

This Agreement made for purposes of identification this 1st day of December, 2003, by and between the CITY OF CHARLOTTESVILLE, Virginia, a municipal corporation (the "City"), the ALBEMARLE COUNTY SERVICE AUTHORITY, a public body politic and corporate (the "ACSA") and the RIVANNA WATER and SEWER AUTHORITY, a public body politic and corporate (the "RWSA").

WITNESSETH:

Background and Intent.

A. RWSA owns and/or operates facilities for the receipt and treatment of potable water pursuant to the terms of a Four Party Agreement dated June 12, 1973, among the City, the RWSA, the ACSA, and the Board of Supervisors of Albemarle County (the "Four Party Agreement") and several supplementary agreements.

B. Pursuant to Section 4.3 of the Four Party Agreement, the City and the ACSA have agreed upon a project, not contemplated by their previous agreements, for the expansion of the South Rivanna Reservoir to increase safe yield of RWSA's urban water system (the "Urban Water System"). The Urban Water System consists of all water related facilities within or serving the City of Charlottesville and the urban growth area of Albemarle County surrounding the City of Charlottesville, including water plants and all reservoirs, pipelines, pumping stations, storage tanks and other appurtenances connected to water plants and operated by RWSA.

C. The ACSA and the City also have reached an agreement concerning the allocation of existing water plant capacity and sharing of costs thereof for the existing Observatory Water Treatment Plant, South Rivanna Water Treatment Plant, and North Rivanna Water Treatment Plant (the "Urban Water System Plants"), including the 1999 expansion of the South Rivanna Water Treatment Plant, and future improvements of these water plants.

D. These agreements are based on the terms of a Comprehensive Review of Costs Allocation Methodology Re: Water System Facilities – Final Report August 18, 2003 – Vincent J. Bryne, Utility Consultant, a copy of which is attached hereto as Exhibit A.

NOW THEREFORE, for and in consideration of the premises and other good and valuable consideration, the receipt of all of which is hereby acknowledged, the City, ACSA and RWSA agree as follows:

Urban Water System Plants' Capacity Allocation.

1. Prior to 1999, RWSA's Urban Water System Plants had a capacity of 17.7 million gallons per day ("mgd") of potable water. In 1999, RWSA, at the request of the City and the ACSA, increased capacity at the South Rivanna Water Treatment Plant by 4.0 mgd, increasing total plant capacity in the Urban Water System Plants to 21.7 mgd.

2. At that time, RWSA used the then existing cost sharing provisions of the Four Party Agreement to collect the cost of the 4.0 mgd expansion from the City and the ACSA. Based on current projections, the City can meet its maximum day

demand through the year 2020 without acquiring any of the 4.0 mgd capacity added to the South Rivanna plant. ACSA and the City have therefore agreed that the additional 4.0 mgd capacity is required by ACSA, and that the entire cost for that expansion of capacity should be allocated to ACSA.

3. ACSA agrees to pay all of the 1999 4.0 mgd South Rivanna Water Treatment Plant expansion cost. As a result, the ACSA will be entitled to all of the 4.0 mgd plant capacity expansion. Concurrently with the expansion of the treatment capacity at the South Rivanna Water Treatment Plant, RWSA made operational improvements and changes to this plant. The total cost of the plant capacity expansion and operational improvements and changes was \$7,869,251.00. RWSA, ACSA, and the City agree that \$2,718,660.00 of this cost was for capacity expansion and \$5,150,591.00 was for operational improvements and changes. ACSA and the City have been paying the annual debt service on the bonds sold by RWSA to fund this project through RWSA's urban water rate. ACSA agrees to reimburse the City for debt service the City has paid on the capacity expansion component of the total debt service. This amount will be calculated by RWSA as of December 31, 2003 and will be paid by January 31, 2004. From January 1, 2004 forward ACSA will pay 100% of the debt service on the capacity expansion component for the 1999 4.0 mgd plant capacity expansion of the South Rivanna Water Treatment Plant.

4. ACSA and the City agree that RWSA's current Urban Water System Plants' capacity of 21.7 mgd will be allocated 48% to the City (10.4 mgd) and

52% to ACSA (11.3 mgd); and each shall pay these respective percentages of all non-capacity expansion related charges imposed by RWSA, including future non-capacity related projects for the Urban Water System.

5. If any improvements increase capacity in the Urban Water System Plants, the City and ACSA will negotiate a new cost sharing and capacity allocation agreement as a result of the increased capacity. If the current 21.7 mgd capacity in the Urban Water System Plants decreases, the ACSA and the City shall continue to own plant capacity proportionally according to the 48/52% allocation set forth herein.

Safe Yield Allocation and South Rivanna Reservoir Safe Yield Expansion.

6. Based on the amount contributed by the City and ACSA for total facilities in RWSA's Urban Water System over the twenty-year period 1983-2002, the City has contributed 65% of the total costs and the ACSA has contributed 35% of the total costs of the Urban Water System. Applying the above methodology, the City is allocated 7.80 mgd and the ACSA is allocated 4.20 mgd of the existing 12.0 mgd of safe yield supply in RWSA's Urban Water System.

7. The City, ACSA, and RWSA have agreed to increase the safe yield provided by RWSA's Urban Water System supply reservoirs by raising the elevation of the South Rivanna Reservoir. The parties propose to increase elevation at the South Rivanna Reservoir to raise the Urban Water System's safe yield at least 7.0 mgd to 19.0 mgd. This 19.0 mgd shall be allocated as follows:

(a). Based on current projections, both the City and ACSA will require a portion of the 7.0 mgd increase in safe yield to ensure an adequate potable water supply to meet future needs. ACSA and the City hereby agree that of the additional 7.0 mgd safe yield achieved from the proposed South Rivanna Reservoir expansion, the City will acquire and be entitled to 1.89 mgd, and the ACSA will acquire and be entitled to 5.11 mgd.

(b). After the expansion of the South Rivanna Reservoir, RWSA's Urban Water System should have a safe yield of 19.0 mgd. Of this safe yield, the City will own 9.69 mgd. ACSA will own 9.31 mgd.

(c). If the work undertaken to raise the elevation of the South Rivanna Reservoir provides an expansion of the safe yield of the South Rivanna Reservoir less than 7.0 mgd, the City's and the ACSA's share of the safe yield of RWSA's urban water system will decrease proportionally. If the safe yield increases the City and ACSA will negotiate the allocation of the increased amount and cost.

8. The cost of the expansion of the South Rivanna Reservoir, including engineering, legal, permitting, and construction costs, shall be allocated to and paid by the City and the ACSA as follows: 27% to the City and 73% to ACSA.

Other Matters.

9. RWSA shall be responsible for all aspects of the design, right-of-way acquisition and construction of the South Rivanna Reservoir expansion.

10. The City and ACSA will continue to pay for routine labor, chemicals, supplies, power, and other operational costs associated with water production in

the Urban Water System on the basis of their respective percentage volume use as set out in the Four Party Agreement, as supplemented by (i) Joint Resolution adopted in January 1983 (as such resolution was clarified by Resolution of the Albemarle County Service Authority dated March 17, 1983, and by Resolution of the Charlottesville City Council dated May 2, 1983, and modified by Joint Resolution adopted in December, 1983), (ii) Working Agreement on Urban Area Wholesale Flow Allocations and Billing Methodology dated January 24, 1983; and (iii) Agreement dated October 26, 1987, relating to the operation of the RWSA's Urban Water System and the division of RWSA's operational costs between the City and the ACSA.

Witness the following duly authorized signatures and seals:

CITY OF CHARLOTTESVILLE

By: _____

Mayor

ALBEMARLE COUNTY SERVICE
AUTHORITY

By: _____

Chairman

RIVANNA WATER AND SEWER
AUTHORITY

By: _____

Chairman

STATE OF VIRGINIA
CITY/COUNTY OF Charlottesville

The foregoing instrument was acknowledged before me this 10th day of December, 2003, by Maurice D. Cox, Mayor.

Barbara K. Roman
Notary Public

My commission expires: 4-30-06

STATE OF VIRGINIA
CITY/COUNTY OF Albemarle

The foregoing instrument was acknowledged before me this 10th day of December, 2003, by J. Randolph Parker.

Susan L. Rohm-Biggs
Notary Public

My commission expires: 083106

STATE OF VIRGINIA
CITY/COUNTY OF ALBEMARLE

The foregoing instrument was acknowledged before me this 15 day of DECEMBER, 2003, by MICHAEL GAFFNEY.

Mary J. Knowler
Notary Public

My commission expires: 7-31-06

acsa.city.agree(rv#56)

Exhibit A

CITY OF CHARLOTTEVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY

COMPREHENSIVE REVIEW OF
COST ALLOCATION METHODOLOGY
RE: WATER SYSTEM FACILITIES

FINAL REPORT

August 18, 2003

Vincent J. Byrne
Utility Consultant

OUTLINE

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EXHIBITS

(1)	Projection of Plant Capacity and Demand
(2)	Comparison – Capacity, Demand and Safe Yield
(3)	Comparison – Average and Maximum Day Demand
(4)	Historical Urban System Demand
(5)	Derivation of Plant Ownership
(6)	Derivation of Cost Allocation – Dam Elevation Project

I. Introduction and Purpose of the Study

This study was initiated with the objective of developing a fair and reasonable cost allocation model to be used by the City of Charlottesville (City) and Albemarle County Service Authority (ACSA) for apportioning the costs of raising the height of the South Rivanna dam – a project estimated at approximately \$7.5 million. Although the primary objective of this study was to determine an appropriate allocation of the costs of the Rivanna dam project, a secondary objective was to develop a more permanent cost allocation methodology to be applied to future projects. The following documents were among those reviewed and analyzed as part of the study:

- Agreement between the City of Charlottesville, County of Albemarle, Albemarle County Service Authority, and Rivanna Water and Sewer Authority related to water and sewer service – Dated June 12, 1973.
- Staff Recommendation – A Multi-Step, Integrated Water Supply Strategy – Dated October 28, 2002.
- Memo to Larry Tropea from George Rest and Thomas Dumm – Supply, Demand and Treatment Information for Cost Allocation – Dated January 3, 2002.
- Water Demand Analysis – Albemarle County and City of Charlottesville – Prepared by VHB and O'Brien & Gere Engineers, Inc. – Dated October 1997.
- Water Supply Analysis – Rivanna Water & Sewer Authority – Prepared by VHB and O'Brien & Gere Engineers, Inc. – Dated June 1997.
- Water Supply Project – Rivanna Water & Sewer Authority – Analysis of Alternatives – Dated February 2000.
- City of Charlottesville – Utility Rate Report

Interviews were held with senior management officials at City of Charlottesville - Department of Public Works, Albemarle County Service Authority, and Rivanna Water and Sewer Authority.

II. Major Findings

The major findings related to this study have been organized into four categories:

- The 1973 Agreement
- Urban Water System Demand
- Urban Water System Capacity
- Safe Yield – Dam Elevation Project

(1) The 1973 Agreement

- The 1973 Agreement does not quantify any capacity ownership or rights by the City or ACSA in the water production of the Rivanna facilities. This makes it very difficult to allocate costs of major improvements to the system facilities and requires a separate negotiation for each major project developed by Rivanna.
- No formal agreement has been reached regarding the appropriate cost allocation between the City and ACSA for the 4.0 mgd expansion of the South Rivanna plant.
- The billing methodology specified in the 1973 Agreement is cumbersome and inherently unfair to the participating jurisdictions. Bills to each jurisdiction for many capital projects are based on volume. Volumetric charges are appropriate for operating costs however, capital costs are normally allocated on a percentage of the total cost of the project based on a specified (percentage) benefit to the jurisdiction.
- As depicted in Exhibit 4, the City contributed 65% of the charges related to the water system plant and facilities and ACSA contributed 35% over the period 1983-2002.

(2) Urban Water System Demand

- Based on the most current maximum day water demand projections of VHB/O'Brien and Gere, the current plant capacity of 21.7 mgd will be adequate to meet Urban System demand until about 2020.
- Based on current demand projections, an increase in capacity will be required in 2020 or shortly thereafter.
- As depicted in Exhibit 1, the increase in demand projections for the City and ACSA between 1999 and 2050 are mostly attributable to ACSA – 87% of total increase.
- The demand projections in this study are based on data contained in the report prepared by VHB/O'Brien and Gere which used a factor of 1.4 to project maximum daily demand and a factor of approximately 13% for water system losses
- As depicted in Exhibit 3, the historical (1990-2002) maximum daily demand for the Urban System occurred in 1998 at 15.7 million gallons per day (mgd).
- As depicted in Exhibit 3, the plant design factor for maximum daily demand of 1.4 has been adequate based on a historical comparison of average and maximum daily demands.
- As can be seen from the data in Exhibit 2, the current safe yield supply of 12.0 mgd must be increased to meet projections of future average daily demands.
- Current projections of demand may be slightly high In light of the recent drought and related water conservation efforts and projects, e.g. subsidies for replacement of certain plumbing fixtures.

(3) Urban Water System Capacity

- As depicted in Exhibit 1, the current combined plant capacity of 21.7 mgd will meet all projected maximum daily urban system demands until about 2020.
- As depicted in Exhibit 5, the City can meet its maximum day demand in 2020 without acquiring any of the 4.0 mgd capacity recently added to the South Rivanna plant. This assumes that the plant capacity of 17.7 mgd is allocated to each jurisdiction based on 1999 maximum daily demands.
- The projection of the City's maximum day demand in 2020 is 10.13 mgd. If the City does not acquire any of the 4.0 mgd South Rivanna plant expansion, its allocation of plant capacity would be 10.40 mgd – an amount very close to its projected demand.
- There is sufficient data available related to prior payments by the jurisdictions (including UVA) for system capacity to develop a cost sharing methodology for allocating existing plant capacity between the City and ACSA in an equitable manner.

(4) Safe Yield – Dam Elevation Project

- As depicted in the VHB/O'Brien and Gere report, the current safe yield related to the urban system is approximately 12.0 mgd based on average daily demand.
- Implementing the dam elevation project will add 7.0 mgd to the existing safe yield. In absence of an ongoing dredging program, the safe yield will deteriorate at about 1.0 mgd every ten years.
- Both the City and ACSA will require a portion of the 7.0 mgd increase in safe yield to ensure an adequate supply to meet future needs.

III. Conclusions and Recommendations

The following are the principle conclusions and recommendations for consideration by the City and ACSA:

- There are a number of benefits to be derived by allocating the existing plant capacity between the City and ACSA. The major benefit is the adoption of a cost allocation formula for all projects related to improving and maintaining the plant facilities. Adopting a cost allocation formula will provide an empirical basis for the equitable sharing of costs for all future projects related to existing plant facilities.
- It is recommended that the water system plant capacity available in 1999 (17.7 mgd) be allocated to the City and ACSA based on their actual demands in 1999 – the year of highest historical demand. The allocation should be based on a maximum day basis and include an allowance for system losses.
- As depicted in Exhibit 5, this allocation methodology results in the City acquiring 59% (10.4 mgd) and ACSA 41% (7.3 mgd) of the plant capacity of 17.7 mgd available in 1999.
- According to the VHB/O'Brien and Gere demand analysis, the City (including UVA) can meet its demands through 2020 without acquiring additional capacity.
- The recent 4.0 mgd plant expansion of the South Rivanna plant facilities is required by ACSA for growth and the entire cost for that expansion of capacity could be allocated to ACSA. If the total of the 4.0 mgd plant expansion at the South Rivanna plant is absorbed by ACSA, the plant capacity of 21.7 mgd would be allocated at 48% to the City and 52% to ACSA.
- However, based on the 2020 projection of the City's demand at 10.13 mgd and its proposed allocation of plant capacity of 10.40 mgd, the City should consider acquiring some portion of the 4.0 mgd South Rivanna plant expansion.

- In order to equitably apportion the costs of the dam elevation project between the jurisdictions, it is recommended that a basis of ownership of the existing 12.0 mgd safe yield be determined. Based on the amount contributed for total facilities over the 20-year period 1983-2002, it was determined that the City had contributed 65% and ACSA 35% of the total
- Applying the above methodology results in the City being allocated 7.80 mgd and ACSA being allocated 4.20 mgd of the existing 12.0 mgd of safe yield supply – Exhibit 6.
- As depicted in Exhibit 6, each of the jurisdictions needs additional safe yield supply augmentation to meet its future needs. Under the depicted analysis, the City would be allocated 1.89 mgd and ACSA allocated 5.11 mgd of the total 7.0 mgd to meet their future needs.
- Based on this methodology, the City would pay \$2.03 million of the \$7.5 million cost of the dam elevation project with UVA contributing \$0.83 million of that amount. ACSA would pay the balance of the project cost - \$5.47 million.

IV. Summary and Next Steps

In summary, the following issues should be considered by the City and ACSA and incorporated into a formal agreement between the two parties:

- (1) Agree on the allocation of plant capacity including the cost allocation methodology for all future projects related to the current plant capacity of 21.7 mgd.
- (2) Agree on the methodology used to allocate the safe yield supply of 12.0 mgd and the methodology used to apportion the additional safe yield supply of 7.0 mgd.
- (3) Agree on the allocation of costs for the dam elevation project based on the methodology depicted in Exhibit 6 of this report.

CITY OF CHARLOTTESVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY

PROJECTION OF PLANT CAPACITY AND DEMAND

<u>Capacity and Demand - MGD</u>	<u>1999*</u>	<u>2020</u>	<u>2050</u>
Capacity	17.70	21.70	21.70
Demand - Average Day			
Albemarle	4.23	6.00	10.90
Charlottesville - City			
Non-UVA	4.35	4.50	5.00
UVA	1.75	1.90	2.10
Other	-	0.20	0.20
Losses	1.60	1.70	<u>2.40</u>
Total	<u>11.93</u>	<u>14.30</u>	<u>20.60</u>
Demand - Maximum Day @ 1.4	15.60	20.02	28.84

* Actual - Fiscal Year

CITY OF CHARLOTTESVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY

COMPARISON - CAPACITY, DEMAND AND SAFE YIELD

	Urban System - MGD			Safe Yield**
	<u>Avg Day Demand</u>	<u>Max Day Demand</u>	<u>Plant Capacity</u>	
1999*	11.9	15.6	17.7	12.0
2002*	10.8	14.6	21.7	12.0
2010	13.5	18.9	21.7	18.0
2020	14.3	20.0	21.7	17.0
2030	16.5	23.1	21.7	16.0
2040	18.0	25.2	21.7	15.0
2050	20.6	28.8	21.7	14.0

* Actual - Fiscal Year

** (1) Based on Average Daily Supply.

(2) Safe yield reduced by 1.0 mgd each decade in absence of dredging.

(3) Safe yield in 2010 includes an additional 7.0 mgd related to dam expansion project and 1.0 mgd reduction in absence of dredging.

CITY OF CHARLOTTESVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY

COMPARISON - AVERAGE AND MAXIMUM DAY DEMAND

Fiscal Year	Urban System		Factor
	Average Day - MGD	Maximum Day - MGD	
1990	10.16	12.99	1.3
1991	10.28	13.45	1.3
1992	9.56	12.27	1.3
1993	10.22	13.91	1.4
1994	11.32	14.43	1.3
1995	10.92	14.28	1.3
1996	11.32	14.57	1.3
1997	10.79	14.96	1.4
1998	11.33	15.67	1.4
1999	11.93	15.57	1.3
2000	11.22	13.77	1.2
2001	11.18	15.43	1.4
2002	10.76	14.59	1.4

Exhibit 4

CITY OF CHARLOTTESVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY
HISTORICAL URBAN SYSTEM DEMAND

Fiscal Year	Million Gallons							Total System
	City			ACSA	Total Urban	Losses	Total	
	Non-UVA	UVA	Total					
1983	1589	383	1972	766	2738	389	3127	
1984	1654	406	2060	832	2892	398	3290	
1985	1624	444	2068	878	2946	274	3220	
1986	1639	433	2072	916	2988	600	3588	
1987	1662	452	2114	959	3073	546	3619	
1988	1696	469	2165	1041	3206	543	3749	
1989	1684	501	2185	1063	3248	554	3802	
1990	1706	553	2259	1044	3303	407	3710	
1991	1612	650	2262	1090	3352	402	3754	
1992	1626	560	2186	1063	3249	241	3490	
1993	1564	563	2127	1087	3214	518	3732	
1994	1633	567	2200	1240	3440	693	4133	
1995	1599	567	2166	1255	3421	563	3984	
1996	1682	575	2257	1294	3551	582	4133	
1997	1491	612	2103	1296	3399	541	3940	
1998	1563	625	2188	1420	3608	527	4135	
1999	1589	640	2229	1543	3772	582	4354	
2000	1553	569	2122	1490	3612	483	4095	
2001	1458	517	1975	1513	3488	592	4080	
2002	1464	573	2037	1572	3609	317	3926	
	32088	10659	42747	23362	66109	9752	75861	
Percentage	49	16	65	35	100			

CITY OF CHARLOTTEVILLE
 ALBEMARLE COUNTY SERVICE AUTHORITY
 DERIVATION OF PLANT OWNERSHIP

	City			ACSA	Total	MG
	Non-UVA	UVA	Total			
<u>Based on 1999 Actual Demand</u>						
Total Urban Demand	1589	640	2229	1543	3772	MG
Average Daily Demand (ADD)	4.35	1.75	6.11	4.23	10.33	MGD
Max Day Demand = 1.4 * ADD	6.09	2.45	8.55	5.92	14.46	MGD
Max Day Demand + Losses (13.1% loss factor)	6.89	2.77	9.67	6.70	16.35	MGD
Percentage - Max Day+Losses/Total	42	17	59	41	100	%
Plant Ownership - Based on 17.7 MGD Plant	7.40	3.00	10.40	7.30	17.70	MGD
<u>Based on 2020 Projected Demand</u>						
Total Urban Demand	1643	694	2337	2190	4527	MG
Average Daily Demand (ADD)	4.50	1.90	6.40	6.00	12.40	MGD
Max Day Demand = 1.4 * ADD	6.30	2.66	8.96	8.40	17.36	MGD
Max Day Demand + Losses (13.1% loss factor)	7.13	3.01	10.13	9.50	19.63	MGD
Plant Ownership - Based on 21.7 MGD Plant	7.40	3.00	10.40	11.30	21.70	MGD
% of Plant Ownership - Based on 21.7 MGD Plant	34	14	48	52	100	%

CITY OF CHARLOTTEVILLE
ALBEMARLE COUNTY SERVICE AUTHORITY

DERIVATION OF COST ALLOCATION - DAM ELEVATION PROJECT

	City			Total Urban 66109 MG
	Non-UVA 32088	UVA 10659	Total 42747	
Total Urban Demand - FY's 1983-2002				
Percentage of Total Urban Demand	49	16	65	100 %
Supply Ownership - Based on 12.0 MGD Supply	5.88	1.92	7.80	12.00 MGD
Supply Requirement - Based on 2020 Plant Ownership	7.40	3.00	10.40	21.70 MGD
Additional Supply Required	1.52	1.08	2.60	9.70 MGD
Percentage - Additional Supply Required	16	11	27	100 %
Allocated Amount of 7.0 MGD Dam Elevation	1.12	0.77	1.89	7.00 MGD
Total Ownership - Based on 19.0 MGD Supply	7.00	2.69	9.69	19.00 MGD
Cost Allocation - \$7.5 Million Project Cost	1.20	0.83	2.03	7.50 \$Million
Cost Allocation Percentage	16	11	27	100 %