

## Memorandum

To: Silver Creek Watershed Site 35A Ad-Hoc Selection Subcommittee  
From: Terry Schumacher, Land & Water Programs Coordinator  
Date: December 3, 2024  
RE: Contract with Houston Engineering, Inc. for the Silver Creek Watershed 35A Project

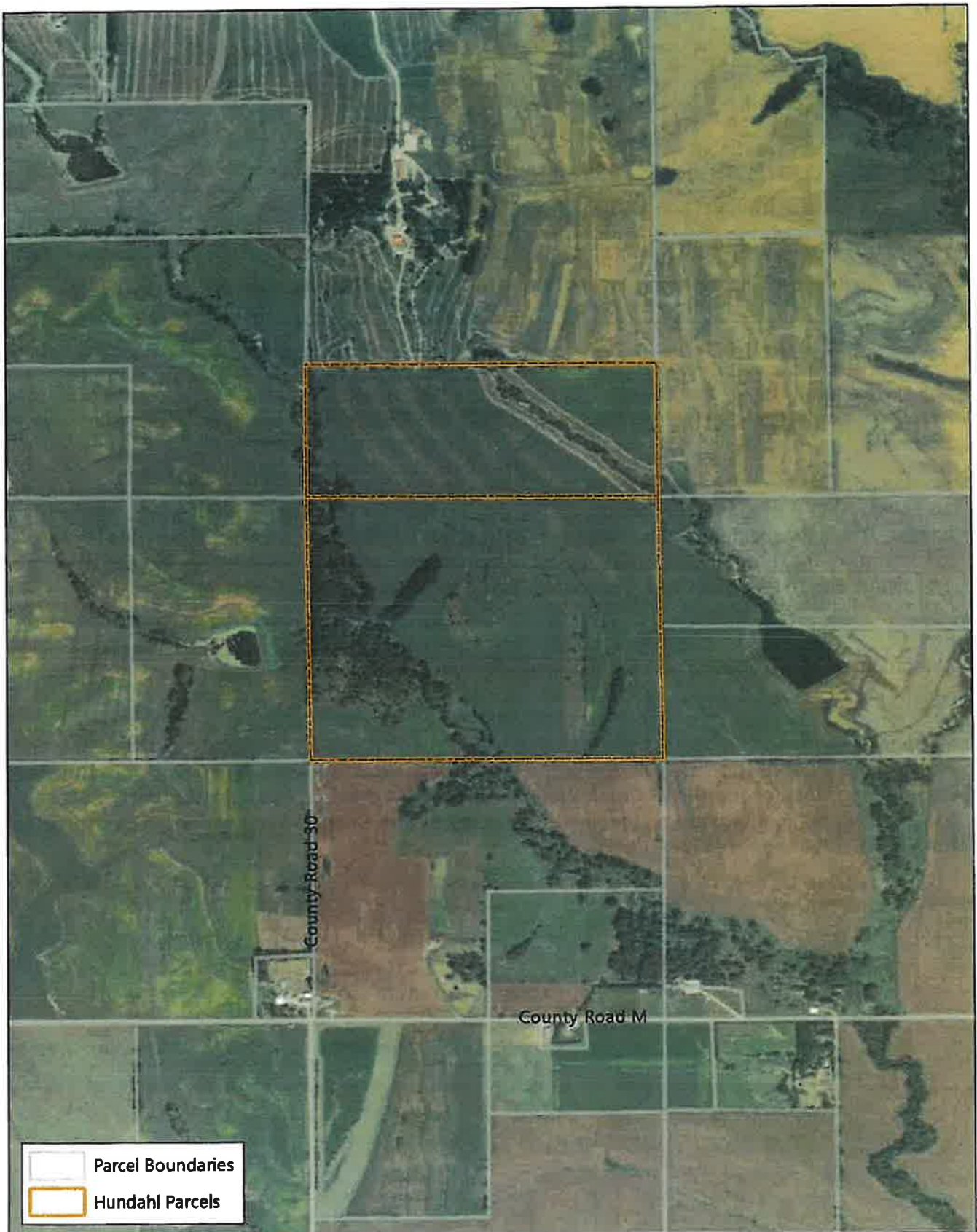
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On November 7, 2024, the Board of Directors selected Houston Engineering, Inc. to provide the necessary services to plan, permit, design and construct Silver Creek Site 35A located in Burt County, Nebraska.

Houston Engineering, Inc. and District staff have discussed and prepared a professional services agreement with a scope of services, time and cost estimate for the project, which will be divided into phases. The agreement for a maximum fee of \$156,426.00 will include professional services necessary to determine the hazard class, 404 permit requirements, provide geotechnical investigation and preliminary design for Silver Creek Watershed Site 35A Project (see attached map).

The proposed scope of work, cost estimate and schedule are attached.

**Management recommends that the Subcommittee recommend to the Board that the General Manager be authorized to execute the proposed professional services agreement with Houston Engineering, Inc. for the Silver Creek Watershed Site 35A Project, in an amount not to exceed \$156,426.00, subject to changes deemed necessary by the General Manager and approval as to form by District Legal Counsel.**



**Figure 1. Hundahl Properties**

Silver Creek Watershed Site 35A Project  
 Papio-Missouri River Natural Resources District



0 1,300 Feet



## **Attachment 1 to Exhibit A – Proposed Scope of Services**

A phased approach for contracting has been developed to make decisions and identify key design criteria that will impact the total effort to complete this project. Per the Project Schedule located in Exhibit A as Attachment 2, three contracting phases have been identified: 1.) Preliminary Investigations, 2.) Final Design and Permitting, and 3.) Bidding and Construction.

The current Proposed Scope of Services and Engineer's Fee Estimate includes work to be completed within the Preliminary Investigations phase. Key decisions to be made during this phase include the hazard class determination and the identification of mitigation requirements/potential sites. A description is provided below for each subtask to describe if the work is complete or if additional time and efforts will be needed in subsequent phases.

### **1 PROJECT MANAGEMENT**

#### **1.1 Client Coordination and Meetings**

Preparation for and attendance of up to two (2) project review meetings, with the Papio-Missouri River Natural Resources District (Papio NRD) and landowner if appropriate. Project review meetings will occur to make critical design decisions and to review findings. Meeting minutes and project task lists will be prepared by Houston Engineering and distributed after each meeting for review by the Papio NRD. This task also includes supplemental communication via email, telephone, or video conference as needed to relay information and request feedback. Additional time will be needed in subsequent phases to continue these services.

#### **1.2 Agency Coordination (NDNR, Burt County)**

Coordination with the Dam Safety Division of the Nebraska Department of Natural Resources discuss the dam type, size, location, and downstream conditions to determine hazard class. Also included in this task is coordination with Burt County to discuss breach path protection options (likely through FEMA FIRM mapping) that may impact hazard class determination. Additional coordination with NDNR will be required in the Final Design and Permitting phase to discuss design criteria, deliverables, and address comments required to obtain a permit to impound water and approval of dam plans. It will be determined if additional coordination is needed with Burt County pending the results of hazard classification and breach path protection preferences.

#### **1.3 Project Administration and Internal Coordination**

Perform project administration tasks such as task tracking, budget checks, organization of materials and information needs to complete tasks, and internal guidance to staff assign tasks, to ensure efficiency, and task completeness. Additional time will be needed in subsequent phases to continue these services.

#### **1.4 Invoicing and Schedule Updates**

Preparation of monthly project invoices and a summary of work completed during the invoicing period. Invoices will be sent to the Papio NRD prior to the first Wednesday of the month. Updates will include budget and schedule tracking. Additional time will be needed in subsequent phases to continue these services.



## **2 SURVEY AND MAPPING**

### **2.1 Initial Site Survey**

Includes a field survey to capture critical elevations required for the evaluation and feasibility of dam/reservoir configuration alternatives. Elevations will be needed on the Hundahl property, as well as upstream and downstream parcels that could provide design constraints. Also includes installation of control points for future survey needs. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **2.2 Data Gathering, Processing and Basemap Development**

Compile survey data, publicly available data including but not limited to LiDAR, aeriels, parcels, and soil data. Includes coordination with local utilities and mapping locations with information provided. Process elevation data to generate digital elevation models and develop basemaps for use in evaluating alternatives. Additional time will be required to update the basemaps as additional data is gathered in the Final Design and Permitting phase.

Additional subtasks and time will be required in future phases to perform the full site topography survey at the dam location and any stream mitigation sites identified, as well as to perform boundary surveys/develop legal descriptions for any easements that may be required.

## **3 ENVIRONMENTAL ASSESSMENTS AND PERMITTING**

### **3.1 Wetland Delineation - Desktop, Field Assessment and Reporting**

Includes a wetland delineation and ordinary high-water mark (OHWM) determination at the potential dam and permanent pool locations. A wetland delineation will be performed in accordance with the USACE 1987 Wetland Delineation Manual and USACE 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0) and will include all required documents and the preparation of a final report to detail waters of the U.S. (WOUS) findings. This includes desktop investigations, field work, and the development of documents required for the final report. An initial investigation will be performed prior to the winter/freezing conditions to allow progress on impact estimates and stream mitigation requirements. A verification field investigation will be required in May to confirm or update initial findings. This effort and all work to complete the final report are included in this Preliminary Investigations scope and fee. Additional assessments and reporting will be required in the Final Design and Permitting Phase for any stream mitigation sites determined necessary during this phase.

### **3.2 NeSCAP - Desktop, Field Assessment and Reporting**

The stream function assessment will follow the Nebraska Stream Condition Assessment Procedure (NeSCAP) as developed by the USACE (2016) and will include a formal stream condition assessment report for existing conditions. This includes desktop preparations, field work, and the development of documents required for the final report. A verification field investigation will be required in May to confirm or update initial findings. This effort and completing the NeSCAP report are included in this phase. Additional assessments and reporting will be required in the Final Design and Permitting Phase for any stream mitigation sites determined necessary during this Preliminary Investigations phase.

### **3.3 Alternatives Analysis**

A range of alternatives will be assessed to determine avoidance and minimization measures that will be required to obtain a USACE Clean Water Act Section (CWA) 404 permit the structure. The alternatives will be screened for purpose and need and practicability, and alternatives that progress beyond the initial screening will be evaluated for impacts and benefits to aquatic resources. Impacts assessments will be coordinated with the preliminary design efforts to guide the selection of the preferred alternative. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **3.4 Determine 404 Permitting and Mitigation Requirements**

Pair the results of the environmental assessments and alternatives analysis to determine the permitting and mitigation requirements for the project. Includes one (1) virtual pre-application meeting with USACE Regulatory to understand 404 permit requirements. Includes desktop analysis of listed threatened and endangered species and initial coordination with NGPC and USFWS, as required. Does not include field work for threatened, endangered, or sensitive species. Does not include cultural resources field work or consultation with SHPO or Tribes. This includes the NeSCAP post-project functional score analysis to determine if mitigation is required and to identify the stream segments that should be assessed as potential mitigation sites.

Additional subtasks and time will be required under the Environmental Assessments and Permitting task in the Final Design and Permitting phase to complete the 404 permit application and develop a complete mitigation report and monitoring plan, as required. Additional subtasks and time will also be required for state permitting requirements through NDEE and NDNR.

## **4 GEOTECHNICAL SERVICES**

### **4.1 Review Existing Information**

A geotechnical report was completed by Olsson Associates in 2006 for a proposed location for Site 35 approximately 500 ft downstream of the Hundahl parcel where the current structure is to be located. HEI will review the "Report of Geotechnical Exploration, Silver Creek Dams Site #35" report and use the information to guide the soil sampling plan and develop preliminary models, as described below. This subtask will be complete, and no additional effort will be required after the Preliminary Investigations phase.

### **4.2 Develop Boring and Soil Sampling Plan**

Once the hazard class has been determined, the soil boring and sampling plan can be prepared according to the required design guidance for the assigned hazard class. Preparation of field layout of borings and number/depth of samples per boring will be developed. Laboratory testing requirements of soil samples will be identified. The boring and testing plan will be reviewed and approved by the Design Engineer/Engineer of record. This information will be used to develop the scope and fees required for the next Final Design and Permitting phase, but no additional time should be required for this task.

### **4.3 Geotechnical Modeling**

Model setup using information and values from the 2006 Olsson Associates report to develop preliminary model runs that will assess structure stability and seepage potential to preliminarily size the dam template at the maximum section. This will allow our team to configure the dam embankment and auxiliary spillway layout, and estimate impacts for the dam alternatives and

determine mitigation requirements. Additional time will be needed in the Final Design and Permitting phase to update and run the models with subsurface soil investigation findings to be gathered in the next phase.

Additional subtasks and time will be required under the Geotechnical Services task in the Final Design and Permitting phase to complete the soil borings and testing and to develop a final geotechnical design report.

## **5 MODELING AND PRELIMINARY DESIGN**

### **5.1 Sediment Load Modeling and Reservoir Sizing**

Perform as sediment load assessment to the proposed dam site using existing information in the Silver Creek Watershed Plan and publicly available data to assess the storage needs for the reservoir and determine the lifetime of the permanent pool. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **5.2 Hydrologic Modeling**

Using the most recent rainfall information, develop a hydrologic model to generate inflow design hydrographs for the three design storms (PSH, SDH, FBH) for all hazard class sizes to estimate dam hydraulic requirements that will impact hazard class determination. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **5.3 Hydraulic Modeling and Outlet Structure Sizing**

For all hazard classes to be considered, develop pertinent stage-storage reservoir data for hydraulic routings. For non-typical spillway configurations, develop stage-discharge curves for spillway alternatives. Using SITES/HEC-HMS software or custom spreadsheet routing tools, perform reservoir routings to determine spillway sizes and control elevations for all alternatives considered. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **5.4 Breach Routing**

Perform breaching routings for dam alternatives of all hazard classes to be considered in order to understand downstream impacts and breach path limits. Permanent pool size, hydrology, and hydraulic routings will inform dam size and storage entered into a dam breach. Must consider upstream structures and potential breaches to be included in modeling efforts. Results to be used to inform the hazard class determination and multiple iterations may be required until the preferred alternative has been selected. Efforts assume a maximum of 5 breach routing runs. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

### **5.5 Hazard Class Determination**

Use information and results from agency coordination and breach routings to determine the hazard classification for this structure. Includes assessing the downstream impacts, breach path protection options, resulting dam size, environmental impacts and mitigation, site limitation and developing materials to inform Papio NRD, NDNR and Burt County staff of the factors to consider. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.



## **5.6 Embankment Design**

Develop the embankment section template using the results of the reservoir sizing, hydrology and hydraulics routings, and hazard class determination to set spillway and top of dam elevations. Use geotechnical modeling to set appropriate slopes, top of dam width, and stability berm widths. Coordinate efforts with the alternatives analysis for potential modifications due to impacts. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

## **5.7 Alternatives Analysis Design and Drafting**

Perform the necessary drafting and grading using the digital elevation models created for this site to layout of the dam alternatives to assess the feasibility and estimate potential impacts. This will include various alignments, dam sizes (as a function of the hydrology and hydraulics routings), pool elevations, and embankment templates. Coordinate this effort with the regulatory permitting alternatives analysis effort to guide the selection of the preferred alternative. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

## **5.8 Sheets Setup and Preliminary Schematics**

Includes the set up of construction plan sheets necessary to display preliminary schematics (plans and concept level details) to display the alternatives considered and the preferred alternative for final design. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

## **5.9 Preliminary Investigations Technical Memorandum**

Document all investigations, assessments, and design processes completed during the Preliminary Investigations phase. Summarize data and results and describe the implications for the Final Design and Permitting phase. This subtask will be complete, and no additional effort should be required after the Preliminary Investigations phase.

## **6 FINAL DESIGN AND CONSTRUCTION DOCUMENTS**

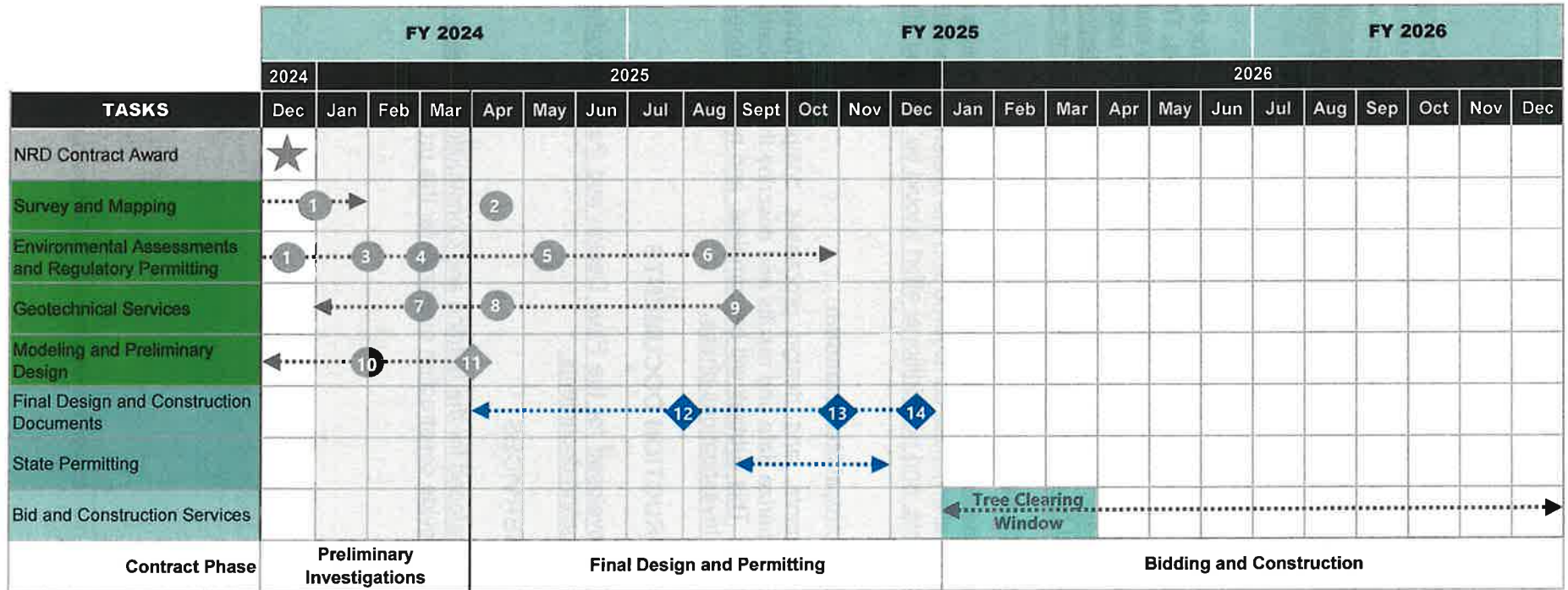
Subtasks and time estimates will be developed for the Final Design and Permitting phase to perform final design and develop construction documents.

## **7 BID AND CONSTRUCTION SERVICES**

Subtasks and time estimates will be developed for the Bidding and Construction phase to assist the Papio NRD in project bidding and provide construction oversight for this project.



**Attachment 2 to Exhibit A - Project Schedule**  
**Silver Creek 35A Small Flood Control and Water Quality Structure**  
**Papio-Missouri River Natural Resources District**  
**Burt County, NE**



**MILESTONES**

- |  |  |
|--|--|
| 1 Initial Field Investigations                           | 8 Perform Soil Borings and Testing                           |
| 2 Full Topography Survey                                 | 9 Final Geotechnical Report                                  |
| 3 USACE 404 Pre-Application Meeting                      | 10 Hazard Class Determination                                |
| 4 Determine Mitigation Requirements and Sites            | 11 Preliminary Investigations Technical Memorandum Submittal |
| 5 Verification* and Mitigation Site Field Investigations | 12 60% Plan Submittal  |
| 6 USACE 404 Applications Submittal                       | 13 90% Plan and Specifications Submittal                     |
| 7 Develop Soil Borings and Testing Plan                  | 14 Final Plan and Specifications Completion                  |





**Attachment 2 to Exhibit C - Engineer's Fee Estimate**  
**Silver Creek 35A Small Flood Control and Water Quality Structure**  
**Preliminary Investigations Phase**  
**Papio-Missouri River Natural Resources District**  
**Burt County, NE**

Houston Engineering													Subtotal Fees	Task Total
Prj Manager	PIC	Sr Engineer	Sr Engineer	Prj Engineer	Prj Engineer	Prj Engineer	Prj Engineer	Assistant Eng	Admin	Houston Expenses				
Mechtenberg	Sotak	Gregalunas	Kelley	Kaufman	Miller	Suing	PE Staff (Varies)	EI Staff (Varies)						
\$237	\$296	\$260	\$216	\$248	\$216	\$194	\$194	\$172	\$106					
<b>Tasks</b>														
<b>1 Project Management</b>														
1.1 Client Coordination and Meetings	8	6						6					\$ 4,704.00	
1.2 Agency Coordination (NDNR, Burt County)	12	8											\$ 5,212.00	
1.3 Project Administration and Internal Coordination	12	2	2	2	2		2	2			3		\$ 5,616.00	
1.4 Invoicing and Schedule Updates (3)	3												\$ 1,029.00	
<b>Task 1 Total</b>	<b>\$8,295</b>	<b>\$4,736</b>	<b>\$520</b>	<b>\$432</b>	<b>\$496</b>	<b>\$0</b>	<b>\$0</b>	<b>\$388</b>	<b>\$1,376</b>	<b>\$318</b>	<b>\$0</b>	<b>\$0</b>		<b>\$16,581</b>
<b>2 Survey and Mapping</b>														
2.1 Initial Site Survey	4							8	8			\$550	\$ 4,426.00	
2.2 Data Gathering, Processing, and Basemap Development	8							4	24				\$ 6,800.00	
<b>Task 2 Total</b>	<b>\$2,844</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,328</b>	<b>\$5,504</b>	<b>\$0</b>	<b>\$550</b>	<b>\$550</b>		<b>\$11,226</b>
<b>3 Environmental Assessments and Permitting</b>														
3.1 Wetland Delineation - Desktop, Field Assessment, and Reporting					6		18		56			\$300	\$ 14,912.00	
3.2 NeSCAP - Desktop, Field Assessment, and Reporting					12		7	60				\$200	\$ 16,174.00	
3.3 Alternatives Analysis	3				6						4		\$ 2,199.00	
3.4 Determine 404 Permitting and Mitigation Requirements	2				12								\$ 4,138.00	
<b>Task 3 Total</b>	<b>\$1,185</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,928</b>	<b>\$0</b>	<b>\$4,850</b>	<b>\$11,640</b>	<b>\$10,320</b>	<b>\$0</b>	<b>\$500</b>	<b>\$500</b>		<b>\$37,423</b>
<b>4 Geotechnical Services</b>														
4.1 Review Existing Information			4				8						\$ 2,788.00	
4.2 Develop Boring and Soil Sampling Plan			4				16						\$ 4,496.00	
4.3 Geotechnical Modeling			8				40						\$ 10,720.00	
<b>Task 4 Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,160</b>	<b>\$0</b>	<b>\$0</b>	<b>\$13,824</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>		<b>\$17,984</b>
<b>5 Modeling and Preliminary Design</b>														
5.1 Sediment Load Modeling and Reservoir Sizing	8	1							16				\$ 4,944.00	
5.2 Hydrologic Modeling	4	1		8				8	32				\$ 10,028.00	
5.3 Hydraulic Modeling and Outlet Structure Sizing	4	1		8				8	32				\$ 10,028.00	
5.4 Breach Routing	4	1		4				4	24				\$ 7,012.00	
5.5 Hazard Class Determination	16	6							8				\$ 6,944.00	
5.6 Embankment Design	4	4	8						2				\$ 4,556.00	
5.7 Alternatives Analysis Design and Drafting	8	2							24				\$ 6,616.00	
5.8 Sheets Setup and Preliminary Schematics	8							8	24				\$ 7,576.00	
5.9 Preliminary Investigations Technical Memorandum	16	6		2	1			8	40	8			\$ 15,528.00	
<b>Task 5 Total</b>	<b>\$17,064</b>	<b>\$6,512</b>	<b>\$2,080</b>	<b>\$4,752</b>	<b>\$248</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,984</b>	<b>\$34,744</b>	<b>\$848</b>	<b>\$0</b>	<b>\$0</b>		<b>\$73,232</b>
<b>Subtotal Hours</b>	<b>124</b>	<b>38</b>	<b>26</b>	<b>24</b>	<b>39</b>	<b>64</b>	<b>25</b>	<b>110</b>	<b>302</b>	<b>11</b>	<b>\$1,050</b>	<b>\$1,050</b>		
<b>Subtotal Costs</b>	<b>\$29,388</b>	<b>\$11,248</b>	<b>\$6,760</b>	<b>\$5,184</b>	<b>\$9,672</b>	<b>\$13,824</b>	<b>\$4,850</b>	<b>\$21,340</b>	<b>\$51,944</b>	<b>\$1,166</b>	<b>\$1,050</b>	<b>\$1,050</b>		<b>\$156,426</b>