DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1070
NASHVILLE, TENNESSEE 37202-1070

IN REPLY REFER TO

Plan Formulation Section

AUG 26 2014

City of Crossville
Mayor J.H. Graham
392 North Main Street
Crossville, Tennessee 38555-4232

Dear Mayor Graham:

Attached is the revised scope of work for continuation of the Cumberland County Regional Water Supply study. The scope document has been modified significantly. The scope includes a yield analysis for a potential raise of Meadow Park Lake dam of up to eighteen and a half (18.5) feet. The raising of the dam is limited to 18.5 feet based upon information contained in the Preliminary Engineering Report, dated December 1998. That report states the "dam can be raised from elevation 1821.5 to 1840.0 feet NGVD29." This revision in scope will address the city's interest in evaluating the raising of Meadow Park Lake dam as an alternative for more detailed study as the project moves into the feasibility phase.

In addition to the revised scope of work, a baseline schedule is provided to for your review and consideration.

Should you have questions, please contact David Bishop, Project Manager at 615-736-7856 or dave.bishop@usace.army.mil.

Sincerely,

Russ L. Rote, P.E., PMP, CFM
Chief, Project Planning Branch

Enclosure

Scope of Work

Cumberland County Regional Water Supply Plan

Revised Determination of Areas of Need, and Recommendations of Water Supply Alternatives

1. BACKGROUND

The work covered in this scope represents a continuation of study for the Cumberland County Water Supply Plan. It builds upon work completed in Task Order DX06 under Contract W91237-09-D-0004, and previous work completed by the A/E in support of the Plan.

2. WORK TO BE PERFORMED BY THE A/E

Task 1 – Determine Areas of the County that have a Need for Additional Water Supply

The A/E will utilize the existing and future conditions OASIS models developed under Task Order DX06, to evaluate the demand versus yield of the existing and future system (in 10 year increments through 2056) to determine the areas of the County that have a need for additional water supply. The demand (based upon the county-wide expected growth scenario) versus yield of the system shall be evaluated under the following scenarios: (1) storage in any reservoir in the system will not be allowed to be drawn below 10% remaining usable storage; (2) storage in any reservoir in the system will not be allowed to be drawn below 20% remaining usable storage.

Task 1a - Existing infrastructure and WTP upgrades will be evaluated in the following scenarios for both the 10% and 20% margin of safety (reduction in usable storage):

Scenario	Description
1A	Reduce usable storage for sources within Cumberland County
2A	Scenario 1A and relax WTP capacity constraints (TDEC Requirement)
3A	Scenario 2A and remove all institutional constraints
4A	Scenario 3A and increase Lake Holiday service area (existing connections)

Task 1b – Analysis of new water supply infrastructure including raising Meadow Park Lake dam and a raw water connection from Fox Creek Lake to Otter Creek Lake in the Crab Orchard Utility District will be conducted as follows:

Raising Meadow Park Lake Dam – A yield analysis will be performed for a potential raise of Meadow Park Lake Dam up to 18.5 feet. The existing long term inflow sequence

developed previously for Meadow Park Lake will be used in this analysis. Recent high resolution digital elevation data will be used, if readily available or else provided to the A/E by the Corps, to extend the elevation-area curves to the new spillway invert elevation (assuming the same spillway configuration), and a new reservoir capacity will be determined. A sequent peak algorithm approach will be utilized for the initial firm yield determination.

Raw Water Connection from Fox Creek Lake to Otter Creek Lake – The existing long term inflow sequence developed previously for Otter Creek Lake will be used in conducting a firm yield analysis of Fox Creek Lake. A sequent peak algorithm approach will be utilized for the initial firm yield determination. A preliminary engineering report for this alternative has been provided by Crab Orchard UD and it is anticipated information such as the stage/storage curve and spillway configuration of Fox Creek dam can be obtained from the report. Based on conversations with the General Manager of Crab Orchard UD, the following assumptions will be used in the yield analysis:

Allowable withdrawal – overflow from Fox Creek Lake plus the top three feet
Pump/Pipeline capacity – initial assumption of 1 MGD maximum capacity
Operation – overflow plus top three feet of storage can be taken at any time
Water Treatment – no new WTP will be constructed

Task 1c – Model new infrastructure scenarios in three difference sequences, since the order of implementation will have a major impact on timing, for both the 10% and 20% margin of safety (reduction in usable storage):

Sequence 1: Prioritize upgrades to physical connections and raising Meadow Park Lake to maximum height

Scenario	Description
5A	Scenario 4A and relax Crossville/South Cumberland and Crossville/Crab Orchard physical interconnection constraints
6A	Scenario 5A and increase usable storage capacity for Meadow Park Lake. Constraint = dam cannot be raised more than 18.5 feet.
7A	Scenario 6A and add one new water supply in the Crab Orchard community.

Sequence 2: Prioritize upgrades to physical connections and raising Meadow Park Lake to intermediate height

Scenario	Description
6A	Scenario 5A and increase usable storage capacity for Meadow Park Lake. The magnitude of the increase will be determined through discussions between the A/E and the Corps.
7A	Scenario 6A and add one new water supply in the Crab Orchard community.

Sequence 3: Prioritize new water supply in Crab Orchard

Scenario	Description
5A	Scenario 4A and add one new water supply in the Crab Orchard community.
6A	Scenario 5A and relax Crossville/South Cumberland and Crossville/Crab Orchard physical interconnection constraints
7A	Scenario 6A and increase usable storage capacity for Meadow Park Lake as necessary. The magnitude of the increase will be determined through discussions between the A/E and the Corps. Constraint = dam cannot be raised more than 18.5 feet.

Modeling assumptions include the following:

1. Yield from sources outside Cumberland County will remain unchanged from previous task work.

2. Lake Tansi operation will not be affected by the margin of safety since this is an institutional issue and not a storage limitation.

3. All other modeling assumptions remain unchanged from previous task work.

For each of the 24 scenarios described above, the A/E will run OASIS for the last benchmark year for which all demands are met and the first benchmark year for which at least one utility district demand is not met. Calibration of weighting factors for each source and conveyance will be required for each scenario to ensure the model is following the intent of the scenario description. For some scenarios, three benchmark years may be evaluated as determining which benchmark years bracket the system-wide safe yield cannot be predicted with 100% accuracy.

Task 2 - Identify and Recommend Potential Alternatives

Based upon the results from Task 1, the A/E will identify and recommend potential alternatives to meet the need for additional water supply. The recommendation will include both suggested alternatives and general timing for alternatives to go on-line.

Task 3 – Report

The A/E will develop a technical memorandum summarizing the results of Task 1 and Task 2, and identification of areas of need within the system. In addition, the A/E will include a section of recommendations of water supply alternatives to target specific areas of need within the Cumberland County system.

Task 4 – Meetings and Coordination

The A/E will develop monthly status reports to be delivered to the Corps and the City of Crossville Council. The status reports will summarize the work completed by the A/E

during the previous month and provide an anticipated schedule for work that is to be completed in the months to follow. The A/E will participate in a monthly conference call with the Corps and the non-Federal sponsor to discuss the monthly report, address questions and raise any concerns regarding the study.

Representatives from the Corps and A/E will attend one, in person, project status meeting with the City of Crossville Council.

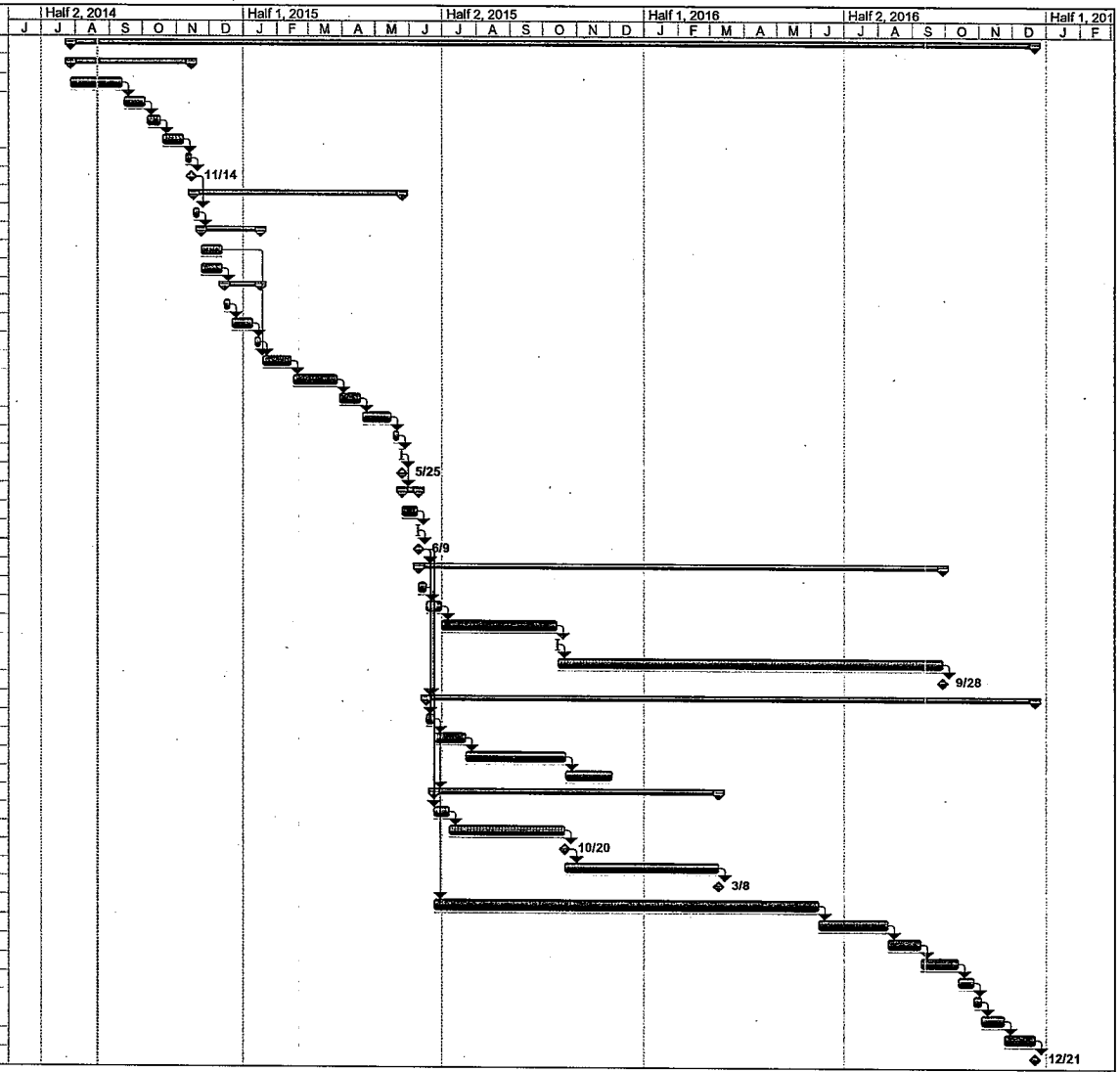
3. DELIVERABLES

The deliverables for this task order include monthly status reports to be delivered to the City of Crossville Council, one in person project status meetings with the City of Crossville Council, a technical draft memorandum, and the final technical memorandum.

A. Provide memorandum of significant findings from in person project status meeting with the City of Crossville Council.

B. In addition, the A/E shall submit monthly progress updates and billing statements

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**CCWS Study & EIS**	**628 days?**	**Mon 7/28/14**	**Wed 12/21/16**		
2	**Determine Areas of Need**	**80 days**	**Mon 7/28/14**	**Fri 11/14/14**		
3	Update Scope	35 days	Mon 7/28/14	Fri 9/12/14		
4	Task Order Prep	15 days	Mon 9/15/14	Fri 10/3/14	3	
5	Issue RFP/IGE	10 days	Mon 10/6/14	Fri 10/17/14	4	
6	Contractor Develop Pr	15 days	Mon 10/20/14	Fri 11/7/14	5	
7	Negotiate	5 days	Mon 11/10/14	Fri 11/14/14	6	
8	Award	0 days	Fri 11/14/14	Fri 11/14/14	7	
9	**AE Study/Analysis**	**136 days?**	**Mon 11/17/14**	**Mon 5/25/15**		
10	Review Existing Data	5 days	Mon 11/17/14	Fri 11/21/14	8	
11	**Task 1**	**40 days**	**Mon 11/24/14**	**Fri 1/16/15**	10	
12	1A	15 days	Mon 11/24/14	Fri 12/12/14		
13	1B	15 days	Mon 11/24/14	Fri 12/12/14		
14	**1C**	**25 days**	**Mon 12/15/14**	**Fri 1/16/15**	13	
15	Sequence 1	5 days	Mon 12/15/14	Fri 12/19/14		
16	Sequence 2	15 days	Mon 12/22/14	Fri 1/9/15	15	
17	Sequence 3	5 days	Mon 1/12/15	Fri 1/16/15	16	
18	Task 2 - Analysis	20 days	Mon 1/19/15	Fri 2/13/15	12,17	
19	Task 3 - Draft Report	30 days	Mon 2/16/15	Fri 3/27/15	18	
20	DQC	15 days	Mon 3/30/15	Fri 4/17/15	19	
21	AE address comment	20 days	Mon 4/20/15	Fri 5/15/15	20	
22	Final Report	5 days	Mon 5/18/15	Fri 5/22/15	21	
23	Presentation	1 day?	Mon 5/25/15	Mon 5/25/15	22	
24	Study Complete	0 days	Mon 5/25/15	Mon 5/25/15	23	
25	**Alternatives List**	**11 days?**	**Tue 5/26/15**	**Tue 6/9/15**	23	
26	City & USACE study r	10 days	Tue 5/26/15	Mon 6/8/15		
27	Discuss Feasibility	1 day?	Tue 6/9/15	Tue 6/9/15	26	
28	Alternatives Identified	0 days	Tue 6/9/15	Tue 6/9/15	27	
29	**Feasibility**	**341 days?**	**Wed 6/10/15**	**Wed 9/28/16**	28	
30	Recruite PDT membe	5 days	Wed 6/10/15	Tue 6/16/15		
31	Develop Scope	10 days	Wed 6/17/15	Tue 6/30/15	30	
32	Procurement Cycle	75 days	Wed 7/1/15	Tue 10/13/15	31	
33	Award Contract	1 day?	Wed 10/14/15	Wed 10/14/15	32	
34	AE Study	250 days	Thu 10/15/15	Wed 9/28/16	33	
35	Feasibility Complete	0 days	Wed 9/28/16	Wed 9/28/16	34	
36	**NEPA**	**396 days?**	**Wed 6/17/15**	**Wed 12/21/16**	30,28	
37	Review Alternatives	5 days	Wed 6/17/15	Tue 6/23/15	28	
38	Verify existing wetlanc	21 days	Wed 6/24/15	Wed 7/22/15	37	
39	JD/ESA consideration	65 days	Thu 7/23/15	Wed 10/21/15	38	
40	Wetland Mitigation Pl	30 days	Thu 10/22/15	Wed 12/2/15	39	
41	**Cultural Resource**	**185 days?**	**Wed 6/24/15**	**Tue 3/8/16**	37	
42	Draft Scope	10 days	Wed 6/24/15	Tue 7/7/15	28	
43	Procurement cyc	75 days	Wed 7/8/15	Tue 10/20/15	42	
44	Award	0 days	Tue 10/20/15	Tue 10/20/15	43	
45	Assessment/Rep	100 days?	Wed 10/21/15	Tue 3/8/16	44	
46	Complete	0 days	Tue 3/8/16	Tue 3/8/16	45	
47	Prepare DEIS	250 days	Wed 6/24/15	Tue 6/7/16	37	
48	Public Review of DEIS	45 days	Wed 6/8/16	Tue 8/9/16	47	
49	Refine DEIS/FEIS	22 days	Wed 8/10/16	Thu 9/8/16	48	
50	Public Review FEIS	24 days	Fri 9/9/16	Wed 10/12/16	49	
51	Revise FEIS/prepare	10 days	Thu 10/13/16	Wed 10/26/16	50	
52	Final	5 days	Thu 10/27/16	Wed 11/2/16	51	
53	Record of Decision	15 days	Thu 11/3/16	Wed 11/23/16	52	
54	Internal Coord & Sign	20 days	Thu 11/24/16	Wed 12/21/16	53	
55	NEPA final	0 days	Wed 12/21/16	Wed 12/21/16	54	



Project: CCWS 2014-8-21
Date: Thu 8/21/14

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone