

Memorandum

To: Dakota County Floodplain Mapping Ad-Hoc Consultant Selection Subcommittee
Re: Contract for Engineering Services with PBS&J
From: Paul Woodward, Water Resources Engineer
Date: October 2, 2007

On August 30, 2007, the Subcommittee interviewed and selected PBS&J, Inc. with which to negotiate a professional services contract to update flood hazard data and prepare Digital Flood Insurance Rate Maps (DFIRM) for Dakota County. Since that time, District staff and representatives from PBS&J have worked together to prepare the enclosed agreement, detailed scope, and time and cost estimate for this project.

In summary, PBS&J will be responsible for providing project management, incorporating recent flood studies prepared by the Corps of Engineers, conducting new modeling and floodplain mapping near South Sioux City, and preparing preliminary DFIRM maps in accordance with FEMA standards. According to the schedule, preliminary DFIRM maps will be ready by the end of March 2009. The total fee for this work was negotiated at \$184,820.50, and is broken down between different tasks in the attached agreement and scope.

In conclusion, services provided by PBS&J for this floodplain mapping project would cost a total of \$184,820.50 and be completed by March 2009. A FEMA grant in the amount of \$138,000 has been secured for this project, and South Sioux City has agreed to split the remaining cost with the District up to \$25,000.

Management recommends that the Subcommittee recommend to the Board that the General Manager be authorized to execute a professional services contract with PBS&J, Inc. to prepare floodplain maps for Dakota County for a maximum fee of \$184,820.50, subject to changes deemed necessary by the General Manager and approval as to form by District legal counsel.

SCOPE OF WORK

FOR

DAKOTA COUNTY, NE

Prepared by:



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Prepared for:

Papio-Missouri River Natural Resources District

October 3, 2007

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Project Work Plan

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Overview and General Requirements

A. Overview

As part of the Map Modernization Program, PBS&J has been tasked to provide DFIRM conversion services and hydrologic and hydraulic engineering services for Dakota County, Nebraska. The following flood hazard areas will be restudied as detailed within the scope of work:

- **Crystal Lake** – Old Missouri River Oxbow located in South Sioux City (approximately 5.4 miles)
- **Old Silver Lake Bed Drainageway** – Beginning from the confluence with the Missouri River to a point 2.5 miles upstream (in South Sioux City)

The following existing flooding sources will be redelineated using updated topographic data that is supplied by others.

- **Pigeon Creek** – Approximately 8.1 miles from U.S. Highway 77 to one mile upstream of Hubbard (from 14,200 feet above mouth to 70,500 feet above mouth)
- **Omaha Creek** – Approximately 2.1 miles from U.S. Highway 77 to Homer (from 1,660 feet above County Road to 11,500 feet above)
- **Old Omaha Creek Channel** – Approximately 1.2 miles from 250 feet above County Road to 6,700 feet above)

The following existing data study (XDS) will be incorporated and redelineated using updated topographic data that is supplied by others.

- **Elk Creek** – Approximately 6.0 miles from the Village of Jackson to BNSF Railroad (from 2,500 feet downstream of Thomas Street to 6,000 feet upstream of BNSF Railroad)

Additionally, the following existing data study will be incorporated:

- **Missouri River** – Approximately 31.2 miles along the Dakota County border
- **Zone A** – Approximately 149 miles have been updated by the USACE – Omaha District

This document outlines the scope of work, deliverables and project schedule. Any analysis involving existing levees in the County are not covered under this Scope of Work (SOW). Upon completion, the completed DFIRM and studies will be submitted to FEMA for approval.

The objective of the Flood Map Project documented in this SOW is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Dakota County and Incorporated Areas. The product of this SOW will be a single set of digital floodplain data for the entire county. This project will be completed primarily by PBS&J, the Papio-Missouri River Natural Resources District (P-MRNRD), and the Federal Emergency Management Agency (FEMA), primarily acting through their consultant, Michael Baker Jr., Inc., hereafter called the National Service Provider (NSP).

B. Compliance with FEMA Standards and P-MRNRD MAS No. 3

The PBS&J Project Manager will review and be familiar with P-MRNRD MAS No. 3 for the DFIRM conversion and restudy of Flood Hazard Areas within Dakota County. The Project Manager will ensure that all FEMA standards, requirements, and deliverables associated with the tasks outlined in this Scope of Work are met, adhered to, and provided. The signed MAS for this project shall be incorporated into this SOW. PBS&J shall be responsible for completing activities in the MAS that have been assigned to the P-MRNRD and are specifically outlined in this SOW. It is understood that some tasks will be completed by the P-MRNRD. Those tasks are excluded

from this scope of work. PBS&J is not responsible for completing activities in the MAS that have been assigned to FEMA or the NSP.

PBS&J shall prepare all new digital information, including maps and flood profiles, in elevations that are adjusted to North America Vertical Datum (NAVD) 1988 datum, regardless of the datum for the source information. PBS&J shall respond to and address all comments and deficiencies that are brought forth during the QA/QC process and by the project Sponsors. PBS&J will complete all tasks and provide final deliverables to the P-MRNRD, FEMA and Dakota County by the end of the performance period, which will not extend beyond September 30, 2009 for the associated MAS.

If there are concerns or questions about meeting MAS standards, including schedule or budget, the Project Manager will immediately bring the issue to the attention of P-MRNRD and will work with P-MRNRD and other appropriate parties toward resolution.

C. Schedule

The scope is based on a 24-month duration for the project from Notice-to-Proceed (NTP). Upon NTP, PBS&J will work with P-MRNRD to create a reasonable schedule which meets the final deliverable dates noted in P-MRNRD MAS No. 3. The anticipated schedule is included as an appendix to this scope of work.

If unforeseen issues arise which affect the overall schedule, PBS&J will consult with P-MRNRD and provide an updated schedule. Changes in schedule will require the preparation of a Special Problems Report (SPR) to the NSP and FEMA. It is anticipated that PBS&J would support the preparation of the SPR, but that P-MRNRD would prepare the document itself.

Task 1 – Project Management, Coordination and Meetings

A. Scope of Work

1.1 Project Management, Coordination and Meetings

The PBS&J team will conduct the following items necessary for the management and coordination of the project:

1.1.1 Project Management. PBS&J management will coordinate all aspects of the work, including data collection, research, DFIRM conversion, surveying, topographic verification and hydraulic analysis. As part of the management task, PBS&J will prepare and submit monthly progress reports and invoices to the P-MRNRD. A written summary of progress for specific work tasks will be included with the monthly invoices. PBS&J will provide regular updates to P-MRNRD via phone and email as needed throughout the project.

1.1.2 Coordination and Progress Meetings. PBS&J will attend a total of 18 progress meetings with the P-MRNRD during the 24 month duration of the project. The work plan associated with this task is based on attending one progress meeting every month during the Preliminary phase and 1 meeting every other month during the Post-Preliminary Phase. It is anticipated that some of these meetings may occur as conference calls rather than formal meetings. If additional stakeholder coordination is required, it is anticipated that those stakeholders will be included in the monthly coordination meetings rather than having a separate meeting. This will keep meeting time to a minimum.

1.1.3 Internal Team Meetings and Coordination. PBS&J's Project Manager will be responsible for ongoing internal coordination of the project team. Internal team meetings will be held with adequate frequency to keep the study proceeding on schedule and to ensure thorough communication on technical issues and approaches.

1.1.4 Public Meetings. This proposal assumes that three formal meetings will be held for the DFIRM portion of the project, including a scoping meeting. This task provides time to prepare for and attend those meetings. PBS&J will assist the P-MRNRD with handouts and documentation for these meetings. It is anticipated that the P-MRNRD will coordinate and facilitate the meetings, and PBS&J will prepare for, attend, participate, and prepare meeting notes for project-related meetings.

Also included in this task is one meeting for each of the hydraulic studies. It is assumed that one meeting will occur prior to formal submittal to FEMA to allow for public agency comment.

Task 2 – DFIRM Conversion

A. Scope of Work

2.1 Base Map Acquisition (MAS Activity 12)

As part of Base Map Acquisition, PBS&J will complete the following tasks in accordance with FEMA Standards & Requirements:

2.1.1 Data Collection and Compilation. The PBS&J team will acquire and compile digital base map data from the P-MRNRD, NSP and local communities. This data may be in both raster and vector format. As part of the acquisition process PBS&J will secure the necessary permissions from the map source(s) to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.

2.1.2 Digital Base Map Development. Once electronic files have been compiled, PBS&J will develop the digital base map for the project. As part of this development, PBS&J will work with communities to certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production. If data cannot be certified to meet these standards it will not be incorporated into the base mapping. PBS&J will work with the P-MRNRD, FEMA and the NSP to determine the appropriate base map format; vector or raster based. The DFIRM database will be populated with the information required by the FEMA G&S.

Deliverables:

Deliverable ID	Deliverable Description
D.2.1	Written certification that the digital data meet FEMA's minimum standards and specifications
D.2.2	Documentation (signed permissions) that FEMA can use the digital base map
D.2.3	Digital Base Map Files

2.2 Profile Digitization and Vertical Datum Conversion

Profiles will be digitized and geo-referenced to the NAVD1998 datum using conversion factors determined from FEMA specifications. This work shall include, at a minimum, the activities listed below.

2.2.1 Datum Conversion. Unless a community-wide conversion factor can be used, a stream-by-stream conversion factor must be determined for each flooding source to adjust data from NGVD29 datum to NAVD88 datum. The datum conversion process is documented in Appendix B of the FEMA Guidelines & Specifications for Flood Hazard Mapping Partners. PBS&J will develop conversion factors for each stream reach and flooding source per the G&S.

2.2.2 Profile Digitization. Effective FIS profiles will be digitized per the FEMA G&S, Appendix J. PBS&J will apply the datum conversion developed in Task 4.1 to the digitized profiles. This task will result in the creation of a seamless county-wide set of profiles for each flooding source. Letters of Map Change (LOMCs) will be incorporated in the digitized profiles.

Deliverables:

Deliverable ID	Deliverable Description
D.2.4	Datum conversion factors for all flooding sources from NGVD29 to NAVD88

Deliverable ID	Deliverable Description
D.2.5	Digitized flood profiles of all flooding mapped flooding sources in NAVD88

2.3 Review and Incorporate Existing Data Study Information

The following tasks will be completed to ensure incorporation of LOMC's and XDS's.

2.3.1 and 2.3.2 Incorporate XDS and Generate New Base Flood Elevations (BFE's).

PBS&J shall review the technical, scientific, and other information supporting XDS's submitted by the P-MRNRD to ensure that the data and modeling are consistent with FEMA Standards and Requirements, and standard engineering practice and are sufficient to prepare the DFIRM. PBS&J shall also review XDS to meet the P-MRNRD rules and regulations for designation and approval of submitted floodplain studies. This work shall include, at a minimum, the activities listed below:

- Review the submittal for regulatory adequacy, completeness of required information, and supporting data and documentation;
- Use of acceptable model(s);
- Flood discharges;
- Regulatory floodway computation methods;
- Tie-in to upstream and downstream non-revised Flood Profiles;
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA;
- Maintain an archive of all data submitted for hydraulic modeling review (all supporting data must be retained for three (3) years from the date of receipt); and
- Comply with the P-MRNRD designation and approval requirements.
- Generate new BFE's

PBS&J will not be responsible for preparing the studies in Technical Study Data Notebook (TSDN) format described in Appendix M of Guidelines and Specifications for Flood Hazard Mapping Partners, and will not be responsible for coordinating with FEMA or the NSP during the review process of any XDS's submitted during the course of the study (other than the studies identified in Tasks 3 and 4 of this SOW). If agreed upon by all mapping partners, XDS's that are not suitable for Limited Detail or Detail studies may be incorporated into the DFIRM as approximate studies if approved by FEMA/NSP/P-MRNRD. All XDS's to be reviewed under this task need to be received within two (2) weeks from the kick-off meeting for the project.

- Elk Creek
- Missouri River
- Approximately 149 miles of updated Zone A flooding sources

Deliverables:

Deliverable ID	Deliverable Description
D.2.6	A Summary Report that describes the findings of the independent QA/QC review
D.2.7	Recommendations to resolve any problems that are identified during the independent QA/QC review

2.4 Redelineation

The following redelineation tasks shall be completed in accordance with the FEMA Standards and Requirements.

2.4.1 1- and 0.2-percent Redelineation. PBS&J shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for all effective flooding sources requiring redelineation. The extent of redelineation efforts will depend upon many factors including availability of adequate topographic mapping and/or aerial photography and availability of adequate hydrologic/hydraulic data. Where inadequate topographic and hydrologic/hydraulic information is available, Approximate A zones may be redelineated based on aerial photography only; however, this will be reviewed with the P-MRNRD prior to any redelineation efforts. PBS&J shall use the topographic data acquired previously to delineate the floodplain and regulatory floodway boundaries as appropriate on a digital work map. If the new topographic data does not reflect the same hydraulic characteristics as in the effective study, PBS&J shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, PBS&J shall contact the P-MRNRD (and the FEMA/NSP as needed) with a recommendation. The following flooding sources will be redelineated:

- Elk Creek – XDS that will be incorporated
- Pigeon Creek
- Omaha Creek
- Old Omaha Channel Creek

Deliverables:

Deliverable ID	Deliverable Description
D.2.8	Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, Base Flood Elevations (BFE's), flood insurance risk zone labels, and all applicable base map features
D.2.9	DFIRM mapping files
D.2.10	Metadata files describing the DFIRM data
D.2.11	Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale
D.2.12	Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM
D.2.13	Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 11
D.2.14	An explanation for the use of existing topography for the studied reaches, if appropriate
D.2.15	NSP Format Mapping Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards

2.5 DFIRM and FIS Production

Upon completion of the DFIRM panels and FIS, PBS&J shall submit the panels and FIS to FEMA/NSP for an independent QA/QC review. PBS&J shall address all related comments and questions that are identified by FEMA/NSP during the independent QA/QC review.

2.5.1 Non-Revised Areas For all flooding sources, except those segments for which updated flood data will be developed as part of this project, PBS&J shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas to digital format in conformance with FEMA DFIRM specifications. The redelineation will include adjustment of approximate zones utilizing best available aerial photography and/or topographic mapping. PBS&J shall use the base map acquired previously for the conversion. PBS&J shall create a total of 28 panels. PBS&J shall incorporate the results of any Letter of Map Change issued by FEMA since the date of the current effective FIRM for each affected community. PBS&J will digitize the floodplain information from the original workmaps if they are available.

PBS&J shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. Rather, PBS&J shall leave these as “holes” in the digital flood theme. Digital data developed in Task 3 will be incorporated into the mapping once those new studies have been approved by the NSP.

Deliverables:

Deliverable ID	Deliverable Description
D.2.16	Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFE's, flood insurance risk zone labels, and all applicable base map features
D.2.17	DFIRM mapping files
D.2.18	Metadata files describing the DFIRM data
D.2.19	Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale
D.2.20	A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM, including a check that the road and floodplain relationship is maintained for all non-revised areas

2.5.2 Merging Revised and Non-Revised Information. Upon completion of the floodplain mapping activities for the revised areas and the DFIRM production for non-revised areas, PBS&J shall merge the digital floodplain data into a single, updated DFIRM. This work includes the tie-in of flood hazard information for areas that were not studied as part of this Flood Map Project. PBS&J shall tie-in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in the MAS. PBS&J shall coordinate with FEMA, as necessary, to resolve any potential tie-in issues.

Deliverables:

Deliverable ID	Deliverable Description
D.2.21	Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFE's, flood insurance risk zone labels, and all applicable base map features
D.2.22	DFIRM mapping files
D.2.23	Metadata files describing the DFIRM data
D.2.24	Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale
D.2.25	Documentation that describes and provides the results of all automated

	or manual QA/QC review steps taken during the preparation of the DFIRM
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2.5.3 Application of FEMA Graphics and Database Specifications. PBS&J shall apply the final FEMA DFIRM graphics and database specifications to the DFIRM files. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to users). PBS&J shall coordinate with FEMA and other Mapping, as necessary, to resolve any problems that are identified.

Deliverables:

Deliverable ID	Deliverable Description
D.2.26	Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFE's, flood insurance risk zone labels, and all applicable base map features
D.2.27	DFIRM mapping files
D.2.28	Metadata files describing the DFIRM data
D.2.29	Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale
D.2.30	A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM
D.2.31	NSP Format DFIRM Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards

2.5.4 FIS Production. PBS&J shall compile a countywide FIS Report for the subject county. This work shall include converting any hardcopy FIS texts into digital format and recompiling the texts into one (1) FIS in countywide format or adding all required sections to the FIS text. All Floodway Data Tables and Flood Profiles will be converted to NAVD 88.

Deliverables:

Deliverable ID	Deliverable Description
D.2.32	FIS Report, in a countywide format

2.6 Preliminary DFIRM and FIS Report Distribution.

This Task involves the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. This Task will be performed by PBS&J, the P-MRNRD, and FEMA/NSP as defined below.

2.6.1 FIS Submittal Preparation. PBS&J shall prepare the FIS report in the FEMA Countywide Format according to FEMA Standards and Requirements. PBS&J shall also prepare letters to transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

The NSP shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report, according to FEMA Standards and Requirements. The NSP shall work with PBS&J, the P-MRNRD, and FEMA as appropriate to resolve discrepancies identified during the final QA/QC review.

2.6.2 FIS Distribution. PBS&J shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. PBS&J shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notifications for accuracy and compliance with FEMA format requirements. PBS&J shall file the notifications for later submittal to FEMA for review.

2.6.3 SOMA Preparation. PBS&J shall prepare Preliminary Summary of Map Actions (SOMA's) for all affected communities if appropriate. The SOMA's shall list pertinent information regarding LOMC's that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Deliverables:

Deliverable ID	Deliverable Description
D.2.33	Preliminary transmittal letters
D.2.34	Preliminary copies of the DFIRM and FIS report, including all new or updated data tables and Flood Profiles
D.2.35	Preliminary copies of the DFIRM and FIS report shall be mailed to the Chief Executive Officer (CEO) of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA
D.2.36	Preliminary SOMA's, prepared in accordance with FEMA requirements, shall be mailed with the Preliminary copies of the DFIRM and FIS report when appropriate
D.2.37	Revised DFIRM mapping files, prepared in accordance with the requirements in Guidelines and Specifications for Flood Hazard Mapping Partners, shall be provided on CD-ROM
D.2.38	Revised DFIRM database files, prepared in accordance with the requirements in Guidelines and Specifications for Flood Hazard Mapping Partners, shall be provided on CD-ROM
D.2.39	Revised metadata files describing the DFIRM data, including all required information shown in Guidelines and Specifications for Flood Hazard Mapping Partners, shall be provided on CD-ROM

Task 3 – Crystal Lake Hydrology and Hydraulics

A. Overview

The PBS&J Team shall perform a limited detailed hydraulic analysis for 5.4 miles of Crystal Lake (the Old Missouri River Oxbow) located in South Sioux City. The modeling will only include the 1-percent-annual-chance event is based on a peak discharge previously developed or that is in the effective study. The hydraulic analysis methods used for this analysis will include the HEC-RAS computer program.

The PBS&J Team shall use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate independent QA/QC review, the PBS&J Team shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, the PBS&J Team shall address all concerns or questions regarding this task that are raised by FEMA during independent QA/QC review.

B. Schedule

The scope is based on a 6 month duration for the project from Notice-to-Proceed. Upon NTP, PBS&J will work with P-MRNRD to create a reasonable schedule which attempts to meet the final deliverable dates noted in P-MRNRD MAS No. 3.

C. Assumptions and Approach

- Reach boundaries for Crystal Lake extend from the confluence of the Missouri River to a point 5.4 miles upstream (Old Missouri River Oxbow in South Sioux City).
- 2-foot topographic mapping is available from the Nebraska Department of Natural Resources (NDNR). Cross-sections will be derived from the topographic mapping.
- Modeling will consist of a HEC-RAS model of the entire reach.
- Past map actions such as LOMRs and LOMAs will be incorporated into the new study work as appropriate. Incorporation of these past map actions is dependent on obtaining backup data related to those studies, i.e. hydraulic models, work maps, and hydraulic calculations. Revalidation of those actions is excluded from this Scope of Work. Incorporation of existing data studies outside of the limits of this project for the purpose of submittal to FEMA are excluded from this Scope of Work.
- Submittal and review fees charged by FEMA will either be waived by FEMA or will be paid by P-MRNRD or the local agencies. It is assumed that the NSP will incorporate these studies into the DFIRM through a PMR process.
- As-builts will be sufficient to prepare the hydraulic analysis and meet FEMA requirements.
- The 1-percent-annual-chance event is based on a peak discharge previously developed or that is in the effective study.

D. General Information

- Length of segment to be modeled = approximately 5.4 miles measured along the channel.
- There is one structure at 39th Street.
- Approximate number of channel cross sections to adequately model the floodplain = 55 (assumes 10 cross sections per mile).
- Engineers will obtain and examine plans for all existing bridges and other hydraulic structures (as available).

- Engineers will collect and examine orthophotography for roughness assignment and to plan field reconnaissance.
- Engineers will perform detailed field reconnaissance of all bridge and hydraulic structure sites.

E. Scope of Work

The following presents itemized scoping items including specific work products and assumptions. Included with this scope of work is a work plan which presents hours by task.

3.0 Project Management, Coordination and Meetings

Project management, coordination meetings, progress meetings and public meetings are included under Task 1 of this scope of work. It is assumed that one public meeting will be held during the duration of the project to review the study findings and receive comment from the City, County, P-MRNRD and FEMA.

3.1 Project Survey

The following survey tasks will be completed as part of this SOW:

3.1.1 Topography QA, Verification. The topographic data will be reviewed to make sure that it is DFIRM compliant.

3.1.2 Structure Reconnaissance. Structure reconnaissance will include detailed field measurements of the structure at 39th Street. As-built data will be supplied by the City.

3.2 Hydrology

The following hydrologic development tasks will be completed as part of this project:

3.2.1 Hydrologic Development. PBS&J will review the hydraulic conditions of the Missouri River at the upstream and downstream ends of Crystal Lake to determine upstream overflows and downstream backwater conditions. In addition, PBS&J will perform a low-level hydrologic analysis using HEC-HMS to determine any additional direct inflows to Crystal Lake. These conditions will be documented in a memorandum and presented to the P-MRNRD for review and concurrence. The hydrologic analysis will then be used to prepare the hydraulic analysis for the stream reach.

3.3 Hydraulics

The PBS&J team will conduct the following work to develop the hydraulic model and required technical submittals. Additionally, PBS&J will perform QA/QC on all deliverables submitted to the P-MRNRD, FEMA and reviewing agencies. The modeling work and workmaps will be reviewed independently, at appropriate junctures, by one or more registered Professional Engineers at PBS&J that will not be otherwise integrally involved in the project. The reviewers will prepare an independent QA/QC summary describing their findings and recommended modifications, if any.

3.3.1 HEC-RAS Model Set-Up. PBS&J will attempt to obtain as-built plans of the bridges, culverts and other hydraulic structures that affect floodplain hydraulics from the owners of the structures. This effort includes phone calls to related agencies and, if needed, a review of paper files at the agency office. In order to make efficient use of the various data important to the study (field notes, photos, mapping, calibration data, structure measurements, etc) PBS&J will compile and organize the data into a readily accessible file system, organized around the format of the Technical Support Data Notebook.

PBS&J will perform field reconnaissance of the flooding zone. The purpose of the reconnaissance will be to note channel and floodplain vegetation and ground cover;

identify potential hydraulic controls; verify the Manning's "n" coefficient; and examine hydraulic structures, bridges, and other features that will affect the floodplain hydraulics. This effort will include a focused reconnaissance visit at the beginning of the project, as well as later visits to specific sites to validate model results in complex areas.

PBS&J will develop the geometric input necessary for HEC-RAS modeling. Cross sections will be extracted from the DTM.. The most recent available aerial orthophotos, along with field reconnaissance observations, will be used for the initial assignment of roughness values.

3.3.2 Model Structures. The as-built structure drawings will provide the information for developing input parameters for bridges and other hydraulic structures as they exist at the time that the model study commences.

3.3.3 HEC-RAS Floodplain Model (1-Percent-Annual-Chance Event Only, no floodway). PBS&J will run HEC-RAS model simulations representing existing conditions for the 1-percent-annual-chance event and troubleshoot the model as necessary. Troubleshooting will involve verifying that the results are reasonable, resolving warnings and/or errors in HEC-RAS output, adjusting bridge modeling parameters as necessary for accurate simulation.

PBS&J will produce GIS and hardcopy workmaps showing topography, floodplain inundation, and proposed floodway. These digital workmaps will be prepared using GIS and will show the topographic contours along with the 1-percent-annual-chance floodplain inundation. Base Flood Elevation contours will also be included in the digital workmap files. Hardcopy versions of the workmaps will be plotted for submittal to P-MRNRD, the City of South Sioux City, Dakota County, FEMA and other reviewing entities.

PBS&J will create profile plots showing the thalweg profile along with the 1-percent-annual-chance event water surface profiles.

3.4 Reporting and Comment Resolution

3.4.1 Technical Support Data Notebook (TSDN). In order to provide complete documentation of the study process, decisions and results, PBS&J will prepare a Technical Support Data Notebook (TSDN) for the study, following FEMA's format and content requirements. The compilation of the TSDN will begin early in the study and will be an ongoing effort throughout the duration of the project. This effort will include limited draft contributions to the Flood Insurance Study (FIS) Report.

3.4.2 Data Capture Standards (DCS). Appendix N of FEMA's Guidelines and Specifications requires that new hydrologic and hydraulic study data be loaded to its Mapping Information Platform in a certain manner. For the Crystal Lake study, Survey and Hydraulics DCS will need to be uploaded to the MIP. PBS&J will prepare data and provide the data to be uploaded to the MIP.

3.4.3 Comment Resolution. PBS&J will coordinate with FEMA to provide any additionally requested information. This coordination is anticipated to consist of phone conversations and/or meetings with National FEMA and local FEMA Region staff.

Deliverables:

Deliverable ID	Deliverable Description
D.3.1	TSDN including both paper and electronic files of survey, hydrologic modeling, hydraulic modeling, profiles, work maps and critical correspondence.

Task 4 – Old Silver Lake Bed Drainageway Hydrology and Hydraulics

A. Overview

The PBS&J Team shall perform a detailed hydraulic analysis for 2.5 miles of the Old Silver Lake Bed Drainageway from the confluence with the Missouri River to a point 2.5 miles upstream. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges from existing sources. Also, the 1-foot rise floodway will be modeled. The hydraulic analysis methods used for this analysis will include the HEC-RAS computer program.

The PBS&J Team shall use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate independent QA/QC review, the PBS&J Team shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, the PBS&J Team shall address all concerns or questions regarding this task that are raised by FEMA during independent QA/QC review.

B. Schedule

The scope is based on a 6 month duration for the project from Notice-to-Proceed. Upon NTP, PBS&J will work with P-MRNRD to create a reasonable schedule which attempts to meet the final deliverable dates noted in P-MRNRD MAS No. 3.

C. Assumptions and Approach

- D.** Reach boundaries for Old Silver Lake Bed Drainageway in South Sioux City extend from the confluence with the Missouri River to a point approximately 2.5 miles upstream.
 - 2-foot topographic mapping from a previous project will be used in conjunction with ground survey developed under this contract.
 - Modeling will consist of a HEC-RAS model of the entire reach.
 - Floodway modeling will consist of running the new 1-percent-annual-chance peak discharge model to meet the allowable surcharge criteria.
 - Past map actions such as LOMRs and LOMAs will be incorporated into the new study work as appropriate. Incorporation of these past map actions is dependent on obtaining backup data related to those studies, i.e. hydraulic models, work maps, and hydraulic calculations. Revalidation of those actions is excluded from this Scope of Work. Incorporation of existing data studies outside of the limits of this project for the purpose of submittal to FEMA are excluded from this Scope of Work.
 - Submittal and review fees charged by FEMA will either be waived by FEMA or will be paid by P-MRNRD or the local agencies.

E. General Information

- Old Silver Lake Bed in South Sioux City (Approximately 2.5 miles)
- Approximate number of bridges and other hydraulic structures = 6 assumed.
- Approximate number of channel cross sections to be surveyed to adequately model the floodplain and floodway = 25 (assumes 10 cross sections per mile).
- Modeling engineers will ground-truth topographic mapping by comparison to ground survey at 2 locations.

- Engineers will obtain and examine plans for all existing bridges and other hydraulic structures (as available).
- Engineers will perform detailed field reconnaissance of all bridge and hydraulic structure sites.

F. Scope of Work

The following presents itemized scoping items including specific work products and assumptions. Included with this scope of work is a work plan which presents hours by task.

4.0 Project Management, Coordination and Meetings

Project management, coordination meetings, progress meetings and public meetings are included under Task 1 of this scope of work. It is assumed that one public meeting will be held during the duration of the project to review the study findings and receive comment from the City, County, P-MRNRD and FEMA.

4.1 Project Survey

The following survey tasks will be completed as part of this SOW:

4.1.1 Topography QA, Verification. The topographic data will be reviewed to make sure that it is DFIRM compliant.

4.1.2 Cross-Section Survey. This task will be completed by the survey sub-consultant (See attached Survey SOW).

4.1.3 Structure Survey. This task will be completed by the survey sub-consultant (See attached Survey SOW).

4.2 Hydrology

The following hydrologic development tasks will be completed as part of this project. PBS&J will obtain all relevant hydrologic studies, gage data and other available information that will aid in the development of a hydrologic model for the drainage basin.

4.2.1 Model Setup. PBS&J will use USGS DEM data to develop basin characteristics for area and slopes. The best available orthophotography and soil surveys will be used to determine land use and soil characteristics. PBS&J will develop a HEC-HMS model using standard practices to estimate the 10-, 2-, 1-, and 0.2-percent-annual-chance-event peak discharges.

4.2.2 HEC-HMS Model. PBS&J will calibrate the HEC-HMS model against the previously performed regression analysis and/or other studies as obtained under the data collection task. HEC-HMS results will be summarized in a memorandum and will be submitted to P-MRNRD for review and approval for use in the limited detail hydraulic analysis. PBS&J will develop peak flow data based on local regression equations, as approved by P-MRNRD. If possible, gage data will be used to develop these flows. Regression flows will be used to evaluate the results of the HEC-HMS model.

4.3 Hydraulics

The PBS&J team will conduct the following work to develop the hydraulic model and required technical submittals. Additionally, PBS&J will perform QA/QC on all deliverables submitted to the P-MRNRD, FEMA and reviewing agencies. The modeling work and workmaps will be reviewed independently, at appropriate junctures, by one or more registered Professional Engineers at PBS&J that will not be otherwise integrally involved in the project. The reviewers will prepare an independent QA/QC summary describing their findings and recommended modifications, if any.

4.3.1 HEC-RAS Model Set-Up. PBS&J will attempt to obtain as-built plans of the bridges, culverts and other hydraulic structures that affect floodplain hydraulics from the owners of the structures. This effort includes phone calls to related agencies and, if needed, a review of paper files at the agency office. In order to make efficient use of the various data important to the study (field notes, photos, mapping, calibration data, structure measurements, etc) PBS&J will compile and organize the data into a readily accessible file system, organized around the format of the Technical Support Data Notebook.

PBS&J will perform field reconnaissance of the flooding zone. The purpose of the reconnaissance will be to note channel and floodplain vegetation and ground cover; identify potential hydraulic controls; verify the Manning's "n" coefficient; and examine hydraulic structures, bridges, and other features that will affect the floodplain hydraulics. This effort will include a focused reconnaissance visit at the beginning of the project, as well as later visits to specific sites to validate model results in complex areas.

PBS&J will develop the geometric input necessary for HEC-RAS modeling. Cross sections will be extracted from the DTM and from ground surveyed cross-sections. The most recent available aerial orthophotos, along with field reconnaissance observations, will be used for the initial assignment of roughness values.

4.3.2 Model Structures. The structure survey and as-built structure drawings will provide the information for developing input parameters for bridges and other hydraulic structures as they exist at the time that the model study commences.

4.3.3 HEC-RAS Floodplain Model (10-, 2-, 1-, and 0.2-Percent-Annual-Chance Events, 1-Foot Rise Floodway). PBS&J will run HEC-RAS model simulations representing existing conditions for the 10-, 2-, 1-, and 0.2-percent-annual-chance events and troubleshoot the model as necessary. Troubleshooting will involve verifying that the results are reasonable, resolving warnings and/or errors in HEC-RAS output, adjusting bridge modeling parameters as necessary for accurate simulation.

PBS&J will develop a floodway model by using the equal conveyance method. PBS&J will run the regulatory floodway model to verify that the allowable 1-foot rise is not exceeded at any location. If the allowable rise is exceeded, the encroachment stations will be adjusted as necessary to bring the rise down to no more than 1 foot. Floodway determination will be compliant with FEMA guidelines.

PBS&J will produce GIS and hardcopy workmaps showing topography, floodplain inundation, and proposed floodway. These digital workmaps will be prepared using GIS and will show the topographic contours along with the 1- and 0.2-percent-annual-chance floodplain inundation and the proposed floodway encroachment lines. Base Flood Elevation contours will also be included in the digital workmap files. Hardcopy versions of the workmaps will be plotted for submittal to P-MRNRD, the City of South Sioux City, Dakota County, FEMA and other reviewing entities.

PBS&J will create profile plots showing the thalweg profile along with the 1-percent-annual-chance event water surface profiles.

4.4 Reporting and Comment Resolution

4.4.1 Technical Support Data Notebook (TSDN). In order to provide complete documentation of the study process, decisions and results, PBS&J will prepare a Technical Support Data Notebook (TSDN) for the study, following FEMA's format and content requirements. The compilation of the TSDN will begin early in the study and will be an ongoing effort throughout the duration of the project. This effort will include limited draft contributions to the Flood Insurance Study (FIS) Report.

4.4.2 Data Capture Standards (DCS). Appendix N of FEMA's Guidelines and Specifications requires that new hydrologic and hydraulic study data be loaded to its Mapping Information Platform in a certain manner. For the Old Silver Lake Study, Survey, Hydrologic and Hydraulics DCS will need to be uploaded to the MIP. PBS&J will prepare data and provide the data to be uploaded to the MIP.

4.4.3 Comment Resolution. PBS&J will coordinate with FEMA to provide any additionally requested information. This coordination is anticipated to consist of phone conversations and/or meetings with National FEMA and local FEMA Region staff.

Deliverables:

Deliverable ID	Deliverable Description
D.4.1	TSDN including both paper and electronic files of survey, hydrologic modeling, hydraulic modeling, profiles, work maps and critical correspondence.



PROJECT WORK PLAN

Project Name:	Dakota County, Nebraska DIRM	Project Manager
Project Number:		
Prepared By:	Josh Price	
Date:	9/27/07	

Task ID	Task	Hours by Staff Member						Totals		Comments	% of Project
		Sr. PM	Sr. GIS	Eng I	Eng II	GIS	Sr. Admin	\$	\$		
Task 1 - Project Management											
Task 1.1 - Project Management, Coordination and Meetings											
1.1	Project Management	40								40	
1.1.1	Project Management	20	8							48	1.8%
1.1.2	Coordination and Progress Meetings	16	8	8			12			60	2.3%
1.1.3	Internal Team Meetings and Coordination	8	8				4			28	2.7%
1.1.4	Public Meetings	84	24	24	8	8	28			176	1.2%
Subtotal Project Management, Coordination and Meetings											7.8%
Task 2 - DIRM Conversion											
Task 2.1 - Base Map Acquisition											
2.1	Base Map Acquisition		20			20				40	
2.1.1	Data Collection and Completion		20			60				80	1.8%
2.1.2	Digital Base Map Development	0	40	0	0	80	0			120	3.3%
Subtotal Base Map Acquisition											5.3%
Task 2.2 - Profile Digitization and Vertical Datum Adjustment											
2.2	Profile Digitization			24						24	
2.2.1	Datum Conversion			52						52	1.1%
2.2.2	Profile Digitization	0	0	78	0	0	0			78	2.3%
Subtotal Profile Digitization and Vertical Datum Adjustment											3.4%
2.3	Review and Incorporate XDS										
2.3.1	Incorporate XDS		20	60						80	3.5%
2.3.2	Generate new BEAs	0	20	60	20					100	4.4%
2.3.3	Review of LOMC's and XDS	0	48	120	20	0	0			188	
Subtotal Review of LOMC's and XDS											
2.4	Redetermination										
2.4.1	Sort XDS		16	84						100	4.4%
Subtotal Redetermination											4.4%
Task 2.5 - DIRM and FIS Production											
2.5	DIRM and FIS Production										
2.5.1	Non-Reviewed Areas		40		130					170	7.5%
2.5.2	Merging Revised and Non-Reviewed Information		16		40					56	2.6%
2.5.3	Application of FEMA Graphics and Database Specifications		100		260					360	18.0%
Subtotal DIRM and FIS Production											5.1%
2.6	Preliminary DIRM and FIS Production	0	168	48	74	430	0			720	31.1%
Subtotal Preliminary DIRM and FIS Production											
2.6.1	FIS Distribution		10	18						28	1.2%
2.6.2	FIS Distribution		19	14						34	1.2%
2.6.3	SOMA Distribution		8	8						16	0.6%
Subtotal Preliminary DIRM and FIS Distribution											2.6%
Estimated Total Hours for DIRM Conversion											54.8%



PROJECT WORK PLAN

Project Name: Dakota County, Nebraska DFIRM		Comments						Project Manager	
Project Number :								Task Manager	
Prepared By :									
Date :		9/27/07							
Task ID	Task	Sr. PM	Sr. GIS Anl	Hours by Staff Member PMT	GIS Anl	Sr. Admin	Totals	Comments	% of Project
Task 3 - Crystal Lake									
3.1	Project Survey			8			8		
3.1.1	Topography QA verification			3			3		0.4%
3.1.2	Structure Reconnaissance			3			3		0.1%
3.2	Submittal Project Survey	0	0	11	0	0	11		
3.2.1	Hydrology			24			24		
3.2.1.1	Hydrologic Development	0	0	24	0	0	24		1.1%
3.2.1.2	Hydraulics			16	4		20		0.9%
3.2.1.3	Model Setup			3			3		0.1%
3.2.2	Model Structures			59	150		209		9.4%
3.2.3	HEC-RAS Model	0	0	59	146	0	215		
3.3	Submittal Hydraulics								
3.3.1	Reporting and Comment Resolution			8	20		28		1.2%
3.3.2	Technical Study Data Notebook (TSDN)			52	24		76		3.4%
3.3.3	Data Capture Standards (DCS)			8	8		16		0.7%
3.3.3.1	FEMA Comment Resolution	0	0	16	80	0	120		5.3%
3.3.3.2	Submittal Reporting and Comment Resolution	0	0	110	234	0	368		16.3%
Estimated Total Hours for Crystal Lake									
Task 4 - Old Silver Lake Bed									
4.1	Project Survey			8			8		
4.1.1	Topography QA verification, documentation			8			8		0.4%
4.1.2	Grass Station Survey - subcontractor jump run						0		
4.1.3	Submittal Project Survey	0	0	8	0	0	8		
4.2	Hydrology								
4.2.1	Model Setup			8	10		18		
4.2.2	HEC-HMS Model	24	32	42	0	0	55		
4.3	Submittal Hydrology	0	0	32	42	0	74		
4.3.1	Hydraulics			17	20		37		
4.3.1.1	Model Setup			3	16		19		1.6%
4.3.2	Model Structures			90	120		200		0.8%
4.3.3	HEC-RAS Model	0	0	100	156	0	256		6.9%
4.4	Submittal Hydraulics								
4.4.1	Reporting and Comment Resolution			8	40		48		11.3%
4.4.1.1	Technical Study Data Notebook (TSDN)			8	40		48		2.1%
4.4.2	Data Capture Standards (DCS)			8	56		64		2.1%
4.4.3	FEMA Comment Resolution			16	8		24		1.2%
4.4.3.1	Submittal Reporting and Comment Resolution	0	0	24	114	0	138		5.3%
4.4.3.2	Estimated Total Hours for Old Silver Lake Bed	84	222	164	312	0	476		21.1%
4.4.3.3	Grand Total All Hours			414	946	28	2756		100.0%

PROJECT COST WORKSHEET

PROJECT NUMBER	TBD		
LOCATION	Denver, CO		
FIRM NAME	PBS&J		
NAME OF PREPARER	Josh Price	PHONE NO.	303.221.7275
SCOPE OF WORK DATE	Oct-07		
TYPE OF PROPOSAL	invoiced rates	CONTRACT TIME	24 months

1. SPECIFIC LABOR RATES:

EMPLOYEE CLASSIFICATION	WORK HOURS	HOURLY RATE	TOTAL FEE
Senior Project Manager	84	\$ 145.00	\$ 12,180.00
Sr. GIS Analyst I	222	\$ 84.00	\$ 18,648.00
Project Manager I (Senior Engineering Task Manager)	414	\$ 100.00	\$ 41,400.00
Engineer I	946	\$ 70.00	\$ 66,220.00
GIS Analyst I	562	\$ 57.00	\$ 32,034.00
Senior Administrative Assistant	28	\$ 65.00	\$ 1,820.00
TOTAL	2256		\$ 172,302.00

2. OTHER DIRECT COSTS (INDIRECT NON-LABOR EXPENSES)

	RATE PER UNIT (\$)	UNITS	QUANTITY	TOTAL (\$)
Travel Expense (Airfare)	\$ 300.00	roundtrip	2	\$ 600.00
Travel Expense (Lodging)	\$ 125.00	person/day	2	\$ 250.00
Travel Expense (Rental Car)	\$ 50.00	day	4	\$ 200.00
Travel Expense (Meals)	\$ 40.00	person/day	2	\$ 80.00
Travel Expense (misc. gas, taxi, tolls, parking, etc.)	\$ 100.00	total	1	\$ 100.00
Travel Expense (local)	\$ 0.485	miles	500	\$ 242.50
Preliminary - Work maps/check plots	\$ 2.00	each	174	\$ 348.00
Preliminary - DFIRM printing	\$ 2.00	each	319	\$ 638.00
Preliminary - FIS/Profile Printing (1 FIS per map set)	\$ 0.14	each	1500	\$ 210.00
Express Mail	\$ 100.00	each	1	\$ 100.00
Reproduction (TSDNs) - 8 assumed for each study	\$ 150.00	each	4	\$ 600.00
TOTAL DIRECT EXPENSES				\$ 2,518.50
SUBTOTAL: (Sum of Lines 1& 2)				\$ 174,820.50

3A. OUTSIDE SERVICES: (Subconsultants & Vendors)

	<u>METHOD OF COMPENSATION</u>	<u>COST</u>
JEO - cross section and structure survey	Lump Sum	\$ 10,000.00

3B. TOTAL OUTSIDE SERVICES	\$ 10,000.00
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4. TOTAL TASK COST: (Sum of lines 1, 2, & 3B)	\$ 184,820.50
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Employee	Classification	Raw Labor		Company		Target Profit %	Loaded Rate + o/h + profit)	Invoice		Estimated Project Hours	Estimated Profit at Invoiced Rate
		Rate		Overhead Rate				Class	Rate		
Randy Graham	Principal	\$ 62.98		162.2%		12.0%	\$ 184.96	\$ 185.00		40	\$ 794.15
Joshua Price	Senior Project Manager	\$ 49.52		162.2%		12.0%	\$ 145.43	\$ 145.00		56	\$ 848.32
Sarah Hougland	Project Manager I	\$ 34.14		162.2%		12.0%	\$ 100.26	\$ 100.00		414	\$ 4,337.93
Jonathon Johnson	Sr. GIS Analyst I	\$ 27.88		162.2%		12.0%	\$ 81.88	\$ 84.00		222	\$ 2,418.26
Ben Fennelly	Engineer I	\$ 25.24		162.2%		12.0%	\$ 74.13	\$ 70.00		946	\$ 3,609.63
Jared SkrivaneK	GIS Analyst II	\$ 22.11		162.2%		12.0%	\$ 64.93	\$ 75.00		187	\$ 3,183.33
Chad Johnson	GIS Analyst I	\$ 18.75		162.2%		12.0%	\$ 55.07	\$ 57.00		187	\$ 1,464.91
Matt Dowling	Designer	\$ 20.00		162.2%		12.0%	\$ 58.74	\$ 60.00		187	\$ 1,412.97
Kelly O'Haver	Sr. Admin I	\$ 20.19		162.2%		12.0%	\$ 59.30	\$ 60.00		28	\$ 197.62
estimated project profit											
\$ 18,267.13											
total contract value minus pass through subcontractors and direct costs											
\$ 172,302.00											
estimated project profit percentage											
10.60%											

PBS&J
2007 HOURLY RATE SCHEDULE

Office Engineering	Hourly Rates	Office Engineering	Hourly Rates
Principal	\$185.00	Sr. IS Developer II	\$120.00
Program Manager	\$175.00	Sr. IS Developer I	\$100.00
Senior Project Manager	\$145.00	IS Developer II	\$78.00
Project Manager II	\$126.00	Sr. GIS Analyst I	\$84.00
Project Manager I	\$100.00	GIS Analyst II	\$75.00
Senior Engineer IV	\$166.00	GIS Analyst I	\$57.00
Senior Engineer III	\$150.00	Professional Land Surveyor	\$117.00
Senior Engineer II	\$116.00	Survey Manager	\$100.00
Senior Engineer I	\$95.00	Survey Party Chief	\$80.00
Engineer II	\$82.00	Surveyor II	\$90.00
Engineer I	\$70.00	Surveyor I	\$75.00
Senior Designer III	\$107.00	Survey Technician I	\$60.00
Senior Designer II	\$92.00	Graphic Designer	\$75.00
Senior Designer I	\$82.00	CADD Supervisor	\$80.00
Designer	\$60.00	CADD Technician II	\$60.00
Senior Planner III	\$110.00	CADD Technician I	\$50.00
Senior Planner II	\$100.00	Sr. Architect	\$180.00
Senior Planner I	\$94.00	Landscape Architect II	\$116.00
Planner II	\$82.00	Landscape Architect I	\$85.00
Planner I	\$70.00	Project Coordinator	\$85.00
Senior Environmental Scientist II	\$115.00	Senior Administrative Assistant	\$60.00
Senior Environmental Scientist I	\$100.00	Administrative Assistant	\$58.00
Environmental Scientist II	\$80.00	Clerk I	\$47.00
Environmental Scientist I	\$65.00		

Construction Management Services	Hourly Rates
Sr. Project Engineer	\$105.00
Project Engineer	\$100.00
Sr. Const. Management Rep. II	\$95.00
Construction Management Rep. II	\$90.00
Construction Management Rep. I	\$80.00
Sr. Field Representative II	\$75.00
Sr. Field Representative I	\$70.00
Field Representative	\$55.00

Reimbursable Expenses	Billing Rate
Mileage	\$0.485/mile
Color Plots	\$3.00 each
Copies (B&W) 8-1/2 x 11	\$0.10/copy
Copies (Color) 8-1/2 x 11	\$1.00/copy
Copies (B&W) 11 x 17	\$0.15/copy
Copies (Color) 11 x 17	\$1.50/copy
Outside services	Cost plus 10%
Subconsultants	Cost plus 10%

Survey Field Services	Hourly Rates
1-Man Survey Crew	\$85.00
2-Man Survey Crew	\$140.00
3-Man Survey Crew	\$200.00