

Memorandum

To: West Papio Watershed Flood Plain Mapping Project Ad-Hoc Consultant Selection Subcommittee
From: Paul Woodward, Water Resources Engineer
Date: February 3, 2004
Re: Contract for Engineering Services with HDR Engineering, Inc.

On December 2, 2003, the Subcommittee interviewed and selected HDR Engineering, Inc. (HDR) with which to negotiate a professional services contract to develop new and/or updated flood hazard data for the West Branch Papillion Creek and its Tributaries. Since that time, District staff and representatives from HDR have worked together to prepare the attached agreement, detailed scope, and time and cost estimate for this project.

In summary, HDR will be responsible for providing project management and documentation, investigating field conditions, performing surveys on nearly 90 bridges and culverts, updating hydrology to FEMA standards, running hydraulic models for over 50 miles of streams, delineating flood plains and floodways, populating GIS databases, and assisting with communications between the NRD, cities, counties, FEMA, and the public. According to the schedule, also attached, draft flood maps will be completed and submitted to FEMA within the next 18 months. The total fee for this work was negotiated at \$368,500, and is broken down between different tasks in the attached agreement and scope.

In conclusion, services provided by HDR for this floodplain mapping project would cost a total of \$368,500 and be completed by July 1, 2005. A FEMA grant in the amount of \$349,100 has been secured for this project.

Management recommends that the Subcommittee recommend to the Board that the General Manager be authorized to execute a professional services contract with HDR Engineering, Inc. for the West Papio Watershed Flood Plain Mapping Project for a maximum fee of \$368,500, subject to changes deemed necessary by the General Manager and approval as to form by District Legal Council.

**STANDARD FORM OF AGREEMENT
BETWEEN
OWNER AND ENGINEER
FOR
STUDY AND REPORT PHASE
PROFESSIONAL SERVICES**

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

[LOGOS]

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

[And](#)

[As Modified by the Parties Hereto \(all changes shown in red-line/strike-out format\)](#)

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4344

**STANDARD FORM OF AGREEMENT
BETWEEN
OWNER AND ENGINEER
FOR
STUDY AND REPORT PHASE
PROFESSIONAL SERVICES**

This is an Agreement effective as of _____, 2004 (“Effective Date”) between [Papio-Missouri River Natural Resources District](#) (“OWNER”) and [HDR Engineering, Inc.](#) (“ENGINEER”).

OWNER retains ENGINEER to perform [professional services, in connection with floodplain remapping of West Branch Papillion Creek and its Tributaries.](#) (“Assignment” or “Project”).

OWNER and ENGINEER, in consideration of their mutual covenants as set forth herein, agree as follows:

ARTICLE 1--ENGINEER'S SERVICES

1.01 Scope

A. ENGINEER shall provide the services set forth in Exhibit SR-A.

B. Upon this Agreement becoming effective, ENGINEER is authorized to begin services as set forth in Exhibit SR-A.

C. If authorized in writing by OWNER, and agreed to by ENGINEER, services beyond the scope of this Agreement will be performed by ENGINEER for additional compensation.

ARTICLE 2--OWNER'S RESPONSIBILITIES

2.01 General

A. OWNER shall have the responsibilities set forth herein and in Exhibit SR-A.

ARTICLE 3--TIMES FOR RENDERING SERVICES

3.01 ENGINEER's services will be performed within the time period or by the date stated in Exhibit SR-A.

3.02 If ENGINEER's services are delayed or suspended in whole or in part by OWNER, ENGINEER shall be entitled to equitable adjustment of the time for performance and rates and amounts of compensation provided for elsewhere in this Agreement to reflect reasonable costs incurred by ENGINEER in connection with, among other things, such delay or suspension and reactivation and the fact that the time for performance under this Agreement has been revised.

ARTICLE 4--PAYMENTS TO ENGINEER

4.01 Methods of Payment for Services of ENGINEER.

A. OWNER shall pay ENGINEER for services rendered under this Agreement as follows:

(Delete inapplicable language.)

~~1. A Lump Sum amount of \$ _____.~~

~~2. Appropriate amounts are incorporated in the Lump Sum to account for labor, overhead, profit, Reimbursable Expenses, and ENGINEER's Consultants' charges, if any.~~

~~3. The portion of the Lump Sum amount billed for ENGINEER's services will be based upon ENGINEER's estimate of the proportion of the total services actually completed during the billing period to the Lump Sum.~~

{OR}

~~1. An amount equal to the cumulative hours charged to the Assignment by each class of ENGINEER's employees times Standard Hourly Rates for each applicable billing class for all services performed on the Assignment, plus Reimbursable Expenses, estimated to be \$ _____ and ENGINEER's Consultants' charges, if any, estimated to be \$ _____. The total compensation under paragraph 4.01.A.1 is estimated to be \$ _____.~~

~~2. ENGINEER's Reimbursable Expenses Schedule and Standard Hourly Rate Schedule are attached to this Agreement as Exhibits SR-C and SR-D, respectively.~~

~~3. The amounts billed for ENGINEER's services will be based on the cumulative hours charged to the Assignment during the billing period by each class of ENGINEER's employees times Standard Hourly Rates for each applicable billing class, plus Reimbursable Expenses and ENGINEER's Consultants' charges, if any, incurred during the billing period.~~

{OR}

1. An amount equal to ENGINEER's Direct Labor Costs times a Factor of 3.15 for the services of ENGINEER's employees engaged on the Assignment, plus Reimbursable Expenses, estimated to be \$ 100,900 which includes ENGINEER's Consultants' charges estimated to be \$ 84,200. The total compensation under paragraph

4.01.A.1 is estimated to be \$ 368,500. The fee proposal for this Agreement is included as Attachment "A"

2. ENGINEER's Reimbursable Expenses Schedule is attached to this Agreement as Exhibit SR-C.

3. The amounts billed for ENGINEER's services will be based on the applicable Direct Labor Costs charged to the Assignment by ENGINEER's employees during the billing period multiplied by the above-designated Factor, plus Reimbursable Expenses and ENGINEER's Consultants' charges, if any, incurred during the billing period.

4. Direct Labor Costs means salaries and wages paid to employees but does not include payroll related costs or benefits.

5. The Direct Labor Costs Factor includes the cost of customary and statutory benefits including, but not limited to, social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation, and holiday pay applicable thereto; the cost of general and administrative overhead, which includes salaries and wages of principals and employees engaged in business operations not directly chargeable to projects, plus indirect operating costs, including but not limited to, business taxes, legal expense, rent, utilities, office supplies, insurance, and other operating costs; plus operating margin or profit.

4.02 Other Provisions Concerning Payment

A. *Estimated Compensation Amounts.*

1. ENGINEER's estimate of the amounts that will become payable are only estimates for planning purposes, are not binding on the parties, and are not the minimum or maximum amounts payable to ENGINEER under the Agreement.

2. When estimated compensation amounts have been stated herein and it subsequently becomes apparent to ENGINEER that a compensation amount thus estimated will be exceeded, ENGINEER shall give OWNER written notice thereof. Promptly thereafter

OWNER and ENGINEER shall review the matter of services remaining to be performed and compensation for such services. OWNER shall either agree to such compensation exceeding said estimated amount or OWNER and ENGINEER shall agree to a reduction in the remaining services to be rendered by ENGINEER, so that total compensation for such services will not exceed said estimated amount when such services are completed.

B. *Adjustments*

1. ENGINEER's compensation is conditioned on time to complete the Assignment not exceeding the time identified in Exhibit SR-A. Should the time to complete the Assignment be extended beyond this period due to reasons not the fault of and beyond the control of ENGINEER, the total compensation to ENGINEER shall be appropriately adjusted.

~~2. If used, the Standard Hourly Rates Schedule, Reimbursable Expenses Schedule, Direct Labor Costs and the Factor applied to Direct Labor Costs will be adjusted annually (as of _____) to reflect equitable changes to the compensation payable to ENGINEER.~~

C. *Reimbursable Expenses.* Reimbursable Expenses means the actual expenses incurred by ENGINEER or ENGINEER's Consultants directly in connection with the Assignment, including the categories and items listed in Exhibit SR-C, plus 10% and if authorized in advance by OWNER, overtime work requiring higher than regular rates. Reimbursable Expenses will also include the amount of any sales tax, excise tax, value added tax, or gross receipts tax or similar tax that may be imposed on this agreement.

D. *For Additional Services.* OWNER shall pay ENGINEER for all services not included in the scope of this Agreement on the basis agreed to in writing by the parties at the time such services are authorized by OWNER.

ARTICLE 5--DESIGNATED REPRESENTATIVES

5.01 Contemporaneous with the execution of this Agreement, ENGINEER and OWNER shall each designate specific individuals as ENGINEER's and OWNER's representatives with respect to the services to be performed or furnished by ENGINEER and responsibilities of OWNER under this Agreement. Such individuals shall have authority to transmit instructions, receive information, and render decisions relative to the Assignment on behalf of their respective party.

ARTICLE 6--CONTENT OF AGREEMENT

6.01 The following Exhibits are incorporated herein by reference:

A. Exhibit SR-A, "Further Description of Services, Responsibilities, Time, and Related Matters," consisting of 12 pages.

B. Exhibit SR-B, "Standard Terms and Conditions," consisting of 5 pages.

C. Exhibit SR-C, "Reimbursable Expenses Schedule," consisting of 1 pages.

D. Attachment A, "West Papillion Creek Floodplain Remapping, Fee Estimate – DFIRM and FIS Generation" consisting of 2 pages.

E. Attachment B, "West Papillion Creek Floodplain Remapping,, Draft General Schedule, Version 1.0" consisting of 2 pages.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, the Effective Date of which is indicated on page 1.

D. Exhibit SR D, "Standard Hourly Rates," consisting of _____ pages.

6.02 Total Agreement

A. This Agreement (consisting of pages 1 to 5, inclusive, together with the Exhibits identified in paragraph 6.01) constitutes the entire agreement between OWNER and ENGINEER and supersedes all prior written or oral understandings. This Agreement may only be amended, supplemented, modified, or canceled by a duly executed written instrument.

OWNER:

PAPIO-MISSOURI RIVER NATUAL RESOURES DISTRICT

By: _____

Title: _____

Date Signed: _____

Address for giving notices:

8901 S. 154th Street

Omaha, NE 68138-3621

Designated Representative (Paragraph 5.01):

Name: Steven Oltmans

Title: General Manager

Phone Number: (402) 444-6222

Facsimile Number: (402) 895-6543

E-Mail Address: soltmans@papionrd.org

ENGINEER:

HDR ENGINEERING, INC.

By: _____

Title: _____

Date Signed: _____

Address for giving notices:

8404 Indian Hills Drive

Omaha, NE 68114

Designated Representative (Paragraph 5.01):

Name: Timothy Crockett, P.E.

Title: Senior Vice President

Phone Number: (402) 399-1257

Facsimile Number: (402) 399-1111

E-Mail Address: tcrocket@hdrinc.com

This is **EXHIBIT SR-A**, consisting of 18 pages, referred to in and part of the **Agreement between OWNER and ENGINEER for Study and Report Phase Professional Services** dated _____, _____.

Initial:

OWNER _____

ENGINEER _____

Further Description of Services, Responsibilities, Time, and Related Matters

Specific articles of the Agreement are amended and supplemented to include the following agreement of the parties:

A.1.01 ENGINEER's Services

A. ENGINEER shall:

~~1. Consult with OWNER to define and clarify OWNER's requirements for the Assignment and available data.~~

~~2. Advise OWNER as to the necessity of OWNER providing data or services which are not part of ENGINEER's services, and assist OWNER in obtaining such data and services.~~

~~3. Identify, consult with, and analyze requirements of governmental authorities having jurisdiction relevant to the Assignment.~~

~~4. Identify and evaluate _____ alternate solutions available to OWNER and, after consultation with OWNER, recommend to OWNER those solutions which, in ENGINEER's judgment, meet OWNER's requirements.~~

~~5. Prepare a report (the "Report") which will, as appropriate, contain schematic layouts, sketches and conceptual design criteria with appropriate exhibits to indicate the agreed to requirements, considerations involved, and those alternate solutions available to OWNER which ENGINEER recommends. This Report will be accompanied by ENGINEER's opinion of Total Project Costs for each solution which is so recommended with each component, including the following, separately itemized: opinion of probable Construction Cost, allowances for contingencies and for the estimated total costs of design, professional, and related services provided by ENGINEER and, on the basis of information furnished by OWNER, allowances for other items and services included within the definition of Total Project Costs.~~

~~6. Perform or provide the following additional tasks or deliverables:~~

~~7. Furnish _____ review copies of the Report to OWNER within ___ days of the Effective Dates of this Agreement and review it with OWNER.~~

~~8. Revise the Report in response to OWNER's and other parties' comments, as appropriate, and furnish _____ final copies of the revised Report to the OWNER within ___ days after completion of reviewing it with OWNER.~~

**For Papio-Missouri River Natural Resources District
For Development of Flood Hazard Data for West Branch Papillion Creek and its
Tributaries
Douglas and Sarpy Counties, NE**



ENGINEERING PROPOSAL



BACKGROUND AND BASIS OF PROPOSAL

The purpose of this effort is to develop a scope of services for the Papio Missouri River Natural Resources District (P-MRNRD) to update the flood hazard data for the West Branch Papillion Creek and its Tributaries (Project). Seven communities in the National Flood Insurance Program (NFIP) also have a vested interest in the Project but are not parties to this Agreement.

The Watershed is a large 134 square mile system spanning Douglas and Sarpy Counties through a complex, diverse mixture of urban and rural land uses in eastern Nebraska. Figure 2 shows the extent of the drainage boundaries. Rural land uses primarily involve peripheral areas in the extreme western, southern and northern stream reaches of the various tributaries. Since Flood Insurance Studies (FIS) were last completed, the Watershed has experienced significant development pressure and growth. This growth continues presently and underscores the need for updating flood hazard data and flood mapping.

The Watershed has experienced various significant flooding events in the past, and other such events in the immediate vicinity have shown the area's susceptibility to flooding and flood damages. On August 6-7, 1999, more than 10-inches of rain fell in 24 hours over parts of the Omaha metropolitan area. Had the storm's center been located over the West Branch Papillion Creek Watershed's 134 square miles, the damages would have been devastating.

The P-MRNRD and USACE have constructed numerous flood control systems on West Papillion Creek including levees extending, from approximately 42nd to 96th Streets, major flood reservoirs located at Lake Zorinsky, Lake Wehrspann and Walnut Creek, and water quality basins strategically placed upstream of Lake Zorinsky and Lake Wehrspann to capture sediment.

The Watershed's primary stream is West Branch Papillion Creek, which has its source near Elkhorn. Major tributaries to West Papillion Creek include South Papillion, North Branch West Papillion, Hell, Walnut, Boxelder and Midland Creeks. The Watershed's slopes, soils, and land uses significantly impact the flows observed through these tributaries.

The communities of Bellevue, Boys Town, Elkhorn, Gretna, LaVista, Papillion, and Omaha along with the unincorporated portions of Douglas and Sarpy Counties drain into West Branch Papillion Creek or one of its tributaries. The communities of Boys Town and Gretna are not located in flood-prone areas.

Many streams in the Watershed have been mapped previously, but for many only limited flood hazard data is available. Detailed studies (establishing numbered A zones) have been completed for West Branch Papillion Creek, Midland Creek, South Midland Creek, West Midland Creek, Walnut Creek, Hell Creek, and North Branch West Papillion Creek. Limited studies (establishing A zones) have been performed for South Papillion Creek, one of its tributaries, and a tributary to West Branch Papillion Creek.

Several Letters of Map Changes (LOMCs) have occurred on the Watershed's streams. A 1999 Letter of Map Revision (LOMR) supersedes the initial detailed studies for segments West Branch Papillion, Midland, and Walnut Creeks and a LOMR extending from 36th to 66th Street is pending FEMA approval, to name just a few. These LOMCs supersede the previously recorded base flood elevations and floodplain boundaries.

This study will include detailed studies for all previously mapped segments. Table 1 summarizes the channel segments, their current flood zones, and reach lengths.

Table 1. New and/or Updated Flood Hazard Data and Flooding Sources

Flooding Source	FEMA Zone	Reach Limits	Modeled Length, feet (miles)
West Branch Papillion Creek	AE	Papillion Creek confluence to Elkhorn extraterritorial limits	113,200 (21.4)
Midland Creek	AE	West Papillion Creek confluence to study limits (upstream from Highway 370)	10,990 (2.1)
South Midland Creek	AE	Midland Creek confluence to study limits	1,590 (0.3)
West Midland Creek	AE	Midland Creek confluence to study limits	2,450 (0.4)
Walnut Creek	AE	West Papillion Creek confluence to Dam Site 21	9,680 (1.8)
Hell Creek	AE	West Papillion Creek confluence to Pacific Street	29,960 (5.7)
North Branch West Papillion Creek	AE	West Papillion Creek confluence to Omaha extraterritorial limits (upstream from State St.)	34,200 (6.5)
West Branch Papillion Creek Tributary	A	West Papillion Creek confluence to study limits (near Highway 370)	14,460 (2.7)
South Papillion Creek	A	West Papillion Creek Confluence to study limits (near Highway 31)	48,470 (9.2)
South Papillion Creek Tributary	A	South Papillion Creek confluence to study limits (near Highway 370)	12,130 (2.3)
Total			277,130 (52.4)

SCOPE OF SERVICES – FLOOD HAZARD DATA

The basic objectives of this Project are:

- Provide on-going project management, including attending internal project coordination meetings.
- Produce hydrologic and hydraulic data for existing and future (2040) land use conditions.
- Update floodplains and floodways for all mapped streams.
- Provide on-going facilitation by conducting public meetings.

The scope of work is segmented into eight task series:

- Task Series 100 – Project Management
- Task Series 200 – Surveying and Field Reconnaissance (MAS Activity 1)
- Task Series 300 – Hydrologic Analysis (MAS Activity 4)
- Task Series 400 – Hydraulic Analysis (MAS Activity 6)
- Task Series 500 – Floodplain Mapping (MAS Activity 8)
- Task Series 600 – Base Map Development (MAS Activity 10)
- Task Series 700 – Appeals and Protest Assistance (MAS Activity 14)

The HDR Team proposes to provide the following professional services over an anticipated eighteen (18) – month project period from the time of contract authorization:

TASK SERIES 100 – PROJECT MANAGEMENT

Task Objective: Confirm that Project elements are being completed.

HDR Activities: **Task 110 Project Management.** Conduct general project management tasks. Includes development of project initiation forms including the development of a project guide, monthly invoicing, monthly progress report, project close out activities and other administration project activities.

Task 120 Coordination Meetings. Coordination meetings will be conducted with the P-MRNRD, National Flood Insurance Program (NFIP) administrators, and FEMA/NSP during the project. An agenda will be prepared prior to the meeting and meeting minutes prepared after the meeting. Meeting minutes will be indexed and included in the TSDN.

Subtask 120.1 Conduct Kick-Off Meeting. Conduct an initial meeting to discuss project details with P-MRNRD, FEMA, NFIP administrators and Nebraska DNR. Review project guide and scope of work.

Subtask 120.2 Conduct P-MRNRD Project Coordination Progress Meetings. Meet with P-MRNRD personnel to review and discuss Project progress. Assume a total of 9 regularly scheduled meetings.

Subtask 120.3 Conduct Final Remapping Presentation. Conduct a final remapping presentation prior to the Public Appeals Meeting to show the results of the study. A Microsoft PowerPoint presentation and handouts will be prepared. Invite NFIP administrators, P-MRNRD Board, and Nebraska DNR.

Subtask 120.4 Coordinate with FEMA NSP. Conduct three (3) meetings with the NSP during the Project.

Task 130 Technical Support Data Notebook (TSDN) The technical and administrative support data generated for the Flood Hazard Mapping Program is to be contained in the TSDN. Five major sections will be submitted to FEMA during the course of the project: General Documentation; Engineering Analyses; Draft FIS Report, Mapping Information and Miscellaneous Reference Materials. Appendix M of the 2003 Guidelines provides the guidance for the TSDN.

Subtask 130.1 Setup TSDN. Prepare filing system and records management system for the TSDN.

Subtask 130.2 General Documentation. All written documentation that pertains to the mapping process is to be documented. This includes Special Problem Reports (SPR), contact reports, meeting minutes/reports and general correspondence. Meeting minutes/reports are included in the coordination meeting tasks. Complete Certification of Compliance of Work. File and index technical and administrative support data.

Subtask 130.3 Submit TSDN. Create a copy of the TSDN for the P-MRNRD permanent record. Submit TSDN to FEMA.

Task Deliverables:

- Project guide
- Monthly invoices and progress reports
- Meetings agenda and minutes
- PowerPoint presentation for Remapping Results Presentation
- Technical Support Data Notebook
- Certification of Compliance for Work

Key Understandings:

- The duration of the project is 18 months.
- Meetings will be held at the offices of the P-MRNRD and attended by 3 HDR professionals.
- NSP coordination meetings will be conducted at the offices of P-MRNRD.

TASK SERIES 200 – SURVEYING AND FIELD RECONNAISSANCE – MAS ACTIVITY 1

Detailed flood hazard analyses require digital topographic data, cross sections and surveys of hydraulic structures. The digital topographic data will be collected in parallel with the field survey and reconnaissance and hydrologic analyses tasks.

Task Objective: Collect cross section and hydraulic structure information to support the hydrologic and hydraulic modeling efforts.

HDR Activities: **Task 210 Field Reconnaissance.** Prior to conducting the field survey and site reconnaissance, a detailed data collection form will be created to capture the pertinent data. This will ensure that the data collected is consistent and efficiently acquired.

Subtask 210.1 Create Data Collection Form. Develop a Trimble Terrasync data collection template for the survey of hydraulic structures. The data collection form will provide information such as floodplain conditions, types of hydraulic structures and flood control structures, data used to set hydraulic parameters such as Manning's roughness coefficients and expansion and contraction coefficients.

Subtask 210.2 Establish Survey Baseline. A survey baseline will be identified approximately at the outer edge of the 2040 floodplain in the left overbank. This baseline would be a geo-referenced line where the cross section stationing would begin.

Subtask 210.3 Conduct Field Reconnaissance. A 1-person team will accompany the surveying crew and conduct a field reconnaissance of each hydraulic structure using a hand held electronic device. The data collection form will be completed along with any special instructions for the surveying party. Photographs at each site will be taken.

Subtask 210.4 Compile Field Reconnaissance Data. Compile the data collected during the field reconnaissance. Downloading field data from Terrasync for reporting purposes. Generate one-page structure reports for each bridge.

Task 220 Field Hydraulic Structure Survey. The hydraulic structural information will be collected by utilizing 3D laser scanning technology. Points will be placed at positions on the structure and assigned Nebraska State Plane coordinates and orthometric elevations with a total station surveying technique. These points will then be scanned in conjunction with the structure and used to reference the hydraulic structures and cross section in the correct spatial orientation and position.

NGS monuments and control points established for the MAPA project will be utilized to set temporary points that will be used to collect bathymetric cross sectional data. Information on NGS will be included in the GIS dataset. Once all of the cross section data is collected, an AutoCAD drawing of the intermediate cross section points and profiles of the hydraulic structures will be created and to used to perform the hydraulic calculations.

Subtask 220.1 Conduct Hydraulic Structure Field Survey Collect hydraulic structure information. GPS base stations will be placed at established National Geodetic Survey (NGS) monuments; temporary control points will then be established at the hydraulic structures. Hydraulic information to be obtained includes: structure type, open-end area, pier dimensions, channel cross section at upstream face, and flow depth.

Subtask 220.2 Process Scanned Data. The scan information will be used to create 2 dimensional cross section drawings, which can then be used to generate profiles, ASCII

files, and dimensioned details. This data will be provided in AutoCAD and HEC-RAS formats.

Task 230 Field Surveys and Reconnaissance Deliverables. The following products will be created and made available to FEMA.

Subtask 230.1 Prepare Field Reconnaissance Findings Report. A summary summarizing the findings of the field reconnaissance will be prepared. The findings report is limited to a 2-page summary along with a structure summary table noting the relevant information gathered during the field reconnaissance. A field reconnaissance form for each hydraulic structure will be included in the appendix.

Subtask 230.2 Prepare Survey Maps and Drawings. Maps and drawing that provided the detailed survey results will be prepared. An drawing for each structure will be provided showing the upstream face cross section.

Subtask 230.3 Prepare Survey Notebook. Copies of the field survey notebook will be copies which notes the equipment used, survey team, benchmark information, weather conditions, and other general survey items.

Task 240 Internal QC Review. An internal review is to be conducted to ensure the most appropriate data and process is being utilized.

Subtask 240.1 Conduct Internal QC Review. An internal review is to be conducted to ensure the most appropriate data and process is being utilized.

Subtask 240.2 Revise Data. Incorporate the internal QC review comments and modify the data as necessary.

Deliverables:

- Field Reconnaissance Summary Report
- Survey maps and drawings
- Survey notebook

Key Understandings:

- Nebraska State plane (fipszone 2600) NAD83, NAVD88 will be used.
- The number of hydraulic structures to be surveyed is 89
- Flood control reservoirs will not be surveyed. Information will be obtained from the topographic mapping.
- No field cross sections will be surveyed to verify the Light Detection and Ranging (LIDAR) created Triangulated Irregular Network (TIN) model.
- The latest annual levee and flood control structures inspection reports will be provided by the P-MRNRD.

TASK SERIES 300 –HYDROLOGIC ANALYSIS – MAS ACTIVITY 3

Hydrologic analyses efforts will focus on the development of a rainfall-runoff model to predict the peak flood discharges for existing and 2040 land use conditions. The HEC-HMS model developed during Stage I of the Big Papillion Creek Watershed study will form the basis of the analyses.

Task Objective: To quantify and predict flood runoff

HDR Activities: **Task 310 Hydrologic Modeling.** Modify the HEC-HMS model developed in Stage I of the Papillion Creek Watershed Study.

Subtask 310.1 Delineate Subbasins and Adjust Hydrologic Parameters. The West Branch Watershed was segmented into 35 subbasins varying in size from 1.0 to 6.2 square miles during Stage I activities. Delineate subbasins to approximately 1- to 2-square mile for the entire Watershed. Adjust hydrologic parameters including timing, and Clark routing parameters (R and t_c).

Subtask 310.2 Define the Critical Storm. Define the critical storm to provide the highest flood discharge/water surface elevation for the flooding source. A sensitivity analysis of various storm durations and temporal distribution will be conducted to define the proper design storm.

Subtask 310.3 Compute Peak Flooding Discharges. Estimate the peak flood discharges for the 10-, 2-, 1- and 0.2-percent annual chance flood discharges for existing and 2040 land use conditions.

Subtask 310.4 Compare Peak Discharge to Other Methods. Conduct a flood-flow frequency analysis on the Ft. Crook USACE stream gage utilizing HEC-FFA and compare to Big Papillion Creek Watershed HEC-HMS model. Compare the 10-, 2-, 1- and 0.2-percent annual chance flood discharges.

Subtask 310.5 Prepare Preliminary Hydrologic Analyses. Prepare Section 3.1 Hydrologic Analysis of the FIS will be prepared along with summary discharge tables and supporting documentation.

Task 320 Internal QC Review. An internal review is to be conducted to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. The analyses will be revised to incorporate internal review comments

Subtask 320.1 Conduct Internal QC Review. Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The internal technical review is to focus on the following:

- Use of acceptable models;
- Use of appropriate methodology(ies);
- Correctly applied methodology(ies)/model(s), including QC of input parameters;
- Comparison with gage data and/or regression equations, if appropriate; and
- Comparison with discharges for contiguous reaches or flooding sources.

Subtask 320.2 Prepare Revised Preliminary Hydrologic Analyses. Incorporate QC review comments and prepare revised preliminary hydrologic analyses.

Task 330 Independent QA/QC Review. Submit revised preliminary hydrologic report. Respond to independent QA/QC Summary Report, which describes the findings of the review and recommendations to resolve any problems identified during the review. Prepare a Summary Response Report.

Task 340 Final Hydrologic Analyses Deliverables. Review comments from the NSP will be incorporated. Submit final deliverables to NSP.

Deliverables:

- Digital copies of hydrologic modeling (input and output) files for the 10%, 2%, 1%, and 0.2% annual-chance storm events;
- Digital and hardcopy version of the Summary of Discharge Table presenting discharge data for the flooding sources for which hydrologic analyses were performed;

- Digital and hardcopy version of draft text for Section 3.1 Hydrologic Analyses of the FIS Report;
- Digital and hardcopy version of all backup data used in the analysis, including work maps;
- For the GIS-based modeling, all input and output data, intermediate data processing products, and GIS data layers; and
- Summary Response Report to Independent QA/QC review.

Key Understandings:

- The HEC-HMS model developed for Stage I will be utilized as the baseline hydrologic model. The land use maps created in Stage I were created from data collected from the Partnership communities and adequately depict 2040 land use conditions.
- Only 1 HEC-HMS model will be prepared for the Watershed.
- Calibration of the baseline HEC-HMS model was performed during Stage I activities. Since only minor modifications will be made to the baseline HEC-HMS model, no additional calibration is anticipated.

TASK SERIES 400 – HYDRAULIC ANALYSIS – MAS ACTIVITY 6

Hydraulic analyses efforts will focus on the development of a standard-step HEC-RAS one-dimensional model. Starting elevations at the confluence of West Branch Papillion with Papillion Creek will be established, the topographic data collected in the MAPA study and the field survey data collected previously will be incorporated to establish flood elevations and regulatory floodways.

Task Objectives: Establish the 10-, 2-, 1- and 0.2-percent annual chance flood hazard data for existing and 2040 land use conditions and establish new flood hazard boundaries.

HDR Activities: **Task 410 Hydraulic Model Development.** Develop the parameters necessary to execute a HEC-RAS hydraulic model.

Subtask 410.1 Verify LIDAR Generated Cross Sections. LIDAR generated TIN cross sections will be compared visually to the sample of field surveyed cross sections provided by P-MRNRD.

Subtask 410.2 Integrate Cross Section and Hydraulic Structure Data. Prepare cross sectional and hydraulic structure data utilizing the LIDAR and field survey data. The cross sections will be “cut” using the LIDAR generated TIN model. *A floodplain corridor strip map will be created using the base topographic map.*

Subtask 410.3 Estimate Manning’s “n” Values. Estimate the Manning’s “n” value using USGS publication, Water Supply Paper 2339.

Subtask 410.4 Key to Cross-Section Labeling. Develop a key to labeling the cross sections which relate the survey, FIS and model cross sections.

Task 420 Hydraulic Model Execution. Create and execute the HEC-RAS hydraulic model. Determine flood elevation and floodway widths.

Subtask 420.1 Determine Flood Elevations. Create a HEC-RAS hydraulic model utilizing the LIDAR data and field survey for the existing and 2040 land use conditions. The beginning water surface elevation at the confluence of the West Papillion will be based on the most recent FIS water surface elevation for the Big Papillion Creek for the corresponding percent annual chance storm event. The beginning water surface elevation for the tributaries will be based on the corresponding tail water elevation on the main

channel.

Utilize the CHECK-RAS program to check and refine the HEC-RAS model. Warning comments will be noted and will either be resolved or documented and explained.

Subtask 420.2 Calibrate Models. Calibrate the hydraulic data to known high water marks and/or available gage data. Modify the hydraulic parameters as necessary. HEC-RAS model are to match known high watermarks within 0.5-feet.

Subtask 420.3 Plot Water Surface Profiles. Flood profiles will be plotted for the 10-, 2-, 1- and 0.2 percent annual chance flood water surface elevations representing existing hydrology and for the 1-percent annual chance flood water surface elevation representing future hydrology.

Subtask 420.4 Floodway Determination. Define the floodway for existing land use conditions. A maximum 1-foot rise will be used to define the floodway or a minimum of 3H:1V of the channel depth measured from the channel invert to the top of bank, plus 20 feet from the center of the channel.

Task 430 Levee Evaluation. The existing levee system was designed for 3- to 4-foot of freeboard. The 1- percent annual chance interior drainage inundation was based on a 10-percent annual chance condition in the West Branch. The certified levees will be evaluated for the existing and future land use conditions.

Subtask 430.1 Existing Conditions Evaluation. Compare the existing 1- percent annual chance water surface elevation to the LIDAR generated top of levee profile. Document the changes in freeboard.

Subtask 430.2 Future Conditions Evaluation. Compare the future 1- percent annual chance water surface elevation to the LIDAR generated top of levee profile. Document the changes in the freeboard. Compare the “design” 10- percent annual chance water surface elevation in West Branch to the future 10-percent annual chance water surface elevation at several key locations between 72nd and 84th Streets. Modify interior drainage flood inundation, if necessary.

Task 440 Preliminary Hydraulic Analyses. Prepare Section 3.3 Hydraulic Analysis of the FIS will be prepared along with summary floodway data tables, summary of elevations tables, transect location table and supporting documentation.

Task 450 Internal QC Review. An internal review is to be conducted to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. The analyses will be revised to incorporate internal review comments.

Subtask 450.1 Conduct Internal QC Review. Review preliminary hydraulic analyses report. This Internal QC review should include, at a minimum, the activities listed below:

- Use of acceptable models;
- Use of appropriate methodology(ies);
- Correctly applied methodology(ies)/model(s), including QC of input parameters;
- Starting water-surface elevations;
- Cross-section geometry;
- Manning’s “n” values and expansion/contraction coefficients;
- Bridge and culvert modeling;
- Flood discharges;
- Regulatory floodway computation methods;

- Tie-in to upstream and downstream non-revised Flood Profiles;
- Use the CHECK-RAS program as appropriate to flag potential problems and focus review efforts.

Subtask 450.2 Prepare Revised Preliminary Hydraulic Analyses. Incorporate QC review comments and prepare revised preliminary hydraulic analyses.

Task 460 Independent QA/QC Review. Submit revised preliminary hydraulic report. Respond to independent QA/QC Summary Report, which describes the findings of the review and recommendations to resolve any problems identified during the review. Prepare a Summary Response Report.

Task 470 Final Hydraulic Analyses Deliverables. Review comments from the NSP will be incorporated. Submit final deliverables to NSP.

Deliverables:

- Digital profiles for 10-, 2-, 1- and 0.2-percent annual chance flood water surface elevations representing existing and 1-percent annual chance flood water surface elevation representing future conditions using FEMAs RAS/PLOT program or similar program;
- Digital and hardcopy of Floodway Data Table for each flooding source that is compatible with the DFIRM database;
- Digital version of all hydraulic modeling (input and output) files;
- Digital version of table with range of Manning's "n";
- Explanation for unresolved messages for CHECK-RAS, as appropriate;
- Digital version of all backup data used in the analyses;
- Digital and hardcopy version of drat text for inclusion Section 3.2, Hydraulic Analysis in the FIS Report;
- GIS based input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure; and
- Summary Response Report to Independent QA/QC review.

Key Understandings:

- P-MRNRD will submit topographic data to FEMA for review. The topographic mapping must be conducted in accordance with FEMA Guidelines, certified by Horizons and approved by FEMA prior to incorporating the data into the hydraulic model.
- Topographic data will be available no later than October 1, 2004.
- It is anticipated that the difference in the cross sectional area between the LIDAR and check cross-section bathymetric will be small when compared to the conveyance of the entire cross section and edits will be minimal.
- No duplicate effective models hydraulic model will be prepared for this remapping study.
- Hydraulic modeling will be limited to one-dimensional analysis using HEC-RAS version 3.0 or 3.1. Split flow analysis is not anticipated and is not included in this scope.
- A single HEC-RAS model will be created for the entire Watershed.
- The existing levees and interior drainage system will be evaluated to determine and clarify FEMA requirements and, if necessary, develop a separate scope to address interior drainage analysis. Revised hydrology and hydraulic analysis of the existing levee and interior drainage system have not been included in this scope.
- Shallow flooding or ice-jam flooding is not included in this scope.
- Since the Big Papillion Creek tributaries are not mutually exclusive and are dependent, a coincident flow analysis will not be conducted.
- The floodway will be defined by a maximum allowable rise in the water surface elevation of 1.0-feet.

TASK SERIES 500 – FLOODPLAIN MAPPING – MAS ACTIVITY 8

The 1-percent-annual-chance floodplain and floodway boundaries for the flooding sources will be delineated on the topographic data. The mapping will follow Appendix L of the Guidelines, “Guidance for Preparing Draft Digital Data and DFIRM Databases”. The database structures are standardized and mapping and engineering data elements are linked to physical geographic features that are georeferenced and integrated with the GIS.

Task Objectives: Delineate the 1-percent-annual-chance floodplain and regulatory floodway boundaries on a digital work map.

Table 2 identifies the “standard” and “enhanced” datasets. Those layers or tables with enhanced fields to be completed are noted.

Table 2. Floodplain Mapping Database Tables

Standard Lookup Tables	Standard Spatial Tables	Standard Domain Tables to be used	Standard Spatial Tables with Enhanced Fields	Enhanced Lookup Tables	Enhanced Spatial Tables	Domain Tables to be used with the Enhanced Tables
L_Comm_Info	S_BFE	D_Floodway	S_Fld_Haz_Ar ¹	L_Case_Info	S_Nodes ²	D_Area_Units
L_MT1_LOMC	S_Riv_Mrk	D_Length_Units	S_Fld_Haz_Ln ¹	L_Hydra_Model	S_Ovrbnkln ¹	D_Discharge_Units ²
L_Pol_FHBM		D_Scale	S_LOMR ²	L_Hydro_Model	S_Precip_Gage ²	D_Frequency ²
L_Stn_Start		D_V_Datum	S_XS ¹	L_Media ²	S_Profil_Basln ²	D_Gage ²
		D_Velocity_Units	Study_Info ¹	L_Node_Disch ²	S_Stn_Start	D_Hydra
		D_Zone		L_Storm_Curve ²	S_Subbasins ²	D_Hydro
				L_Storm_Info ²	S_Water_Gage ²	D_Nodes ²
				L_Subbas_Disch ²		D_Storms ²
				L_XS_Ratings ²		D_Time_Units ²
				L_Regression ²		D_Volume_Units ²
						D_Scale

¹ All fields will be populated.

² Layer or table **will not** be populated.

HDR Activities:

Task 510 Field Hydraulic Structure Survey Integration. The field survey data collected in Task Series 200 will be integrated into the mapping database.

Task 520 Floodplain Boundary Delineation. Create floodplain boundary maps which contain cross sections, BFEs, labels showing the flood insurance risk zones and other pertinent base mapping information. Integrate effective Letters of Map Change (LOMCs) within the mapped floodplains, as appropriate.

Subtask 520.1 Delineate Floodplain Boundaries. Delineate the 1-percent-annual-chance regulatory floodplain boundaries for the existing and future (2040) conditions in DFIRM ESRI shape file format.

Subtask 520.2 Generate Floodplain Boundary Metadata. Generate the metadata for the floodplain boundaries. The metadata will be exported to a text file and then included on the CD-ROM.

Task 530 Floodway Boundary Delineation. Delineate the 1-percent annual-chance floodway boundaries for the existing land use condition. Check the floodplain boundaries and their integration with the LOMCs to assure they are contiguous across the whole study basin.

Subtask 530.1 Delineate Floodway Boundaries. Delineate the 1-percent-annual-

chance regulatory floodway boundaries for the existing condition in DFIRM ESRI shape file format.

Subtask 530.2 Generate Floodway Boundary Metadata. Generate the metadata for the floodway boundaries. The metadata will be exported to a text file and then included on the CD-ROM.

Task 540 Digital Work Map Preparation. Prepare the digital flood hazard work mapfiles and databases using DFIRM ESRI shape file format. Format these files to FEMA standards as defined in the Guidelines.

Subtask 540.1 Prepare Work-in-Progress Work Map. Prepare and submit a sample of the work map along with its associated metadata to the NSP for preliminary comment when the digital work map is approximately 10% complete.

Subtask 540.2 Prepare Draft Work Map. Prepare and submit draft work map along with its associated metadata to the NSP for comment.

Subtask 540.3 Prepare Final Work Map. Prepare and submit final work map along with its associated metadata to the NSP for comment.

Task 550 Internal QC Review. Conduct an internal review on the mapping products. Utilize internally developed customized programs and processes to check the integrity of the data and the data in the databases.

Subtask 550.1 Draft and Final Spatial QC Review. The internal spatial QC review will include, at a minimum, the activities listed below:

- Review the cross sections graphics for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths on the map for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries graphics for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths graphics at cross sections as shown on the work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundary graphics as shown on the work maps to ensure they match the Flood Profiles.
- Check the floodplain boundary graphics and their integration with the LOMCs to assure they are contiguous across the whole study basin
- Review the flood insurance risk zone graphics as shown on the work maps to ensure they are labeled properly.
- Review the DFIRM graphics files to ensure they were prepared in accordance with the requirements in Guidelines and Specifications for Flood Hazard Mapping Partners.
- Will run the graphic through ArcINFO Workstation to ensure correct topology requirements. Checks will be made to ensure all polygons are closed, there are no overshoots at endpoints, all endpoints are connected that are suppose to be connected and that there are no orphan polygons and “slivers”.

Subtask 550.2 Draft and Final Attribute QC Review. The internal attribute QC review will include, at a minimum, the activities listed below:

- Review the cross sections tabular attributed data to be in agreement with the Floodway Data Table.
- Review the BFEs tabular attributed data to be in agreement with the results of the hydraulic modeling.
- Review the regulatory floodway tabular attributed data for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries tabular attributed data for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths tabular attributed data at cross sections to ensure they match the Floodway Data Table.
- Review the DFIRM mapping tabular attributed data files to ensure they are structured, formatted and prepared in accordance with the requirements in Guidelines and Specifications for Flood Hazard Mapping Partners.
- Review the metadata files to ensure they include all required information shown in Guidelines and Specifications for Flood Hazard Mapping Partners. These files will also be checked against Appendix L.5 Federal Emergency Management Agency Digital Mapping Information Checklist.

Task 560 Independent QA/QC Review. Review comments from the NSP will be incorporated and documented with in a Summary Response Report.

Subtask 560.1 Submit and Respond to Work-in-Progress Work Map. Submit work-in-progress digital work maps and respond to independent QA/QC review.

Subtask 560.2 Submit and Respond to Draft Work Map. Submit draft digital work maps and respond to independent QA/QC review.

Subtask 560.3 Submit and Respond to Final Work Map. Submit final digital work maps and respond to independent QA/QC review.

Task 570 Final Digital Floodplain Work Map Deliverables. Prepare final digital work map incorporating the independent QA/QC comments.

Deliverables:

- Digital work maps showing the 1% existing and future flood boundary delineations representing existing and future conditions
- Digital work maps showing the regulatory floodway boundaries cross-sections, BFE's, flood insurance risk zone labels representing existing and future conditions
- Digital work map files in accordance with the Guidelines for Standard DFIRM Database as submitted to FEMA
- Metadata files describe the digital work map data and required information in Guidelines
- Backup or supplemental information used in the mapping required for independent QC review
- Summary Response Report
- Explanation of the use of existing topography for the studied reaches, if appropriate
- For GIS, all input data, output data intermediate data processing products and GIS data layers used to make the work maps
- Standard layers and tables noted in Task 510 using Appendix L naming convention.

Key Understandings:

- Metadata will meet the standards as defined in the Content Standards for Digital Geospatial Metadata as set up by the Federal Geographic Data Committee (FGDC), 1998.
- Metadata will be completed using ESRI ArcCatalog program.

- The FGDC Classic style sheet will be used for the metadata.

TASK SERIES 600 – BASE MAP DEVELOPMENT – MAS ACTIVITY 10

Base maps will be developed for the study area. The base mapping will follow Appendix L of the Guidelines, “Guidance for Preparing Draft Digital Data and DFIRM Databases”. The base maps will be in ESRI Shape file format and will follow the Standard DFIRM database format. Base maps include the non-floodplain related items, such as roads, railroads, rivers, lakes, levees and benchmarks.

Task Objective: Generate base mapping for the study area.

HDR Activities: **Task 610 Base Map Creation.** Create the following information to be used in the generation of the base map for the study area. Integrate the 6 of the 12 basic FEMA required layers from FEMA.

Subtask 610.1 Create Required Spatial Base Map Layers. Create or modify the following 6 basic FEMA required layers from source agencies.

S_Gen_Struct: The S_Gen_Struct layer contains information about the hydraulic structures within the study area. It should include all structures shown in the flood profiles. In addition, levees, channels that contain flooding, and other significant flood control structures shown on the FIRM should be included. A spatial file with locational information also corresponds with this data table. Coordinates for the hydraulic structures will be obtained by a combination of field survey, LIDAR and imagery. Levees and flood control data will be obtained from the LIDAR generated topographic mapping.

S_Label_Ld: The S_Label_Ld layer contains information about leader lines that would connect labels to feature locations on base maps.

S_Label_Pt: The S_Label_Pt layer contains information for text insertion point locations that would link labels to base map features. The purpose of this table, along with the S_Label_Ld table is so that the DFIRM database can contain the names of roads and other physical features in or near the Special Flood Hazard Areas (SFHAs) regardless of the type or structure of the base map used.

S_Perm_Bmk: The S_Perm_Bmk layer contains information about Permanent Bench Marks that are associated with the study area. The bench marks shown in this file must meet the requirements specified in Subsection 1.4.1.4.1 of Appendix L.

S_Wtr_Ar: The S_Wtr_Ar table contains information about surface water area features and **S_Wtr_Ln:** The S_Wtr_Ln table contains information about surface water linear features.

Subtask 610.2 Create Required Domain and Lookup Base Map Tables. Create the following 5 basic FEMA required domain tables and create the one lookup table from source agencies.

D_Chan_Rep: The channel table contains information on the channel type.

D_Label_Typ: The label table contains information about valid features to which the labels and leaders apply.

D_Struct_Typ: The structure type table contains information about valid structure types associated with general hydraulic structures.

D_Ln_Typ: The line type contains information about valid line types used to determine symbology and drawing order on the hardcopy FIRM.

D_Water_Typ: The water table contains information about valid water feature types.

L_Wtr_Nm: The water name table contains information about hydrographic features on the DFIRM.

Subtask 610.3 Create Additional Layer. Obtain the additional layer from source agencies:

S_Base_Index: The S_Base_Index table contains information on the aerial data.

Task 620 Metadata Generation. Create the metadata for the 12 basic DFIRM FEMA layers collected in this task. The Metadata will be completed using ESRI ArcCatalog program. The FGDC Classic style sheet will be used for the metadata.

Task 630 Internal QC Review. Conduct an internal review on the mapping products. Utilize internally developed customized programs and processes to check the integrity of the data and the data in the databases.

Subtask 630.1 Conduct Spatial QC Review. The internal spatial QC review will include, at a minimum, the activities listed below (per the specification in Appendix L). Review the DFIRM base mapping files to ensure they were prepared in accordance with the requirements in Guidelines.

- Digitized linework must be collected at a reasonably fine line weight.
- Only simple linestrings or simple linear elements may be used for all linework
- Line features must be continuous (no dashes, dots, patterns, or hatching).
- Files must not contain annotation generated from a database; the annotation must be placed as text. GIS files (e.g. ESRI coverages or ESRI Shape files) may contain annotation and/or database attributes.
- Vectors may not cross other vectors within the same theme and all intersecting vectors must end at intersections.
- Area spatial features for a given theme must cover the entire study area without overlaps, under laps or sliver polygons between adjacent polygons.
- Files must be free of discontinuities such as overlapping lines, gaps, "turn backs," dangling lines and duplicate elements.
- Spatial files must not contain any linear or area patterns.
- Gaps or overshoots between features that should close must be eliminated.
- Areas will be represented by closed polygons, without overshoots or undershoots.
- Unattributed polygons are not permitted, including "sliver" polygons that result from poor digitizing methods.
- Unnecessary nodes and vertices must be avoided.
- Vertices must be placed conservatively when designing features so that only the minimal number of vertices or nodes is used to create the desired shape with appropriate smoothness (e.g., a straight line will be defined with two nodes only).
- Lines must begin and end at nodes.
- Lines must connect to each other at nodes.
- Lines must not extend through nodes.
- Disconnect QC: Disconnects occur when the linework for features does not connect, either by being too short or too long at the source maps' edge.
- Jogs QC: Jogs occur when a common feature on adjoining maps does not line up seamlessly
- Missing Features QC: Missing features are those that appear on one source map, but not on the adjacent map. The features may be missing from one map because of a variety of reasons, such as (1) different dates of the two maps; (2) an error in one map; (3) a difference in interpretation by the cartographers of the two maps; (4) differing scales of the two source maps, or (5) adjacent data not available.

- Different Representation of Features QC: Different representation of features occurs when features are represented differently on the source maps. For example, a road is a double line on one, and a single line on the other.
- Coincident features QC: Check that coincident features were created by digitizing the graphic features only once. Additional copies of coincident features should have been made by copying part of the first feature to create the relevant portion of the second, when necessary. This ensures that the lines match perfectly.

Subtask 630.2 Conduct Attribute QC Review. The internal attribute QC review will include, at a minimum, the activities listed below.

- Verify that shapefile attribute tables have been created per the Appendix L guidelines, with regards to the field name, length, type, etc.
- Verify that the cell data for each spatial feature is correct for the feature it is describing.
- Verify that the cell data corresponds to the correct D_table entry and that it is an approved entry.

Subtask 630.3 Conduct Metadata QC Review. The internal metadata QC review will include, at a minimum, the activities listed below.

- Review the metadata files to ensure they include all required information shown in Guidelines and Specifications for Flood Hazard Mapping Partners. These files will also be checked against Appendix L.5 Federal Emergency Management Agency Digital Mapping Information Checklist.

Subtask 630.4 Conduct General QC Review. The general QC review will include, at a minimum, the activities listed below.

- Verify that have written certification that the digital data will meet the minimum standards and specification as defined in the Guidelines.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.

Task 640 Final Digital Base Map Deliverables. Prepare final digital work map incorporating the independent QA/QC comments.

Deliverables:

- Digital base maps showing permanent benchmarks, transportation network, water features, jurisdictional boundaries, public land survey boundaries, hydraulic structures and aerial data.
- Digital base map database files in accordance with the Guidelines for Standard DFIRM Database as submitted to FEMA
- Metadata files describe the digital base map data and all required information in Guidelines
- Written certification that the digital data meet the minimum standards and specifications of the Guidelines
- Documentation that FEMA can use the digital base maps, free of charge (by P-MRNRD)
- Summary Report describes and provides result of all automated or manual QA/QC review steps noting any deficiencies in or agreeing with the mapping results
- Explanation of the use of existing topography for the studied reaches, if appropriate
- For GIS, all input data, output data intermediate data processing products and GIS data layers used to make the base maps

Key Understandings:

- P-MRNRD will obtain the necessary permission from the base map sources to allow FEMA's use and distribution of hardcopy and digital map products, free of charge.

- Base map will be comprised of 12 contiguous layers for the entire study area.
- Metadata will meet the standards as defined in the Content Standards for Digital Geospatial Metadata as set up by the Federal Geographic Data Committee (FGDC), 1998.
- The following QA/QC'ed and approved base mapping spatial files and corresponding metadata files will be provided by FEMA for integration: S_PLSS_Ar or S_PLSS_Ln, S_Pol_Ar or S_Pol_Ln, S_Quad_Index, and S_Trnsport_Ln. D_Nm_Typ, D_Rd_Stat, D_Struct_Typ, and D_Trans_Typ.

TASK SERIES 700 – APPEALS AND PROTEST ASSISTANCE – MAS ACTIVITY 14

During the appeals process, the HDR Team will provide technical support to P-MRNRD, as needed.

Task Objective: To consider and evaluate all comments during the appeal period and resolve all appeals and protests with the communities.

HDR Activities: **Task 710 Digital Work Map and FIS Report Review.** After FEMA has prepared the Preliminary DFIRM and FIS Report, the HDR Team will review the map and report.

Task 720 Appeals and Protest Support. The P-MRNRD will hold a public meeting with community officials, residents, and other interested parties to present and explain the new FIRM and FIS report.

Subtask 720.1 Attend Meeting. Attend the meeting and assist in the presentation.

Subtask 720.2 Respond to Appeals Comments. After the public comment period has expired, a meeting with the P-MRNRD to respond to FEMA and public comments.

Task Deliverables:

- Final comments to appeals process.

Key Understandings:

- P-MRNRD will be responsible for inviting key people to attend the public meeting and documenting public appeals meeting.
- FEMA will be responsible for the preparation, presentation and documentation of the Appeals and Protest Public Meeting.
- Any content for a web site will be prepared by P-MRNRD.
- Effort to revise the DFIRM or FIS Report is not included.
- Appeals and Protest process will be conducted after the grant expires in November 1, 2005.

A.2.01 OWNER's Responsibilities

A. OWNER shall do the following in a timely manner, so as not to delay the services of ENGINEER:

1. Provide all criteria and full information as to OWNER's requirements for the Assignment.

2. Furnish to ENGINEER all existing studies, reports and other available data pertinent to the Assignment, obtain or authorize ENGINEER to obtain or provide additional reports and data as required, and furnish to ENGINEER services of others as required for the performance of ENGINEER's services.

B. ENGINEER shall be entitled to use and rely upon all such information and services provided by OWNER or others in performing ENGINEER's services under this Agreement.

C. OWNER shall bear all costs incident to compliance with its responsibilities pursuant to this paragraph A.2.01.

A.3.01 Times for Rendering Services

A. The time period for the performance of ENGINEER's services shall be 18 months with milestones established as follows:

Grant expires October 1, 2005.

MAS No. 1 -	Field Surveys and Reconnaissance	January 1, 2004 to October 1, 2004
MAS No. 4-	Hydrologic Analyses	January 1, 2004 to October 1, 2004
MAS No. 6 -	Hydraulic Analyses	November 1, 2004 to April 1, 2005
MAS No. 8 -	Floodplain Mapping	April 1, 2005 to July 1, 2005
MAS No. 10 -	Base Map Acquisition	January 1, 2004 to June 1, 2005
MAS No. 14 -	Post-Preliminary Processing	December 1, 2005 to March 1, 2006

A draft schedule is included as Attachment "B".

B. ENGINEER's services under this Agreement will be considered complete when all deliverables set forth in Exhibit SR-A are submitted to OWNER.

A.4.02 Other

E. OWNER has established the following budgets:

Project fee is not to exceed three hundred sixty eight thousand five hundred dollars (\$368,500).

This is EXHIBIT **SR-B**, consisting of 5 pages, referred to in and part of the **Agreement between OWNER and ENGINEER for Study and Report Phase Professional Services** dated _____.

Initial:

OWNER _____
ENGINEER _____

Standard Terms and Conditions

Article 6 of the Agreement is amended and supplemented to include the following agreement of the parties:

B.6.01.B Standard Terms and Conditions

1. Standard of Care

The standard of care for all professional services performed or furnished by ENGINEER under this Agreement will be the care and skill ordinarily used by members of ENGINEER's profession practicing under similar circumstances at the same time and in the same locality. ENGINEER makes no warranties, express or implied, under this Agreement or otherwise, in connection with ENGINEER's services.

2. Independent Contractor

All duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of OWNER and ENGINEER and not for the benefit of any other party. Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of a third party against either OWNER or ENGINEER. ENGINEER's services under this Agreement are being performed solely for OWNER's benefit, and no other entity shall have any claim against ENGINEER because of this Agreement or the performance or nonperformance of services hereunder. OWNER agrees to include a provision in all contracts with contractors and other entities involved in this project to carry out the intent of this paragraph.

3. Payments to ENGINEER

Invoices will be prepared in accordance with ENGINEER's standard invoicing practices and will be submitted to OWNER by ENGINEER monthly, unless otherwise agreed. Invoices are due and payable within 30 days of receipt. If OWNER fails to make any payment due ENGINEER for services and expenses within 30 days after receipt of ENGINEER's invoice therefor, the amounts due ENGINEER will be increased at the rate of 1.0% per month (or the maximum rate of interest permitted by law, if less) from said thirtieth day. In addition, ENGINEER may, after giving seven days written notice to OWNER, suspend services under this Agreement until ENGINEER has been paid in full all amounts due for services, expenses, and other related charges.

4. Insurance

ENGINEER will maintain insurance coverage for Workers' Compensation, General Liability, and Automobile Liability and will provide certificates of insurance to OWNER upon request.

5. Indemnification and Allocation of Risk

a. To the fullest extent permitted by law, ENGINEER shall indemnify and hold harmless OWNER, OWNER's officers, directors, partners, and employees from and against costs, losses, and damages (including but not limited to reasonable fees and charges of engineers, architects, attorneys, and other professionals, and reasonable court or arbitration or other dispute resolution costs) caused solely by the negligent acts or omissions of ENGINEER or ENGINEER's officers, directors, partners, employees, and consultants in the performance of ENGINEER's services under this Agreement.

b. To the fullest extent permitted by law, OWNER shall indemnify and hold harmless ENGINEER, ENGINEER's officers, directors, partners, employees, and consultants from and against costs, losses, and damages (including but not limited to reasonable fees and charges of engineers, architects, attorneys, and other

professionals, and reasonable court or arbitration or other dispute resolution costs) caused solely by the negligent acts or omissions of OWNER or OWNER's officers, directors, partners, employees, and consultants with respect to this Agreement.

c. To the fullest extent permitted by law, ENGINEER's total liability to OWNER and anyone claiming by, through, or under OWNER for any injuries, losses, damages and expenses caused in part by the negligence of ENGINEER and in part by the negligence of OWNER or any other negligent entity or individual, shall not exceed the percentage share that ENGINEER's negligence bears to the total negligence of OWNER, ENGINEER, and all other negligent entities and individuals.

d. In addition to the indemnity provided under paragraph B.6.01.B.5.b. of this Exhibit, and to the fullest extent permitted by law, OWNER shall indemnify and hold harmless ENGINEER and ENGINEER's officers, directors, partners, employees, and consultants from and against injuries, losses, damages and expenses (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other disputes resolution costs) caused by, arising out of, or resulting from Hazardous Environmental Condition, provided that (i) any such injuries, losses, damages and expenses are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, and (ii) nothing in this paragraph B.6.01.B.5.d shall obligate OWNER to indemnify any individual or entity to the extent of that individual or entity's own negligence or willful misconduct.

e. The indemnification provision of paragraph B.6.01.B.5.a. is subject to and limited by the provisions agreed to by OWNER and ENGINEER in paragraph B.6.01.B.6, "Limit of Liability," of this Agreement.

6. **LIMIT OF LIABILITY**

TO THE FULLEST EXTENT PERMITTED BY LAW, THE TOTAL LIABILITY, IN THE AGGREGATE, OF ENGINEER AND ENGINEER'S OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS, AND CONSULTANTS, OR ANY OF THEM TO OWNER AND ANYONE CLAIMING BY, THROUGH, OR UNDER OWNER, FOR ANY AND ALL INJURIES, LOSSES, DAMAGES AND EXPENSES, WHATSOEVER ARISING OUT OF, RESULTING FROM, OR IN ANY WAY RELATED TO THIS AGREEMENT FROM ANY CAUSE OR CAUSES INCLUDING BUT NOT LIMITED TO THE NEGLIGENCE, PROFESSIONAL ERRORS OR OMISSIONS, STRICT LIABILITY OR BREACH OF CONTRACT OR WARRANTY, EXPRESS OR IMPLIED, OF ENGINEER OR ENGINEER'S OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS, AND CONSULTANTS, OR ANY OF THEM, SHALL NOT EXCEED THE TOTAL AMOUNT OF \$500,000.

7. Dispute Resolution

a. OWNER and ENGINEER agree that they shall first submit any and all unsettled claims, counterclaims, disputes, and other matters in question between them arising out of or relating to this Agreement or the breach thereof ("disputes") to mediation.

b. If a party alleges a dispute or controversy with the other party arising out of or relating to the performance of services under this Agreement, then either party shall have the right to request mediation within 20 days after the claiming party has provided the other party with written notice describing the dispute and the claiming party's position with reference to the resolution of the dispute.

c. Except as otherwise agreed, mediation will proceed pursuant to the Construction Industry Mediation Rules of the American Arbitration Association in effect on the Effective Date of the Agreement. A mediator will be appointed within 30 days of receipt of a written request. The mediator will endeavor to complete the mediation within 30 days thereafter.

d. No performance obligation under or related to this Agreement shall be interrupted or delayed during any mediation proceeding except upon written agreement of both parties.

- e. The mediator shall not be a witness in any legal proceedings related to this Agreement.
8. Termination of Contract
Either party may at any time, upon seven days prior written notice to the other party, terminate this Agreement. Upon such termination, OWNER shall pay to ENGINEER all amounts owing to ENGINEER under this Agreement, for all work performed up to the effective date of termination, plus reasonable termination costs.
9. Access
OWNER shall arrange for safe access to and make all provisions for ENGINEER and ENGINEER's Consultants to enter upon public and private property as required for ENGINEER to perform services under this Agreement.
10. Hazardous Environmental Conditions
It is acknowledged by both parties that ENGINEER's scope of services does not include any services related to a "Hazardous Environmental Condition," i.e. the presence at the site of asbestos, PCBs, petroleum, hazardous waste, or radioactive materials in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Assignment. In the event ENGINEER or any other party encounters a Hazardous Environmental Condition, ENGINEER may, at its option and without liability for consequential or any other damages, suspend performance of services on the portion of the Assignment affected thereby until OWNER: (i) retains appropriate specialist consultant(s) or contractor(s) to identify and, as appropriate, abate, remediate, or remove the Hazardous Environmental Condition; and (ii) warrants that the site is in full compliance with applicable laws and regulations. OWNER acknowledges that ENGINEER is performing professional services for OWNER and that ENGINEER is not and shall not be required to become an "arranger," "operator," "generator," or "transporter" of hazardous substances, as defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA), which are or may be encountered at or near the site in connection with ENGINEER's activities under this Agreement.
11. Patents
ENGINEER shall not conduct patent searches in connection with its services under this Agreement and assumes no responsibility for any patent or copyright infringement arising therefrom. Nothing in this Agreement shall be construed as a warranty or representation that anything made, used, or sold arising out of the services performed under this Agreement will be free from infringement of patents or copyrights.
12. Ownership and Reuse of Documents
All documents prepared or furnished by ENGINEER pursuant to this Agreement are instruments of service, and ENGINEER shall retain an ownership and property interest therein. Reuse of any such documents by OWNER shall be at OWNER's sole risk; and OWNER agrees to indemnify, and hold ENGINEER harmless from all claims, damages, and expenses including attorney's fees arising out of such reuse of documents by OWNER or by others acting through OWNER.
13. Use of Electronic Media
- a. Copies of Documents that may be relied upon by OWNER are limited to the printed copies (also known as hard copies) that are signed or sealed by the ENGINEER. Files in electronic media format of text, data, graphics, or of other types that are furnished by ENGINEER to OWNER are only for convenience of OWNER. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk.
- b. When transferring documents in electronic media format, ENGINEER makes no representations as to long-term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by ENGINEER at the beginning of this Assignment.
- c. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

- d. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the party delivering the electronic files. ENGINEER shall not be responsible to maintain documents stored in electronic media format after acceptance by OWNER.
14. Opinions of Probable Construction Cost
- a. Construction Cost is the cost to OWNER to construct proposed facilities. Construction Cost does not include costs of services of ENGINEER or other design professionals and consultants, cost of land, rights-of-way, or compensation for damages to properties, or OWNER's costs for legal, accounting, insurance counseling or auditing services, or interest and financing charges incurred in connection with OWNER's contemplated project, or the cost of other services to be provided by others to OWNER pursuant to of this Agreement. Construction Cost is one of the items comprising Total Project Costs.
- b. ENGINEER's opinions of probable Construction Cost provided for herein are to be made on the basis of ENGINEER's experience and qualifications and represent ENGINEER's best judgment as an experienced and qualified professional generally familiar with the industry. However, since ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, ENGINEER cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by ENGINEER. If OWNER wishes greater assurance as to probable Construction Cost, OWNER shall employ an independent cost estimator.
15. Opinions of Total Project Costs
- a. Total Project Costs are the sum of the probable Construction Cost, allowances for contingencies, the estimated total costs of services of ENGINEER or other design professionals and consultants, cost of land, rights-of-way, or compensation for damages to properties, and OWNER's costs for legal, accounting, insurance counseling or auditing services, and interest and financing charges incurred in connection with a proposed project, and the cost of other services to be provided by others to OWNER pursuant to this Agreement.
- b. ENGINEER assumes no responsibility for the accuracy of opinions of Total Project Costs.
16. Force Majeure
ENGINEER shall not be liable for any loss or damage due to failure or delay in rendering any service called for under this Agreement resulting from any cause beyond ENGINEER's reasonable control.
17. Assignment
Neither party shall assign its rights, interests or obligations under this Agreement without the express written consent of the other party.
18. Binding Effect
This Agreement shall bind, and the benefits thereof shall inure to the respective parties hereto, their legal representatives, executors, administrators, successors, and assigns.
19. Severability and Waiver of Provisions
Any provision or part of the Agreement held to be void or unenforceable under any laws or regulations shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and ENGINEER, who agree that the Agreement shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision. Non-enforcement of any provision by either party shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Agreement.
20. Survival

All express representations, indemnifications, or limitations of liability included in this Agreement will survive its completion or termination for any reason.

21. Headings

The headings used in this Agreement are for general reference only and do not have special significance.

22. Controlling Law

This Agreement is to be governed by the law of the [State of Nebraska](#) in which the ENGINEER's principal office is located.

23. Notices

Any notice required under this Agreement will be in writing, addressed to the appropriate party at its address on the signature page and given personally, or by registered or certified mail postage prepaid, or by a commercial courier service. All notices shall be effective upon the date of receipt.

This is **EXHIBIT SR-C**, consisting of 1 pages, referred to in and part of the **Agreement between OWNER and ENGINEER for Study and Report Phase Professional Services** dated _____.

Initial:

OWNER _____
ENGINEER _____

Reimbursable Expenses Schedule

Reimbursable Expenses are subject to annual review and adjustment. Reimbursable expense rates in effect on the date of the Agreement are:

8-1/2"x11" Copies/black & white	\$0.06/page
8-1/2"x11" Copies/color	\$0.75/page
11"x17" Copies/color	\$1.50/page
Presentation Boards (plot and mount)	\$150.00 each
Report Binders with Custom Index Tabs	\$15.00 each
Blue Print Copies	_____ /sq.ft.
Reproducible Copies (Mylar)	_____ /sq.ft.
Reproducible Copies (Paper)	_____ /sq.ft.
Mileage (auto)	\$0.37/mile
Technology Fee	\$4.10/direct labor hour
GPS Unit	_____
3-D Laser Surveying Unit	_____
Film and film processing	_____ cost
Field Truck Daily Charge	_____ /day
Mileage (Field Truck)	_____ /mile
Field Survey Equipment	_____ /day
Computer CPU Charge	_____ /hour
Personal Computer Charge	_____ /hour
CAD Charge	_____ /hour
CAE Terminal Charge	_____ /hour
VCR and Monitor Charge	_____ /day, \$/week, or \$ _____ /month
Video Camcorder	_____ /day, plus \$ _____ /tape
Electrical Meters Charge	_____ /week, or \$ _____ /month
Flow Meter Charge	_____ /week, or \$ _____ /month
Rain Gauge	_____ /week, or \$ _____ /month
Sampler Charge	_____ /week, or \$ _____ /month
Dissolved Oxygen Tester Charge	_____ /week
Fluorometer	_____ /week
Laboratory Pilot Testing Charge	_____ /week, or \$ _____ /month
Soil Gas Kit	_____ /day
Submersible Pump	_____ /day
Water Level Meter	_____ /day, or \$ _____ /month
Soil Sampling	_____ /sample
Groundwater Sampling	_____ /sample
Health and Safety Level D	_____ /day
Health and Safety Level C	_____ /day
Electronic Media Charge	_____ /hour
Long Distance Phone Calls	cost
Meals and Lodging	cost

This is ~~EXHIBIT SR-D~~, consisting of _____ pages, referred to in and part of the ~~Agreement between OWNER and ENGINEER for Study and Report Phase Professional Services~~ dated _____, _____.

Initial:

OWNER _____

ENGINEER _____

Standard Hourly Rates Schedule

Standard Hourly Rates are subject to annual review and adjustment. Hourly rates for services in effect on the date of the Agreement are:

Billing Class 9	Senior Associate	\$ _____/hour
Billing Class 8	Staff Manager	\$ _____/hour
Billing Class 7	Professional VI	\$ _____/hour
Billing Class 6	Professional V	\$ _____/hour
Billing Class 5	Professional IV	\$ _____/hour
Billing Class 4	Professional III	\$ _____/hour
Billing Class 3	Professional II	\$ _____/hour
Billing Class 2	Technician II	\$ _____/hour
Billing Class 1	Technician I	\$ _____/hour
Principal		\$ _____/hour
Support Staff		\$ _____/hour

This is ~~EXHIBIT SR-D~~, consisting of _____ pages, referred to in and part of the ~~Agreement between OWNER and ENGINEER for Study and Report Phase Professional Services~~ dated _____, _____.

Initial:

OWNER _____

ENGINEER _____

Standard Hourly Rates Schedule

Standard Hourly Rates are subject to annual review and adjustment. Hourly rates for services in effect on the date of the Agreement are:

Billing Class 9	Senior Associate	\$ _____/hour
Billing Class 8	Staff Manager	\$ _____/hour
Billing Class 7	Professional VI	\$ _____/hour
Billing Class 6	Professional V	\$ _____/hour
Billing Class 5	Professional IV	\$ _____/hour
Billing Class 4	Professional III	\$ _____/hour
Billing Class 3	Professional II	\$ _____/hour
Billing Class 2	Technician II	\$ _____/hour
Billing Class 1	Technician I	\$ _____/hour
Principal		\$ _____/hour
Support Staff		\$ _____/hour

ATTACHMENT "A"
PAPILLION MISSOURI RIVER NATURAL RESOURCES DISTRICT
WEST BRANCH PAPILLION CREEK FLOODPLAIN REMAPPING
FEE ESTIMATE - DFIRM AND FIS GENERATION

TASKS	HDR Engineering, Inc. Estimated Hours/Costs											Expenses				Sub-Consultant Estimated Costs				Est. Total Cost
	Project Principal	Project Manager	QC Specialists	Sr Engr/ Technical	Junior Engineer	Tech Support	Clerical	Total Hours	Total Labor Cost	Tech. Fee	Printing	Travel	Misc.	Total Expenses [1]	Total HDR	LRA	GIS Workshop	Total Sub-Consult.		
TASK SERIES 100 – PROJECT MANAGEMENT																				
Task 110	Project Management																			
	8	68					24	100	\$12,044	\$451				\$451	\$12,495			\$0	\$12,495	
Task 120	Coordination Meetings																			
Subtask 120.1		24		8	24		8	64	\$6,760	\$289		\$8		\$297	\$7,057			\$0	\$7,057	
Subtask 120.2					54			81	\$7,749	\$365		\$73		\$439	\$8,188			\$0	\$8,188	
Subtask 120.3					26		8	44	\$3,914	\$198		\$8		\$207	\$4,121			\$0	\$4,121	
Subtask 120.4		54		24	54			132	\$14,958	\$595		\$24		\$620	\$15,578		\$561	\$561	\$16,139	
Task 130	Technical Support Data Notebook (TSDN)																			
Subtask 130.1					8		16	24	\$1,664	\$108				\$108	\$1,772			\$0	\$1,772	
Subtask 130.2		72			36		72	180	\$16,920	\$812			\$110	\$922	\$17,842			\$0	\$17,842	
Subtask 130.3					4		16	20	\$1,352	\$90	\$330			\$420	\$1,772			\$0	\$1,772	
	Estimated Task Hours Subtotal	8	255	0	32	206	8	136												
	Estimated Task Cost Subtotal	\$1,576	\$33,405	\$0	\$4,896	\$16,068	\$576	\$8,840	\$65,361	\$2,909	\$330	\$114	\$110	\$3,463	\$68,824	\$0	\$561	\$561	\$69,385	
TASK SERIES 200 – SURVEYING AND FIELD RECONNAISSANCE – MAS ACTIVITY 1																				
Task 210	Field Reconnaissance																			
Subtask 210.1		2		1	24		4	31	\$2,547	\$140				\$140	\$2,687		\$3,740	\$3,740	\$6,427	
Subtask 210.2					16			16	\$1,248	\$72				\$72	\$1,320			\$0	\$1,320	
Subtask 210.3				8	100			110	\$9,286	\$496		\$110	\$1,280	\$1,886	\$11,172			\$0	\$11,172	
Subtask 210.4		2			32		16	50	\$3,798	\$226				\$226	\$4,024			\$0	\$4,024	
Task 220	Field Hydraulic Structure Survey																			
Subtask 220.1		2						2	\$262	\$9				\$9	\$271	\$44,550		\$44,550	\$44,821	
Subtask 220.2		2			32			34	\$2,758	\$153				\$153	\$2,911	\$9,900		\$9,900	\$12,811	
Task 230	Field Surveys and Reconnaissance Deliverables																			
Subtask 230.1		2		2	32		2	38	\$3,194	\$171	\$11			\$182	\$3,376			\$0	\$3,376	
Subtask 230.2					8		8	18	\$1,330	\$81	\$28			\$109	\$1,439	\$3,850		\$3,850	\$5,289	
Subtask 230.3					2		2	4	\$286	\$18	\$28		\$110	\$156	\$442	\$550		\$550	\$992	
Task 240	Internal QC Review																			
Subtask 240.1		2	16		4		4	26	\$3,522	\$117				\$117	\$3,639			\$0	\$3,639	
Subtask 240.2		2		2	12		4	20	\$1,764	\$90				\$90	\$1,854			\$0	\$1,854	
	Estimated Task Hours Subtotal	0	16	16	13	262	8	349												
	Estimated Task Cost Subtotal	\$0	\$2,096	\$2,688	\$1,989	\$20,436	\$576	\$2,210	\$29,995	\$1,574	\$66	\$110	\$1,390	\$3,140	\$33,135	\$58,850	\$3,740	\$62,590	\$95,725	
TASK SERIES 300 – HYDROLOGIC ANALYSIS – MAS ACTIVITY 4																				
Task 310	Hydrologic Modeling																			
Subtask 310.1				2	60			62	\$4,986	\$280				\$280	\$5,266			\$0	\$5,266	
Subtask 310.2				2	40			42	\$3,426	\$189				\$189	\$3,615			\$0	\$3,615	
Subtask 310.3				1	60			61	\$4,833	\$275				\$275	\$5,108			\$0	\$5,108	
Subtask 310.4				1	16			17	\$1,401	\$77				\$77	\$1,478			\$0	\$1,478	
Subtask 310.5		2		2	40		4	52	\$4,236	\$235				\$235	\$4,471			\$0	\$4,471	
Task 320	Internal QC Review																			
Subtask 320.1		2	16		2			20	\$3,106	\$90				\$90	\$3,196			\$0	\$3,196	
Subtask 320.2		2			16		8	30	\$2,346	\$135				\$135	\$2,481			\$0	\$2,481	
Task 330	Independent QA/QC Review																			
		2		2	8		2	14	\$1,322	\$63				\$63	\$1,385			\$0	\$1,385	
Task 340	Final Hydrologic Analyses Deliverables																			
		2		2	16		8	32	\$2,652	\$144	\$110		\$110	\$364	\$3,016			\$0	\$3,016	
	Estimated Task Hours Subtotal	0	10	16	12	258	20	14	330											
	Estimated Task Cost Subtotal	\$0	\$1,310	\$2,688	\$1,836	\$20,124	\$1,440	\$910	\$28,308	\$1,488	\$110	\$0	\$110	\$1,708	\$30,016	\$0	\$0	\$0	\$30,016	
TASK SERIES 400 – HYDRAULIC ANALYSIS – MAS ACTIVITY 6																				
Task 410	Hydraulic Model Development																			
Subtask 410.1				1	4		8	13	\$1,041	\$59				\$59	\$1,100			\$0	\$1,100	
Subtask 410.2		4		1	160		16	181	\$14,309	\$816				\$816	\$15,125			\$0	\$15,125	
Subtask 410.3				2	32		8	42	\$3,378	\$189				\$189	\$3,567			\$0	\$3,567	
Subtask 410.4					32			32	\$2,496	\$144				\$144	\$2,640			\$0	\$2,640	
Task 420	Hydraulic Model Execution																			
Subtask 420.1		2		8	240			250	\$20,206	\$1,128				\$1,128	\$21,334			\$0	\$21,334	
Subtask 420.2				2	40		8	50	\$4,002	\$226				\$226	\$4,228			\$0	\$4,228	
Subtask 420.3					8		40	48	\$3,504	\$216				\$216	\$3,720			\$0	\$3,720	
Subtask 420.4		2		8	140		24	174	\$14,134	\$785				\$785	\$14,919			\$0	\$14,919	
Task 430	Levee Evaluation																			
Subtask 430.1				2	40		16	58	\$4,578	\$262				\$262	\$4,840			\$0	\$4,840	
Subtask 430.2				2	40		16	58	\$4,578	\$262				\$262	\$4,840			\$0	\$4,840	

ATTACHMENT "A"
PAPILLION MISSOURI RIVER NATURAL RESOURCES DISTRICT
WEST BRANCH PAPILLION CREEK FLOODPLAIN REMAPPING
FEE ESTIMATE - DFIRM AND FIS GENERATION

TASKS	HDR Engineering, Inc. Estimated Hours/Costs										Expenses				Sub-Consultant Estimated Costs				Est. Total Cost
	Project Principal	Project Manager	QC Specialists	Sr Engr/ Technical	Junior Engineer	Tech Support	Clerical	Total Hours	Total Labor Cost	Tech. Fee	Printing	Travel	Misc.	Total Expenses [1]	Total HDR	LRA	GIS Workshop	Total Sub-Consult.	
Task 440	Preliminary Hydraulic Analyses																		
Task 450	Internal QC Review																		
Subtask 450.1	Conduct Internal QC Review																		
Subtask 450.2	Prepare Revised Preliminary Hydraulic Analyses																		
Task 460	Independent QA/QC Review																		
Task 470	Final Hydraulic Analyses Deliverables																		
	Estimated Task Hours Subtotal																		
	Estimated Task Cost Subtotal																		
TASK SERIES 500 – FLOODPLAIN MAPPING – MAS ACTIVITY 8																			
Task 510	Field Hydraulic Structure Survey Integration																		
Task 520	Floodplain Boundary Delineation																		
Subtask 520.1	Delineate Floodplain Boundaries																		
Subtask 520.2	Generate Floodplain Boundary Metadata																		
Task 530	Floodway Boundary Delineation																		
Subtask 530.1	Delineate Floodway Boundaries																		
Subtask 530.2	Generate Floodway Boundary Metadata																		
Task 540	Digital Work Map Preparation																		
Subtask 540.1	Prepare Work-in-Progress Work Map																		
Subtask 540.2	Prepare Draft Work Map																		
Subtask 540.3	Prepare Final Work Map																		
Task 550	Internal QC Review																		
Subtask 550.1	Conduct Draft and Final Spatial QC Review																		
Subtask 550.2	Conduct Draft and Final Attribute QC Review																		
Task 560	Independent QA/QC Review																		
Subtask 560.1	Submit & Respond to Work-in-Progress Work Map Review																		
Subtask 560.2	Submit & Respond to Draft Work Map Review																		
Subtask 560.3	Submit & Respond to Final Work Map Review																		
Task 570	Final Digital Floodplain Work Map Deliverables																		
	Estimated Task Hours Subtotal																		
	Estimated Task Cost Subtotal																		
TASK SERIES 600 – BASE MAP DEVELOPMENT – MAS ACTIVITY 10																			
Task 610	Base Map Creation																		
Subtask 610.1	Create Required Spatial Base Map Layers																		
Subtask 610.2	Create Required Domain and Lookup Base Map Tables																		
Subtask 610.3	Create Additional Layer																		
Task 620	Metadata Generation																		
Task 630	Conduct Internal QC Review																		
Subtask 630.1	Conduct Spatial QC Review																		
Subtask 630.2	Conduct Attribute QC Review																		
Subtask 630.3	Conduct Metadata QC Review																		
Subtask 630.4	Conduct General QC Review																		
Task 640	Final Digital Base Map Deliverables																		
	Estimated Task Hours Subtotal																		
	Estimated Task Cost Subtotal																		
TASK SERIES 700 – APPEALS AND PROTEST ASSISTANCE – MAS ACTIVITY 14																			
Task 710	Digital Work Map and FIS Report Review																		
Task 720	Appeals and Protest Support																		
Subtask 720.1	Attend Meeting																		
Subtask 720.2	Respond to Appeals Comments																		
	Estimated Task Hours Subtotal																		
	Estimated Task Cost Subtotal																		
TOTAL HOURS																			
TOTAL COST (ROUNDED)																			

[1] Includes administrative fee for sub-consultants and expenses @ 10%

ATTACHMENT "B"
PAPILLION MISSOURI RIVER NATURAL RESOURCES DISTRICT
WEST BRANCH PAPILLION CREEK FLOODPLAIN REMAPPING
DRAFT GENERAL SCHEDULE, VERSION 1.0

		Mar '04	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec '04	Jan '05	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct '05	Nov '05 to Mar '06
TASK SERIES 100 – PROJECT MANAGEMENT																						
Task 110	Project Management	[Red]																				
Task 120	Coordination Meetings																					
Subtask 120.1	Conduct Kick-off Meeting		KM																			
Subtask 120.2	Conduct P-MRNRD Project Coordination Progress Meetings			CM	CM			CM	CM			CM	CM				CM	CM				
Subtask 120.3	Conduct Final Remapping Presentation (Post-Preliminary Processing (12/01/05 to 03/01/06))																					PM
Subtask 120.4	Coordinate with FEMA NSP					FM					FM											
Task 130	Technical Support Data Notebook (TSDN)	[Red]																				
Subtask 130.1	Setup TSDN	[Red]																				
Subtask 130.2	General Documentation	[Red]																				
Subtask 130.3	Submit TSDN	[Red]																				
TASK SERIES 200 – SURVEYING AND FIELD RECONNAISSANCE – MAS ACTIVITY 1 (Completion by Oct 1, 2004)																						
Task 210	Field Reconnaissance																					
Subtask 210.1	Create Data Collection Form		[Red]	[Red]																		
Subtask 210.2	Establish Survey Baseline			[Red]	[Red]																	
Subtask 210.3	Conduct Field Reconnaissance			[Red]	[Red]	[Red]																
Subtask 210.4	Compile Field Reconnaissance Data				[Red]	[Red]	[Red]															
Task 220	Field Hydraulic Structure Survey																					
Subtask 220.1	Conduct Hydraulic Structure Field Survey				[Red]	[Red]	[Red]															
Subtask 220.2	Process Scanned Data					[Red]	[Red]	[Red]														
Task 230	Field Surveys and Reconnaissance Deliverables																					
Subtask 230.1	Prepare Field Reconnaissance Findings Report				[Red]	[Red]	[Red]															
Subtask 230.2	Prepare Survey Maps and Drawings					[Red]	[Red]	[Red]														
Subtask 230.3	Prepare Survey Notebook						[Red]	[Red]														
Task 240	Internal QC Review																					
Subtask 240.1	Conduct Internal QC Review							[Red]	[Red]													
Subtask 240.2	Revise Data							[Red]	[Red]													
TASK SERIES 300 – HYDROLOGIC ANALYSIS – MAS ACTIVITY 4 (Completion by Oct 1, 2004)																						
Task 310	Hydrologic Modeling																					
Subtask 310.1	Delineate Subbasins and Adjust Hydrologic Parameters		[Red]	[Red]	[Red]																	
Subtask 310.2	Define the Critical Storm			[Red]	[Red]																	
Subtask 310.3	Compute Peak Flooding Discharges				[Red]	[Red]	[Red]															
Subtask 310.4	Compare Peak Discharge to Other Methods					[Red]	[Red]															
Subtask 310.5	Prepare Preliminary Hydrologic Analyses						[Red]	[Red]														
Task 320	Internal QC Review																					
Subtask 320.1	Conduct Internal QC Review							[Red]	[Red]													
Subtask 320.2	Prepare Revised Preliminary Hydrologic Analyses								[Red]	[Red]												
Task 330	Independent QA/QC Review																					
Subtask 330.1	Conduct Internal QC Review								[Red]	[Red]												
Subtask 330.2	Prepare Revised Preliminary Hydrologic Analyses									[Red]	[Red]											
Task 340	Final Hydrologic Analyses Deliverables																					
Subtask 340.1	Final Hydrologic Analyses Deliverables										[Red]	[Red]										
TASK SERIES 400 – HYDRAULIC ANALYSIS – MAS ACTIVITY 6 (Completion by April 1, 2005)																						
Task 410	Hydraulic Model Development																					
Subtask 410.1	Verify LIDAR Generated Cross Sections																					
Subtask 410.2	Integrate Cross Section and Hydraulic Structure Data					[Red]	[Red]															
Subtask 410.3	Estimate Manning's "n" Values						[Red]	[Red]														
Subtask 410.4	Key to Cross-Section Labeling																					
Task 420	Hydraulic Model Execution																					
Subtask 420.1	Determine Flood Elevations																					
Subtask 420.2	Calibrate Models																					
Subtask 420.3	Plot Water Surface Profiles																					
Subtask 420.4	Floodway Determination																					
Task 430	Levee Evaluation																					
Subtask 430.1	Existing Conditions Evaluation																					
Subtask 430.2	Future Conditions Evaluation																					
Task 440	Preliminary Hydraulic Analyses																					
Task 450	Internal QC Review																					
Subtask 450.1	Conduct Internal QC Review																					
Subtask 450.2	Prepare Revised Preliminary Hydraulic Analyses																					
Task 460	Independent QA/QC Review																					
Subtask 460.1	Conduct Internal QC Review																					
Subtask 460.2	Prepare Revised Preliminary Hydraulic Analyses																					
Task 470	Final Hydraulic Analyses Deliverables																					
Subtask 470.1	Final Hydraulic Analyses Deliverables																					
TASK SERIES 500 – FLOODPLAIN MAPPING – MAS ACTIVITY 8 (Completion by July 1, 2005)																						
Task 510	Field Hydraulic Structure Survey Integration																					
Task 520	Floodplain Boundary Delineation																					
Subtask 520.1	Delineate Floodplain Boundaries																					
Subtask 520.2	Generate Floodplain Boundary Metadata																					
Task 530	Floodway Boundary Delineation																					
Subtask 530.1	Delineate Floodway Boundaries																					

ATTACHMENT "B"
PAPILLION MISSOURI RIVER NATURAL RESOURCES DISTRICT
WEST BRANCH PAPILLION CREEK FLOODPLAIN REMAPPING
DRAFT GENERAL SCHEDULE, VERSION 1.0

		Mar '04	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec '04	Jan '05	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct '05	Nov '05 to Mar '06	
Subtask 530.2	Generate Floodway Boundary Metadata																						
Task 540	Digital Work Map Preparation																						
Subtask 540.1	Prepare Work-in-Progress Work Map																						
Subtask 540.2	Prepare Draft Work Map																						
Subtask 540.3	Prepare Final Work Map																						
Task 550	Internal QC Review																						
Subtask 550.1	Conduct Draft and Final Spatial QC Review																						
Subtask 550.2	Conduct Draft and Final Attribute QC Review																						
Task 560	Independent QA/QC Review																						
Subtask 560.1	Submit & Respond to Work-in-Progress Work Map Review																						
Subtask 560.2	Submit & Respond to Draft Work Map Review																						
Subtask 560.3	Submit & Respond to Final Work Map Review																						
Task 570	Final Digital Floodplain Work Map Deliverables																						
TASK SERIES 600 – BASE MAP DEVELOPMENT – MAS ACTIVITY 10 (Completion by July 1, 2005)																							
Task 610	Base Map Creation																						
Subtask 610.1	Create Required Spatial Base Map Layers																						
Subtask 610.2	Create Required Domain and Lookup Base Map Tables																						
Subtask 610.3	Create Additional Layer																						
Task 620	Metadata Generation																						
Task 630	Conduct Internal QC Review																						
Subtask 630.1	Conduct Spatial QC Review																						
Subtask 630.2	Conduct Attribute QC Review																						
Subtask 630.3	Conduct Metadata QC Review																						
Subtask 630.4	Conduct General QC Review																						
Task 640	Final Digital Base Map Deliverables																						
TASK SERIES 700 – APPEALS AND PROTEST ASSISTANCE – MAS ACTIVITY 14 -- Post-Preliminary Processing (12/01/05 to 03/01/06)																							
Task 710	Digital Work Map and FIS Report Review																						
Task 720	Appeals and Protest Support																						
Subtask 720.1	Attend Meeting																						
Subtask 720.2	Respond to Appeals Comments																						

- Legend**
- Estimated time required for task.
 - NSP activity
 - KM** Denotes a kickoff meeting with FEMA, P-MRNRD, NFIP and HDR Project Team, March 31, 2004.
 - CM** Denotes an internal coordination meeting with P-MRNRD and HDR Project Team.
 - FM** Denotes a meeting with FEMA (NSP), P-MRNRD and HDR Project Team
 - AP** Appeals and Protest Public Meeting

Notes: Grant expires October 1, 2005. Final Remapping Presentation and Appeals and Protest Assistance to be conducted after October 1, 2005.

MAS No. 1 -	Field Surveys and Reconnaissance	January 1, 2004 to October 1, 2004
MAS No. 4-	Hydrologic Analyses	January 1, 2004 to October 1, 2004
MAS No. 6 -	Hydraulic Analyses	November 1, 2004 to April 1, 2005
MAS No. 8 -	Floodplain Mapping	April 1, 2005 to July 1, 2005
MAS No. 10 -	Base Map Acquisition	January 1, 2004 to June 1, 2005
MAS No. 14 -	Post-Preliminary Processing	December 1, 2005 to March 1, 2006