Scope of Services
Program Management
Community Water Supply Capital Program
Rivanna Water and Sewer Authority (RWSA)
January 20, 2004

Background:

Rivanna Water and Sewer Authority has completed detailed investigations over the last several decades to better understand the capabilities of their community water supply system. RWSA is also well aware that its water system demands are increasing, and water supply safe yield decreasing at such a pace that a deficit will eventually exist. In the last several years alternate water supply projects to expand the current water supply and upgrade the water treatment plants have been undertaken. In May 2001, the latest list of recommended alternatives for expanding the water supply was completed. Since that time, RWSA has been working with regulatory agencies to refine the approach for developing the favorable alternative(s). In October 2002, RWSA presented their Multi-Step Integrated Water Supply Strategy for the Urban Water Service Area. This document identifies immediate and long term elements of a plan to expand safe yield of water supplies. Since that time, RWSA staff and consultants have been developing various elements of that plan. Many elements of the plan are not yet addressed in the environmental documentation developed to-date. Also during this period of time many natural conditions have changed and much time has elapsed. Nearly 3 ½ years have passed since the recommended alternatives document was completed. Much of the data used to develop this document is now nearly 7 years old. Since completion of the recommended alternatives document, Charlottesville area has experienced a drought that equals or exceed the drought of record and in 2003 one of the heavier years for rainfall. RWSA staff recognized these many developments and commissioned a re-evaluation of the water supply safe yield. The results to-date and associated recommendations are discussed below.

Gannett Fleming recently completed a daily flow computer model of the existing RWSA system in order to determine the safe yield of the system and to evaluate the impacts of various release requirements and changes in reservoir storage due to sedimentation and raising reservoir level(s) at South Fork Rivanna Reservoir. The safe yield analysis considers the entire period of record since the 1930s drought though 2002. Although RWSA has commissioned numerous safe yield investigations previously, many natural conditions change over time and work techniques vary. GF results differ primarily due to estimation of useable storage available in reservoirs, source system operational variations, release assumptions, and the inclusion of data from the most recent 2002 drought. The different results suggest a re-evaluation of water source alternatives be performed to determine the impact of this new information.

GF has also completed a review of South Fork Rivanna Reservoir Dredging Project. Short and long term dredging is costly and is effective only when a long term (20 year) program is implemented. The very high cost of such a program also suggests alternate water source expansion options be re-evaluated.

RWSA, therefore, requested GF to prepare a scope of work and budget for necessary evaluations. The scope of services presented here represents Gannett Fleming's approach for renewing historic investigations and refining the previously completed alternatives analysis in light of new information identified in work completed to-date. This work will result in an implementation plan for developing short and long term water supply system upgrades.

PHASE I REFORMULATE FAVORABLE WATER SUPPLY ALTERNATIVES

Task 1: Additional Raw Water Modeling Activities

1. Supplemental Safe Yield Investigations.
   a. Expand the RWSA system computer model and climatic and hydrologic database to include the following three reservoirs:
      - Beaver Creek Reservoir (Including withdrawals from Crozet)
      - Lake Albemarle
      - Chris Green Lake
   b. Develop elevation-area-volume data for Beaver Creek Lake, Lake Albemarle, and Chris Green Lake.
   c. Simulate the operation of the RWSA system using the computer model to determine the additional safe yield available from each of the above mentioned three reservoirs.
   d. Simulate the operation of the RWSA system to determine the additional safe yield for other source expansion alternatives.
   e. Prepare a report documenting the analyses and summarizing the findings.
2. Optional On-Site Training of RWSA Computer Model
   This optional task involves delivering and installing the computer model and providing basic on-site training on how to use the model and view and evaluate the output. The estimated effort to complete this task assumes a limited amount of time to prepare some user notes followed by one day of training time. Included in this task is 10 hours of telephone support.

3. Compare and contrast recently completed Gannett Fleming Safe Yield Analysis with safe yield analyses completed by O'Brien & Gere since 1997.
   a. Prepare timeline of key safe yield analyses and findings, and indicate how the findings were communicated.
   b. Compare and contrast Gannett Fleming safe yield findings with those identified in item "a" above and explain any differences.

c. Internal Review.
d. Review Meeting with RWSA.

Task 2.Establish the adequacy of existing facilities based on 2004 GF Safe Yield Analysis

1. Confirm short and long term planning horizons and re-evaluate demand analysis completed by others for compliance with Virginia guidelines for drinking water needs assessment, industry standard practice, and current data.
    a. Update the demands for the Urban system based on currently available information using established methodology. Consider impact of current information on projections.
    b. Document recent historical demands in the Crozet system based on readily available information. Prepare ballpark projections through the established planning period using available population projections and likely development predications provided by RWSA.
2. Determine water supply deficiencies for established short and long term planning periods.
    a. Develop system demand and safe yield curves for integrated Urban water system.
    b. Develop logical breakouts of Urban System and allocate demands to each area.
    c. Compile safe yield results and demands for each break-out area and identify short and long term water supply deficiencies.
    d. Develop system demand and safe yield curves for Crozet system.
3. Consider existing treatment and transmission system constraints in safe yield analyses.
    a. Discuss treatment and transmission systems, conditions, and constraints with RWSA. Compile condition and performance criteria based on discussion.
    b. Perform basic static hydraulic evaluations to confirm operating constraints.
    c. Document raw water conveyance and treatment plant performance capability and condition.
4. Prepare report text.
    a. Prepare draft report and submit for review and comment.
    b. Incorporate comments and prepare final report (provide 10 copies).

Task 3. Formulate and evaluate alternative water supply projects.

1. Review all of the previously documented alternatives and reformulate the most promising alternatives from previous investigations and refine project elements to correspond to short and long term water supply deficiencies identified in Task 2. Gannett Fleming will formulate alternatives to the extent allowable by the budget. If additional alternatives appear favorable, GF will advise RWSA and seek concurrence and authorization to increase budget.
    a. Perform preliminary evaluation of Beavercreek Lake as a potential alternative
        i. Using demand and safe yield projections to determine water supply surplus (deficit) in Beavercreek Lake.
        ii. Perform preliminary investigations on possibly modifying the dam or reallocating existing storage to increase safe yield.

b. Develop progress report for completed evaluations for Ragged Mountain Dams and meet with Virginia Department of Conservation and Recreation to advise of status and discuss regulatory compliance. Meeting RWSA to advise and develop a plan to comply.
c. Establish the raw water improvements necessary to satisfy water supply deficits (safe yields will be developed based on reasonable assumptions for inflow release in consultation with RWSA legal staff).
d. Document raw water conveyance and treatment plant elements associated with each water source and develop improvements necessary to coordinate with conceptual raw water supply projects identified.
e. Perform constructability review.
f. Consider Phasing to satisfy short and long term demands and identify practical project phases.
    i. Identify regulatory deadlines (Ragged Mountain, WTP compliance, etc.)
    ii. Identify system limitations (capacity exceeded by demand)
    iii. Identify and consider out of service limitations.
g. Estimate and document conceptual level environmental impacts and likely mitigation measures for each alternative. Review National Wetlands Inventory maps. Submit data request letters for threatened and endangered species and cultural resources. Review results.

2. Prepare action plan and schedule for Phase II services.

Task 4. Program Management

1. Coordinate among various disciplines, provide update to RWSA and Legal Counsel, monitor progress and make adjustments as necessary.

Task 5. Meetings

1. Prepare for and attend meetings as necessary

PHASE II EVALUATE FAVORABLE WATER SUPPLY ALTERNATIVES

Perform the following services for each of the favorable water supply alternatives (a preliminary budget is established. At the conclusion of Phase I services, a more detailed scope of services and fee estimate will be prepared and budget adjusted):

Task 1. Engineering

1. Develop project descriptions, capital and operating cost estimates for raw water source development, conveyance and treatment plant improvements.
2. Prepare estimates of probable construction cost and operating cost.
3. Prepare present worth estimates.

Task 2. Environmental

1. Identify environmental impacts based on published information (no field work at this time). Use color infrared photos and limited field work to ground truth wetland impacts at planning level (no delineation).

2. Develop potential mitigation plans for impacted areas.
3. Prepare estimates of probable capital and operating costs for mitigation plans.

Task 3. Related Activities
1. Initiate meeting with Regulators.
2. Prepare action plan and schedule for Phase III services.

Task 4. Program Management
1. Coordinate among various disciplines, provide update to RWSA and Legal Counsel, monitor progress and make adjustments as necessary.

Task 5. Meetings
1. Prepare for and attend meetings as necessary.

PHASE III PROGRAM MANAGEMENT

1. Prepare summary report of favorable options using text and matrix presentation of capital and operating costs for water supply, treatment and transmission elements, key environmental impacts, anticipated public acceptance and other advantages and disadvantages if appropriate. Address compatibility with previous work.
    a. Document evaluations in figures, tables, and brief explanatory text.
    b. Summarize investigations and document justification for approach.
    c. Summarize strategy to modify approach.
    d. Prepare executive summary.
2. Public Involvement.
    a. Develop public presentation materials to explain current status and review viable alternatives.
    b. Conduct public involvement meetings and secure input.
3. Program Management
    a. Identify project phasing in consideration of funding, permitting, and other factors.
    b. Identify action plan and develop scope of services for future activities.

COMPENSATION

1. Phase I Services will be provided for a lump sum fee of $188,000.
2. Phase II Services can not be accurately estimated at this time. An initial authorization of $100,000 is recommended. Phase II Scope of Services and Fee will be established at the conclusion of Phase I.
3. Phase III Services are not estimated at this time and will require future authorization.
4. These services will be provided in accordance with the Additional Services provision of the Gannett Fleming/RWSA Contract dated October 9, 2003.

SCHEDULE

1. Phase I Services are estimated to require 2 ½ months to complete. Phase II Services are estimated to require an additional 2 months for a total of 4 ½ months. Phase III services schedule will be identified at the conclusion of Phase II.