

## ***EXECUTIVE SUMMARY***

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Butts County is in the enviable position of being able to design their future water and wastewater systems in a deliberate, logical way that is not often possible. The county is still not highly developed. Most of the unincorporated county is not sewered and so there is limited coverage. The Butts County, et al. Water and Sewer Authority (BCWSA) has service agreements and understandings with the Cities of Flovilla, Jackson and Jenkinsburg for providing water and sewer service. BCWSA understands the value of optimizing the system design in advance and thus has undertaken this 50-year Water and Wastewater Master Plan. The Plan will also satisfy the Georgia Environmental Protection Division's (EPD's) request for a 50-year water and sewer master plan. Completion of the Master Plan will support EPD's approval of the BCWSA's request to increase their Ocmulgee River withdrawal to 10 mgd.

Brown and Caldwell (BC), in conjunction with Carter & Sloope (C&S), has developed this Water and Wastewater Master Plan (Plan) to achieve the goals for the Plan identified by BCWSA. The purpose of the Plan is to:

- To ensure that suitable sources and infrastructure are available to meet the demands for water in the short- and long-term,
- To create a plan for wastewater collection and treatment in the various growth intensity areas of the County, and
- To provide both water and wastewater facilities of sufficient capacity to allow industrial and commercial growth within the County in addition to anticipated residential growth in order to allow for balanced economic growth in the county.

### **PROJECT BACKGROUND**

The State of Georgia and the Atlanta metropolitan area, in particular, have seen significant growth during the last 20 to 30 years. The typical trend for metropolitan areas is for the heart of the area to grow until it becomes unpleasantly crowded and the residents move outward from the core. As residents continue to move further and further away from the city's center, businesses start to follow, creating new urban "centers" and the trend continues. The Atlanta metropolitan area is made up of 10 core counties and more than 20 outlying counties, including Butts County, that make up the metropolitan statistical area (MSA). These outlying counties are beginning to experience more significant growth as people continue to move into their areas. Butts County will likely be a potential outlet for significant growth in the future. Several characteristics contribute towards growth potential. These include I-75 as a major transportation corridor; Jackson Lake, Butts County's premier natural resource, is a big draw for retirees and people looking for second or vacation homes; Henry County is one of the fastest growing counties in the United States and Butts County could experience spillover from there as it continues to develop; and the existing Highways 16 and 36 that provide easy access into the heart of the county.



In addition to the potential growth pressures in Butts County, the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources (DNR) has required the Butts County, et al., Water & Sewer Authority (BCWSA) prepare this Master Plan as supporting evidence for an increase in its surface water withdrawal from the Ocmulgee River.

House Bill (HB) 237, the Comprehensive Statewide Water Management Planning Act, was passed by the General Assembly and signed by the Governor. This bill requires the preparation of a statewide water management plan that will dictate all water withdrawal permit decisions. A Master Plan will assist Butts County in providing well-documented water needs for the 50-year planning period that can be used as input to the statewide water plan.

This Master Plan estimated residential, commercial, and industrial growth for each decade from the present through 2050 along with future water demand and wastewater production.

In this Master Plan, additional water sources and treatment were identified based on a vision for the county expressed by several county leaders and the projected water demand for that vision. Wastewater generation was also forecasted based on water demand. From the amount of water that will be required in the future and the amount of wastewater that could be generated, a variety of water and wastewater system options were evaluated for efficiency, logistics, and costs. These options provide information to make the best choices for future expansion of the systems.

This Plan presents recommendations, based on the options developed, for system growth. A preliminary Capital Improvement Plan was developed, which will provide guidance for making improvements over time and their relative costs. These recommended improvements provide BCWSA the ability to monitor development as it occurs, to prepare for the economic impact of system expansion, and to address permitting and other environmental issues at the appropriate time.

## **CURRENT CONDITIONS AND EXISTING CAPACITY**

Butts County is located approximately 40 miles south of Atlanta. The County is bordered by Henry, Newton, Jasper, Monroe, Lamar and Spaulding Counties. The 2000 Census reports a population of 19,533 living within the 190 square miles that make up the County. The County remains primarily rural and has not yet seen the significant growth experienced by neighboring counties, growth pressures from the metropolitan Atlanta area are expected to move into the County in the next 50 years.

Jackson, Jenkinsburg and Flovilla are the three cities in the county. There are four water system entities in Butts County: Jackson, Jenkinsburg, Flovilla, and Butts County Water and Sewer Authority (BCWSA). There are two public wastewater treatment systems in Butts County. The City of Jackson provides centralized service within its city limits by three wastewater treatment facilities. BCWSA owns the Bucksnot Ranch Land Application System (LAS) facility, located on the west side of I-75 between the Georgia Highways 16 and 36.



**FORECASTED POPULATION AND WATER DEMAND**

To estimate future water service requirements in Butts County, the growth in the number of residents, businesses, and industries was estimated for two different growth scenarios. The more rapid growth pattern, termed Master Plan, for Butts County was used for planning purposes. This scenario is based in part on a population density of 1,000 people per square mile in 2050 (which was the Clayton County density 25 years ago). This density reflects an average density of 1.5 persons per acre, which is mid-range of other similar counties. The other scenario described in the Master Plan and carried throughout the evaluations, was based on an historical population forecast made by the MacIntosh Trail RDC. It is termed the RDC scenario throughout the report.

In determining future increase in water customers in the County, both the RDC and Master Plan scenario population projections define the range of people that could live in the County by 2050. Table ES-1 shows the RDC and Master Plan population estimates for each decade through 2050. The actual population in Butts County will be a function of land use decisions made by local governments and the general economy of the Atlanta MSA and Georgia.

**Table ES-1. County Residential Growth**

| Year              | RDC Scenario |                            | Master Plan Scenario |                            |
|-------------------|--------------|----------------------------|----------------------|----------------------------|
|                   | Population   | Density<br>(People/sq. mi) | Population           | Density<br>(People/sq. mi) |
| 2000 <sup>a</sup> | 19,522       | 103                        | 19,522               | 103                        |
| 2010              | 27,622       | 145                        | 36,570               | 192                        |
| 2020              | 36,307       | 191                        | 53,618               | 282                        |
| 2030              | 43,765       | 230                        | 87,713               | 462                        |
| 2040              | 53,280       | 280                        | 121,809              | 641                        |
| 2050              | 63,439       | 334                        | 190,010              | 1,000                      |

<sup>a</sup> Year 2000 is from Census data.

Water demand is the amount of water that is required by people, businesses, industries, and others. It is important to forecast future demand to effectively plan for system upgrades, to determine if additional water sources will be required, and to develop alternatives for supplying water to consumers. Future water demand was calculated based on future population projections and estimating the types and number of new businesses and industries that will be in Butts County. The water demand projections in the Master Plan are based on the BCWSA customer types projected for each decade during the planning period. Table ES-2 summarizes the projections.



Table ES-2. Forecasted Water Demands

| <b>RDC Scenario Water Demand</b>        |                              |             |             |
|---|------------------------------|-------------|-------------|
| <b>Customer</b>                         | <b>2000<br/>(historical)</b> | <b>2030</b> | <b>2050</b> |
| Residential                             | 968,000                      | 2,457,000   | 3,756,000   |
| Commercial                              | 342,000                      | 766,000     | 1,249,000   |
| Industrial                              | 115,000                      | 258,000     | 437,000     |
| Public/Institutional                    | 8,000                        | 18,000      | 29,000      |
| Municipal/Wholesale                     | 280,000                      | 280,000     | 280,000     |
| Park/Recreation/Conservation            | 8,000                        | 18,000      | 27,000      |
| Transportation/Communication/Utilities  | 5,000                        | 11,000      | 20,000      |
| <b>Average Daily Demand (mgd)</b>       | <b>1.7</b>                   | <b>3.8</b>  | <b>5.8</b>  |
| <b>Average Daily Demand + UAW (mgd)</b> | <b>2.0</b>                   | <b>4.4</b>  | <b>6.7</b>  |
| <b>Peak Daily Demand (mgd)</b>          | <b>3.3</b>                   | <b>8.8</b>  | <b>13.3</b> |

| <b>Master Plan Scenario Water Demand</b> |                              |             |             |
|--|------------------------------|-------------|-------------|
| <b>Customer</b>                          | <b>2000<br/>(historical)</b> | <b>2030</b> | <b>2050</b> |
| Residential                              | 968,000                      | 5,102,000   | 11,528,000  |
| Commercial                               | 342,000                      | 1,535,000   | 3,919,000   |
| Industrial                               | 115,000                      | 518,000     | 826,000     |
| Public/Institutional                     | 8,000                        | 35,000      | 46,000      |
| Municipal/Wholesale                      | 280,000                      | 280,000     | 280,000     |
| Park/Recreation/Conservation             | 8,000                        | 35,000      | 45,000      |
| Transportation/Communication/Utilities   | 5,000                        | 22,000      | 38,000      |
| <b>Average Daily Demand (mgd)</b>        | <b>1.7</b>                   | <b>7.5</b>  | <b>16.7</b> |
| <b>Average Daily Demand + UAW (mgd)</b>  | <b>2.1</b>                   | <b>8.7</b>  | <b>19.2</b> |
| <b>Peak Daily Demand (mgd)</b>           | <b>3.3</b>                   | <b>17.3</b> | <b>38.4</b> |

In addition to the quantity of water projected to be needed, the general location for the demand impacts the infrastructure that will be needed in various parts of the county. Ten areas of the county represent areas of similar in nature and projected growth patterns. The population is expected to grow earliest around I-75 and along the major road corridors from I-75 to Jackson. In addition, Henry County is growing very rapidly and growth is expected to encroach upon northern Butts County. The area with the latest growth is expected to be in the southeast corner of the county as there are fewer transportation corridors and it is farthest from the Atlanta metro area growth. The county is divided into two service areas based on the operating pressure in the water distribution system. The two pressure zones are generally the western and eastern portions of the county. The water demand for these two areas are shown in Table ES-3.



**Table ES-3. Peak Day Flows 2050**

| Service Area | RDC Scenario |               | Master Plan Scenario |               |
|--------------|--------------|---------------|----------------------|---------------|
|              | Average, mgd | Peak Day, mgd | Average, mgd         | Peak Day, mgd |
| West         | 2.7          | 5.4           | 7.4                  | 14.9          |
| East         | 4.0          | 7.9           | 11.8                 | 23.5          |
| Total        | 6.7          | 13.3          | 19.2                 | 38.4          |

## OPTIONS FOR WATER SUPPLY AND TREATMENT

Water supply alternatives for Butts County include continued use of the Ocmulgee River alone or in combination with another source. Other possible water supply sources for Butts County are direct withdrawal from Jackson Lake or reactivation of the Towaliga River intake. Groundwater may be used to augment the county's water supply, but it does not appear to be a significant means of meeting future demand. It may be possible to purchase raw water from another utility, but no commitments have been obtained at this time.

Water treatment alternatives include two alternatives—use of an expanded Ocmulgee Water Treatment Plant (WTP) and use of a combination of an expanded Ocmulgee WTP and a reactivated and expanded Towaliga WTP.

## OPTIONS FOR WASTEWATER COLLECTION, TREATMENT AND DISPOSAL

Two options for wastewater treatment were evaluated—use of a centralized wastewater management system and use of decentralized wastewater facilities. Centralized systems include the use of sewers to collect wastewater from customers and convey it to a publicly owned treatment plant for treatment and disposal. Decentralized systems are typically small systems with treatment either on-site or close to the site where wastewater is generated. Evaluation of wastewater alternatives is done on a watershed (sewershed) basis because sewers take advantage of gravity to convey wastewater. Seven sewersheds were evaluated. The Towaliga River Basin and the Big Sandy Creek Basin will be considered for centralized wastewater management.

Wastewater flow projections were made for those portions of the county where centralized wastewater management will be considered for use.



**Table ES-4. Projected Wastewater Flows, mgd<sup>1</sup>**

| Basin           | RDC Scenario |           | Master Plan Scenario |           |
|-----------------|--------------|-----------|----------------------|-----------|
|                 | 2000-2025    | 2025-2050 | 2000-2025            | 2025-2050 |
| Towaliga Basin  | 0.415        | 1.039     | 0.624                | 1.348     |
| Big Sandy Basin | 0.101        | 0.210     | 0.151                | 0.340     |
| Total           | 0.516        | 1.249     | 0.775                | 1.688     |

<sup>1</sup> Flows are for portions of the basin with centralized wastewater management. Some areas served by decentralized systems including onsite systems.

**MASTER PLAN RECOMMENDATIONS FOR WATER AND WASTEWATER SERVICE**

BCWSA should use the Master Plan scenario with two service centers for planning improvements for the water system. The actual implementation of improvements will depend in part on actions by regulatory agencies, primarily EPD. Table ES-5 lists the major water supply and treatment milestones for the planning period. The next five years will be critical in setting the path forward in water supply for Butts County. The State-wide Comprehensive Water Plan may set forth the anticipated raw water supplies for Butts County. Depending on the recommendations of the State-wide Plan and how specific the recommendations are will determine for which source a Surface Water Withdrawal Permit application should be made. If the State-wide Plan differs from the use of Jackson Lake and the Towaliga River as dual supplies, BCWSA may need to modify the Master Plan.

**Table ES-5. Water System Sequence and Timeline**

| Timing      | Component | System-wide   | East Service Center                      | West Service Center                       |
|-------------|-----------|---|--|---|
| 2005 – 2006 | WTP       |   |  | Repair and rehab of Towaliga WTP at 1 mgd |
| 2005-2006   | Raw Water |   | 9.7 mgd Ocmulgee River withdrawal permit |   |
| 2005-2007   |           | State-wide Water Planning and request Jackson Lake and Towaliga River withdrawals |  |   |
| 2006-2009   | WTP       |   | Expand Ocmulgee WTP to 8 mgd             |   |



**Table ES-5. Water System Sequence and Timeline**

| Timing    | Component | System-wide  | East Service Center  | West Service Center  |
|-----------|-----------|--|--|--|
| 2006-2007 | Raw Water |  |  | Request 4 mgd withdrawal from Towaliga River               |
| 2007-2010 | WTP       |  |  | Construct new 4 mgd WTP at existing site                   |
| 2008-2010 | Raw Water | Update water system planning based on State-wide Comprehensive Water Plan. Jackson Lake re-licensing if needed | Request 8 mgd new withdrawal from Jackson Lake or increased withdrawal from Ocmulgee River                   | Request increased withdrawal from Towaliga River to 10 mgd |
| 2008-2018 | Raw Water |  |  | Plan, design and construct 450 Mgal raw water reservoir    |
| 2015-2020 | WTP       |  |  | Expand Towaliga WTP to 10 mgd                              |
| 2015-2025 | Raw Water |  | Plan, design and construct Jackson Lake intake or 240 Mgal raw water reservoir if no Jackson Lake withdrawal |  |
| 2020-2030 | WTP       |  | Expand Ocmulgee WTP to 16 mgd  |  |
| 2035-2040 | WTP       |  | Expand Ocmulgee WTP to 24 mgd  |  |
| 2035-2040 | WTP       |  |  | Expand Towaliga WTP to 16 mgd                              |

About two-thirds of the area of Butts County will be served by decentralized wastewater management systems. Most will be on-site systems such as septic tanks. The potential for clustered systems will depend largely on interest by developers in such systems. All decentralized cluster



systems to be constructed will be at the expense of the developer for new developments. The BCWSA should be active in setting standards for process, equipment, and materials of construction. In regards to the decentralized individual systems, it is recommended the BCWSA coordinate multiple septage handling facilities. There needs to be at least two systems in Butts County. The Bucksnot Ranch LAS could be used, with the addition of facilities for pretreatment for Nitrogen and BOD reduction.

In the Towaliga River Basin and the Big Sandy Creek Basin centralized wastewater management systems should be evaluated and implemented as development occurs. A projected timeline for each basin has been developed based on background information gathered from a variety of county sources and similar development patterns witnessed in other communities. In the near-term the Authority should focus primarily on industrial/commercial customers for expansion of the existing wastewater system. As new development and redevelopment occur the Authority should continue to work to maintain high water quality in the area. This may require that some residential areas previously planned to be on septic tanks become connected to a sewer system.

**Table ES-6. Towaliga Basin Timeline for Projected Improvements**

|  | Short-Term                       | 2010                                      | 2020   | 2025                                   | 2025-2050   |
|--|----------------------------------|---|--|--|---|
| <b>Projected Wastewater Volume Range</b> | ← 0.42 MGD to 0.62 MGD →         |   |  |  | 1.04 MGD to 1.35 MGD<br>← →                                   |
| <b>Permitted Capacity</b>                | 0.80 MGD (Bucksnot)              | 0.80 MGD (Bucksnot)                       | 0.80 Transitioning to 1.30 to 1.80 MGD (Bucksnot & Towaliga)             | 1.30 or 1.80 MGD (Bucksnot & Towaliga) | 1.30 or 1.80 MGD (Bucksnot & Towaliga)                        |
| <b>Completed Improvements</b>            | Hwy 16 Southeast Quadrant Served | Industrial/Commercial along Hwy 36 served | Industrial/Commercial west of I-75<br>Industrial/Commercial east of I-75 | Towaliga River Reuse WWTF              | Dependent upon future land use plans and development patterns |

A general conclusion of the projected volumes in the Big Sandy Creek Basin is that future wastewater flows could be handled by the reserve capacity at the City of Jackson’s Southside WPCP. This scenario would be dependent on the City of Jackson’s willingness to accept additional customers outside the current city limits and the assumption that reserve capacity at the Southside WPCP would continue to be available. These assumptions are used for planning purposes at this time.



**Table ES-7. Big Sandy Creek Timeline for Projected Improvements**

|  | Short-Term                        | 2010   | 2020  | 2025                                      | 2025-2050   |
|--|-----------------------------------|--|---|---|---|
| <b>Projected Wastewater Volume Range</b> | ←———— 0.10 MGD to 0.15 MGD —————→ |  |   |   | 0.21 MGD to 0.34 MGD →                                      |
| <b>Permitted Capacity</b>                | 0.70 MGD (Jackson)                | 0.70 MGD (Jackson)   | 0.70 Transitioning to 1.0 or 1.20 MGD (Jackson & Indian Springs)                        | 1.0 or 1.2 MGD (Jackson & Indian Springs) | 1.0 or 1.2 MGD (Jackson & Indian Springs)                   |
| <b>Completed Improvements</b>            | Nothing                           | Highway 36 & By-Pass intersection served<br>Rock Quarry & business park served | Brownlee Rd & By-Pass intersection served.<br>Serve future growth along Jackson By-Pass | Indian Springs WWTF                       | Dependent upon future land use plans & development patterns |

**ACTION PLAN FOR NEAR-TERM**

BCWSA will need to be aggressive in implementation of portions of the recommended plan to ensure continued ability to meet the demand for water and wastewater services. At least some of the recommendations are subject to outside forces and will need to be evaluated prior to construction of facilities. The State-wide Comprehensive Water Plan may impact the selection of raw water supplies for the Authority. The construction of cluster systems for wastewater treatment and disposal may become more common in coming years. In the short-term, the Authority should undertake the following actions.

**Water**

- Obtain 9.7 mgd Ocmulgee River withdrawal permit from EPD.
- Reactivate the Towaliga WTP.
- Participate in the development of the State-wide Comprehensive Water Plan.
- Expand the Ocmulgee WTP to 8 mgd.
- Request an increased withdrawal from Towaliga River to 4 mgd.
- Construct a new 4 mgd WTP at the existing Towaliga WTP site.



## **Wastewater**

- Evaluate timing for construction of additional sewers to serve commercial and industrial customers near I-75.
- Obtain commitment from the City of Jackson for the amount of capacity at the Southside WPCP available for use by BCWSA. If insufficient for forecasted need, initiate planning for a new WPCP in the Indian Springs area.
- Develop standards for decentralized wastewater management systems—individual and cluster types.
- Develop and adopt policies for decentralized wastewater management systems regarding capital costs, ownership, operation, capacity, treatment processes, equipment and materials of construction.
- Plan and construct two septage handling facilities.

