Technical Consultant
Scope of Work and Budget for Task 5A
to Develop the
2021 Brazos G Regional Water Plan

Evaluation and Selection of Water Management Strategies

Background

The TWDB has prepared a scope of work for development of the 2021 Brazos G Regional Water Plan (2021 Plan)[1]. This scope of work identifies elements required to evaluate and select water management strategies and projects to meet the needs of Water User Groups (WUGs) and Wholesale Water Providers (WWPs) under Task 5A. The TWDB has identified total funds available for Task 5A, Evaluation and Recommendation of Water Management Strategies and Associated Water Management Strategy Projects, but requires that each regional planning group submit a detailed scope of work identifying those water management strategies the planning group will evaluate as potentially feasible to meet needs within the planning area.

This scope of work identifies those strategies that have been identified by the Brazos G Regional Water Planning Group (Brazos G) to potentially meet the needs of WUGs and WWPs in the Brazos G Area in the 2021 Plan. Other strategies that were identified as potentially feasible but were not included in this scope of work are identified and listed at the end of this scope of work. Strategies included in this proposed scope of work for Task 5A funds will be evaluated following the guidelines presented in the Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development[2].

Task 5A. Evaluation and Selection of Water Management Strategies

Task 5A involves the technical evaluation and selection of recommended and alternative water management strategies (WMSs) and water management strategy projects (WMSPs) to meet projected needs. Technical evaluations of WMSs and WMSPs in the 2021 Plan will be at the same level of detail and follow a similar pattern to evaluations completed in the 2016 Plan, except for where updated TWDB rules require additional evaluation elements. For existing water management strategies fully evaluated previously for the 2016 Plan, only costs and developed supply (using updated Brazos G WAM and/or groundwater availability information, as appropriate), will be updated. No additional analysis of existing water management strategies will be completed, except as described herein.

Tasks common to each strategy evaluation include:

- Estimate available supply using the Brazos G WAM, groundwater availability models, or other sources;
- Estimate costs using the TWDB's WMSP Costing Tool;

[1]https://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/2ndAmendedSOW.pdf?d=28462.600000202656
[2]https://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/2ndAmendedExhibitC.pdf?d=9317.500000121072

- Evaluate each strategy in accordance with the Regional Water Planning Guidelines, including reliability, cost, environmental issues, impacts to agricultural and rural areas, impacts to natural resources, and other issues relevant to Brazos G; and
- Develop GIS maps for all strategies showing infrastructure improvements and supply sources.

1. Water Conservation.

For each municipal WUG having an identified need, advanced water conservation will be evaluated as a water management strategy. For municipal WUGs, a single set of "active" strategies will be evaluated that will result in a hypothetical water savings. As the actual water savings and costs associated with any individual conservation strategy for any individual water utility is nearly impossible to quantify, water savings and costs will be based upon the best available information and presented in the cumulative, with the expectation that each individual WUG will pursue one or more specific strategies to achieve the stated conservation goals. The resulting savings and costs will be based upon a hypothetical group of strategies. In addition to the mix of strategies included in the 2011 Plan, the specific conservation strategies to be evaluated will include landscaping/xeriscaping incentives, such as turf replacement/reimbursement programs.

Based on preliminary needs analysis, conservation will be considered as a water management strategy for approximately 149 municipal WUGs with needs.

For non-municipal WUGs (irrigation, manufacturing and steam electric), conservation strategies will be evaluated to meet needs as appropriate in similar fashion to the 2016 Plan, following updated TWDB requirements.

Task 1 Budget: $11,200

2. Reuse.

2.1. Miscellaneous Reuse Projects

Reuse supplies potentially available will be identified based on estimated effluent and return flow projections applied during surface water availability analysis. Reuse supplies will be considered to meet needs for all water use sectors based on availability and proximity. Up to 10 reuse strategies/projects will be evaluated under this task/budget per TWDB guidelines.

Task 2.1 Budget: $49,700

2.2. City of College Station Direct Potable Reuse

The City of College Station is considering direct potable reuse as a future water supply. Brazos G will coordinate with College Station to identify any changes to the City's plans since this strategy was evaluated for the 2016 Plan. Supply, cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 2.2 Budget: $3,300

2.3. City of College Station Indirect Reuse

The City of College Station is considering expanding its use of reclaimed water for irrigation within the City. Brazos G will coordinate with College Station to identify any changes to the City's plans since this strategy was evaluated for the 2016 Plan. Supply, cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 2.3 Budget: $3,300

2.4. City of Bryan Lake Bryan Reuse

The City of Bryan is considering options for augmenting supplies at the Bryan Utilities Lake. Brazos G will coordinate with the City of Bryan to obtain the City's latest plans for these projects and will update supplies, costs and environmental evaluation for the projects per TWDB guidelines.

Task 2.4 Budget: $3,300

2.5. City of Bryan Miramont Reuse

The City of Bryan is considering utilizing reclaimed water to irrigate facilities at the Miramont Country Club. Brazos G will coordinate with the City of Bryan to obtain the City's latest plans for this project and will update supplies, costs and the environmental evaluation for this project per TWDB guidelines.

Task 2.5 Budget: $3,300

2.6. City of Cleburne Reuse

Brazos G will coordinate with the City of Cleburne to obtain the City's latest plans for expanding its reuse system and will update supplies, costs and the environmental evaluation for this project per TWDB guidelines.

Task 2.6 Budget: $3,300

2.7. Waco WMARSS Reuse Projects

For the 2016 Plan, Brazos G evaluated four reuse systems from the Waco Metropolitan Area Sewerage System (WMARSS), which would utilize supplies from the WMARSS Central Plant and the Bullhide Creek Plant. These evaluations will be updated for supplies, costs and environmental issues per TWDB guidelines:

- Waco East Reuse – Hallsburg, Mart and Riesel
- Bellmead/Lacy Lakeview Reuse
- Bullhide Creek Reuse – Hewitt and Lorena

- Flat Creek Reuse – various Waco industrial customers
- Waco North Reuse – Chalk Bluff WSC and Gholson

Task 2.7 Budget: $13,400

2.8. Bell County WCID No. 1 Reuse Projects

Bell County WCID No. 1 is considering implementing the North Reuse Project and the South Reuse Project, utilizing Type I reclaimed water from its three wastewater treatment plants. Brazos G will coordinate with the District to obtain current plans for these projects, and will update evaluations of these two projects, including supplies, costs and environmental evaluations per TWDB guidelines.

Task 2.8 Budget: $6,600

Task 2 Budget: $86,200

3. New Reservoirs.

New reservoir projects that could be developed to meet needs will be evaluated. Some were evaluated in the 2016 Plan and will require updates to project yield and cost, and some have been identified subsequent to the 2016 Plan and will require fully new evaluations. Some reservoir projects are currently identified for specific WUGs or WWPs, while others are considered to be regional supplies, for which the potential project sponsor will be identified as the 2021 Plan is developed.

3.1. Brushy Creek Reservoir – City of Marlin Supply

Yield, project cost and environmental evaluation will be updated per TWDB guidelines, based on the City of Marlin's current plans for the reservoir project.

Task 3.1 Budget: $8,800

3.2. Cedar Ridge Reservoir – regional supply for City of Abilene and customers

Yield, project cost and environmental evaluation will be updated per TWDB guidelines, based on the City of Abilene's current plans for the reservoir project.

Task 3.2 Budget: $6,600

3.3. Coryell County Off-Channel Reservoir – regional supply

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.3 Budget: $4,600

3.4. Groesbeck Off-Channel Reservoir – regional supply

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines. Additional coordination with the City of Groesbeck will be required to confirm the location of the potential off-channel reservoir site.

Task 3.4 Budget: $6,100

3.5. Hamilton County Reservoir – regional supply

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.5 Budget: $4,600

3.6. Lake Creek Reservoir – regional supply for NCTMWA and customers

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.6 Budget: $7,200

3.7. Brazos River Main Stem Off-Channel Reservoir – regional supply

An abbreviated analysis to identify potential off-channel reservoir sites proximate to the main stem of the Brazos River in the central part of the Brazos G Area was conducted during development of the 2016 Plan. Fourteen potential sites were identified, and yield analyses and costs were estimated for two of those. One of the sites is no longer considered feasible (Little River OCR) and the second (Milam County OCR) is located in an area that may preclude its feasibility, also. The 14 locations identified previously will be evaluated again, and a more detailed search for additional sites will also be made. Two candidate sites will be evaluated per TWDB guidelines for possible recommendation by Brazos G. Supplies to the off-channel reservoir sites would be made available from the BRA's System Operations Permit or from additional unappropriated flows in the Brazos Basin.

Task 3.7 Budget: $22,500

3.8. Peach Creek Off-Channel Reservoir – regional supply for Brazos County and surrounding area

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.8 Budget: $4,600

3.9. South Bend Reservoir – regional supply

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.9 Budget: $8,200

3.10. Throckmorton Reservoir – regional supply

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines.

Task 3.10 Budget: $4,600

3.11. Turkey Peak Reservoir – regional supply for Palo Pinto County MWD No. 1 and customers

Yield, project cost and environmental evaluation will be updated from the 2016 Plan per TWDB guidelines, based on PPCMWD No. 1's current plans for the project.

Task 3.10 Budget: $5,600

Task 3 Budget: $83,400

4. New Groundwater Supplies and Groundwater Projects

Additional groundwater development will be required to meet future needs. The final list of WUGs for which additional groundwater development will be evaluated will be determined during the planning process as the final water needs are established and those entities are coordinated with to determine their preferred strategies and projects. Strategies and projects to increase groundwater supplies will be evaluated from the following aquifer systems, consistent with projects recommended in the 2016 Brazos G Plan and continued coordination with WUGs in the Brazos G Area. Final selection of projects will be made based on remaining aquifer availability after current supplies are met, proximity to WUGs with needs, and preferences of local sponsors.

- Blaine Aquifer
- Brazos River Alluvium
- Carrizo-Wilcox Aquifer
- Cross Timbers Aquifer
- Dockum Aquifer
- Edwards BFZ
- Ellenburger-San Saba Aquifer
- Gulf Coast Aquifer System
- Navasota River Alluvium
- Queen City Aquifer
- Seymour Aquifer
- Sparta Aquifer
- Trinity Aquifer
- Woodbine Aquifer
- Yegua-Jackson Aquifer
- Other aquifers, as needed to meet local needs

Based upon projects and strategies evaluated and/or recommended in the 2016 Plan, and the number of new WUGs added since the 2016 Plan, approximately 90 individual groundwater projects will be evaluated for the 2021 Plan, in addition to three larger strategies for College Station, Bryan and Williamson County entities. Supplies may be made available from the SAWS Vista Ridge project for which additional projects may be evaluated to supply needs in Williamson and Bell Counties that would utilize the SAWS Vista Ridge project as a source.

4.1. Miscellaneous GW Strategies/Projects

Supplies, project costs and GIS information will be developed for approximately 90 groundwater projects. Supplies will not be developed that would cause the MAG for any aquifer to be exceeded. Potential strategies and projects may involve brackish groundwater in some cases where brackish sources are in closer proximity than fresh sources. Environmental evaluations will be performed for those expected to potentially impact cultural or environmental resources, otherwise all evaluations will assume that pipelines and well fields will avoid sensitive areas and few environmental issues will need to be addressed. Brazos G will coordinate with local groundwater conservation districts to identify recently permitted groundwater well projects that should be included as water management strategies.

Task 4.1 Budget: $98,200

4.2. Update Groundwater Strategy for Bryan

Brazos G will coordinate with the City of Bryan to update the current groundwater strategy in the 2016 Plan that increases Bryan's supplies from the Carrizo-Wilcox Aquifer in Brazos and Robertson Counties. Brazos G will incorporate the most recent project information obtained from Bryan during this update.

Task 4.2 Budget: $11,000

4.3. Update Groundwater Strategy for College Station

Brazos G will coordinate with the City of College Station to update the current groundwater strategy in the 2016 Plan that increases College Station's supplies from the Carrizo-Wilcox Aquifer and potentially other aquifers in Brazos and potentially Robertson Counties. Brazos G will incorporate the most recent project information obtained from College Station during this update.

Task 4.3 Budget: $11,000

4.4. Update Groundwater Strategy for Williamson County

Brazos G will coordinate with Williamson County entities and potential groundwater suppliers to develop a water management strategy for developing groundwater supplies to meet Williamson County needs. Brazos G will include supplies from the SAWS Vista Ridge project if appropriate.

Task 4.4 Budget: $26,500

Task 4 Budget: $146,700

5. BRA System Operations Supplies

The BRA's recently granted System Operations Permit provides roughly 100,000 acft/yr of additional supply. The BRA has recently begun considering where the agency might provide additional water through new contractual agreements. Brazos G will coordinate with the BRA to identify specific WUGs and/or WWPs that might purchase these additional supplies and develop specific projects (intakes, pipelines, pump stations, water treatment plants) to allow them to access these supplies. Because the amount of water available under the System Operations Permit varies accordingly to where contractual diversions are located in the basin, additional WAM simulations will be needed to

confirm availability of supplies at the diversion locations identified. Up to 15 individual projects will be evaluated per TWDB guidelines.

Task 5 Budget: $21,500

6. Oak Creek Reservoir Conjunctive Management – City of Sweetwater

Oak Creek Reservoir, located in the Colorado River Basin in Region F, is used by the City of Sweetwater for water supply. When reservoir levels are low, Sweetwater utilizes the Champion Well Field. Conjunctively operating the reservoir and well field together has been shown to increase the total combined supply from the two sources, when supplies in Oak Creek are augmented with a subordination agreement (recommended strategy in the 2016 Brazos G and Region F Plans). This strategy will be updated from the information in the 2016 Plan, with new supply estimates and costs per TWDB guidelines

Task 6 Budget: $9,900

7. Aquifer Storage and Recovery

Brazos G will coordinate with project sponsors for the following Aquifer Storage and Recovery (ASR) projects that were evaluated for the 2016 Brazos G Plan. Updated project information will be obtained. Project supplies, costs and environmental and cultural resource issues will be updated from the 2016 Plan per TWDB guidelines. Sources for some of these ASR projects may be either fresh water or reuse supplies.

7.1. City of Bryan ASR

Yield, project cost and environmental evaluation will be updated per TWDB guidelines, based on the City of Bryan's current plans for the project.

Task 7.1 Budget: $3,500

7.2. City of College Station ASR

Yield, project cost and environmental evaluation will be updated per TWDB guidelines, based on the City of College Station's current plans for the project.

Task 7.2 Budget: $3,500

7.3. Trinity Aquifer ASR in Johnson County

Yield, project cost and environmental evaluation will be updated per TWDB guidelines for this ASR project.

Task 7.3 Budget: $5,800

7.4. Trinity Aquifer ASR in McLennan County

Yield, project cost and environmental evaluation will be updated per TWDB guidelines for this ASR project.

Task 7.4 Budget: $9,400

7.5. Lake Granger ASR (Trinity Aquifer)

This ASR project is operated conjunctively with Lake Granger to supplement the reservoir's supplies. The Brazos G WAM analysis will be updated for this project, and yield, project cost and environmental evaluation will be updated per TWDB guidelines.

Task 7.5 Budget: $10,300

7.6. Additional ASR Projects

Several other ASR project ideas have been hypothesized recently, such as an ASR project to augment supplies in Williamson County. Brazos G will identify and evaluate two additional ASR project to meet needs in the Brazos G Area.

Task 7.6 Budget: $19,800

Task 7 Budget: $52,300

8. Regional Projects

8.1. Lake Belton to Stillhouse Hollow Pipeline

The BRA is planning to construct a pipeline to transfer water from Lake Belton to Lake Stillhouse Hollow. In conjunction with the existing pipeline from Lake Stillhouse Hollow to Lake Georgetown, this project will improve the flexibility of the BRA's Little River System of reservoirs, allowing supplies from all three reservoirs to be utilized most efficiently. Brazos G will coordinate with BRA to obtain the latest project information and will update supplies, costs and environmental evaluation per TWDB guidelines.

Task 8.1 Budget: $1,800

8.2. Bosque County Regional Project

With groundwater reliability remaining a concern in Bosque County, this project contemplates increasing the capacity of the City of Clifton Off-Channel Reservoir to increase supply to be made available to WUGs in Bosque County. Project information will be updated from the 2016 Plan for supply, costs and environmental evaluation per TWDB guidelines.

Task 8.2 Budget: $6,900

8.3. Brushy Creek RUA Water Supply Project

The Cities of Leander, Cedar Park and Round Rock are pursuing implementation of a project to utilize supplies from the Highland Lakes (Colorado River Basin, Region K). Brazos G will coordinate with the Brushy Creek Regional Utility Authority to obtain current project information, and will update supply, costs and environmental evaluations per TWDB guidelines.

Task 8.3 Budget: $5,600

8.4. East Williamson County Water Supply Project

The Lonestar Regional Water Authority is pursuing projects to deliver water from the BRA's East Williamson County Water Treatment Plant located near Taylor, Texas to various entities in Williamson and possibly southern Bell Counties. Brazos G will coordinate with Lonestar to obtain recent project information, as well as identify potential future directions of the project. Supplies, costs and environmental evaluation for the project will be updated per TWDB guidelines.

Task 8.4 Budget: $7,400

8.5. Phase I and Future Phases of the Lake Whitney Water Supply Project

The City of Cleburne has contracted for supplies from Lake Whitney and Lake Aquilla. This project will develop pipeline and treatment systems to deliver water from Lake Aquilla to Cleburne, and deliver water from Lake Whitney to either Lake Aquilla or Cleburne, depending on the option selected. Brazos G will coordinate with Cleburne to obtain the latest project information and will update supplies, costs and environmental evaluation per TWDB guidelines.

Task 8.5 Budget: $8,600

8.6. Somervell County Water Supply Project

The Somervell County Water District recently constructed Wheeler Branch Reservoir and began projects to deliver this water to customers throughout Somervell County. Brazos G will coordinate with the District to obtain the latest project information and will update supplies, costs and environmental evaluation per TWDB guidelines.

Task 8.6 Budget: $4,000

8.7. West Central Brazos Water Distribution System

The West Central Texas Municipal Water District recently acquired this water distribution system from the BRA. The project can deliver water to District customers from Possum Kingdom Lake and possibly from Hubbard Creek Reservoir. Brazos G will coordinate with the District to identify the District's current plans to upgrade and utilize this resource, and will evaluate supplies, costs and environmental issues per TWDB guidelines.

Task 8.7 Budget: $8,600

Task 8 Budget: $42,900

9. Augmentation of Existing Reservoir Supplies

9.1. Gibbons Creek Reservoir Expansion

Gibbons Creek Reservoir is operated by the Texas Municipal Power Agency (TMPA) to provide steam-electric cooling water to the TMPA generating station located at the lake. Despite TMPA plans to liquidate the facilities, the reservoir remains a resource to supply water for steam-electric generation, whether at the Gibbons Creek Power Station or elsewhere. Brazos G will update supplies, costs and environmental evaluation of the proposed raising of the reservoir pool. Supplies will be updated using WAM analyses. All evaluations will be completed per TWDB guidelines.

Task 9.1 Budget: $7,000

9.2. Lake Aquilla Storage Reallocation

The BRA and the U.S. Army Corps of Engineers have been investigating the feasibility of reallocating some of the flood storage in Lake Aquilla to conservation storage for water supply purposes. Brazos G will coordinate with the BRA and the Corps to obtain the latest project information from their evaluation, and will update supplies, costs and environmental evaluation per TWDB guidelines. Supplies will be updated using WAM analyses.

Task 9.2 Budget: $7,000

9.3. Lake Granger Storage Reallocation

The BRA and the U.S. Army Corps of Engineers have been investigating the feasibility of reallocating some of the flood storage in Lake Granger to conservation storage for water supply purposes. Brazos G will coordinate with the BRA and the Corps to obtain the latest project information from their evaluation, and will update supplies, costs and environmental evaluation per TWDB guidelines. Supplies will be updated using WAM analyses.

Task 9.3 Budget: $7,000

9.4. Lake Stillhouse Hollow Storage Reallocation

The BRA and the U.S. Army Corps of Engineers have been investigating the feasibility of reallocating some of the flood storage in Lake Stillhouse Hollow to conservation storage for water supply purposes. Brazos G will coordinate with the BRA and the Corps to obtain the latest project information from their evaluation, and will update supplies, costs and environmental evaluation per TWDB guidelines. Supplies will be updated using WAM analyses.

Task 9.4 Budget: $7,000

9.5. Lake Whitney Storage Reallocation

The BRA and the U.S. Army Corps of Engineers have been investigating the feasibility of reallocating some of the flood storage in Lake Whitney to conservation storage for water supply purposes. Brazos G will coordinate with the BRA and the Corps to obtain the latest project information from their evaluation, and will update supplies, costs and environmental evaluation per TWDB guidelines. Supplies will be updated using WAM analyses.

Task 9.5 Budget: $7,000

9.6. Lake Granger Augmentation

The BRA has been considering augmenting supplies from Lake Granger with regional groundwater supplies to meet water needs in Williamson County and southern Bell County. Brazos G coordinate with BRA to update supplies, costs and environmental evaluation of the proposed project. Supplies will be updated using WAM analyses,

coupled with evaluation of available groundwater supplies. All evaluations will be completed per TWDB guidelines.

Task 9.6 Budget: $12,600

9.7. Lake Whitney Overdrafting Supply into Off-Channel Reservoir

Lake Whitney is frequently in its flood pool, and it often takes the Corps of Engineers days or weeks to release the water so as to not increase flooding downstream. During these times, water could be diverted from the flood pool and stored in an off-channel reservoir for future use. Brazos G will evaluate supplies that could be made available to store in an off-channel reservoir, will identify a potential location for such a project, and will develop supplies, costs and environmental evaluation for the project per TWDB guidelines. Water supply analyses will be completed using WAM analyses.

Task 9.7 Budget: $12,500

9.8. Millers Creek Reservoir Augmentation

The North Central Texas Municipal Water Authority owns and operates Millers Creek Reservoir. Millers Creek does not have a reliable supply, and the Authority has been exploring ways to increase supplies from the reservoir. Brazos G will coordinate with the Authority to identify current plans and/or new concepts for augmenting supplies, and will complete an evaluation of the Authority's preferred alternative. Brazos G will develop supplies, costs and environmental evaluation for the proposed project. Supplies will be updated using WAM analyses. All evaluations will be completed per TWDB guidelines.

Task 9.8 Budget: $12,900

9.9. BRA Sediment Reduction Program

The BRA system of reservoirs is projected to lose substantial yield due as reservoir storage capacity is lost due to reservoir sedimentation. Brazos G will coordinate with BRA to research and identify pro-active measures the BRA could pursue to reduce sediment inflows and extend the useful life of the BRA's water supplies. Estimates for how much sediment inflows might be reduced will be estimated, and updated year 2070 yields will be determined. These updated yields will not require TCEQ permitting because they will not represent a new appropriation of water, so the Brazos G WAM will be used to determine future 2070 yields under the sediment reduction program so that supplies are consistent and comparable to the estimates of existing supplies performed under Task 3. Brazos G will estimate the costs of the program and will evaluate potential environmental issues. All analyses of sediment reduction and costs will be based upon literature research.

Task 9.9 Budget: $26,600

9.10. South San Gabriel Diversion into Lake Georgetown

During high flow events, there may be the opportunity to divert flows from the South San Gabriel River into Lake Georgetown to supplement storage in the reservoir. Brazos G will determine the supplies that such a project may make available through increasing the yield of Lake Georgetown. Brazos G will determine the costs of the necessary facilities

and will complete an environmental evaluation of the proposed project per TWDB guidelines. Supplies will be determined using WAM analyses.

Task 9.10 Budget: $5,400

Task 9 Budget: $105,000

10. Salt Fork Water Quality Control Corporation Chloride Control Project

10.1. Update 2016 Evaluation with New/Changed Data

Control of naturally occurring chlorides originating from the upper Brazos Basin has been a subject of study for decades among university researchers and various state and federal agencies. The Salt Fork Water Quality Corporation (SFWQC) has been implementing a project to capture brine before it seeps into Brazos Basin streams, remove the salt, and utilize the salt and fresh water produced for economic purposes. Brazos G has completed extensive evaluation of this project and its benefits for the 2011 and 2016 Plans. For the 2021 Plan, Brazos G will coordinate with the SFWQC to obtain the latest project configuration and facilities costs. The 2016 Plan presented an evaluation of the effectiveness of the chloride control using the WRAP-SALT program developed at Texas A&M University. That analysis will not be updated for this study because the underlying data have not changed since that analysis. The 2016 Plan also presented an evaluation of the potential savings in treatment costs that might be realized by downstream users of the water. That analysis will be updated only to reflect treatment costs consistent with other strategies in the 2021 Plan.

Task 10.1 Budget: $16,600

10.2. Fresh Water Supply Projects from the SFWQC Chloride Control Project

A new feature of the SFWQC project is the capability to supply approximately 2,000 acft/yr of fresh water that is a product of the desalination process. Several entities in the upper Brazos Basin (both in the Brazos G Area in the Region O Area) have expressed an interest in obtaining this new supply. Brazos G will coordinate with the SFWQC, WUGs that would be potential purchasers of the fresh water, and Region O to evaluate water management strategy projects that would utilize this source. Brazos G will develop costs for those projects and evaluate environmental issues per TWDB guidelines.

Task 10.2 Budget: $6,600

Task 10 Budget: $23,200

11. Possum Kingdom Reservoir Supplies to Abilene

The City of Abilene has recently implemented an emergency supply project from Possum Kingdom Reservoir. Brazos G will coordinate with the City and the BRA to determine supplies that might be available should the City pursue this project as a permanent supply, and will identify other potential users in the vicinity that may have water needs. This strategy will be updated from the information in the 2016 Plan, with new supply estimates and costs per TWDB guidelines.

Task 11 Budget: $4,100

12. Brush Control

Brazos G will update the evaluation of Brush Control as a water management strategy from the 2016 Plan.

Task 12 Budget: $4,300

13. New, Increased, or Restructured Contracts and Agreements

Often, supplies can be made available simply by restructuring existing water supply contracts or water treatment agreements, or by entering into new agreements, including subordination agreements. For this strategy, Brazos G will identify WUGs and WWPs that have needs that could be alleviated through restricting or increasing existing contracts or entering into new agreements, and evaluate the possibility of increasing supplies under those contracts. Supply increases due to subordination agreements will be determined using WAM analyses. Projects (pipelines, pump stations, water treatment plants, etc.) that may be required to utilize increased supplies under this strategy will evaluated as Miscellaneous Projects under Task 14. Miscellaneous Strategies and Projects.

Task 13 Budget: $7,100

14. Miscellaneous Strategies and Projects

14.1. Miscellaneous Pipelines, Pump Stations, Connections and Interconnections

During the planning process, a number of necessary smaller projects consisting of pipelines, pump stations, storage tanks, and connections between neighboring systems are identified. In the 2016 Plan, approximately 15 such projects are identified and evaluated. For the 2021 Plan, an estimated 25 such projects will be identified and evaluated. Supplies, project costs and GIS information will be developed for each of these per TWDB guidelines. Environmental evaluations will be performed for those projects expected to potentially impact cultural or environmental resources, otherwise all evaluations will assume that pipelines and system interconnections will avoid sensitive areas and few environmental issues will need to be addressed.

Task 14.1 Budget: $28,800

14.2. Lower Existing Wells

Desired Future Conditions (DFCs) associated with the Modeled Available Groundwater (MAG) estimates represent deceases in groundwater levels or piezometric heads in confined aquifer systems. These decreased groundwater levels may require that pumps in existing supply wells be lowered, or that new wells be developed to replace wells that no longer have high enough water levels. This is a particularly noticeable issue in McLennan County, where the desired future conditions in the Trinity Aquifer allow for several hundred feet of additional drawdown. Brazos G will access the TWDB

groundwater well inventory and import well information into a Geographic Information System (GIS) for the wells associated with municipal WUGs. Brazos G will estimate well pump elevations and compare those elevations to projected groundwater levels under the DFCs to identify specific public supply wells that may be in danger of "going dry" under the DFCs.

Brazos G will estimate costs for well pump lowering or well replacement, as appropriate for those wells requiring some form of action.

Task 14.2 Budget: $33,000

14.3. Water Treatment Plant Expansions

The 2016 Plan identifies 10 water user groups or wholesale water providers requiring a water treatment plant expansion or a new water treatment plant in order to utilize existing supplies. These plants or plant expansion are not included in any other water management strategy or project. For the 2021 Plan, 10 entities are expected to require a similar project.

Task 14.3 Budget: $4,600

Task 14 Budget: $66,400

15. Additional Strategies

During the course of preparing the 2021 Plan, it is likely that new potentially feasible water management strategies will be identified. This task allocates a portion of the overall budget provided by the TWDB for Task 45A to allow evaluation of new strategies that might be identified during the remainder of the planning process. If sufficient funds are not available to evaluate a strategy that comes to the planning group's attention, then a local sponsoring entity may be required to fund the evaluation of the strategy. New strategies will not be evaluated without prior approval of the Brazos G Regional Water Planning Group and concurrence of the TWDB.

Task 15 Budget: $25,000

16. Plan Development

A plan will be developed for each WUG and WWP assigning recommended or alternative water management strategies to meet the needs of each entity. As water management strategies are evaluated, the plan for each WUG and WWP will be developed that meets each projected water need. This task includes coordination as necessary with the WUGs and WWPs regarding individual plans.

Task 16 Budget: $32,700

17. Database Entry

All recommended or alternative water management strategies will be entered into the TWDB water planning database (DB22), and supplies and costs distributed to the WUGs and WWPs receiving water from each strategy. Specific tasks include:

- Define each recommended and alternative strategy in accordance to database requirements;
- Assign WUGs and WWPs to specific strategies and distribute supply from the strategy to each;
- Enter capital and annual costs for each WUG and WWP;
- Coordinate with adjacent regions sharing the source or with shared WUGs or WWPs;
- Quality control/quality assurance checks of the data entered into the database;
- Coordination with TWDB staff as needed.

Task 17 Budget: $33,800

18. Chapter 5 Preparation

Chapter 5 documents the evaluation and selection of water management strategies and presents the water supply plan for each WUG and WWP. The technical evaluations of the water management strategies are presented in a separate bound volume of the regional water plan due to the extensive and voluminous nature of the evaluations. This separate volume exceeded 850 pages of text, tables, maps and figures in the 2016 Plan. The section of chapter 5 presenting the plans for each WUG and WWP exceeded 350 pages of text and tables in the 2016 Plan. This task includes the effort to compile all the required information into Chapter 5 (both volumes), coordination with the planning group, TWDB staff, and other entities regarding comments on the final chapters in the Initially Prepared and Final Plans, as required by TWDB planning rules.

Task 18 Budget: $35,400

Total Task 5A Fee Estimate: $791,100

Total TWDB Funding: $703,546

Additional Funds Needed: $87,554

Table 1
Technical Consultant Budget for Task 5A

Task No.	Task Name / Report Section	Technical Consultant Budget
Task 1	Water Conservation	**$ 11,200**
Task 2	Reuse	**$ 86,200**
Task 3	New Reservoirs	**$ 83,400**
Task 4	Groundwater Supplies and Projects	**$ 146,700**
Task 5	BRA System Operations Supplies	**$ 21,500**
Task 6	Oak Creek Reservoir Conjunctive Managemnet	**$ 9,900**
Task 7	Aquifer Storage and Recovery (ASR)	**$ 52,300**
Task 8	Regional Projects	**$ 42,900**
Task 9	Augmentation of Existing Reservoir Supplies	**$ 105,000**
Task 10	Salt Fork Water Quality Corporation Chloride Control Project	**$ 23,200**
Task 11	Possum Kingdom Reservoir Supplies to Abilene	**$ 4,100**
Task 12	Brush Control	**$ 4,300**
Task 13	New, Increased or Restructured Contracts and Agreements	**$ 7,100**
Task 14	Miscellaneous Strategies and Projects	**$ 66,400**
Task 15	Additional Strategies	**$ 25,000**
Task 16	Plan Development	**$ 32,700**
Task 17	Database Entry	**$ 33,800**
Task 18	Chapter 5 Preparation	**$ 35,400**
Total - Technical Consultant Budget for Task 5A		**$ 791,100**

No.	Strategy	2001	2006	2011	2016	Supply Developed (acft/yr)	Project Cost	Cost of Water ($/1,000 gals)	
	Conservation and Demand Management								
1	Municipal Conservation		X	X	R	na	na	1.45	
2	Industrial Conservation		X	X	R	na	na		
3	Irrigation Conservation		X	X	R	na	na	0.70	
4	Advanced Municipal Conservation (gpcd < 140)				R	na	na		
5	Advanced Industrial Conservation				R	na	na		
6	Drought Management		X	X	X				
7	Leave Needs Unmet				R				
	New Reservoirs								
8	Breckenridge Reservoir		X			28,920	$ 82,755,000	0.69	No
9	Brushy Creek Reservoir			X	R	1,450	$ 20,836,000	1.48	Yes
10	Cedar Ridge Reservoir		X	X	R	26,575	$ 290,868,000	3.16	Yes
11	Coryell County Off-Channel Reservoir			X	R	3,135	$ 42,246,000	4.31	Yes
12	Double Mtn. Fork (East) Reservoir		X	X		36,025	$ 211,373,000	1.37	No
13	Double Mtn. Fork (West) Reservoir		X	X		34,775	$ 151,456,000	1.02	No
14	Lake Bosque	X				17,900	$ 67,063,000	0.83	No
15	Groesbeck Off-Channel Reservoir	X	X	X	R	1,755	$ 11,909,000	1.89	Yes
16	Hamilton County Reservoir				X	9,275	$ 153,839,000	5.90	??
17	Lake Creek Reservoir				A	14,500	$ 193,524,000	4.01	Yes
18	Lake Palo Pinto Off-Channel Reservoir		X	X	A	3,110	$ 34,685,000	3.01	??
19	Little River Off-Channel Reservoir	X	X	X	R	56,150	$ 248,761,000	1.27	No
20	Little River Reservoir			X		71,275	$ 331,705,000	1.01	No
21	Brazos River Main Stem Off-Channel Reservoir				X				Yes
22	Meridian Off-Channel Reservoir	X		X	A	615	$ 21,702,000	12.15	No
23	Millican-Bundic Reservoir	X	X			38,080	$ 464,764,000	2.80	No
24	Millican-Panther Reservoir			X		194,500	$ 1,159,907,000	1.90	No
25	Paluxy Reservoir	X				16,300	$ 74,147,000	1.03	No
26	Peach Creek Off-Channel Reservoir	X	X	X	X	4,240	$ 66,852,000	4.40	??
27	Somervell County Off-Channel Reservoir	X				2,000	$ 24,633,000	3.38	No
28	South Bend Reservoir	X	X	X	X	62,100	$ 504,509,000	1.73	Yes
29	Throckmorton Reservoir			X	R	3,540	$ 28,041,000	1.85	Yes
30	Turkey Peak Reservoir		X	X	R	8,100	$ 83,363,000	2.30	Yes
31	Wheeler Branch Off-Channel Reservoir		X	X		1,800			No
	New Groundwater Supplies								Yes
32	Brazos River Alluvium - various entities	X			R				Yes
33	others	X	X	X	R				Yes
34	Gulf Coast Aquifer - various entities			X	R				Yes
35	Trinity Aquifer - various entities			X	R				Yes
36	Edwards Aquifer - various entities			X	R				??
37	Sparta Aquifer - various entities				R				Yes

38	Dockum Aquifer - various entities				R				Yes
39	Woodbine Aquifer - various entities				R				Yes
40	Blaine Aquifer - various entities				R				Yes
41	Yegua-Jackson Aquifer - various entities				R				Yes
42	Seymour Aquifer - various entities				R				Yes
	Conjuctive Operation of Existing Supplies								
43	BRA System Operation - various projects to utilize new supply		X	X	R	247,320			Yes
44	Coordinated use of Fort Phantom Hill and Hubbard Creek Reservoirs	X							No
45	Coordinated Use of Lake Leon Water Supply with Local Groundwater	X							No
46	Oak Creek Reservoir Conjunctive Management			X	R	4,142			Yes
	Aquifer Storage and Recovery								
47	Bryan ASR				R	19,839	$ 57,328,000	1.18	Yes
48	College Station ASR				R	2,800	$ 63,850,000	9.42	Yes
49	Trinity ASR in Johnson County (Johnson County SUD and Acton MUD)		X	X	A	3,400	$ 22,045,300	4.61	Yes
50	Trinity ASR in McLennan County		X	X	R	8,000	$ 50,516,000	2.31	Yes
51	Lake Granger ASR (Trinity Aquifer)				R	9,050	$ 59,060,000	2.67	Yes
52	Seymour ASR Project	X	X	X		3,750	$ 18,826,000	1.45	No
	Reuse								
53	Reuse Supply - various reuse projects throughout Brazos G		X	X	R	83,527	$ 160,277,000	2.82	Yes
54	College Station DPR				A	2,800	$ 56,192,000	10.69	Yes
55	College Station Non-Potable Reuse				R	103	$ 1,705,000	5.15	Yes
56	City of Bryan Lake Bryan Reuse				R	605	$ 8,989,000	4.75	Yes
57	City of Bryan Miramont Reuse				R	600	$ 2,544,000	1.25	Yes
58	City of Cleburne Reuse				R	2,031	$ 14,059,000	2.26	Yes
59	Waco WMARSS Reuse Projects		X	X	R	7,847	multiple	multiple	Yes
60	Bell County WCID No. 1 Reuse			X	R	1,925	$ 12,146,000	2.35	Yes
61	TRA Reuse - Joe Pool		X	X		20,000	$ 79,257,000	1.84	No
	Regional Projects								
62	Lake Belton to Lake Stillhouse Hollow Pipeline			X	R	30,000	$ 38,069,000	154.00	Yes
63	Bosque County Regional Project	X	X	X	R	1,070	$ 21,792,000	6.99	Yes
64	Brushy Creek RUA Water Supply Project	X	X	X	R	67,000	$ 314,847,000	3.46	Yes
65	East Williamson County Water Supply Project			X	R	8,400	$ 42,127,000	3.60	Yes
66	Phase I Lake Whitney Water Supply Project			X	R	2,128	$ 42,221,700	8.75	Yes
67	Future Phases of Lake Whitney Water Supply Project			X	R	7,572	$ 110,843,000	2.84	Yes
68	Somervell County WSP			X	R	600	$ 35,249,000	18.20	Yes
69	West Central Brazos Water Distribution System	X	X	X	R	1,400	$ 21,148,000	7.65	Yes
	Augmentation of Existing Supplies								
70	Gibbons Creek Reservoir Expansion			X	R	2,605	$ 12,979,000	1.10	Yes
71	Lake Aquilla Storage Reallocation			X	R	2,400	$ 21,887,000	2.65	Yes
72	Lake Aquilla Augmentation - Cleburne (Lake Whitney to Aquilla)				R	14,700	$ 88,231,000	3.19	Yes
73	Lake Cisco Augmentation	X				500	$ 4,700,000	2.95	No
74	Lake Granger Augmentation		X	X	A	46,265	$ 637,057,000	4.94	Yes

75	Lake Granger Storage Reallocation			X	A	1,940	$ 28,710,000	4.76	Yes
76	Lake Stillhouse Hollow Reallocation				A	2,643	$ 36,553,000	3.61	Yes
77	Lake Whitney Reallocation	X			A	20,842	$ 89,948,000	1.11	Yes
78	Lake Whitney Over-Drafting Supply with Off-Channel Reservoir								Yes
79	Lake Leon Augmentation	X				9,100	$ 2,200,000		No
80	Lake Stamford Augmentation	X				6,680	$ 6,300,000		No
81	Lake Sweetwater Augmentation	X				790	$ 3,000,000		No
82	Millers Creek Reservoir Augmentation			X	R	775	$ 2,549,700	7.38	Yes
83	BRA Sediment Reduction Program			X	A				Yes
84	South San Gabriel Diversion into Lake Georgetown								Yes
	Chloride Reduction or Treatment								
85	Brackish GW Desal	X		X	X				Yes
86	Chloride Control Project (SFWQC)			X	R				Yes
87	Supplies from Chloride Control Project - Aspermont, Jayton, Region O								Yes
88	Lake Whitney Desal	X				11,202	$ 29,085,000	1.58	No
89	Ocean Water Desal								No
90	BRA SWATS reallocation of capacity	X		X	X				Yes
	Other Strategies								
91	Purchase and Use of Water from Possum Kingdom - Abilene				A	14,800	$ 269,334,000	7.93	Yes
92	Brackish Groundwater				X				Yes
93	Brush Control		X	X	R	0	$ 7,532,000		Yes
94	Restructure Contracts			X	R				Yes
95	Subordination Agreements			X	R				Yes
96	Weather Modification	X	X	X					No
	Misc Strategies								
97	Misc. Pipelines, Pump Stations and GW Options - various entities	X	X	X	R				Yes
98	Misc. Purchases, Interconnects and Reallocations - various entities	X	X	X	R				Yes
99	Rehabilitate Existing Wells			X	R				Yes
100	Purchase from Walnut Creek Mine - Robertson County SE				R	9,000	N/A	1.55	Yes
101	Purchase from SAWS Vista Ridge Project (Williamson County)				R	5,700	None	6.68	Yes
102	Water Treatment Plant Expansions - various entities	X	X	X	R				Yes
	New Supplies from Other Planning Areas								

X = evaluated in the identified regional water plan
R = recommended in the 2016 Brazos G Plan
A = alternative strategy in the 2016 Brazos G Plan

Task 5A Budget-V2

	Fee	
Task 5A Fee	$ 703,546	
Estimated	$ 790,971	
Remaining	$ (87,425)	$ 51,975
Total Planned HDR Hours	4710	
Total Planned SRA Hours	100	
Total Planned FNI Hours	0	

No.	Strategy	Task Budget	Task Fee	Subtask		Subtask Fee	Hours
1	Conservation	$ 9,800	$ 11,200	1	Conservation Determination and Costing	$ 11,200	72
2	Reuse	$ 75,500	$ 86,286	1	Update Available Reuse Supplies	$ 4,300	24
				1	Identify Potential Reuse Projects	$ 5,300	32
				1	Evaluate 10 Reuse Projects	$ 40,100	272
				2	College Station DPR	$ 3,300	22
				3	College Station Indirect Reuse	$ 3,300	22
				4	Bryan Lake Bryan Reuse	$ 3,300	22
				5	Bryan Miramont Reuse	$ 3,300	22
				6	Cleburne Reuse	$ 3,300	22
				7	Waco WMARSS Reuse Projects	$ 13,400	88
				8	Bell County WCID No. 1 Reuse Projects	$ 6,600	44
3	New Reservoirs	$ 72,900	$ 83,314	1	Brushy Creek Reservoir	$ 8,800	52
				2	Cedar Ridge Reservoir	$ 6,600	40
				3	Coryell County OCR	$ 4,600	28
				4	Groesbeck OCR	$ 6,100	36
				5	Hamilton County Reservoir	$ 4,600	28
				6	Lake Creek Reservoir	$ 7,200	42
				7	Brazos River Main Stem OCR	$ 22,500	132
				8	Peach Creek OCR	$ 4,600	28
				9	South Bend Reservoir	$ 8,200	46
				10	Throckmorton Reservoir	$ 4,600	28
				11	Turkey Peak Reservoir	$ 5,600	32
4	Groundwater Sup	$ 128,300	$ 146,629	1	Misc. GW Projects (assume 90)	$ 98,200	692
				2	Update GW Strategy for Bryan	$ 11,000	53
				3	Update GW Strategy for College Station	$ 11,000	53
				4	Update GW Strategy for Williamson County	$ 26,500	114
5	BRA System Opera	$ 18,800	$ 21,486	1	BRA System Operations Supplies	$ 21,500	114
6	Oak Creek Reserv	$ 8,700	$ 9,943	1	Oak Creek Reservoir Conjunctive Operation	$ 9,900	46
7	Aquifer Storage ar	$ 45,800	$ 52,343	1	Bryan ASR	$ 3,500	20
				2	College Station ASR	$ 3,500	20
				3	Trinity ASR in Johnson County	$ 5,800	28
				4	Trinity ASR in McLennan County	$ 9,400	42
				5	Lake Granger ASR (Trinity Aquifer)	$ 10,300	46
				6	Additional ASR Projects (2)	$ 19,800	88
8	Regional Projects	$ 37,500	$ 42,857	1	Lake Belton to Stillhouse Pipeline	$ 1,800	15
				2	Bosque County Regional Project	$ 6,900	42
				3	Brushy Creek RUA Water Supply Project	$ 5,600	34
				4	East Williamson County Water Supply Project	$ 7,400	52
				5	Phase I and Future Phases Lake Whitney Water Su	$ 8,600	54
				6	Somervell County Water Supply Project	$ 4,000	32
				7	West Central Brazos Water Distribution System	$ 8,600	54
9	Augmentation of E	$ 91,700	$ 104,800	1	Gibbons Creek Reservoir Expansion	$ 7,000	42
				2	Lake Aquilla Storage Reallocation	$ 7,000	48
				3	Lake Granger Storage Reallocation	$ 7,000	48
				4	Lake Stillhouse Hollow Reallocation	$ 7,000	48
				5	Lake Whitney Reallocation	$ 7,000	48
				6	Lake Granger Augmentation	$ 12,600	72
				7	Lake Whitney Over-Drafting Supply with Off-Chanr	$ 12,500	76
				8	Millers Creek Reservoir Augmentation	$ 12,900	70
				9	BRA Sediment Reduction Program	$ 26,600	188
				10	South San Gabriel Diversion into Lake Georgetown	$ 5,400	38

10	SFWQC Chloride C	$ 20,300.00	$ 23,200.00	1	Update 2016 Plan Evaluation	$	16,600	80
				1	SFWQC Freshwater Supplies	$	6,600	42
11	Possum Kingdom S	$ 3,600.00	$ 4,114.29	1	Update evaluation	$	4,100	24
12	Brush Control	$ 3,800.00	$ 4,342.86	1	Update evaluation	$	4,300	26
13	New, Increased or	$ 6,200.00	$ 7,085.71	1	Identify and Evaluate Opportunities	$	7,100	32
14	Misc. Strategies ar	$ 58,100.00	$ 66,400.00	1	Misc. Pipelines, Pump Stations, Connections and Ir	$	28,800	202
				2	Lower Existing Wells	$	33,000	172
				3	WTP Expansions	$	4,600	26
15	Additional Stratgie	$ 21,900.00	$ 25,028.57	1	Identify and Evaluate Other Strategies	$	25,000	123
16	Plan Development	$ 28,600.00	$ 32,685.71	1	Assign WMSs to WUGs and WWPs	$	32,700	164
17	Database Entry	$ 29,600.00	$ 33,828.57	1	Complete and QC database entry of WMWs	$	33,800	248
18	Chapter 5 Prepara	$ 31,000.00	$ 35,428.57	1	Compile Evaluations into Single Chapter	$	35,400	160