. Sites that fulfill the criteria for solid waste disposal and that are acceptable to the public are scarce in the Mid-Willamette Valley region. As a result, Aumsville will participate in a regional solid waste management program that maximizes the use of existing sites, endorses energy conservation and recycling of wastes, and the coordination of solid waste activities of counties in the region. Therefore, the City has adopts the following policy: *Aumsville continues to support a regional solid waste management program that includes recycling opportunities.*

SANITARY SEWER, WATER & STORM DRAINAGE SYSTEMS

This element of the Comprehensive Plan is intended to be used as a guide for urban development and the provision of capital improvements. Urban growth should be limited to areas where public sewer and water are already provided or can be economically and efficiently provided.

Note: Much of the information provided for the sanitary sewer and the water system comes from the master plans recently developed for each of these two infrastructure facilities. While a general description is provided of the existing systems, system deficiencies, and the required corrections or expansions, the Water System Master Plan completed in March of 1998 by J.M.S. Engineering, and the Wastewater Facilities Plan completed in March of 1999 by Balfour Consulting, Inc. should be relied on for complete and accurate information. Please refer to these documents specifically in regard to cost estimates for public facility projects, discussions of existing and future funding mechanisms and their ability to fund public facility projects and systems, and the scheduling of these improvements and projects .

OVERALL GOAL: To plan, develop and provide a timely, orderly, and efficient arrangement of public facilities and services in a coordinated, efficient and economical manner to serve as a framework for urban development.

OVERALL OBJECTIVE:

1) ***Maintain and enhance the quality of public facilities and services, and provide them in a timely cost-effective manner.***
2) ***Direct new development to locations where facilities and services exist, or to buildable areas adjacent to the existing service area.***

OVERALL POLICY:

1) The sizing and location of sewer, water and storm drainage lines is to reflect the requirements of desired land use arrangements and densities of the service area.
2) Utilize the provision of community facilities and services as a guide to urban development by phasing and directing growth based on facility and service capability and capacity.
3) Encourage development of vacant land within the city prior to urbanization of rural land within the urban growth boundary so as to achieve maximum utilization of public investment.
4) The installation, repair or resizing of municipal service lines should be done prior to, or concurrent with street improvements.

WASTEWATER/ SANITARY SEWER SYSTEM

BACKGROUND AND SYSTEM OVERVIEW

Note: For information and discussion on waste and process discharges from future development and their impact when combined with existing development, please refer to the Wastewater Facility Plan completed in March of 1999 by Balfour Consulting, Inc. (WWFP).

The City of Aumsville converted from a sewer system consisting of septic tanks with drain fields to a municipal sanitary sewer system, including a gravity collection system and lagoon treatment plant, in the late 1960's. A study, conducted in 1997 by Balfour Consulting, Inc., P.E.'s resulted in the Wastewater Facilities Plan submitted for final approval in March of 1999.

The existing Wastewater System Characteristics are as follows:

- Service Area - The sewage service area encompasses the City of Aumsville and the area within its Urban Growth Boundary.

- Collection System - The existing collection system consists of approximately 52,400 feet of buried piping, ranging in size from 6 to 10-inches in diameter. The majority of the collection pipes are 8-inch diameter. The existing 10-inch sewer main trunk line has a calculated maximum capacity of 2.16 MGD, compared to a projected design flow rate (20-year PIF) of 8.05 MGD.

  Although videotapes indicate the collection system is in relatively good shape with few leaks, limited flow monitoring data suggests a more significant I&I problem. Flow reductions up to 10-20 percent may be possible by maintaining a modest I&I reduction program.

- Treatment Plant Influent Pump Station - The City has one pump station, located at the wastewater treatment facility. This influent pump station has a capacity of 0.9 MGD with one pump operating, and 1.8 MGD with two pumps operating. The projected design flow (20-year PIF) is 8.05 MGD. The existing wetwell has insufficient capacity to handle future design flows.

- Wastewater Treatment Plant - The City operates a facultative lagoon wastewater treatment facility. The effluent is disinfected with chlorine gas and routed through a contact chamber. The treatment facility was originally constructed in the late 1960s and expanded in the 1970s.

  Although the lagoon treatment plant is currently capable of meeting the 30/50 wastewater discharge limits stipulated in the City's NPDES permit, the plant has not had sufficient capacity to store all of the flow collected over the six-month dry weather period in the recent past.

- Effluent Disposal - During the wet season months (November through April), chlorinated effluent is discharged into Beaver Creek via a gravity outfall located adjacent to the treatment plant. During the remainder of the year (May through October), no discharge is permitted and the wastewater is stored in the treatment plant lagoons.

- Biosolids Management - Biosolids have not been removed from the primary lagoons since their last upgrade in the 1970s. Typically, sludge should be removed from primary facultative lagoons every 10 to 20 years.

Map 3.1: Sewer Map

CURRENT SEWER SYSTEM

WASTEWATER TREATMENT PLANT

Pretreatment

No pretreatment is conducted at the WWTP. Ektron, a metals finishing facility, is the only facility discharging an industrial wastewater in Aumsville. Ektron reportedly pretreats its wastewater prior to discharging to the collection system.

Influent Lift Station

Wastewater from the collection system is discharged into the WWTP through an influent lift station. The influent pump station is a duplex submersible station.

The pump station has performed reasonably well in recent times, requiring only routine maintenance such as wet well cleaning and sealing to control grease buildup. The pump station has, however, reached its capacity. During major rainfall events it discharges at its full 1.8 mgd capacity and is not always able to handle all of the influent generated within the collection basin. When this occurs, the main trunk line into the WWTP surcharges and sewage overflows along Michael Way. There is no direct bypass line from the pump station to the creek. The wet well appears to be in generally good condition, and could possible be incorporated into future expansions.

Influent Metering/Sampling

Wastewater flows from the influent pump station into the WWTP through a 6-inch Parshall flume. This device measures all flow routed into the plant.

Primary Treatment

The primary treatment of wastewater is accomplished within two facultative lagoons. These types of lagoons operate with separate aerobic and anaerobic zones. The aerobic environment occurs in approximately the upper 80% of the lagoon, but must be adjusted according to the sludge level in the pond. The anaerobic zone, located in the lower depths of the lagoon, contains only anaerobic bacteria that use the settled wastes (BOD) and chemically bound oxygen for metabolism.

The two primary cells were originally designed for primary and secondary treatment. Modifications completed in 1978 added a new secondary treatment cell and a new tertiary treatment cell, and converted the existing secondary treatment cell into a primary treatment cell.

Secondary/Tertiary Treatment

Secondary and tertiary treatment of the wastewater is accomplished in two facultative lagoons located north of the primary cells. The primary and secondary/tertiary cells are separated by Beaver Creek, which flows southeast to northwest across the site. Wastewater is transferred between the primary and secondary cells via a 10-inch diameter cast iron pipeline routed beneath the creek. The creek crossing is accomplished with an inverted siphon. The secondary and tertiary lagoons connect through a 10-inch diameter pipeline. Each cell operates in series.

Over the past few years the ability of the lagoons to provide high quality effluent appears to be decreasing. It is possible that the long storage times during the summer are adversely impacting the primary cells, due to organic overload and little flow through the cells.

Although the lagoon treatment plant is currently capable of meeting the 30/50 wastewater discharge limits stipulated in the City's NPDES permit, the plant has not had sufficient capacity to store all of the flow collected over the six-month dry weather period in the recent past. For two of the last three years, the lagoons have become so full that the integrity of the dikes was threatened. To alleviate pressure on the dikes, effluent was discharged to Beaver Creek (directly or via the storm drain system) outside of the permitted discharge period. The City has received two notices of noncompliance (NONs) from the DEQ related to these discharges. A third notice from the DEQ will trigger a regulatory enforcement program that would place the City under mandatory order to implement corrections necessary to prevent future violations.

Disinfection System

Treated wastewater flows from the tertiary lagoon outlet structure, located in the southwest corner of the lagoon, through a 12-inch diameter cast iron pipe into a mixing vault, then into a chlorine contact chamber. The outfall is an open pipe on the bank above the normal stream water surface.

Effluent Sampling/Metering

The disinfected effluent flows from the chlorine contact chamber over a flow measuring weir into a 12-inch outfall pipe and is discharged into Beaver Creek. Total flow is continuously recorded.

Biosolids

Biosolids, also known as sludge, accumulate in each of the four (4) lagoons and stabilize through anaerobic treatment. This is the standard means of sludge storage in facultative lagoon wastewater treatment plants. Sludge should be removed from a lagoon once every ten to twenty years.

To date, sludge has not been removed from any of the lagoons at the WWTP. The volume of sludge in the lagoons has reportedly not been measured. Sludge accumulation in the primary cells will reduce the lagoon volume available for storage and treatment. The accumulation of biosolids within the primary lagoons will need to be addressed in the near future.

Effluent Disposal
Winter Discharge

Effluent is discharged into Beaver Creek between November 1 and April 30. The City's current permit limits the affluent concentrations of BOD and TSS to less than 30 mg/l and 50 mg/l, respectively. While the discharge currently meets this criteria, an expansion of the treatment facilities could lead to more stringent permit limitations.

Summer Discharge

No discharge is permitted from May 1 to October 31. During this time, the lagoons serve as detention basins.

MAJOR SYSTEM NEEDS AND DEFICIENCIES

- Collection System - In order to accommodate the projected future flows, replace the existing 10-inch diameter main trunk line sewer with a 24-inch diameter PVC sewer pipe between the influent lift station and manhole A-3.

  Conduct sewer system flow monitoring during significant rainfall with high groundwater events. Measure flow from manhole to manhole in high flow basins to identify specific pipe reaches within the system where high flows are found to exist and clarify where these problems can possibly be corrected.

- Treatment Plant Influent Pump Station - The influent lift station is currently at capacity and requires replacement. Install a pump station with a minimum capacity of 8.05 MGD, and a new 10 to 12-foot diameter wetwell. Install a new 16-inch forcemain to route the flow into the headworks.

- Wastewater Treatment Plant - The plant does not have sufficient capacity to meet the projected growth within the 20 year planning period (see WWFP), and has been unable to store all of the flow collected over the six-month dry weather period for two of the last three years. The lagoons have become so full that the integrity of the dikes was threatened and effluent was discharged to the river outside of the permitted discharge period. The City has received two notices of noncompliance (NONs) from the DEQ related to these discharges.

- Disinfection - The volume of the chlorine contact chamber is not sufficient to provide the required detention time for the current discharge flow rates. The flash mixer is no longer in operation. The receiving stream, Beaver Creek, is effluent dominated and may not provide sufficient dilution for a chlorinated discharge.

- Effluent Disposal (November-April) - The outfall pipe discharges on the bank of the creek, above the normal water surface. The outfall to the creek must be upgraded to discharge below the normal water surface and to provide better mixing.

- Effluent Disposal (May-October) - The treatment facility has not had sufficient capacity to store all of the flow collected over the six-month dry weather period in the recent past. The City should immediately implement a reclaimed water irrigation system, coordinating with the DEQ to meet both current and future demands.

- Biosolids Management - Remove biosolids from the existing primary lagoons to accommodate construction of plant upgrades and to achieve the required storage and treatment capacity. Land apply the biosolids on nearby agricultural land.

RECOMMENDED IMPROVEMENTS

The City's new wastewater facilities plan presents a number of system deficiencies that inhibit the City's ability to comply with the existing and projected future wastewater discharge permit requirements. The facilities plan shows a conceptual layout of the preferred treatment alternative and summarizes the design criteria. Total system costs, including operation and maintenance costs, and salvage value, are shown in Tables 7-3 and 7-4 of the Facilities Plan. The following projects for upgrading the wastewater collection and treatment system are recommended.

Collection System: A new 24-inch diameter trunk line to be constructed from manhole A-3 to the influent lift station.

Influent Pump Station: A new influent pump station to convey the forecast peak flow for the year 2017.

Headworks: The headworks will be upgraded, including a self-cleaning mechanical screen, a new Parshall flume, and new or upgraded sampling equipment. A new building would be constructed to house the electrical controls, samplers, and influent pump station generator. The building would be insulated to minimize past electrical problems during the warmer summer months.

Primary/Secondary Treatment: Two aerated lagoons constructed within the existing primary lagoons. The existing tertiary lagoon will be utilized as a final settling lagoon. The existing secondary lagoon would not be specifically used in this upgrade, however, it could serve as a surge basin, a storage basin for effluent irrigation, or as a sludge lagoon. With the lagoon modifications, additional rip-rap would be placed around the perimeter. Transfer piping would be constructed to allow for flexibility in system operations, and staff gauges would be installed to monitor pond depth.

Tertiary Treatment: A filtration system will be constructed to remove excess TSS, including algae, to meet the year 2017 effluent TSS requirements. A filtration system is typically designed

to treat peak hourly flows. In this case, the equalization through the lagoons will buffer peak flows. The proposed filtration system will be sized to treat the MMWWF in the year 2017.

Disinfection: The existing disinfectant will be upgraded to liquid chlorine. In addition, the flash mixer must be upgraded and contact basin expanded. The effluent will need to be de-chlorinated prior to discharge to Beaver Creek.

Winter Effluent Disposal: The treated effluent will continue to be discharged to Beaver Creek during the winter. A new gravity outfall pipeline will be constructed to Beaver Creek.

Summer Effluent Disposal: To alleviate hydraulic pressures on the wastewater treatment plan, a new land application system for a poplar tree crop will be constructed to dispose of wastewater during the summer. Poplar trees are the recommended crop. A new effluent pumping station and forcemain will be designed to deliver the treated effluent to the irrigation site.

Existing Biosolids Removal: The existing lagoons have never been cleaned of biosolids. The volume of biosolids in the lagoons needs to be measured during pre-design, and the biosolids will need to be removed prior to construction of the lagoon upgrades.

Biosolids Treatment and Disposal: Biosolids will settle and be treated within the upgraded lagoons. The City will need to remove the accumulated sludge periodically. The time frame will be determined through a sludge inventory.

Miscellaneous: With any major upgrade to the WWTP, there are ancillary improvements that are necessary. Included would be additional lab equipment, general improvements to the maintenance facilities and buildings (such as shop lighting, a washer and dryer, more efficient HVAC, etc.), and building expansions to house control and electrical equipment.

SEWER SYSTEM GOALS AND POLICIES*:*

GOAL:

1) To continue a program for sanitary sewer service that represents the most cost-effective approach for providing service to existing and future residents.

OBJECTIVE:

1) Strive for the most cost-effective approach to provide sewage treatment capacity that accommodates the projected year 2017 sewerage flows, and that meets the objectives of DEQ's state water quality management plan.
2) Urban development should be confined to the limits of the gravity flow sewer system within the urban growth boundary.
3) Consider an increase of connection fees, system development charges and monthly charges to help finance maintenance of sewer systems.

POLICY:

1) Encourage development of land within the gravity flow areas when expanding or connecting to the City's waste water facilities
2) Review all development proposals with regard to its impact on the treatment system.
3) The sizing and location of wastewater line is to reflect the requirements of the desired land use arrangements and densities of the service area
4) Review all development proposals with regard to their impact on the waste water treatment system.

WATER SYSTEM

EXISTING WATER SYSTEM

Water Supply Sources

The Aumsville water system currently depends on four individual ground water wells for its water supply. All wells are used on a rotating basis during periods of normal demand; continuous as required during periods of high demand. Boone Well #1 and Boone Well #2 are located in the southwesterly portion of the city, in Boone Park; New Well is located adjacent to the 1 MG reservoir in the southeasterly portion of the city.

The wells produce a current combined total of 630 GPM. The City holds additional water rights on Boone #2 of 217 GPM above its current pumping capacity of 240 GPM. Baker Well (currently not in use) has water use registration that pre-dates the 1955 Water Law, therefore these water rights cannot be transferred to a new well. Boone #2 is the only well obtaining water from the deeper Columbia Basalt Formation; the remaining three wells obtain water from the shallower alluvials.

Storage Facilities

The City water system uses two water storage reservoirs in the distribution system: one 100,000 gallon (0.1 MG) elevated steel reservoir built in 1964, and one 1,000,000 gallon (1 MG) on-ground, welded steel reservoir built in 1982, the same time as the booster pumping station. The elevated tank plays a key role in the distribution system. Being 120 feet high to overflow, it provides the pressure gradient for the distribution system. It is in good overall condition, although the interior needs to be scheduled for repainting.

The 1 MG reservoir is in very good condition. It is on a regular maintenance schedule for cleaning, and as it has cathodic protection for corrosion, the interior and exterior coatings are in very good condition after nearly sixteen years of service. The booster pumping station and Reservoir Well are also located adjacent to this reservoir. A chain link fence with a locked gate surrounds the facilities at this site.

Distribution System

The distribution system utilizes a variety of pipe sizes and types: PVC= polyvinyl chloride; DI= ductile iron; AC= asbestos cement; Stl= steel. An inventory of the existing distribution system is shown in Table 2-3 of the Water System Master Plan. The total estimated length of the distribution system is 60,614 feet or 11.5 miles.

The isolation valving in the distribution system is inadequate in several areas of the system. This causes the system operator to shut down much more of the system than is necessary in order to make repairs. A program has been implemented to add/replace several gate valves during each budget year.

The distribution system pressure ranges from 44 PSI to 56 PSI due to the elevation differences within the City. Other than aeration at Boone #2 for removal of hydrogen sulfide, no water treatment is currently required.

A review of fire hydrant placement shows general conformance to local fire department standards IE: Maximum spacing between hydrants not to exceed 500'. A program has been implemented to replace several older, out-dated hydrants during each budget year.

System Operation

All wells, except the Reservoir Well, pump directly into the distribution system. The Reservoir Well is located adjacent to, and pumps directly into, the 1 MG Reservoir. Excess water beyond the user demands fills the overhead reservoir and 1 MG reservoir. A booster pumping station is located adjacent to the 1 MG Reservoir. It utilizes two 20 HP centrifugal pumps (475 GPM each) to maintain the water level of the overhead reservoir, as well as meet the demands of the distribution system. When the level in the 1 MG reservoir declines, the wells are then called on to re-fill the reservoir(s).

Map 3.2: Water Map

Fire Flows

Evaluation to establish fire protection ratings are based on a limited level of potential fire problems. Any building with a required fire flow of 2,500 GPM or greater, as well as fully sprinkled buildings are not considered when establishing a community's protection class, except for response distance. Therefore, any building needing more than 2,500 GPM for fire protection will require responsibility by the individual owner to provide that flow.

For further information and discussion on fire flows, please refer to the Water System Master Plan completed in March of 1998 by JMS Engineering.

WATER REQUIREMENTS

Current Water Requirements

Current water connections (726 metered services) consist of 91% domestic, 7% commercial, 1% industrial and 1% public. The City's current average daily demand of water is approximately 280,000 gallons per day which is equal to 110 gallons per capita per day, including water lost through line leakage. The gallons per capita usage is normal for a city the size of Aumsville. The current maximum day demand (usually occurring in the summer months) is approximately 900,000 gallons per day, an increase of 3.21 times the average day demand. System leakage and non-revenue water is currently estimated to be 13%-20%. An effort should be made to reduce this leakage to around 10%. The current available water sources are capable of meeting current maximum day demand. The City should emphasize water conservation and implement a program to reduce the per capita consumption by at least 10%.

Future Water Requirements

Average daily water demand is projected to rise to 750,000 gallons per day with a maximum day water demand of 2,250,000 gallons by year 2017. Based on these projected water demands, as shown on Table 4-3 within the Water System Master Plan, the current total combined capacity of 630 GPM/0.91 MGD will meet the Average Day Demand until the year 2017. However, there is a substantial shortfall in attempting to meet the Maximum Day Demand directly from the wells. For the sake of economy, a combination of well capacity and adequate storage must be developed to meet the Maximum Day Demands.

Future Water Sources

Connection to City of Salem Transmission Line: The water transmission line serving as the main supply line for the City of Salem passes about one-half mile south of Aumsville. The City of Turner also receives its water supply from this line, mainly because it and other water line control facilities are located in Turner. This line is currently in the pre-design stages for installation of a new, larger 54" water line, replacing the existing 36" water line, in order to serve the future needs of Salem. (See Figure 5-1.) Generally, Salem has been very reluctant to serve new outside users. However, preliminary discussions with Salem Public Works indicate there may be a possibility of connecting to the new water line, to be used on an emergency basis.

Additional Wells: The City has traditionally relied on wells for its water supply. They have been a dependable source of adequate, good quality water. The advantage to a well is that it can be located near the point of use and can be constructed in 6 to 8 months. It can be added to the system as the City grows and needs the additional water. A well located within the Urban Growth Boundary would be the most desirable as it would be located close to the area of demand.

Recommended Plan

Based on the previous review of available water supply sources, the City will continue to rely on groundwater sources.

Boone Well #2: This well is the best producing well within the Aumsville supply system. Due to previous power supply restraints, the well was developed to maximize the existing power service. The well was test pumped in 1996 at a sustained rate of 380 GPM. As it is currently being used at 240 GPM, an additional 140 GPM is available for a relatively low cost. A new larger electrical service will have to be installed, along with a larger well pump, an additional hydrogen sulfide removal unit and larger high service pump.

Oregon Park Development Well Site: The owners of Windemere Estates, a manufactured home park located adjacent to the 1 MG reservoir, gave the City the right to drill a test hole(s) on their undeveloped property located to the north of their development. If the test hole(s) show that water is available, property for a well site will be given to the City at no charge. There are no well logs on file at Water Resources for this immediate area, but based on the formations encountered when drilling the Reservoir Well, a correctly developed, gravel-packed screened well could produce 150-180 GPM.

The City's wells have a total combined flow of 630 GPM. By increasing the current flows of Boone #2 by 140 GPM, to a total flow of 380 GPM, it will bring this well to its permitted flow. The increased flow will require an additional aeration chamber be constructed to remove the likely increase in Hydrogen Sulfide. An additional well is proposed to be drilled in the area north of Windemere Estates where a well site will be donated to the City. A test hole(s) should be drilled to determine if water is available. This work should increase the available water source by approximately 265 GPM; for a total of 895 GPM. This should meet the system demands until year 2003. The City, in the mean time, should be considering additional well sites, and after successful test drilling, secure these sites for addition to the system in the future.

WATER STORAGE

Water storage is provided in the water system for several reasons:

- To equalize supply and demand for daily flow fluctuations, maximum day and peak hour requirements.

- To provide emergency reserve supply during pipeline breaks, well failures and power outages.

- To provide for fire protection.

Required Storage Volume

In determining the required storage volume, the following factors must be considered:

Operational Storage: Operational storage provides reserve water during the ups and downs in the system demand that occur within one day of normal operation. This reserve storage is used to allow the sources to pump at a continuous rate. Since Aumsville consists of mostly residential and light commercial demands, a factor of 25% of maximum day demand (commonly used for systems similar to Aumsville's) will be used.

Fire Protection Storage: As discussed in Chapter 4 of Water System Mater Plan, the quantity of water required for effective fire fighting varies according to population and type of development. The quantity of water required for the present and future fire flow storage is shown in Table 4-4 of the Water System Master Plan.

Water Storage Requirements

The total amount of required water storage is the sum of the individual storage requirements as outlined above. The required storage is shown on the Table below.

Table 3.1 Future Water Storage Requirements

	1997	2002	2007	2012	2017
Operational Storage	230,000	310,000	420,000	480,000	560,000
Fire Reserve Storage	403,040	465,690	538,420	578,080	619,200
Reserve Emergency Storage	620,000	820,000	1,120,000	1,280,000	1,500,000
Total Req'd Storage	1,253,040	1,595,690	2,078,420	2,338,080	2,679,200
LESS Avail. Storage	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000
Total (Deficit)	(153,040)	(495,690)	(978,420)	(1,238,000)	(1,579,200)

The available water storage of 1,100,000 gallons is slightly deficient for current fire flow demands. The City should start planning to add an additional 1,500,000 gallons of storage by year 2003. It is recommended the new reservoir be sited near the Boone Park Wells. Then, if in the future mandatory disinfection is required, costs would be minimized to construct a separate raw water line directly into the new reservoir. This will be needed in order to meet the detention time requirements.

Water Quality Considerations

The City of Aumsville, by virtue of its population and number of services, is classified as a "Community Water System" serving less than 3,300 people. Water quality issues will have significant impact on groundwater sources over the next decade. Strict new regulations and monitoring requirements are presently in effect, with more to be enacted in the 2-7 years. Many of these regulations apply to surface water and groundwater sources, while some apply to one type of source.

Since the City of Aumsville uses groundwater exclusively, recent changes to the Safe Water Drinking Act affecting surface water supplies have little or no impact to Aumsville. Proposed regulations due in 1999-2002, however, may require mandatory disinfection of groundwater sources. In addition, new monitoring requirements for synthetic and volatile organic contaminants will represent an expensive and time consuming task for all water systems.

PROPOSED IMPROVEMENTS

Proposed Storage System Improvements

Given the current storage deficit of 153,040 gallons, it is apparent that the City will need to begin planning to add water storage to the system within the next 2-3 years. It is recommended that a 1,500,000 gallon reservoir be added to the system. A site will have to be chosen and obtained to site the proposed storage facilities. A booster pumping station, similar to the one adjacent to the 1 MG reservoir, would also be required to match the system operating head. Estimated cost for a new 1.5 MG reservoir and booster pumping station is $879,500.00. The City is advised to begin planning for these facilities within the next year

Proposed Distribution System Improvements

Recommended distribution system improvements are shown in the Water System Master Plan. Distribution system improvements designated as Priority 'A' should be completed within the next several years. These improvements will provide critical system looping at 11th and Main Streets, and up-sizing of a short segment of waterline on Delmar to increase fire flows to the elementary school area.

Distribution system improvements designated as Priority 'B' should be completed as development occurs in the northwesterly portion of the City. These improvements will provide basic water service, as well as system looping that will increase fire flows to this area.

WATER SYSTEM GOALS AND POLICIES:

GOALS:

1) To maintain and enhance the quality of water service to all customers.
2) To conserve water and encourage its wise use.

OBJECTIVES:

1) Implement the water facilities plan completed in January of 1998.
2) Increase monthly water rates commensurate with the need to conserve water, and increase overage beyond base rates for residential and commercial users, to pay for future needed improvements.
3) Replace undersized distribution lines in the original townsite.
4) Secure additional well sites to ensure water supply.

POLICIES:

1) All land use developments are required to install distribution lines that will provide at least, minimum water pressure and flow for the proposed land use and future land uses.
2) To maintain adequate water flow and pressure, the City continually strives to loop the system and require a standard pipe size based upon the level of development
3) The City will acquire additional well sites including OPD well site or others as identified.

STORM DRAINAGE SYSTEM

The direction of surface drainage in the Aumsville area is generally to the north, south and west. Surface drainage, is for the most part, discharged into Beaver Creek and Mill Creek. Surface water movement is not easily discernible due to the area's gently sloping topography. Storm drainage in the city is handled by both a piped drainage system and surface draining. The original townsite relies, for the most part on surface drainage into open ditches.

Soils of the area have a high water table within one foot of the surface in some places, and are also rated by the Soil Conservation Service as having a high water runoff potential. Such conditions necessitate the need of a storm drainage system.

Storm drainage is handled by both a pipe system and surface draining. The newer developed section of the city is provided with a piped system that discharges storm water into Beaver Creek. The original townsite has several storm drainage lines, but mostly relies on surface drainage into open ditches. Development policies of the Comprehensive Plan for infilling within the original townsite will require an improved storm drainage system. Available federal or state funds should be targeted for improvement of this system.

The City has recently received a grant from the Oregon Department of Economic Development to help fund a storm water drainage system master plan. The grant has been awarded and the City has hired an engineering consulting firm. Work on the plan should be completed in spring of 1999. Upon completion and adoption, the City plans to utilize this plan as a portion of this document.

SEPARATION OF WASTE WATER AND STORM WATER. The Department of Environmental Quality requires cities to separate their storm drainage from their sanitary sewage. The design of sanitary sewer systems allows for the collection and treatment of sanitary sewage only. The introduction of ground water into the system reduces the capacity of the collection system pipes to carry the flow. The unwelcome water also impacts the size of the treatment plant and the cost of operating the sewerage system. The term infiltration and inflow (I & I) refers to this introduction of unwanted surface or groundwater into the sewage system.

INFLOW. The definition of inflow is rain water entering the collection system through direct connections with storm water facilities. Facilities include such things as catch basins, roof drains, area drains, storm drainage pipes, perforated drainage, etc. The City considers these connections illegal and in violation of the City Code but they do continue to exist. Some are unknown to the City while others continue because no other economic solution exists to remove the storm water.

INFILTRATION. Infiltration is the term for groundwater that enters the sanitary system through leaky pipe joints, cracked or broken pipe, leaking manholes, etc. Trunk sewers, collectors, and house lateral sewers are the source of flow. The soils in Aumsville vary considerably from one location to another. The relatively flat areas on the existing or ancient flood plains of the North Santiam River and Mill Creek have generally gravely silty soils that are well drained and quickly transmit groundwater to the pipeline. The clay soils found in Aumsville are less porous but the gravel backfill in the sewer trenches act as a French drain collecting ground water and conveying it to any pipe or manhole opening.

CORRECTING INFLOW. Inflow can be relatively inexpensive to correct if simple disconnection corrects the problem. The City should make corrections as the City discovers inflow.

CORRECTING INFILTRATION. Infiltration correction can be highly cost effective if isolated leaks can be identified and when repaired will actually and significantly reduce flows. Continued correction tends to reach a point of diminishing returns where the corrections cost much more than transporting and treating storm water. To cure the leakage problem, it may in some cases require replacing the street lateral, the manholes, and service lateral. The City may find replacement cost effective in small areas, however, the City cannot consider repair of larger system segments cost-effective.

Infiltration correction can be a never ending process but is necessary maintenance procedure of any municipal sewer system. Any sewer system will continue to deteriorate over time. An ongoing I & I correction program allows the storm groundwater to become stabilized; otherwise these flows will steadily increase. An on-going program or rehabilitation also maintains the system's structural integrity for an indefinite period--beyond the original design life of the pipe system.

STORM DRAINAGE SYSTEM GOALS AND POLICIES:

GOAL: 1) That existing and future development areas be provided with an adequate storm drainage system.

OBJECTIVE: 1) Adopt and implement the storm drainage master plan due to be completed in spring of 1999.

2) Upgrade the storm drainage system in the original townsite concurrent with street improvements.

POLICY: 1) All storm drainage is to be channeled into an effective storm drainage system.

2) All new developments shall install engineered and City approved storm drainage facilities along with other improvements.