Overview of Financial Strengths and Weaknesses of North Central Water Utilities

1.1 Introduction

Evaluation methods, data sources, and literature references are presented in full in later sections 1.2 and 1.3. This "Overview" is intended to provide only the highlights of the analyses of financial strengths and weaknesses of the North Central water utilities.

1.1.1 Overview of Methods

The North Central water utilities; Castalian Springs-Bethpage UD (CS-B UD), Gallatin, Portland, Westmoreland, and White House UD (WHUD) have been evaluated using various tests of economic viability. These tests have been applied to the water utility as a whole; and for all of the utilities, with the exception of CS-B UD, include the finances of water and wastewater systems combined.

The financial performance tests applied range from a regulatory "financial distress" test employed by the Tennessee Comptroller to comparisons to "peer group" scores on other financial tests. There are also comparisons to generally accepted financial performance "rules of thumb" and comparisons to ideal full cost pricing financial indicators. Tests of the financial conditions of the individual utilities should be understood to represent a spectrum with a number of points along it. Those financial measures used by the Comptroller would appear at one end of the spectrum where unfavorable comparisons would indicate a financial crisis. At the other end of the performance spectrum would be comparisons to the ideal "full cost pricing" financial indicators. Unfavorable comparisons to ideal full cost pricing indicators carry far less serious financial implications than unfavorable comparisons to Comptroller financial distress indicators.

It is not the intent of this analysis to criticize, but to point out areas of possible weakness where corrective actions might improve financial performance over time.

The agencies and organizations which comprised the study team felt that it was important to compare the financial performance of the individual utilities to an ideal "full cost pricing" model.

Full-cost pricing of water supply services is important to the water utility since it enables long-term, self-sufficiency of budgets. It is also important that the water utility customer understand the full value of the water and the water service provided by the utility. Full-cost pricing of water provides incentives for customers to conserve the water resource. Full-cost pricing is more than simply balancing the books on an annual basis. In addition to balancing the books, reserve funds are accumulated to continue full services through times of adversity, such as droughts. Reserve funds are provided for operational emergencies and for replacement of water system components which reach the end of their useful life.

1.1.2 Comparisons to Ideal Full Cost Pricing

This overview of the North Central utilities' financial conditions begins with a comparison to the most rudimentary indicator of full cost pricing ideal conditions.

CS-B UD, Portland and Westmoreland all failed by slight margins to meet the most rudimentary test of revenue sufficiency (Operating Ratio > 1.0) for some of the time during 2007-2009 fiscal years. Only Gallatin and WHUD pass this threshold test for all three fiscal years with Operating Ratios consistently > 1.0.

More rigorous tests were applied to determine if the water utilities are achieving ideal "full cost pricing" of their water services. For this study ideal "full cost pricing" means that operating revenue should be consistently sufficient, on an annual basis, to cover all operating expenses , including depreciation, plus annual debt service. In addition, there should be sufficient surplus revenue to build unrestricted reserve funds to, at least, an amount equal to 6 months of normal operating expenses.

None of the 5 regional utilities consistently demonstrated a complete set of ideal "full cost pricing" characteristics. Throughout the region unrestricted reserve funds were too low, except for CS-B UD in 2008 and Portland in 2008. Similarly, Full Cost Recovery Ratios were mostly < 1.0; except for Gallatin in 2007 and 2008. In 2009 Gallatin slipped further from a full cost pricing ideal due to high debt service payments on new sewage treatment plant construction. To achieve ideal full cost pricing conditions all of the regional water utilities should work on raising the levels of their unrestricted reserve funds.

1.1.3 System Productivity Overview

Return on total assets is derived from readily available, annual financial reports to the Comptroller. Net income (operating income (or loss)) added to non-operating income (or loss), **before contributions**; is divided by the total assets of the utility; both capital assets and current assets. This ratio expresses the "return on investment" of all assets combined. It is a benchmarking performance measure for the financial effectiveness of the utility.

American Water Works Association (AWWA) survey results indicate that return on total assets should be in the range of 2.0% to 2.7% in order to compare favorably to a national peer group of water utilities. The 5 North Central utilities struggle to show even slightly positive returns on total assets. Because of high interest payments on long-term debt WHUD showed small percentages of **negative** returns on total assets in both 2008 and 2009. Gallatin and Portland also had negative "return on total assets" in 2009.

Despite these low "return on total assets" percentages, the North Central water utilities showed very substantial positive increases in net assets, a key performance (financial distress) indicator used by the Tennessee Comptroller. These positive results are largely driven by transfer of ownership of water/sewer infrastructure built by developers to serve new housing and then "contributed" to the utility.

1.1.4 Debt Burden Overview

The debt burden of North Central utilities was compared to debt burdens of two peer groups; (1.) a national group of utilities who responded to an AWWA survey (a debt ratio comparison) and (2) water utilities in North Carolina and Georgia (a debt per customer comparison).

Westmoreland has the smallest number of system customers and their 2008 and 2009 debt ratios are less than half of the 2007AWWA Benchmarking Performance Indicators Survey median debt ratio for their population grouping. For 2009, Westmoreland has the least debt load of the 5 water systems in the North Central region; as measured by both the debt/customer ratio and by the total liabilities/total assets "debt ratio". Westmoreland's debt per customer was $392 in 2008 and $378 in 2009.

At the other end of the range of debt ratios; Gallatin, WHUD, and Portland all have 2009 debt ratios which are approaching the AWWA survey bottom quartile for their "population served" category. For Gallatin this high debt load is a very recent development precipitated by the need to construct a new sewage treatment plant. Gallatin, WHUD, and Portland also have the highest debt/customer ratios in the region. For 2009 the Gallatin debt per customer was $1,430; for WHUD $1,626; and for Portland $1,129. The annual debt service on these relatively high debt loads are a major factor driving the less-than-ideal "full cost recovery ratios" for these systems.

1.1.5 Water Price Comparisons Overview

North Central system water prices were compared to statewide median water prices resulting from two statewide surveys. These two surveys were conducted with somewhat different parameters, but they are both useful for comparison to water prices in the North Central Region. Allen & Hoshall (A&H) is a Tennessee-based engineering firm established in 1915 that is active in water system engineering projects. In June of 2009, A&H mailed form letters to 444 utility organizations throughout the state of Tennessee. The purpose of the mailing was to survey the water utilities soliciting information on water and sewer billing rates. 197 survey responses were received. The A&H survey rank-ordered the prices for three quantities of water using "inside residential" rates for a ¾" or smaller meter size. The three water quantities were 5,000 gallons; 15,000 gallons; and 25,000 gallons.

Gallatin adopted new water rates effective July 1, 2009, raising the price for 5,000 gallons inside the city limits to $18.58. This price was still lower than 72% of the 252 water systems included in the 2009 statewide survey. Portland's price of $18.93 for 5,000 gallons inside town limits was lower than 71% of the systems in the statewide survey.

The White House Utility District price for 5,000 gallons, using new rates effective April 1, 2009, was $33.10. Using this same statewide survey, based on inside water rates for cities and uniform rates for utility districts, the White House Utility District price for 5,000 gallons was lower than only 25% of the 252 systems included in the survey.

Since the A & H statewide survey used inside city rates, there may be an inherent comparison bias against utility districts providing service over expansive geographic areas. For this reason, White House Utility District conducted its own statewide survey of water rates in December 2008. In that survey, a water quantity of 5,394 gallons was selected for statewide comparisons.

The White House Utility District's April 1, 2009 price for 5,394 gallons was $35.27, which was lower than 52% of the 298 water systems included in that survey.

The other statewide survey was conducted in 2008 by staff of the White House Utility District (WHUD). WHUD, through an analysis of their own water billing, came to a conclusion that 5,394 gallons represented average base residential water use, excluding irrigation usage. WHUD also used the "outside residential" rates of municipal water systems rather than the "inside" rates of the A&H survey. WHUD reasons that outside rates are more comparable to the rates of the utility districts in the survey. WHUD was able to include water prices from 298 water systems throughout Tennessee in their survey.

Gallatin has the lowest regional "inside" water prices for the water quantities of 5,000 gallons, 15,000 gallons and 25,000 gallons. For these water quantities Gallatin's prices are $4.64, $9.78, and $28.32, respectively, lower than the statewide median prices of the A&H survey. For the 5,000 gallon quantity Portland's "inside" price is the second-lowest in the region at $18.93; which is only $0.35 higher than the Gallatin price and $4.29 below the statewide (A&H) median price of $23.22. Overall, Portland and Gallatin inside water prices are significantly lower than the other regional utilities.

However, when water prices are compared with the WHUD survey results, Portland's "outside" water price ranks second highest behind Westmoreland outside water. Westmoreland and Portland outside water prices for 5,394 gallons are $55.33 and $46.90, respectively. These prices are significantly higher than the statewide WHUD survey median price of $35.75. It is significant to note that Gallatin outside water is priced the lowest (for outside water) in the region; even significantly lower than the prices of the two utility districts adjacent to Gallatin, who do not have "outside" rates.

In comparisons to the A&H survey median prices (inside rates) CS-B UD has, by far, the highest water prices in the region; ranging up to more than 100% higher than the statewide median (A&H survey) price at the 25,000 gallon quantity. However, using comparisons to the WHUD survey results (outside rates of cities alongside utility district rates) the price of CS-B UD water is significantly lower than the prices charged by Portland and Westmoreland to their outside city limit customers.

These water price comparisons show that, due to large differences in water prices among the regional utilities, there are significant boundary line inequities in water price. . For example, adjacent residences on the boundary between Gallatin "outside rate" residences and CS-B UD residences pay $15.50 more per month (per 5,394 gal.) on the Castalian Springs-Bethpage side of the boundary. If adjacent water customers at this boundary purchase 25,000 gallons per month; those on the CS-B UD side pay $82.57 more per month. Other specific examples of these inequities are described in Section 1.3.3.

Even with Gallatin's recent water rate increase, their water prices are below statewide median prices at all quantities; for both of the comparative surveys. Westmoreland has recently raised water rates and their prices are above statewide median prices for all quantities; for both comparative surveys. Castalian Springs-Bethpage UD has not raised rates recently but their prices are already above statewide median prices for all quantities; for both statewide surveys.

1.1.6 Overview of Affordability of Water

A 2003 study published by the National Rural Water Association, "The Cost of Water and Wastewater Service in the United States" shows that the average water and wastewater bill as a % of median household income (MHI) for the entire United States was 1.13 %. For Tennessee the average water/wastewater bill as a % of MHI was 1.05%. An industry rule of thumb is that combined water/wastewater bills over 1.5% of MHI are approaching "unaffordable".

The State of North Carolina has established a "High Unit Cost" grant threshold which requires the average residential water or sewer bill to exceed 0.75% of the median household income of the community before additional state grant assistance is available to assure the affordability of water services. The National Rural Water Association has reported that several states use a water bill of 1% MHI as a rule of thumb to determine if a grant-seeking community is "disadvantaged". For purposes of this study 0.75% MHI was selected as a threshold of water affordability. A more extensive discussion of the selection of this threshold value can be found in Section 1.3.5.

So North Central water prices are also compared to 0.75% of median household income (MHI) as a measure of affordability. For the North Central Region the only areas which demonstrate a significant variance with the 0.75% MHI rule of thumb measure of water affordability are the Trousdale County portion of the CS-B UD service area; the Robertson County and Sumner County "outside rate "portions of the Portland service area; and the Sumner County "outside rate" portion of the Westmoreland service area.

Outside water rates for Portland and Westmoreland are high enough to raise concerns about the affordability of water for low income families and, for Portland, concerns about service boundary price inequities.

1.1.7 Overview of Revenue Structure

All of the water utilities, except Westmoreland, employ uniform rate structures. Westmoreland has a decreasing block rate structure but purchases all its water from Gallatin, which charges for that water at a uniform rate.
Portland and Westmoreland both employ substantially higher water rates for commercial and industrial customers.

Very high base water usage charges represent a particular hardship to low-income or cost-conscious households. Westmoreland outside rate customers, at the low end of monthly usage (2,500 gallons per month), pay $33.62. This is due to the relatively high base usage outside charge employed by Westmoreland. The second-highest charge for a minimal usage of 2500 gallons is $21.92 for outside rate customers in Portland.

Responding to land development pressures in the region Gallatin, Portland and White House UD have all employed some version of "system capacity charges" which tend to place the financial burden of new developments directly with the new customers stemming from new land development. Westmoreland and Castalian Springs-Bethpage UD do not employ a "system capacity charge" and, without such a revenue source, the initial cost of building new infrastructure (or the dedication of existing system capacity) to serve new land developments is largely shouldered by existing customers until new land development build-out is achieved. This

is an important issue in a region of population and employment growth which is stronger than the state as a whole.

The regional utilities have not been active in employing any innovative rate structures which encourage conservation of water. Guidance on key considerations in designing adequate revenue sources is provided in Section 1.3.6.

1.2 Introduction

1.2.1 Oversight of Financial Management of Water Utilities

The Tennessee Comptroller of the Treasury has a long history of active oversight of municipal and utility district water and sewer system financial management. State statute provides that all of these systems should operate as self-sufficient enterprise funds which are fully supported by customer revenues. The Comptroller's active oversight of these systems is in recognition of the reality that any threats of default on local debts will erode the confidence of bond holders and, ultimately, affect not only local government bond ratings and interest rates but also the bond ratings of the entire state. Tennessee has always guarded its superior bond ratings with vigor.

The first line of Comptroller oversight is in the Division of Municipal Audit where annual financial statements of the water and sewer systems are reviewed with special attention to any early signs of financial troubles. Water utilities must account for depreciation of their capital assets on a yearly basis with Comptroller-approved depreciation schedules. After annual depreciation is taken into account the Municipal Audit review will determine if the system is "financially distressed". Financially distressed systems are defined as having one, or more, of the following conditions: having a deficit total net assets in any one year; having a negative change in net assets for a period of two consecutive years; or being currently in default on any debt instruments.

The most sensitive trigger for oversight action is the negative change in net assets for two consecutive years. In 2009 the Tennessee General Assembly changed this financial oversight trigger from three consecutive years of negative change in net assets to the tighter standard of two consecutive years of negative change in net assets.

Financially distressed utility districts are referred to the jurisdiction of the Utility Management Review Board where the Board works with utility management to create an action plan to relieve the financial distress. In many cases, water rate adjustments are necessary before the troubled utility can be released from Board jurisdiction. In a similar fashion, with the same triggers of "financial distress", water and sewer systems operated by municipalities or counties are referred to the Water and Wastewater Financing Board for corrective action.

Both the Utility Management Review Board and the Water and Wastewater Financing Board were created in 1987 as a part of a larger Clean Water Initiative undertaken by the Governor's Office and the Tennessee General Assembly in the mid-1980s.

A further component of the financial oversight of water utilities is housed in the Comptroller's Office of State and Local Finance where utility districts and municipal governments must come for review and authorization of the issuance of bonds or notes for financing water projects. This Office also houses the staff of both of the oversight boards described above.

The various components of the Comptroller's oversight of water utility fiscal management constitute one of the strongest systems of state-level controls in the U.S. Since the key components of this oversight have been in place for over 20 years, and the requirements for responsible fiscal management have only been strengthened over that time, there have been strong incentives for Tennessee water utilities to move toward full cost pricing of the water services provided to their customers.

To complete the financial status report on North Central water utilities, which follows in the next several pages, data was pulled from the Annual Financial Statements of the water utilities, and staffs in the Municipal Audit Division and in the Office of State and Local Finance of the Comptroller were consulted.

Appropriate data bases of water utility financial performance were identified in order to compare the financial performance of North Central utilities with larger groups of similar utilities. As will be described in more detail below, appropriate data bases for comparison of financial performance were found in the Allen and Hoshall, Tennessee Water and Sewer Rate Survey; data bases on Georgia and North Carolina utilities maintained by the University of North Carolina, Environmental Finance Center; and the American Water Works, 2007 Annual Survey Data and Analyses Report. Comparisons were also made to generally accepted performance benchmarks in the marketing of utility bond issues.

1.2.2 Full-Cost Pricing

Full-cost pricing of water supply services is important to the water utility since it enables long-term, self-sufficiency of budgets; a requirement of Tennessee statute. It is also important that the water utility customer understand the full value of the water and the water distribution service provided by the utility. Full-cost pricing of water provides incentives for customers to conserve the water resource. Full-cost pricing is more than simply balancing the books on an annual basis. In addition to balancing the books, reserve funds are accumulated to continue full services through times of adversity, such as droughts. Reserve funds are provided for operational emergencies and for replacement of water system components which reach the end of their useful life.

If a water utility operates with significant inefficiencies; with large volumes of unaccounted for water; or with high debt burdens caused by disorderly asset management; the prices which customers must pay for water could exceed a reasonable full-cost pricing. The following is a quote from an October 10, 2008 paper entitled "The State of Full Cost Pricing" produced by the University of North Carolina, Environmental Finance Center.

"While it seems reasonable to expect that utilities that charge more for service are more likely to have full cost pricing, the data does not bear this out. Although there is a slight trend among utilities in Georgia, there is generally very little correlation between the amount that utilities charge for, in this case 6,000 gallons of water and the system's operating ratio. This means that utilities which charge very little for water service are almost as likely as utilities which charge very much for water to have full cost pricing and vice versa."

Water utilities which have kept water loss to a minimum, have highly efficient operations, and, through continuous asset management, have kept debt burdens low; are most likely to be the utilities which achieve full cost pricing without charging high prices for water.

1.3 Status of North Central Water Utilities with Respect to the Comptroller's Fiscal Standards and Financial Viability Measures

The North Central water utilities; Castalian Springs- Bethpage UD (CS-B UD), Gallatin, Portland, Westmoreland, and White House UD (WHUD) have been evaluated using various tests of economic viability. These tests have been applied to the water utility as a whole; including the financial condition of combined water and sewer funds as reported to the Tennessee Comptroller. CS-B UD is the one utility in this group which has no sewer system to operate.

1.3.1 Revenue Sufficiency and Reserve Funds

Tables 1 and 2 which follow can be used to compare the financial conditions of North Central utilities to the ideal financial indicators of full cost pricing.

A threshold test of revenue self-sufficiency is the Operating Ratio (OR). The OR is calculated by dividing annual operating revenues by annual operating expenses, making sure those annual operating expenses also include depreciation. In Tennessee the amounts of the annual budget dedicated to depreciation are established by Comptroller-sanctioned depreciation schedules. Operating Ratios must remain consistently above 1.0 from year to year as an important indicator of full-cost pricing.

The 2007, 2008, and 2009 Operating Ratio columns of Table 1 below show that North Central utilities do not always meet this basic threshold test. Gallatin and White House UD have been consistent over the three years in passing this threshold test. CS-B UD has failed this basic test in two of the three years. Across the three years, for all 5 utilities, there is a general pattern of decline in Operating Ratios since the beginning of the National Economic Recession.

Table 1: Revenue Sufficiency

System/ Fund Name	Operating Revenues			Operating Ratio			Full Cost Recovery Ratio		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Castalian Springs-Bethpage Utility District (water only)	$2,015,675	$2,061,649	$1,985,342	1.04	0.99	0.99	0.949	0.900	0.896
Gallatin Water and Sewer Enterprise Fund*	$8,071,541	$8,538,950	$9,371,205	1.18	1.15	1.08	1.050	1.040	0.830
Portland Water and Sewer Enterprise Fund	$4,584,277	$4,980,273	$4,647,135	1.10	1.06	0.96	0.906	0.890	0.800
Westmoreland Water and Sewer Enterprise Fund**	$1,002,909	$1,145,847	$1,184,289	0.95	1.07	1.02	0.805	0.905	0.960
White House Utility District (water and sewer)***	$16,160,000	$15,079,000	$15,377,053	1.18	1.05	1.08	0.917	0.827	0.850

*Gallatin raised water rates July 1, 2009. The effects of these rate increases are not included in the revenue sufficiency figures above.
**Westmoreland raised water rates effective September, 2009. The effects of these rate increases are not included in the revenue sufficiency figures above.
*** White House Utility District raised water rates effective April 1, 2009. The water rates were in effect for 75% of the 2009 fiscal year.

Research at the University of North Carolina, Environmental Finance Center has shown that as many as 50% of the 900 water utilities studied in North Carolina and Georgia had an OR less than 1.0 for fiscal year 2006-2007. The North Central data, showing a much-better-than 50% result during economic recession years, support the conclusion that the Tennessee Comptroller's policy of fiscal oversight of water utilities exceeds those of some surrounding states.

The Full Cost Recovery Ratio columns of Table 1 set a higher standard for ideal full-cost pricing by including annual debt service in the denominator of the previous OR calculation. This ratio might be called a Full Cost Recovery Ratio (FCRR) but the sufficiency of this ratio must also be examined in conjunction with consideration of accumulated unrestricted reserve funding.

From Table 1 it can be seen that for 2007, 2008, and 2009 only Gallatin has demonstrated some success in passing this higher-level test of ideal full cost recovery. In 2009 Gallatin's full cost recovery ratio dipped sharply below 1.0 due to new debt service requirements. Effective July 1, 2009, the beginning of their 2010 fiscal year, Gallatin raised water rates by approximately 20%. The Gallatin full cost recovery ratio should show improvement for 2010.

Gallatin, Westmoreland and White House UD have all raised water rates in 2009 and their operating ratios and full cost recovery ratios should show improvement in 2010. Portland and CS-B UD have steadily declining FCRR(s) and have not raised water rates for several years.

To achieve true "full cost pricing" the water utility must have the full cost recovery ratio (FCRR) consistently above 1.0 and simultaneously maintain unrestricted reserve funds which can be available in operating emergencies and available for periods of revenue shortage which may accompany drought conditions. If such unrestricted reserves are of sufficient size they can also be used for replacement of capital assets as they reach the end of useful life. Since debt service is also included in the FCRR this also provides another mechanism for securing funding for system replacement.

Table 2 below shows the 2008 and 2009 amounts of unrestricted cash reserves held for investment; unrestricted cash reserves as a percentage of operating expense (including depreciation); and as a percentage of debt service. These unrestricted reserves are over and above the normal operating cash reserves typically held in checking accounts to make sure that outstanding bills can be paid. Good management practice holds that 8% of annual operating expenditures should be maintained in highly liquid cash reserves to be sure that bills are paid on time. Further unrestricted reserves at a minimum of 6 months of operating expenses, or sufficient to replace the single most expensive equipment asset, are highly desirable.

Table 2 shows that unrestricted reserve funds held by Gallatin, Westmoreland and White House UD fall below the ideal 50% of annual operating expense threshold. The Table 2 footnote regarding Portland indicates that, as the 2009 fiscal year ended, there was an unresolved issue regarding the need to fully fund the debt service reserve fund. For this reason Portland's unrestricted funds are not reported for 2009. While CSB-UD reported adequate unrestricted reserves in 2008, these reserves had slipped below an ideal level for 2009.

From the Table 1 and Table 2 data it appears that Portland faces the greatest challenges in eventually becoming an ideal full cost pricing utility. Later, Table 5 will show that Portland's inside water rates are considerably lower than surrounding systems, other than Gallatin. Portland can possibly re-build reserve funds and become a full cost pricing utility through re-evaluation of water rates and through increasing operational efficiencies, especially in regard to unaccounted for water loss.

Gallatin, Westmoreland, and White House UD all took action in 2009 to raise water rates. Through these actions these utilities have created opportunities to re-build reserve funds and overcome full cost recovery ratio deficits.

For 2007 and 2008 the Gallatin Water and Sewer fund exhibited the region's best full cost pricing characteristics while maintaining low water rates. Even with the July 1, 2009 water rate increase, Gallatin still has the lowest water rates among the North Central utilities (see later Table 5). Clearly, Gallatin may have the best opportunity to achieve the ideal of full-cost water pricing in conjunction with relatively low water rates.

Table 2: Unrestricted Reserve Funds

System/ Fund Name	Unrestricted Reserve Funds Held for Investment		Unrestricted Reserve Funds As a Percentage of Total Operating Expense		Unrestricted Reserve Funds As a Percentage of Debt Service	
	2008	2009	2008	2009	2008	2009
Castalian Springs - Bethpage Utility District (water only)	$1,122,144	$700,961	53.7%	34.9%	565%	341%
Gallatin Water and Sewer Enterprise Fund	$1,494,488	*	20.2%	*	186%	*
Portland Water and Sewer Enterprise Fund	$2,798,687	**	59.6%	**	312%	**
Westmoreland Water and Sewer Enterprise Fund	$341,585	$128,558	32.0%	11.1%	171%	183%
White House Utility District (Water and Sewer)	$4,510,000	$4,733,951	31.3%	33.4%	118%	124%

*Gallatin's unrestricted reserve funds held for investment could not be determined from the 2009 Annual Financial Statement.

**At the close of the 2009 fiscal year Portland had not fully funded the Debt Service Reserve Fund. For this reason the unrestricted reserve funds for Portland for 2009 are not shown.

1.3.2 System Productivity

This section examines two top-level performance measures which may help to explain the pattern of full cost recovery ratio deficits for North Central utilities.

Return on total assets is derived from readily available, annual financial reports to the Comptroller. Net income (operating income (or loss)) added to non-operating income (or loss), **before contributions**; is divided by the total assets of the utility; both capital assets and current assets. This ratio expresses the "return on investment" of all assets combined. It is a benchmarking performance measure for the financial effectiveness of the utility.

In the 2007 American Water Works Association Benchmarking Survey 180 water utilities across the nation reported their "return on assets" ratio. Those utilities serving populations 0-10,000 reported a median value of 2.5% return on assets. Those utilities serving 10,001- 50,000 populations reported a median value of 2.7% return on assets. The median value for utilities serving 50,001-100,000 population was 2.4%. Of the 180 water utilities responding to this AWWA survey, 106 utilities were combined water and sewer operations. Since 4 of the 5 North Central utilities have water and sewer combined operations it is relevant that the AWWA survey reveals that there was a "return on assets' median value of 2.0% for water and sewer combined utilities (106 respondents).

AWWA survey results indicate that North Central utilities' returns on total assets should be in the range of 2.0% to 2.7%. Table 3 data below reveals that the 5 North Central utilities struggle to show even slightly positive returns on total assets. Because of high interest payments on long-term debt WHUD showed small percentages of **negative** returns on total assets in both 2008 and 2009. Gallatin and Portland also had negative "return on total assets" in 2009.

Table 3: System Productivity

	Total Assets Before Liabilities		Net Income Before Contributions and Transfers		Return on Total Assets (Net Income/Total Assets)		Net Assets Change	
System/ Fund Name	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2007-2008**	**2008-2009**
Castalian Springs - Bethpage Utility District (water only)	$7,759,460	$7,857,514	$3,196	$1,880	0.04%	0.02%	$3,196	$501,880*
Gallatin Water and Sewer Enterprise Fund	$77,041,451	$117,627,817	$1,172,537	($454,927)	1.50%	-3.90%	$7,487,981***	$265,641
Portland Water and Sewer Enterprise Fund	$31,176,120	$32,179,837	$185,623	($615,074)	0.60%	-1.90%	$838,049	$504,534
Westmoreland Water and Sewer Enterprise Fund	$6,064,613	$6,257,064	$12,046	$2,547	0.20%	0.04%	$30,984	$144,287**
White House Utility District (Water and Sewer)	$131,777,389	$140,019,577	($1,622,034)	($1,266,375)	-1.20%	-0.90%	$12,820,195	$9,472,344

*Includes a $500,000 contribution from Sumner County for an underserved area.
**Includes a $141,740 grant from USDA for Sewer System Improvements.
*** Includes proceeds of bond sales not yet dedicated to construction underway.

It has been explained previously that the Tennessee Comptroller focuses on the annual change of net assets of water utilities. Table 3 shows the 2008 and 2009 net assets changes for North Central utilities. For this high-level indicator of system productivity North Central utilities show consistently positive results.

Contributions of capital assets by developers generate some large increases in net assets. These developers build new residential service water and sewer lines in subdivisions to utility specifications and then "contribute" the ownership of these new "assets" to the utilities. Despite the negative return on total assets figures for WHUD; their 2008 and 2009 positive net assets changes are quite large.

Table 3 System Productivity numbers for all of the North Central utilities are quite low, or even negative, and suggest the possibility that developer contributions of capital assets (new service lines) should be viewed more critically. Contributed service lines with high maintenance costs and low income potential could become financial impediments. Acceptance of these contributed distribution lines brings added Comptroller-required depreciation charges and the financial implications of consuming currently available water treatment capacity. Some of the region's utilities employ "capacity charges" to offset these impacts; but others do not.

1.3.3 Long-Term Debt and Debt Capacity

In Table 4 below, two different performance measures are employed to evaluate the debt load of North Central utilities. The previously referenced AWWA 2007 benchmarking survey employed the "debt ratio" performance indicator of total liabilities (including current liabilities) divided by total assets. As explained previously, the AWWA survey respondents were divided into groups according to "population served". For the "population served categories of 0-10,000; 10,001-50,000; and 50,001-100,000 the "debt ratio' median scores were 48.6%, 26.8%, and 26.9%; respectively. For these same "population served" groupings the bottom quartile (75% of respondents had lower debt ratios) started at 51.9%, 45.8%, and 28.9%; respectively.

Table 4: Long-Term Debt and Debt Capacity

	Long-Term Debt and Leases		Total Liabilities/Total Assets*		Debt Per Customer**		Average Debt Service Coverage Ratio	Next Five Year Debt Outlook
System/ Fund Name	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2006-2008**	**2009-2014**
Castalian Springs - Bethpage Utility District (water only)	$2,941,680	$2,743,143	42.6%	37.0%	$475	$443	2.02	There is some early planning for a water treatment plant but construction is likely beyond the 5-year period
Gallatin Water and Sewer Enterprise Fund	$6,820,000	$33,864,444***	10.5%	41.1%	$1,426	$1,430	4.47***	No additional debt in 5-year period
Portland Water and Sewer Enterprise Fund	$11,174,812	$11,635,349	39.8%	40.1%	$1,084	$1,129	1.31	During 2009 additional debt of $900,000 was accumulated to extend water and sewer lines to a new elementary school. There were prospects for additional debt for an AMR Project
Westmoreland Water and Sewer Enterprise Fund	$1,161,762	$1,118,314	17.6%	21.7%	$392	$378	1.28	No change in Debt Service anticipated
White House Utility District (Water and Sewer)	$51,021,715	$50,183,439	41.3%	38.0%	$1,669	$1,626	1.32	The outlook for additional debt in 5 years is uncertain due to the economic forecast for the area. The Capital Improvement Plan is being revised.

* Total liabilities includes long-term debt and leases plus current liabilities.
**Debt includes long-term debt and leases and not current liabilities. Sources for number of customers: 2009 Financial Report (Castalian Springs-Bethpage U.D. and White House U.D.); 2009 USCOE Phase 1 Report (Gallatin, Portland, Westmoreland with water customers added to sewer customers as if they were two separate groups).
*** The calculated average Debt Service Coverage Ratio for Gallatin for 2006-2008 does not include Debt Service for the additional $26,960,000 in debt assumed in 2009. This new debt increased the debt service burden by 397%. The new debt for Gallatin in 2009 is due to construction of a new sewage treatment plant.

Westmoreland has the smallest number of system customers and their 2008 and 2009 debt ratios are less than half of the AWWA median debt ratio for their population grouping. For 2009 Westmoreland has the least debt load of the 5 water systems in the North Central region using both of the debt load measures of Table 4.

At the other end of the range of debt ratios; Gallatin, WHUD, and Portland all have 2009 debt ratios which are approaching the AWWA survey bottom quartile for their "population served" category. For Gallatin this high debt load is a very recent development precipitated by the need to construct a new sewage treatment plant.

CS-B UD has a debt load which is well below the AWWA median score for their size category.

Referencing the previously mentioned UNC Environmental Finance Center data set of 900 water utilities in North Carolina and Georgia, it is found that approximately 1/2 of the utilities have debt per customer equal to or less than $1,000. More than 75% of these utilities have debt per customer levels below $2,500.

Table 4 shows that Westmoreland and CS-B UD have the lowest debt/customer ratios in the North Central Region. WHUD has the highest debt/customer ratio; a ratio more than 400% of the ratio for Westmoreland. Portland and Gallatin also have debt/customer ratios over $1,000.

An average 2006-2008 debt service coverage ratio (DSCR) was calculated for each system using standard methods required by bond underwriters. This three-year average figure was produced to dampen out fluctuations in net operating income. Bond covenants and loan agreements for water utilities typically require a demonstration of a minimum DSCR of 1.1. For the larger water utilities which receive bond ratings on their debt, those rated in 2007 with an "AAA" rating had a median DSCR of 1.5. The median DSCR for systems with an "AA" rating was 1.35, and, for those systems with "A" ratings, the median DSCR was 1.32 (source "The State of Full Cost Pricing", UNC).

The DSRC values in the North Central Region are adequate; but not outstanding. The Gallatin DSCR which was 4.47 for the average of 2006-2008 dropped to 1.35 for 2009, but was still the highest in the region; and equal to the median DSCR for systems having an "AA" bond rating.

A survey of the 5 system managers revealed no substantive plans for additional debt over the next 5 years. With the exception of the Westmoreland system, with its very low debt burden; there is limited capacity for additional debt in the other 4 systems. Recent water rate increases instituted by Gallatin and WHUD should generate higher net incomes which would build capacity for additional debt in the future.

1**.3.4 North Central Water Price Comparisons**

Water price is an unreliable indicator of water system efficiency or full cost pricing practices. However, consumers of water system services are interested in knowing how their water bills compare to water bills from other utilities across the state. These issues always come into clearer focus when an increase in water rates is proposed for debate. Also, in the context of this regional study, it is appropriate to compare water service

prices across the region and to develop a broader perspective about regional water prices as compared to median statewide prices in order to examine the potential for raising revenue for long-term regional water supply projects.

In 2008-2009 there were two statewide surveys of water prices which included both utility districts and municipal water supply systems. These two surveys were conducted with somewhat different parameters but they are both useful for comparison to water prices in the North Central Region.

Allen & Hoshall is a Tennessee-based engineering firm established in 1915 which is active in water system engineering projects. In June of 2009 Allen and Hoshall mailed form letters to 444 utility organizations throughout the State of Tennessee. The purpose of the mailing was to survey the water utilities soliciting information on water and sewer billing rates. 197 survey responses were received. A similar survey had been conducted in 2008. So if no response was received in 2009 from a particular utility, but 2008 data from that utility was available, then the prior year (2008) data was included in the survey results and indicated by *. By using this method 2008-2009 data was included in survey results for 252 water systems. The Allen and Hoshall survey rank- ordered the prices for three quantities of water using “inside residential” rates for a ¾” or smaller meter size. The three water quantities were 5,000 gallons; 15,000 gallons; and 25,000 gallons.

The other statewide survey was conducted in 2008 by staff of the White House Utility District (WHUD). First, web sites of utilities were checked for water rates. Then, if information was inadequate, White House UD contacted utility districts or municipal water systems by phone to obtain water rates. White House UD, through an analysis of their own water billing, came to a conclusion that 5,394 gallons represented average base residential water use, excluding irrigation usage. White House UD also used the “outside residential” rates of municipal water systems rather than the “inside rates of the Allen& Hoshall survey. White House UD reasons that outside rates are more comparable to the rates of the utility districts in the survey. Customer density of the portions of municipal water systems subject to municipal outside rates would be more comparable to the customer densities of rural and suburban utility districts. White House UD was able to include water prices from 298 water systems throughout Tennessee in their survey.

Table 5 on the following page compares the water prices of North Central water utilities with the median 2008-2009 statewide water prices as determined from the 2008-2009 Allen & Hoshall and the 2008 White House UD (WHUD) water price surveys.

For the North Central systems the water rates used were from the 2009 Annual Financial Statement or from updated rate information supplied by regional water managers in the fall of 2009. The more recent water rate increases in Gallatin, Westmoreland and, for White House UD, are taken into account in Table 5.

In making the Table 5 comparisons some water prices from North Central utilities were already included in the statewide surveys. For those utilities which were not included in the two statewide surveys, most current water rate sheets were used to calculate the water prices for Table 5.

Table 5: North Central Water Price Comparisons

	Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H
	Price of 5,000 Gal. at Residential "Inside" Rate	Variance from Statewide Median Price of 5,000 Gal.[1]	Price of 15,000 Gal. at Residential "Inside" Rate	Variance from Statewide Median Price of 15,000 Gal.[2]	Price of 25,000 Gal. at Residential "Inside" Rate	Variance from Statewide Median Price of 25,000 Gal.[3]	Price of 5,394 Gal. at Residential "Outside" Rate[4]	Variance from Statewide Median Price of 5,394 Gal.[5]
System/Fund Name	**2008-2009**	**2008-2009**	**2008-2009**	**2008-2009**	**2008-2009**	**2008-2009**	**2008-2009**	**2008-2009**
Castalian Springs - Bethpage Utility District (water only)	$42.05	$18.83	$123.45	$63.68	$204.85	$109.73	$45.26	$9.51
Gallatin Water and Sewer Enterprise Fund*	$18.58	($4.64)	$49.99	($9.78)	$81.41	($28.32)	$29.76	($5.99)
Portland Water and Sewer Enterprise Fund**	$18.93	($4.29)	$56.53	($3.24)	$94.13	($0.99)	$46.90	$11.15
Westmoreland Water and Sewer Enterprise Fund***	$35.19	$11.97	$75.69	$15.92	$113.29	$18.17	$55.33	$19.58
White House Utility District (Water and Sewer)******	$33.10	$9.88	$88.30	$28.53	$143.50	$48.38	$35.26	($0.49)

[1] Variance from Statewide Median Price of $23.22 for 5,000 gallons in Allen and Hoshall Survey.

[2] Variance from Statewide Median Price of $59.77 for 15,000 gallons in Allen and Hoshall Survey.

[3] Variance from Statewide Median Price of $95.12 for 25,000 gallons in Allen and Hoshall Survey.

[4] The Utility Districts do not have separate "Inside" and "Outside" rates. Only Gallatin, Portland and Westmoreland have higher "Outside" rates for water customers outside city limits.

[5] Variance from Statewide Median Price of 5,394 Gallons in White House U.D. Survey ($35.75).

*Gallatin raised water rates effective July 1, 2009. The effects of these new rates are not reflected in the 2009 Annual Financial Report. The new rates are reflected in the comparisons above.

** In 2010 Portland water rates are the same as those that became effective August 1, 2006.

***Westmoreland raised water rates effective September, 2009. The effects of these new rates are not reflected in the 2009 Annual Financial Report. The new rates are reflected in the comparisons above.

****White House U.D. raised water rates effective April 1, 2009. These new rates were used in the comparison calculation above.

Columns B, D, and F of Table 5 above show the variances from the statewide median prices of the quantities of water in the Allen & Hoshall (A&H) survey; 5,000 gallons; 15,000 gallons; and 25,000 gallons.

Gallatin has the lowest regional “inside” water prices for the water quantities of 5,000 gallons, 15,000 gallons and 25,000 gallons. For these water quantities Gallatin’s prices are $4.64, $9.78, and $28.32, respectively, lower than the statewide median prices of the A&H survey. For the 5,000 gallon quantity Portland’s “inside” price is the second-lowest in the region at $18.93; which is only $0.35 higher than the Gallatin price and $4.29 below the statewide (A&H) median price of $23.22. Overall, Portland and Gallatin inside water prices are significantly lower than the other regional utilities.

However, when water prices are compared with the WHUD survey results, Portland “outside” water ranks second highest behind Westmoreland outside water. Westmoreland and Portland outside water prices for 5,394 gallons (Table 5, Column H) are $19.58 and $11.15 more expensive, respectively, than the statewide WHUD survey median price of $35.75. It is significant to note that Gallatin outside water is priced the lowest in the region; even significantly lower than the prices of the two adjacent utility districts in the region, who do not have “outside” rates.

In comparisons to the A&H median prices (inside rates) Castalian Springs-Bethpage UD (CS-B UD) has , by far, the highest water prices in the region; ranging up to more than 100% higher than the statewide median price at the 25,000 gallon quantity. However, using comparisons to the WHUD survey results (outside rates of cities alongside utility district rates) the price of CS-B UD water is significantly lower than the prices charged by Portland and Westmoreland to their outside city limit customers (Table 5, Column H) at the 5,394 gallon quantity.

These water price comparisons show that, due to large differences in water prices among the regional utilities, there are significant boundary line inequities in water price. For example, adjacent residences on the boundary between Gallatin “outside rate” residences and CS-B UD residences pay $15.50 more per month (per 5,394 gal.) on the Castalian Springs-Bethpage side of the boundary. If adjacent water customers at this boundary purchase 25,000 gallons per month; those on the CS-B UD side pay $82.57 more per month (Note: for this comparison the 25,000 gallon outside rate price for Gallatin is not in Table 5).

Adjacent residences on the boundary between Portland “outside rate” residences and White House UD residences pay $11.64 more per month (per 5,394 gal.) on the Portland side of the boundary. If adjacent residential water customers at this boundary purchase 25,000 gallons per month; those on the Portland side pay $72.59 more per month (note: the Portland outside residential price for 25,000 gallons is not in Table 5, but was calculated for this comparison) .

Even with Gallatin’s recent water rate increase, their water prices are below statewide median prices at all quantities; for both of the comparative surveys. Westmoreland has recently raised water rates and their prices are above statewide median prices for all quantities; for both comparative surveys. Castalian Springs-Bethpage UD has not raised rates recently but their prices are already above statewide median prices for all quantities; for both comparative surveys.

For the other 2 regional utilities the comparisons to statewide median prices vary significantly according to whether inside rates are compared versus comparisons with outside rates. This pattern of positive and negative variances from statewide median prices indicates that water prices for Portland and White House UD align closely with statewide median prices. However, the difference between Portland inside rates and Portland outside rates is significant.

1.3.5 Affordability of North Central Public Drinking Water

Affordability of drinking water is most critical for those families at, or below, median household income. Cost considerations of low income households certainly favor water conservation, so affordability comparisons will be made at the lower quantities of water usage in Table 5 above. Those lower quantities are 5,000 gallons in the Allen & Hoshall survey (Table 5, column A prices) and 5,394 gallons in the White House UD survey (Table 5, column G prices).

In Table 6 below the water prices of Table 5 will be compared to local median household incomes and expressed as percentages of those local median household incomes.

Table 6: Affordability of North Central Public Water

	2008 Median Household Monthly Income of Counties Comprising a Portion of The Water System Service Area		5,000 Gal. "Inside Rate" Water Price as a Percentage of 2008 County Median Household*	2008 Median Household Monthly Income of Counties Comprising the "Outside Rate" Service Areas**		5,394 Gallon "Outside Rate" Water Price As a Percentage of County Median 2008 Household Income***
System/Fund Name	**Amount**	**County**	**Percentage**	**Amount**	**County**	**Percentage**
Castalian Springs - Bethpage Utility District (Water Only)	$4,609	Sumner	0.91%	-	-	-
	$3,251	Trousdale	1.29%	-	-	-
Gallatin Water and Sewer Enterprise Fund	$4,609	Sumner	0.40%	$4,609	Sumner	0.65%
Portland Water and Sewer Enterprise Fund	$4,005	Robertson	0.47%	$4,005	Robertson	1.17%
	$4,609	Sumner	0.41%	$4,609	Sumner	1.02%
Westmoreland Water and Sewer Enterprise Fund	$4,609	Sumner	0.76%	$4,609	Sumner	1.20%
White House Utility District (Water and Sewer)	$4,005	Robertson	0.83%	-	-	-
	$4,609	Sumner	0.72%	-	-	-

* See Table 5, Column "A" for water prices.

** Note: Castalian Springs - Bethpage U.D. and White House U.D. do not have "Outside" water rates.

*** See Table 5, Column "G" for "Outside Rate" water prices.

For the rural and suburban utility districts of the North Central Region the Table 5 water prices will be compared to the median household incomes of the counties which comprise the utility district service area.

For the region's municipal water systems, first, the "inside rate" water prices for 5,000 gallons (Table 5, column A water prices) will be compared to the median household incomes of the counties which comprise the municipal system service areas.

Next, the city "outside water rate" prices for 5,394 gallons (Table 5, column G water prices) will be compared to the median household incomes of the counties comprising the "outside rate" portions of the municipal water system service areas.

A common measure, used by infrastructure funding agencies is the average residential utility bill as a percentage of Median Household Income (MHI). A 2003 study published by the National Rural Water Association, "The Cost of Water and Wastewater Service in the United States" shows that the average water and wastewater bill as a % of MHI for the entire United States was 1.13 %. For Tennessee the average water/wastewater bill as a % of MHI was 1.05%. An industry rule of thumb is that combined water/wastewater bills over 1.5% of MHI are approaching "unaffordable". Consideration was given to USEPA's affordability threshold of 2.5% MHI. This threshold was found to be inappropriate for this study since it is used by USEPA as a regulatory measure for approval of variance technologies. Advocates of small public water systems see the USEPA threshold as unreasonably high and an artificial barrier to USEPA approvals of variance technologies sought by some small water systems. The National Rural Water Association has reported that several states use a water bill of 1% MHI as a rule of thumb to determine if a grant-seeking community is "disadvantaged."

The State of North Carolina has established a "High Unit Cost" grant threshold which requires the average residential water or sewer bill to exceed 0.75% of the median household income of the community before additional state grant assistance is available to assure the affordability of water services. In Tennessee the economic recession and relatively high unemployment have placed new burdens on low-income households. For these reasons the water affordability threshold of 0.75 % MHI was selected for use in this study.

So the values of Table 6 are also compared to 0.75% of median household income as a measure of affordability.

For the North Central Region the only areas which demonstrate a significant variance with the 0.75% MHI rule of thumb measure of water affordability are the Trousdale County portion of the CS-B UD service area; the Robertson County and Sumner County "outside rate "portions of the Portland service area; and the Sumner County "outside rate" portion of the Westmoreland service area. Table 5 has already shown that outside rates for Portland and Westmoreland are significantly higher than outside statewide median rates at the 5,394 quantity level.

Outside water rates for Portland and Westmoreland are high enough to raise concerns about the affordability of water for low income families and, for Portland, concerns about service boundary price inequities.

The relatively high rates for CS-B UD raise both low-income affordability issues and service boundary equity issues.

1.3.6 Revenue Structure of North Central Water Utilities

Tennessee law requires that public water supply systems maintain self-sufficient budgets driven by revenues from water customers. The Tennessee Comptroller of the Treasury actively enforces this policy. The U.S. Environmental Protection Agency and its regulatory partners in the Tennessee Department of Environment and Conservation, Division of Water Supply require that water supply systems maintain financial capacity, technical capacity, and managerial capacity. These combined institutional capacity requirements drive the need for "full cost pricing" annual revenues.

To determine the most appropriate revenue structure each water utility must evaluate the characteristics of its system, its customer base, and the options for revenue stability and predictability ("Setting Small Drinking Water System Rates for a Sustainable Future," U. S. Environmental Protection Agency). Further guidance from this source is provided below:

The EPA recommends evaluating the characteristics of the system, its customer base, and its options for maintaining predictable rates and rate increases. In addition to recovering all costs, the EPA suggests that utilities consider six factors:

1. **Rate Stability.** Customers are more likely to pay for rate increases if their rates are generally stable. Most systems know that the worst thing they can do is maintain a stable rate for many years, then increase it by 10% or more. A single, large increase can lead to "rate shock" and opposition to the increase. It is far better to increase rates by 2 percent per year for 5 years than 10 percent once every 5 years.

2. **Rate Predictability.** Managers need to know how much revenue to expect next year and in the years to come. However, predicting revenue can be difficult, as water use can vary from year to year. Water use can increase significantly during a dry year and decrease during a wet year. Promoting conservation can lead to a reduction in water use, which may require a rate increase. This lack of predictability should not discourage managers from experimenting with rate structures that promote a valuable public program like conservation. Instead, they should aim to generate and keep sufficient reserves so that their system can survive a significant decrease in water use.

3. **Number of Customers.** If the system serves fewer than 500 persons, the simplest approach to rate setting might be to take the revenue needed and divide it more or less equally among its customers. If it serves more customers, the system might choose an alternative rate structure, e.g., increasing block rates.

4. **Customer Classes.** Some systems may serve only residential customers, while others also serve industrial, commercial, or agricultural customers. Residential, industrial, commercial, and agricultural customers may have very different patterns of water use. The cost of servicing these customers may be different as well. Utility managers may want to use different rates and rate structures for different classes of customers in order to meet their specific needs.

5. **Water Use.** Examine customers' water use habits during peak and off-peak seasons. If most customers use roughly the same amount of water, a flat fee might make the most sense. If customers use significantly different volumes of

water, the utility should consider charging for the amount of water used. A family of four should not expect to receive the same water bill as a car wash or laundromat. Water is a scarce commodity. Rates can be structures rates so that they send a "price signal" to customers and encourage conservation. Customers who recognize the value of the service will be more likely to use that product in a way that reflects its true value.

6. **Customer Needs.** There may be differences among customers within a class that affect the cost of providing water service to them or their ability to pay for that service. For example, some residential customers may have low fixed incomes and, therefore, may have difficulty paying their water bills. Faced with these types of issues, utility managers may want to consider rate structures that allow for different rates for customers with different needs within a single customer class.

A good source of information about possible rate structures is the National Regulatory Research Institute's *Meeting Water Utility Revenue Requirements: Financing and Ratemaking Alternatives*, which describes six basic rate structures and the advantages and disadvantages of each:

- Dedicated-Capacity Charges
  Advantages
  - Both availability charges and demand charges promote cost sharing, adhere to the cost-causation standard, and provide revenue stability.

  Disadvantages
  - Availability charges may have problems associated with usage-sensitive costs, legal constraints, and equity.
  - Demand charges may require utilities to expand capacity and customer losses may result in stranded utility investment.

- System-Development Charges
  Advantages
  - They protect existing customers, preclude consideration of vintage rates, and reduce capital financing needs.

  Disadvantages
  - They can create revenue instability, discourage growth, and introduce forecasting error into cost estimation.
  - Their use can be constrained for tax, regulatory, and public policy reasons.

- Contract Rates
  Advantages
  - They provide utilities with adequate, stable, and guaranteed revenues, adhere to the cost-causation standard, and stimulate economic activity.
  - Large users benefit from assured water service at a guaranteed price.

Disadvantages

- They can create cross-subsidization and result in higher rates for other customers.
- They can impede conservation, equity, and other regulatory and public policy goals.

- Conservation Surcharges
  Advantages
  - They can be used in conjunction with different costing approaches, least-cost planning, and incentive regulation.
  - They unbundle rates, and transmit a forward-looking and efficient pricing signal.

  Disadvantages
  - Implementation and administration can be difficult.
  - They raise revenues outside of traditional revenue requirement determination.

- Seasonal Rates
  Advantages
  - They can increase operational efficiency and reduce peak demands.
  - They can help utilities eliminate or postpone the need for capacity.

  Disadvantages
  - They make sense only for systems with seasonally variable demand.
  - Implementation can be difficult and may require changes in metering and billing.
  - Anticipated benefits do not always materialize.

- Zonal Rates
  Advantages
  - They may be consistent with the cost-causation standard, particularly with respect to costs driven by customer distance from supply and treatment facilities.
  - They unbundle rates and promote efficiency, as might occur in a competitive market.

  Disadvantages
  - They may subvert optimum system performance.
  - They may accentuate, rather than mitigate, localized cost and rate shock.
  - They can be arbitrary, discriminatory, and used for political purposes.
  - Their use requires a careful analysis of tradeoffs among economies and diseconomies.

These six rate strategies and their pros and cons are fully explained in the National Regulatory Research Institute's report.

Another good source of information about possible rate structures is the National Regulatory Research Institute's *Meeting Water Utility Revenue Requirements: Financing and Ratemaking Alternatives*, which describes six basic rate structures and the advantages and disadvantages of each.

Also, the University of Tennessee Municipal Technical Advisory Service's *How Any City Can Conduct A Utility Rate Study And Successfully Increase Rates* provides guidance. MTAS suggests the following goals for a rate study:

- Generate additional revenues to fund needed infrastructure improvements and expansions. Funds would come from a combination of user fees, loans, and grants.
- Make water and sewer rate structures fair for all users.
- Comply with professional and regulatory requirements.
- Examine and modify (if needed) water and sewer policies, including extension policies, connection and tap fees, etc., to ensure that "new" customers were not being allowed to connect onto the system at the expense of existing customers.
- Develop rate and policy information that is easy to explain to ratepayers.
- Develop a communications plan to inform customers.

One primary revenue structure consideration for the North Central Region is that Sumner and Robertson counties are part of the 10-county, Nashville Economic Market Region. As such, economic growth and population growth trends in these two counties have exceeded the State as a whole. Because of these strong growth factors the water utilities have relied heavily in the past on an expanding customer base. The utilities have accepted ownership of large amounts of water distribution infrastructure built my subdivision developers.

Tables 7 and 8, which follow, reflect the decisions which have been made by North Central water utilities in designing their revenue structures.

All of the water utilities, except Westmoreland, employ uniform rate structures. Westmoreland has a decreasing block rate structure but purchases all its water from Gallatin, which charges for that water at a uniform rate.

Since Westmoreland has a 30% rate of water "unaccounted for". If 1000 gallons purchased from Gallatin for $3.28 (July 1, 2010 price) dwindles down to 700 gallons before it reaches a residential customer purchasing water at $3.76 per 1000 gal (for usage over 10,001 gallons per the September, 2009 Westmoreland rate structure); the customer pays $2.63 for that 700 gallons. The Westmoreland water system loses $0.65 on the transaction. For Westmoreland the decreasing block rate structure offers little incentive for water conservation by residential customers and, due to high water loss rates, is a financial drain on the system, at least for inside residential customers using over 10,001 gallons per month.

Portland and Westmoreland both employ substantially higher water rates for commercial and industrial customers. At these higher rates Westmoreland commercial and industrial customers pay a premium price for water which more than offsets the financial drain of water losses.

Very high base water usage charges represent a particular hardship to low-income or cost-conscious households. Westmoreland outside rate customers, at the low end of monthly usage (2,500 gallons per month), pay $33.62. This is due to the relatively high base usage charge employed by Westmoreland. The second-highest charge for a minimal usage of 2500 gallons is $21.92 for outside rate customers in Portland.

Responding to land development pressures in the region; Table 8, below, shows that Gallatin, Portland and White House UD have all employed some version of “system capacity charges” which tend to place the financial burden of new developments directly with the new customers stemming from new land development. Westmoreland and Castalian Springs-Bethpage UD do not employ a “system capacity charge” and, without such a revenue source, the initial cost of building new infrastructure (or the dedication of existing system capacity) to serve new land developments is largely shouldered by existing customers until new land development build-out is achieved. This is an important issue in a region of population and employment growth which is stronger than the state as a whole.

Table 8 shows that the regional utilities have not been active in employing any innovative rate structures which encourage conservation of water.

Table 7: Basic Water Rate Structure

	Rate Structure By Customer Rate Category			Inside Base Minimum Charge and Base Minimum Allowance					
	Residential Category	Commercial and Industrial Category	Other Categories	Residential Category		Commercial Category		Industrial Category	
System/Fund Name				**# of First Gallons**	**Cost**	**# of First Gallons**	**Cost**	**# of First Gallons**	**Cost**
Castalian Springs - Bethpage Utility District (Water Only)	Uniform rate all over first 2,500 Gallons.	None	None	First 2,500 Gallons at $21.70					
Gallatin Water and Sewer Enterprise Fund	Uniform rate all over first 250 cubic Ft. (1,870 Gal.)	None	Per Service Private Fire Protection	First 250 Cubic Feet (1,870 Gallons) at $8.75					
Portland Water and Sewer Enterprise Fund	Uniform rate all over first 2,500 Gallons.	Higher uniform rate for commercial over 2,500 Gallons and higher uniform rate for industrial over 2,500 Gallons.	One time Service fee for commercial and industrial	2,500	$9.53	2,500	$13.35	2,500	$16.20
Westmoreland Water and Sewer Enterprise Fund	Declining block rate structure for all over 2,000 Gallons	Higher declining block rate structure for commercial usage over 2,000 Gallons and even higher declining block rate structure for industrial usage over 2,000 Gallons.	None	2,000	$19.86	2,000	$25.82	2,000	$31.78

White House Utility District (Water and Sewer)	Uniform rate for all water used	None	None	Base Charge of $5.50 with no usage, then $5.52 per 1,000 For all water used

Table 8: Special Rates Responsive To Demand Characteristics

System/Fund Name	Seasonal Rate	Drought Surcharge	Peaking Surcharge	Special Conservation Rates or Incentives	System Capacity charges	"Lifeline" Low Income Program
Castalian Springs - Bethpage Utility District (Water Only)	No	No	No	No	No	No
Gallatin Water and Sewer Enterprise Fund	No	No	No	No	*	No
Portland Water and Sewer Enterprise Fund	No	No	No	No	**	No
Westmoreland Water and Sewer Enterprise Fund	No	No	No	No	No	No
White House Utility District (Water and Sewer)	No	No	No	No	***	No

* Large water customers (over 3,000 cubic feet) maintain a time deposit, survey bond, or irrevocable letter of credit for entire duration of service.

**Declining tap fees for multi-unit developments and capacity fee based on units of flow.

*** Capacity fee based on infrastructure needs/costs to supply estimated flows associated with a new development.