



April 27, 2018

Joaquin Solis, PE – Floodplain Engineer  
Karen Riggs, PE, LS – Special Project Engineer  
Brad Simmons, PE – Project Manager  
Highway & Floodplain Division  
Cochise County Community Development  
1415 Melody Lane, Building F  
Bisbee, AZ 85603

**Arizona**

8950 S. 52nd St., Ste. 210  
Tempe, AZ 85284-1043  
(480) 345-2155

**California**

101 Parkshore Drive  
Folsom, CA 95630-4726  
(916) 932-7402

11440 W. Bernardo Ct., Ste. 360  
San Diego, CA 92127-1644  
(858) 487-9378

**Oregon**

2601 25th Street SE, Ste. 450  
Salem, OR 97302-1286  
(503) 485-5490

10300 SW Greenburg Road, Ste. 470  
Portland, OR 97223-5488  
(503) 946-8536

**Washington**

12509 Bel-Red Rd., Ste. 100  
Bellevue, WA 98005-2535  
(425) 646-8806

**River Measurement**

**A Division of WEST Consultants**  
811 NE 154th Street  
Vancouver, WA 98685-1347  
(360) 571-2290

[www.westconsultants.com](http://www.westconsultants.com)

Jose Rosado, PE – Hydraulic Engineer  
USDA, Natural Resources Conservation Service  
230 N. 1<sup>st</sup> Avenue, Suite 509  
Phoenix, AZ 85003

**Re: Bella Vista Urban Enhanced Runoff (UER) Recharge Project –  
Engineering Design Services Statement of Work Proposal**

Dear Joaquin, Karen, Brad, and Jose:

In regard to the above referenced project, the WEST Project Team is pleased to provide you with this proposal for professional engineering services. Following are the project understanding, project approach, scope of professional services (scope), deliverables, fees for engineering services, schedule, and project assumptions/exclusions. The scope reflects our understanding of the project based on review of RFQ documents and recent discussions with Cochise County.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions or require additional information, please feel free to contact either Brian Wahlin or Ricardo Aguirre at your earliest convenience.

Sincerely,

Brian Wahlin, Ph.D., PE, D. WRE  
WEST Consultants, Inc.  
[bwahlin@westconsultants.com](mailto:bwahlin@westconsultants.com)  
(602) 999-0317

Ricardo Aguirre, PE, CFM, WHC, AP, ENV SP  
Holistic Engineering and Land Management, Inc.  
[ricardo.aguirre@helm.world](mailto:ricardo.aguirre@helm.world)  
(619) 865-4406

## Project Understanding

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### BACKGROUND

Cochise County (County) has become a leader in Arizona and beyond in developing critical water security needs for local communities, surrounding rural areas, local agricultural operations, and ecosystem conditions that are currently in decline. For more than twenty-five years the County, a founding member of both the Upper San Pedro Partnership (USPP) and the Cochise Conservation and Recharge Network (CCRN), has been pioneering a vision to establish a regional water management program that would meet the long-term water needs derived from the San Pedro River watershed.

As a continued effort to fulfill this vision, the County was recently awarded a grant from the Natural Resources Conservation Service (NRCS) to conceive, design, and construct the Bella Vista Urban Enhanced Runoff (UER) Recharge Project (Project) on the County's 2,984-acre Bella Vista Property. Partnered with The Nature Conservancy (TNC) and prompted by the work of the CCRN to implement a regional network of water management projects that meet the long-term needs of the San Pedro River watershed, this project has been identified as the next project to help achieve the objective of increasing both the regional and alluvial aquifer levels and the base flows in the San Pedro River, providing benefit to ecological and agricultural conditions as well as economic stability. The grant funding for this project is to cover two phases of the project, which is 1) the Watershed Plan and Environmental Assessment (Plan/EA) and 2) the Engineering Design. The authority for preparation of the Plan/EA is the NRCS Watershed Protection and Flood Prevention Act - Public Law 83-566 (PL-566), which shall be prepared in accordance with the National Environmental Policy Act (NEPA), the Principles and Requirements for Federal Investments in Water Resources (PR&G), the NRCS National Watershed Program Manual (NWPM), and the National Watershed Program Handbook (NWPH).

Both the Plan/EA and the Engineering Design are required to be completed by February 2020. This proposal is for Engineering Design, which has been written to be in conformance with the Plan/EA and assumes that all tasks are to be completed by February 2020.

### PURPOSE AND NEED

The Buena School Watershed, a sub-watershed of the San Pedro River Basin that is currently experiencing critical erosion, flooding and sedimentation problems. Also, the San Pedro River base flows are declining, resulting in the decline of habitat that supports both threatened and endangered species. As such, there is a need to plan and implement conservation measures to mitigate these concerns. Therefore, the purpose of this project is to: 1) prevent excess flooding because of urban enhanced runoff; 2) protect the watershed by improving the riparian habitat; and 3) manage water for agricultural operations and enhance riparian ecosystems through groundwater recharge.

The project shall follow the NRCS Watershed Program, which requires the development of a physically, environmentally, socially, and economically effective improvement plan. Based on our understanding of the NRCS Watershed Program, the first part of this process is to develop and complete the Plan/EA with public input and guidance from both the County and the NRCS. The Plan/EA proposal has been written to describe the tasks necessary to document the need and feasibility of a project to address identified natural resource concerns and opportunities. According to our April 18, 2018 planning meeting, we understand that

the final draft Phase II Bella Vista Ranch Recharge Investigation report will be submitted to the County by the end of April 2018. This report will be used along with other documented investigations that determine the conditions of the watershed to prepare the Plan/EA.

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## ALTERNATIVES

The Plan/EA phase of the Project will conceive and develop preliminary alternatives for review by the County, TNC, the NRCS, CCRN, stakeholders, and the public through a workshop. The workshop is intended to identify selected alternatives for further evaluation and detailed study. These selected alternatives will require a planning level engineering design to determine both their technical and their economic feasibility. Another workshop will then determine the preferred alternative. Previous investigations within the study area and throughout the region will provide guidance on alternative selection including the four alternatives identified in the Phase II Bella Vista Ranch Recharge Investigation report.

Because the grant proposal indicates that 20% of this project will benefit nearby agricultural enterprises by raising groundwater levels and increasing water security for dryland grazing operations and a desire to consider green infrastructure to mitigate existing impervious services, which are the major cause of UER, decentralized land management (treatment) approaches, such as animal impact and replacing impervious services with ultra-high pervious surfaces will also be considered.

At this time, both traditional infrastructure improvements and ongoing land management are expected to be a part of the final design for this project. As such, the final engineering design will develop the preferred alternative for both construction and implementation to optimize the size of the Project for maximum recharge capability and provide conservation improvements having the quality and durability required for the economic life of the facility at the least total cost consistent with functional requirements.

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## Project Approach

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### OBJECTIVE

The engineering design developed from the preferred alternative identified in the Plan/EA will fully consider the landscape, land use, topography, foundation and other site conditions including environmental quality, and the economy and feasibility of construction, operation and maintenance. Any proposed changes to the preferred alternative will be in conformance with final Plan/EA and will be documented in the design report with written approval by the NRCS.

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### TASKS

Based on review of both the Plan/EA and the Engineering Design Statement of Work (SOW) the two documents appear to assume that the Plan/EA phase and the Engineering Design phased are conducted at two different times possibly by two different contractors. The following items in the Engineering Design Statement of Work: 1) Analysis to determine the hydrology and hydraulics for the watershed; 2) Evaluation of the condition of the existing topography; and 3) Preparation of a cost analysis, on a 15% planning-level preliminary engineering design are to be completed during the Plan/EA phase. The remaining tasks, as described in the Engineering Design Statement of Work have been carried forward to this proposal.

## Scope of Professional Services

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Below is the scope to develop and prepare final engineering design for this project. The estimated scope for engineering design services are based on the task descriptions below, which have been developed to address the project understanding and project approach as described above and the project understanding and approach as described in the Plan/EA proposal.

A detailed schedule for the Engineering Design was prepared and appears in Appendix A. This schedule was developed based on the Project Team’s current knowledge of the project but may change as the Plan/EA phase clarifies the preferred alternative for final design.

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### **TASK 1: KICK-OFF MEETING**

- ◆ At County Office.
- ◆ The Project Team will prepare an agenda summarizing project goals, anticipated project schedule for Groundwater Recharge Facility Engineering Design Services, and list design issues for discussion.
- ◆ The Project Team shall prepare and distribute meeting minutes.
- ◆ The Project Team will visit the site with the County and TNC specifically to observe utility conflicts, alignment issues, and impacts of existing infrastructure as it relates to the recommended alternative.

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### **TASK 2: QUALITY CONTROL PLAN AND AGENCY COORDINATION**

#### **Task 2.1: Quality Control Plan**

- ◆ The Project Team will work with the County to develop a Quality Control Plan (QCP) in accordance with the Engineering Design SOW.

#### **Task 2.2: Agency Coordination**

- ◆ The Project Team will work with both the County and the NRCS, as necessary to ensure proper execution of the NRCS Engineering Design Statement of work and to collect any appropriate information associated with the project. The Project Team will write letters on behalf of the County and the NRCS to bring visibility to this forward-thinking project. Because this project is a key project of the CCRN, agency coordination plans will include communication with the CCRN group.

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### **TASK 3: MEETINGS AND STAKEHOLDER PRESENTATIONS**

- ◆ The Project Team will prepare weekly Project Status Reports that summarize the work done the prior week and send to the County and TNC for their review.
- ◆ The Project Team will meet with the County staff and stakeholders such as the CCRN Technical work group.

- ◆ The Project Team will present progress during monthly meetings and update stakeholders and the NRCS in accordance with the Engineering Design SOW. (Assume up to 6 in person meetings and 10 Skype meetings)
- ◆ Progress Meeting efforts such as preparation and reproduction effort are described in subsequent tasks.

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#### **TASK 4: EXPANDED DESIGN TOPOGRAPHY, BOUNDARY VERIFICATION (OPTIONAL), AND LEGAL DESCRIPTION (OPTIONAL)**

- ◆ To be performed by the Project Team Survey crews.
- ◆ Optional and as approved by the County, detailed design topography will be performed at cross-section intervals desired for limited areas to be determined for design purposes. This detailed design topography is based on requests made during the DCR submittal meeting and is in addition to the aerial topography or LiDAR and expands on the detailed design topography performed for the DCR. Similar to the DCR the survey may include horizontal and vertical location of visible utilities, including, but not limited to, water, sanitary sewer, storm drain, electric, telephone, gas, existing building finish floors, and adjacent ground elevations.
- ◆ Optional and as approved by the County, the Project Team will perform a site visit to verify topographical and utility locations to minimize potential conflicts during construction for the proposed drainage infrastructure. The Project Team will field verify the planned improvement area with elevation spot checks to compare and overlay with aerial topography or LiDAR.
- ◆ Optional and as approved by the County, the Project Team will provide the necessary right-of-way and permanent access easement legal descriptions and exhibits. The Project Team will perform a field survey of the sectional and parcel boundary, and research and obtain the necessary current title report (or equivalent) for the parcel containing the project site.
- ◆ All measurements and ground surveys shall be located with the Cochise County Low Distortion Projection (LDP)
- ◆ Field surveys will be performed in accordance with the Engineering Design SOW.

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#### **TASK 5: HYDROLOGY AND HYDRAULICS (DEVELOPMENT OF FUTURE CONDITIONS)**

##### **Task 5.1: FLO-2D**

- ◆ The FLO-2D model will be updated to reflect the preferred alternative for use in the final design.
- ◆ Hydrology and hydraulics will be performed in accordance with the Engineering Design SOW.
- ◆ Improvements such as, channels, basins, weirs, culverts, grade control structures, natural river design, green infrastructure and/or land management strategies as appropriate will be developed in a holistic system thinking approach.
- ◆ Using the geotechnical information and the planning criteria developed in the Plan/EA, the Project Team will design the necessary project elements, which may consist of the following:

- Engineered channel grade control structure as necessary;
- Culverts as necessary;
- Detention/Retention basins as necessary;
- Stepped spillways with terraced basins as necessary;
- Embankments;
- Utility relocations, as necessary; and,
- Construction sequence to maintain access and accelerate the project schedule as appropriate.
- Green Infrastructure
- Animal impact treatment programs
- Natural river design
- Other land management (treatment) approaches as approved

#### **Task 5.2: MODFLOW / SWR**

- The MODFLOW / SWR will be updated to reflect the preferred alternative for use in the final design.
- Hydrology and hydraulics will be performed in accordance with the Engineering Design SOW.

#### **Task 5.3: Sediment Transport**

- The sediment transport model will be updated to reflect the preferred alternative for use in the final design.
- Hydrology and hydraulics will be performed in accordance with the Engineering Design SOW.

#### **Task 5.4: Sketches**

- Sketches, calculations, material selection, charts and design alternatives, such as, soil cement instead of concrete, type of permeable pavement systems, porous asphalt, permeable pavers, or permeable blocks, cast in place or precast culverts or other design level detail that would be flushed out during the detailed design process and reflected in the standard details of the construction drawings, will be prepared for review.

#### **Task 5.5: Structural Calculations**

- The Project Team will provide the necessary structural calculations and prepare structural details for the infrastructure treatments selected for the preferred alternative, if appropriate.

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### **TASK 6: FINAL DESIGN GEOTECHNICAL ENGINEERING SERVICES**

- The Project Team will provide a geotechnical evaluation of the soils within and adjacent to the project limits.
- The Project Team will incorporate and use previous geotechnical studies as appropriate.

- This task will include coordination with the County for right-of-way access and permitting to perform the field exploration. The Project Team will submit test boring locations to AZ 811 to clear the public utility locations prior to the field exploration, if appropriate. The use of private locators may be utilized where necessary to clear utility locations on private property. This task also includes mobilization and demobilization from the site.
- The Project Team will provide and execute a boring plan based on the proposed project and familiarity with the expected geologic conditions at this site.
- Planned boring depths would range depending on location. The soil borings will be advanced to recommended minimum depths unless refusal to drilling is encountered prior to reaching planned boring depth.
- During the drilling operations, a field engineer or geologist will log the borings, record the results of field tests taken in soil horizons, and will obtain representative undisturbed and disturbed bulk subgrade soil samples for further laboratory evaluation. Penetration resistance determinations will also be obtained by driving either ring-lined or standard split barrel samplers. All drilling and sampling will be conducted in general accordance with applicable ASTM/AASHTO/ADOT or local standards.
- Groundwater measurements will be made in each boring during exploration and immediately upon completion of drilling or later, if necessary.
- During the field exploration, the Project Team will select a location within each planned improvement (i.e., basin, grade control structure, etc.) for percolation testing. A PVC casing will be set at each location extended to the approximate planned improvement subgrade elevation. Once the casing is set, each test location will be soaked with water for a minimum 24-hour duration before conducting the actual percolation test. Each percolation test will be conducted for a duration of approximately 4 hours or until a steady state percolation rate is determined during the test. Each PVC casing will be removed at the completion of the test and the test hole will be backfilled with on-site soils.
- At the completion of the drilling operations, all samples obtained from the field exploration will be taken to the laboratory where they will be examined by the project geotechnical engineer. At that time, the field descriptions will be confirmed or modified, final boring logs prepared, and an applicable laboratory testing program will be formulated.
- Based upon engineering analyses, the Project Team will prepare a geotechnical engineering report for the project. The following information will be provided in the report:
  - A review of the field and laboratory procedures, and the results of all testing conducted;
  - A discussion of the general subsurface conditions including the local and regional geology, soil, rock and groundwater conditions;
  - A review of known design and structural conditions;
  - Geotechnical design criteria related to the construction of major structures on the project, including recommendations for ground modification/improvements, recommended foundations for support of infrastructure and lateral design criteria for structural treatments;

- Geotechnical design criteria related to channel walls including recommended lateral earth pressures for retaining walls and appropriate geotechnical parameters for design of Mechanically Stabilized Earth (MSE) structures as appropriate;
  - The results of the laboratory testing and the evaluation of the engineering properties of the soils within the open channel portions of the wash and a discussion of erosion control alternatives;
  - Results of the slope stability analyses and recommendations for safe slope configurations for open channel portions of the project, planned swales, and for the planned basin areas as appropriate;
  - Results of the soil cement mix design and recommended specifications for design and construction of soil cement if appropriate;
  - Recommended construction procedures and quality control measures related to earthwork on the project; and,
  - Other miscellaneous geotechnical design and construction criteria which should be considered in further design and planning of the project based upon geotechnical conditions encountered on the site.
- ◆ Both the Geotechnical and Subsurface Investigations and the Plan of Investigation will be performed in accordance with the Engineering Design SOW.
  - ◆ Site Preparation and Foundation Investigation will be performed in accordance with the Engineering Design SOW.
  - ◆ The Project Team has noted that the Engineering Design SOW appears to be developed for the design of dams, which may not be applicable for this project depending on the outcome of the Plan/EA. Items 11 through 28 are largely for a dam design project but will be considered and applied to this project when and where appropriate.

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#### **TASK 7: GENERAL DESIGN CONSIDERATIONS AND RESEARCH**

- ◆ The Project Team will prepare construction documents, which include construction drawings and specifications, quantities, bid schedules, design report, cost estimate, operation and maintenance plan and other documents as appropriate based on the Plan/EA.
- ◆ The design will conform to federal, state, and local design standards.
- ◆ The Project Team will also incorporate the General Design Considerations, item 29, as described in the Engineering Design SOW.
- ◆ The following tasks provide a general description of how the construction documents will be prepared.
  - Determine the Job Class of the project per NEM Part 501 – Authorizations.
  - Use the appropriate NRCS standards per the National Handbook of Conservation Practices Chapter 3.

- Incorporate the appropriate references as shown item 53(Appendix I. NRCS Reference Material) in accordance with the Engineering Design SOW.

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**TASK 8: SIXTY (60) PERCENT, PLANS, SPECS, AND ESTIMATES (PRELIMINARY DESIGN)**

- The Project Team will prepare draft plans using AutoCAD Civil 3D software. Plans will be designed for ease of installation and constructability.
- The Project Team will estimate and provide a list of the drawings needed to adequately describe the work; however, the County should understand that the final number of sheets may change depending on information or issues uncovered during the design concept for identifying the recommended alternative process.
- Any required County Standard details supplemented with Maricopa Association of Governments (MAG) Standard details will be added by reference only and will not be copied in the plan set but will be submitted electronically.
- Technical specifications will be prepared in accordance with the National Engineering Handbook (NEH) Part 642 – Specifications for Construction Contracts.
- The Project Team will incorporate items 30 through 34, 37 through 40, 42 through 44, and item 50, in accordance with the Engineering Design SOW as appropriate.

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**TASK 9: CONFERENCE REVIEW (PROGRESS MEETING #1)**

- The Project Team will submit 60 percent plans, specs, estimates package, and Preliminary Design Report and discuss with both the County, TNC, and the NRCS. The submittals will be both electronic and hard copies.
- Receive and respond to comments from both the County, TNC (through the County), and the NRCS.
- The Project Team will incorporate item 52 in accordance with the Engineering Design SOW as appropriate.

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**TASK 10: NINETY (90) PERCENT PLANS, SPECS, AND ESTIMATES PACKAGE**

- The Project Team will prepare 90 percent plans, specs, and estimates package and discuss with the County, TNC, and NRCS.
- Receive and respond to comments from the County, TNC (through the County) and NRCS.
- The Project Team will incorporate items 30 through 34, 37 through 40, and 42 through 44 in accordance with the Engineering Design SOW as appropriate.

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**TASK 11: CONFERENCE REVIEW (PROGRESS MEETING #2)**

- ◆ The Project Team will submit 90 percent plans, specs, estimates package, and updated Preliminary Design Report and discuss with the County, TNC, and NRCS. The submittals will be both electronic and hard copies.
- ◆ Receive and respond to comments from the County, TNC (thought the County), and the NRCS.
- ◆ The Project Team will incorporate item 52 in accordance with the Engineering Design SOW as appropriate.

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**TASK 12: CONFERENCE REVIEW PREPARATION FOR REGULATORY AGENCIES AND NON-GOVERNMENTAL ORGANIZATIONS**

- ◆ Municipalities, public, and stakeholders (up to 2 meetings)
- ◆ City of Sierra Vista for acknowledgement
- ◆ Upper San Pedro Partnership for acknowledgement
- ◆ The Project Team will incorporate item 52 in accordance with the Engineering Design SOW as appropriate.

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**TASK 13: DESIGN REPORT (PRELIMINARY AND FINAL)**

- ◆ The Project Team will prepare a design report to summarize findings and present the proposed design improvements for the planned improvements.
- ◆ Alternate treatment configurations and materials or installation techniques will be discussed for the recommended alternative solution.
- ◆ Cost estimates of all elements of these improvements will be made. A conceptual construction schedule will be determined.
- ◆ Coordinate with the County to identify conflicts and propose solutions.
- ◆ Submit to both the County and the NRCS for review and finalize upon receipt of comments.
- ◆ The Project Team will submit the Preliminary Design Report during the 60% design plan submittal.
- ◆ The Project Team will submit an updated Preliminary Design Report during the 90% design plan submittal.
- ◆ The Project Team will submit the Final Design Report during the final design plan submittal.
- ◆ The Project Team will incorporate item 35 and item 47 in accordance with the Engineering Design SOW as appropriate.
- ◆ The Design Report format shall follow NEM Part 511 – Design, Subpart B – Documentation.

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**TASK 14: FINAL PLANS, SPECS, AND ESTIMATES**

- ◆ Both the NRCS (National Headquarters assuming Class 8 Job) and the County comments will be incorporated in the final construction documents.

- ◆ Comments from NGOs will be incorporated with the County’s approval.
- ◆ Final quantity take-offs and engineer’s opinion of probable costs.
- ◆ Digital deliverables will include all drainage analysis and CAD base maps of all improvement line work. Final base map shall be in AutoCAD format.
- ◆ The Project Team will incorporate item 36 in accordance with the Engineering Design SOW as appropriate.

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## **TASK 15: SWPPP AND O&M**

### **Task 15.1: SWPP**

- ◆ The Project Team will prepare a Stormwater Pollution Prevention Plan (SWPPP in accordance with both item 45 in the Engineering Design SOW and Cochise County Standards as appropriate.

### **Task 15.2: O&M Plan**

- ◆ The Project Team will prepare an Operation and Maintenance (O&M) Plan based on item 46 in the Engineering Design SOW. Because land management through animal impact may become a part of the preferred alternative, certain planning charts and approaches may be incorporated into the O&M plan in accordance with land management methods, such as, holistic management.

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## **TASK 16: LANDRIGHTS WORK MAPS**

- ◆ Landrights Work Map(s) will be prepared electronically on a scale of 1 inch to 400 feet.
- ◆ The Landrights Work Map(s) will be prepared in accordance with item 51 in the Engineering Design SOW as appropriate.
- ◆ The Project Team will prepare letters of notification to stakeholders.

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## **TASK 17: BIDDING PHASE SERVICES**

- ◆ The Project Team will provide bidding phase services to assist both the County and the NRCS in identifying a contractor to construct the project.
- ◆ The Project Team will prepare a bid schedule in accordance with item 41 in the Engineering Design SOW as appropriate.

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## **Assumptions and Exclusions**

The following assumptions and exclusions were made in preparing this Engineering Design proposal:

- ◆ The preferred alternative developed in the Plan/EA will serve as the basis for the engineering design. Preparation of any follow-on construction phase documentation and/or land management operation and maintenance procedures are not included in this proposal and will be considered outside the scope of this proposal.

- ◆ Sub-consultant fees are based on a projected understanding of the project as it is understood today. As the Watershed Plan/EA is completed, the proposed total of fees for completion of the project may fluctuate, depending on the alternatives selected for the Engineering Design. All parties, to include sub-contractors, guarantee that all hourly rates will remain constant, throughout the life of the contract. Additionally, the scope of work pertaining to the Engineering Design of this project is subject to change based on the selection of alternatives from the County. When the Engineering Design phase of this project begins, the scope may change from what is presented in this document depending on which alternative is selected from the Plan/EA. As such, both the scope and fees for completion may need to be adjusted prior to beginning the Engineering Design for this project.
- ◆ No construction phase services are provided during this phase of the project
- ◆ Infrastructure needs beyond the Plan/EA defined project area will not be evaluated nor designed for recommended improvements as a part of this scope.
- ◆ Both the County and the NRCS will provide all available documentation and support material for the Engineering Design.
- ◆ The County will pay all review or permitting fees, if any.
- ◆ No Conditional Letter of Map Revision and/or Letter of Map Revision (CLOMR/LOMR) will be a part of this effort.
- ◆ No easement or legal descriptions services will be provided at this time; however, the County may need to identify a fixed Right-of-Way for jurisdictional purposes such as maintenance and control.
- ◆ The scope and fee for Task 5 Hydrology and Hydraulics (Development of Future Conditions) assumes that there will be some flood control/infrastructure design that will be based on detailed design topography to proceed to the 60%, 90% and final design level. During the Plan/EA the preferred alternative will be identified at a 15% planning level based on the best available topography during that phase of the project. Based on past similar projects performed the scope and fee for this task reflects the efforts to perform detail drainage design where the actual components of a facility are being sized and located within 0.01 feet with elevations that are within 0.01 feet. This information will then be translated onto construction drawings and the design report to reflect these design level details on plan and profiles, cross-sections and in standard details so that these potential facilities are constructible.

## Cost Estimate

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The Project Team's cost estimate for complete the Engineering Design is a fee of \$287,136.00. These fees have been estimated based on the Project Team's current knowledge of the project but may change as the Plan/EA phase clarifies the preferred alternative for final design. A detailed cost estimate, broken out by tasks, is provided in Appendix B. The sum of both the Watershed Plan and EA and the Engineering Design is \$499,975.00.

## **Appendix A: Engineering Design Schedule**

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| ID | Task Mode | Task Name                                      | Duration        | Start               | Finish              | May | July | September | November | January | March | May | July | September | November | January |
|----|-----------|--|-----------------|---------------------|---------------------|-----|------|-----------|----------|---------|-------|-----|------|-----------|----------|---------|
| 1  | ★         | <b>Engineering Design</b>                      | <b>304 days</b> | <b>Tue 1/1/19</b>   | <b>Fri 2/28/20</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 2  | ★         | 1.0 Kick-Off Meeting                           | 7 days          | Fri 2/1/19          | Mon 2/11/19         |     |      |           |          |         |       |     |      |           |          |         |
| 3  | ★         | <b>2.0 Coordination and QCP</b>                | <b>281 days</b> | <b>Fri 2/1/19</b>   | <b>Fri 2/28/20</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 4  | ★         | 2.1 QCP  | 14 days         | Fri 2/1/19          | Wed 2/20/19         |     |      |           |          |         |       |     |      |           |          |         |
| 5  | ★         | 2.2 Coordination                               | 281 days        | Fri 2/1/19          | Fri 2/28/20         |     |      |           |          |         |       |     |      |           |          |         |
| 6  | ★         | 3.0 Meetings and Stakeholder Presentations     | 281 days        | Fri 2/1/19          | Fri 2/28/20         |     |      |           |          |         |       |     |      |           |          |         |
| 7  | ★         | 4.0 Expanded Design Topo                       | 43 days         | Tue 1/1/19          | Thu 2/28/19         |     |      |           |          |         |       |     |      |           |          |         |
| 8  | ★         | <b>5.0 Hydrology and Hydraulics</b>            | <b>21 days</b>  | <b>Tue 4/30/19</b>  | <b>Tue 5/28/19</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 9  | ★         | 5.1 FLO-2D                                     | 40 days         | Fri 3/1/19          | Thu 4/25/19         |     |      |           |          |         |       |     |      |           |          |         |
| 10 | ★         | 5.2 MODFLOW / SWR                              | 40 days         | Fri 3/1/19          | Thu 4/25/19         |     |      |           |          |         |       |     |      |           |          |         |
| 11 | ★         | 5.3 Sediment Transport                         | 40 days         | Fri 3/1/19          | Thu 4/25/19         |     |      |           |          |         |       |     |      |           |          |         |
| 12 | ★         | 5.4 Sketches                                   | 30 days         | Mon 4/1/19          | Fri 5/10/19         |     |      |           |          |         |       |     |      |           |          |         |
| 13 | ★         | 5.5 Structural Calculations                    | 30 days         | Mon 4/1/19          | Fri 5/10/19         |     |      |           |          |         |       |     |      |           |          |         |
| 14 | ★         | 6.0 Final Design Geotechnical Engineering      | 62 days         | Fri 3/1/19          | Sat 5/25/19         |     |      |           |          |         |       |     |      |           |          |         |
| 15 | ★         | 7.0 General Design Considerations and Research | 82 days         | Fri 2/1/19          | Sat 5/25/19         |     |      |           |          |         |       |     |      |           |          |         |
| 16 | ★         | 8.0 60% Plans and Specs                        | 45 days         | Mon 4/15/19         | Fri 6/14/19         |     |      |           |          |         |       |     |      |           |          |         |
| 17 | 📅         | <b>9.0 Conference Review #1</b>                | <b>32 days</b>  | <b>Fri 6/14/19</b>  | <b>Mon 7/29/19</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 18 | ★         | 9.1 Conference Review                          | 6 days          | Fri 6/14/19         | Fri 6/21/19         |     |      |           |          |         |       |     |      |           |          |         |
| 19 | ★         | 9.2 Agency Review                              | 22 days         | Fri 6/21/19         | Sun 7/21/19         |     |      |           |          |         |       |     |      |           |          |         |
| 20 | ★         | 9.3 Respond to Agency Comments                 | 7 days          | Sun 7/21/19         | Mon 7/29/19         |     |      |           |          |         |       |     |      |           |          |         |
| 21 | ★         | 10.0 90% Plans and Specs                       | 35 days         | Mon 7/29/19         | Fri 9/13/19         |     |      |           |          |         |       |     |      |           |          |         |
| 22 | 📅         | <b>11.0 Conference Review #2</b>               | <b>32 days</b>  | <b>Fri 9/13/19</b>  | <b>Mon 10/28/19</b> |     |      |           |          |         |       |     |      |           |          |         |
| 23 | ★         | 11.1 Conference Review                         | 6 days          | Fri 9/13/19         | Fri 9/20/19         |     |      |           |          |         |       |     |      |           |          |         |
| 24 | ★         | 11.2 Agency Review                             | 21 days         | Fri 9/20/19         | Fri 10/18/19        |     |      |           |          |         |       |     |      |           |          |         |
| 25 | ★         | 11.3 Respond to Agency Comments                | 7 days          | Fri 10/18/19        | Mon 10/28/19        |     |      |           |          |         |       |     |      |           |          |         |
| 26 | ★         | 12.0 Conference Review for Regulatory Agencies | 14 days         | Mon 10/28/19        | Thu 11/14/19        |     |      |           |          |         |       |     |      |           |          |         |
| 27 | 📅         | <b>13.0 Design Report</b>                      | <b>169 days</b> | <b>Mon 4/15/19</b>  | <b>Thu 12/5/19</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 28 | ★         | 13.1 Draft Design Report                       | 45 days         | Mon 4/15/19         | Fri 6/14/19         |     |      |           |          |         |       |     |      |           |          |         |
| 29 | ★         | 13.2 Agency Review                             | 22 days         | Fri 6/21/19         | Sun 7/21/19         |     |      |           |          |         |       |     |      |           |          |         |
| 30 | ★         | 13.3 Respond to Agency Comments                | 7 days          | Sun 7/21/19         | Mon 7/29/19         |     |      |           |          |         |       |     |      |           |          |         |
| 31 | ★         | 13.4 Final Design Report                       | 99 days         | Mon 7/22/19         | Thu 12/5/19         |     |      |           |          |         |       |     |      |           |          |         |
| 32 | 📅         | <b>14.0 Final Plans and Specs</b>              | <b>51 days</b>  | <b>Thu 11/14/19</b> | <b>Thu 1/23/20</b>  |     |      |           |          |         |       |     |      |           |          |         |
| 33 | ★         | 14.1 Draft Final Plans and Specs               | 16 days         | Thu 11/14/19        | Thu 12/5/19         |     |      |           |          |         |       |     |      |           |          |         |
| 34 | ★         | 14.2 Agency Review                             | 16 days         | Thu 12/5/19         | Thu 12/26/19        |     |      |           |          |         |       |     |      |           |          |         |
| 35 | ★         | 14.3 Respond to Agency Comments                | 10 days         | Fri 12/27/19        | Thu 1/9/20          |     |      |           |          |         |       |     |      |           |          |         |
| 36 | ★         | 14.4 Final Plans and Specs                     | 11 days         | Thu 1/9/20          | Thu 1/23/20         |     |      |           |          |         |       |     |      |           |          |         |
| 37 | 📅         | <b>15.0 SWPPP and O&amp;M</b>                  | <b>46 days</b>  | <b>Thu 12/5/19</b>  | <b>Thu 2/6/20</b>   |     |      |           |          |         |       |     |      |           |          |         |
| 38 | ★         | 15.1 SWPPP                                     | 20 days         | Thu 12/5/19         | Wed 1/1/20          |     |      |           |          |         |       |     |      |           |          |         |
| 39 | ★         | 15.2 O&M                                       | 20 days         | Thu 12/5/19         | Wed 1/1/20          |     |      |           |          |         |       |     |      |           |          |         |
| 40 | ★         | 15.3 Agency Review                             | 21 days         | Wed 1/1/20          | Wed 1/29/20         |     |      |           |          |         |       |     |      |           |          |         |
| 41 | ★         | 15.4 Respond to Agency Comments                | 7 days          | Wed 1/29/20         | Thu 2/6/20          |     |      |           |          |         |       |     |      |           |          |         |
| 42 | ★         | 16.0 Landrights Work Maps                      | 45 days         | Mon 4/15/19         | Fri 6/14/19         |     |      |           |          |         |       |     |      |           |          |         |
| 43 | ★         | 17.0 Bidding Phase Services                    | 24 days         | Tue 1/28/20         | Fri 2/28/20         |     |      |           |          |         |       |     |      |           |          |         |

## **Appendix B: Detailed Cost Estimate**

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**COST PROPOSAL**

**Cochise County  
Bella Vista Recharge Project Engineering Design  
April 24, 2018**

Prepared by:

**WEST** CONSULTANTS, INC.  
WEST Consultants, Inc.  
8950 S. 52nd Street, Suite 210  
Tempe, AZ 85284



Cochise County  
Highway & Floodplain Division - Cochise County Community Development  
1415 Melody Lane, Building F  
Bisbee, AZ 85603

Prepared for:

| TASK                  | SUB-TASK | DESCRIPTION  | WEST Consultants |                 |                 |                |                |          | HELM            |                 |                    |                    | Sampson     | Terracon        |                  |                 |                | Total Task Hours | COST         |            |
|-----------------------|----------|--|------------------|-----------------|-----------------|----------------|----------------|----------|-----------------|-----------------|--------------------|--------------------|-------------|-----------------|------------------|-----------------|----------------|------------------|--------------|------------|
|                       |          |  | Associate        | Project Manager | Senior Engineer | Staff Engineer | GIS Technician | Clerical | Project Manager | Senior Engineer | Project Engineer 2 | Project Engineer 1 | Designer    | Project Manager | Senior Principal | Project Manager | Field Engineer |                  |              | Technician |
| Hourly Rate           |          |  | \$252.00         | \$205.00        | \$158.00        | \$103.00       | \$119.00       | \$78.00  | \$158.00        | \$158.00        | \$137.00           | \$122.00           | \$85.00     | \$125.00        | \$215.00         | \$150.00        | \$95.00        | \$85.00          |              |            |
| <b>A. LABOR COSTS</b> |          |  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
| 1                     |          | <b>Bella Vista Watershed Plan and EA</b>                     |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 1.1      | Kick-Off Meeting   |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 1.1      | Prepare for and participate in kick-off meeting              |                  |                 | 8               |                |                |          | 16              |                 |                    |                    | 20          |                 |                  |                 |                |                  | 44           |            |
| 2                     |          | Coordination and OCP   |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 2.1      | Project coordination   |                  |                 | 16              |                |                |          | 8               |                 |                    |                    | 8           |                 |                  |                 |                |                  | 32           |            |
|                       | 2.2      | Develop Quality Control Plan                                 |                  |                 | 4               |                |                |          | 4               |                 |                    |                    |             |                 |                  |                 |                |                  | 8            |            |
| 3                     |          | Meetings and Stakeholder Presentations                       |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 3.1      | Weekly Progress Reports                                      |                  |                 |                 |                |                |          | 8               |                 |                    |                    |             |                 |                  |                 |                |                  | 8            |            |
|                       | 3.2      | Coordination meetings  |                  |                 | 20              |                |                |          | 40              |                 |                    |                    | 60          |                 |                  |                 |                |                  | 120          |            |
|                       | 3.3      | Presentations to stakeholders                                |                  |                 | 20              |                |                |          | 36              |                 |                    |                    | 40          |                 |                  |                 |                |                  | 96           |            |
| 4                     |          | Expanded Design Topography                                   |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 4.1      | Expanded design topography                                   |                  |                 |                 |                |                |          | 4               |                 |                    |                    |             |                 |                  |                 |                |                  | 4            |            |
| 5                     |          | Hydrology and Hydraulics (Future Conditions)                 |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 5.1      | Update FLO-2D model to reflect future conditions             |                  |                 |                 |                |                |          | 8               | 8               | 120                |                    | 20          |                 |                  |                 |                |                  | 156          |            |
|                       | 5.2      | Update MODFLOW / SWR model to reflect future conditions      |                  |                 | 8               |                | 60             |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  | 68           |            |
|                       | 5.3      | Update sediment transport model to reflect future conditions |                  |                 | 8               |                | 60             |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  | 68           |            |
|                       | 5.4      | Develop sketches   |                  |                 |                 |                |                |          | 8               |                 |                    | 20                 | 40          |                 |                  |                 |                |                  | 68           |            |
|                       | 5.5      | Perform structural calculations                              |                  |                 |                 |                |                |          | 8               |                 |                    | 20                 | 40          |                 |                  |                 |                |                  | 68           |            |
| 6                     |          | Final Design Geotechnical Engineering Services               |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 6.1      | Geotechnical evaluation                                      |                  |                 |                 |                |                |          |                 |                 |                    |                    |             | 8               | 8                | 40              |                |                  | 56           |            |
|                       | 6.2      | Borings  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             | 8               | 8                | 40              | 40             |                  | 96           |            |
|                       | 6.3      | Groundwater measurements                                     |                  |                 |                 |                |                |          |                 |                 |                    |                    |             | 8               | 8                | 40              | 40             |                  | 96           |            |
|                       | 6.4      | Percolation testing  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             | 8               | 8                | 20              | 40             |                  | 76           |            |
|                       | 6.5      | Geotechnical report  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             | 10              | 8                | 16              |                |                  | 34           |            |
| 7                     |          | General Design Considerations and Research                   |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 7.1      | Construction documents                                       |                  |                 |                 |                |                |          | 8               |                 |                    |                    | 48          |                 |                  |                 |                |                  | 56           |            |
| 8                     |          | 60% Plans, Specs, and Estimates                              |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 8.1      | Draft plans  |                  |                 | 2               |                |                |          | 8               |                 | 40                 | 16                 | 30          |                 |                  |                 |                |                  | 96           |            |
|                       | 8.2      | Draft specs  |                  |                 | 2               |                |                |          | 8               |                 | 40                 |                    | 30          |                 |                  |                 |                |                  | 80           |            |
|                       | 8.3      | Draft estimates  |                  |                 | 2               |                |                |          | 8               |                 | 40                 |                    | 30          |                 |                  |                 |                |                  | 80           |            |
| 9                     |          | Progress Meeting #1  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 9.1      | Progress meeting #1  |                  |                 | 8               |                |                |          | 16              |                 |                    |                    | 20          |                 |                  |                 |                |                  | 44           |            |
| 10                    |          | 90% Plans, Specs, and Estimates                              |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 10.1     | Draft plans  |                  |                 | 2               |                |                |          | 8               |                 | 40                 | 24                 | 30          |                 |                  |                 |                |                  | 104          |            |
|                       | 10.2     | Draft specs  |                  |                 | 2               |                |                |          | 8               |                 | 40                 |                    | 30          |                 |                  |                 |                |                  | 80           |            |
|                       | 10.3     | Draft estimates  |                  |                 | 2               |                |                |          | 8               |                 | 40                 |                    | 30          |                 |                  |                 |                |                  | 80           |            |
| 11                    |          | Progress Meeting #2  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 11.1     | Progress meeting #2  |                  |                 | 8               |                |                |          | 16              |                 |                    |                    | 20          |                 |                  |                 |                |                  | 44           |            |
| 12                    |          | Conference Review Prep                                       |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 12.1     | Conference review prep                                       |                  |                 | 4               |                |                |          | 24              |                 | 8                  |                    | 40          |                 |                  |                 |                |                  | 76           |            |
| 13                    |          | Design Report  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 13.1     | Preliminary design report                                    |                  |                 | 4               |                |                |          | 16              | 2               | 16                 |                    | 40          |                 |                  |                 |                |                  | 78           |            |
|                       | 13.2     | Final design report  |                  |                 | 4               |                |                |          | 8               | 2               | 8                  |                    | 20          |                 |                  |                 |                |                  | 42           |            |
| 14                    |          | Final Plans, Specs, and Estimates                            |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 14.1     | Final plans  |                  |                 | 2               |                |                |          | 8               |                 | 30                 |                    | 12          |                 |                  |                 |                |                  | 52           |            |
|                       | 14.2     | Final specs  |                  |                 | 2               |                |                |          | 8               |                 | 30                 |                    | 12          |                 |                  |                 |                |                  | 52           |            |
|                       | 14.3     | Final estimates  |                  |                 | 2               |                |                |          | 8               |                 | 20                 |                    | 12          |                 |                  |                 |                |                  | 42           |            |
| 15                    |          | SWPPP and O&M  |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 15.1     | Stormwater Pollution Prevention Plan                         |                  |                 | 2               |                |                |          | 20              |                 |                    |                    | 40          |                 |                  |                 |                |                  | 62           |            |
|                       | 15.2     | Operations and Maintenance Plan                              |                  |                 | 2               |                |                |          | 20              |                 |                    |                    | 40          |                 |                  |                 |                |                  | 62           |            |
| 16                    |          | Landrights Work Maps   |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 16.1     | Landrights work maps   |                  |                 | 2               |                |                |          | 4               |                 |                    |                    | 16          |                 |                  |                 |                |                  | 22           |            |
| 17                    |          | Bidding Phase Services                                       |                  |                 |                 |                |                |          |                 |                 |                    |                    |             |                 |                  |                 |                |                  |              |            |
|                       | 17.1     | Bidding phase services                                       |                  |                 | 2               |                |                |          | 8               |                 |                    |                    | 16          |                 |                  |                 |                |                  | 26           |            |
|                       |          | Sub total  | 0                | 138             | 0               | 120            | 0              | 0        | 352             | 12              | 472                | 80                 | 744         | 0               | 42               | 40              | 156            | 120              | 2276         |            |
|                       |          | TOTAL HOURS  | 0                | 138             | 0               | 120            | 0              | 0        | 352             | 12              | 472                | 80                 | 744         | 0               | 42               | 40              | 156            | 120              | 2276         |            |
|                       |          | (Percentage of overall Base Labor Cost)                      | 0%               | 6%              | 0%              | 5%             | 0%             | 0%       | 15%             | 1%              | 21%                | 4%                 | 33%         | 0%              | 2%               | 2%              | 7%             | 5%               |              |            |
|                       |          | TOTAL LABOR COST:  | \$0.00           | \$28,290.00     | \$0.00          | \$12,360.00    | \$0.00         | \$0.00   | \$55,616.00     | \$1,896.00      | \$64,664.00        | \$9,760.00         | \$63,240.00 | \$0.00          | \$9,030.00       | \$6,000.00      | \$14,820.00    | \$10,200.00      | \$275,876.00 |            |

| <b>B. DIRECT COSTS</b> |                            | COST                                    |
|------------------------|----------------------------|---|
|                        | Expanded design topography | \$10,000.00                             |
|                        | Mileage                    | 600 miles at \$ 0.545 per mile \$327.00 |
|                        | Federal per diem           | 4 days at \$ 93.00 per day \$372.00     |
|                        | Federal M&IE               | 11 days at \$ 51.00 per day \$561.00    |
|                        | Airfare                    | 0 trips at \$ 400.00 per day \$0.00     |
|                        | Rental car                 | \$0.00                                  |
|                        | <b>TOTAL DIRECT COSTS</b>  | <b>\$11,260.00</b>                      |
|                        | <b>TOTAL FOR ALL TASKS</b> | <b>\$287,136.00</b>                     |