

Appendix M

Implementation of the 2016 Brazos G Regional Water Plan

- M-1. Memorandum – Implementation of Strategies Recommended in the
2016 Brazos G Regional Water Plan
- M-2. Spreadsheet – RegionG_2017SWP_ImplementationSurvey.xlsx
(electronic, not included in report)

This page intentionally left blank.

TO: David Dunn (HDR)
CC: File
FROM: Spencer Schnier (FNI)
SUBJECT: Implementation of Strategies Recommended in the 2016 Brazos G Regional Water Plan
DATE: 12/31/2019
PROJECT: 2021 Brazos G Regional Water Plan (HDR19363)

The purpose of this memorandum is to provide information regarding the status of water management strategies (WMSs) recommended in the 2016 Brazos G Regional Water Plan, including information regarding water rights applications, funding sought, construction initiated, real estate purchased, and other information that provides an update as to the status of various strategies in the plan. This memorandum provides a summary of the information known to Freese and Nichols, Inc. (FNI) regarding the strategies being pursued by entities in the Brazos G Area, rather than an exhaustive summary of all WMSs recommended in the 2016 Plan. The focus is on strategies that have been or are currently being implemented. WMSs that were recommended in the 2016 Plan for future decades (2040-2070), and that were retained in the 2021 Plan for future decades, were reevaluated and are discussed in Chapter 5 (Water Management Strategies) of the 2021 Plan.

This memorandum provides updates for the following water management strategies recommended in the 2016 Brazos G Regional Water Plan:

- Cleburne Reuse
- Other Cleburne Strategies
- Brazos River Authority System Operation Permit
- West Central Brazos Water Distribution System

Responses to the Texas Water Development Board (TWDB) Region G Implementation Survey for the strategies listed above are provided in an Excel file as part of this memorandum. The status of each strategy is briefly described below. FNI did not provide an update for the Turkey Peak Project or Cedar Ridge Reservoir, two projects that are currently being pursued, because HDR is more familiar with the details of these strategies.

Cleburne Reuse

The information in Table 1 through Table 4 is from Cleburne’s 2019 Water Supply Plan. The updated Cleburne Reuse water management strategy is summarized in Table 1.

Table 1. Summary of Cleburne's Reuse Strategy

WMS	Recommended or Alternative	Decade Implemented	Capital Cost	Unit Cost (\$/kGal)	Quantity (ac-ft/yr)
West Loop Reuse Phase 1	Recommended	2020	\$10,203,000	\$1.22	2,240
West Loop Reuse Phase 2	Recommended	2030	\$19,600,000	\$1.24	5,377*

* 4 MGD of additional Indirect Potable Reuse water and 0.8 MGD of reuse supplies for Cleburne’s industrial customers

Phase 1, which has already received funding, consists of an Indirect Potable Reuse (IPR) pump station and pipeline to deliver supplies to Lake Pat Cleburne from the existing wastewater treatment facility. The pipeline was sized for 6 million gallons per day (MGD) but will only be able to utilize 2 MGD due to high levels of total dissolved solids (TDS). Construction of a reuse system at the existing plant is included in Cleburne’s Wastewater System CIP so it was not included in the costs shown in Table 1.

Phase 2 consists of construction of a new industrial wastewater reuse system and additional pumps at the IPR pump station. This system will serve to treat Cleburne’s industrial customers only. Removing this high TDS stream will allow Cleburne to utilize the remaining 4 MGD capacity available at the existing plant’s reuse system constructed in Phase 1.

The information in the bullet points below is summarized in Appendix A.

- The initial phase of the IPR project will yield 2 MGD upon completion and future phases will expand that to 6 MGD plus 0.8 MGD for Cleburne’s industrial customers. The ultimate volume of water supplied by the reuse project is 6.8 MGD, or 7,617 acre-feet per year (ac-ft/yr).
- The cost of Phase 1 is estimated to be \$10.2 million and the cost of Phase 2 is estimated to be \$19.6 million for an ultimate project cost of \$29.8 million. To date, \$660,000 has been expended for the design of Phase 1 (\$0 have been expended for construction).

- Initial planning for the IPR project began in 2014 and design began in 2019. The project is currently in the acquisition and design phase. Construction of Phase 1 is scheduled to begin in 2020, and the facilities are scheduled to be operating starting in 2023. The project reaches maximum capacity when Phase 2 comes online around 2030 (depending on population growth).
- The funding source for the construction phase of the project is the Texas Water Development Board’s State Revolving Fund. Cleburne’s reuse strategy is included in the 2021 Brazos G Regional Water Plan. The project does not involve reallocation of flood control, nor does it provide any measurable flood risk reduction.

Other Cleburne Strategies

The remainder of this section describes the current status of Cleburne’s future water management strategies. The reuse project summarized in Table 1 and described in the preceding paragraphs has delayed the need for Cleburne to purchase water from prospective sellers in the Dallas-Fort Worth Metroplex area (Trinity Basin, Region C), Phase 1 of which is scheduled to be implemented by 2040 (Table 2).

Table 2. Summary of Cleburne's Trinity Basin Purchase Strategy

WMS	Recommended or Alternative	Decade Implemented	Capital Cost	Unit Cost (\$/kGal)	Quantity (ac-ft/yr)
Trinity Basin Purchase Phase 1	Recommended	2040	\$26,468,000	\$3.71	5,601
Trinity Basin Purchase Phase 2	Recommended	2050	\$17,668,000	\$3.42	5,601

The City of Cleburne and Region G can decide which Trinity Basin water supplier they would like to indicate in the 2021 Brazos G Regional Water Plan. Cleburne’s 2019 Water Supply Plan considered Arlington, Mansfield, and Fort Worth as potential sellers, all of which are Region C wholesale water providers. The costs shown in Table 2 are for a hypothetical purchase from Fort Worth.

In the 2021 Plan, the Lake Whitney Desalination strategy is recommended to meet the water supply needs expected to arise in the later decades, with the first phase implemented in the 2060 decade (Table 3). The cost per thousand gallons for the desalination strategy is higher than the Trinity Basin Purchase strategy.

Table 3. Summary of Cleburne's Lake Whitney Desalination Strategy from the Water Supply Update

WMS	Recommended or Alternative	Decade Implemented	Capital Cost	Unit Cost (\$/kGal)	Quantity (ac-ft/yr)
Lake Whitney Desalination Phase 1	Recommended	2060	\$54,370,000	\$5.65	4,257
Lake Whitney Desalination Phase 2	Recommended	2070	\$17,797,000	\$4.14	3,136

The City of Cleburne has an existing supply of water provided by the Brazos River Authority (BRA) out of Lake Aquilla. Cleburne has another contract with the BRA for 9,700 ac-ft/yr of BRA system water. The project will consist of an intake (White Bluff), advanced water treatment facility, pump station and a pipeline to transfer Lake Whitney supplies to Lake Pat Cleburne.

In the 2016 Plan, the predecessor to the Lake Whitney Desalination strategy was the Lake Aquilla Augmentation strategy. Previous variants of the strategy involved the Aquilla Water Supply District and pumping water from Lake Whitney to Lake Aquilla before connecting to the existing Barkman Pipeline for delivery to Cleburne. These variants are no longer under consideration and were not evaluated in Cleburne’s 2019 Water Supply Plan. The version of the strategy evaluated and recommended in Cleburne’s 2019 Water Supply Plan is a strategy for Cleburne only, in which approximately 7,400 ac-ft/yr are ultimately delivered from Lake Whitney directly to the City of Cleburne.

Table 4 summarizes alternative strategies for the City of Cleburne. These are the strategies the City would consider if something changed to make them more feasible, or if the recommended strategies in Table 1, Table 2 and Table 3 became less feasible or suitable for some reason.

Table 4. Summary of Cleburne's Alternative Strategies

WMS	Recommended or Alternative	Decade Implemented	Capital Cost	Unit Cost (\$/kGal)	Quantity (ac-ft/yr)
Johnson County SUD Connection	Alternative	2060	\$6,902,000	\$4.90	3,360
Lake Aquilla Reallocation	Alternative				

Johnson County Special Utility District (JCSUD) obtains both treated water from Mansfield as well as desalinated supplies from Lake Granbury. At the time of the development of Cleburne’s 2019 Water Supply Plan, the JCSUD Connection alternative had a high unit cost for water (dollars per thousand gallons) and there were concerns with TDS. The feasibility of this strategy could change in the future and therefore it is suggested to retain it in the Regional Water Plan as an alternative strategy.

The Lake Aquilla Reallocation strategy was not evaluated in Cleburne's 2019 Water Supply Plan since it was not expected for Cleburne's portion of the Lake Aquilla yield to drop below the contracted amount prior to 2045 and the Lake Aquilla reallocation study was ongoing. However, more supplies could become potentially available through a reallocation of flood pool to conservation pool storage at Lake Aquilla. If additional supply is made available through reallocation and the BRA is willing to increase the contracted amount to Cleburne this could be a potentially feasible strategy.

Brazos River Authority System Operation Permit

The Brazos River Authority (BRA) began pursuit of a System Operations Permit and began work on a Water Management Plan (WMP) to accompany the application. The analysis and permitting effort were necessary to obtain the State authorization to take advantage of additional water supplies that could be made available through the integrated management of the BRA's multiple water supply reservoirs and other potential sources (e.g. return flows). The BRA wanted to operate its 12 Brazos basin reservoirs as a system with available unappropriated flow to increase the water supply available for the basin. The project was initiated in 2003.

The information in the bullet points below is summarized in Appendix B.

- Prior to the System Operations (Sys Ops) Permit, the Texas Commission on Environmental Quality (TCEQ) had not issued a permit to operate a basin-wide system of reservoirs in a coordinated way so as to increase the total yield available from the system. The permitting process took approximately 15 years.
- The TCEQ formally issued the Sys Ops Permit to the BRA on November 30, 2016. TCEQ required BRA to modify the Water Management Plan (WMP) and Accounting Plan so that each conformed with the final version of the Permit. The TCEQ Executive Director approved the conformed documents on April 2, 2018.
- The permitted diversion amount is 434,703 ac-ft/yr according to a database of active water rights maintained by the TCEQ.
- The total project cost estimated for the 2016 Brazos G Regional Water Plan was \$23,581,674. The project was funded primarily through rates, not loans. The costs involved primarily legal, administrative and engineering fees associated with obtaining the permit.
- The project is currently operating, and the BRA is in the process of evaluating potential contracts for system water. The System Rate for 2020 is \$79.00 per acre-foot per year.

- The strategy is included in the 2021 Plan as an existing supply (Chapter 3) and is no longer included as a potential water management strategy (Chapter 5).
- The project does not involve reallocation of flood control storage, nor is any measurable flood risk reduction expected as a result of the project.

West Central Brazos Water Distribution System

The West Central Brazos Water Distribution System (WCBWDS) was originally developed to provide water for oil and gas production in the late seventies and early eighties. The West Central Texas Municipal Water District (WCTMWD), the current owner of the system, has repurposed the system to provide municipal water to WCTMWD customers and the Stephens Regional Special Utility District (SUD), as well as water for mining and domestic and livestock use.

In the 2016 Plan, the transport of water from Possum Kingdom Lake using the WCBWDS was being considered by several west Texas entities including Fort Griffin SUD (formerly Shackelford WSC), Stephens Regional SUD, and the City of Throckmorton. Although some individual project elements have been implemented, the project as described in the 2016 Plan was not implemented because the sponsors elected to pursue their own projects rather than a regional solution. Fort Griffin SUD recommended that the strategy not be included in the 2021 Plan, and the Stephens Regional SUD concurred.

Appendix A

Responses to TWDB's 2016 Implementation Survey
For Cleburne's Reuse Strategy

WMS or WMS Project Name	REUSE- CLEBURNE
Database Online Decade	2020
Related Sponsor Entity and/or Benefitting WUGs	PROJECT SPONSOR(S): CLEBURNE
Implementation Survey Record Type	RECOMMENDED WMS PROJECT
Database ID	1838

*Survey questions that tie directly to meeting statutory requirements are **bolded**. Please regard bolded questions as more important.

1. Has Sponsor taken affirmative vote or actions?* (TWC 16.053(h)(10))

- Yes
- No

2. If yes, in what year did this occur?

- 2014
 - 2015
 - 2016
 - 2017
 - 2018
 - 2019
- Initial planning for the Indirect Potable Reuse (IPR) project began in 2014. Design began in 2019.

3. If yes, by what date is the action on schedule for implementation?

_____ 2020 _____ Construction is scheduled to begin in 2020. Startup of the facilities is scheduled for 2023.

4. At what level of implementation is the project currently?*

- Not Implemented
- Sponsor has taken official action to initiate project
- Feasibility study ongoing
- Permit application submitted/pending
- Acquisition and design phase
- Under construction
- Currently operating
- All phases fully implemented

5. If not implemented, why?* (When "If other, please describe" is selected, please add the descriptive text to that field)

- Too soon
- Financing
- Permit constraints
- Environmental obstacles
- If other, please describe: _____

6. What impediments presented to implementation?* (When "If other, please describe" is selected, please add the descriptive text to that field)

- Not applicable

- 2025
- 2030
- 2035
- 2040
- 2045
- 2050
- 2055
- 2060
- 2065
- 2070

The project reaches maximum capacity when Phase 2 comes online around 2030 (depending on population growth).

15. What is the project funding source(s)?*

- Commercial/Bank loan
- Market
- TWDB - SWIFT
- TWDB - Other TWDB State Revolving Fund for Construction
- Federal - EPA
- Federal - USDA
- Federal - Other
- Other

16. Funding Mechanism if Other?

17. Included in 2021 plan?*

- Yes
- No

18. Does the project or WMS involve reallocation of flood control?*

- Yes
- No

19. Does the project or WMS provide any measurable flood risk reduction?*

- No
- Potentially, but no technical flood analysis performed
- Yes, flood risk study confirmed benefits

20. Optional Comments

Appendix B

Responses to TWDB's 2016 Implementation Survey for
The Brazos River Authority's System Operations Permit

WMS or WMS Project Name	1) BRA SYSTEM OPERATION-MAIN STEM 2) BRA SYSTEM OPERATIONS-LITTLE RIVER
Database Online Decade	1) 2020 2) 2050
Related Sponsor Entity and/or Benefitting WUGs	PROJECT SPONSOR(S): BRAZOS RIVER AUTHORITY
Implementation Survey Record Type	RECOMMENDED WMS PROJECT
Database ID	1) 2447 2) 1920

*Survey questions that tie directly to meeting statutory requirements are **bolded**. Please regard bolded questions as more important.

1. Has Sponsor taken affirmative vote or actions?* (TWC 16.053(h)(10))

- Yes
- No

2. If yes, in what year did this occur?

- 2014
 - 2015
 - 2016
 - 2017
 - 2018
 - 2019
- The BRA initiated the project in 2003.
TCEQ approved the permit in 2016, pending a modified Water Management Plan (WMP), Accounting Plan and other documents.

3. If yes, by what date is the action on schedule for implementation?

April 2, 2018 TCEQ approved revised WMP, Accounting Plan and other documents.

4. At what level of implementation is the project currently?*

- Not Implemented
- Sponsor has taken official action to initiate project
- Feasibility study ongoing
- Permit application submitted/pending
- Acquisition and design phase
- Under construction
- Currently operating
- All phases fully implemented

5. If not implemented, why?* (When "If other, please describe" is selected, please add the descriptive text to that field)

- Too soon
- Financing
- Permit constraints
- Environmental obstacles
- If other, please describe: _____

6. What impediments presented to implementation?* (When "If other, please describe" is selected, please add the descriptive text to that field)

- Not applicable
- Access to funding
- Permitting process
- Political support/governance
- If other, please describe: _____

7. Current water supply project yield (ac-ft/yr) This is the permitted diversion amount according to TCEQ database of active water rights.
434,703 ac-ft/yr

8. Funds expended to date (\$)
\$23,581,674 (assumed)

9. Project Cost (\$) This is the amount estimated in the 2016 Plan.
\$23,581,674

10. Year the project is online?*

- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023

11. Is this a phased project?*

- Yes
- No

12. (Phased) Ultimate volume (ac-ft/yr)
N/A

13. (Phased) Ultimate project cost (\$)
N/A

14. Year project reaches maximum capacity?*

- 2014
- 2015
- 2016
- 2017

- 2018
- 2019
- 2020
- 2025
- 2030
- 2035
- 2040
- 2045
- 2050
- 2055
- 2060
- 2065
- 2070

15. What is the project funding source(s)?*

- Commercial/Bank loan
- Market
- TWDB - SWIFT
- TWDB - Other
- Federal - EPA
- Federal - USDA
- Federal - Other
- Other

16. Funding Mechanism if Other?

Rates

17. Included in 2021 plan?*

- Yes
 - No
- The strategy is included in the 2021 Plan as an existing supply, not as a future water management strategy.

18. Does the project or WMS involve reallocation of flood control?*

- Yes
- No

19. Does the project or WMS provide any measurable flood risk reduction?*

- No
- Potentially, but no technical flood analysis performed
- Yes, flood risk study confirmed benefits

20. Optional Comments
