DRAFT SCOPE OF WORK FOR TASK 4D

Task 4D Evaluate and Recommend Water Management Strategies

1. Incorporate changes to conservation and reuse water management measures based on input from WUG and WWP surveys and meetings to be completed as part of Task 10.

2. Update the analyses of the larger water management strategies in the 2011 Region C Water Plan to incorporate changed conditions and extend the analyses to 2070. Updates for each strategy will include quantitative and qualitative evaluation. Quantitative evaluation includes determining the quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.

   The larger water management strategies are listed below in four primary categories: 2a. "No Change since 2011 Region C Water Plan", 2b. "Partially Implemented or in Design Phase", 2c. "In Study or Permit Phase", and 2d. "Other Changes since 2011 Plan."

   2a. No Change since 2011 Region C Water Plan: For the following strategies, no changed conditions are anticipated. However, strategies need to be revisited and updated for reasons such as extending the analysis to 2070, updating cost estimates with revised unit costs, etc.

   - Toledo Bend Reservoir
   - Gulf of Mexico with Desalination
   - Lake Texoma Not Yet Authorized – Blend
   - Lake Texoma Not Yet Authorized – Desalination
   - Lake Livingston
   - Oklahoma Water
   - Lake Texoma – Blend
   - Neches River Run-of-the-River Diversion
   - Lake Texoma – Desalination
   - Carrizo-Wilcox Groundwater (Brazos County)
   - Cypress Basin Supplies (Lake O' the Pines)
   - Tawakoni Pipeline
   - DWU Southside (Lake Ray Hubbard) Reuse
   - DWU Lake Lewisville Reuse
   - Tehuacana Reservoir
   - Lake Columbia

2b. Partially Implemented or in Design Phase: The following strategies are known to be partially implemented or in design phase. Based on further study or design that has been done since publication of the *2011 Region C Water Plan*, these strategies should be revisited and updated accordingly. Updates may be made to supply amounts, cost estimates, expected in-service dates, etc.

- Lake Palestine (DWU Integrated Pipeline with TRWD)
- TRWD Wetlands
- Main Stem Trinity River Pump Station

2c. In Study or Permit Phase: The following strategies are known to be in study or permitting phase. Based on further study that has been done since publication of the *2011 Region C Water Plan*, these strategies should be revisited and updated. Updates may be made to supply amounts, cost estimates, expected in-service dates, environmental impacts, etc.

- Lower Bois d-Arc Creek Reservoir
- Lake Ralph Hall and Reuse

2d. Other Changes since 2011 Plan

These strategies may change as a result of the Sulphur River Basin study that is in progress: The following strategies will be updated as part of the Sulphur River Basin study sponsored by the Army Corps of Engineers and the Sulphur River Basin Authority. The anticipated project schedule (as of February 2013) indicates that the study will be completed in early 2014. The strategies listed below will be updated for the Region C Water Plan to be consistent with the results of the Sulphur River Basin study.

- Wright Patman Lake – System
- Wright Patman Lake – Raise Conservation Pool
- Wright Patman Lake – Texarkana
- Marvin Nichols Reservoir
- George Parkhouse Lake (North)
- George Parkhouse Lake (South)

3. Several of the larger existing Region C water management strategies rely on transporting water from one body of water to another. These strategies need to be re-evaluated in light of concerns regarding transmission of invasive species, introduction of perceived pollutants, and other regulatory issues. This task would develop alternative cost estimates for up to 20 water management strategies that take water directly to end-users. The first step in this analysis will be to determine which of the existing Region C water management strategies should be re-evaluated to transmit water directly to end users.

4. Provide evaluation of recent data (6-years) to assess the effectiveness of reuse during drought years (years 2006 and 2011) in comparison to wetter years. Compare reuse supplies determined from this evaluation with estimated supplies from reuse water management strategies. Use results of this assessment to evaluate and modify, as appropriate, water management strategies associated with reuse.

5. Update the quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of water management strategies in the 2011 Region C Water Plan, that are not included in Subtask ii above, to incorporate changed conditions and extend the analysis to 2070. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.

   5a. Update evaluation of water management strategies for wholesale water providers.

   5b. Update evaluation of water management strategies for water user groups.

6. Update the quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of alternative water management strategies in the 2011 Region C Water Plan to incorporate changed conditions and extend the analysis to 2070. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.

7. Complete quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of new recommended and new alternative water management strategies that were not in the 2011 Region C Water Plan. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.

   7a. Evaluate new recommended and alternative water management strategies for wholesale water providers.

   7b. Evaluate new recommended and alternative water management strategies for water user groups.

8. Prepare a presentation of the recommended and alternative water management strategies for the 2016 Region C Water Plan for the Region C WPG.

9. Write the portion of the Initially Prepared 2016 Region C Water Plan that corresponds to Task 4D. The following sections will be written as part of this subtask:

   9a. Water Conservation and Reuse

   9b. Evaluation of Major Water Management Strategies

   9c. Recommended Water Management Strategies for Wholesale Water Providers

   9d. Recommended Water Management Strategies for Water User Groups by County

	A	B	C	D	E	F	G	H	I
3	Region	Overall TWDB Task Number	SubTask / WMS evaluation number	SubTask / WMS(s) Title	SubTask Scope of Work Write-up	Deliverable	Total Budget	SubTask Budget [PARTIAL - For Phase 1 Only. All tasks to be completed in Phase 2.]	Remaining SubTask Budget [To Complete in Phase 2]
4	C	**4D**	1	***Update Conservation and Reuse Water Management Strategies***	Incorporate changes to conservation and reuse water management measures based on input from WUG and WWP surveys and meetings. **[Partial completion in Phase 1]**	Water management strategy documentation will include projected available supply from conservation and reuse, environmental factors, engineering & costing considerations, and implementation issues.	$ 50,660	$ 30,396	$ 20,264
5	C	**4D**	2	***Update Larger WMS from 2011 Region C Plan***	Update the quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of larger water management strategies in the 2011 Region C Water Plan to incorporate changed conditions and extend the analysis to 2070. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies. **[Partial completion in Phase 1]** Larger water management strategies from the 2011 Region C Water Plan are listed below and divided into categories: No Change, Partially Implemented or in Design Phase, In Study or Permit Phase, Other Changes.	Water management strategy documentation will include description and discussion of planned facilities, firm DOR supply, environmental factors, engineering & costing considerations, and implementation issues.			
6	C	**4D**	2a	***No Change since 2011 Region C Water Plan***	Toledo Bend Reservoir, Gulf of Mexico with Desalination, Lake Texoma Not Yet Authorized – Blend, Lake Texoma Not Yet Authorized – Desalination, Lake Livingston, Lake Texoma – Blend, Neches River Run-of-the-River Diversion, Lake Texoma – Desalination, Cypress Basin Supplies (Lake O' the Pines), Tehuacana Reservoir, Lake Columbia, Carrizo-Wilcox Groundwater (Brazos County), DWU Southside (Lake Ray Hubbard) Reuse, DWU Lake Lewisville Reuse, Lake Columbia, Tawakoni Pipeline		$ 83,964	$ 53,851	$ 30,113
7	C	**4D**	2b	***Partially Implemented or in Design Phase***	Lake Palestine (DWU Integrated Pipeline with TRWD), TRWD Wetlands, Main Stem Trinity River Pump Station		$ 15,743	$ 7,871	$ 7,872
8	C	**4D**	2c	***In Study or Permit Phase***	Lower Bois d'Arc Creek Reservoir, Lake Ralph Hall and Reuse		$ 10,496	$ 5,248	$ 5,248
9	C	**4D**	2d	***Other Changes since 2011 Plan***	Wright Patman Lake – System, Wright Patman Lake – Raise Flood Pool, Wright Patman Lake – Texarkana, Marvin Nichols Reservoir, George Parkhouse Lake (North), George Parkhouse Lake (South)		$ 31,487	$ -	$ 31,487
10	C	**4D**	3	***Evaluate Cost Impacts of Transmitting Water from Source to WTP in lieu of Transporting to Another Reservoir***	Several larger Region C water management strategies rely on transporting water from one body of water to another. These strategies need to be re-evaluated in light of concerns regarding transmission of invasive species, introduction of perceived pollutants, and other regulatory issues. This task would develop alternative cost estimates for up to 20 water management strategies that take water directly to end-users. **[Partial completion in Phase 1]**	Description of facilities, description of changes to facilities, engineering and cost considerations and impacts, implementation issues, environmental factors	$ 107,880	$ 95,000	$ 12,880
11	C	**4D**	4	***Effectiveness of reuse during drought years compared to estimated supplies from reuse WMSs***	Provide evaluation of recent data (6-years) to assess the effectiveness of reuse during drought years (years 2006 and 2011) in comparison to wetter years. Compare reuse supplies determined from this evaluation with estimated supplies from reuse water management strategies. Use results of this assessment to evaluate and modify, as appropriate, water management strategies associated with reuse.	Description and discussion of reuse projects, how much reuse supply was available from these projects in 2006 and 2011, how those amounts compare to supply in wetter years and how much is expected on a reliable basis based on previous studies of the reuse strategies	$ 30,000	$ -	$ 30,000
12	C	**4D**	5	***Update analysis of all other WMSs in the 2011 Plan that are not covered in Task 4D.2.***	Update the quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of water management strategies in the 2011 Region C Water Plan to incorporate changed conditions and extend the analysis to 2070. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.	Water management strategy documentation will include description and discussion of planned facilities, firm DOR supply, environmental factors, engineering & costing considerations, and implementation issues.			
13	C	**4D**	5a	***Strategies for WWPs***			$ 69,820	$ -	$ 69,820
14	C	**4D**	5b	***Strategies for WUGs***			$ 160,220	$ -	$ 160,220
15	C	**4D**	6	***Update analysis of alternative WMSs in the 2011 Plan***	Update the quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of alternative water management strategies in the 2011 Region C Water Plan to incorporate changed conditions and extend the analysis to 2070. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.	Water management strategy documentation will include description and discussion of planned facilities, firm DOR supply, environmental factors, engineering & costing considerations, and implementation issues.	$ 150,880	$ -	$ 150,880

	A	B	C	D	E	F	G	H	I
3	Region	Overall TWDB Task Number	SubTask / WMS evaluation number	SubTask / WMS(s) Title	SubTask Scope of Work Write-up	Deliverable	Total Budget	SubTask Budget [PARTIAL - For Phase 1 Only. All tasks to be completed in Phase 2.]	Remaining SubTask Budget [To Complete in Phase 2]
16	C	**4D**	7	***Evaluate new recommended WMSs and new alternative WMSs***	Quantitative evaluation of supply that will be made available from and qualitative evaluation of other aspects of new recommended and alternative water management strategies. Quantitative evaluation includes determining quantity of water to be provided, reliability of supply, cost, and the quantifiable environmental impacts such as cost, total acres impacted, and acres of wetlands impacted. Qualitative evaluation includes other categories of environmental impacts, which will be classified as "high," medium," or "low." It may also include impacts on other water management strategies.	Water management strategy documentation will include description and discussion of planned facilities, firm DOR supply, environmental factors, engineering & costing considerations, and implementation issues.			
17	C	**4D**	7a	***Strategies for WWPs***			$ 37,940	$ -	$ 37,940
18	C	**4D**	7b	***Strategies for WUGs***			$ 89,760	$ -	$ 89,760
19	C	**4D**	8	***Prepare presentation of recommended and alternative WMSs to RCWPG***	Prepare a presentation of recommended and alternative water management strategies for the Region C WPG.	Presentation for RCWPG meeting.	$ 9,380	$ -	$ 9,380
20	C	**4D**	9	***Write portion of IPP corresponding to 4D tasks***	Write the section of the Initially Prepared Region C Water Plan that corresponds to Task 4D. This budget includes labor costs but does not include printing costs.	Written report. This budget does not include printing costs.			
21	C	**4D**	9a	***Water Conservation and Reuse***			$ 5,080	$ -	$ 5,080
22	C	**4D**	9b	***Evaluation of Major WMSs***			$ 7,160	$ -	$ 7,160
23	C	**4D**	9c	***Recommended WMSs for WWPs***			$ 17,120	$ -	$ 17,120
24	C	**4D**	9d	***Recommended WMSs for WUGs by county***			$ 55,240	$ -	$ 55,240
25					TOTAL BUDGET		$ 932,830	$ 192,366	$ 740,464