Copyright
by
Tadahisa Muramatsu
2010

**The Thesis Committee for Tadahisa Muramatsu
Certifies that this is the approved version of the following thesis:**

**Development of an Index to Rate the Completeness and Quality of
Mitigation Project Definition**

**APPROVED BY
SUPERVISING COMMITTEE:**

Cindy L. Menches, Supervisor

John D. Borcharding, Co-Supervisor

**Development of an Index to Rate the Completeness and Quality of
Mitigation Project Definition**

by

Tadahisa Muramatsu, B.E.

Thesis

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Engineering

The University of Texas at Austin

May 2010

Dedication

To my precious children and helpmate,
with love, confidence, and hope.

(最愛の妻、そして子供たちへ、愛と信頼、希望とともに)

Acknowledgements

I would like to express my deepest gratitude to my supervisor, Dr. Cindy L. Menches, for her continued support and valuable guidance throughout this research. It has been a pleasure working with Dr. Menches, and I am thankful she has shared her knowledge and experience with me. Without her insight and guidance this project would not have come together as successfully as it did.

I am very grateful to my co-supervisor, Dr. John D. Borcharding, for reviewing my thesis and giving his helpful and astute advice.

I would also like to thank Dr. Ghislaine De Regge for her precise comments and positive suggestions while developing my thesis. Her continuous enthusiasm and encouragement enabled me to complete this thesis.

A separate note of gratitude is dedicated to Central Nippon Expressway Co., Ltd. Their continuous support and kind help enabled me to pursue this opportunity for graduate study at the University of Texas.

Finally, I want to thank to my family who crossed the sea with me. Without their love and understanding, it could not have been done.

May 2010

Abstract

Development of Rating Index for the Completeness and Quality of Disaster Mitigation Project Definition

Tadahisa Muramatsu, M.S.E.

The University of Texas at Austin, 2010

Supervisor: Cindy L. Menches

Co-Supervisor: John D. Borcharding

In the summer of 2008, two hurricanes made landfall along the Texas coast causing billions of dollars in damage. Texas received presidential disaster declarations, which resulted in the state receiving over \$350 million in hazard mitigation funds. Over 500 requests for mitigation projects were submitted to the government from communities impacted. Not all requested projects could be funded. As a result, those communities that submitted requests for well-defined mitigation projects were the primary beneficiaries of the federal mitigation funds. To better understand the factors that characterize a “well-defined” mitigation project, this study developed an index to rate the completeness and quality of mitigation project definitions. The study incorporated concepts from research on quality community planning and from project definition rating methods. The rating tool consists of detailed descriptions of the project scope elements along with a scoring method for the completeness and quality of the project’s definition. The rating tool and the detailed descriptions help to develop a “well-defined” mitigation project definition as well as to evaluate it.

Table of Contents

List of Tables	x
List of Figures	xi
Chapter 1 Introduction	1
1.1 Background and Problem Statement	1
1.2 Challenges of the Current Mitigation Project Evaluation Process	4
1.3 Goals and Objectives	5
1.4 Research Questions	6
1.5 Significance of the Research	6
1.6 Methodology	8
1.7 Scope and Limitations	9
1.8 Thesis Organization	9
1.8.1 Chapter 2 - Literature Review	9
1.8.2 Chapter 3 - Research Methodology	10
1.8.3 Chapter 4 - Development of Evaluation System	10
1.8.4 Chapter 5 - Demonstration of the CQS System	10
1.8.5 Chapter 6 - Conclusion	10
Chapter 2 Literature Review	11
2.1 Quality of Community Planning	11
2.2 Project Definition Rating Methods	12
2.3 Summary	13
Chapter 3 Research Methodology	14
3.1 Overview	14

3.1.1 Research Process	14
3.1.2 Definition of Terms	15
3.2 Development of an Assessment Protocol (Phase I)	16
3.2.1 Clustering Elements	16
3.2.2 Identifying Indicators	16
3.3 Development of a Scoring Tool (Phase II)	17
3.3.1 Equal Weighting of Indicators in a Section	17
3.3.2 Section Score	18
3.3.3 Weighted Scoring of Sections	18
3.4 Development of a User Friendly Application Tool	19
Chapter 4 Development of an Evaluation System	20
4.1 Development of Mitigation Project Scope Elements and Definitions	21
4.1.1 Categorization of Scope Elements	21
4.1.2 Defining the Scope Elements and Developing Indicators	23
4.2 Method to Rate the Completeness and Quality of Scope Definition	24
4.3 Detailed Definitions of the Scope Elements and Indicators	26
4.3.1 Overview of the Sections and Categories	26
4.3.2 Scope Element Descriptions and Indicators	27
Chapter 5 Demonstration of the CQS System	42
5.1 Overview	42
5.2 Application Tool Development	43
5.3 Attributions of Sample Projects Used for Analysis	44
5.4 Assessment Results	45

Chapter 6 Conclusion	49
6.1 Research Objectives and Accomplishments Revisited	49
6.2 Limitations and Future Studies	51
Appendix A Score Sheet Used Primarily for Hurricane and Flood Disasters	53
Appendix B Sample Mitigation Project Definitions and Application Package	54
Bibliography	80
Vita	82

List of Tables

Table 1.1:	Disaster Declarations in Texas 1999 - 2008 (FEMA 2009)	2
Table 1.2:	Percent of Communities that Received Mitigation Project Funding since 1989 (Texas GDEM Mitigation Section).....	8
Table 5.1:	Applicants and Project Information	44
Table 5.2:	Mitigation Project Definition Section Quality (SQ) Scores	46
Table 5.3:	Mitigation Project Definition Completeness-Quality Scores (CQSs)	48

List of Figures

Figure 1.1: Billion Dollar Climate and Weather Disasters 1980 - 2009 (NCDC 2010)	1
Figure 3.1: Research Process Framework	15
Figure 4.1: Completeness-Quality Score (CQS) System Development Framework	20
Figure 4.2: Mitigation Project Scope Elements (The State of Texas 2009)	22
Figure 4.3: Mitigation Project Scope Element Definition and Indicators	23
Figure 5.1: Framework of CQS System Development	42
Figure 5.2: Sample Snapshot of the User-Friendly Tool	43

Chapter 1: Introduction

1.1 BACKGROUND AND PROBLEM STATEMENT

The state of Texas has experienced several major disasters in recent years. Figure 1.1 shows the number of billion dollar disasters throughout the United States as reported by The National Climatic Data Center (NCDC). Texas has experienced over 31 disasters over the past 30 years that caused losses of more than \$1 billion for each. The figure also describes that tropical storms or hurricanes caused the most damage (\$367 billion), which is more than a half of the total disaster losses.

Figure 1.1: Billion Dollar Climate and Weather Disasters 1980 - 2009 (NCDC 2010)

The primary disasters experienced by Texas include hurricanes, tropical storms and flooding, which resulted in Texas receiving numerous presidential disaster declarations by the Federal Emergency Management Agency (FEMA), which administers the natural disaster recovery and mitigation program. In fact, Texas has received disaster

Year	Disaster Types	Disaster Number
2008	Hurricane Ike	1791
2008	Hurricane Dolly	1780
2007	Tropical Storm Erin	1730
2007	Severe Storms, Tornadoes, and Flooding	1709
2007	Severe Storms and Tornadoes	1697
2006	Flooding	1658
2005	Hurricane Rita	1606
2003	Hurricane Claudette	1479
2002	Severe Storms, Tornadoes, and Flooding	1439
2002	Tropical Storm Fay	1434
2002	Severe Storms and Flooding	1425
2001	Severe Storms & Flooding	1379
2000	Severe Storms, Tornadoes And Flooding	1323
1999	Hurricane Bret	1287
1999	Severe Storms and Tornadoes	1274

Table 1.1: Disaster Declarations in Texas 1999 - 2008 (FEMA 2009)

declarations every year for the past decade, except in 2004, and more than three declarations were received in 2002 and 2007, which caused tremendous damage in terms of loss of life, injuries and property (Table 1.1) Those disaster declarations spawned disaster mitigation grants from the Hazard Mitigation Grant

Program (HMGP) through FEMA. Applications for hundreds of mitigation projects requiring hundreds of millions of dollars from HMGP follow every declaration because these mitigation projects are critical for reducing future vulnerabilities of Texas communities.

Furthermore, Texas had an especially hazardous year in 2008. In 2008, hurricanes Dolly and Ike made landfall along the Texas coast, causing an estimated \$23 billion in loss of life, injuries, and property damage (Nodar 2008). The damage caused by these two events exceeds all disaster losses in Texas during the previous 15 years, making 2008 the most devastating year in Texas history. While these statistics are staggering, the number of communities that have struggled to recover following Hurricanes Dolly and Ike is

equally disturbing. Reports indicate that the sheer magnitude of the destruction resulted in a slow recovery that anecdotally has been attributed to the lack of clear methods for prioritizing and implementing mitigation and reconstruction projects at the community level (Oxfam America 2008). This problem is especially acute in small communities that lack adequate resources to plan, develop and implement projects that will mitigate the impacts of such disasters.

To assist communities with mitigation efforts, several federal entities exist to provide funding for mitigation projects. Among the many types of projects that can be funded through federal assistance programs are public capital improvement projects, including bridge elevations, drainage improvements, structural hardening, and utility upgrades. In fact, capital improvement projects are particularly effective at reducing the vulnerabilities of entire communities, making them especially attractive options to achieve local mitigation goals.

Hurricane Ike alone brought in \$350 million in Hazard Mitigation Grant Program (HMGP) funds, and over 500 requests for HMGP funds were submitted. Unfortunately, not all requests could be funded, as a result, those communities who submitted requests for well-defined mitigation projects (i.e., had complete scopes of work, cost estimates, preliminary engineering, etc.) were the primary beneficiaries. However, a recent field study found that larger communities in Texas have been the key beneficiaries of federal mitigation project assistance, and furthermore, that this apparent bias may be occurring because these communities have access to engineering resources necessary for developing viable mitigation capital improvement projects. Unfortunately, smaller communities often do not have similar access to engineering resources, and as a result they are less likely to develop viable projects that can be funded through much-needed federal subsidies.

Recent field research indicates that federal mitigation policy may be inadvertently biased in favor of communities that already have access to mitigation project development resources, causing concern that the present policy may be allocating subsidies in an unintended way that limits small communities' abilities to reduce their hazard exposure. The problem of inequitable distribution of subsidies is not new and was hinted at in a landmark study conducted a decade ago by Godschalk, Beatley, Berke, Brower, and Kaiser (1999). The researchers cite the "scattershot nature of the projects" approved for funding (p. 530) and propose that local governments should "operate mitigation implementation programs made up of coordinated and prioritized mitigation projects" (p. 532). However, the study did not address the detailed and often complex process of developing and implementing mitigation projects. In fact, since 1989, countless communities continue to struggle with the development of mitigation capital improvement projects because they do not have the engineering resources to advance from a mitigation idea to a well-developed mitigation project that can be funded through federal subsidies (CDEM Table 1.2). Therefore, there is a critical need to address this complex process in order to ensure all communities have equal access to mitigation funding and equal opportunities to reduce their hazard exposure.

1.2 CHALLENGES OF THE CURRENT MITIGATION PROJECT EVALUATION PROCESS

The Texas Governor's Division of Emergency Management (GDEM) has developed a set of instructions for completing a Hazard Mitigation Grant Program Application Package (GDEM 2009). The set of instructions provides basic guidelines about the information that needs to be included in the application package, but these instructions do not provide examples or specific instructions on how to assemble a high quality application package. The State Application Instruction also contains an evaluation

sheet The GDEM also provides a sample evaluation sheet that identifies a total possible score of 138 points (GDEM 2006) (Appendix 1). However, the evaluation sheet and the project application instructions do not correlate well to one another, nor is it possible to predict what score a project package might receive. A project can receive 55 points, for example, if it is identified in the community's Mitigation Action Plan (MAP), and another 14 of the 138 points are allocated based on the project's cost effectiveness. Yet, there are no instructions on how cost effective a project must be to receive all 14 points. Therefore it is difficult for a community to predict what score they might achieve and how competitive their project might be when compared to other proposed projects. The proposed rating method attempts to resolve many of these evaluation problems.

1.3 GOALS AND OBJECTIVES

The goal of this research was to develop an appropriate and objective evaluation system for assessing the completeness and quality of mitigation capital improvement projects submitted for funding under the federal Hazard Mitigation Grant Program (HMGP). The evaluation system will identify the characteristics of projects that have been successfully funded and contrast them with projects that have been rejected so that this information can be distributed to and used by communities as they prepare future mitigation projects. The evaluation system, which consists of detailed descriptions of the project scope elements, has a secondary benefit of providing a checklist of items that make up the project application package (i.e., funding request), which can be used by communities during the project development stage. The objectives of the research were the following:

1. Develop a checklist of scope elements and associated detailed definitions that can be used by communities to develop high quality, complete mitigation project definition packages,
2. Develop a rating method and tool that can be used by state officials to evaluate the quality and completeness of submitted mitigation projects for the purpose of selecting projects for funding through the federal Hazard Mitigation Grant Program, and
3. Demonstrate the effectiveness of the rating tool for comparing the completeness and quality of mitigation project definition packages.

1.4 RESEARCH QUESTIONS

The current research endeavors to answer the following key question: What elements define a complete and high quality mitigation project? Correspondingly, the research attempts to provide evidence to support the following hypothesis:

There are specific elements that comprise a well-defined mitigation project application package.

1.5 SIGNIFICANCE OF THE RESEARCH

When hurricanes Dolly and Ike made landfall, these two events generated over \$350 million in available federal mitigation funding, creating an unprecedented opportunity for communities to address their most critical vulnerabilities. Unfortunately, many communities that requested mitigation funding were unable to develop a viable project that was eligible for a subsidy, and this problem was especially acute for capital improvement projects in small communities. In fact, larger communities in Texas, which

make up a small percentage of the total, have historically received a significant proportion of the available funding, while the majority of small communities has received a small proportion of the funding (Table 1.2). Based on field observations, evidence suggests that a positive relationship exists between a community's access to engineering resources and the quality of the community's proposed mitigation project, and communities that have a systematic process for developing mitigation capital improvement projects are more likely to receive federal subsidies than those that do not (Menches et al. 2009). Hence, this research is part of a larger effort to develop and test the effectiveness of a mitigation project development process that is fundamentally different from the public capital improvement project development process. The research effort will provide tools for researchers to investigate why specific projects were selected for funding, which project characteristics increased or decreased its chances for being selected for funding, and how and by whom the successful projects were developed. Ultimately, this data will be used to develop a project development process uniquely suited for the development of mitigation capital improvement projects. Furthermore, this research will affect emergency management staff members who are evaluating project application packages, as well as communities that are developing project packages. Therefore, completion of the research will provide new knowledge in a field that is understudied; mitigation project development, and is expected to address a critical gap in the existing field of hazard mitigation policy implementation.

Table 1.2: Percent of Communities that Received Mitigation Project Funding since 1989 (Texas GDEM Mitigation Section)

Community Population	Percentage of Cities with this Population	Percentage of Mitigation Capital Improvement Projects Awarded
0-10,000	60%	26%
10,001-20,000	6%	18%
20,001-30,000	29%	20%
30,001-100,000	4%	16%
100,001+	2%	20%

1.6 METHODOLOGY

First, we reviewed the State of Texas Hazard Mitigation Grant Program Comprehensive Application Package 2009 (hereafter referred to as “State Application Instruction”) (Texas 2009) and several completed mitigation project application packages to identify the elements required and recommended for inclusion in the project definition/application package. Second, we analyzed planning and project definition scoring methods to develop a tool for rating both the completeness and the quality of mitigation project definition. Third we develop a list of mitigation project scope elements and detailed descriptions that could be used by communities to develop mitigation projects. We compiled a checklist of items that should be included in a mitigation project application package in order to produce a quality package. Next, we developed a quantitative rating system largely based on plan quality scoring techniques commonly used in the field of community planning. Finally, the rating system is implemented as a database tool, and eight projects are entered into the tool and scored using the rating

method. The results confirm that the scoring system and tool can distinguish the quality and completeness of project packages.

1.7 SCOPE AND LIMITATIONS

The scope of the research includes identifying the elements that make up a mitigation project application package and the methodology for rating a project's completeness and quality. The evaluation system is a practical, objective and accurate method for evaluating mitigation project packages.

This research was limited to mitigation project application packages developed by communities in Texas. The procedure for developing packages in other states may be different. Furthermore, a comparison of accepted and rejected project packages would be useful but very few rejected project packages are retained by the State of Texas. Also, the types of projects examined were limited to those labeled “structural”, such as acquisition, elevation, drainage improvement, facility retrofit, and utility relocation. Consequently, this study did not cover all types of mitigation projects.

1.8 THESIS ORGANIZATION

This thesis is organized into six chapters as follows.

1.8.1 Chapter 2 - Literature Review

The relevant literature on rating systems for the construction industry as well as the community planning profession was reviewed. Furthermore, documents that address mitigation project package development were surveyed to understand the mitigation project development process.

1.8.2 Chapter 3 - Research Methodology

This chapter introduces the methodology and then describes the project development process and rating procedure.

1.8.3 Chapter 4 - Development Evaluation System

Chapter 4 develops an evaluation system for (1) assessing the quality and completeness of mitigation project definition and (2) rating the resulting project application package. The scoring model is called the Completeness-Quality Score (CQS) system.

1.8.4 Chapter 5 - Demonstration of the CQS system

A user-friendly application tool is developed for (1) mitigation project evaluators to evaluate mitigation project definitions and (2) mitigation project developers to assess the quality of their project definitions. This tool, which is easy to use and straightforward to achieve CQS, can be used without specific knowledge of computer and mitigation projects. As a result, users learn to increase the completeness and quality of mitigation projects. Discussion of observations from the demonstration of the tool follows.

1.8.5 Chapter 6 - Conclusion

The final chapter presents the conclusion of this research. This chapter revisits the project objectives and describes the contributions of this research to the improvement of quality and completeness of the mitigation project definitions. This chapter concludes with a statement of research limitations and ideas for future research.

Chapter 2: Literature Review

This chapter reviews the literature related to this study, which incorporates concepts from research on the quality of community planning and from project definition rating methods. The chapter concludes with a summary of the literature review and a highlight of the gaps in the literature and subsequent need for this research.

2.1 QUALITY OF COMMUNITY PLANNING

Research on the quality of community plans has evolved over the past decade, and was originated by Kaiser, Godschalk, and Chapin (1995), who defined plan quality as consisting of three core characteristics: (1) a strong factual basis, (2) clearly articulated goals, and (3) appropriately directed policies. To measure these three core characteristics, referred to as plan components, a series of indicators were developed that allow for quantitative assessment and analysis of plan quality. For example, the “goals” component included information on economic goals (e.g., minimize fiscal impacts of hazards), physical goals (e.g., reduce property loss), and public interest goals (e.g., protect human safety). Each indicator developed to measure the quality of each plan component was assessed on a 0 to 2 ordinal scale, in which 0 = not identified or mentioned in the community plan, 1 = suggested or identified but not discussed in detail in the community plan, and 2 = fully detailed or is a mandatory part of the community plan. Equal weighting was assigned to each plan quality indicator to avoid subjectivity.

As described by Brody (2003), the measurement of overall plan quality was calculated by creating indices for each plan component and overall plan quality. There were three steps in the development of the index for each plan component. First, the

scores for each of the indicators were summed within each of the plan components. Second, the sum of the scores was divided by the total possible score for each plan component. Third, this fractional score was multiplied by 10, placing the plan component on a 0-to-10 scale. Finally, a total plan quality score was developed by adding the scores of each component. Thus, a maximum score was determined, and the quality of various communities' plans could be contrasted by comparing their plan quality index score.

Berke et al. (1996) expanded the plan quality research by adding two additional factors that impact community plan quality: commitment to planning and community wealth. Berke later added population to the list of factors that impact plan quality (Berke 1998), and Burby and May (1998) further investigated the impact of planning agency capacity on plan quality. Finally, Brody (2003) incorporated hazard mitigation measures into existing conceptions of what constitutes a high-quality plan. As noted by Brody (2003), the ability to code and measure indicators within a plan has made this technique a widely used instrument for quantitatively assessing the quality of planning efforts.

2.2 PROJECT DEFINITION RATING METHODS

The standards for rating the completeness of project definition were established by Gibson with the development of the original Project Definition Rating Index (PDRI) (Gibson and Dumont 1996). Gibson first identified and categorized the critical elements that should be included in a capital project's scope definition package by reviewing company documents and conducting workshops with experts. Elements included design objectives, project schedule, site location, and numerous others. Each of the scope elements was then described in detail to ensure consistent understanding of the elements by all stakeholders. Furthermore, recognizing that not all elements will be equally important to overall project success, a series of workshops was conducted with experts to

evaluated and assign a weight to each scope element based on its importance to project success relative to all other scope elements. Overall, 70 project scope elements were defined, weighed, and combined into an index that could be used to evaluate the completeness of project scope definition. Gibson subsequently developed project rating indices for industrial, building, and infrastructure applications, resulting in a mature coverage of the rating of project definition.

2.3 SUMMARY

This research combined the method of rating plan quality with the method of rating the completeness of project definition in order to develop a method for rating the completeness and quality of mitigation project application packages. These packages (1) should contain specific elements of project definition and (2) must achieve a relatively high level of quality in order to increase the community's chances for receiving federal funding to execute the mitigation project.

Chapter 3: Research Methodology

3.1. OVERVIEW

This research aims at developing an appropriate and objective evaluation system for assessing the completeness and quality of mitigation capital improvement projects submitted for funding under the HMGP. The evaluation system, named the Completeness-Quality Score (CQS) system, contains a protocol of necessary scope elements and associated detailed definitions and a rating tool. Finally, this system is supported by a user-friendly computer application tool.

3.1.1 Research Process

An overall view of the methodology is illustrated in the research process framework, Figure 3.1. This research methodology employs both qualitative and quantitative approaches to meet the research objectives. Combining both approaches enhances the overall strength of the study compared to either qualitative or quantitative research methods alone (Creswell 2008). Therefore, the research separately discusses a qualitative phase and a quantitative phase and combines the results of both phases into the CQS system. The first phase is a qualitative phase that involves developing an assessment protocol with detailed descriptions. This phase categorizes elements that are required for the mitigation project definition/application package (MPDP) and identifies indicators that affect the quality of MPDP. This phase results in an assessment protocol with detailed descriptions. The second phase is a quantitative phase that involves developing a scoring tool. This phase weights sections that are categorized groups of

elements and rates the indicators. Finally, a user-friendly computer tool that combines both phases is developed to support the CQS system and assess MPDPs.

Figure 3.1: Research Process Framework

3.1.2 Definition of Terms

Identified below are the definitions associated with Figure 3.1.

Element: a unit of components required in the MPDP. An element is described as a status or an item in the State of Texas Hazard Mitigation Grant Program Comprehensive Application Package 2009 (Texas, 2009) (hereafter referred to as “State Application Instructions”)

Section: a finalized set of elements.

Indicator: a metric used to objectively evaluate the completeness and quality of the MPDP.

3.2. DEVELOPMENT OF AN ASSESSMENT PROTOCOL (PHASE I)

This qualitative phase categorized elements and developed indicators. This phase included a review of the State Application Instructions and existing MPDPs, and resulted in the detailed descriptions that define each element and indicator.

3.2.1 Clustering Elements

The elements that are required in the MPDP are identified in the State Application Instructions, which is a brief guideline for developing a MPDP. The State Application Instructions describe items required in the MPDP, and also fundamental elements that validate the MPDP. Thus, elements contain both items and validity status. However, these elements of guidelines for the MPDP are found in various places in that document.

This research categorizes the elements that must be included in the MPDP and organizes sections, which are groups of elements containing the same or similar characteristics.

3.2.2 Identifying Indicators

The indicators are the indivisible core components of the elements and indicate the levels of the completeness and quality of MPDPs. The process for identifying indicators involved a review of the State Application Instructions and several completed MPDPs, and used the KJ Method, namely the Affinity Diagram Method (Kawakita 1967), which consists of brainstorming sessions and consolidating redundant information. The review collected various keywords that affect the completeness and quality of the MPDP, and the KJ Method clusters these keywords to identify and eliminate redundancy.

The clustered keywords that describe unique components in an element are labeled as indicators.

3.3. DEVELOPMENT OF A SCORING TOOL (PHASE II)

After developing the indicators and elements, a quantitative rating system was developed to assess and compare the quality and completeness of MPDP. This phase transformed the qualitative indicators into a quantitative scoring tool to objectively assess the completeness and quality of MPDPs. This phase contains two processes: rating of the indicators and weighting of the sections. These processes generated a rating index: Completeness-Quality Score (CQS).

3.3.1 Equal Weighting of Indicators in a Section

The first part of the scoring process rated the indicators in a section, which directly affect the sections' completeness and quality. The indicators are the minimum pieces of information in MPDPs. Each indicator in a section represents a unique portion of the quality and the completeness and, thus, is equally weighed. This study employs a 0-to-1 scale, in which 0 = not identified or mentioned in the MPDPs, and 1 = described in the MPDPs. Kaiser, Godschalk, and Chapin (1995) employed a 0-to-2 ordinal scale to assess the quality of community plans, and Brody (2003) followed suit. This 0-to-2 scale contained a subjective assessment for scores of 1 or 2 (1 = suggested or identified but *not discussed in detail* in the community plan, and 2 = *fully detailed* or is a mandatory part of the community plan). On the other hand, the indicators in this study are identified as indivisible core components of MPDPs, so that every score (I_{ij} , the score of j th indicator in the i th section) can be assigned by a yes-no question, and subjective assessments, such as *in detail* or *fully* can be avoided.

3.3.2 Section Score

Section scores, defined as Section Quality (SQ) represents the completeness and quality of a section. Developing SQ scores involved three steps. First, the scores for each of the indicators within each of the sections (I_{ij}) are summed. Second, the sum of the scores is divided by the number of the indicators (n_i). Third, this fractional score is multiplied by 100, which results in a SQ score with the maximum possible score of 100. That is,

$$SQ_i = \frac{100}{n_i} \sum_{j=1}^{n_i} I_{ij} \quad (1)$$

3.3.3 Weighted Scoring of Sections

Because each section covers a different topic, a section might have a different affect on the decision making on HMGP funds. These sections are not of equal value. The completeness and quality of a MPDP involves an unequal weighting of sections based on how important each section is to the overall application package. Thus, this second process weights these sections and develops the CQS. State hazard mitigation officials independently weighted each section, and this feedback was included in the scoring system.

Peacock et al. (2009) employed a scoring system ranging from 0 to 100 for a Plan Quality Score to assess a community plan for natural hazard mitigation, so the CQS is also designed on a 0-100 scale. That is,

$$CQS = \sum_{i=1}^n (SQ_i * W_i) \quad (2)$$

$$= 100 \sum_{i=1}^n \left(\frac{W_i}{n_i} \sum_{j=1}^{n_i} I_{ij} \right) \quad (3)$$

where W_i is the weight for the i th section,

$f(s_i) = SQ_i$ is the score of the i th section.

3.4. DEVELOPMENT OF A USER FRIENDLY APPLICATION TOOL

As shown in Figure 3.1, the CQS system contains both a protocol for delineating sections, elements and indicators with detailed descriptions and a CQS score. The CQS system is computerized to make it user-friendly and efficient, employing a common software application, Microsoft Access[®].

Finally, six completed mitigation project definition and application packages were assessed by the CQS system.

Chapter 4: Development of an Evaluation System

This chapter describes the development of an evaluation system that is primarily used for (1) assessing the quality and completeness of mitigation project definition and (2) assigning a rating to the resulting project application package. The scoring model is named the Completeness-Quality Score (CQS) system. Figure 4.1 presents the framework for developing the CQS system.

Figure 4.1: Completeness-Quality Score (CQS) System Development Framework

The development of the scoring model occurred in two phases. In the first phase, a framework for organizing the scope elements that can be used by communities to develop high quality, complete mitigation project definition packages was developed. Detailed definitions of the project scope elements were also created. In the second phase, a rating method was developed, which can be used to evaluate the quality and

completeness of the scope of mitigation projects. This Chapter is divided in three sections: 4.1 describes the *development* of scope elements and their definitions, 4.2 describes the *method for scoring* the completeness and quality of the developed scope elements, and 4.3 presents the definitions and scoring indicators for all scope elements.

4.1. DEVELOPMENT OF MITIGATION PROJECT SCOPE ELEMENTS AND DEFINITIONS

In the first phase of the development process, the project scope elements were identified and detailed definitions of the scope elements were developed.

4.1.1 Categorization of Scope Elements

To develop mitigation project scope elements, the researchers interviewed state officials and reviewed the State of Texas Hazard Mitigation Grant Program Comprehensive Application Package Instructions 2009 and six completed mitigation project application packages to identify the elements that were required and recommended for inclusion in the project definition/application package.. The instructions provide basic guidance on items that must be included in the project application package, but it does not describe the expected quality or the level of detail that is necessary to produce a high-quality project definition. From the instructions, and by reviewing project application packages, the researchers developed a checklist of project scope elements. Figure 4.2 displays an outline of the project scope elements. As shown in Fig. 4.2, there are four sections of a mitigation project definition/ application package: (1) eligibility status, (2) standard forms, (3) mitigation project information, and (4) project cost effectiveness.

SECTION I – ELIGIBILITY STATUS	
A. ELIGIBILITY AND DECLARATION STATUS	
A 1. Eligibility of Entity and Project	
A 2. Conformance with Eligibility Criteria	
A 3. Location Proximate to Declared Area	
SECTION II – STANDARD FORMS	
B. APPLICATION FORMS	
B 1. State Project Application	
B 2. State of Texas Assurances	
B 3. Federal Application SF 424 and Assurance	
B 4. Engineering Checklist	
C. DESIGNATIONS, CERTIFICATIONS, AND STATEMENTS	
C 1. Project Officer Designation	
C 2. Floodplain Manager Form	
C 3. Cost Share Certification	
C 4. Record of Environmental Consideration	
SECTION III – MITIGATION PROJECT INFORMATION	
D. PROJECT OBJECTIVES AND SCOPE	
D 1. Synopsis Statement	
D 2. Narrative Statement	
D 2-1. Summary	
D 2-2. Need for Proposed Action	
D 2-3. Description of the Proposed Action	
D 2-4. Discussion of Alternatives Considered	
D 2-5. Coverage in the Mitigation Action Plan	
D 3. Cost Breakdown	
D 4. Proposed Work Schedules	
D 5. Flood Insurance Rate Map (FIRM) with Project Plotted	
D 6. Photographs of Project Area	
E. ENVIRONMENTAL & HISTORICAL INFORMATION	
E 1. Description of Environmental and Historical Information	
SECTION IV – MITIGATION PROJECT COST EFFECTIVENESS	
F. BENEFIT COST ANALYSIS, RATIO, AND SUPPORTIVE DATA	
F 1. Benefit Cost Analysis & Cost Effectiveness Study	
F 1-1. BCA Cover Sheet with Benefit-Cost Ratio (BCR)	
F 1-2. Benefit Cost Analysis (BCA) Output	
F 1-3 BCA Back-up Data and Assumptions	

Figure 4.2: Mitigation Project Scope Elements (The State of Texas 2009)

4.1.2 Defining the Scope Elements and Developing Indicators

Because the Application Package Instructions do not describe the expected quality or the level of detail that is necessary to produce a high-quality project definition, the researchers felt it was important to develop detailed descriptions of each scope element, along with indicators that could guide communities during the project development process and could also be used by state officials to evaluate the completeness and quality of applications. Figure 4.3 presents an example of a mitigation project scope element definition and indicators.

D 1. Synopsis Statement

A synopsis statement is a brief summary of project related information. It should include information about the project objective, cost, schedule, and benefit-cost ratio (BCR). Are the following items included in the Synopsis?

☐ Yes ☐ No	1. Project location
☐ Yes ☐ No	2. Problem definition (i.e., need for the proposed project and expected result)
☐ Yes ☐ No	3. Project description and scope
☐ Yes ☐ No	4. Estimated project cost
☐ Yes ☐ No	5. Benefit cost ratio (BCR)

SCORING:

- ☐ 0 = A Synopsis is not included
- ☐ 1 = A Synopsis is included but 5 items from above are missing
- ☐ 2 = A Synopsis is included but 4 items from above are missing
- ☐ 3 = A Synopsis is included but 3 items from above are missing
- ☐ 4 = A Synopsis is included but 2 items from above are missing
- ☐ 5 = A Synopsis is included but 1 item from above is missing
- ☐ 6 = A Synopsis is included and no items from above are missing

Figure 4.3: Mitigation Project Scope Element Definition and Indicators

4.2. METHOD TO RATE THE COMPLETENESS AND QUALITY OF SCOPE DEFINITION

In Fig. 4.3, *completeness* and *quality* of scope definition are conceptualized as a combination of the responses to the Yes/No criteria (i.e., “Are the following items included in the Synopsis?”) and the number of criteria that have been met.

As the number of criteria that have been achieved in the project definition/application package increases, the completeness likewise increases, and as a result, the quality overall increases. Hence, the scoring that has been assigned (i.e., “0 = A Synopsis is not included” or “1 = A Synopsis is included but 5 items are missing”) is a reflection of both completeness and quality.

As shown previously in Fig. 4.2, there are four sections of a mitigation project definition/ application package: (1) eligibility status, (2) standard forms, (3) mitigation project information, and (4) project cost effectiveness. Hence, completeness and quality of scope definition is conceptualized as consisting of unequal weighting of these four sections based on how important the content of each section is to the overall application package. Experts at the state hazard mitigation office were queried to determine which weights were assigned to each section of the application package. Based on their response, eligibility status was assigned a weight of 30%, standard forms was assigned a weight of 10%, mitigation project information was assigned a weight of 30%, and project cost effectiveness was assigned a weight of 30%.

Together, these four sections of the mitigation project definition/application package enable a local community to develop a viable scope of work for a mitigation capital improvement project. Furthermore, within each section of the project definition/application package, individual scope elements further specify the concept of

completeness and quality of scope definition. The following process was used to develop an index score for each section of the project definition package.

1. Each individual scope element received a raw score, which was arrived at by using a rating system similar to the one identified in Fig. 4.3. For example, the raw score of the j th scope element (e.g., Synopsis Statement) in the i th section (e.g., Section III) was determined by how many of the indicators were included in the Synopsis Statement (0 = Synopsis is not included, 1 = Synopsis is included but 5 items are missing, etc.).
2. The raw scores assigned to each scope element within a section were summed to determine the total points assigned to all scope elements within each section.
3. The sum of the assigned raw scores was divided by the sum of the total possible scores for each section.
4. This fractional score was multiplied by 100 to standardize the section score on a more intuitive 0-100 scale.

The measure of *overall* project definition/application completeness and quality was derived as follows:

1. Each section standardized score was multiplied by its section weight.
2. The weighted standardized section scores were summed to arrive at an overall project definition/application weighted score.

Ultimately, the scores can be used by state officials to compare the quality and completeness of submitted mitigation projects so that they can select the highest quality projects for funding.

4.3. DETAILED DEFINITIONS OF THE SCOPE ELEMENTS AND INDICATORS

The following descriptions were developed to help generate a clear understanding of the terms used in the Completeness-Quality Score (CQS) system. The descriptions below include a checklist of items to be evaluated (i.e., indicators) in order to determine the completeness and quality of definition of each element in the application package. Each element is measured on a scale that is established by the degree of completeness of the element's definition.

The descriptions are listed in the same order as they appear in the CQS system. They are organized in a hierarchy by section, category, and element. The CQS system consists of three main sections, each of which has a series of categories and scope elements. Scoring is performed by evaluating the levels of completeness and quality of the scope elements, as described in each narrative below.

4.3.1 OVERVIEW OF THE SECTIONS AND CATEGORIES

The project application sections and categories include:

SECTION I – ELIGIBILITY STATUS

This section evaluates the eligibility of agencies for federal mitigation funding.

Categories:

A – Eligibility and declaration status

SECTION II – STANDARD FORMS

This section consists of standard forms that the applicant is to fill out with the correct information.

Categories:

B – Application Forms

C – Designations, Certifications, and Statements

SECTION III – MITIGATION PROJECT INFORMATION

This section consists of information about the particular project for which the applicant is requesting funding, including the objective, scope, cost, and schedule.

Categories:

D – Project Objectives and Scope

E – Environmental and Historical Information

SECTION IV – MITIGATION PROJECT COST EFFECTIVENESS

This section consists of the Benefit-Cost Analysis, Benefit-Cost Ratio, and necessary backup data to support the analysis.

Categories:

F – Benefit-Cost Analysis, Ratio, and Supportive Data

4.3.2 SCOPE ELEMENT DESCRIPTIONS AND INDICATORS

The next few pages contain detailed descriptions for each scope element.

SECTION I – ELIGIBILITY STATUS

A. ELIGIBILITY AND DECLARATION STATUS

A 1. Eligibility of Entity and Project

Only eligible applicants may receive federal funding for mitigation projects. Is the applicant one of the following:

- ☐ Yes ☐ No 1. State and local government
- ☐ Yes ☐ No 2. Private non-profit organizations or institutions that own or operate a private non-profit facility, as defined under State and Federal law
- ☐ Yes ☐ No 3. Indian tribes or authorized tribal organizations

SCORING:

- ☐ 0 = All of the above answers are No.
- ☐ 1 = One of the above answers is Yes.

A 2. Conformance with Eligibility Criteria

In addition to meeting the eligibility criteria, the applicant must also meet the following criteria. Does the applicant meet the following criteria?

- ☐ Yes ☐ No 1. Does the applicant have a State and FEMA approved Mitigation Action Plan?
- ☐ Yes ☐ No 2. Does the applicant have a current emergency management plan that meets the requirements for a basic level of planning preparedness as defined in the Preparedness Standards for Texas Emergency Management?
- ☐ Yes ☐ No 3. Is the participant a participating member in good standing with the National Flood Insurance Program (NFIP)?

SCORING:

- ☐ 0 = One of the above answers is No.
- ☐ 1 = All of the above answers are Yes.

A 3. Location Proximate to Declared Area

Preference is given to those applicants that are located in the area that has received the federal disaster declaration.

SCORING:

- ☐ 1 = The applicant is not located in the federally-declared disaster area.
- ☐ 2 = The applicant is located in the federally-declared disaster area.

SECTION II – STANDARD FORMS

B. APPLICATION FORMS

B 1. State Project Application (Item-1)

B 2. State of Texas Assurances (Item-2)

B 3. Federal Application SF 424 and Assurance (Item-3)

These three items have specific formats required by FEMA and the Texas Governor's Division of Emergency Management, and these forms must be filled in completely with signatures of responsible officials. Issue of concern may include:

- ☐ 0 = Form is not included
- ☐ 1 = Form is included but some of the information is not filled in, incorrect, or not signed
- ☐ 2 = Form is included and all of the information is filled in, correct, and signed

B 4. Engineering Checklist (Item-17)

The Engineering Checklist specifies the level of engineering design that has been completed (conceptual, 30% or 100%) and provides basic engineering calculations (such as drainage area, culvert size, etc.). The form must be completed on all projects except acquisitions, elevations, or initiatives.

☐ 0 = Form is not included

☐ 1 = Form is included but some of the information is not filled in, incorrect, or not signed

☐ 2 = Form is included and all of the information is filled in, correct, and signed

C. DESIGNATIONS, CERTIFICATIONS, AND STATEMENTS

C 1. Project Officer Designation (Item-8)

C 2. Floodplain Manager Form (Item-9)

These documents designate a project officer, alternate point of contact, and a flood plain manager, who are familiar with, and oversee, the submission of the application and execution of the project.

☐ 0 = Form is not included

☐ 1 = Form is included but some of the information is not filled in, incorrect, or not signed

☐ 2 = Form is included and all of the information is filled in, correct, and signed

C 3. Cost Share Certification (Item-10)

C 4. Environmental Justice Statement (Item-13)

These documents certify that funds are available to provide the community's 25% required match to the federal government's 75% share of funding and that there are no adverse impacts to protected groups, such as low income or minority residents. The documents are required and have standard language provided by the State Hazard Mitigation Officer. The document must employ the proper language to be acceptable.

☐ 0 = Document is not included

☐ 1 = Document is included but the statements are not correct or it is not signed

☐ 2 = Document is included and the statements are correct and it is signed

C 5. Record of Environmental Consideration (Item-12)

The Record of Environmental Consideration is a standard form that is filled out to document the outcome of the Environmental Assessment/Narrative. The form documents the outcome after considering the impact of the project on the environment.

☐ 0 = Form is not included

☐ 1 = Form is included but some of the information is not filled in, incorrect, or not signed

☐ 2 = Form is included and all of the information is filled in, correct, and signed

SECTION III – MITIGATION PROJECT INFORMATION

D. PROJECT OBJECTIVES AND SCOPE

D 1. Synopsis Statement (Item-4)

A synopsis statement is a brief summary of project related information. It should include information about the project objective, cost, schedule, and benefit-cost ratio (BCR). Are the following items included in the Synopsis?

☐ Yes ☐ No 1. Project location

☐ Yes ☐ No 2. Problem, need for the proposed project, and expected result

☐ Yes ☐ No 3. Project description and scope

☐ Yes ☐ No 4. Estimated project cost

☐ Yes ☐ No 5. Benefit cost ratio (BCR)

SCORING:

☐ 0 = A Synopsis is not included

☐ 1 = A Synopsis is included but 5 items from above are missing

☐ 2 = A Synopsis is included but 4 items from above are missing

☐ 3 = A Synopsis is included but 3 items from above are missing

☐ 4 = A Synopsis is included but 2 items from above is missing

☐ 5 = A Synopsis is included but 1 item from above are missing

☐ 6 = A Synopsis is included and no items from above are missing

D 2. Narrative Statement (Item-5)

The Narrative Statement describes the problem, the cause of the problem, why the project is needed, what the proposed project is, how many people are impacted, how much damage has been experienced in the past, and other alternatives considered. It has subcategories that should be discussed in the Narrative Statement Section. Subcategories and issues to consider include:

D 2-1. Summary (Item-5)

A Summary provides a clear and brief one-page overview of the proposed action and its need. This section allows a reviewer to quickly understand the proposed action. Does the summary contain the following?

- ☐ Yes ☐ No 1. Description of the proposed action
- ☐ Yes ☐ No 2. Description of the event that will be mitigated
- ☐ Yes ☐ No 3. Where the project is located
- ☐ Yes ☐ No 4. Whether the project is included in the Mitigation Action Plan
- ☐ Yes ☐ No 5. Whether the project located in a declared disaster area
- ☐ Yes ☐ No 6. Whether the project significantly impacts the environment
- ☐ Yes ☐ No 7. Whether the project is cost effective

SCORING:

- ☐ 0 = A Summary is not included
- ☐ 1 = A Summary is included but 7 items from above are missing
- ☐ 2 = A Summary is included but 6 items from above are missing
- ☐ 3 = A Summary is included but 5 items from above are missing
- ☐ 4 = A Summary is included but 4 items from above are missing
- ☐ 5 = A Summary is included but 3 items from above are missing
- ☐ 6 = A Summary is included but 2 items from above are missing
- ☐ 7 = A Summary is included but 1 item from above is missing
- ☐ 8 = A Summary is included and no items from above are missing

D 2-2. Need for Proposed Action (Item-5)

The Need for Proposed Action discusses the nature and history of the disaster, the risk of occurrence of the specific disaster that should be mitigated, and reasons why the project is needed. Does the summary contain the following?

- ☐ Yes ☐ No 1. Brief description of the nature of the event that needs to be mitigated
- ☐ Yes ☐ No 2. A photograph showing the event or its impacts
- ☐ Yes ☐ No 3. Description of the people and properties that are at risk, including the number of people, houses and businesses in the immediate vicinity of the project
- ☐ Yes ☐ No 4. Description of projected growth of the community
- ☐ Yes ☐ No 5. Description of the history of similar events and previous declarations
- ☐ Yes ☐ No 6. Description of the most current event, including pictures and maps
- ☐ Yes ☐ No 8. How the event impacted the specific location
- ☐ Yes ☐ No 9. Explain why the project is needed
- ☐ Yes ☐ No 10. Explain what happens during a disaster event
- ☐ Yes ☐ No 10. Explain whether the useful life of the structure has been reached or exceeded
- ☐ Yes ☐ No 11. Explain what will happen if the action is not taken

SCORING:

- ☐ 0 = A Need for the Proposed Action is not included
- ☐ 1 = A Need for the Proposed Action is included but 11 items from above are missing
- ☐ 2 = A Need for the Proposed Action is included but 10 items from above are missing
- ☐ 3 = A Need for the Proposed Action is included but 9 items from above are missing
- ☐ 4 = A Need for the Proposed Action is included but 8 items from above are missing

- ☐ 5 = A Need for the Proposed Action is included but 7 items from above are missing
- ☐ 6 = A Need for the Proposed Action is included but 6 items from above are missing
- ☐ 7 = A Need for the Proposed Action is included but 5 items from above are missing
- ☐ 8 = A Need for the Proposed Action is included but 4 items from above are missing
- ☐ 9 = A Need for the Proposed Action is included but 3 items from above are missing
- ☐ 10 = A Need for the Proposed Action is included but 2 items from above are missing
- ☐ 11 = A Need for the Proposed Action is included but 1 item from above is missing
- ☐ 12 = A Need for the Proposed Action is included and no items from above are missing

D 2-3. Description of the Proposed Action (Item-5)

A Description of the Proposed Action provides detailed and specific information about the location of the project, flood hazard area, current conditions, scope of work, and specific work tasks. Does the summary contain the following?

- ☐ Yes ☐ No 1. The location of the proposed project, including the county, city and neighborhood
- ☐ Yes ☐ No 2. Description of the nearest cross streets with a detailed map
- ☐ Yes ☐ No 3. Exact GPS coordinates
- ☐ Yes ☐ No 4. The flood zone that the project is located in, as shown on the Flood Insurance Rate Map (FIRM)
- ☐ Yes ☐ No 5. A diagram from the FIRM
- ☐ Yes ☐ No 6. Description of the current condition with photos
- ☐ Yes ☐ No 7. Description of the scope of work for the proposed project
- ☐ Yes ☐ No 8. Work Breakdown Structure (WBS) of the proposed project
- ☐ Yes ☐ No 9. Plans and specifications of the proposed project (as an attachment)

SCORING:

- ☐ 0 = A Description of the Proposed Action is not included
- ☐ 1 = A Description of the Proposed Action is included but 9 items from above are missing
- ☐ 2 = A Description of the Proposed Action is included but 8 items from above are missing
- ☐ 3 = A Description of the Proposed Action is included but 7 items from above are missing
- ☐ 4 = A Description of the Proposed Action is included but 6 items from above are missing
- ☐ 5 = A Description of the Proposed Action is included but 5 items from above are missing
- ☐ 6 = A Description of the Proposed Action is included but 4 items from above are missing
- ☐ 7 = A Description of the Proposed Action is included but 3 items from above are missing
- ☐ 8 = A Description of the Proposed Action is included but 2 items from above are missing
- ☐ 9 = A Description of the Proposed Action is included but 1 item from above is missing
- ☐ 10 = A Need for the Proposed Action is included and no items from above are missing

D 2-4. Discussion of Alternatives Considered (Item-5)

A Discussion of the Alternatives Considered presents a systematic evaluation and comparison of the benefits and limitations of the proposed action, at least one other action that was considered, and the No Action alternative.

- ☐ 0 = A Discussion of Alternatives Considered is not included
- ☐ 1 = Only the proposed action is discussed in the Discussion of Alternatives Considered
- ☐ 2 = Only the proposed action and the No Action alternatives are presented in the Discussion of Alternatives Considered

- ☐ 3 = The proposed action, one alternative action, and the No Action alternative are discussed in the Discussion of Alternatives Considered
- ☐ 4 = The proposed action, two or more alternative actions, and the No Action alternative are discussed in the Discussion of Alternatives Considered

D 2-5. Coverage in the Mitigation Action Plan (Item-5)

The application should specifically state whether the proposed project is identified in the Mitigation Action Plan. The project may be specifically or generally identified.

- ☐ 0 = The application does not state whether the proposed project is identified in the Mitigation Action Plan or it states that the proposed project was not identified in the Mitigation Action Plan.
- ☐ 1 = The application states that the proposed project is GENERALLY identified in the Mitigation Action Plan.
- ☐ 2 = The application states that the proposed project is SPECIFICALLY identified in the Mitigation Action Plan.

D 3. Cost Breakdown (Item-6)

The Project Cost Breakdown should match the description of the scope of work and work tasks, if possible. Ideally, it will have been prepared by a consultant or using an acceptable pricing guide (such as R.S. Means), which is clearly identified in the discussion of the Cost Breakdown. Does the Cost Breakdown contain the following?

- ☐ Yes ☐ No 1. Is the cost breakdown detailed (i.e., does it include more than 3, and preferably more than 5 line items)?
- ☐ Yes ☐ No 2. Does the cost breakdown match the Work Breakdown Structure or the work tasks?
- ☐ Yes ☐ No 3. Is there evidence that a consultant has prepared the cost breakdown?
- ☐ Yes ☐ No 4. Is there evidence that a national pricing guide was used?

SCORING:

- ☐ 0 = No Cost Breakdown is included
- ☐ 1 = A Cost Breakdown is included but 1 item from above is missing
- ☐ 2 = A Cost Breakdown is included but 2 item from above are missing

- ☐ 3 = A Cost Breakdown is included but 3 items from above are missing
- ☐ 4 = A Cost Breakdown is included but 4 items from above are missing

D 4. Proposed Work Schedules

The proposed work schedule must address two issues: (1) the project must be completed within two years, and (2) more than two activities must be contained in every quarter of the year. Does the proposed work schedule contain the following?

- ☐ Yes ☐ No 1. Does the proposed work schedule include at least 2 activities per quarter?
- ☐ Yes ☐ No 2. Does the proposed work schedule indicate that the project can be completed in two years or less?

SCORING:

- ☐ 0 = No work schedule is included
- ☐ 1 = A work schedule is included but 1 item from above is missing
- ☐ 2 = A work schedule is included but 2 item from above are missing

D 5. Flood Insurance Rate Map (FIRM) with Project Plotted (Item-15)

The FIRM shows mapped special flood hazard areas and will indicate whether the proposed project is located within a mapped flood hazard zone. Have the following issues been considered?

- ☐ Yes ☐ No 1. A FIRM is included in the application
- ☐ Yes ☐ No 2. The floodplain map panel number is shown on the FIRM
- ☐ Yes ☐ No 3. The Project Location is plotted with coordinate data (lat/long)

SCORING:

- ☐ 0 = A FIRM is not included
- ☐ 1 = A FIRM is included but does not show the panel number or plotted project
- ☐ 2 = A FIRM is included and shows the panel number and plotted project

D 6. Photographs of Project Area (Item-16)

Photographs are required and are useful for documenting the impacted areas as well as the damage resulting from an event. Scoring includes:

SCORING:

- ☐ 0 = No photographs are included
- ☐ 1 = One photograph is included after the event
- ☐ 2 = More than one photographs are included after the event
- ☐ 3 = One photograph is included during the event
- ☐ 4 = More than one photographs are included during the event

E. ENVIRONMENTAL & HISTORICAL INFORMATION

E 1. Description of Environmental and Historical Information (Item 11)

The Environmental and Historical Information section documents the potential impacts the project will have on the environment, natural resources, and on cultural resources and has very specific sections that must be completed by the applicant. These sections are intended to help the applicant ultimately fill out the Record of Environmental Consideration. Are each of the following sections included in the Environmental and Historical Information section?

- ☐ Yes ☐ No 1. A discussion of existing resources in the project area: the projects' estimated lat/long (decimal degrees to 5 decimal places). Provide a description of the project area. Include natural and historic resources, significant cultural or social issues, and land use concerns.
- ☐ Yes ☐ No 2. Need for the proposed action is described
- ☐ Yes ☐ No 3. Description of the proposed action is described
- ☐ Yes ☐ No 4. Alternatives considered is described
- ☐ Yes ☐ No 5. Land Use & Socioeconomic Issues
- ☐ Yes ☐ No 6. Air & Water Quality Issues
- ☐ Yes ☐ No 7. Natural Resources Issues
- ☐ Yes ☐ No 8. Archeological & Historical Issues
- ☐ Yes ☐ No 9. Hazardous Material Issues

☐ Yes ☐ No 10. Public Involvement Issues

SCORING:

- ☐ 0 = An Environmental & Historical Information section is not included
- ☐ 1 = An Environmental & Historical Information section is included but 10 items from above are missing
- ☐ 2 = An Environmental & Historical Information section is included but 9 items from above are missing
- ☐ 3 = An Environmental & Historical Information section is included but 8 items from above are missing
- ☐ 4 = An Environmental & Historical Information section is included but 7 items from above are missing
- ☐ 5 = An Environmental & Historical Information section is included but 6 items from above are missing
- ☐ 6 = An Environmental & Historical Information section is included but 5 items from above are missing
- ☐ 7 = An Environmental & Historical Information section is included but 4 items from above are missing
- ☐ 8 = An Environmental & Historical Information section is included but 3 items from above are missing
- ☐ 9 = An Environmental & Historical Information section is included but 2 items from above are missing
- ☐ 10 = An Environmental & Historical Information section is included but 1 item from above is missing
- ☐ 11 = An Environmental & Historical Information section is included but no items from above are missing

SECTION IV – MITIGATION PROJECT COST EFFECTIVENESS

F. BENEFIT COST ANALYSIS, RATIO, AND SUPPORTIVE DATA

F 1. Benefit Cost Analysis & Cost Effectiveness Study (Item-14)

The Benefit Cost Analysis (BCA) is a critical element of the application package. In all cases, except for Mitigation Action Plans, substantially damaged Acquisition Projects,

and initiatives, an application is required to have a Benefit-Cost Study. The Benefit-Cost Ratio (BCR) must be 1.0 or greater to be eligible for funding, and backup data is necessary to support the benefits and the costs described in the application. The BCR can be calculated by using the BCA tools approved by FEMA, with appropriate objective back up data.

F 1-1. BCA Cover Sheet with Benefit-Cost Ratio (BCR) (Item-14)

The BCA Cover Sheet identifies the method of BCR calculation and the BCR. Are the following items included in this element?

- ☐ Yes ☐ No 1. BCA coversheet
- ☐ Yes ☐ No 2. BCR is 1.0 or greater

SCORING:

- ☐ 0 = A BCA Cover Sheet is not included
- ☐ 1 = A BCA Cover Sheet is included but the BCR is less than 1.0 OR
- ☐ 1 = A BCA Cover Sheet is included but the BCR cannot be determined/verified
- ☐ 2 = A BCA Cover Sheet is included and the BCR is 1.0 or greater

F 1-2. Benefit Cost Analysis (BCA) Output (Item-14)

The Benefit Cost Analysis is often performed using FEMA-provided standard software, although occasionally FEMA will accept alternative methods. The output from the software application must be printed and included in the application package.

SCORING:

- ☐ 0 = The BCA software output is not included
- ☐ 1 = The BCA software output is included

F 1-3 BCA Back-up Data and Assumptions (Item-14)

Objective, well-documented backup data that supports the benefit-cost study are required as part of the BCA. Lack of credible backup data may potentially cause the entire application to be rejected by FEMA. For example, the type of backup data that will likely be required include: (1) event frequency, (2) rainfall data, (3) dollar value

of damages, (3) event that will be mitigated (i.e., 100-year event), and (4) effectiveness of the proposed project. Issues to consider include:

- ☐ Yes ☐ No 1. The damages have been documented with receipts, damage reports (such as Project Worksheets or FEMA Basic Report), FEMA allowances, or other credible sources of damage reporting
- ☐ Yes ☐ No 2. The event recurrence interval has been documented using credible sources, such as National Weather Service, NOAA, or USGS records
- ☐ Yes ☐ No 3. The effectiveness of the proposed mitigation project has been well-documented (e.g., demonstrated that the proposed action will mitigate a 50-year event)

SCORING:

- ☐ 0 = No back-up data has been included
- ☐ 1 = Back-up data is included but 3 items from above are missing
- ☐ 2 = Back-up data is included but 2 items from above are missing
- ☐ 3 = Back-up data is included but 1 items from above are missing
- ☐ 4 = Back-up data is included and no items from above are missing

Chapter 5: Demonstration of the CQS System

5.1 OVERVIEW

The CQS system employed a user-friendly computer tool to assess mitigation project definition and application packages (MPDP). The CQS system includes the CQS scores and detailed descriptions, which are standards to develop as well as to rate MPDPs. One objective of this study was to make the CQS system practical, so this chapter develops a user-friendly computer tool (Figure 5.1). This chapter also demonstrates how the CQS system assesses six completed MPDPs, and analyzes the results.

Figure 5.1: Framework of CQS System Development

5.2 APPLICATION TOOL DEVELOPMENT

A user-friendly application tool was developed to apply the CQS system for a practical assessment of the completeness and quality of MPDPs. The tool was developed using Microsoft Access™ 2007, a widely used relational database management system. This software package was chosen because of its ease of data entry, its ability to efficiently sort data and its availability. In addition, this tool could be used throughout the MPDP development and rating process, from data entry to score delivery. Moreover, this tool contains a user-friendly interface (Figure 5.2) which an evaluator or developer can easily follow. The MPDP data entry screens follow the order of elements listed in the State Application Instructions.

Figure 5.2: Sample Snapshot of the User-Friendly Tool

Information related to an indicator can be filled out by clicking a checkbox next to the instruction for that indicator if a MPDP contains information that associated with the description of the indicator (Figure 5.2.)

5.3 ATTRIBUTIONS OF SAMPLE PROJECTS USED FOR ANALYSIS

To assess the CQS system and the application tool, six completed mitigation project definition and application packages were examined. The applicant and project information is summarized in Table 5.1. Two of the six applicants were cities, three were counties, and one was a drainage district. All of the projects were intended to mitigate the impacts of flooding, and the types of requested projects included four culvert replacements or installations, one channel construction, and one general drainage improvement project. The projects ranged in value from \$253,000 to \$902,000.

Table 5.1: Applicants and Project Information

Applicant No.	Entity	Event Mitigated	Type of Project	Cost
1	County	Flood	Culvert replacement	\$294,000
2	Drainage District	Flood	Drainage improvements	\$902,000
3	City	Flood	Install storm sewers	\$458,000
4	City	Flood	Install storm sewers	\$715,000
5	County	Flood	Elevate road/install culverts	\$253,000
6	County	Flood	Channel construction	\$665,000

5.4 ASSESSMENT RESULTS

The results are presented in Table 5.2 (section scoring: SQ) and Table 5.3 (overall scoring: CQS). The applicants are identified in rows, and the project definition and application package sections are identified in columns.

Table 5.2 displays SQ scores, which are the unweighted-standardized scores for the four application sections and calculated by equation (1). Each row in the table represents the scores received by one applicant, and both the raw score and the SQ score are displayed in the table. At the bottom of the table, the total possible raw score and SQ score for each section is shown. For example, the first applicant received a raw score of two out of three for Section I, 16 out of 18 for Section II, 54 out of 65 for Section III, and six out of seven for Section IV. Each of these raw scores is normalized to the Section-Quality (SQ) score with a maximum score of 100, shown in the rows below each raw score. For instance, Applicant 1's raw score of 2 for Section I is normalized to a SQ score of 66.7.

As can be seen in the fourth bottom row of Table 5.2, the mean SQ scores in Section I and II are over 60 out of 100, while Section III and IV are below 40. These results indicate that the eligibility status (Section I) and standard forms (Section II) are relatively well developed and completed compared to the project information (Section III) and the Benefit-Cost Analysis (BCA) (Section IV). Section I and II deal with “straightforward” issues. Section I denotes whether the project applicants are eligible to be awarded the HMGP mitigation funds, and Section II considers the standard forms that must be correctly completed. On the other hand, Section III and IV discuss “creative” issues, which need to be developed with data and engineering tools and skills. Therefore, these results assume that it is more difficult to develop creative sections (Section III and IV) than straightforward sections (Section I and II). Also, the standard deviations on the

SQ scores of Sections III and IV are larger than those of Sections I and II. This shows that there are bigger differences in the completeness and quality of the creative sections than those of the straightforward sections. Thus, the project information (Section III) and the Benefit-Cost Analysis (Section IV) can increase the completeness and quality of MPDPs.

Table 5.2: Mitigation Project Definition Section Quality (SQ) Scores

Applicant No.	Scores	Raw / Section Quality (SQ) Scores				Total
		Section I	Section II	Section III	Section IV	
APP.1	Raw Score	2	16	54	6	78
	SQ Score	66.7	88.9	83.1	85.7	324.3
APP.2	Raw Score	2	13	31	3	49
	SQ Score	66.7	72.2	47.7	42.9	229.4
APP.3	Raw Score	2	14	12	2	30
	SQ Score	66.7	77.8	18.5	28.6	191.5
APP.4	Raw Score	1	8	20	1	30
	SQ Score	33.3	44.4	30.8	14.3	122.8
APP.5	Raw Score	2	9	18	3	32
	SQ Score	66.7	50.0	27.7	42.9	187.2
APP.6	Raw Score	2	12	9	1	24
	SQ Score	66.7	66.7	13.8	14.3	161.5
Mean Raw Score		1.8	12.0	24.0	2.7	40.5
Standard Deviation		0.41	3.03	16.55	1.86	20.22
Mean SQ Score		61.1	66.7	36.9	38.1	202.8
Standard Deviation		13.6	16.9	25.5	26.6	69.2
Max. Raw Score		3	18	65	7	93
Max. Std. Score		100	100	100	100	400

Table 5.3 displays the standardized scores (SQ scores) and the weighted standardized scores for each section. For example, Section I has a weight of 30%; hence, the total weighted standardized score possible is $100 \times 0.30 = 30$. The first applicant received a weighted standardized score of 20 for Section I. The total possible overall weighted score, which is a CQS score calculated by equation (2), is 100. The first applicant received a CQS score of 79.5. Comparatively, the first applicant had a relatively high CQS score (79.5), whereas the fourth applicant had a low CQS score (28.0). The fourth applicant needs to improve the completeness and quality of the benefit-cost analysis (Section IV) in order to compete more effectively for federal grant funding.

The standard deviations of weighted SQ scores in the third from the bottom row of Table 5.3 show that the standard deviation of Section III (7.6) and Section IV (8.0) are higher than that of Section I (4.1) and Section II (1.7). This result means that Sections III and IV have bigger ranges in terms of the completeness and quality of the MPDPs. The completeness and quality of Sections III and IV tend to more strongly affect a CQS score that represents the completeness and quality of MPDPs. In other words, the completeness and quality of MPDPs may depend more on how well the project applicants developed the project definitions (Section III) and discussed this project's benefit based on its cost (Section IV).

Table 5.3: Mitigation Project Definition Completeness-Quality Scores (CQSs)

Applicant No.	Scores	Weighted Standardized Scores				Total Score
		SECTION I	SECTION II	SECTION III	SECTION IV	
		Weight: 30%	Weight: 10%	Weight: 30%	Weight: 30%	
APP.1	SQ Score	66.7	88.9	83.1	85.7	324.3
	Wt. Score	20.0	8.9	24.9	25.7	79.5
APP.2	SQ Score	66.7	72.2	47.7	42.9	229.4
	Wt. Score	20.0	7.2	14.3	12.9	54.4
APP.3	SQ Score	66.7	77.8	18.5	28.6	191.5
	Wt. Score	20.0	7.8	5.5	8.6	41.9
APP.4	SQ Score	33.3	44.4	30.8	14.3	122.8
	Wt. Score	10.0	4.4	9.2	4.3	28.0
APP.5	SQ Score	66.7	50.0	27.7	42.9	187.2
	Wt. Score	20.0	5.0	8.3	12.9	46.2
APP.6	SQ Score	66.7	66.7	13.8	14.3	161.5
	Wt. Score	20.0	6.7	4.2	4.3	35.1
Mean SQ Score		61.1	66.7	36.9	38.1	202.8
Standard Deviation		13.6	16.9	25.5	26.6	69.2
Mean Weighted SQ Score		18.3	6.7	11.1	11.5	47.5
Standard Deviation		4.1	1.7	7.6	8.0	18.1
Max. Score	Standard.	100	100	100	100	400
	Weighted	30	10	30	30	100

Chapter 6: Conclusion

This research explored the completeness and quality of mitigation project definition and application packages (MPDP) and created the Completeness-Quality Score (CQS) system to assess MPDPs. In the course of this study, 93 indicators categorized into four sections, along with detailed descriptions, were developed. These indicators and the descriptions can increase the ability of project applicants or developers to create more complete, high quality MPDPs.

These indicators were transformed a qualitative process of evaluating project definitions to a quantitative rating system, CQS, to rate MPDPs. This system also operates as a checklist for the completeness and quality of MPDPs, guides the efforts of the project applicant, and answers communities' questions about how to define a high quality project definition. This study increased the knowledge regarding what factors need to be contained in MPDPs, and how these factors influence their completeness and quality.

This chapter reviews the research objectives and methodology, followed by a discussion of the findings and conclusions. Finally, the limitations of the study and ideas for future research are presented.

6.1. RESEARCH OBJECTIVES AND ACCOMPLISHMENTS REVISITED

The goal of this research was to better understand hazard mitigation project definition, so the focus of the research was to develop an appropriate and objective evaluation system including a tool to assess the completeness and quality of mitigation

project definition and application packages (MPDP) submitted for funding under the federal Hazard Mitigation Grant Program (HMGP). The specific objectives of the research were the following:

1. Develop a checklist of scope elements and associated detailed definitions that can be used by communities to develop high quality, complete mitigation project definition packages,
2. Develop a rating method and tool that can be used both by project applicants or developers, mostly local communities, to develop a more complete and high quality MPDPs, and by state officials to evaluate the completeness and quality of submitted MPDPs for the purpose of selecting projects for funding through the HMGP, and
3. Demonstrate the effectiveness of the rating tool for comparing the completeness and quality of mitigation project definition packages.

These research objectives were accomplished as follows:

1. Mitigation project scope quality elements and their indicators were identified and defined through a qualitative process. These elements and indicators were categorized into four sections. The process resulted in the development of a checklist associated with the detailed definitions,
2. These sections and indicators were transformed a quantitative process into a quantitative rating system; namely, the Completeness-Quality Score (CQS) system. This system provides a CQS score with a maximum possible value of 100. The CQS score represents the completeness and quality of MPDPs, and
3. The CQS system employed a computer based assessment tool with a user-friendly interface. This system assessed six completed MPDPs, and provided CQS scores for each MPDP.

This research has successfully developed a quantitative rating system called the CQS system, which can be used by both project developers and project evaluators. Project developers, including local communities or independent districts, can develop better, more complete and higher quality mitigation project definitions and application packages (MPDP) for HMGP funds. Project evaluators, mostly state mitigation officers, can rate the completeness and quality of MPDPs and select the best projects to be awarded HMGP funds. Another significant advantage is that both the project developers and project evaluators can employ the same, consecutive, accurate and objective standards to develop and evaluate MPDPs.

6.2. LIMITATIONS AND FUTURE STUDIES

This research focused on factors that affect the completeness and quality of mitigation project definitions to obtain or award HMGP funds. This research developed the CQS system and demonstrated how it works. However, although our application of the CQS system suggests that Sections III and IV that have bigger gaps between successful and unsuccessful MPDPs need further development, this suggestion is tentative because the sample size of the data used in the analysis was limited. This study was not able to define “good” scores that need to be reached, because data related to rejected MPDPs are rarely kept. A hypothesis that all indicators in a section are equally important might also limit the validity of the system.

Future research will involve conducting a reliability analysis of this system. Hence, future research is intended to collect additional data on MPDPs that are both awarded and rejected, and to further refine the scoring method. A validity and reliability

analysis will be conducted to determine the importance of each indicator to the total index score.

Appendix A

SCORE SHEET USED PRIMARILY FOR HURRICANE AND FLOOD DISASTERS

		POINTS	SCORE
Is this project geographically identified in the applicants MAP?		45	
Is this <i>type</i> of project identified in the applicants MAP?		10	
Is this project in the declared area?		20	
Is this project in a CRS community?		2	
ENVIRONMENTAL			
Catex eligible?		5	
Assessment required?		3	
Requires Full Environmental Impact Statement		1	
COST EFFECTIVE			
Good BC study provided		5	
Initiative project (no BC required)		5	
Weak BC study provided		3	
No BC study provided		1	
STATE STRATEGY POINTS			
Residential			
Is buyout in the floodplain	Value:	10	
Buyout of a NFIP repetitive loss home	Value:	7	
Other Buyouts	Value:	5	
Residential Relocation		4	
Elevation		4	
Retrofit & Safe-rooms		3	
Structural		2	
Warning and Public Information Systems		1	
Mitigation Action Plans		1	
Equipment		1	

Appendix B: Sample Mitigation Project Definitions and Application Package

THE TITLE OF THE INDIVIDUAL SIGNING THE DOCUMENT:		05/94
HAZARD MITIGATION GRANT PROGRAM		
PROJECT APPLICATION		
APPLICANTS, PLEASE FILL IN SECTIONS 1 - 13 ONLY.		
TEXAS DIVISION OF EMERGENCY MANAGEMENT		
1. Project County: <u>Maverick County</u>	5. Point - of - Contact <u>Mr. John P. Sullivan</u>	County Admin.
2. Name of Applicant: (City, Agency, etc.) <u>MAVERICK COUNTY</u>	Phone: (830) 773-3824	
3. FIPS Code: <u>48-323</u>	FAX No. (830) 773-6450	
4. Address: (Street, City, ZIP) <u>500 Quarry Street Suite 3, Eagle Pass, Texas 78852-4528</u>		
6. Description of Project / Scope of Work: <u>Channel, Culvert, and Clearing on Unnamed Tributary to Rio Grande River.</u>		
7. List Alternative Measures Considered: <u>Buyout and Relocation, Upstream Detention, Upstream Channelization and Channel Lining</u>		
8. Estimated Project Cost: <u>\$ 665,000</u>	This Section for State use only	
9. FEMA Funding Requested: <u>\$ 500,000</u>	Disaster Declaration Number: <u>1677</u>	
10. Proposed Project: Start Date: <u>9-1-07</u> Ending Date: <u>9-1-08</u>	Date Received: <u>7/24/07</u> Application #: <u>201</u> Rank:	
11. Attached Documentation (required prior to final approval):	State Recommendation	
Application Form	YES	NO
Narrative Statement	YES	NO
Signed Financial Certification	YES	NO
Environmental Questionnaire	YES	NO
Benefit Cost Analysis	YES	NO
SP424	YES	NO
Participant in National Flood Insurance Program (NFIP)	YES	NO
12. Signature: <u>[Signature]</u>	SHMO Signature	
13. Title: <u>County Judge</u>	Date: <u>7-26-07</u>	

ENTERED 505

- (16) Intentionally omitted; This State Assurance corresponds with OMB Approved No. 0348-0042 Federal Assurance number (15).
- (17) Intentionally omitted; This State Assurance corresponds with OMB Approved No. 0348-0042 Federal Assurance number (16).
- (18) Intentionally omitted; This State Assurance corresponds with OMB Approved No. 0348-0042 Federal Assurance number (17).
- (19) Intentionally omitted; This State Assurance corresponds with OMB Approved No. 0348-0042 Federal Assurance number (11).
- (20) Intentionally omitted; This State Assurance corresponds with OMB Approved No. 0348-0042 Federal Assurance number (9).
- (21) Subgrantees will comply with Public Law 103277, also known as the Pro-Children Act of 1994 (Act), which prohibits smoking within any portion of any indoor facility used for the provision of services for children as defined by the Act.
- (22) Subgrantees will comply with all federal tax laws and are solely responsible for filing all required state and federal tax forms.
- (23) Subgrantees will comply with all applicable requirements of all other federal and state laws, executive orders, regulations and policies governing this program.
- (24) The applicant must certify that they are not debarred or suspended or otherwise excluded from or ineligible for participation in federal assistance programs.
- (25) Subgrantees must adopt and implement applicable provisions of the model HIV/AIDS work place guidelines of the Texas Department of Health as required by the Texas Health and Safety Code, Ann., Sec. 85.001, et seq.

[Signature] Date 2 Aug 07

Subgrantee Mr. Jose A. Aranda, Jr.

IR	2007	CA FOR (Name of Applicant) Maverick County, Texas
----	------	--

summary sheet includes Assurances and Certifications that must be read, signed, and submitted as a part of the application for Federal Assistance.

applicant must check each item that they are certifying to:

Part I ☒ FEMA Form 20-16A, Assurances-Nonconstruction Programs

Part II ☒ FEMA Form 20-16B, Assurances-Construction Programs

Part III ☒ FEMA Form 20-16C, Certifications Regarding Lobbying; Debarment, Suspension, and Other Responsibility Matters; and Drug-Free Workplace Requirements

Part IV ☒ SF LLL, Disclosures of Lobbying Activities (If applicable)

the duly authorized representative of the applicant. I hereby certify that the applicant will comply with the identified attached assurances and certifications.

Jose A. Aranda, Jr.
Typed Name of Authorized Representative

County Judge

Signature of Authorized Representative

Date Signed 2 AUG 07

NOTE: By signing the certification regarding debarment, suspension, and other responsibility matters for primary covered transaction, the applicant agrees that, should the proposed covered transaction be entered into, it shall not knowingly enter any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by FEMA entering into this transaction.

The applicant further agrees by submitting this application that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by FEMA Regional Office entering into this covered transaction, without modification, in all lower tier covered transactions in all solicitations for lower tier covered transactions. (Refer to 44 CFR Part 17.)

Paperwork Burden Disclosure Notice

Reporting burden for this form is estimated to average 1.7 hours per response. Burden means the time, effort and financial resources expended by persons to generate, maintain, retain, disclose, or to provide information to us. You may estimate the burden of a particular collection of information by using the methodology set forth in the instructions for information collections. Management, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472, Paperwork Reduction Project (3067-0206). You are not required to respond to this collection of information unless a valid control number appears in the upper right corner of this form. Please do not send your completed form to the above address.

2. DATE SUBMITTED 7-26-07		Applicant Identifier 	
3. DATE RECEIVED BY STATE 		State Application Identifier 	
4. DATE RECEIVED BY FEDERAL AGENCY 		Federal Application Identifier 4-600702	

5. APPLICANT INFORMATION Legal Name: Maverick County, Texas Organizational (DUNS): 01-052-8289 Address: Street: 500 Quarry Street Suite: 3 City: Engle Pass County: Maverick County State: Texas Zip Code: 78652-4528		Organizational Unit: Administrative Assistant to County Judge Division: Name and telephone number of person to be contacted on matters involving this application (give area code) Prefix: Mr. First Name: John Middle Name: P. Last Name: Sullivan Suffix: N/A	
6. EMPLOYER IDENTIFICATION NUMBER (EIN): - - - - - a. TYPE OF APPLICATION: ☐ New ☐ Continuation ☐ Revision Revision: ☐ If yes, enter appropriate letter(s) in box(es) (See back of form for description of letters) Other (specify):		Email: julsullivan@maverickcounty.org Phone Number (give area code): (800) 773-3824 FAX Number (give area code): (800) 773-6450 7. TYPE OF APPLICATION: (See back of form for Application Types) B County Government Other (specify):	

8. NAME OF FEDERAL AGENCY: FEDERAL DEPARTMENT OF THE INTERIOR DESCRIPTIVE TITLE OF AGENCY'S PROJECT: Drainage Improvements to Unnamed Tributary, Maverick County, Texas		9. NAME OF FEDERAL AGENCY: FEDERAL DEPARTMENT OF THE INTERIOR DESCRIPTIVE TITLE OF AGENCY'S PROJECT: Drainage Improvements to Unnamed Tributary, Maverick County, Texas	
--	--	--	--

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: - - - - -		11. PROPOSED PROJECT Start Date: 9-1-07 Ending Date: 9-1-08	
12. AREAS AFFECTED BY PROJECT (Cities, Counties, States, etc.) Engle Pass, Maverick County, Texas		13. ESTIMATED FUNDING:	
a. Federal	\$	500,000.00	
b. Applicant	\$	165,000.00	
c. State	\$	.00	
d. Local	\$	.00	
e. Other	\$	.00	
f. Program Income	\$	.00	
g. TOTAL	\$	665,000.00	

16. TO THE BEST OF MY KNOWLEDGE AND BELIEF ALL DATA IN THIS APPLICATION ARE TRUE AND CORRECT. THE APPLICANT HEREBY AUTHORIZES THE AGENCIES AND THE APPLICANT WILL COMPLY WITH THE ATTACHED REPRESENTATIONS.		17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT? ☐ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No	
18. SIGNATURE OF APPLICANT (Typed Name) John P. Sullivan		19. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
20. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		21. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

22. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		23. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
24. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		25. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

26. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		27. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
28. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		29. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

30. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		31. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
32. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		33. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

34. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		35. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
36. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		37. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

38. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		39. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
40. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		41. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

42. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		43. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
44. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		45. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

46. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		47. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
48. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		49. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

50. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		51. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
52. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		53. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

54. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		55. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
56. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		57. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

58. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		59. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
60. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		61. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

62. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		63. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
64. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		65. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

66. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		67. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	
68. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan		69. SIGNATURE OF AGENCIES (Typed Name) John P. Sullivan	

Paperwork Burden Disclosure Notice

Reporting burden for this form is estimated to average 1.7 hours per response. Burden means the time, effort and financial resources expended by persons to generate, maintain, retain, disclose, or to provide information to us. You may estimate the burden by aggregating all reported burdens for a particular form and divide this total by the number of respondents, including those who do not provide an answer. For example, if persons report a total of 170 hours of burden for a particular form and the form is reported by 100 persons, then the average burden per person for this form is 1.7 hours. Your comments and suggestions for reducing the burden should include estimates of any potential reduction in hours. Send comments to the Department of the Treasury, Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472, and to the Paperwork Reduction Project (3057-0206). You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Please do not send your completed form to the above address.

FEDERAL EMERGENCY MANAGEMENT AGENCY ASSURANCES-NON-CONSTRUCTION PROGRAMS	
<p>Notes: Certain of these assurances may not be applicable to your project or program. If you have any questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.</p> <p>As the duly authorized representative of the applicant, I certify that the applicant:</p>	
1.	<p>Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of the project described in this application.</p>
2.	<p>Will give the awarding agency, the Comptroller General of the United States, and if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award, and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.</p>
3.	<p>Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal gain.</p>
4.	<p>Will initiate and complete the work within the available time frame after receipt of approval of the awarding agency.</p>
5.	<p>Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. Section 4728-4763) relating to prescribed standards for merit systems for programs funded under one of the nineteen statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration 5 C.F.R. 900, Subpart F).</p>
6.	<p>Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. Sections 1681, 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. Section 794), which prohibits discrimination on the basis of handicaps; (d) The Age Discrimination Act of 1975, as amended (42 U.S.C. Sections 6101-6107), which prohibits discrimination on the basis of age; (e) The Drug Abuse Office and Treatment Act (21 U.S.C. 262-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of</p>
7.	<p>Will comply, or has already complied, with the requirements of Title II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or Federally assisted programs. These requirements apply to all interest in real property acquired for project purposes regardless of Federal participation in purchases.</p>
8.	<p>Will comply with provisions of the Hatch Act (5 U.S.C. Sections 1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.</p>
9.	<p>Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. Sections 276a to 276a-7), the Copeland Act (40 U.S.C. Section 276c and 18 U.S.C. Sections 874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. Sections 327-333), regarding labor standards for Federally assisted construction agreements.</p>
10.	<p>Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.</p>

11.	<p>Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order 11514; (b) notification of "flood" facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11996; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State Management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. Section 1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. Section 7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended, (P.L. 93-523); and (h) protection of endangered species under the Endangered Species Act of 1973, as amended, (P.L. 93-205).</p>
12.	<p>Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. Section 1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.</p>
13.	<p>Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470), 9 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469a-1 et seq.).</p>
14.	<p>Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.</p>
15.	<p>Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. 2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.</p>
16.	<p>Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. Section 4801 et seq.) which prohibits the use of lead based paint in construction or rehabilitation of residence structures.</p>
17.	<p>Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act of 1984.</p>
18.	<p>Will comply with all applicable requirements of all other Federal laws, executive orders, regulations and policies governing this program.</p>
19.	<p>It will comply with the minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act (29 U.S.C. 201), as they apply to employees of institutions of higher education, hospitals, and other non-profit organizations.</p>

FEDERAL EMERGENCY MANAGEMENT AGENCY ASSISTANCE-CONSTRUCTION PROGRAMS	
<p>NOTE: Certain of these assurances may not be applicable to your project or program. If you have any questions, please contact the awarding agency. Further, certain Federal assistance awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.</p> <p>As the duly authorized representative of the applicant, I certify that the applicant:</p>	
1. I have the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of the project described in this application.	9. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. Sections 4801 et seq.) which prohibits the use of lead based paint in construction or rehabilitation of residence structures.
2. Will give the awarding agency, the Comptroller General of the United States, and if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the assistance; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.	10. Will comply with all Federal statutes relating to non-discrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. Sections 1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. Section 794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. Sections 6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to non-discrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to non-discrimination on the basis of alcohol abuse or alcoholism; (g) Sections 523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. Section 3601 et seq.), as amended, relating to non-discrimination in the sale, rental or financing of housing; (i) any other non-discrimination provision in the specific statute(s) under which application for Federal assistance is being made; and (j) the requirements of any other non-discrimination statute(s) which may apply to the application.
3. Will not dispose of, modify the use of, or change the terms of the real property title, or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal interest in the title of real property in accordance with awarding agency directives and will include a covenant in the deed of real property acquired in whole or in part with Federal assistance funds to assure nondiscrimination during the useful life of the project.	11. Will comply, or has already complied, with the requirements of Title II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or Federally assisted programs. These requirements apply to all interest in real property acquired for project purposes regardless of Federal participation in purchase.
4. Will comply with the requirements of the assistance awarding agency with regard to the drafting, review and approval of construction plans and specifications.	12. Will comply with provisions of the Hatch Act (5 U.S.C. Sections 1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
5. Will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the complete work conforms with the approved plans and specifications and will furnish progress reports and such other information as may be required by the assistance awarding agency or state.	
6. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.	
7. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.	
8. Will comply with the Intergovernmental Personnel Act (50 U.S.C. Sections 4728-4763) relating to prescribed standards for merit systems for programs funded under one or the nineteen statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).	

13. Will comply, as applicable, with the provisions of the Disaster Relief Act (40 U.S.C. Sections 276a to 276a-7), the Flood Insurance Act (40 U.S.C. Section 276c and 18 U.S.C. Section 874), the Contract Work Hours and Safety Standards Act (40 U.S.C. Sections 327-333) regarding labor standards for federally assisted construction subagreements.	20. It will comply with the minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act (29 U.S.C. 201), as they apply to employees of institutions of higher education, hospitals, and other non-profit organizations.
14. Will comply with the Flood Insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.	21. It will obtain approval by the appropriate Federal agency of the final working drawings and specifications before the project is advertised or placed on the market for bidding; that it will construct the project, or cause it to be constructed, to final completion in accordance with the application and approved plans and specifications; that it will submit to the appropriate Federal agency for prior approval changes that alter the cost of the project, use of space, or functional layout, that it will not enter into a construction contract(s) for the project or undertake other activities until the conditions of the construction grant program(s) have been met.
15. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violations pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. Section 1451 et seq.); (f) conformity with Federal actions to State (Clean Air) Implementation Act under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. Section 7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended, (P.L. 93-523); and (h) protection of endangered species under the Endangered Species Act of 1973, as amended, (P.L. 93-205).	22. It will operate and maintain the facility in accordance with the minimum standards as may be required or prescribed by the applicable Federal, State, and local agencies for the maintenance and operation of such facilities.
16. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. Section 1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.	23. It will require the facility to be designed to comply with the "American Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped," Number A117 - 1961, as modified (41 CFR 101-17.703). The applicant will be responsible for conducting inspections to ensure compliance with these specifications by the contractor.
17. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470), EO 11593 (identification and preservation of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 409a-1 et seq.).	24. If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the applicant, this assistance shall obligate the applicant, or in the case of any transfer of such property, any transfer, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits.
18. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act of 1984.	25. In making subgrants with nonprofit institutions under this Comprehensive Cooperative Agreement, it agrees that such grants will be subject to OMB Circular A-122, "Cost Principles for Non-profit Organizations" included in Vol. 49, Federal Register, pages 18260 through 18277 (April 27, 1984).

FEDERAL EMERGENCY MANAGEMENT AGENCY

CERTIFICATIONS REGARDING LOBBYING; DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS; AND DRUG-FREE WORKPLACE REQUIREMENTS

Applicants should refer to the regulations cited below to determine the certification to which they are required to attest. Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 44 CFR Part 18, "New Restrictions on Lobbying, and 28 CFR Part 17, "Government-wide Debarment and Suspension (Nonprocurement) and Government-wide Requirements for Drug-Free Workplace (Grants)." The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Federal Emergency Management Agency (FEMA) determines to award the covered transaction, grant, or cooperative agreement.

1. LOBBYING

A. As required by section 1552, Title 31 of the U.S. Code, and implemented at 44 CFR Part 18, for persons entering into a grant or cooperative agreement over \$100,000, as defined at 44 CFR Part 18, the applicant certifies that:

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of any agency, or an employee of a Member of Congress in connection with the making of any Federal grant, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal grant or cooperative agreement.

(b) If any other funds than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of any agency, or an employee of a member of Congress in connection with the Federal grant or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, contracts under grants and cooperative agreements, and subcontracts) and that all subrecipients shall certify and disclose accordingly.

☐ Standard Form LLL, "Disclosure of Lobbying Activities" attached (This form must be attached to certification if nonappropriated funds are to be used to influence activities.)

2. DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS (DIRECT RECIPIENT)

As required by Executive Order 12549, Debarment and Suspension, and implemented at 44 CFR Part 67, for prospective participants in procurement covered transactions, as defined at 44 CFR Part 17, Section 7.510-A, The applicant certifies that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, sentenced to a civil or Federal benefits by a State or Federal court, or voluntarily excluded from covered transactions by any Federal department or agency.

(b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, bribery, fraud, or obstruction of justice; or making false statements, or receiving stolen property.

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default; and

B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

3. DRUG-FREE WORKPLACE (GRANTEES OTHER THAN INDIVIDUALS)

As required by the Drug-Free Workplace Act of 1986, and implemented at 44 CFR Part 17, Subpart F, for grantees, as defined at 44 CFR Part 17, Sections 17.615 and 17.620:

A. The applicant certifies that it will continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(b) Establishing an on-going drug-free awareness program to inform employees about:

(1) The dangers of drug abuse in the workplace;

(2) The grantee's policy of maintaining a drug-free workplace;

(3) Any available drug counseling, rehabilitation, and employee assistance programs; and

(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(c) Making it a requirement that each employee to be engaged in the performance of the grant to be given a copy of this statement by paragraph (b).

(d) Notifying the employees in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will:

(1) Abide by the terms of this statement; and

(2) Notify the employee in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(e) Notifying the agency, in writing, within 10 calendar days after receiving notice under subparagraph (b)(2) from an employee or otherwise receiving actual notice of such conviction. Employees of convicted employees must provide notice, including position title, to the applicable FEMA awarding office, i.e., regional office or FEMA office.

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (b)(2), with respect to any employee who is so convicted:

(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f).

6. The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance (Street address, City, County, State, Zip code)

Maverick County, Texas - Drainage Improvements

to Unnamed Tributary near FM 1021

Check ☐ If there are workplaces on file that are not identified here.

Section 17.620 of the regulations provide that a grantee that is a State may elect to make one certification in each Federal fiscal year. A copy of which should be included with each application for FEMA funding. States and State agencies may elect to use a Statewide certification.

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OAG
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure)

1. Type of Federal Action: ☒ a. contract ☐ b. grant ☐ c. cooperative agreement ☐ d. loan ☐ e. loan guarantee ☐ f. loan insurance		2. Status of Federal Action: ☒ a. bid/offer/application ☐ b. initial award ☐ c. post-award		3. Report Type: ☒ a. initial filing ☐ b. material change For Material Change Only: year _____ quarter _____ date of last report _____	
4. Name and Address of Reporting Entity: ☒ Prime ☐ Subawardee Tier _____, if known:		5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:			
Congressional District, if known: 23		Congressional District, if known:			
6. Federal Department/Agency:		7. Federal Program Name/Description:			
Federal Action Number, if known:		CFDA Number, if applicable:			
8. Award Amount, if known: \$		9. Award Amount, if known: \$			
10. a. Name and Address of Lobbying Registrant (If individual, last name, first name, MI):		b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI):			
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the far above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.		Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____			
Federal Use Only:		Authorized for Local Reproduction (Standard Form LLL Rev. 7-97)			

Item 4. Narrative

Unnamed Tributary Drainage Improvements

The proposed mitigation measure in Maverick County on the Unnamed Tributary is to extend the concrete lined channel from its existing terminus behind the local middle school in Eagle Pass to El Indio Highway culvert (FM 1021). Then to add two additional box culverts under the roadway and extend the channel improvements downstream for about 100 feet. Clearing and/or purchase/donation of additional ROW for drainage would be extended further downstream. Exhibit 1 below shows these proposed improvements.

Exhibit 1 – Showing the Unnamed Tributary - Proposed Channel, Culvert and Drainage Improvements – Described later as Phase 4.

The proposed Unnamed Tributary Improvements are estimated to be around \$500,000 in construction cost. About 2000' of channel would have to be concrete lined; two culverts are proposed to be added at FM 1021.

The cost for these improvements is shown in Table 1 below. These quantities were taken from the December 2000 Eagle Pass Flood Protection Study and updated to July 2007 prices.

Table 1

[illegible]

Another aspect of the proposed drainage improvements is that this is essentially phase 4 of a four-part drainage improvement to the Unnamed Tributary from the Eagle Pass Flood Protection Study completed in December, 2000 by Halff Associates. This study identified approximately \$1.7 million in improvements on the Unnamed Tributary. (See Below) Since December, 2000, the City of Eagle Pass has embarked on a phased approach to implementing the drainage improvements on the Unnamed Tributary. The Public Works Department began this process as described below:

- First Phase – Channel Improvements from FM 3443 to Cherry Leaf Drive. The first phase of the project was a 70 wide concrete lined channel for approximately 2,300'. Transitions at FM 3443, Dog Creek, and Cherry Leaf Drive. Lane Associates, Inc. designed these improvements in 2003 for the City of Eagle Pass. The City built this phase with their own forces.
- Second Phase – Channel Improvements from FM 3443 to Laura Lane – 70 wide concrete lined for approximately 2,400'. Transitions at FM 3443 and foot bridge to Middle School. These drainage improvements were designed by Lane Associates, Inc. for Maverick County and constructed using Community Development Block Grant money.

- Third Phase – Language Center Detention Pond upstream of Chery Leaf Drive.** Approximately 200,000 cubic yards of dirt has to be removed to construct the detention pond, outlet works and inlet transition. The detention pond is designed as a dry detention pond and fills only during extreme storm events. Tetra-Tech designed this project for Maverick County in 2006. This project was funded in part by Community Development Block Grant money for the land acquisition and also funded in part by the City of Eagle Pass drainage fee assessment. This assessment is about \$3.00/resident/month.
- Fourth Phase – Extension of Channel Improvements to FM 1021 (El Indio Highway).** Culvert Improvements at El Indio Highway, and clearing and snagging downstream from FM 1021. The fourth phase is what is described and requested with this HMGCP application.

Exhibit 2 – Showing Drainage Improvements on Unnamed Tributary from Eagle Pass Flood Protection Study – December 2000.

Task	Description	Start Date	Months
1	Site Visit	8/1/2007	1
2	Data Collection		2
3	Field Surveys		3
4	Preliminary Study		4
5	Early Completed Work		5
6	Approval of Preliminary Study		6
7	Final Design		7
8	Specifications		8
9	Bidding		9
10	Construction Management		10
11	Project Close-out		11

HMGP Application
Schedule
Unnamed Tributary Drainage Improvements

UNNAMED TRIBUTARY DRAINAGE IMPROVEMENTS – PHASE 4
TEXAS STATE BENEFIT-COST STUDY COVERSHEET

(THIS COVERSHEET TO BE ATTACHED TO THE FACE OF ANY BENEFIT-COST STUDY
SUBMITTED FOR HMGP 06 PDM)

DATE: JULY 25, 2007 THE BENEFIT-COST FOR THIS PROJECT IS > 5 TO 1

1. THE BENEFIT-COST STUDY METHOD I HAVE CHOSEN TO USE IS: (CHECK ONE)

THE FEMA VERY LIMITED DATA MODULE.

☐ THE FEMA LIMITED DATA MODULE.

☐ THE FEMA FULL DATA MODULE.

☐ A DIFFERENT BENEFIT-COST METHOD OF MY CHOOSING.

2. IF NOT USING ONE OF THE FEMA MODULES, THE METHOD USED IN MY BENEFIT-COST STUDY INVOLVES: (CHECK ONE, IF APPLICABLE)

X METHOD 1, I WILL EXTRAPOLATE DATA FROM PAST LOSSES INTO THE FUTURE.

☐ METHOD 2, I WILL COMPARE THE STRUCTURES DESIGN OR ELEVATION TO EXPECTED LOADS OR FLOOD HEIGHTS.

3. If using the FEMA Limited, or Very Limited data module, or Method 1 of my own choosing, the loss frequency is 100 years¹.

4. I have checked and to the best of my ability to determine, the attached benefit-cost study is mathematically correct. Additionally, all figures used are supported by footnotes and attached documentation.

John N. Furlong, P.E.
Name of Person Preparing

¹ This is a number, not a range of numbers. Example: 5 years or 6.7 years, not 'frequently' or every 5 to 7 years

UN3Rev'd

HALFF ASSOCIATES, INC.
1221 N. Bower Road
Richardson, Texas 75081
(214) 344-6200

CLIENT: Maverick County/Eagle Pass
PROJECT: UN3 - Channel & Culvert Improvements
AVO: 1004-07-5284

FILE: Estimate
July 2007
BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on July, 2007 Price Levels)

Item No.	Description	Quantity	Units	Unit Price	Amount
1	Modification Excavation	10000	C.Y.	\$ 10,000.00	\$ 1,000,000.00
2	70" Concrete Channel	2000	L.F.	\$ 175.00	\$ 350,000.00
3	Concrete Channel Transition	100	L.F.	\$ 100.00	\$ 10,000.00
4	Culvert Improvement - RM 1021	200	S.Y.	\$ 60,000.00	\$ 12,000,000.00
5	Concrete Channel Backfill	200	C.V.	\$ 30.00	\$ 6,000.00
6	Utility Relocations	1	L.S.	\$ 10,000.00	\$ 10,000.00
7	Erosion Controls	1	L.S.	\$ 10,000.00	\$ 10,000.00
8	Seeding for Erosion Control	5000	S.Y.	\$ 1.00	\$ 5,000.00
		Subtotal			\$ 489,000.00
		Total			\$ 489,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that the contractor shall be responsible for obtaining all necessary permits and third party for any failure to accurately estimate the cost of this project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on July, 2007 Price Levels)

Item No.	Description	Quantity	Units	Unit Price	Amount
	Average residential structure value	Each		\$ 50,000.00	\$ -
1	Average business structure value	Each		\$ 100,000.00	\$ -
2	Residential contents	287	L.S.	\$ 23,500.00	\$ 6,675,500.00
3	Businesses	15	L.S.	\$ 12,500.00	\$ 187,500.00
4	Other	15	L.S.	\$ 100,000.00	\$ 1,500,000.00
		Subtotal		\$ 50,000.00	\$ 750,000.00
		Total			\$ 12,262,500.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties. Values for structures were computed at 50% of the structure value protected. Values for contents were computed at 25% of the structure value protected. Values for businesses contents were computed at 25% of average structure value.

FEMA REGION VI MITIGATION GRANT PROGRAM
ENGINEERING CHECKLIST

Project Title: Unnamed Trib. Drainage Imp. - Ph. 4
Applicant: Maverick County
Project Location: Maverick County
Project Number:
Grant Number:

Yes	No	Attached	Overall Project Information
☒	☐	☒	How was this project identified? Unnamed Tributary Drainage Improvements
☒	☐	☐	Will this project change effective BFE's, floodplain or floodway boundaries?
☒	☐	☐	Has a flood study been prepared?
☒	☐	☐	What level of planning has been completed?
☒	☐	☐	Conceptual - General layout, flow capacity, due diligence study, and quantity estimate
☐	☒	☐	Preliminary - 35% plans with survey, plan and profile sheets, grade lines and potential conflicts identified
☒	☐	☐	Final Plans - 100% complete plans and bid documents
☐	☒	☐	Has a Conditional Letter Of Map Revision (CLOMR) been prepared?
☐	☐	☐	☐ Prepared ☐ Submitted ☐ Approved

Structural Elements

- 1) Check "Yes" for those elements that are proposed in this project,
- 2) list the number of each type of proposed structural element,
- 3) provide one copy of the corresponding "Structure Check List" for each proposed structure.

Yes	No	Number	Structure Type	Page
☐	☒		Detention / Retention	2
☐	☒		Diversion	2
☐	☒		Berm / Floodwall	3
☐	☒		Flap Gate / Flood Gate	3
☒	☐		Channelization	4
☒	☐		Bridge / Culvert	4

Page 1

REGION VI

**FEMA REGION VI MITIGATION GRANT PROGRAM
ENGINEERING CHECKLIST**

Project Title: Unnamed Trib. Drainage Imp. - Ph. 4
Applicant: Maverick County
Project Location: Maverick County
Grant Number: _____
Project Number: _____

Detention / Retention Check List

Fill out this section for each element for this project

Name/Description of Element: _____ Number _____ of _____
Drainage Area: _____ sq. mi. Type of Structure: ☐ Detention ☐ Retention
Does any portion meet the state definition of a Dam? ☐ Yes ☐ No

Design Storm:	Classification	
	Design Storm	100-Year
Peak Inflow (cfs)		
Peak Outflow (cfs)		
Storage Volume (ac-ft)		

Sizing Method: ☐ Computer Model (HEC-1, HEC-HMS, TR-20, etc):
☐ Modified Rational Method ☐ Other: _____

Immediate downstream maximum non-damaging discharge: _____ cfs

Diversion Check List

Fill out this section for each element for this project

Name/Description of Element: _____ Number _____ of _____
Drainage Area: _____ sq. mi. Type of Structure: ☐ Off Channel Storage ☐ Other: _____

Design Storm: _____
Peak Inflow: _____ cfs Diverted Flow: _____ cfs Remaining Flow: _____ cfs
Diversion is proposed by: ☐ Gravity ☐ Pumping
Proposed pump Number: _____ Size: _____ gpm
Description of sizing method: ☐ is ☐ is not attached
Immediate downstream maximum non-damaging discharge: _____ cfs

Page 2

REGION VI

**FEMA REGION VI MITIGATION GRANT PROGRAM
ENGINEERING CHECKLIST**

Project Title: Unnamed Trib. Drainage Imp. - Ph. 4
Applicant: Maverick County
Project Location: Maverick County
Grant Number: _____
Project Number: _____

Berm / Floodwall Check List

Fill out this section for each element for this project

Name/Description of Element: _____ Number _____ of _____
Type of Structure: ☐ Berm ☐ Floodwall ☐ Other:
Design Storm: _____ Proposed Material: ☐ Earthen ☐ Concrete ☐ Other: _____

Design Storm:	Design Discharge (cfs)		100-year Discharge (cfs)	
	Water side	Land side	Water side	Land side

Minimum Freeboard: Average: _____ ft Upstream End: _____ ft Downstream End: _____ ft
Internal Drainage Plan ☐ Yes ☐ No ☐ Attached
Geotechnical Report ☐ Yes ☐ No ☐ Attached
Hydraulic Study ☐ Yes ☐ No ☐ Attached
Proposed Pumps ☐ Yes ☐ No ☐ Description Attached
Immediate downstream maximum non-damaging discharge: _____ cfs

Flap Gates / Flood Gates Check List

Fill out this section for each element for this project

Name/Description of Element: _____ Number _____ of _____
Design Storm: _____ Hydraulic Study ☐ Yes ☐ No ☐ Attached

Design Storm:	Design Discharge (cfs)		100-year Discharge (cfs)	
	Water side	Land side	Water side	Land side

Upstream Pool Elevation: _____ ft. msl. Lowest Finished Floor of Adjacent Structures: _____ ft. msl.
Pool elevation determined by: ☐ Computer Model (HEC-1, HEC-HMS, TR-20, etc):
☐ Modified Rational Method ☐ Other: _____

Page 3

REGION VI

**FEMA REGION VI MITIGATION GRANT PROGRAM
ENGINEERING CHECKLIST**

Project Title: Unnamed Trib. Drainage: Imp. - Ph. 4
 Applicant: Maverick County
 Project Number: 1345
 Project Location: Maverick County
 Grant Number:

Bridge / Culvert Check List

Fill out this section for each element for this project

Name/Description of Element: Box @ FM 1021 Number of

Method used to size the proposed structure (e.g., HEC-2, HEC-RAS, WSPRO, HYS): HYS

Dimensions: Culvert Set #1 5 barrels 7 foot span by 7 foot rise Material: Concrete
 Culvert Set #2 2 barrels 6 foot span by 7 foot rise Material: Concrete to be added
 Culvert Set #3 barrels foot span by foot rise Material:

Upstream Flowline: NA Downstream Flowline: NA High Chord: NA Low Chord: NA

Total cross sectional area below low chord: NA sq. ft. Drainage Area: <2.0 sq. mi.

Design Storm: 50 Structure Capacity: NA cfs at Headwater Elevation: NA ft. msl.

Peak Discharge (cfs)	Design Storm	100-Year
Tail Water (ft msl)	3600	4300
Headwater (ft msl)		

Immediate downstream maximum non-damaging discharge: NA cfs

Channelization Check List

Fill out this section for each element for this project

Name/Description of Element: Unnamed Tributary - Phase 4
 Number NA of NA

Proposed material: ☐ Earthen/grass lined ☒ Concrete ☐ Gabion Lined ☐ Other:

Drainage Area: >2.0 sq. mi. Design Storm: 100

Design Peak Discharge: 4500 cfs 100-Year Peak Discharge: 4300 w/ Detention Pond cfs

Channel Capacity: 4700 cfs ☒ with 2 feet of freeboard ☐ without freeboard

Sizing Method: ☒ Computer Model (HEC-2, HEC-RAS, etc): HEC-RAS
☐ Hand Calculation (Manning's Equation or other):

Immediate downstream maximum non-damaging discharge: NA cfs

REGION VI

PROJECT OFFICER DESIGNATION
For
HAZARD MITIGATION GRANT

DR 1697
Date: 7-27-07

Subgrantee: *Maverick County, Texas*
Local Government or eligible Agency/Organization
Hazard Mitigation Grant Program (HMGF) Project Number: DR 1697
Pre-Disaster Mitigation Program (PDM) Project Number: N. A.

I designate my Project Officer for this grant as follows:

Primary Project Officer	Secondary Project Officer
Name: Mr. John P. Sullivan	Name
Organization: Maverick County	Organization
Official Position: Administrative Assistant	Official Position
Mailing Address: 500 Quarry Street, Suite 3	Mailing Address
City, State, Zip: Eagle Pass, Texas 78852	City, State, Zip
Daytime Phone: (830) 773-3824	Daytime Phone
Fax Number: (830) 773-6450	Fax Number
Email: jsullivan@maverickcounty.org	Email

The above Primary and Secondary Project Officers are hereby authorized to execute and file application for this mitigation project on behalf of this organization for the purpose of obtaining certain state and federal financial assistance under the Robert T. Stafford Disaster Relief & Emergency Assistance Act, (Public Law 93-288 as amended) or otherwise available. Designated Project Officers are authorized by the below Certifying Official to represent and act for this organization in all dealings with the State of Texas for all matters pertaining to this grant, and will serve as the single point of contact with the designated State Project Officer.

Signature of Mayor, Judge, or Executive Director _____ Date 2 AUG 07

Jose A. Aranda, Jr.
Printed Name of above Authorized Official

MAVERICK COUNTY, TEXAS

500 Quarry Street, Suite 3 Eagle Pass, Texas 78852-4528

JULY 26, 2007

THIS IS TO CERTIFY THAT THE COUNTY OF MAVERICK, TEXAS IS LIABLE AND HAS
READY ACCESS TO THE FUNDING FOR 25% OR MORE OF THE ATTACHED DRAINAGE
IMPROVEMENT, WITH A TOTAL PROJECT COST OF
\$665,000 DOLLARS.

SIGNED,

JUDGE JOSE A. ARANDA, JR.
COMMISSIONER'S COURT JUDGE
COUNTY OF MAVERICK, TEXAS

Record of Environmental Consideration

See 44 Code of Federal Regulation Part 10.

Project Name/Number: Maverick County – Unnamed Tributary Drainage Improvements – Phase 4

Project Location: Eagle Pass, Maverick County, Texas

Project Description: See Narrative. Briefly, 2000' of Concrete lined Channel, Culvert replacement and addition to FM 1021, and clearing and snagging downstream from FM 1021 on the Unnamed Tributary in Maverick County, Texas.

Documentation Requirements

- ☐ No Documentation Required **(Review Concluded)**
- ☒ **(Short version)** All consultation and agreements implemented to comply with the National Historic Preservation Act, Endangered Species Act, and Executive Orders 11988, 11990 and 12898 are completed and no other laws apply. **(Review Concluded)**
- ☐ **(Long version)** All applicable laws and executive orders were reviewed. Additional information for compliance is attached to this REC.

National Environmental Policy Act (NEPA) Determination

- ☒ Statutorily excluded from NEPA review. **(Review Concluded)**
- ☒ Programmatic Categorical Exclusion - Category (Reference PCE in comments) **(Review Concluded)**
- ☐ Categorical Exclusion - Category
- ☐ No Extraordinary Circumstances exist.
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- ☐ Extraordinary Circumstances exist (See Section IV).
- ☐ Extraordinary Circumstances mitigated. (See Section IV comments)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- ☐ Environmental Assessment
- ☐ Supplemental Environmental Assessment (Reference EA or PEA in comments)
- ☐ Environmental Impact Statement

Comments:

Reviewer and Approvals

- ☐ Project is Non-Compliant (See attached documentation justifying selection).

FEMA Environmental Reviewer.

Name:

Record of Environmental Consideration (06/27/05)

1

07/25/07

Signature _____ Date _____

FEMA Regional Environmental Officer or delegated approving official.

Name:

Signature _____ Date _____

I. Compliance Review for Environmental Laws (other than NEPA)

A. National Historic Preservation Act

- ☒ Not type of activity with potential to affect historic properties. **(Review Concluded)**
- ☐ Applicable executed Programmatic Agreement (insert date). Otherwise, conduct standard Section 106 review.
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**

HISTORIC BUILDINGS AND STRUCTURES

- ☒ No historic properties that are listed or 45/50 years or older in project area. **(Review Concluded)**
- ☐ Building or structure listed or 45/50 years or older in project area and activity not exempt from review.
- Determination of No Historic Properties Affected (FEMA finding/SHPO/THPO concurrence on file)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- Determination of Historic Properties Affected (FEMA finding/SHPO/THPO concurrence on file)
- ☐ Property a National Historic Landmark and National Park Service was provided early notification of project and opportunity to conduct Section 106 review.
- ☐ No Adverse Effect Determination (FEMA finding/SHPO/THPO concurrence on file).
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- Adverse Effect Determination (FEMA finding/SHPO/THPO concurrence on file)
- ☐ Resolution of Adverse Effect completed. (MOA on file)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**

ARCHEOLOGICAL RESOURCES

- ☒ Project affects only previously disturbed ground. **(Review Concluded)**
- ☐ Project affects undisturbed ground.
- ☐ Project area has no potential for presence of archeological resources
- Determination of no historic properties affected (FEMA finding/SHPO/THPO concurrence or consultation on file) **(Review Concluded)**
- ☐ Project area has potential for presence of archeological resources
- Determination of no historic properties affected (FEMA finding/SHPO/THPO concurrence on file)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- Determination of historic properties affected
- ☐ NR eligible resources not present (FEMA finding/SHPO/THPO concurrence on file).
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- ☐ NR eligible resources present in project area. (FEMA finding/ SHPO/THPO concurrence on file)
- No Adverse Effect Determination (FEMA finding/ SHPO/THPO concurrence on file)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- Adverse Effect Determination. (FEMA finding/ SHPO/THPO concurrence on file)
- ☐ Resolution of Adverse Effect completed. (MOA on file)
- Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**

Comments: See 44CFR is bounded by the channelized creek of the proposed project on the north and east sides. This site is listed as disturbed and no further work is proposed. The site should be maintained the same to the Texas Historical Commission. A pre-construction inspection of the banks and/or monitoring of the site during construction may be requested.

Record of Environmental Consideration (06/27/05)

2

07/25/07

Reviewer Name: [Click here and type name]
Disaster/Program/Project Title: [Click here and type name]

Applicant: [Click here and type name]

Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Project adversely affects Essential Fish Habitat (FEMA determination/USFWS/NMFS concurrence on file)
☐ NOAA Fisheries provided no recommendations **(Review Concluded)**
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ NOAA Fisheries provided recommendations
☐ Written reply to NOAA Fisheries recommendations completed
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

K. Wild and Scenic Rivers Act
☒ Project is not along and does not affect Wild or Scenic River (WSR) - **(Review Concluded)**
☐ Project is along or affects WSR
☐ Project adversely affects WSR as determined by NPS/USFS. FEMA cannot fund the action (NPS/USFS/USFWS/BLM consultation on file) **(Review Concluded)**
☐ Project does not adversely affect WSR. (NPS/USFS/USFWS/BLM consultation on file)
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

L. Other Relevant Laws and Environmental Regulations
Identify relevant law or regulations, resolution and any consultation/references

Comments:
Correspondence/Consultation/References:

II. Compliance Review for Executive Orders
A. E.O. 11988 - Floodplains
☐ No Effect on Floodplain/Flood levels and project outside Floodplain - **(Review Concluded)**
☒ Located in Floodplain or Effects on Floodplains/Flood levels
☒ No adverse effect on Floodplain/Flood levels adversely affected by the floodplain. **(Review Concluded)**
Are project conditions required? ☐ Yes (see section V) ☒ No **(Review Concluded)**
☐ Beneficial Effect on Floodplain Occupancy/Values **(Review Concluded)**
☐ Possible adverse effects associated with investment in floodplain, occupancy or modification of floodplain environment
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**
☐ 8 Step Process Complete - documentation on file
Comments: A preliminary drainage study was completed in December, 2000 on the Unnamed Tributary. Drainage improvements were proposed. To date the first three phases of these improvements have been completed. This HMGP application is for the fourth phase.
Correspondence/Consultation/References:

B. E.O. 11990 - Wetlands
☐ No Effects on Wetland(s) and project located outside Wetland(s) - **(Review Concluded)**
☒ Located in Wetland or effects Wetland(s)
☒ Beneficial Effect on Wetland - **(Review Concluded)**
☐ Possible adverse effect associated with constructing in or near wetland
☐ Review completed as part of floodplain review

Record of Environmental Consideration (06/27/05)

Reviewer Name: [Click here and type name]
Disaster/Program/Project Title: [Click here and type name]

Applicant: [Click here and type name]

Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Project adversely affects Essential Fish Habitat (FEMA determination/USFWS/NMFS concurrence on file)
☐ NOAA Fisheries provided no recommendations **(Review Concluded)**
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ NOAA Fisheries provided recommendations
☐ Written reply to NOAA Fisheries recommendations completed
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

C. E.O. 12898 - Environmental Justice For Low Income and Minority Populations
☐ No Low income or minority population in, near or affected by the project - **(Review Concluded)**
☒ Low income or minority population in or near project area
☒ No disproportionately high and adverse impact on low income or minority population
☐ Disproportionately high and adverse effects on low income or minority population
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

III. Other Environmental Issues
Identify other potential environmental concerns in the comment box not clearly falling under a law or executive order (see environmental concerns scoping checklist for guidance).

Comments:
Correspondence/Consultation/References:

IV. Extraordinary Circumstances
Based on the review of compliance with other environmental laws and Executive Orders, and in consideration of other environmental factors, review the project for extraordinary circumstances.

* A "Yes" under any circumstance may require an Environmental Assessment (EA) with the exception of (i) which should be applied in conjunction with adversity on an environmental issue. If the circumstance can be mitigated, please explain in comments. If no, leave blank.

Yes
☐ (i) Greater scope or size than normally experienced for a particular category of action
☐ (ii) Actions with a high level of public controversy
☐ (iii) Potential for degradation, even though slight, of already existing poor environmental
☐ (iv) Employment of unproven technology with potential adverse effects or actions involving unique or unknown environmental risks;
☐ (v) Presence of endangered or threatened species or their critical habitat, or archaeological, cultural, historical or other protected resources;
☐ (vi) Presence of hazardous or toxic substances at levels which exceed Federal, state or local regulations or standards requiring action or attention;
☐ (vii) Actions with the potential to affect special status areas adversely or other critical resources such as wetlands, coastal zones, wildlife refuge and wilderness areas, wild and scenic rivers, sole or principal drinking water aquifers;
☐ (viii) Potential for adverse effects on health or safety; and
☐ (ix) Potential to violate a federal, state, local or tribal law or requirement imposed for the protection of the environment.

Record of Environmental Consideration (06/27/05)

68

Reviewer Name: [Click here and type name]
Disaster/Emergency/Program/Project Title: [Click here and type name]

Applicant: [Click here and type name]

☐ (x) Potential for significant cumulative impact when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves.

Comments:

V. Environmental Review Project Conditions

General comments:

Project Conditions:

Monitoring Requirements:

07/25/07

8

Record of Environmental Consideration (06/27/05)

07/25/07

7

Record of Environmental Consideration (06/27/05)

COUNTY OF MAVERICK
Office of the County Judge

August 13, 2007

Texas Historical Commission
Post Office Box 12276
Austin, Texas 78711-2276

Attention: Lawrence Oaks, Executive Director

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, (the Tornado that struck Maverick County, Texas in April, 2007), disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Half Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

Figure 1 – Aerial Photo of Proposed Project – Unnamed Tributary – Maverick County

Figure 2 – Wetlands Inventory Map of Proposed Project – Unnamed Tributary – Maverick County

COUNTY OF MAVERICK
Office of the County Judge

U.S. Fish and Wildlife Service Field Office
Post Office Box 1306
Albuquerque, New Mexico 87103

10 August 10, 2007

Attention: Office of the Director

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, (the Tornado that struck Maverick County, Texas in April, 2007), disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Halff Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

COUNTY OF MAVERICK
Office of the County Judge

U.S. Army Corps of Engineers
Galveston District Regulatory Field Office
5151 Flynn Parkway, Suite 306
Corpus Christi, Texas 78411-4318

August 13, 2007

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, (the Tornado that struck Maverick County, Texas in April, 2007), disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Halff Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

COUNTY OF MAVERICK
Office of the County Judge

August 13, 2007

Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744-3291

ATTN: J. Rollin MacRae

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, the Tornado that struck Maverick County in April, 2007, and disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impacts on navigable waterways. The project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Half Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

COUNTY OF MAVERICK
Office of the County Judge

August 13, 2007

Texas Commission on Environmental Quality
Post Office Box 13087, MC 160
Austin, Texas 78711-3087

Attention: Mr. Mike Howard, CFM

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, the Tornado that struck Maverick County, Texas in April, 2007, disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Half Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

COUNTY OF MAVERICK
Office of the County Judge

Texas General Land Office
1700 N. Congress Avenue
Austin, Texas 78701-1495

Attention: Mr. William D. Grimes

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, (the Tornado that struck Maverick County, Texas in April, 2007), disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Halff Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

COUNTY OF MAVERICK
Office of the County Judge

Natural Resources Conservation Services
USDA, NRCS
101 South Main Street
Temple, Texas 76501
Attention: State Conservationist

August 13, 2007

Dear Sir:

In accordance with the directives of the Hazard Mitigation Grant Program, we are notifying you of our intent to apply for funding under DR-1697, (the Tornado that struck Maverick County, Texas in April, 2007), disaster declaration. Grant funding will be used to construct drainage improvements on an Unnamed Tributary in Maverick County. All of the work will take place in the locations shown on the enclosed map(s). The project will involve approximately 2300 LF of Concrete lined channel, adding two culverts at FM 1021 (El Indio Highway) road crossing, and some clearing and snagging of the waterway below FM 1021. The property in our proposal is located at FM 1021 southeast of Eagle Pass, Texas.

Before beginning the project, the county is required to complete an Environmental Review and request the input of local citizens, interest groups, agencies, and other interested parties, concerning the possible impact of the project and its activities. Based on research and survey records, we do not believe that there are any significant vegetative or wildlife areas on or under the proposed land locations.

To the best of our knowledge, the project will not have any negative impact on navigable waterways. Additionally, the project will not adversely impact the air, vegetation, wildlife or ground water, except on a short-term basis during a flooding event.

The purpose of this letter is to provide your agency an opportunity to comment on this project. Should you find or have record of any significant parks or wildlife areas within the proposed project site, we would appreciate your office contacting us at (830) 773-3824.

Sincerely,

John P. Sullivan
Administrative Assistant to the County Judge

Cc: Mr. John N. Furlong, P.E., Halff Associates
Mr. Hector Chavez, CFM, Public Works Director Eagle Pass
Mr. Celestino Hernandez, City Planner, Eagle Pass

500 Quarry Street Suite 3 • Eagle Pass, Texas, 78852 • Tel. (830) 773-3824 • Facsimile (830) 773-6450
e-mail: judge@maverickcounty.org

Environmental Justice Statement

As a means to comply with EO 12898 requirements, all HMGP applications must include an Environmental Justice Certification signed by the authorized agent or Chief elected/executive official, which states the following:

1. There are no concentrations of low income or minority populations that will be negatively impacted by this project.
2. The project will not result in a disproportionately high or adverse effect on low income or minority populations.
3. As there are no low income or minority populations that will be negatively impacted by this project, there will be no actions required to be taken to ensure achievement of environmental justice for low income and minority populations.

Authorized Representative: Judge Jose A. Abanda, Jr.
County Judge, Maverick County, Texas

Signature: _____
Date: _____

Photo 7 – Looking Upstream at Unnamed Trib. Behind Middle School

Photo 8 – Looking Downstream at Unnamed Tributary behind Middle School.

Photo 5 – Looking Downstream from FM 3443 at Unnamed Tributary

Photo 6 – Looking upstream at Project Sign for Phase 2 – Identified as Las Quintas Drainage Project funded by CDBG money.

Photo 3 – Looking upstream from FM 3443 at Unnamed Trib. – Ph. 1 Chan. Imp.

Photo 4 – Looking at Upstream side of Box Culvert @ FM 3443 – Looking North

HMGP Application Unnamed Tributary	2	Photos taken 6-22-07 Maverick County, Texas
---------------------------------------	---	--

HMGP Application Unnamed Tributary	3	Photos taken 6-22-07 Maverick County, Texas
---------------------------------------	---	--

Photo 1 - Looking downstream from Cherry Creek Dr. - Phase 1 Channel Imp.

Photo 2 Looking Upstream at Cherry Creek Drive Culvert on Unnamed Trib.

HMGP Application
Unnamed Tributary

1

Photos taken 6-22-07
Maverick County, Texas

September 8, 2001 Cherry Creek Bridge Looking East

September 8, 2001 Camarinos and Ballou's Bridge

HMGP Application
Unnamed Tributary

3

Photos taken 7-9-2001
Maverick County, Texas

HMGP Application
 Unnamed Tributary

2

Photos taken 7-9-2001
 Maverick County, Texas

HMGP Application
 Unnamed Tributary

4

Photos taken 7-9-2001
 Maverick County, Texas

Bibliography

- Berke, P., Roenigk, D., Kaiser, E. and Burby, R. (1996). "Enhancing plan quality: Evaluating the role of state planning mandates for natural hazard mitigation." *Journal of Environmental Planning and Management*. 39:79-96.
- Berke, P. R. (1998). "Reducing natural hazard risks through state growth management." *Journal of the American Planning Association*, 64(1), 76-87.
- Britz, G.C., Emerling, D.W., Hare, L.B., Hoerl, R.W., Janis, S.J. and Shade, J.E. (2000). *Improving Performance Through Statistical Thinking*. ASQ Quality Press, Milwaukee, WI
- Brody, S. D. (2003). "Are we learning to make better plans? A longitudinal analysis of plan quality associated with natural hazards." *Journal of Planning Education and Research*, 23(2), 191-201.
- Burby, Raymond J., and May, P. (1998). "Intergovernmental environmental planning: Addressing the commitment conundrum." *Journal of Environmental Planning and Management* 41 (1): 95-110.
- Creswell, J. W. (2008). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Third Edition), Sage Publications, Thousand Oaks, California.
- Gibson, G. E., and Dumont, P. R. (1996). "Project Definition Rating Index (PDRI)." Research Report 113-11, Construction Industry Institute, Austin, Texas.
- Godschalk, D.R., Beatley, T., Berke, P., Brower, D.J., and Kaiser, E.J. (1999). *Natural hazard mitigation: Recasting disaster policy and planning*. Washington, D.C.: Island Press.
- Kaiser, Edward J., David R. Godschalk, and F. Stuart Chapin. 1995. *Urban land use planning*. 4th ed. Urbana: University of Illinois Press.

- Kawakita, J. (川喜田二郎). (1967). 発想法(Abduction). 中央公論社(Chuokoron-Shinsya Inc.), Chuo, Tokyo, Japan
- Menches, C. L., Seekins, R., and Eissler, C. (2009). "Mitigation project information system." 7th International Workshop on Remote Sensing and Disaster Response, Austin, TX.
- National Climatic Data Center (NCDC). (2010). Billion Dollar Climate and Weather Disasters 1980 - 2009. <http://www.ncdc.noaa.gov/img/reports/billion/state2009.pdf>.
- Nodar, J. (2008). "Galveston regroups from Hurricane Ike." The Journal of Commerce (on-line). Newark, N.J.: Commonwealth Business Media, Inc.
- Oxfam America. (2008). Mirror on America: How the state of Gulf Coast Recovery reflects on us all. Boston, MA: Oxfam America Inc.
- Peacock, W.G., Kang, J.E., Husein, R., Burns, G.R., Prater, P., Brody, S. and Kennedy, T. (2009). "An Assessment of Coastal Zone Hazard Mitigation Plans in Texas." Coastal Hazard Mitigation Action Plan Assessment Report. College Station, TX.
- Texas Governor's Division of Emergency Management (GDEM). (2009). Hazard Mitigation Grant Program (HMGP) Comprehensive Application Package 2009. Texas Department of Public Safety, Austin, TX.
- Texas Governor's Division of Emergency Management (GDEM). (2006). State of Texas Hazard Mitigation Plan, Annex A Hazard Mitigation Grant Program Administration Plan, Approval and Implementation. Texas Department of Public Safety, Austin, TX.
- Texas Governor's Division of Emergency Management (GDEM). (2002). State of Texas Mitigation Handbook. Texas Department of Public Safety, Austin, TX.

Vita

Tadahisa Muramatsu received his B.E. in Civil and Environmental Engineering from The University of Yamanashi. Since then, he has been employed by both Japan Highway Public Corporation (JH) and its reorganized company, Central Nippon Expressway Co., Ltd. (C-NEXCO), both of which are Japan's toll expressway authorities. He has three years of supervisory experience in each of the following: expressway maintenance and inspection programs, expressway development projects including bridge and tunnel construction, a bridge anti-seismic reinforcement program and an expressway pavement program. He also lectured on highway management and highway engineering techniques to foreign engineers associated with Japan's Official Development Assistance (ODA). He was awarded an opportunity to study overseas under the Study Abroad Support Program from C-NEXCO, and he started work on a Master's degree at The University of Texas at Austin in 2008.

Permanent address: 22 Wakakusadai Aoba-ku, Yokohama, Japan

This thesis was typed by the author.