

# Bossier Plan Chapter 8

## Utilities & Infrastructure

Public utilities and infrastructure includes all piping systems and facilities that are used to distribute, collect, transmit, control, or dispose of drinking water, stormwater and sewage (wastewater). The extension of utility services into future growth areas determines whether or not quality, sustainable growth can occur in these areas. More, upgrades of utilities in developed areas assure that the required level of service will be maintained as further development and infill occurs. The expansion of potable water, wastewater, and stormwater facilities is necessary to support the desired economic potential of Bossier City and Bossier Parish and to meet the increased utility demands of a growing population for the next twenty years and beyond.

To encourage quality growth, the utility systems must meet certain requirements. There should be a reliable, safe and adequate supply source of treatable water. Drinking water should meet minimum standards for taste, odor, color and hardness and be in compliance with the legal limits of health risk contaminants as regulated by the Environmental Protection Agency (EPA) under the Safe Drinking Water Act (SDWA). The public owned water supply (POWS) should be adequate to meet all domestic, industrial, commercial, and fire protection needs. Standards for rural areas must also assure water quality and domestic supply and provide fire flow levels consistent with low density urban residential areas. Adequate drainage and flood protection should be afforded to all developed areas to avoid disaster and to maintain accessibility. Sewer collection systems should be capable of delivering wastewater discharges from household, commercial and industrial connection points to the wastewater treatment facility with minimum stormwater inflow and groundwater infiltration and no risk for environmental contamination. All gaps, breaks or other defects in the sewer system, which allow the wastewater stream to have potential contact with the potable water or stormwater drainage systems, should be eliminated to protect public health and the environment.

The Utilities element of the Bossier Plan contains many of the issues and

concerns of public officials who are charged with maintenance and operation of their utilities, engineering, public funds allocation and capital improvements as well as review of private development proposals and regulation of other public and private utility services. Public officials and supervisory personnel from Bossier City and Bossier Parish provided much of the information contained herein regarding existing infrastructure issues, conditions, capacities, administration, supervision, personnel, technical training, codes, standards, ordinances and regulatory compliance. In addition, concerns and issues from citizens recorded during public meetings are included.

The Land Use element of the Bossier Plan identifies where growth is most likely to occur based on uses that will meet the needs and desires of the community. Utilities' planning takes into account that a significant portion of total growth will not necessarily take place on vacant property, but in areas already developed or in areas of potential revitalization. Constraints such as the Red River levee, Barksdale Air Force Air Installation Compatibility Use Zone (AICUZ), environmentally sensitive areas and flood prone areas should serve to confine the growth pattern on vacant land to areas with quality access and an elevation above the 100-year flood plain.

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The Utilities element includes goals, objectives and actions, which provide a framework for plans to address existing issues and problems as well as to prepare for future expansion and infill. It should be used as a guide for decision making with regard to the provision of adequate utilities in future areas of growth so as not to hinder development potential. The Utilities element consists of six general sections including:

- ◆ Water and sewer, flooding and stormwater Issues as raised by concerned citizens, City and Parish officials, and utility department operating and maintenance personnel;
- ◆ Related studies and ordinances;
- ◆ Goals, objectives and action statements that address utility issues;
- ◆ Existing system conditions and capacities;
- ◆ Details of the Master Plan including specific recommendations; and,
- ◆ Funding sources available to implement recommendations.

### Utilities, Flooding and Stormwater Drainage Issues

As determined from comments obtained during an interview process with City and Parish officials and utility department supervisory personnel, along with responses from citizens during two series of public meetings, major issues have been summarized into broad categories. Each issue is addressed through goals, objectives, actions and the Future Water System Plan.

- ◆ **Water Supply** - Source security, availability and conservation are the primary issues concerning the general public with regard to the water supply for Bossier

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City and Bossier Parish. In light of recent acts of terrorism and the general fear of assault on the nation's infrastructure, there is a real concern for protection of the

surface water supply and the delivery system from malicious contamination or vandalism.

In addition, a natural resources conservation strategy needs to be adopted that establishes practical conservation measures for long-term, efficient use of groundwater, surface water and energy resources by the general public and private industry.

Increased demands on water wells in the Wilcox groundwater formation have resulted in water supply problems in areas of Bossier Parish where private and community water system wells are the only water source. Alternate surface water treatment sources, including connection to the Bossier City system or a separate regional water treatment plant, need to be studied and developed to reduce demand on ground water and assure a constant supply of safe drinking water for rural residents in the Parish.

- ◆ **Water Treatment** - Treatment plants require constant maintenance and attention to keep operations running smoothly and efficiently. Plant operation and maintenance involves many tasks to monitor and check conditions of items such as discharge quality, chemical feed rates, influent/effluent flow rates, pumping/process equipment operation, storage volumes, valves, on-site chemicals inventory, spare parts, sludge disposal, and algae control. Equipment, piping, fittings and valves are subject to corrosion attack from repeated exposure to chemicals, water, sunlight, and humidity. Mechanical equipment items routinely fail or break down from normal wear and tear, abuse, defective manufacturing, poor application design or a number of other reasons.

Improved monitoring of processes and equipment affords the plant superintendent and operators instant access to information that aids decision-making and control abilities. Instruments that measure physical parameters such as temperature, pH, chlorine residuals, dissolved oxygen levels, flow rates, etc. in water and wastewater are vital for automated systems and manual controls to function effectively.

- ◆ **Water Distribution** - High demand for water during periods of hot weather and drought conditions

present problems associated with low pressure such as inadequate fire flow, difficulty in filling elevated storage tanks, and taste, odor, and disinfection problems.

There have been periods of extreme drought where daytime peak demands have placed a strain on the water plant's pumping capability to maintain adequate line pressures in the extreme reaches of the distribution system. Plant treatment capacity is adequate, but the pumping distance required and piping characteristics prohibit delivering treated water into the distribution system at a rate high enough to satisfy short-term peak demands at the outermost extremities. This presents a major difficulty in determining disinfection dosage rates to maintain adequate chlorine residuals throughout the system.

Chlorine residuals, as monitored by the water department and Department of Health and Hospitals, are routinely low in the southern extremities of the distribution system. These low chlorine levels are a result of restrictive pipe sizes, long pumping distances and dead-end pipe sections that exist between the water treatment plant high service pumping facilities and the southernmost system point service connections.

Large diameter yard and process gate valves, which are seldom used, are extremely difficult to open and close without the aid of a valve truck. There are several valves that are not operational due to broken shafts from excessive torque application or being frozen due to excessive corrosion and mineral deposits.

The extreme southern end of the distribution system experiences periodic cycles of low pressure, especially during summertime periods of high demand. During these periods, the Highway 71 South elevated storage tank often experiences difficulty in re-filling during off peak hours in time to meet the next cycle of daily peak demand. Plant high service discharge pressures required to fill the tank effectively during these off peak hours are often above the maximum safe operating limit. In effect, this indicates that the distribution system main to the southern section of Bossier City is of inadequate capacity to meet instantaneous peak demand requirements.

System pressures in the northern sections between Benton Road and Airline Drive have also been extremely low

during periods of high demand. The relatively high population growth of this area has led to water use that has outgrown the ability of existing service mains to effectively meet instantaneous peak demands and maintain minimum fire flow requirements. At the present time, there is no elevated storage tank in this area, which would minimize system response time by placing the additional volume of water required closer to the demand point.

- ◆ **Sewer Collection, Treatment and Disposal** - Rehabilitation, repair and replacement of non-functioning, outdated and inefficient equipment systems is vital to assure that unnecessary, wasteful use of supervision, labor and electrical power is mitigated. Therefore, it is extremely important that supervisory personnel have the necessary manpower and materials to effectively maintain and operate the wastewater plant to provide a high level of service to the public at minimal cost. In addition, it is important that resources be allocated to address all plant safety concerns and compliance with Occupational Safety and Health Administration (OSHA) regulations for items such as material and treatment chemicals handling, confined space entry, fall protection, accident prevention and facility access issues.

Infiltration of groundwater and inflow of surface water runoff into the sanitary sewer collection system introduces additional flows that the treatment plant must process. A large influx of stormwater into the plant can overload the system process and upset the biological sludge stabilization process. In addition, if collection system piping, manholes or lift station wetwells are defective, the potential for pollution of the surrounding environment exists.

In the wastewater collection system, lift stations raise the wastewater to a higher elevation to continue gravity flow at reasonable slopes and depths and transfer wastewater between gravity drainage basins. Lift stations may be built in place or supplied as package units and consist of a collection manhole, pumps and a discharge pipe known as a force main.

Because the plan area's topography is very flat, lift stations are a requirement for most new

development. These lift stations typically discharge into the closest gravity sewer lines. The gravity sewer lines on the periphery of Bossier City's wastewater collections are not always sized to accept these additional flows.

The untreated sewer waste stream should remain completely isolated from the stormwater collection system, rising flood waters, open ditches and surface water runoff. Piping and manholes should be cleaned and washed out routinely to remove the accumulation of sediment, trash and debris that affects the ability of the system to convey wastewater to the plant without flow obstruction and backup.

Red River Wastewater Treatment Plant staff is currently unable to effectively monitor the major plant systems and processes from a central location in the plant control room. A Systems Control and Data Acquisition (SCADA) system is being planned for the Red River Waste Water Treatment Plant (WWTP) to allow for remote monitoring of various wastewater plant functions. However, the Red River WWTP has no plans to utilize this type of system for control, data acquisition and recording tasks.

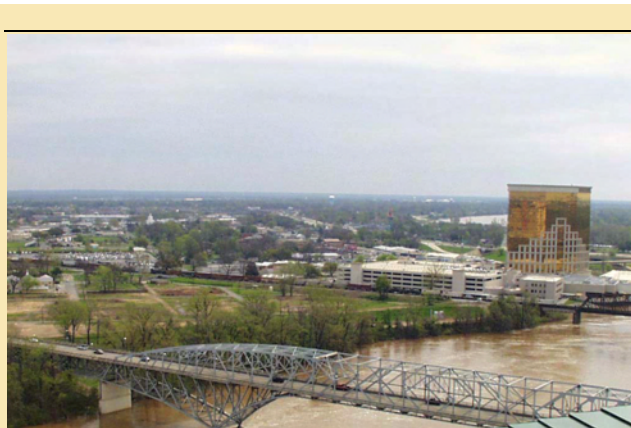
During site visits and other conversations with plant staff, several other areas of the plant may need upgrading or rehabilitation sometime in the future, including:

1. Lighting for the entire plant;
2. Hand rails for treatment basins (Red River);
3. A hoist for influent screw pump motors (Red River); and,
4. A hoist for return sludge pumps (NE).

Utilities construction by private developers outside the city limits are frequently incompatible with Bossier City codes and standards. A requirement for developers of new subdivisions to construct wastewater collection and lift station facilities according to the Bossier City Utilities Department standards and specifications, and provisions for enforcement of the requirement, would mitigate problems when ownership is deeded to the City for maintenance and operation.

- ◆ **Stormwater and Flood Management** - Bossier Parish receives an abundance of rainwater every year. While ample rainfall and water is needed for the agriculture

and many recreational activities, it can be a problem for residential, commercial and industrial land uses with inadequate drainage systems that are located within flood prone areas.



*Bossier City and most of the study area is very flat and prone to flooding. This photo shows a high water event on the Red River in April 2002.*

Flooding and poor drainage of land are deterrents to land development. The cost associated with development of land in these areas often deters development until growth demands make development more economical. The development pattern of the study area proves this point. The floodplain regions located along the northern, eastern and southern portions have received sparse development until recently due to the proximity of flood prone and environmental sensitive areas. It was not until the shortage of high safe ground occurred, which was more economical to develop, that growth demands pushed development into areas requiring more substantial development costs. Factors causing higher costs include larger and more elaborate drainage systems, greater site work costs and difficult access to the necessary utility systems.

In an effort to encourage growth and reduce the effect of flooding on existing development, Bossier City and Bossier Parish, in conjunction with Federal and state agencies, have implemented control measures. These control measures include enlargement and improvement of bayous and drainage canals, levee construction, and development of flood control and water supply reservoirs. However, with these improvements come

the costs and the demand of ongoing maintenance and repair.

Bank erosion and water quality are also key stormwater management issues that must be managed by governmental officials and private citizens alike. Bank erosion caused by high velocity flows, inadequate channel configuration (steep bank slopes and/or undersized) and lack of bank protection (when required) reduce the amount of valuable property and cause sediment problems downstream as well as water quality problems. Stormwater runoff carrying fertilizers, chemicals, oils and greases and similar chemicals also have a dramatic effect on receiving water quality. Pollution of these waters can dramatically affect fish, wildlife, and fauna located within or near these waters as well as water supply and recreational activities for residents. Reports of water quality problems have been identified in the study area. Areas adjacent to or downstream of urbanized and residential development are especially susceptible to water quality problems.

In a 1994 meeting involving a drainage coalition of governmental, environmental, planning and engineering professionals, developers, and citizens concerned about drainage and flooding, several key stormwater and drainage problems were identified. These problems were summarized into six broad-based problems, including:

1. Flooding within Bossier City.
2. Flooding in the lower regions of Bossier Parish.
3. Gully erosion into Flat River and Red Chute Bayou.
4. Water quality problems in the Flat River Watershed.
5. Loss of wetlands and associated resources.
6. Inadequate floodplain management due to rapid development.

These issues are as pertinent today as they were then. Upon review of the ordinances and policies implemented by Bossier City, Bossier Parish and the MPC concerning stormwater issues, it appears that there are sufficient regulations and policies to address many of the current problems. This, however, does not mean that further modifications are not needed to strengthen some areas and to improve coordination between agencies.

Research has indicated that frequently the required rules are waived by the governing authority, usually for what appear to be rational reasons. Often though, this has resulted in problems in subsequent development. The waiver of drainage requirements should be thoroughly reviewed before being allowed by the governing body. In addition, because of significant recent residential, commercial, and industrial development, the controlling agencies should develop drainage criteria fact sheets and recommended best management practices to help standardize and assist in orderly development.

- ◆ **Failing or Aging Infrastructure** - Bossier City and Bossier Parish have utility systems and structures in place that are old, dilapidated and have outlasted their useful life expectancy. These systems are in various stages of deterioration from corrosion brought on by freeze-thaw cycles, chemical corrosion, acid attack, weather exposure or physical damage. Some systems are simply outdated and need to be replaced with newer technology for cost efficiency and regulatory compliance.

There are several water distribution mains and neighborhood water distribution sub-systems that require excessive maintenance and need to be completely replaced. Small diameter and cast iron piping that do not meet current American Water Works Association (AWWA) standards needs to be replaced with new, larger diameter and improved technology material such as polyvinyl chloride (PVC) or high density polyethylene (HDPE). Dead ends, restrictions and piping with interior restrictions are typical characteristics of the older sections of water distribution piping system that adversely affect the overall hydraulic efficiency. These factors contribute to high internal friction losses and the resulting larger pressures, which require higher pumping energy and maintenance costs.

Slow moving, overloaded or obstructed sewer gravity lines and long force mains create anaerobic (absence of free oxygen) conditions ideal for the production of hydrogen sulfide (H<sub>2</sub>S) from the decomposition of organic matter in wastewater. Sulfuric acid is produced by bacteria, which oxidize

the naturally occurring gaseous phase hydrogen sulfide (H<sub>2</sub>S). This formation process occurs in the transition zone below the pipe crown and above the water line where H<sub>2</sub>S gas accumulates. The odor produced from the release of H<sub>2</sub>S gas into the atmosphere and the damage to piping and manholes from sulfuric acid attack are detrimental problems that need to be addressed.

Structural deterioration from acid attack, defective construction, pipe joint separation and physical damage are all problems that exist in Bossier City and compromise the overall integrity of the collection system infrastructure. Open cracks, holes, joints, etc. are sources of infiltration and inflow (I&I) into the system from groundwater and surface water runoff and result in excessive loading of the collection system and treatment plant processes.

Existing conditions of the Bossier City collection system infrastructure exhibit various levels of damage from sulfuric acid attack corrosion and also from physical damage. Some of the various problems associated with this include:

1. Erosion of concrete interior surfaces from acid attack;
2. Crumbled and collapsed interior walls;
3. Corrosion of cast metal rings and manhole covers;
4. Corrosion of metal access doors, steps, rail system supports and other miscellaneous metal items;
5. Sewer line pipe joint separation; and,
6. Cracked or broken concrete structures from physical damage or movement due to erosion or consolidation.

## Regulatory Issues

### Wastewater Treatment

The current U.S. EPA permit and Louisiana Pollution Discharge Elimination System (LPDES) Permit No. LA0065978 for the Northeast Wastewater Treatment Plant (NEWWTP) became effective November 1, 1998 and expires on November 1, 2003. Therefore, the permit renewal process for the plant needs to begin soon. The NEWWTP, which is located at 8000 Shed Road, has been authorized to discharge treated sanitary wastewater to the Red River via a 7-mile force main.

Diversion of the effluent discharge of NEWWTP from the Red Chute Bayou on December 22, 1994, to the Red River enabled the issuance of less stringent effluent limitations, which are reflected in the current permit. The NEWWTP consistently meets all effluent limitations and is not under any enforcement actions by the U.S. EPA or by the Louisiana Department of Environmental Quality.

The current NPDES Permit No. LA0053716 for the Red River Wastewater Treatment Plant (RRWWTP) became effective December 1, 1994 and expired on November 30, 1999. An application for a new permit was submitted to the Louisiana Department of Environmental Quality (LDEQ) on May 18, 1999 and is still under review. The RRWWTP has been authorized to discharge treated sanitary wastewater to the Red River immediately west of and adjacent to the treatment plant site. The RRWWTP consistently meets all effluent limitations and is not under any enforcement actions by the U.S. EPA or by the Louisiana Department of Environmental Quality.

The City of Bossier City currently hauls their processed sludge (biosolids) to two land sites for final disposal in accordance with the sewage sludge requirements of the LPDES Permit No. LA0065978.

### Stormwater

To reduce the effects of flooding on new development, it is now required that all inhabited buildings are built above the base flood elevation. In order to accomplish this task with some level of confidence, accurate up-to-date flood maps are required. The Federal Emergency Management Agency (FEMA) is in the process of having the flood insurance rate maps (FIRM) for the master plan study area updated to reflect current flood conditions. Upon completion, these maps should be reviewed for correctness and when approved, officially adopted to be used for development.

In order to help address nationwide water pollution, the Environmental Protection Agency (EPA) was tasked by Congress with development of a program to reduce pollution from stormwater runoff. To accomplish this task, the EPA created a tiered approach. The Phase I EPA stormwater NPDES program, which addressed permitting of runoff from large to medium cities and from certain types of industrial activity, has been implemented. The

Phase II rules, which are geared toward cities and adjacent areas with a population of 50,000 persons and above, will affect Bossier City and the areas within the study area. This rule requires that Bossier City and Bossier Parish submit a permit application to apply for a Phase II National Pollutant Discharge Elimination System (NPDES) permit by March 10, 2003. In the permit, six major control measures will need to be addressed and implemented, including:

- ◆ Public education and outreach program on storm water impacts;
- ◆ Public participation/ involvement programs;
- ◆ Illicit discharge detection and elimination program;
- ◆ Post-construction stormwater management in new development and redevelopment areas;
- ◆ Construction site stormwater runoff control; and,
- ◆ Pollution prevent/ good housekeeping for municipal operations.

## Related Studies and Ordinances

### Pre-treatment Ordinance

The Sewer Use Ordinance for Bossier City establishes rules and regulations regarding discharge of commercial and industrial organic and inorganic wastes into the City collection system. The ordinance sets forth discharge limits for oil, grease, and other contaminants and rules for pretreatment, monitoring and reporting methods and documentation. This ordinance serves to prevent the introduction of fats, oils and grease into the wastewater stream, which causes buildup problems in sewer lines and interferes with biological action at the treatment plant.

### The Hydraulic Analysis and Master Plan for the Bossier City Water System, April 2002

This plan was authorized by Bossier City to define and determine solutions for existing problem areas with regards to pressures, fire protection, storage, and excessive residence times. The method involved creation of a base map of the City's existing water distribution system and a computerized hydraulic model, which was used as an analytical tool. The model was also utilized to predict the effect of future growth on storage, supply, and line sizing. This report evaluated the adequacy of the Bossier City water distribution system and

determined the improvements needed to meet current and projected water demands through the year 2025.

### Facility Plan for Northeast Wastewater Treatment Plant and the Red River Wastewater Treatment Plant - City of Bossier City - Bossier Parish, Louisiana, January 2001

This plan evaluated the existing plant process at the wastewater treatment plant facilities with regard to condition of the existing infrastructure, odor control, plant efficiency, regulatory compliance and treatment capacity. In addition, the plan projected demand requirements for future population and service area growth and made recommendations for appropriate improvements and expansion.

### Chapter 9, Drainage and Flood Control Ordinance for Bossier City with subsequent amendment ordinances

These ordinances outline the authority, administrative procedures and provisions for flood hazard reduction within the City of Bossier. While fairly general in nature, they provide substantial power and leeway to the City for regulation of drainage and flood control issues within the City of Bossier City. Amendment Ordinance 47 of 1998 revised the regulations for the National Flood Insurance Program listed in Chapter 9 to meet updated eligibility requirements for Federal Flood Insurance. Ordinance 38 of 2001, revised the Flood Damage Prevention requirements. This revision made it mandatory that all new construction or substantially improved construction lowest floor elevations are placed a minimum of one foot above the base flood elevation.

### Bossier City-Parish Metropolitan Planning Commission Zoning Ordinance with revision ordinances

These mutually adopted ordinances establish the requirements for zoning and land use within Bossier City and the unincorporated portion of Bossier Parish lying within five miles of the Bossier City corporate limits, which designates the Metropolitan planning district boundary.

**Bossier City-Parish Metropolitan Planning Commission Subdivision Regulations with revision ordinances**

These mutually adopted ordinances establish the rules and regulations for the subdivision of land within the planning area of the Bossier City-Parish Metropolitan Planning Commission.

**Section 25, Streets, Roads, Sidewalks, Drainage, Bossier Parish Code of Ordinances**

This section provides guidance for drainage as well as features for areas of the Parish outside of subdivisions.

**South Bossier River Basin Study, April 1998**

This comprehensive river basin study, developed by the United States Department of Agriculture Natural Resources Conservation Service, provides a detailed discussion on the South Bossier River Watershed Basin, which includes the master plan study area. This report describes the physical and hydrologic condition and land uses of the watershed, major storm water and flood related problems, and alternative and recommended solutions to the problems. This document has a wealth of information, which should be used in alleviating and solving flooding and storm water problems.

**Owen & White, Inc. South Bossier River Basin Study, May 1996**

This report presents the findings of the hydrologic and hydraulic analysis, which was performed for the South Bossier River Basin Study mentioned above. Included in the report are maps, diagrams, analyses information and drainage recommendations. This report should be used in conjunction with the above report and should serve as a valuable tool in preparing and implementing flood prevention and drainage improvement measures.

**Flood Hazard Mitigation Plan, August 2001 (Draft)**

This document is to assist the City of Bossier City in preparing and implementing a plan to reduce future flood disaster losses and encourage effective management of National Flood Insurance Program (NFIP) compliance ordinances. The plan includes areas of Bossier City and the Parish located within the master plan study area. Elements of this plan are key tools, which will be used by Bossier City for the reduction of flood hazards.

**Benoit Bayou Flood Plain Management Study, April 1994**

The objective of this study, which was commissioned by a host of local governmental agencies, was to identify flood hazard areas along Benoit Bayou. The findings from the study are used to help make land use decisions in the watershed of Benoit Bayou. Typical land use decisions dealt with in the report include: regulating flood plan use, controlling upland land uses, and taking steps to protect or remove existing properties to reduce flood losses.

**Miscellaneous Drainage Studies**

The Bossier City Engineer’s office has several studies that deal with localized flooding in smaller areas. These studies are used to develop solutions and action plans for solving the drainage problems and to help the City Engineer’s office to prevent future problems caused by additional development in these areas.

**Utilities Goals, Objectives and Action Statements**

The goals, objectives and subsequent actions respond directly to the issues raised by citizens who participated in the community meetings conducted as part of the planning process as well as members of the City and Parish staff. They also reflect the observations discovered through extended analysis of the water, wastewater and drainage conditions throughout the MPC Planning Area.

Utilities and infrastructure goals include:

- ◆ Provide safe, reliable utility services to adequately meet present and future residential, commercial and industrial demands.
- ◆ Develop a comprehensive flood and stormwater management program to eliminate or mitigate floodplain and localized flooding, stormwater quality issues, and bank erosion within the master plan study area.
- ◆ Provide environmentally sensitive, high quality service level, utility systems to adequately support future land use and development planning.
- ◆ Revitalize all aging and failing utilities infrastructure.

- ◆ Enhance existing utilities for maximum operating and maintenance efficiency.
- ◆ Assure high quality, low maintenance utility infrastructure that is in regulatory compliance.
- ◆ Improve efficiency and effectiveness of the Utilities Department in preparation for an expanded area of responsibility due to anticipated growth and development within the MPC area.

**Goal 8.1: Provide safe, reliable utility services to adequately meet present and future residential, commercial and industrial demands.**

**Objective A:** Secure and maintain reliable primary and alternative sources of water to assure an uninterrupted, safe water supply in case of drought or emergency situations.

**Objective B:** Improve water distribution system flow characteristics and overall system efficiency to lower required operating pressures, reduce operating/maintenance costs and increase disinfection capability.

**Objective C:** Increase water treatment plant capacity and upgrade treatment technology to satisfy increased future demands and more stringent water quality regulations.

**Objective D:** Increase water distribution system storage capacity to facilitate meeting high instantaneous peak demands and minimum fire flow requirements during periods of drought or emergency.

**Objective E:** Replace and upgrade sewer collection system components as necessary to improve flow capacity, minimize septic conditions and reduce operating/maintenance costs where overloading and poor flow characteristics dictate overall efficiency.

**Objective F:** Increase wastewater treatment plant capacity and upgrade treatment technology to satisfy increased future flows and more stringent discharge regulations.

**Action 8.1.1:** Provide increased security measures to safeguard against vandalism or terrorism of water source facilities at both the Reservoir Pumping Station and the Red River Pumping Station. Add pumping units and discharge header piping as necessary at

both existing pumping stations to assure an adequate supply to the treatment plant from either location.



*The Red River Pumping Station is slated for upgrade in the summer of 2002.*

**Action 8.1.2:** Install new water lines to complete loops and connect water sub-systems at Shady Grove/Southgate Loop, Sun City/Golden Meadows Loop and Southern Gardens/Southgate Loop.

**Action 8.1.3:** Expand existing water treatment facilities by adding 10 million gallons/day (MGD) capacity to the existing 25 MGD plant.

**Action 8.1.4:** Acquire property, design and construct a new two million gallon (MG) elevated water storage tank on Kingston Road between Benton Road and Airline Drive in North Bossier.

**Action 8.1.5:** Complete a water system loop from Hospital Drive to Prestwick Circle in Greenacres Place Subdivision.

**Action 8.1.6:** Complete a water system loop by installing new water lines to connect the east and west ends of Viking Drive.

**Action 8.1.7:** Complete a water system loop on Village Lane to connect with the water line on Airline Drive.

**Action 8.1.8:** Complete a water system loop in River Bend Subdivision.

**Action 8.1.9:** Install a new transmission line down the Arthur Ray Teague Parkway from Old Minden Road to the Highway 71 South 2 MG elevated storage tank.

**Action 8.1.10:** Install a new water line from the water treatment plan (WTP) north on Benton Road to the new two MG elevated storage tank on Airline Drive.

**Action 8.1.11:** Install a new transmission line from the WTP south on Hamilton Road to Old Minden Road.

**Action 8.1.12:** Modify the collection system as necessary to increase carrying capacity and scouring velocities, reduce odor causing potential, improve flow efficiency while simultaneously reducing operating and maintenance costs.

**Action 8.1.13:** Add a SCADA system to provide system control, monitoring and data acquisition capabilities for treatment plant systems.

**Action 8.1.14:** Add sludge thickener to the waste disposal process at the wastewater treatment plants to increase capacity for solids removal rate from aeration basins.

**Action 8.1.15:** Add hoisting equipment at wastewater treatment plants to facilitate pumps replacement at the Northeast WWTP Return Sludge Pump Station.

**Goal 8.2: Develop a comprehensive flood and stormwater management program to eliminate or mitigate floodplain and localized flooding, stormwater quality issues, and bank erosion within the master plan study area.**

**Objective A:** Develop a comprehensive floodplain management program through the use of existing flood identification and mitigation studies, new FEMA Flood Insurance Rate Maps, and local governmental and professional expertise.

**Objective B:** Develop a comprehensive program to analyze, select, prioritize, and implement solutions to flooding and other related drainage problems identified in the South Bossier River Basin Study developed by the USDA NRCS in April, 1998, the Benoit Bayou Floodplain Management Study and other miscellaneous studies performed on smaller development areas.

**Objective C:** Provide for more consistent development of new residential, commercial and industrial areas through the

development of drainage hydrologic and hydraulic design criteria manuals, best management practices manuals with standard details, and standardization of City and Parish requirements.



*Replacement of failing ditch pavement should be a priority.*

**Objective D:** Improve storm water quality standards and meet EPA mandated requirements for Phase II Storm Water NPDES Permits for small municipalities.

**Action 8.2.1:** Review, revise as necessary and implement the programs in the Draft Flood Hazard Mitigation Master Plan developed by AEGIS Innovation Solutions in conjunction with Bossier City and other local governmental authorities.

**Action 8.2.2:** Review flooding and related problems in the South Bossier River Basin Study, select desired problem solutions, prioritize, develop funding sources and implement the solutions.

**Action 8.2.3:** Review the Benoit Bayou Flood Plain Management Study, develop projects to address identified flooding problems, develop funding sources and implement the solutions to address the problems in this key development area. Benoit Circle Drainage Report developed by FBL Associates can be used for a specific project for Northland Estates Subdivision.

**Action 8.2.4:** Implement the drainage system improvements identified in the River Bend Drainage Analysis report developed by Owen and

White in June, 2001, to alleviate localized flooding problems in the River Bend subdivision.

**Action 8.2.5:** Have the Bossier City Engineer's office and appropriate Barksdale AFB personnel develop a working relationship concerning mutually beneficial drainage and floodplain conservation and improvement projects.

**Action 8.2.6:** Coordinate drainage hydrologic and hydraulic design and analysis criteria between Bossier City's and Bossier Parish's Engineering offices and develop design criteria manuals for use by engineers and developers for new development and substantial redevelopment areas. Manuals could also include situations where retention or detention ponds would be required.

**Action 8.2.7:** Develop recommended best management practices and details for residential, commercial and industrial areas. All implemented practices should receive approval of Bossier City or Parish Engineers before installation is allowed.

**Action 8.2.8:** Public education on wetland mitigation and conservation issues should be developed in order to help protect and preserve existing wetlands. A regional wetland banking program might be considered to help development of areas where wetland preservation cannot be accomplished because of an important public need like flood reduction.

**Action 8.2.9:** Review, amend as required, and adopt the new FEMA Flood Insurance Rate Maps for the Master Plan study area in order to have the most accurate and up-to-date flood level information to assist new development and flood mitigation programs.

**Goal 8.3: Provide environmentally sensitive, high quality service level utility systems to adequately support future land use and development planning.**

**Objective A:** Extend and upgrade existing utilities within the MPC area to adequately serve projected residential and commercial growth and infill development for the next twenty years.

**Objective B:** Provide utility services that attract potential commerce and industry to preferred zones and proposed facility locations that are compatible with land use plans.

**Objective C:** Upgrade existing utility infrastructure to overcome problems of system overloading from increased demand.

**Action 8.3.1:** Install new water and sanitary sewer systems in the following areas:

- ◆ along the proposed extension of Winfield Road from Stockwell Road to Swan Lake Road;
- ◆ from the Swan Lake Road intersection with Airline Drive east to Benton Road;
- ◆ along the proposed extension of Winfield Road from Swan Lake Road to Airline Drive;
- ◆ along the proposed extension of Wimple Road to Swan Lake Road;
- ◆ along proposed extension of Wimple Road from Airline Drive to Benton Road;
- ◆ along the Greenacres Drive extension from Airline Drive to Swan Lake Road;
- ◆ along the proposed extension of Sunflower Boulevard south and east to Barksdale Boulevard;
- ◆ along the proposed extension of Golden Meadows Drive west of Barksdale Boulevard and connecting to Sunflower Boulevard extension;
- ◆ along the proposed extension of Hope Street from Barksdale Boulevard west to connection with the Sunflower Boulevard extension; and,
- ◆ along Vanceville Lisbon and Bobby Byrd Roads from Benton Road to Airline Drive.

**Action 8.3.2:** Relocate water system lines to accommodate widening Barksdale Boulevard to a five-lane cross section.

**Action 8.3.3:** Extend the existing water line and sanitary sewer system along Swan Lake Road north and west to Airline Drive.

**Action 8.3.4:** Install a new water line from Swan Lake Road to connect the northeastern end of the Lakewood Subdivision water system.

**Action 8.3.5:** Install a new water line from Stonebridge to Swan Lake Road.

**Goal 8.4: Revitalize all aging and failing utilities infrastructure.**

**Objective A:** Protect and preserve existing equipment, piping systems and structures to extend the useful life span where cost effective.

**Objective B:** Replace aging sections of the water distribution system and sewer collection system to reduce high frequency maintenance and repairs.

**Action 8.4.1:** Sandblast, apply protective coating systems, repair welds and rehabilitate serviceable water and wastewater treatment plant equipment and lift stations.

**Action 8.4.2:** Replace water mains along Shed Road from Airline to Benton Road, on East Texas from Benton Road to Eatman Street, and on Benton Road from Kingston to Wemple Roads.

**Action 8.4.3:** Replace the water system in Coleman Park subdivision from Patricia to Murphy Street.

**Action 8.4.4:** Replace all cast iron piping with new polyvinyl chloride (PVC) or high density polyethylene (HDPE) piping systems.

**Action 8.4.5:** Replace all 2-inch diameter water mains with 4-inch minimum diameter PVC or HDPE piping as recommended by the American Water Works Association (AWWA).

**Action 8.4.6:** Replace severely corroded handrails at the Northeast WWTP.

**Goal 8.5: Enhance existing utilities for maximum operating and maintenance efficiency.**

**Objective A:** Provide means to facilitate isolation of water distribution system for repairs with minimal service interruption.

**Objective B:** Improve city vehicle and employee access and safety at city-owned facilities while maintaining security against trespassers.

**Action 8.5.1:** Add sectional valves in the water distribution system every 400-600 feet and at critical points within the existing system.

**Action 8.5.2:** Obtain additional easements, pave access roads, add security fences/gates and access hatches/ladders, where necessary, at city owned

facilities such as sewer lift stations and raw water pumping stations.

**Action 8.5.3:** Add a SCADA system to provide monitoring and control for lift stations.

**Goal 8.6: Assure high quality, low maintenance utility infrastructure that is in regulatory compliance.**

**Objective A:** Facilitate quality control of new construction and rehabilitation/repair projects or maintenance tasks.

**Objective B:** Reduce inventory requirements for replacement parts and materials.

**Objective C:** Maintain the ability to comply with Federal and state regulations with regard to water quality standards and waste discharge requirements.

**Action 8.6.1:** Adopt a uniform building code and establish uniform standards and details that govern design, materials and methods for new construction and rehabilitation projects as well as for in-house maintenance and repair tasks.

**Action 8.6.2:** Require department head and supervisory staff input and review during project preliminary design development.

**Action 8.6.3:** Compile and publish a list of approved manufacturers and models for valves, hydrants, post indicators, pipe fittings, pumps, treatment process equipment, hoists, controls, and other items requiring routine maintenance to use as a guide for the purchase of replacement parts project bid specifications.

**Action 8.6.4:** Modify city ordinances to establish rules for pre-treatment, monitoring and control of commercial and industrial discharges into the sewer collection system.

**Goal 8.7: Improve efficiency and effectiveness of the Utilities Department in preparation for an expanded area of responsibility due to anticipated growth and development within the MPC area.**

**Objective A:** Monitor and control operation, maintenance and capital replacement costs.

**Objective B:** Raise the level of qualifications and competency for all supervisory and staff personnel.

**Objective C:** Minimize maintenance or repair crew response time and service disruption during repairs and emergencies.

**Action 8.7.1:** Schedule and perform preventative equipment maintenance, check operation and document service records in accordance with manufacturer's recommended procedures and performance criteria. Strict adherence to these practices will serve to avoid premature repairs or replacement. Replace worn, inefficient equipment that has reached its expected service life.

**Action 8.7.2:** Mandate applicable, specialized training, certification and continuing education for all department personnel. Cross train individuals and superintendents within the department to achieve manpower flexibility in the event of employee illness or attrition.

**Action 8.7.3:** Maintain crew sizes, supervision, tools, etc. that are adequate to perform maintenance and repairs as necessary.

**Action 8.7.4:** Improve methods of communication, correspondence and record keeping within the department to coordinate work orders, document maintenance records, expedite materials, report laboratory findings and avoid redundancy.

## Existing Systems

### Bossier City Water Sources

The Bossier City water supply comes from two intake locations on the Red River, the Bossier City reservoir facility and the Red River facility at the treatment plant. The primary source is the Bossier City reservoir, which is a 100-acre, 20 feet average depth, impoundment located on leased property adjacent to the Red River and situated north of I-220 approximately two miles north of the water treatment plant. Pumping facilities here include a river intake pump station utilized to pump raw water from the river into the reservoir and a 50 MGD raw water transmission station, which pumps water from the reservoir to the treatment plant.

The Red River pump station intake at the treatment plant, which is currently being rehabilitated, which will be on line by Fall 2002, will have the capacity to deliver raw water at a

maximum rate of 20 million gallons per day directly to the water treatment plant. This facility will serve as the backup or supplemental raw water source.

### Water Treatment

The Bossier City Water Treatment Plant (WTP) underwent a major expansion and improvement project completed in the summer of 2000. Plant treatment capacity was increased from 16 MGD to 25 MGD. Raw water total



Filter gallery at Water Treatment Plant.

pumping capacity from the Bossier City reservoir was increased to 25 MGD with six new pumps at the existing reservoir pump station. Other major improvements include an ozone disinfection system, eight new dual media filters with air/backwash system, a new 1.5 MGD clearwell, two new high service pumping stations, a new gravity thickener with sludge removal system and two (2) new belt filter presses.

Shown in **Figure 8.1, Red River Water Treatment Plant Schematic**, is the process of treating water drawn from the Red River. Generally, the process included pre-disinfection, clarification, primary disinfection, filtration, scouring, final disinfection, storage and pumping.

### Water Distribution

The public water distribution system network for Bossier City, displayed in **Figure 8.2, Existing Water System**, is bounded on the west by the Red River and extends to the point of connection with the Benton storage tank in the north, Louisiana Downs to the east and Golden Meadows

subdivision to the south. The water system is connected to the Shreveport water system by a 20" line crossing the Red River over the Long-Allen Texas Street (Highway 80) bridge. This river crossing was implemented to provide a water supply sharing capability in the event of emergency or shortage in either city.

**Water Storage**

Finished water storage at the Bossier City water treatment plant consists of three underground concrete tank clearwells, for a total plant storage capacity of 4.5 million gallons (MG). Clearwells are connected by a transfer valve and treated water is pumped into the distribution system by two high service pump stations consisting of ten vertical turbine pumping units of 3000 gallons per minute (gpm) capacity each.

There are three elevated storage tanks in the Bossier City distribution system that provides a total storage capacity of 5.5 MG. The Airline Drive Tank has a capacity of 1.5 MG and the North East and Highway 171 South (Golden Meadows) Tanks have capacities of 2 MG each. Altitude valves at each tank provide automatic re-fill and overflow protection capabilities based on system pressure set points. Tank level transmitters on each tank facilitate continuous level monitoring at the WTP. All three elevated storage tanks have recently undergone lead abatement, structural repair, cleaning and re-painting procedures and are in excellent condition. In addition, they were upgraded to meet current OSHA access and FAA lighting requirements.

A summary of existing Bossier City water treatment and distribution system capacities is displayed in **Table 8.1, Water Treatment and Distribution**.

**Table 8.1  
Water Treatment and Distribution  
City of Bossier City**

Treatment and Distribution Facilities	Capacity
Water Treatment Plant	25 Million Gallons/Day
High Service Pumping	45.5 Million Gallons/Day
Clearwell Storage	4.5 Million Gallons
Elevated Tank Storage	5.5 Million Gallons
Total Length of Distribution System Lines	254 Miles

Source: City of Bossier City

**Wastewater Treatment**

The Bossier City Red River Wastewater Treatment Plant, which is approximately 25 years old, has a total treatment capacity



Airline Drive water tank.

of 8 million gallons per day (MGD) and serves the southern and eastern sections of Bossier City. The plant has recently undergone some limited equipment retrofit and an odor control improvements project.

The Bossier City Northeast Plant has a treatment capacity of 6 MGD and serves the northern and western sections. It



Clarifier and oxidation ditch at Red River Wastewater Treatment Plant.

has undergone recent capacity expansion of 4 MGD and addition of odor control features and equipment.

Both treatment plants utilize the extended aeration activated sludge process, which is an aerobic method of biological wastewater treatment. This process is based on the aeration of wastewater with flocculating biological growth, followed by separation of treated wastewater from this growth.

The flow through each plant is illustrated in **Figure 8.3, Red River Wastewater Treatment Plan Schematic**, and **Figure 8.4, Northeast Wastewater Treatment Plant**. The treatment process generally involves initial screening to remove debris, grit removal/separation, aeration/oxidation, final clarification, sludge settlement, final disinfection, effluent discharge, sludge treatment, chemical conditioning, and sterilization.

**Wastewater Collection System**

In order to control odors generated by the formation and emission of hydrogen sulfide (gas phase) into the atmosphere, Bossier City has placed several chemical feed stations in service at critical locations within the sewer collection system. These stations feed ferric sulfate into the wastewater stream, which combines with dissolved hydrogen sulfide (liquid phase) to form a compound that settles rapidly, but which can be re-suspended for easy removal at the treatment plant. Bossier City is currently using this chemical at five locations in the system for odor control, as well as at the Bossier City Water Treatment Plant for enhanced coagulation in the treatment units.

A recent odor control modifications and improvements project at both Bossier City wastewater plants will be completed in the Spring of 2002. This project will upgrade the treatment plants to include covers and chemical scrubber



*Influent wetwell at the NEWWTP.*

equipment to reduce the odors generated at the headworks of the plants. Also, mechanical barscreens have been added to increase the overall velocity of the incoming wastewater by improving the efficiency of the wastewater screening process. The influent wetwell bottom elevation at

the NEWWTP was lowered by 10 feet to prevent surcharging in the 42-inch gravity influent line to the plant and thus increasing the velocity of flow into the wetwell.

There are currently 87 sewer lift stations and 52.8 miles of force main located throughout the Bossier City collection system. Force main pipe sizes range in diameter from 2-inches to 24-inches and range in length from 100 feet to nearly 7 miles. These lift stations typically serve individual subdivisions, areas, districts, trailer parks, etc. or function as booster pump stations.

A summary of Bossier City wastewater treatment and collection system capacities is displayed in **Table 8.2, Wastewater Treatment and Collection**.

**Table 8.2**  
**Wastewater Treatment and Collection**  
**City of Bossier City**

Treatment and Collection Facilities	Capacity
Total Wastewater Treatment Capacity	14 Million Gallons/Day
Red River Treatment Plant Capacity	8 Million Gallons/Day
Northeast Treatment Plant Capacity	6 Million Gallons/Day
Sewer Lift Stations	87
Length of Force Mains	52.8 Miles
Longest Force Main	7 Miles
Length of Gravity Lines	207 Miles
Largest Gravity Line	42 Inches

Source: City of Bossier City

Displayed in **Figure 8.5, Existing Sewer System**, are the major lift stations in Bossier City, the location of the treatment plants, the dividing line between the two plants and other locations of community systems.

Manholes in sewer collection systems are typically located at junctions, changes of direction, and in long straight runs to provide convenient clean out access to gravity flow sewer piping. Most of the existing manholes are precast - concrete, however some of the manholes in the older sections of town are constructed of clay brick.

The Bossier City sewer collection system currently consists of a total of 206.7 miles of gravity line. Gravity lines range from 4-inches to 42-inches in diameter, with the largest being the Red River gravity interceptor which is located near the Arthur Ray Teague Parkway along the Red River. Newer sewer lines are constructed of PVC or ductile iron and older lines are constructed of clay tile, concrete, or cast iron.

### Parish Utility Systems

Bossier Parish has numerous community, private and public water systems outside the city limits of Bossier City, which range in size from a few users to a few thousand customers. Rural parish water supply sources for independent community or private systems are primarily wells that tap the surface alluvial, Wilcox and Chicot formation aquifers. A few systems outside the city limits are being supplied either totally or partially by the Bossier City public owned water systems (POWS). The largest privately operated water system in the parish is Village Water Supply with approximately 2,600 service connections and 16 wells. Private and public water systems in Bossier Parish outside the city limits of Bossier City include the following:

1. Village Water Supply;
2. Belleview Water System;
3. South Bossier Water System;
4. Central Bossier Water System;
5. Red Chute Water System;
6. Cypress Black Bayou Water System;
7. East 80 Utilities;
8. The Town of Benton;
9. The Town of Haughton; and,
10. The Town of Plain Dealing.

Groundwater wells are the sole source of water for most of these systems except for the Town of Benton, East 80 Utilities



Red River at Arthur Ray Teague Boat Ramp.

and Cypress Black Bayou water systems, which purchase water from Bossier City. Red Chute purchases water from both Bossier City and Village Water Supply. Barksdale Air Force Base purchases water from the City of Shreveport via a 20-inch line across the Texas Street (Highway 80) bridge.

Sewerage collection and treatment facilities for rural Bossier Parish outside the city limits typically consist of individual house septic tanks or community treatment systems. Many of the community water systems also maintain community sewer systems.

### Drainage

Flooding has historically been a problem within the Bossier City-Parish MPC planning area. Prior to the creation of the levee system along the Red River, it was commonplace for the Red River to overrun its banks and flood the low areas within the study boundary after large rain events, which occurred upstream and during the wet parts of the year. Throughout its life, the river has also meandered throughout the Bossier flood plain valley. Prior to the removal of the Red River Raft, which obstructed the river, the river channel meandered through channels on both sides of the river. Two channel remnants of the river meandering within Bossier include the Flat River and the Red Chute Bayou. This effectively limited development of the area to high ground until the completion of the Red River Levee System in 1946. Since that time the river has not breached the levee.

Flooding has also occurred because of the configuration of the watershed runoff basin and the topography of Bossier Parish. The watershed has the shape of a banana, which runs from the southern edge of Arkansas to the Northern tip of the Red River Parish where Loggy Bayou discharges into the Red River. The watershed area encompasses over 1,138 square miles. The northern area of the watershed is hilly with relatively steep slopes, which flatten out approximately south of Benton. Because of this varied watershed topography, high peak flows that travel very fast occur at the upper end of the basin, which spread out and require wide floodplains when they hit the flat land. Areas of localized flooding due to undersized drainage inlets, pipes and ditches also occur in several locations in the urbanized regions of the study area.

The major waterways that drain the study area include Willow Chute Bayou, Benoit Bayou, Flat River, Red Chute Bayou, Fifi Bayou, Macks Bayou, as shown in **Figure 8.6, Existing Drainage**. In the urbanized areas of Bossier City, several manmade ditch and subsurface systems exist. All the flow from these tributaries and drainage systems flow to the southern portion of the watershed to Loggy Bayou, which eventually discharges into the Red River.

## Details of the Master Plan

### Future Inter-modal Transportation, Public, Industrial and Military Facilities

#### *Shreveport-Bossier Port Facilities*

When development occurs at the Port, the existing water system (with an extension of the distribution system) can be utilized for potable water purposes. Depending on the water quantity and quality needs of future industry at the port, several options can be evaluated including a new drinking water treatment plant, the use of treated wastewater from the Red River WTP and water from the Red River treated to less than potable water standards. Treated water requirements of up to two MGD at the Shreveport-Bossier Port could be accommodated by expanding the existing water treatment plant.

#### *Barksdale Air Force Base*

Barksdale Air Force Base is currently served by the City of Shreveport. There is a connection from the Bossier City system to the base for use in emergencies when service is disrupted from Shreveport. The importance of BAFB to national defense and the area economy make it imperative that Bossier City consider the impact of this facility in their planning process. The impact of the base on the distribution system is 2 MGD average day demand and 3.2 MGD max month demand. While Bossier City could currently supply the base with water during months of low demand, supplying the base with water during a dry summer would tax the current capacity of the WTP. Programmed expansion to the WTP could be implemented to accommodate the additional capacity during high demand periods.

#### *I-69 Corridor*

Based on current information, I-69 may be a reality in 15 years, which would spur additional development along the corridor.

Due to the physical distance from municipal treatment facilities and elevation constraints, utility requirements could be more practically met by private rural water distribution systems and individual or community wastewater collection and treatment systems. Another option to attract commercial and industrial activity would be to design and construct additional water and wastewater treatment facilities at locations more central to the proposed corridor activity.

#### *Regional Water/Wastewater System*

There are several existing water systems within a 15-mile radius of the current water treatment plant as well as areas of Bossier Parish that get their water from individual private wells. As development occurs, the aquifers that provide water to these systems may become taxed and good quality water may diminish resulting in the need for a surface water supply or the purchasing of water from Bossier City. Based on the 2002 hydraulic analysis, developments east of Red Chute water system could not be directly fed by the Bossier City water system. A ground storage tank with pumps would be required to feed these systems due to the rapid change in elevation past Red Chute. Water systems within the City limits can be accommodated with the current system. Water systems to the south could be fed directly by the Bossier City system for a few miles, but would require a ground storage facility with pumps past a few miles from Highway 71. The Sligo Road water system will be fed through their current connection and ground storage tank.

#### *Parish Sewer Districts*

There is presently a concern about the need to extend sanitary sewer services into suburban areas of the parish. At present, the easternmost extent of the sewer collection system service is Louisiana Downs at the intersection of Stockwell Road and Highway 80. The establishment of a municipal wastewater treatment system in areas adjacent to the city limits would improve the potential to attract and maintain commercial and light industrial development. Subdivisions, communities and proposed urban villages would also benefit from a more efficient and environmentally acceptable method of wastewater disposal. It is not, however, practical to connect these outlying areas of the Parish to the existing Bossier City wastewater treatment system because of the distances

and additional treatment loading that would be involved. The concept of sewer district establishment for rural areas of the parish, however, is an option that parish government may want to consider. Funding mechanisms are available through the Environmental Protection Agency Office of Water.



*Expansion of Bossier City's wastewater treatment facilities to serve outlying areas is not practical.*

**Industry within Bossier City**

Bossier City currently has one industrial park within the City limits as well as several areas zoned for industrial use. Based on the 2010 and 2025 hydraulic analysis, the current system can accommodate small to medium industrial water users (50,000 to 150,000 gpd), within the existing industrial areas. If a large water user (1 MGD) is added to the Ruben E. White Industrial Park, the existing distribution system can accommodate the demand without any system upgrades.

**Basis for Planning**

There are very few areas remaining within the MPC planning area considered optimal for expansive land development. Most of the remaining vacant area is flood prone, environmentally sensitive or within the Barksdale Air Force Base AICUZ. Therefore, a substantial portion of planning for utilities involves upgrade measures to improve and increase the carrying capacity of water distribution and sewer collection systems in areas that are already developed or are under-developed.

Areas outside the current city limits that have been proposed for urban village development typically would require an extension of the existing utility systems. However, it may be necessary to replace and upgrade a portion of the existing system according to the additional system demand requirements. Improvements to upgrade the efficiency of existing utility systems by correcting deficiencies can, in certain instances, be done concurrently with improvements required to accommodate proposed future infill and expansion development demands.

Staff input and comments were obtained from interviews conducted with key personnel including the Bossier City Engineer, Northeast Wastewater Treatment Plant Superintendent, Red River Wastewater Treatment Plant Superintendent, Bossier Water Treatment Plant Superintendent, Sewer Collection System and Lift Stations Superintendent, Water Distributions Systems Superintendent and the Bossier Parish Engineer. The nature of questions and discussion during each interview dealt with the identification and assessment of problems inherent to the existing utility system infrastructure and with day-to-day operating and maintenance procedures. Present and short-term future needs along with other potential system improvements were discussed and classified as requiring further evaluation and review. Other issues discussed included staffing levels, personnel qualifications, employee education and training and safety compliance concerns. Concerns and issues from citizen responses that were recorded during public meetings were also incorporated into the issue statements section of this chapter.

**Bossier City Water System Hydraulic Analysis**

The Hydraulic Analysis and Master Plan for the Bossier City water system, dated April 2002, identified problem areas within the existing system and recommended corrective actions that would improve the overall hydraulic efficiency of the water distribution system. The future water facilities and services lines recommended through this study are displayed in **Figure 8.7, Future Water System**. The report findings and recommendations for capital improvements were based on hydraulic modeling analysis, population projections and usage data as described in the following paragraphs.

The purpose of a hydraulic model is to create a base map of the City's existing water distribution system in a computerized hydraulic model that can be manipulated to define and determine solutions for existing problem areas with regards to pressures, fire protection, storage, and excessive residence times. The model can also be utilized to predict the effect of future growth on storage, supply, and line sizing.

The basic model consists of a data collection phase and the design and calibration of a hydraulic model of the City's existing system based upon GIS information. The data collection phase included data from the water treatment plant, billing records, and water main maps on GIS (provided by the City). Billing records were utilized to determine an average day demand and allocation of demands at junction nodes on the water model. Records from the water plant, including average, minimum and maximum day demands and elevated tank information, were used to determine peaking factors for the hydraulic model. The GIS information was utilized to locate water lines and sizes and generate the model pipe network.

The hydraulic analysis consisted of generating the model network utilizing the GIS information, allocating demands based upon billing records, model calibration, extended period simulations utilizing peaking factors, water quality analysis, and running fire flow analyses. Once the basic model was complete, the work focused the model on a City wide basis to determine requirements to correct existing and future deficiencies based upon population projections, water quality and fire flows.

A Capital Improvement Plan (CIP) was developed utilizing the basic calibrated model population projections, water quality and fire flows to determine system upgrades to correct existing and future deficiencies. This included location and size of future elevated storage, line size upgrades and extensions, looping within the system, water disinfection booster stations and additional water supply necessary within the study period.

Findings of the 2002 Hydraulic Analysis were as follows:

- ◆ The projected population for Bossier City is expected to increase from 56,461 in the Year 2000 to 71,517 in the Year 2025. (The Area Profile Chapter of this plan projects a population increase of 10,000 in the year 2010 and

another increase of 11,000 in the Year 2020 for the MPC planning area.)

- ◆ The projected average day/max month water use for Bossier City is expected to increase from 9.36/15.03 MGD in the Year 2000 to 14.25/22.8 MGD in the Year 2025.
- ◆ Fire flow storage of 5.5 MG in the existing distribution system is adequate through the Year 2025 based on a future population of 71,517 persons.
- ◆ Hydraulic analysis of the Year 2000 validates current problems of low pressures and low chlorine residuals experienced in the distribution system during high demand periods.
- ◆ Improvements recommended in future years improve the low pressure and low chlorine residual problems through the Year 2025.
- ◆ Additional water treatment capacity is required by the Year 2008.
- ◆ A new 2 MG elevated storage tank is required near Kingston Road by the Year 2005 or 2006.
- ◆ A 2 MGD water demand in the area of a future Bossier Parish port can be accommodated with the existing distribution system. Expansion of water treatment capacity would be required to meet this future demand. Demands larger than this would require a new treatment facility at the port site.
- ◆ The existing distribution system is capable of providing 1 MGD to an industry located in the Hazel Jones Industrial Park. Consideration should be given to the timing of a water treatment plant expansion.
- ◆ The existing distribution system is capable of providing 2 MGD to Barksdale Air Force Base (BAFB). An expansion of water treatment capacity would be required to safely provide this flow on a long-term basis.

### Wastewater Treatment

Design capacity of wastewater treatment is based on per capita usage multiplied by the population of the area served. Per capita usage can be calculated by dividing actual plant flow records data by the population of the area served. From this, flows can be accurately projected

for the planning period to determine the necessity for expansion of treatment capacity.

The continued residential growth being experienced in northern Bossier City and its projected continuance in areas that include Lakewood, Bayou Bend, Cross Creek and other similar developments emphasize the anticipated impact on the NEWWTP. The growth trend for the southern portion of Bossier City, which is serviced by the RRWWTP, has the second largest projected change in population with continued growth and expansion in the Plantation Trace, River Bend, Sunflower Place, Golden Meadows, and Plantation Estates developments.

Displayed in **Table 8.3, Treatment Plan Design Flows**, is a tabulation of existing and projected design flows for both treatment plants in Million Gallons/Day (MGD). It is recommended that a new wastewater treatment system master plan including a sewer system evaluation survey be conducted to evaluate present conditions and determine future requirements in order to develop cost effective rehabilitation and expansion plans.

**Table 8.3  
Treatment Plant Design Flows  
City of Bossier City**

Capacity and Flows	Northeast WWTP		Red River WWTP	
	Year 2000	Year 2020	Year 2000	Year 2020
Average Daily Flow	2.00	5.11	6.24	5.56
Maximum Monthly Flow	2.60	6.64	7.95	7.22
Existing Capacity	6.00		8.00	

*Source: WSA Consultant Team/Aillet, Fenner, Jolly & McClelland, Inc.*