U.S. Department of Transportation
Federal Highway Administration

Federal Lands Highway

Construction Manual

- A guide for FLH field project and contract administration personnel
- To be used with FLH Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects

Comprehensively Rewritten and Issued - March 2009
Dates of Subsequently Updated Pages in Lower Left Corner

TABLE OF CONTENTS

Section **Page**

CHAPTER 1 – INTRODUCTION 1-1

1.1 Purpose and Use of the Manual 1-1

1.2 Abbreviations and Definitions 1-2

1.3 Delegations of Authority 1-4
1.3.1 Chief of Contracting Office (COCO) 1-4
1.3.2 Contracting Officer 1-4
1.3.3 Contracting Officer's Technical Representative (COTR) 1-5

1.4 Responsibilities of the Project Engineer 1-6
1.4.1 General 1-6
1.4.2 Project Documents 1-6
1.4.3 Plan of Operations 1-6
1.4.4 Project Stakeout 1-6
1.4.5 Inspection 1-7
1.4.6 Measurement and Payment 1-7
1.4.7 Changes 1-8
1.4.8 Personnel 1-8
1.4.9 Equipment 1-8
1.4.10 Records and Reports 1-8
1.4.11 Project Costs 1-8

1.5 Relations with the Contractor 1-10

1.6 Relations with Cooperating and Other Agencies 1-12
1.6.1 General 1-12
1.6.2 Forest Service 1-12
1.6.3 National Park Service 1-13
1.6.4 Indian Reservation Roads (IRR) Program 1-13
1.6.5 Fish and Wildlife Service 1-13
1.6.6 Other Federal Cooperating Agencies 1-14
1.6.7 Other Cooperating Agencies 1-14
1.6.8 Regulatory Agencies 1-15

1.7 Relations with the Public 1-16

1.8 Media Relations 1-17

CHAPTER 2 – PRECONSTRUCTION 2-1

2.1 General 2-1

2.2 Field Office 2-2

2.3 Preconstruction Conference 2-3

2.4 Claims and Disputes 2-5

TABLE OF CONTENTS
(Continued)

Section **Page**

2.5 Partnering with the Construction Contractor 2-9
2.5.1 Background 2-9
2.5.2 Policy for Partnering 2-11
2.5.3 Formal Partnering 2-11
2.5.4 Informal Partnering 2-14
2.5.5 Emphasis is on Attitude 2-14
2.5.6 Follow-up Evaluations and Measurement 2-14

2.6 Notice to Proceed 2-15

CHAPTER 3 – SAFETY 3-1

3.1 General 3-1

3.2 Government Responsibility for Safety of FLH Personnel 3-2
3.2.1 Personal protective Equipment 3-2
3.2.2 Project Engineer Safety REsponsibilities 3-2
3.2.3 Operating Government Vehicles 3-2

3.3 Accidents 3-4
3.3.1 Accidents Involving Government Vehicles 3-4
3.3.2 Personal or property accidents 3-5
3.3.3 Occupational Accident Report 3-5
3.3.4 Accident/Injury Compensation Forms 3-6
3.3.5 Contractor Accidents 3-7

3.4 Construction Safety 3-9
3.4.1 General 3-9
3.4.2 FLH Safety Responsibilities Prior to Start of Construction 3-9
3.4.3 FLH Safety Responsibilities During Construction Operations 3-12
3.4.4 High Risk Situations 3-16

CHAPTER 4 – LEGAL AND ENVIRONMENTAL COMPLIANCE 4-1

4.1 General 4-1

4.2 Laws to be Observed 4-2

4.3 Permits and Responsibilities 4-3
4.3.1 Materials Sources and Easements 4-3
4.3.2 Load Limits 4-3
4.3.3 Bulletin Board 4-4
4.3.4 NPDES Permits 4-4

4.4 Protection and Restoration of Property and Landscape 4-7
4.4.1 General 4-7
4.4.2 Trespassing 4-7
4.4.3 Forest, Park, and Public Lands Protection 4-7
4.4.4 Fire Prevention and Control 4-8
4.4.5 Pits and Quarries 4-9

TABLE OF CONTENTS
(Continued)

Section **Page**

4.5 Contractor's Responsibility for Work 4-10

4.6 Utilities 4-11
4.6.1 Government-Owned Utilities 4-11
4.6.2 Privately-Owned Utilities 4-11

4.7 Encroachments on Highway Right-of-Way 4-13

CHAPTER 5 – CONSTRUCTION SCHEDULE AND PROGRESS 5-1

5.1 General 5-1

5.2 Construction Schedules 5-2
5.2.1 General Requirements 5-2
5.2.2 Limitations on Completing Work 5-2
5.2.3 Construction Schedule Format 5-2
5.2.4 Schedule Updates 5-9

5.3 Limitation of Operations 5-11

5.4 Contract Time 5-12
5.4.1 Failure to Complete Work Within the Time Allowed 5-12
5.4.2 Methods of Adjusting Time Allowance 5-12
5.4.3 Consideration of Time Adjustments 5-13

5.5 Work Suspensions and Stop Orders 5-14
5.5.1 Definitions 5-14
5.5.2 Suspension of Contractor Operations 5-14
5.5.3 Stoppage of Contractor Operations 5-15
5.5.4 Content of Suspensions and Stop Orders 5-16
5.5.5 Content of Resumption Orders 5-19

CHAPTER 6 – SURVEYING AND STAKING 6-1

6.1 General 6-1

6.2 Verification of Staking Information 6-2

6.3 Verification of Survey Control in the Field 6-3

6.4 Establishing and Referencing Centerline and/or Other Roadway Control 6-4

6.5 Permanent Monuments 6-5

6.6 Bridges 6-6

6.7 Retaining Walls 6-7

6.8 Slope Stakes 6-8

TABLE OF CONTENTS
(Continued)

Section **Page**

6.9 Fine Grade Control Stakes 6-11

6.10 Sight Levels 6-12

CHAPTER 7 – QUALITY CONTROL/QUALITY ASSURANCE 7-1

7.1 General 7-1

7.2 Character of Workers and Adequacy of Equipment 7-2

7.3 Contractor Quality Control Plan (CQCP) 7-3
7.3.1 General 7-3
7.3.2 Development of a CQCP 7-6
7.3.3 Acceptance of the CQCP 7-11
7.3.4 Contract Administration 7-14

7.4 Record and Report Preparation 7-16
7.4.1 General 7-16
7.4.2 Project Diaries and Inspector's Daily Reports (IDRs) 7-16
7.4.3 Photographs 7-18

7.5 Contract Inspectors 7-22
7.5.1 General 7-22
7.5.2 Contract Inspection Contract (CIC) 7-22
7.5.3 Task Orders 7-22
7.5.4 CI Duties 7-23
7.5.5 Project Engineer Duties 7-24
7.5.6 CI Time and Attendance 7-24
7.5.7 CI Invoices 7-26
7.5.8 CI Performance and/or Conduct 7-26
7.5.9 CI and Government Furnished Equipment 7-27
7.5.10 CI Releases and Transfers 7-27

CHAPTER 8 – PROJECT ADMINISTRATION 8-1

8.1 General 8-1

8.2 Labor Requirements 8-2

8.3 Equal Employment Opportunity Requirements 8-4
8.3.1 Nondiscrimination 8-4
8.3.2 Affirmative Action 8-4
8.3.3 Reports 8-4

8.4 Correspondence 8-6

8.5 Working Drawings 8-7

8.6 Project Status Reports 8-8

TABLE OF CONTENTS
(Continued)

Section **Page**

8.7 Opening of Sections of Project to Traffic 8-9

8.8 Subcontracting 8-10
8.8.1 General 8-10
8.8.2 Percent Subcontracted 8-11
8.8.3 Materials Supply Subcontracts 8-11
8.8.4 Small and Small Disadvantaged Business Concerns 8-12
8.8.5 Miller Act 8-12

CHAPTER 9 – MEASUREMENT AND PAYMENT 9-1

9.1 General 9-1

9.2 Pay Notes and Computations 9-2
9.2.1 General 9-2
9.2.2 Computations and Supporting Documents 9-2

9.3 Probables and Construction Engineering Costs 9-4

9.4 Measurement of Quantities 9-5
9.4.1 General 9-5
9.4.2 Quantity Significant Figures 9-6
9.4.3 Computation of Earthwork Quantities 9-7
9.4.4 Measurement of Materials (Weight Basis) 9-8

9.5 Progress Payments 9-11
9.5.1 General Requirements 9-11
9.5.2 Prompt Payment 9-11
9.5.3 Government's Receiving Report Generated from the Progress Payment Report 9-12
9.5.4 Contractor Invoices 9-14
9.5.5 Subcontractor Work and Payments 9-17
9.5.6 Preparatory Work and Stockpiled Materials 9-21
9.5.7 Adjustments to Contractor's Invoice 9-23
9.5.8 Retainage and Liquidated Damages for Poor Progress 9-23
9.5.9 Pre-Final Payment 9-24

CHAPTER 10 – MAJOR CONSTRUCTION PROCESSES 10-1

10.1 Introduction 10-1

10.2 Clearing and Grubbing 10-2
10.2.1 Clearing and Grubbing 10-2
10.2.2 Removal of Structures and Obstructions 10-4
10.2.3 Excavation and Embankment 10-5
10.2.4 Soil Erosion Control 10-16
10.2.5 Structural Excavation 10-17
10.2.6 Watering 10-18
10.2.7 Finishing Roadbed 10-19

10.3 Aggregate Base and Subbase Courses 10-20

TABLE OF CONTENTS
(Continued)

Section **Page**

10.3.1 Aggregate Base and Subbase Courses 10-20
10.3.2 Dust Palliatives 10-25

10.4 Asphalt Construction 10-27
10.4.1 Hot Asphalt Concrete Pavement 10-27
10.4.2 Open-Graded Asphalt Friction Course 10-42
10.4.3 Open-Graded Emulsified Asphalt Pavement (OGEAP) 10-43
10.4.4 Dense-Graded Emulsified Asphalt Pavement 10-48
10.4.5 Single or Multi-Course Asphalt Surface Treatments 10-49
10.4.6 Minor Asphalt Concrete 10-53

10.5 Concrete and Structures 10-54
10.5.1 Portland Cement Concrete 10-54
10.5.2 Concrete Structures 10-57
10.5.3 Prestressed Concrete 10-80
10.5.4 Reinforcing Steel 10-82
10.5.5 Piling 10-86
10.5.6 Steel Structures 10-92
10.5.7 Painting of Structures 10-95
10.5.8 Rehabilitation of Concrete Structures 10-98

10.6 Miscellaneous Construction 10-101
10.6.1 Drainage Structures 10-101
10.6.2 Guardrail and Concrete Barriers 10-103
10.6.3 Fence 10-104
10.6.4 Curb, Gutter, Waterways and Sidewalk 10-106
10.6.5 Signing, Delineators, and Striping 10-110
10.6.6 Slope Protection 10-112
10.6.7 Landscaping 10-114
10.6.8 Maintenance of Traffic 10-116

CHAPTER 11 – MATERIALS 11-1

11.1 General 11-1

11.2 Source Approval 11-2
11.2.1 General 11-2
11.2.2 Government Provided Sources 11-2
11.2.3 Contractor-Located Sources 11-3

11.3 Material Production 11-4
11.3.1 Number of Samples to Submit for Verification Testing 11-4
11.3.2 Material Not Meeting Contract Requirements 11-4
11.3.3 Pay Factor Projections 11-5

11.4 Material Storage 11-6

11.5 Sampling and Testing 11-7
11.5.1 Records and Reports of Materials 11-7

11.6 Acceptance 11-8

TABLE OF CONTENTS
(Continued)

Section **Page**

11.6.1 Determining Acceptance 11-8
11.6.2 Non-Conforming Material or Work 11-10

CHAPTER 12 – PROJECT CLOSEOUT 12-1

12.1 General 12-1

12.2 Contractor Performance Evaluation 12-2

12.3 Final Construction Report 12-5

12.4 As-Constructed Plans 12-6

12.5 Disposition of Records 12-9

12.6 Feedback 12-10
12.6.1 Forms of Feedback 12-10
12.6.2 Feedback Report 12-10

12.7 Final Payment 12-12
12.7.1 General 12-12
12.7.2 Final Payment Designations 12-12
12.7.3 Final Progress Payment Report 12-13
12.7.4 Final Voucher 12-13
12.7.5 Contractor's (Claims) Release 12-17
12.7.6 Letters of Acceptance by Cooperating Agencies 12-21
12.7.7 Letter of Acceptance by FLH 12-21
12.7.8 Final Voucher Assembly 12-23
12.7.9 Payment of Claims 12-23

CHAPTER 13 – CONTRACT MODIFICATION 13-1

13.1 Overview 13-1

13.2 Authority 13-2
13.2.1 Administrative/Technical Concurrences 13-2

13.3 Types of Contract Modifications 13-3
13.3.1 Bilateral Contract Modifications (Supplemental Agreements) 13-3
13.3.2 Unilateral Contract Modifications (Change Orders) 13-3

13.4 Contract Clauses 13-7
13.4.1 FAR Clause 52.243-4, Changes 13-7
13.4.2 FAR Clause 52.249-10, Default 13-7
13.4.3 FAR Clause 52.236-2, Differing Site Conditions 13-7
13.4.4 FAR Clause 52.242-14, Suspension of Work 13-8
13.4.5 FAR Clause 52.211-18, Variation in Estimated Quantity (VEQ) 13-8

13.5 Time Extensions in Contract Modifications 13-9
13.5.1 Compensable Delays 13-9

TABLE OF CONTENTS
(Continued)

Section **Page**

13.5.2 Excusable Delays 13-9

13.6 Contract Modification Process 13-12
13.6.1 Identify the Need for a Contract Modification 13-14
13.6.2 Coordinate with FHWA and External Agencies 13-14
13.6.3 Identify Scope of Work 13-16
13.6.4 Request Contractor to Prepare a Proposal 13-17
13.6.5 Prepare an Independent Government Estimate 13-17
13.6.6 Complete a Procurement Request (PR) 13-27
13.6.7 Determine if Cost and Pricing Data are Required 13-28
13.6.8 Analyze the Contractor's Proposal 13-28
13.6.9 Accept the Contractor's Proposal or Perform Additional Fact Finding 13-31
13.6.10 Prepare a Negotiation Memorandum 13-31
13.6.11 Negotiate with the Contractor 13-32
13.6.12 Complete the Negotiation Memorandum 13-32
13.6.13 Amend the PR 13-32
13.6.14 Determine What Type of Contract Modification to Issue 13-33
13.6.15 Prepare the Contract Modification 13-33
13.6.16 Send the Contract Modification to the Contractor for Signature 13-34
13.6.17 Review, Approve, and Distribute Contract Modication 13-34

CHAPTER 14 – REFERENCES 14-1

LIST OF EXHIBITS

Exhibit		Page
Exhibit 2.4-A	Preventative Measures for Claims	2-7
Exhibit 2.4-B	Example Acknowledgment of Receipt of Claim	2-8
Exhibit 2.5-A	What is Partnering?	2-10
Exhibit 2.5-B	Example Project Charter	2-13
Exhibit 2.6-A	Example Notice to Proceed	2-16
Exhibit 2.6-B	SF 1442, Solicitation, Offer, and Award	2-17
Exhibit 3.3-A	Work Zone Accident Report	3-8
Exhibit 3.4-A	Example Approval Letter of Contractor's Safety Plan	3-11
Exhibit 3.4-B	Example Notification of a Safety Deficiency	3-14
Exhibit 3.4-C	Example Notification of Chronic Deficiencies	3-15
Exhibit 3.4-D	Summary of OSHA Trenching and Excavation Requirements	3-17
Exhibit 5.2-A	Example Bar Chart Schedule	5-4
Exhibit 5.2-B	Example Critical Path Method (CPM) Schedule	5-7
Exhibit 5.5-A	Example Stop Order	5-17
Exhibit 5.5-B	Example Suspension Letter	5-18
Exhibit 6.8-A	Example Slope Stake and Reference Stake Markings and Notes	6-10
Exhibit 6.10-A	Sight Levels	6-13
Exhibit 7.3-A	Outline of CQCP Requirements per FP-03, Subsection 153.02	7-5
Exhibit 7.3-B	Example CQCP Acceptance Letter	7-12
Exhibit 7.4-A	Inspector's Daily Report	7-20
Exhibit 7.5-A	Example Contract Inspection Time Sheet – Receiving Report	7-25
Exhibit 8.2-A	Contractor Payroll Checklist	8-3
Exhibit 9.5-A	Example Project Engineer's Receiving Report	9-13
Exhibit 9.5-B	Example Contractor's Invoice	9-15
Exhibit 9.5-C	Example Prompt Payment Letter	9-19
Exhibit 9.5-D	Guidelines for Nonpayment Complaints from Subcontractors	9-20
Exhibit 9.5-E	Guidelines for Percentage Payments for Partially Complete Work	9-22
Exhibit 10.5-A	Allowable Bearing on Sandy Soils	10-60
Exhibit 10.5-B	Allowable Bearing on Clayey Soils	10-62
Exhibit 10.5-C	Checklist for Falsework Inspection	10-67
Exhibit 10.5-D	Report of Field Changes to Falsework/Formwork	10-70
Exhibit 10.5-E	Evaporation Rates in Hot Weather	10-76
Exhibit 10.5-F	Identification Marks - ASTM Standard Bars	10-83
Exhibit 10.5-G	ASTM Standard Reinforcing Bars	10-85
Exhibit 10.5-H	Pile Driving Equipment Data Sheet	10-88
Exhibit 10.5-I	Pile Driving Record	10-90
Exhibit 10.5-J	ASTM Standard Structural Bolts	10-94
Exhibit 10.6-A	Basic Checklist for Traffic Control	10-119
Exhibit 12.2-A	SF 1420, Performance Evaluation – Construction	12-3
Exhibit 12.6-A	Feedback Report	12-11
Exhibit 12.7-A	Example Final Voucher – No Exceptions	12-14
Exhibit 12.7-B	Example Final Voucher – With Exception for Pending Dispute	12-15
Exhibit 12.7-C	Example Final Voucher – With Exception for Plant Establishment	12-16
Exhibit 12.7-D	Example Contractor's Release – No Pending Dispute	12-18
Exhibit 12.7-E	Example Contractor's Release – With Pending Dispute	12-19
Exhibit 12.7-F	Example Contractor's Release – With Plant Establishment Exception	12-20
Exhibit 12.7-G	Example Letter of Final Acceptance	12-22
Exhibit 13.3-A	SF 30, Amendment of Solicitation/Modification of Contract	13-5
Exhibit 13.6-A	Contract Modification Process	13-13
Exhibit 13.6-B	Contract Modification Database Report	13-35

Chapter 1 – INTRODUCTION
TABLE OF CONTENTS

Section **Page**

1.1 Purpose and Use of the Manual 1-1

1.2 Abbreviations and Definitions 1-2

1.3 Delegations of Authority 1-4
1.3.1 Chief of Contracting Office (COCO) 1-4
1.3.2 Contracting Officer 1-4
1.3.3 Contracting Officer's Technical Representative (COTR) 1-5

1.4 Responsibilities of the Project Engineer 1-6
1.4.1 General 1-6
1.4.2 Project Documents 1-6
1.4.3 Plan of Operations 1-6
1.4.4 Project Stakeout 1-6
1.4.5 Inspection 1-7
1.4.6 Measurement and Payment 1-7
1.4.7 Changes 1-8
1.4.8 Personnel 1-8
1.4.9 Equipment 1-8
1.4.10 Records and Reports 1-8
1.4.11 Project Costs 1-8

1.5 Relations with the Contractor 1-10

1.6 Relations with Cooperating and Other Agencies 1-12
1.6.1 General 1-12
1.6.2 Forest Service 1-12
1.6.3 National Park Service 1-13
1.6.4 Indian Reservation Roads (IRR) Program 1-13
1.6.5 Fish and Wildlife Service 1-13
1.6.6 Other Federal Cooperating Agencies 1-14
1.6.7 Other Cooperating Agencies 1-14
1.6.8 Regulatory Agencies 1-15

1.7 Relations with the Public 1-16

1.8 Media Relations 1-17

CHAPTER 1

INTRODUCTION

1.1 PURPOSE AND USE OF THE MANUAL

This manual describes the process field personnel are to generally follow when administering construction contracts for Federal Lands Highways (FLH).

It is stressed that this manual is a guide, not a compilation of mandatory instructions. Unless the language is explicitly mandatory, such as that related to regulatory requirements, operations personnel are expected to be innovative and to apply their own reasoning to unique project situations. Those unique situations may sometimes lead to conclusions and actions contrary to what is written in this manual; all actions, however, must fall within the constraints of Division policies, procedures, and delegations.

The manual does not contain detailed discussions of every technical area of construction engineering. To effectively carry out their responsibilities, users will find it necessary to also refer to other sources of information, such as the *FLH Field Materials Manual*, the *Manual on Uniform Traffic Control Devices* (MUTCD), individual Division construction manuals, various AASHTO and ASTM publications, Federal Regulations, and construction industry standards.

It should also be noted that although this manual has been written in part to clarify contract requirements and may at times specifically refer to such requirements, the guidance provided does not replace, modify, or supersede any contract provisions, including the specifications, special provisions, and plans.

This manual has been updated as an electronic version to in part improve the timeliness and ease of updates as methods, materials, policies, procedures, specifications and technologies change in the construction field.

1.2 ABBREVIATIONS AND DEFINITIONS

Section 101 of the Standard Specifications includes the intent and meaning of abbreviations and terms commonly used in connection with highway construction projects administered by FLH. FLH personnel that prepare contract documents, reports, and correspondence should be familiar with these terms and abbreviations and use them correctly.

The terms cited in the Standard Specifications, as well as other terms, which are defined or explained as follows, will be used frequently in this manual.

Contracting Officer (CO) - The Agency representative having full authority to execute and administer the contract on behalf of the Government, or a warranted delegate of that official who has been delegated some of that authority, e.g. contract administration.

As this term is used in the Standard Specifications, it also includes the COTR (see below) operating within his/her delegated authority.

Contracting Officer's Technical Representative (COTR) - The FLH employee or employees having onsite support authority on behalf of the CO as provided in Division delegations. For construction contracts, this person is normally the Project Engineer.

Construction Operations Engineer (COE) - The immediate supervisor of the Project Engineer who may also be a warranted CO with limited contract administration delegations with respect to construction contracts.

Construction Engineer (CE) - The immediate supervisor of the COE who may also be a warranted CO with delegations for most contract administration functions.

Denver Service Center (DSC) - The organization in the National Park Service which provides technical, administrative and funds management liaison between FLH and other Park Service organizational entities.

Director of Project Delivery - The immediate supervisor of the CE who may be a warranted CO.

Division Engineer (DE) - The immediate supervisor of the Director of Project Delivery, and the person in charge of one of the FLH Divisions who may be a warranted CO.

Division Office or Division - The FLH Division with jurisdiction for the project. References to Federal-Aid Division Offices will be specified.

Federal Acquisition Regulation (FAR) - The uniform Federal Government-wide procurement regulations found in the Code of Federal Regulations (CFR) at 48 CFR, Chapter 1. Some parts will be made contract clauses. Others will be furnished separately to the Project Engineer, depending on need.

FLH Field Materials Manual - A companion to this manual giving FLH test methods as well as policies and procedures for monitoring materials and materials-related functions on construction contracts.

Legal Counsel – Provides advice on the existence or interpretation of laws and regulations for the Division.

Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) - The industry standard for design and utilization of standard traffic control devices.

Project Engineer - The authorized representative of the CO who is delegated the responsibility for quality assurance, inspection, payment, and otherwise representing the interests of the Government onsite.

1.3 DELEGATIONS OF AUTHORITY

The CO holds full authority for executing and administering FLH construction contracts. The CO delegates and assigns specific authorities and responsibilities to lower level COs and to COTRs, including the Project Engineer. The Project Engineer cannot formally redelegate authority or responsibility. Therefore, all inspectors and other subordinates act on behalf of the Project Engineer with apparent authority limited by the Project Engineer's supervision.

The Contractor must be informed of the authority of FLH personnel, including the Project Engineer, for administering the contract. This is properly done with a delegation of authority letter from the CO. Questions of authority should be addressed at the preconstruction conference (see Section 2.3 of this manual for more information). Normally, the Contractor provides a description of the authorities of his or her representative at the site. Authority to agree to contract modifications and otherwise agree to contract changes is of particular importance for efficient contract administration.

1.3.1 CHIEF OF CONTRACTING OFFICE (COCO)

The Chief of Contracting Office (COCO) is the FLH Program Administrator, Federal Lands Highway Office, Washington, DC.

The Chief of Contracting Office (COCO) for FLH is the FLH Associate Administrator, Federal Lands Highway Office, Washington, DC. FLH Division Engineers are considered COCOs within their respective offices. The COCO establishes contracting activities and delegates authorities as described in TAM 1201.603. The COCO is delegated his authority from the Head of Contracting Activity (HCA) at the position of FHWA Executive Director.

1.3.2 CONTRACTING OFFICER

Each FLH office has a head CO. This person has various contracting responsibilities including awarding and administering contracts, terminating contracts, and executing final settlements of contracts. The CO responsibilities are delegated to the CE, COE and Project Engineer, through the Delegation of Authority Letter. Authority for the CE and COE is predicated on the employee having a Contracting Officer Warrant issued by the COCO. Many CO functions are typically delegated to different Division personnel depending on their nature. However, expending additional contract funds or changing a contract are not delegable, and therefore must be authorized by a CO. The COE may be a CO with respect to most contract modifications, but may not be a CO with respect to major contract awards or settling claims.

From FAR 43.102:

> *(a) Only Contracting Officers acting within the scope of their authority are empowered to execute contract modifications on behalf of the Government. Other Government personnel shall not*
>
> *(1) Execute contract modifications;*
>
> *(2) Act in such a manner as to cause the contractor to believe that they have authority to bind the Government; or*

> *(3) Direct or encourage the contractor to perform work that should be the subject of a contract modification.*

From FAR 43.202:

> *Change orders shall be issued by the contracting officer except when authority is delegated to an administrative contracting officer.*

And from FAR 2.101:

> *The term [CO] includes certain authorized representatives [delegant] of the contracting officer acting within the limits of their authority as delegated by the contracting officer.*

FAR, Subparts 42.2 and 42.3, prescribe the policies and procedures for the CO's assignment of contract administration responsibilities to a delegant, such as the CE, Claims Specialist, COE, and Project Engineer.

1.3.3 CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR)

The TAR, Subpart 1242.70, authorizes the FLH to designate a COTR to be the onsite contact person for the contract and to generally verify that the work performed meets the requirements of the contract. That person is generally the Project Engineer. The Project Engineer may be delegated support and verification functions, but not functions specifically reserved for COs.

In FLH, the Project Engineer is usually a subordinate of a CO (typically the COE) and therefore may be delegated certain functions in assisting the CO in fulfilling his/her functions. An example might be in facilitating the negotiation of a contract modification. However, the Project Engineer is not delegated the authority to commit the Government as a CO.

1.4 RESPONSIBILITIES OF THE PROJECT ENGINEER

1.4.1 GENERAL

The Project Engineer should conduct all activities in accordance with assigned authority in a manner that will be in the best interest of, and will reflect well upon, the Government.

1.4.2 PROJECT DOCUMENTS

The Project Engineer should carefully analyze the contract documents and supplementary reference material. This includes, but is not limited to: the plans, specifications, special contract requirements, FAR references, geotechnical reports, permits, and all other relevant documents and references. The Project Engineer should also examine the entire area of the proposed construction and compare existing field conditions with those shown on the plans. Any significant differences should be reported immediately to the COE. The Project Engineer must investigate any Contractor reported errors or omissions in the contract documents, and notify the COE of complete details.

1.4.3 PLAN OF OPERATIONS

The Project Engineer should become fully acquainted with the Contractor's plan of operations, planned progress schedule, and other submittals, such as its safety, erosion control, quality control, and traffic control plans. This information should be obtained at the preconstruction conference or prior to the start of work. It is often helpful to set up a submittal log to track submittals, approvals, and pending approvals. Such a log, jointly reviewed by the Project Engineer and the Contractor, can help avoid surprises and disputes.

The Project Engineer should keep current with all changes in the Contractor's plans, and report all significant changes to the COE. All changes in the Contractor's plan of operations must be included on the construction schedule updates. See Section 5.2.4 for further details.

Except as specified in the contract, the Project Engineer should not dictate the Contractor's sequence of operations. When the progress of work is unsatisfactory based on the accepted construction schedule, the Project Engineer should evaluate the situation and consult with the COE.

1.4.4 PROJECT STAKEOUT

Section 152 of the contract will define the Government's and Contractor's responsibility for survey and staking.

When the Government is responsible for staking, the Project Engineer should make every effort to keep construction staking activities well in advance of construction operations so the Contractor's work is not delayed by the Government.

When the contract provides for staking work by the Contractor, the Project Engineer should develop and follow a systematic method to monitor and document the Contractor's staking

process. In this case, staking work is the responsibility of the Contractor. It is not an acceptable solution for the Government to continuously monitor or perform the Contractor's staking activity. The Project Engineer has the authority to demand competence and quality under the contract. Corrective measures are to be made by the Contractor's forces.

The contract specifies staking standards or tolerances, but not necessarily the slope and grade tolerances controlled by that staking. This means construction is to be consistent with the Standards of the Industry, which should be discussed and agreed upon by the Contractor and the Project Engineer prior to the start of work.

See Chapter 6 for more information on construction staking.

1.4.5 INSPECTION

It is the responsibility of the Project Engineer to verify and document that the project is constructed in reasonably close conformity with the plans and specifications, and in compliance with the terms of the Contract. The Project Engineer must therefore conduct periodic inspection and testing as the Contractor completes each phase or element of the work. Continuous or full-time inspection should be avoided whenever possible as it tends to result in FLH taking over the Contractor's quality control responsibilities. However, if certain work is of such criticality or will be obscured by subsequent construction, continuous inspection may be necessary.

Unless otherwise provided for in the plans or specifications, construction methods and sources of materials are the Contractor's option. However, the Project Engineer has the authority to reject both unsatisfactory workmanship and materials. The Project Engineer may suggest methods of improving workmanship and sources of better materials. However, it should always be clear that these are just suggestions, and that the decision is up to the Contractor. In the event the Contractor's methods continue to produce unsatisfactory work, and the Contractor will not accept suggestions, the Project Engineer should discuss with the COE the possibility of ordered changes or stoppage of nonconforming work

When rejecting work for either unsatisfactory materials or workmanship, the Project Engineer should document and photograph the cause for rejection, if appropriate, and identify the Contract provision or specification being violated.

See Chapter 7 for additional information on the inspection responsibilities of the Project Engineer.

1.4.6 MEASUREMENT AND PAYMENT

The Project Engineer is responsible for measuring quantities on the project, making computations, and receiving reports to validate Contractor invoices. Clear and fair standards as to how quantities are measured, as well as prompt submission of receiving reports, will contribute to good Project Engineer/Contractor relations. Instructions for measurement and payment are contained in Chapter 9.

1.4.7 CHANGES

The Project Engineer should try to anticipate necessary changes in design or specifications as early as possible. When changes are anticipated, the Project Engineer should notify the COE immediately. Instructions for preparation of contract modifications are contained in Chapter 13.

1.4.8 PERSONNEL

The Project Engineer is responsible for all official activities of the project and consultant inspection staff. As discussed Section 3.2, the Project Engineer is responsible for the safety of the staff while they are on duty, and may prescribe appropriate dress and methods for the work they perform. The Project Engineer should instruct Government personnel in the performance of their assigned tasks and assist in training them for more advanced assignments. The Project Engineer should strive to support any prescribed training program and recommend additional training when appropriate.

Project Engineers should consult their respective Division's operation manuals and the employee handbook, *Your Job in the Federal Highway Administration*, for guidance relative to personnel questions or problems. Consultation with the COE or the Personnel Office may be appropriate.

1.4.9 EQUIPMENT

The Project Engineer is responsible for all Government equipment on the project, and for the protection and preservation of all rented or leased property and equipment. Proper precautions should be taken to prevent loss by fire or theft. The Project Engineer must instruct personnel in the care of vehicles and equipment, and make personal inspections of such property to ensure proper maintenance. The Project Engineer should promptly report all damaged or otherwise unsatisfactory equipment to the proper authorities and make recommendations for repair or replacement. Unsafe equipment must not be used or operated. Additional instructions for the handling of equipment matters will be prescribed by the Division.

1.4.10 RECORDS AND REPORTS

The Project Engineer is responsible for preparing and maintaining all records kept on the project. Electronic project files should be backed up on a regular basis and stored offsite to protect against hard drive failures and other catastrophes. Instructions covering records and reports are contained in several chapters within this manual.

The Contractor is responsible for maintaining records required by the contract. The Contractor must provide access to, or in some cases copies of, such records to the Project Engineer within specific time frames.

1.4.11 PROJECT COSTS

The keeping of official project cost records is a function of the accounting units of the Divisions. However, the Project Engineer should have access to sufficient cost records to be able to

estimate the total accrued costs of both construction and construction engineering at any given time. As the work progresses, the Project Engineer must monitor how these costs relate to the work completed and amount of work remaining to be done, taking into consideration any necessary changes.

The Project Engineer should carefully examine anticipated overruns and underruns, and keep the COE informed. Refer to Section 9.3 for additional instructions on project cost reporting.

1.5 RELATIONS WITH THE CONTRACTOR

FLH personnel engaged in a construction project must remember they are at all times representatives of the Government and, as such, must conduct themselves in a courteous and business-like manner.

Integrity on the part of all employees is essential. The acceptance of most gifts and favors from Contractors and others doing business with FLH is strictly forbidden. Federal law and regulations prohibit the acceptance of (1) unsolicited gifts with a market value of more than $20 ($10 for designated procurement officials) per occasion, (2) gifts of any value aggregating to more than $50 in a calendar year, and (3) gifts of any value that are solicited, or which are associated with an expectation, stated or implied, of a return favor. It is FLH policy that acceptance of any gift or favor, regardless of value, that might give the appearance of impropriety is unacceptable. Gifts should therefore be avoided except in situations where refusing a small gift (such as a calendar intended as a promotional item) would embarrass either or both parties.

Employees must never place themselves under obligation to the Contractor, as this would impair their ability to effectively represent the Government, and might create a condition where more serious improprieties could occur. Offers of gifts, or other actions on the part of the Contractor or its representatives that could be construed as an attempt to influence the actions of an FLH employee, should be immediately reported to the COE. Other offers of gifts should also be reported to the COE, who will advise as to a polite refusal.

Inspectors should maintain a fair and impartial attitude without undue display of emotions, and should not engage in arguments with members of the Contractor's organization. If disagreements cannot be settled in a reasonable time with mutual satisfaction, the matter should be referred to the Project Engineer. FLH project personnel do not have the authority to alter or waive the provisions of the contract, to issue instructions contrary to the plans and specifications, or to act as foreman for the Contractor. They do have authority to reject noncomplying materials and work, and to suspend work that is being performed in apparent noncompliance, or in a manner that creates unfunded liability to the Government, until the matter is referred to a higher authority.

All nonroutine orders to the Contractor are to be given by the Project Engineer to the Contractor's superintendent on the project, unless circumstances make it necessary to communicate with lower level personnel. Such orders should be confirmed with the superintendent as soon as possible. Orders that alter the contract or create additional liability to the Government must be in writing and must be executed (signed) in accordance with prevailing construction contract administration delegations. Except for certain minor orders, this means a warranted CO.

Discussions concerning the Contractor's organization, equipment, methods, and/or efficiency, should be limited to those undertaken by the Project Engineer with appropriate representatives of the Contractor.

It is recommended that the Project Engineer hold regularly scheduled meetings with the Contractor's superintendent to discuss the Contractor's plan, schedule of work, and problems arising on the project. The Project Engineer should record the substance of such discussions in the project diary or in meeting minutes. See Section 2.5, Partnering with the Construction Contractor.

At the conclusion of the project, the Contractor will be asked to complete a Quality Improvement Survey. This survey allows the Contractor to identify problem areas in our design, payment, and contract administration processes. Periodically our processes are reviewed using this feedback.

1.6 RELATIONS WITH COOPERATING AND OTHER AGENCIES

1.6.1 GENERAL

As soon as possible after assignment to the project, the Project Engineer should become acquainted with the local State, County, Forest Service, National Park Service, Fish and Wildlife Service, Tribal and/or other interested officials, and discuss phases of the work pertinent to them.

It should be emphasized to these officials that contact with the Contractor on contract issues should be exclusively through the Project Engineer. However, this should not preclude them from dealing directly with the Contractor on non-contract issues, such as overweight permits, pollution regulations, speed enforcement, and similar matters.

Local officials should also be advised of limitations in our ability to add to, or change contract work; and that such requests should be in writing and will have to be cleared by all appropriate officials.

These issues should be discussed at the preconstruction conference (see Section 2.3) so the Contractor understands the relationship involved.

At the conclusion of construction, the cooperating agency and other third party entities involved in the project will be asked to complete a Completed Project Survey providing feedback on the quality of the project and our delivery of the construction. See Appendix 1A.1 for a blank survey form.

1.6.2 FOREST SERVICE

The U.S. Forest Service is one of the tri-agency group charged with overall administration of the Forest Highway Program. Therefore, Forest Service officials have legitimate interest beyond the immediate relationship of the project and its National Forest environs.

During project development, most of FLH's contact with the Forest Service will be through the Regional Forester's Office (including the Regional Engineer). During construction, the Project Engineer should be careful to avoid taking actions, making changes, or making informal agreements with local officials that are inconsistent with previous agreements, unless such issues are adequately coordinated with the Forest Service representative.

During the construction of a Forest Highway project, the Project Engineer should maintain close liaison with the Forest Service representative assigned to the project. The representative and his/her staff may be most interested in the following:

- erosion control,
- landscape preservation,
- prevention of fires and damage outside the right-of-way,
- sources of borrow and aggregates,
- other matters pertaining to land use, and the
- preparation and disposal of merchantable timber.

In addition to visits by the assigned Forest Service representative, the project may also be visited by the Forest Supervisor, Forest Engineer, Regional Engineer, and Regional Forester. Generally speaking, however, these officials should be encouraged to channel all requests or requirements through a single contact official designated by the Forest Service for the project.

The Project Engineer should take immediate action on all appropriate Forest Service requests that are within the scope of the contract. Requests or instructions that are not of an emergency nature and that would necessitate a contract modification should be in writing and referred to the COE. Requests or instructions that are of an emergency nature must be acted on promptly, and the COE should be notified as soon as possible thereafter.

1.6.3 NATIONAL PARK SERVICE

Because the National Park Service (NPS) normally owns the highway right-of-way and adjacent property, and is responsible for maintenance and operation after construction, it maintains an active interest in all phases of FLH Park Service projects. Under normal conditions, the Park Service is represented on the project by a designated liaison from the Denver Service Center (DSC) or a person designated in the project agreement. However, the Project Engineer should also develop a good working relationship with the Park Superintendent, local Park Rangers, and maintenance personnel.

Park Service requests or instructions are to be coordinated through the designated NPS liaison. If conflicting instructions or changes become a problem, the COE should be advised so that coordination above the project level can be improved.

1.6.4 INDIAN RESERVATION ROADS (IRR) PROGRAM

The Project Engineer and the COE should obtain training in American Indian Culture prior to attending project meetings. An IRR project will normally be performed on highway right-of-way owned by the Bureau of Indian Affairs (BIA), Tribes, or State, county, or local agencies. The relationship of the FLH to these agencies will vary, but coordination and communication with all will likely be required through the design and construction phases of a project. The Project Engineer should take immediate steps to establish a point of contact or primary liaison with each agency. Requests from the effected parties should be responded to immediately if within the scope of the work. For significant changes, approval should be obtained through the Tribal liaison and BIA Region before being acted upon.

In those cases where a tribe has entered into an agreement directly with the FHWA, coordinate with the FLH IRR Program Manager in Washington, DC.

1.6.5 FISH AND WILDLIFE SERVICE

Like the National Park Service (NPS), the Fish and Wild Life Service normally owns the highway right-of-way and adjacent property, and is responsible for maintenance and operation after construction. They maintain an active interest in all phases of FLH Refuge Roads projects. Under normal conditions, they are represented on the project by a designated FLHP coordinator from the Fish and Wildlife Regional office or a person designated in the project agreement.

However, the Project Engineer should also develop a good working relationship with the Refuge Manager Park Superintendent and local maintenance personnel.

Fish and Wildlife requests or instructions are to be coordinated through the designated liaison. If conflicting instructions or changes become a problem, the COE should be advised so that coordination above the project level can be improved.

1.6.6 OTHER FEDERAL COOPERATING AGENCIES

Other Federal agencies with which FLH has an active relationship include the Department of Interior's Bureau of Land Management and the Department of Defense (DOD). The relationship of FLH to these agencies varies. Some are land owning agencies like the Park Service and have interest in all aspects of the project, including maintenance. Others, like DOD, have a stake in programming and funding as well as the operational functioning of the project, but the projects are usually destined to become a State or county highway with respect to maintenance. Therefore, a tri-agency relationship is created.

Whenever a construction project is undertaken for, or involving one of these agencies, the COE will make the Project Engineer aware of all necessary administrative information regarding our obligations to the agency, and furnish copies to the Project Engineer as appropriate. This documentation will usually include a Memorandum of Agreement (MOA) for the project.

1.6.7 OTHER COOPERATING AGENCIES

Except in National Parks and on National Parkways, the maintenance of roads constructed by FLH is generally performed by States or counties in accordance with a previously executed agreement. In such cases, the maintaining agency will be asked to inspect the project prior to assuming the maintenance obligation. It is therefore important to identify these officials early in the project and to maintain a good working relationship with them. Their interest in the project will mostly focus on the technical details and maintainability, rather than impact on the surrounding environment. They will also be interested in traffic control, and whether hauling might adversely impact adjacent roads. When changes are proposed that impact technical details, maintainability, and traffic operations, they should be coordinated with these officials. Their requests should be promptly honored if reasonable and within the Project Engineer's authority. Other requests should be referred to the COE.

With respect to Forest Highways, the State highway department is another member of the tri-agency group (See Section 1.6.2) charged with overall administration of the Forest Highway program. With respect to other Public Lands highways, the Forest Service has less of a role in planning and setting priorities, but has an interest in the highway's impact on the environment. The State may also have specific assigned responsibilities for local roads in the State regardless of whether or not they are on the State system. Therefore, even if the County is the maintaining agency for a particular project, the State may also have legitimate interest and should be consulted appropriately.

The acquisition of rights-of-way across private lands is generally a function of the cooperating agencies. In some instances, only a right-of-entry or easement for a construction project will have been obtained prior to construction. In such cases, the Project Engineer should cooperate fully with appraisers and other agents in their work of obtaining the actual right-of-way. The

Project Engineer must also be aware of the limitations (if any) of the right-of-entry and attempt to maintain good relations with the property owners during construction.

The Project Engineer should also be aware of any limitation in the Government's authority to approve or agree to any work that would change the limit of construction with respect to available right-of-way. The COE should be consulted if any uncertainty develops.

1.6.8 REGULATORY AGENCIES

A number of Federal and State agencies have regulatory responsibilities that might result in their coming onto the project and interacting with the Contractor or FLH personnel. These agencies include those responsible for water pollution control, air pollution control, occupational safety, erosion control, storm water management, and protection of endangered species.

The involvement of these Federal and State regulatory agencies has increased in recent years as a result of changes in Federal regulations requiring compliance with all local and State regulations. Most FLH permits allow these agencies the right to inspect the project and to review project records at any reasonable time.

In addition to diary notation, the COE should be notified of all visits and any anticipated further action. When regulatory agencies take issue with FLH's compliance with permit or project agreements, the COE should be advised and will arrange for technical assistance from Division office specialists.

See Chapter 4 for more on this subject.

1.7 RELATIONS WITH THE PUBLIC

FLH field personnel are in daily contact with, and under the critical eyes of our ultimate customer, the public. This might include adjacent property owners, daily commuters, residents of nearby communities, tourists, and groups with special environmental or other interests. For these and other reasons, it is essential that all employees strive to conduct themselves in a manner that will command respect and confidence.

In any community, information concerning highway improvement is of primary interest. From the standpoint of good public relations, it is important that information pertaining to FLH projects be made available as soon as possible, and that it be both accurate and complete.

On most Park Service and similar projects where there is a single, strong cooperating agency, all questions and requests from the public dealing with the project should be referred to and coordinated by a designated cooperating agency contact. Sometimes, especially on low profile projects, the cooperating agency(s) will defer to FLH for routine public interaction. If the COE advises that this is the case, the Project Engineer should become acquainted with heads of civic groups and other public entities to furnish such information of local interest as it is pertinent to the project to which they are assigned. Care must be exercised to avoid the release of information concerning controversial matters or items that might be misconstrued or misunderstood. Reference to any conflict or disagreement between FLH and the State, county, or another Federal agency should be avoided. For example, a statement such as the "the matter is being jointly studied" is preferred over "there is a conflict".

When the Project Engineer is specifically assigned to be the focal point of public contacts and information, the following are some guides as to the kinds of information that could be of interest to the public, along with the actions to be taken to ensure timely releases that establish and maintain good public relations:

- Information concerning road closures, detours, speed restrictions, and other items related to public safety and of general interest to motorists should be given timely publicity. In some instances, sketch maps will be helpful in conveying such information.

- Refrain from stating opinions on local issues that have no connection with the project, or involve choices that are the prerogative of the local authorities.

- Questions directed to survey crew, construction engineering crew members, or contract inspectors should generally be referred to the Project Engineer for an answer.

- Requests for information pertaining to matters of recognized public interest that cannot be completely answered at the project level should be promptly referred to the COE.

FLH is very sensitive to the public's opinion of our projects and the quality of the project delivery process. The *Completed Project Survey* is often requested from local officials attuned to local public opinion. The public often write their elected officials to provide input or to voice complaints related to our projects. It is important to respond professionally and to accommodate, if possible, public requests and input.

1.8 MEDIA RELATIONS

Requests from the media, such as from newspaper and magazine reporters or TV and radio news producers, are to be directed to the FHWA Office of Public Affairs. If the Project Engineer is to answer questions from the media, he must first be designated to do so by the FHWA Public Affairs officer, otherwise the only information that should be provided to reporters is the phone number or email addresses of FHWA's Office of Public Affairs, as provided below.

FHWA Office of Public Affairs 202-366-0660

- Doug Hecox: doug.hecox@dot.gov
- Nancy Singer: nancy.singer@dot.gov

FHWA's Public Affairs office is always the first place reporters should be directed. This policy applies to everyone, from summer interns to the Administrator himself. The media is a stakeholder of the FHWA's as much as any other part of the public, and good customer service demands we provide them a central contact point. In this way, FHWA is better able to respond to the many inquiries of the press and, by extension, the informational needs of the public.

CHAPTER 1 – INTRODUCTION

LIST OF APPENDICES

1A.1 COMPLETED PROJECT SURVEY 1

1A.1 COMPLETED PROJECT SURVEY

Federal Highway Administration
Federal Lands Highway

Completed Project Survey

FHWA Federal Lands Highway Completed Project Survey

January 2005

1

We would like you to complete this survey for "Name" project. Your participation is vital to ensuring that the information is valid and representative of our customers.

---

1) Respondent's Agency for

If you selected other, please specify:

2) Respondent Information

Name:
Title:
Organization:
Phone:
E-Mail:

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

2

3) FLH's Management Practices. Please indicate your level of satisfaction with the conditions addressed below. Use the rating scale to select what represents your best judgment.

	Very Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Very Satisfied	NA or Don't Know
Management of the construction schedule.	☐	☐	☐	☐	☐	☐
Management of construction costs.	☐	☐	☐	☐	☐	☐
Timeliness of response to guidance and requests by your agency.	☐	☐	☐	☐	☐	☐
Quality of response to guidance and requests by your agency.	☐	☐	☐	☐	☐	☐
FLH and construction contractors working together to resolve problems.	☐	☐	☐	☐	☐	☐
Overall job of managing the construction.	☐	☐	☐	☐	☐	☐

4) Please provide any additional comments, suggestions or recommendations on FLH's Management Practices below.

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

3

5) Completed Project Elements. Please indicate your level of satisfaction with the conditions addressed below. Use the rating scale to select what represents your best judgment.

	Very Dissatisfied	Dissatisfied	Neither Dissatisfied nor Satisfied	Satisfied	Very Satisfied	NA or Don't Know
Pavement or bridge surface (texture and ride).	☐	☐	☐	☐	☐	☐
Drainage structures (culverts, channels and ditches).	☐	☐	☐	☐	☐	☐
Major structures (bridges, walls, etc.)	☐	☐	☐	☐	☐	☐
Stability of cut and fill slopes and road shoulders.	☐	☐	☐	☐	☐	☐
Maintainability (mowing, vegetation, snow removal, etc.)	☐	☐	☐	☐	☐	☐

6) Please provide any additional comments, suggestions and recommendations about Completed Project Elements below:

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

4

7) Completed Project Aesthetics. Please indicate your level of satisfaction with the conditions addressed below. Use the rating scale to select what represents your best judgment.

	Very Dissatisfied	Dissatisfied	Neither Dissatisfied nor Satisfied	Satisfied	Very Satisfied	NA or Don't Know
Landscaping and seeding.	☐	☐	☐	☐	☐	☐
Striping (roadway and parking areas).	☐	☐	☐	☐	☐	☐
Alignment of guardrail, walls and roadside appurtenances.	☐	☐	☐	☐	☐	☐
Earth shoulders and slopes (including rock slopes).	☐	☐	☐	☐	☐	☐
Drainage structures (culverts, channels and ditches).	☐	☐	☐	☐	☐	☐
Major structures (bridges, walls, etc.)	☐	☐	☐	☐	☐	☐
The overall aesthetics of the completed project.	☐	☐	☐	☐	☐	☐

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

5

8) Please provide any additional comments, suggestions and recommendations about Completed Project Aesthetics below:

9) Conditions during Construction. Please indicate your level of satisfaction with the conditions addressed below. Use the rating scale to select what represents your best judgment.

	Very Dissatisfied	Dissatisfied	Neither Dissatisfied nor Satisfied	Satisfied	Very Satisfied	NA or Don't Know
Roadway conditions.	☐	☐	☐	☐	☐	☐
Detours and traffic flow.	☐	☐	☐	☐	☐	☐
Safety of motorists and non-motorists.	☐	☐	☐	☐	☐	☐
Accommodations of landowners.	☐	☐	☐	☐	☐	☐
Access to business and adjacent property.	☐	☐	☐	☐	☐	☐
Signage.	☐	☐	☐	☐	☐	☐
Your perception of overall public reaction during construction.	☐	☐	☐	☐	☐	☐

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

10) Please provide any comments, suggestions and recommendations on Conditions during Construction below:

11) Environmental Sensitivity. Please indicate your level of satisfaction with the conditions addressed below. Use the rating scale to select what represents your best judgment.

	Very Dissatisfied	Dissatisfied	Neither Dissatisfied nor Satisfied	Satisfied	Very Satisfied	NA or Don't Know
Preservation of existing vegetation.	☐	☐	☐	☐	☐	☐
Protection and preservation of natural, historical and cultural resources.	☐	☐	☐	☐	☐	☐
Riparian (preservation and establishment of vegetation adjacent to streams).	☐	☐	☐	☐	☐	☐
Erosion and sediment control.	☐	☐	☐	☐	☐	☐
Materials source/waste area management.	☐	☐	☐	☐	☐	☐

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

7

Environmental compliance with contract.	☐	☐	☐	☐	☐	☐

12) Please provide any comments, suggestions and recommendations on Environmental Sensitivity during Construction:

13) Overall Rating. Please indicate your overall level of satisfaction with the FLH construction process. Use the rating scale to select what represents your best judgment.

- ☐ Very Dissatisfied
- ☐ Dissatisfied
- ☐ Neither Dissatisfied nor Satisfied
- ☐ Satisfied
- ☐ Very Satisfied
- ☐ NA or Don't Know

14) Please provide any overall comments, suggestions and recommendations below:

Federal Highway Administration
Federal Lands Highway
Completed Project Survey

Chapter 2 – PRECONSTRUCTION
TABLE OF CONTENTS

Section **Page**

2.1 General 2-1

2.2 Field Office 2-2

2.3 Preconstruction Conference 2-3

2.4 Claims and Disputes 2-5

2.5 Partnering with the Construction Contractor 2-9
2.5.1 Background 2-9
2.5.2 Policy for Partnering 2-11
2.5.3 Formal Partnering 2-11
2.5.4 Informal Partnering 2-14
2.5.5 Emphasis is on Attitude 2-14
2.5.6 Follow-up Evaluations and Measurement 2-14

2.6 Notice to Proceed 2-15

LIST OF EXHIBITS

Exhibit		Page
Exhibit 2.4-A	Preventative Measures for Claims	2-7
Exhibit 2.4-B	Example Acknowledgment of Receipt of Claim	2-8
Exhibit 2.5-A	What is Partnering?	2-10
Exhibit 2.5-B	Example Project Charter	2-13
Exhibit 2.6-A	Example Notice to Proceed	2-16
Exhibit 2.6-B	SF 1442, Solicitation, Offer, and Award	2-17

CHAPTER 2

PRECONSTRUCTION

2.1 GENERAL

This chapter addresses preconstruction activities that will help ensure a smoother construction phase. Topics discussed include the following:

- Field Office Requirements
- Preconstruction conference requirements and considerations, including preparatory work, agenda topics, suggested attendees, and follow-up activities;
- Claims avoidance techniques;
- Partnering concepts, benefits, and processes; and
- Issuance of the Notice to Proceed (NTP), including situations under which NTP may be delayed.

2.2 FIELD OFFICE

A field office will be established for every project. Facilities will be provided through a negotiated lease, Government or Contractor supplied trailer, or other office space as determined by the COE and the contract.

A sign shall be placed at the office facility, with the following wording:

OFFICE OF PROJECT ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

2.3 PRECONSTRUCTION CONFERENCE

As soon as practical after the contract is awarded and before issuance of the Notice to Proceed (NTP), the COE or the Project Engineer will arrange a conference with the Contractor. FLH personnel in attendance will normally include the Project Engineer, the COE, and specialized personnel as needed. Representatives of Federal cooperating agencies, States, utility companies, and any other groups that will be significantly affected by the construction should also be invited.

The COE will prepare and send to the Contractor, a meeting agenda and other information to assist in preparing for the conference. See Appendix 2A.1.1 for an example of a basic preconstruction conference agenda. This agenda should be augmented to reflect unique features of the contract and Division-specific issues. Appendix 2A.1.2 provides an example of a letter setting up the preconstruction conference.

The purpose of the conference is to discuss the following:

- project plans and specifications;
- unusual conditions;
- the Contractor's plan and schedule of operation;
- type and adequacy of equipment;
- labor requirements (see Section 8.2);
- equal employment opportunity requirement (see Section 8.3);
- maintenance of traffic;
- traffic control requirements;
- the Contractor's responsibilities for worksite safety, and accident prevention (see Section 3.4);
- material sources and testing requirements (see Chapter 11);
- subcontracting requirements (see Section 8.8);
- required submissions;
- compliance requirements;
- specific project related issues; and
- any other pertinent items that will result in a better job understanding.

The person conducting the conference (usually the Project Engineer or COE) should explain:

- the FLH contract administration process;
- the authority and responsibilities of FLH personnel;
- the relationship of FLH to the cooperating agency(s), emphasizing that FLH (and not any other entity) will issue all orders to the Contractor relating to the contract; and
- the payment and invoice process, particularly the Contractor's obligation to provide the required materials documentation, test reports, and certifications to support payment for the work in question (see Section 9.5).

Similarly, the Contractor's representatives should explain its organization and identify its authorized representative for the project. See FAR Clause 52.236-6, Superintendence by the Contractor. If a representative is not identified at the conference, the Contractor must submit a written designation at a later date.

A written report or minutes will be prepared by Project Engineer or COE for each preconstruction conference (see Appendix 2A.1.3). This report should consist of a summary of the discussions, with the conference agenda attached. The report of minutes will document the explanation of authority and duties of FLH personnel, and the Contractor's explanation of its organization and designation of its authorized representative. One or more copies of that report or minutes should be provided to the Contractor and other major participants, along with a request that any omissions and perceived misrepresentations be documented in writing to FLH.

2.4 CLAIMS AND DISPUTES

In the course of construction, it is not uncommon for differences of opinion to arise between the Contractor and Project Engineer over interpretation of the contract provisions, or as to whether increased costs or time extensions are allowable for changes, differing site conditions, or delays. The Contractor may also express dissatisfaction or disagreement with contract modifications.

FLH endorses the philosophy of *partnering* to avoid and resolve contract disputes. See Section 2.5 for additional information on partnering. Most differences can be resolved by negotiation that leads to appropriate contract modifications. Prompt action should be taken to resolve issues and to participate in making any equitable adjustments as necessary, giving full consideration to the terms of the contract.

The Project Engineer must keep the COE informed of issues as they arise. The COE will keep the legal office and higher level COs informed as necessary, and will advise the Project Engineer on appropriate actions in the meantime.

The Project Engineer should use the project diaries, *Inspector's Daily Reports*, and all other available records to document and evaluate issues. Photographs, if applicable, can be an important part of the documentation. See Section 7.4 for additional information on record keeping.

Because recorded information is invaluable in the event of a claim, and claims may occur on any project, the need for routine preparation and maintenance of records cannot be over emphasized.

The Project Engineer must maintain a daily diary. Project diaries should contain sufficient factual information to reveal the nature of the Contractor's complaint, the circumstances involved, and the substance of statements made by both parties. Both the project diaries and the *Inspector's Daily Reports* should discuss the Contractor's operations relative to the work in question. Descriptions of the equipment and materials that may be involved, construction progress or lack thereof, and similar information should be included. Any opinions or conclusions should be labeled as such, with their factual basis described. See Section 7.4.2.

If the Contractor indicates that it may file a claim, the Project Engineer should direct the Contractor's attention to the Contract, particularly to those provisions dealing with disputes, changes, differing site conditions, suspension of work, contract time, and notice requirements, as applicable (see Section 13.4 for more information). FLH personnel should avoid letting personal opinions and the opinions or intentions of designers influence their response to a possible claim. What matters most are the specific provisions of the contract - what they say and how a reasonable bidder would interpret them. Exhibit 2.4-A provides some additional tips related to claims prevention.

Formal claims must be submitted to a delegated CO for decision. If in receipt of a claim, the Project Engineer must forward it to the COE or higher level CO for review as to legal sufficiency and acknowledgment. The COE will seek the advice of Legal Counsel and other specialists as necessary. An example acknowledgment of receipt of claim is shown in Exhibit 2.4-B.

See Chapter 13, Contract Modifications, for a discussion of the FAR clauses usually used as grounds for a dispute, and the specific notice and administrative requirements associated with those clauses.

Exhibit 2.4-A Preventative Measures for Claims

- Develop a thorough knowledge of plans and specifications.
- Read all relevant portions of the contract before answering questions or making decisions.
- Perform accurate and consistent timely inspections, testing and reporting.
- Strictly adhere to established testing procedures.
- Accept nothing less, nor require anything more, than required by the contract.
- Ensure that all inspectors are properly instructed to apply consistent standards for the work being performed.
- Maintain professional and cooperative attitude with Contractor personnel.
- Be sympathetic to Contractor problems, complimentary when Contractor delivers exceptional quality.
- View project accomplishments as a team effort between Contractor and FLH personnel.
- Deal with the superintendent or at least the same people on the same issues all the time.
- Try to anticipate and recognize potential claim situations.
- Face problems including FLH mistakes, and seek fair and equitable resolutions.
- Track proposed CM to be sure those charged with making decisions know that the project is waiting for those decisions.
- Act promptly and decisively in dealing with problems. If you can't resolve an issue, refer it to someone who can.
- Realize that communication is probably the most effective deterrent to claims – thorough documentation is the best defense.

Exhibit 2.4-B Example Acknowledgment of Receipt of Claim

U.S. Department
of Transportation
Federal Highway Administration

Central Federal Lands Highway Division
12300 West Dakota Avenue, Suite 210A
Lakewood, CO 80228-2583

February 7, 2008

In Reply Refer to: HFCO-16

Mr. John Smith, President
Smith Construction
423 Tumbling River Road
San Diego, California 55532

Dear Mr. Smith:

Subject: CA PFH 47-1(2), Sacramento Basin
Contract No. DTFH68-05-C-00321
Claim No. XVI-07-002

Your claim on CA PFH 47-1(2), Sacramento Basin, was received on December 5, 2007. Claim Number XVI-07-002 has been assigned to your claim. Please include this number on all future correspondence associated with the subject claim.

We will issue the final Contracting Officer's Decision on the subject project after our evaluations are completed. Due to the size and complexity of the claim, we do not yet know how long the evaluation and subsequent issuance of the final Contracting Officer's Decision will take.

We will inform you of our anticipated schedule for issuance of the final Contracting Officer's Decision within 60 days of the claim submittal date.

Sincerely yours,

Seth C. Greenwell, P.E.
Contracting Officer

2.5 PARTNERING WITH THE CONSTRUCTION CONTRACTOR

2.5.1 BACKGROUND

State highway agencies, the Federal Highway Administration (FHWA), and in particular, the FHWA's FLH program, have officially adopted the concept of partnering for administering construction contracts and improving internal agency and client relationships. The FLH definition of partnering is:

Partnering - *A formal process of bringing teams from different organizations together where they cooperate to achieve separate but mutually beneficial objectives*.

While the contract establishes the legal relationships, the partnering process attempts to establish working relationships among the parties (stakeholders) through a mutually-developed, formal strategy of commitment and communication. It attempts to create an environment where trust, continuous communication, and teamwork prevent disputes, foster a cooperative bond to everyone's benefit, and facilitate the completion of a successful project.

The basic intent of partnering is to bring key managers of the project together to open channels of communication, set complimentary goals, and foster a climate in which issues can be openly raised, discussed, and jointly settled at the lowest practical level of responsibility. The goal of this concept is to create a cooperative team spirit, trust among team members, and a step-by-step joint issue identification and resolution process to minimize the number and contentiousness of disputes.

Making changes to the contract requirements or relaxation of the specifications are not a part of the partnering process. However, when changes are appropriate to solve a problem or make the project run smoother, partnering is the forum that the stakeholders can use to recognize the need for the change and to quickly reach an equitable agreement.

See Exhibit 2.5-A, What is Partnering, an excerpt from the Corps of Engineers pamphlet, *Partnering a Concept for Success*.

Exhibit 2.5-A What is Partnering?

What is Partnering?*

The Partnering *concept* goes back to the way people used to do business when a person's word was their bond and people accepted responsibility. Partnering is not a contract, but a recognition that every contract includes an implied covenant of good faith.

While the contract establishes the legal relationships, the Partnering process attempts to establish working relationships among the parties (stakeholders) through a mutually-developed, formal strategy of commitment and communication. It attempts to create an environment where trust and teamwork prevent disputes, foster a cooperative bond to everyone's benefit, and facilitate the completion of a successful project.

For the most effective results, stakeholders should conduct a Partnering workshop, ideally at the early stages of the contract. The sole agenda of the workshop is to establish and begin implementing the Partnering process. This forum produces the opportunity to initiate the key elements of Partnering.

The key elements of Partnering are:

- **Commitment** - Commitment to Partnering must come from top management. The jointly-developed Partnership charter is not a contract, but a symbol of commitment.

- **Equity** - All stakeholders' interests are considered in creating mutual goals, and there is commitment to satisfying each stakeholder's requirements for a successful project by utilizing win/win thinking.

- **Trust** - Teamwork is not possible where there is cynicism about others' motives. Through the development of personal relationships and communication about each stakeholders risks and goals, there is better understanding. With understanding comes trust and with trust comes the possibility for a mutually beneficial relationship.

- **Development of Mutual Goals/Objectives -** At a Partnering workshop the stakeholders identify all respective goals for the project in which their interests overlap. These jointly-developed and mutually agreed to goals may include achieving value engineering savings, meeting the financial goals of each party, limiting cost growth, limiting review periods for contract submittals, early completion, no lost time because of injuries, minimizing paperwork generated for the purpose of case building or posturing, no litigation, or other goals specific to the nature of the project.

- **Implementation** - Stakeholders together develop strategies for implementing their mutual goals and the mechanisms for solving problems.

- **Continuous Evaluation** - In order to ensure implementation, the stakeholders agree to a plan for periodic joint evaluation based on the mutually agreed to goals - to ensure the plan is proceeding as intended and that all stakeholders are carrying their share of the bad.

- **Timely Responsiveness** - Timely communication and decision making not only save money, but also can keep a problem from growing into a dispute. In the Partnering workshop the stakeholders develop mechanisms for encouraging rapid issue resolution, including the escalation of unresolved issues to the next level of management.

* Excerpt from USACE pamphlet: Partnering, A Concept for Success

2.5.2 POLICY FOR PARTNERING

The following summarizes the policy guidance contained in the *FLH Manual, Subsection 1-C-3, Partnering*. A copy of this guidance is also provided as Appendix 2A.2.

- Partnering should be offered to the Contractor on a voluntary basis and not mandated.
- Formal partnering, using a trained facilitator, is to be offered to contractors on all major projects.
- Smaller or less complicated projects can be partnered on an informal or abbreviated basis.
- The development of a partnering agreement, or charter, signed by all the partners is suggested for all partnered projects (both formal and informal) to document the goals and objectives agreed upon.
- Key decision makers for FLH and the Contractor may be involved in partnering, as well as major subcontractors, the clients, and other regulatory agencies, such as the Corps of Engineers and the Fish and Wildlife Service, who have specific interest in the project.
- The use of a professional and experienced facilitator is recommended for all formal partnering.
- The cost of partnering should be shared equally by FLH and the Contractor. The progress payment system will include an item for formal partnering to allow FLH to compensate the Contractor for the Government's share of the cost. If deemed appropriate by the COE, a partnering item may also be set up for informal partnering.
- As the partnered project develops, feedback and continuous evaluation of the partnering process and the project needs to be discussed and documented at the project level on a weekly basis or on the otherwise agreed upon meeting frequency. .
- A major objective of partnering is for the individuals at the project level to make timely decisions, work as a team, and resolve conflicts or issues to the extent possible. It is also important to have a clear and expeditious escalation procedure, so that conflicts that cannot be resolved at the project level may be escalated to the appropriate level as quickly as possible.

2.5.3 FORMAL PARTNERING

The contract will typically include an invitation to partner as part of the notice to bidders. Prior to, or during the preconstruction conference, the COE will determine from the Contractor if the project will be partnered. Jointly, they will agree upon the level of the partnering effort and on the location, tentative date, and participants for the partnering workshop.

Next, the COE, or Project Engineer, and the Contractor will determine who will facilitate the workshop. Generally, if the Contractor has a preference, FLH will honor that selection. Each Division has a list of acceptable facilitators and may offer to share the list with the Contractor. If

prior arrangements and commitments are made, consideration should be given to having the partnering workshop in conjunction with (before or after) the preconstruction conference.

Following the selection of the facilitator, the COE or Project Engineer should finalize the attendance list with the Contractor. The availability and role of key decision makers in the management of the contract is very important. Ideally, both FLH and the Contractor should strive to have their respective key persons attend all formal partnering workshops. A successful match-up for a partnering workshop could include:

For the Contractor	For FLH
Senior Vice-President	Director of Project Delivery/CO Branch Manager Construction Engineer
Project Manager	COE
Project Superintendent	Project Engineer
Foreman	Assistant Project Engineer
Subcontractors	Inspectors

Other representation should include the clients or customers, the State or county maintaining agencies, regulatory or compliance groups, and other interested parties that may impact the project during construction.

When deciding on the appropriate attendees, do not unnecessarily expand the size of the group to the extent that the partnering process may fail. Keep in mind that the success of the partnering workshop depends on the expertise and actions of the facilitator and most importantly, the cooperation and commitment of the key decision makers.

Another critical question in scheduling a formal partnering workshop is: “How long should the session last?” Since key individuals must allot their time carefully due to their respective positions and responsibilities, it is suggested that one day is ideal for the typical large or complex FLH contract. Of course, if all parties agree, additional time should be scheduled. Often the selected facilitator can provide input on the optimal workshop duration. But, follow the rule:

Don’t make the partnering workshop too long; it will deter from the intended goals and expectations.

Beyond the workshop, it will be necessary to agree on the approximate frequency of subsequent meetings of the stakeholders, and if those meetings will be facilitated. Generally, facilitated meetings are more formal and less frequent - say quarterly - than nonfacilitated meetings. However, if serious conflicts develop, facilitated meetings may be more effective than nonfacilitated. Minutes should be kept of all partnering sessions.

Once all the details are agreed to, FLH will reimburse the Contractor for the Government’s share of the costs of the initial workshop and subsequent meetings as part of the progress payments.

The Project Engineer or COE should then proceed to contact the individual participants by telephone and personally invite them to the workshop, identify the facilitator, and present an overview of the partnering concept. At this time, the date and location of the workshop should

be confirmed. Often, the facilitator will wish to call each of the participants to outline the partnering process and establish common goals.

At the workshop, the participants will agree on a charter, which is normally a written commitment to work together to successfully complete the project, and will supplement that overall charter with agreed upon processes (Action Planning Processes) for handling general categories of potential problems. An example partnering charter is included in Exhibit 2.5-B.

Exhibit 2.5-B Example Project Charter

PROJECT CHARTER

Desert View/South Entrance, Ground Canyon National Park

Fann Contracting, Inc., Federal Highway Administration, National Park Service

In order to improve the visitor experience and preserve the natural and cultural resources in the Park, we commit to deliver a high quality, safe, successful through trust, cooperation, honesty, open communication, and mutual respect. Our partnership agrees to accomplish the following objectives:

Safety
- No unsafe working conditions.
- Promote safety awareness.
- Maintain good housekeeping practices.

Quality
- Do it right the first time.
- Meet contract specifications in a professional workmanlike manner.
- Do a job we can all be proud of.

Schedule
- Meet or exceed schedule commitments.
- Allow flexibility to optimize construction performance.

Cost/Budget/Efficiency
- Build a profitable project within budget.
- Identify and incorporate cooperative cost saving proposals.

Owner and the Public
- Keep owner and public informed.
- Assure prompt response to public concerns.
- Be sensitive to environmental concerns.
- Protect Park natural and cultural resources.

Partnering
- Be pro-active in issue identification and resolution.
- Resolve issues within agreed-upon time frame and by those closest to the problem.
- Respect each others' work.
- Have no claims or litigation at end of project.
- Develop long-term positive personal and business relationships.
- Take pride in our performance and enjoy our work.

CORPORATE ADVISORS
Sherman Tingey, President
March 20, 2003

2.5.4 INFORMAL PARTNERING

Partnering on a formal or informal basis is encouraged and recommended for all projects. The reference document from *EFLHD, Partnering Implementation Guide*, has an excellent overview of the informal partnering process. Basically, the COE is the key stakeholder for FLH, and his or her counterpart for the Contractor (usually the project manager or project sponsor) is the other stakeholder. The concept is similar to the formal partnering process, but usually the stakeholders are limited to representatives of the Contractor and FLH, and an outside facilitator is not used. However, trained in-house staff members can serve as facilitators. Team development occurs as part of the project management. Early in the project, the COE and his or her counterpart for the Contractor develop the partnering agreement, escalation procedure, and common goals. It is suggested that the agreement and related resolution procedures and action plans be prepared in draft prior to the informal partnering session. Minutes should be kept of all partnering sessions.

2.5.5 EMPHASIS IS ON ATTITUDE

At any time in the partnering process, COEs and their counterparts may move from informal to formal partnering if they perceive that informal partnering is not adequate to fulfill their expectations. Anytime the Contractor requests a change from informal to formal, FLH will honor that request.

If formal partnering is in place and partners desire a transition to an informal process, the partners must agree that such a move is in the best interests of all. Further, the parties have a responsibility to settle the facilitator's contract.

2.5.6 FOLLOW-UP EVALUATIONS AND MEASUREMENT

Follow-up evaluations and measurements of the partnering process are performed in various ways in the individual Division. Refer to individual Division manuals for guidance.

2.6 NOTICE TO PROCEED

The Notice to Proceed (NTP) will be issued by, or with the concurrence of, the CE. Exhibit 2.6-A contains a sample NTP letter.

Standard Form 1442, *Solicitation, Offer, and Award*, (see Exhibit 2.6-B) and FAR Clause 52.211-10, Commencement, Prosecution, and Completion of the Work, establish the contract completion date for each project. The contract may also provide a specific number of calendar days (i.e., after the bid opening or receipt of acceptable bonds), or a specific date, by which time the NTP must be issued. In the event the NTP is not issued within the specified time period for reasons not the fault of the Contractor, the Government must extend the fixed completion date accordingly.

Inordinate delays in issuing the NTP may warrant more than just a day-for-day extension if the project completion date has been pushed into the next construction season. In addition, the Contractor may be due compensation for additional costs such as remobilization for the extra season. Such eventualities should be treated as a contract modification, requiring cost data and negotiations in accordance with Chapter 13 of this manual.

FAR Clause 52.211-10 requires the Contractor to start work within a specified period of time after receipt of the NTP. To allow the Contractor to coordinate operations and mobilization, the date for issuing the NTP should be discussed with the Contractor as soon as possible. The Project Engineer and COE should remain aware of the status of project award and establish a NTP date that falls within the time period specified in the contract, unless the delay is due to the fault or negligence of the Contractor (e.g. by failing to submit acceptable bonds) or the Contractor and FLH have mutually agreed to delay the NTP, in which case, a contract modification signed by both parties should be executed.

Construction should provide input at the time of PS&E approval for an anticipated NTP date. This is particularly important for contracts awarded in the fourth quarter when weather conditions may be unfavorable for work to commence immediately after award. If this situation is anticipated, it may be best to provide an NTP date for the following spring, when conditions are expected to be suitable for work. Failure to account for seasonal limitations may result in the need to issue the NTP at a time when it is impossible for the Contractor to begin work in the specified period or a need to delay the NTP until conditions are suitable for work. If the Contractor requests and FLH agrees to a delay in the NTP, FLH has no obligation to extend the completion date unless that is a part of the overall agreement.

Exhibit 2.6-A Example Notice to Proceed

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

December 29, 2008

12300 West Dakota Avenue
Suite 210A
Lakewood, CO 80228

In Reply Refer To: HFCO-16

Sent via Federal Express

Notice to Proceed

Mr. Roger Brown
R. Brown Construction Company, Inc.
406 Brown Way
Willow Creek, CA 95573

Dear Mr. Brown:

In accordance with your Contract No. DTFH68-08-C-00013 dated May 27, 2008, for the construction of CA ERFO 4(1) and 6(1), Six Rivers – Lower Trinity in Six Rivers National Forest; you are hereby directed to begin construction operations on June 17, 2008.

Note that specific clearances and documents according to Sections 105, 107, 108, 152, 153, 155, 156, and 157 must be submitted to, and be accepted by, the CO or other agency officials prior to commencement of related on-site construction activities. Required documents include, but are not limited to, a preliminary construction schedule, a quality control plan, and traffic control implementation drawings.

As stated in our contract, a project completion date of October 1, 2008, has been established. Please acknowledge receipt of this order by dating, signing, and returning this original letter.

Should you have any questions, please contact Mr. Randy Everett, Construction Operations Engineer, at 720-963-3415.

Sincerely yours,

Randy Everett
Contracting Officer

I acknowledge the above Notice to Proceed date

Date _____

By _____

Title _____

MOVING THE AMERICAN ECONOMY

Exhibit 2.6-B SF 1442, Solicitation, Offer, and Award

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO.	2. TYPE OF SOLICITATION ☐ SEALED BID *(IFB)* ☐ NEGOTIATED *(RFP)*	3. DATE ISSUED	PAGE OF PAGES

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.

7. ISSUED BY CODE	8. ADDRESS OFFER TO

9. FOR INFORMATION CALL:	a. NAME	b. TELEPHONE NO. *(Include area code) (NO COLLECT CALLS)*

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (*Title, identifying no., date)*

11. The Contractor shall begin performance _____ calendar days and complete it within _____ calendar days after receiving ☐ award, ☐ notice to proceed. This performance period is ☐ mandatory ☐ negotiable. ***(See*** _____ ***.)***

12a. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12b).* ☐ YES ☐ NO	12b. CALENDAR DAYS

13. ADDITIONAL SOLICITATION REQUIREMENTS:

a. Sealed offers in original and _____ copies to perform the work required are due at the place specified in Item 8 by _____ ***(hour)*** local time _____ (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

b. An offer guarantee ☐ is, ☐ is not required.

c. All offers are subject to the (1) work reqiurements, and (2) other provisions and clauses incorporated in the solicitation in full text or by

d. Offers providing less than _____ calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

NSN 7540-01-155-3212

STANDARD FORM 1442 (REV. 4-85)
Prescribed by GSA - FAR (48 CFR) 53.236-1(d)

Exhibit 2.6-B SF 1442, Solicitation, Offer, and Award *(Continued)*

OFFER ***(Must be fully completed by offeror)***

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	15. TELEPHONE NO. *(Include area code)*
	16. REMITTANCE ADDRESS *(Include only if different than Item 14.)*
CODE FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirement stated in Item 13d. Failure to insert any number means the offeror accepts the minimum in Item 13d.)*

AMOUNTS ▶

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)

AMENDMENT NO.										
DATE.										

20a. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20. SIGNATURE	20c. OFFER DATE

AWARD ***(To be completed by Government)***

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)* ▶	ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )
26. ADMINISTERED BY		27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30a. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31a. NAME OF CONTRACTING OFFICER *(Type or print)*	
30b. SIGNATURE	30c. DATE	31b. UNITED STATES OF AMERICA BY	30c. DATE

STANDARD FORM 1442 (REV. 4-85) **BACK**

CHAPTER 2 – PRECONSTRUCTION

LIST OF APPENDICES

2A.1 PRECONSTRUCTION CONFERENCE INFORMATION 1

2A.1.1 Example Preconstruction Conference Agenda 2

2A.1.2 Example Letter Setting up the Preconstruction Conference 8

2A.1.3 Example Preconstruction Conference Minutes 16

2A.2 POLICY ON PARTNERING 34

2A.1 PRECONSTRUCTION CONFERENCE INFORMATION

This appendix contains information to assist FLH personnel in preparing for a preconstruction conference with the Contractor. Examples of the following are provided:

- Preconstruction Conference Agenda
- Letter Setting up the Preconstruction Conference
- Preconstruction Conference Minutes

For additional guidance on preparing for and conducting a preconstruction conference, refer to Section 2.3.

2A.1.1 EXAMPLE PRECONSTRUCTION CONFERENCE AGENDA

Based on DOT F 4220.3 and Typical Contract Requirements

1. Date and location of conference
2. Attendees including names and organizations
3. Organizational makeup and lines of authority (Government and Contractor)
    a. Government
        1. Contracting Officer(s)
        2. Project Engineer/COTR
        3. Inspectors
        4. Contract Inspectors
    b. Contractor
        1. Project Manager
        2. Superintendent
        3. Quality Control Personnel
        4. Traffic and Safety Supervisor
        5. EEO Officer
        6. Subcontractors
    c. Cooperating and other agencies
        1. Agency liaison
        2. Local contact
4. Commencement, progress and completion of work
    a. Insurance requirements
    b. Notice to Proceed
    c. Construction schedule submittal, approval, updates
    d. Retent for poor progress and/or delinquent submittals
    e. Completion date

f. Liquidated damages

g. Intended shifts, Saturday, Sunday, holiday, night work

5. Correspondence

   a. To Contractor

   b. To FLH - Division and Project Engineer

6. Partnering

7. Other contracts at or near the project site

8. Utilities

   a. Relocation responsibility and schedule

   b. Location, protection, notification

   c. Coordination with utility companies

9. Operations and storage

   a. Storage/staging areas to be authorized or approved

   b. Government Project Engineer's field office

   c. Access and hauling limitations

   d. Employee parking

   e. Disposal areas

   f. Bulletin board (posters, emergency phone numbers, EEO policy, minimum wage schedule)

10. Layout of work

    a. Government established base line and bench marks

    b. Contractor responsibilities for stakeout, line and grades

    c. Responsibility to notify Government of missing or conflicting stakeout information

11. Government furnished property and salvaged material

    a. Furnished property - Location, delivery, storage, protection, damage

    b. Salvaged material - Identification, who will salvage, delivery location, storage, damage

12. Protection of material and work

a. Protection of existing structures, utilities, vegetation, adjacent property and Government property

b. Protection of completed work until acceptance

13. Erosion, sedimentation and other environmental concerns

a. Authority of, and inspection by, regulatory agencies

b. Protection of completed work until acceptance

14. Compliance with local rules and regulations

a. Fire hazards and forest fires

b. Burn permits

15. Safety

a. Contractor's safety plan

b. Protection of the public and Government employees

c. Protection of contractor employees

d. Accident reports

e. No inspection/acceptance under unsafe conditions

f. Hazardous/toxic materials

g. Blasting

16. Shop and falsework drawings

a. Submittal, approval and review time

b. Rejection and corrections

c. Signed and sealed by a professional engineer

d. Notify Government of incomplete information

17. Traffic Control

a. Ordering signs and devices

b. Approving alternates to TCP

c. Ordering changes to TCP

d. Monitoring and QC of TCP

e. Flagging and pilot cars

f. MUTCD - minimum standards

g. Maintenance of devices

18. Drainage and underdrain

a. Designing, approving the design, and staking of culverts

b. Identifying need for and ordering underdrain

19. Earthwork and subgrade

a. Erosion control and temporary seeding

b. Responsibility to utilize excavated materials and topsoil efficiently

c. Balanced earthwork vs. contractor responsible for borrow/waste

20. Inspection

a. Contractor's inspection system - QC personnel

b. Government's right to: inspect, reject defective material and workmanship, stop noncomplying work

c. COTRs/inspectors not authorized to waive or change contract requirements.

d. Responsibility to notify Government of conflicts in contract documents.

e. Acceptance - partial & final

21. Changes

a. Contract Modifications - Supplemental Agreements & Change Orders

b. All contract modifications in writing

c. Written notice of: constructive changes, delays, differing site conditions

d. Detailed cost proposal for any request for equitable adjustment

e. Advanced pricing vs. post work pricing

f. Value Engineering Change Proposals

22. Subcontracting

a. Notice to OFCCP and SF 1413 for onsite subcontracts more than $10,000

b. Report all subcontracts (onsite, offsite and materials supply) on Form FHWA 1775

c. Responsibility for coordination of, and contract compliance of all subcontractors

d. Small business and small disadvantaged business subcontracting plan

    1. Contractor's liaison officer

    2. Records

    3. Reporting (SF 294/295)

    4. Liquidated damages

e. DBE/WBE subcontracting compensation clause

    1. DBE/WBE certification

    2. Submittals

    3. Threshold for Compensation

    4. Compensation (monetary and contract time)

23. Labor

a. Equal opportunity - SF 100, EEO policy, VETS-100

b. Contract Work Hours Standards Act

c. Davis-Bacon Act - minimum wage decision, additional classifications

d. Payrolls and basic records

e. Retent for nonpayment of wages or delinquent payrolls

f. Owner operators, salaried employees

g. Apprentices

h. Copeland (Anti-Kickback) act

i. Subcontractor labor compliance

24. Payment to Contractor

a. Prompt payment

b. Invoices - Receiving reports

c. Electronic Funds Transfer Payment

d. Contractor responsibility to provide stakeout/measurement data

e. Lump sum items - breakdown of contract price

f. Weighing and certifying materials for payment

g. Obligation to pay subcontractors, including suppliers

h. Interest, penalties, certification

i. No invoices for work associated with delinquent payrolls, test reports, materials certifications, or construction schedule

j. Bond premiums

k. Stockpiled materials - storage and protection, test reports, certifications

l. Mobilization item, other preparatory work, percentages payments

25. Notice of delays, disputes, claims

a. Responsibility to notify Government

b. No contract time adjustment except if delay is beyond control and without fault or negligence of Contractor. Delay must impact construction schedule.

26. Materials

a. Sources

1. Contractor vs. Government sources

2. Borrow areas, limits, etc.

3. Staking, stripping, pit cleanup

b. Specifications for materials

1. Source approval

2. Quality control

3. Quality assurance sampling & testing

4. Documentation of Compliance

5. Production Documentation

6. Commercial Product Documentation

7. Acceptance, Statistical Analysis, QL-Pay Program

2A.1.2 EXAMPLE LETTER SETTING UP THE PRECONSTRUCTION CONFERENCE

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 210A
Lakewood, CO 80228

July 17, 2008

Refer To: HFCO-16

FEDEX TO ADDRESSEE

Mr. David Rael
President
S&L Industrial
675 Road 7 ½
Cowley, WY 82420

Dear Mr. Rael:

In accordance with Subsection 108.01 of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP- 03, the preconstruction and informal partnering conference for NM ERFO PFH 28(1), Gilita Creek Road, will be held at 8 AM on August 6 at the USDA Reserve Ranger District Office, Highway 12, Mile Marker 6, Reserve, NM.

Mr. Jim Klamerus is the Project Engineer and will conduct the preconstruction conference. By copy of this letter the following are also invited to participate in the conference:

Mr. John Elmquist
Roads & Bridge O&M Engineer
USDA Forest Service, Region 3
333 Broadway SE
Albuquerque, NM 87102

Mr. Dick Markley
Forest Supervisor
Gila National Forest
3005 East Camino del Bosque
Silver City, NM 88061

Mr. John Pierson
District Ranger
Reserve Ranger District
P.O. Box 170
Reserve, NM 87830

Mr. Rex Null
Civil Engineer
Gila National Forest
3005 East Camino del Bosque
Silver City, NM 88061

Mr. John Keen
Field Engineer
Western New Mexico
Telephone Company, Inc.
P.O. Box 150
Cliff, NM 88028

At the conference please be prepared to discuss or submit the following items to FHWA:

1. Pursuant to FP Section 155, "Schedules for Construction Contracts," and Section 152 "Construction Survey and Staking," please bring your proposed schedule of operations and your proposed schedule of staking priorities for your work schedule.

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

2. Submit a written plan and be prepared to discuss in detail your proposed inspection system and quality control procedures in accordance with FP Section 153, "Contractor Quality Control."

3. Submit to the FHWA the name of your EEO officer for the project, a copy of your EEO policy, and your plan for implementing the EEO provisions of the contract. You must meet the requirements of the Federal Acquisition Regulations (FAR) Contract Clause 52.222-26. If you have already met the requirements of this clause, please furnish us a copy of the previously filed report. If you have not already met the requirements of this clause (or don't know if you do), refer to paragraph #4 below.

4. Filing EEO-1 survey reports is required by law and is not voluntary: refer to Section 709(c) of Title VII of the Civil Rights Act of 1964, as amended, and Sections 1602.7-1602.14, Code of Federal Regulations, Chapter XIV, Subpart B, Title 29. These legal texts are printed in the EEO-1 instruction booklet. Copies of this booklet, a sample form, and the on-line filing instructions are available at http://www.eeoc.gov/eeo1survey . Additional assistance can be obtained by calling 1-866-286-6440 or by writing to: Joint Reporting Committee (EEO-1), P.O. Box 19100, Washington, DC 20036-9100.

5. Pursuant to FP Section 156, "Public Traffic," submit the name of your traffic safety supervisor and discuss matters pertaining to safety and your proposed traffic control plan.

6. Submit names and signatures of company officials and representatives authorized to sign project documents.

7. Discuss the insurance requirements of FP Subsection 107.05 and furnish the required submittals.

8. Discuss the accident prevention and health standards of the contract in accordance with FP Subsections 107.05 and 107.08 and submit your written proposal for implementing these provisions in accordance with FAR Contract Clause 52.236-13. Discuss Subsections 209.04 and 208.04, demonstrate compliance with OSHA regulations in excavations and cofferdams.

9. Submit proposed schedule for accomplishing temporary and permanent erosion control work and your proposed method of controlling erosion on haul roads, borrow pits, or materials sources in accordance with FP Section 157, "Soil Erosion Control." Indicate in writing the person(s) responsible for implementing effective erosion control procedures and monitoring water quality to ensure the appropriate standards are met.

10. Discuss labor compliance and payrolls.

11. Submit your written plan and discuss your program and certification in accordance with FAR Contract Clauses 55.223-5 (Pollution Prevention and Right-to-Know Information) and 52.223-6 (Drug-Free Workplace).

12. Discuss materials sources and submit a list of suppliers.

13. List any known subcontractors. As required by the FAR, furnish an executed SF 1413 and the Supplement to SF 1413, "Subcontracting Certification" (both enclosed), to the Project Engineer within 14 calendar days of each subcontract award. Make additional copies of the forms as necessary.

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

14. Discuss the contractor's certification of prompt payment to subcontractors and suppliers in accordance with FAR Contract Clause 52.232-5 and FP Section 109, "Progress Payments."

15. Discuss any other items of particular significance pertaining to the plans, specifications, or contract documents that will promote a better understanding of job accomplishment.

16. Read the enclosed "Appointment of Contracting Officer's Technical Representative" memorandum and **submit the enclosed "Contractor's Acknowledgment" of receipt to the Project Engineer**.

The cutoff date for progress payments will be determined by mutual agreement at this conference. The Project Engineer will be available to discuss progress payment quantities within 7 calendar days of the cutoff date.

Sincerely yours,

Curtis Scott, PE
Construction Engineer

Enclosures 4

bcc without enclosures:
Invitees named herein
Jim Klamerus, Project Engineer
William Hakala, Construction Operations Engineer
HFHD-16, Bob Bell
HFPM-16 Allen Grasmick, Project Manager
HFTS-16
HFHD-16 Sebastian Guzman
Scott / reading file
contract file
WRHakala:wrh:su:7-17-08:precon nm 28(1).doc

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: INFORMATION: Appointment of Contracting Officer's Technical Representative for Project NM ERFO PFH 28(1), Gilita Creek Road

Date: July 17, 2008

From: Mr. Curtis Scott, P.E.
Construction Engineer/Contracting Officer
Lakewood, CO

In Reply Refer To: HFCO-16

To: Mr. Jim Klamerus
Project Engineer
Contract No. DTFH68-08-C-00018

1. You are hereby appointed as Contracting Officer's Technical Representative (COTR) under the above stated contract and project.
2. The Construction Operations Engineer (COE) for this project is William Hakala.
3. This appointment shall remain in effect for the life of the contract unless:
   a. The appointment is terminated in writing by the undersigned Contracting Officer (CO) or by his/her successor Contracting Officer;
   b. You are reassigned; or
   c. Your employment with the Government is terminated.
4. You shall represent the CO by:
   a. Familiarizing yourself with the terms and conditions of the contract, particularly those which fall within the area of your authority.
   b. Conducting yourself in a courteous and professional manner.
   c. Administering the contract in a fair and equitable manner
   d. Maintaining open lines of communication with the contractor, the partner agency, your staff, and the Denver office.
   e. Performing quality assurance activities including testing, inspection, and oversight of contractor QA/QC activities to assure compliance with the contract requirements.

MOVING THE AMERICAN ECONOMY

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

f. Recording the contractor's daily operations and documenting all significant communications with the contractor.

g. Providing notice of noncompliance with the contract.

h. Providing stakeout or other technical information required to perform the work included in the contract or required to fit field conditions.

i. Adjusting miscellaneous features of the work (e.g., culvert pipe, underdrain, guardrail, paved ditches, curb and gutter, etc.) to fit field conditions. To the extent that necessary adjustments become major in nature (i.e., potentially affecting cost or time), notify your COE.

j. Answering the contractor's technical questions which clarify, but do not change, the contract requirements.

k. Approving or disapproving contractor shop drawings and other submittals. All approvals shall be made in writing and with appropriate input and support of specialist personnel and partner agencies. In the event you are uncertain which submittals require review by others, notify your COE.

l. Measuring or verifying the quantities of work performed for the monthly and final progress pay estimate (invoices).

m. Providing written authorization to furnish and install contract work which requires on-site FHWA/contractor coordination.

n. Verifying compliance with contract labor provisions and providing notice of noncompliance.

o. Stopping work on affected operations which are not being performed in compliance with the contract or which may cause damage and/or liability to the Government. Except for minor interruptions, provide written notice which details the deficiencies to be corrected to permit work to continue. Immediately notify the COE or other CO of any order requiring the contractor to stop work. Stop work orders are to cover only those items of work which are deficient; they shall not be punitive.

p. Notifying the contractor of possible safety deficiencies. Do not permit Government personnel, including yourself, to enter areas or be in the vicinity of operations which do not comply with OSHA regulations. If safety deficiencies are chronic, unresolved, or impair the Government's ability to inspect the work, notify your COE or other CO.

q. Issuing urgent or emergency suspensions of work for the convenience of the Government for a reasonable period of time but not to exceed 1 day. Issue all suspensions in writing. Immediately notify the COE or other CO of said suspension. The COE or other CO will issue suspensions of longer duration when necessary.

r. Preparing estimates of construction costs for contract modifications.

s. Conducting preliminary negotiations on contract modifications for approval by the COE or other CO.

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

t. Making qualitative or quantitative judgments which are required by the contract at the work site (e.g., determining limits of subexcavation).

u. Evaluating the contractor's progress with respect to accepted progress schedules and requesting updated schedules when necessary. Notify your COE when it appears the contractor is significantly behind schedule.

v. Formally transmitting information provided to the contractor and maintaining copies of same.

w. Forwarding to your COE a copy of all correspondence initiated by you or received from the contractor.

x. Notifying your COE of all verbal discussions of a significant nature.

y. Coordinating, leading, and overseeing the Government project team. Inspectors are authorized to inspect all work performed and materials furnished, including the preparation, fabrication, or manufacture of materials to be used. Inspectors have the authority to reject materials and workmanship until any questions at issue can be referred to and decided by yourself or the COE as appropriate. Inspectors are not authorized to alter or waive the provisions of the contract, to issue instructions contrary to the plans or specifications, to act as foreman for the contractor, or to direct the contractor's operations.

5. You do not have the authority and shall not:

a. Change the terms of the contract or waive the requirements of the contract.

b. Direct the contractor's operations.

c. Obligate the payment of any money by the Government.

d. Cause the contractor to incur costs not otherwise covered by the contract with the expectation that such costs will be reimbursed by the Government.

e. Redelegate your authority to any other person.

6. I have the utmost confidence in your abilities to carry out the duties of COTR as indicated above. Please contact your COE, myself, or other Construction Branch staff if you are in doubt as to the extent of your authority, if unusual circumstances arise, or if you otherwise require assistance.

cc:
S&L Industrial
675 Road 7 ½
Cowley, WY 82420

bcc:
W. Hakala, Construction Operations Engineer
contract file
reading file
WRHakala:wrh:su:7-17-08:precon nm 28(1).doc

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

CONTRACTOR'S ACKNOWLEDGMENT

I hereby acknowledge receipt of a copy of the letter appointing Mr. Jim Klamerus, Project Engineer, as the Contracting Officer's Technical Representative for NM ERFO PFH 28(1), Gilita Creek Road, Contract Number DTFH68-08-C-00018.

If I have any questions relating to authority, I will contact Mr. William Hakala of the Federal Highway Administration's Construction Branch at 720-963-3418.

S&L Industrial

_____
Signature

_____
Name

_____
Title

_____
Date

MOVING THE AMERICAN ECONOMY

2A.1.2 Example Letter Setting up the Preconstruction Conference *(Continued)*

In accordance with U.S. Department of Transportation COTR Training Standards dated November 2006, employees are required to fulfill specific training requirements before serving as a COTR on any FHWA contract. ***These training requirements include 24 hours of basic COTR training. Refresher training consisting of a minimum of 40 continuous learning points are required every 2 years.*** These requirements can be found at the following web site**:** http://www.dot.gov/ost/m60/workforce/ and reviewing Appendix D.

COTR Acknowledgment and Certification Statement

(Sign and date the appropriate statement and return this page to Acquisitions @ HFAC-16.)

= = = = = = = = = = = = =

I understand and accept my assignment as the Contracting Officer's Technical Representative (COTR) for Contract Number DTFH68-08-C-00018 as outlined in your memorandum to me dated July 17, 2008. I also certify that **I meet the training requirements** for appointment as an FHWA COTR -- including the prescribed general and annual refresher training -- and am otherwise eligible for appointment as COTR on this contract in accordance with the Transportation Acquisition Manual (TAM) 1242.70.

_____ _____

Jim Klamerus Date
Project Engineer

= = = = = = = = **or** = = = = = = =

I understand and accept my assignment as the Contracting Officer's Technical Representative (COTR) for Contract No. DTFH68-08-C-00018 as outlined in your memorandum to me dated July 17, 2008. I **certify that I am aware of the training requirement for appointment as an FHWA COTR -- including the prescribed basic and continuous learning training -- and will complete the required training** ***within 90 days*** **of the date of this certification in accordance with Transportation Acquisition Manual (TAM) 1242.7102** and **will provide evidence of such to the Contracting Officer upon completion**.

_____ _____

Jim Klamerus Date
Project Engineer

Please check training needed: ☐ 24 hour basic training
☐ Continuous Learning (refresher training)

Contact the Contracting Officer for information on registering for a course.

2A.1.3 EXAMPLE PRECONSTRUCTION CONFERENCE MINUTES

Project CO PFH 16-1(2) Marvine - Yampa
Routt National Forest

Preconstruction Conference Minutes

The Preconstruction conference for the Marvine-Yampa project was held on May 7, 2008 at the Yampa Forest Service District Office from 9:00am to 11:30 am.

1. **INTRODUCTIONS**

   - Sign in Sheet

   Copied and distributed to all in attendance (Sign in sheet attached)

   - Introductions

2. **PURPOSE OF THE CONFERENCE**

   The purpose of the conference is to discuss general contract requirements, specifications, plans, any unusual or unclear conditions, Contractor's progress schedule and any other significant items pertaining to this project prior to or during construction.

3. **CONTRACT INFORMATION**

   a. Name of Project: CO PFH 16-1(2) Marvine –Yampa Routt National Forest

   b. Contract Number: DTFH68-08-C-00003

      Awarded 11/20/2007

      Completion Date 10/15/2008

   c. Contract Amount: $1,859,495.00

   d. Type of Construction 0.386 miles of slide repairs ***(11 slide sites)***

4. **ORGANIZATION AND LINES OF AUTHORITY (Government & Contractor)**

   The Forest Service is the 'owner' for this project. Rio Blanco County is the maintaining agency for this project. The contract is solely between FHWA and American Civil Constructors. Federal Highway Administration has full authorization from the Forest Service to administer and execute the contract. Any issues that may arise requiring input or approval from the Forest Service or County will go through the Project Engineer. Any issues that the Forest Service or County may have, in turn, will also go through the Project Engineer.

White River N.F. is the owner of the Ripple Pass Pit and Routt N.F. is the owner of the project area and Rough Creek Pit.

a. **Government Representatives:**

The Federal Highway Administrations Organization is as follows:

1. **Contracting Officers:**

Construction Operations Engineer: **Randy Everett**

Construction Engineer: **Curtis Scott**

2. **Project Management:**

Project Manager: **Chuck Luedders**

3. **Contracting Officer's Technical Representative:**

Project Engineer: **Lorell Duteil**

- On site Representative of the Contracting Officer
- Duties as described in correspondence dated April 29, 2008, Subject: 'Appointment of Contracting Officer's Technical Representative' ***(Acknowledgement of COTR received May 7, 2008)***
- Project Engineer will decide all questions that may arise on the quality and acceptability of:
  - Materials Furnished
  - Work Performed
  - Rate of Progress of the Work
- Project Engineer will decide all questions that may arise concerning interpretations of plans and specifications
- Project Engineer will decide all questions as to the acceptable fulfillment of the contract

4. **Channels of Authority:**

1st level: All matters pertaining to the project shall go through the PE - **Lorell Duteil**

2nd level: COE - **Randy Everett**

3rd level: Construction Engineer (CE) – **Curtis Scott**

5. **Inspectors** (FP-03, 104.02)

- Inspectors have the authority to:
  - inspect all work

- reject work until the issue can be resolved by the Project Engineer

- Inspectors are NOT authorized to:
  - alter or waive contract requirements
  - issue instruction contrary to the contract
  - act as foreman for the Contractor
  - direct the Contractor's operations

- The presence or absence of an inspector does not relieve the Contactor from any contract requirements.

Anticipated at this time to have one FHWA inspector onsite in addition to the Project Engineer.

b. **Contractor Representatives:**

1st level:	Foreman:	*Unknown at this time*
2nd level:	Project Engineer:	*Brian Danner*
3rd level:	Superintendent:	*Lee Coppock*
4th level:	Project Manager:	*Grant Johns*

c. **Forest Service Representatives:**

Routt N.F.:

Gary Gray- Project & Rough Creek Pit Liaison

Oscar Martinez- Local District Liaison

White River N.F.:

Linn Pettijohn- Ripple Pass Pit and area use Liaison

Bruce Moss, Linda Torgerson- Coordination between FHWA & FS projects

d. **Rio Blanco County Representatives:**

Scott Nielson- Coordination between FHWA & County for projects and maintenance

Dave Morlan- Project Liaison

5. **STATUS: COMMENCEMENT, PROGRESS AND COMPLETION OF WORK**

a. **Document Order of Precedence**

The intent of the contract is to provide for the construction and completion of the work in accordance with the plans and specifications. The contractor shall furnish all labor,

materials, equipment, tools, transportation and supplies necessary to complete the work in accordance with the following documents in order of precedence:

1. Federal Acquisition Regulations (FAR Clauses) / Transportation Acquisition Regulations (TAR Clauses) (see section 'F')

2. DOL Davis Bacon Minimum Wage Rates (see section 'G')

3. Special Contract Requirements (SCRs, see section 'I')

4. Plans

5. Bid Schedule

6. Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03

Any questions or clarifications of information pertaining to this project should be referred to the Lorell Duteil. This order of precedence will be used to resolve any conflicts between documents.

b. **Insurance Requirements (107.05)**

The contractor is required to carry all insurance listed in this section and furnish the appropriate "certificates of insurance" before work begins ***(Certificates of insurance received May 7, 2008)*** & Payment and Performance bonds in the penal amount of 100% of the original contract price, **(*Bonds received Jan 22, 2008).***

c. **Notice to Proceed**

The contractor is required to commence work under this contract within 10 calendar days after the date the contractor receives the 'Notice to Proceed' (FAR 52.211-10)

The NTP will not be issued prior to May 26, 2008.

Current snow levels on the project are around 69" as reported by the remote snow gage on Ripple Pass. The county has recently attempted to plow the snow from the Meeker side of Ripple Pass but was unsuccessful due to snow conditions. County Road 8 is currently open to the Trappers Lake turnoff. County Road 8 is currently plowed up to the forest boundary on the Yampa side. At this point depending on the snow melt it is possible that work may not be able to start on May 27. Dave Morlan will coordinate with FHWA on the snow conditions and plowing progress. FHWA will notify ACC as soon as the road is open to any part of the project or quarries. As soon as construction is possible on the project site following the May 26th date, FHWA will issue immediate NTP to ACC.

6. **CONSTRUCTION SCHEDULE AND STAKING SCHEDULE**

A well planned and executed schedule is particularly important to this project because of the short construction season window. The Project is located at a

high altitude between 9000 -10000 ft. and is prone to late spring and early fall snowstorms. It is important that all submittals, time requirements, and processes for the project are accounted for on the schedule for the project to be successful.

a. **Preliminary Schedule**

Contractor to discuss/submit Schedule as requested in item #1 of our letter dated April 29, 2008. Initial construction schedule received May 7, 2008.

Overview of the contractor's initial schedule and production plan as presented by Grant Johns: Current schedule shows starting work on May 27, 2008 with finish on October 15, 2008. The contract has broken the 11 sites into 4 groups A-D. They anticipate starting on Area C (sites 7-10) because of the lower elevation and then working uphill and eventually dropping back to finish at site 11. The first activities that need to occur are survey and staking of the slides and pipe culverts to verify earthwork and order culvert pipe. Installation of underdrain to remove the water in the slide area prior to excavation is the next priority. ACC is currently planning to utilize the existing material from the road excavation within a relatively nearby area with minimal use of the borrow pit to minimize disturbance of the pit. Currently ACC is planning to work on 2 sites at one time with the possibility of a 3rd site dependent on schedule, site size, and material. ACC plans to use pilot car and flagger through each work zone during the day and use proceed when clear signs at night where sight distance allows. The rockery wall will be built by ACC personnel with previous experience building rockery walls on FHWA projects.

b. **Construction Schedule**

- Submit within 30 days after Notice to Proceed
- Must include written narrative as described in SCR section 155.05
- At a minimum, submit an updated schedule at least every **month (at least 7 days prior to anticipated payment)**, which includes finish dates of completed activities, remaining duration of uncompleted activities, and any logic and/or time revisions.
- Schedule revisions submitted **sooner** than every month if:
    - Delay occurs in the completion of a critical activity
    - Delay occurs which causes a change in the critical path
    - Actual prosecution of work is different from that represented in the schedule
    - Addition, deletion, or revision of activities caused by a contract modification
    - Change in the schedule logic
- No progress payments will be made for any work until an updated construction schedule has been submitted to and accepted by the CO
- Include submittals and required review time for all pertinent submittals in the schedule (mix designs, QC plan, shop drawings etc)

Short discussion on being sure to include lead time for geogrids and drainage items in the detailed construction schedule.

c. **Staking Schedule**

Staking schedule should include the dates and sequence of staking requirements and should directly tie in to, or be part of the construction schedule. Follow guidelines in the CFLHD's "Location/Construction Surveying Guide", or other approved format.

1 hard copy and 1 electronic copy of the staking notes will be available for the Contractor per 152.02 on May 16, 2008.

FHWA will send the electronic copy via email with the hardcopy to follow in the mail.

Staking is included in the preliminary schedule. Surveying will be completed by Marcin Engineering. Initial operations will be verifying and establishing control, staking the limits of the project, and staking the pipe culverts for pipe plots. Surveyors will typically be out 48 hours prior to the operation such as underdrain and blue tops. Depending on tree cover and terrain, surveying subcontractor plans to be using mostly GPS.

FHWA agreed to provide the services of their construction surveyor, Bob Bell, to assist Marcin Engineering with there initial setup of control data and other points of reference on the project site.

7. **PROSECUTION AND PROGRESS (FP-03 & SCR's section 108)**

a. **Liquidated Damages**

Failure to complete the work within the specified time will result in the contractor having to pay liquidated damages to the Government in the amount of **$1,100.00** per day. All contract work to be completed by **October 15, 2008.**

b. **Other Contracts**

This contract allows for the award of other contracts near the project. Contractor shall fully cooperate with the other contractors and with government and County employees and shall not interfere with the performance of work.

Anticipated contracts in area:

- Forest Service

  Culvert replacement Project at Ripple Creek & Trappers Lake – This project will be accessing the Ripple Creek Pass Pit for Material. Possible short delays accessing project through the Ripple Creek work zone. Contract has not been let yet, but Forest anticipates work in mid to late August. This contract would most likely require leaving a loader in the Ripple Pit.

- Rio Blanco County

  Williams Fork Road project, General Road Maintenance – County will be accessing the Ripple Creek Pass Pit for Material. The County will be maintaining Forest and county roads in and around the project. The County is anticipating working out of the Ripple Pit beginning the 2nd or 3rd week of August for a few

weeks. Trucks will be hauling through the project. The maintenance crew will be working throughout the season.

8. **INTENDED SHIFTS**

The contractor intends to work from 7 a.m. to 6 p.m. Monday through Friday. No weekend work is allowed without the approval of the CO and the Forest Service.

At this time ACC has no weekend work is planned, but cautioned that potential delay in starting due to the extreme amount of snow currently on the project site may cause them to request weekend work. FHWA and the Forest Service will consider weekend work. Both parties base decisions on many factors including reasonableness, need, schedule, and impact to forest users.

It is understood by all parties that work hours may change based on the operations taking place, the needs of the project and restrictions in the contract. FHWA requests as much notice as possible when a change in work hours will take place in order to inform the FS and County and to adjust staffing as necessary.

9. **CHANGES:** (Ref. FAR 52.243-4, Changes)

- Changes to the contract will be made by written order.
- Project Engineer can negotiate changes
- Changes have to be approved by the Contracting Officer
- Contractor is required to notify the project engineer immediately of any:
    - Anticipated problems or changes
    - Discrepancies in the plans or specifications
- Value Engineering (FP-03 103.03, FAR 52.248-3)

    (Change to contract resulting in reduced contract price; Cost savings shared by contractor and government)

    - Initial written description submitted to CO – 14-day review
    - Value Engineering Change Proposal – 45-calendar day review

10. **CORRESPONDENCE**

All communications and correspondence concerning this contract will be directed to the project engineer:

U.S. Postal Service
Attn: Lorell Duteil – FHWA
P.O. Box 95
Yampa, CO 80483

FedEx
Attn: FHWA – Lorell Dutei
TBD

Telephone:
Denver Office Tel: (720) 963-3425
Denver Office Fax: (720) 963-3437
Personal Cell: (970) 218-0238

Email: lorell.duteil@fhwa.dot.gov

Correspondence to American Civil Constructors:

Address to follow when project office location is arranged

11. **SUPERINTENDENCE BY CONTRACTOR**

In accordance with FAR Clause 52.236-6, at all times during performance of this contract and until the work is completed and accepted, the contractor shall directly superintend the work.

As requested in our correspondence dated **April 29, 2008**, under item #6, please submit the names and signatures of company officials and representatives authorized to sign project documents.

(Authorized Company Signers letter received May 7, 2008)

12. **SUBCONTRACTORS:** (FAR Clause 52.236-1 & 52.222-11, FP Subsection 108.2)

a. Contractor is required to perform at least 50% of the total contract amount of work.

b. Statement and Acknowledgment, Form SF 1413 and supplement to Form SF 1413 is required for each subcontractor ***(Forms provided by FHWA at Precon)***

c. Item #13 of our letter requests a list of any known subcontractors (include suppliers/sources). Please submit any known subcontractors at this time.

(List of known subs suppliers/sources received May 7, 2008)

- Major Suppliers:
  - Geogrid- Tensar
  - Testing- Koechlein
  - Culvert & drain pipe- Grand Junction Pipe
  - Concrete & underdrain aggregates- Meeker Sand & Gravel
  - Geotextiles - Contech

d. Subcontracting does not relieve the contractor of liability and responsibility under the contract and does not create any contractual relations between the government and the subcontractors.

e. Project engineer shall deal with the prime contractor only. Subcontractors shall go through the prime for any issues pertaining to the project.

f. The contractor is liable for any action or lack of action of subcontractors. The contractor shall be responsible for compliance of the subcontractor and lower tier subcontractors with applicable contract documents including the following:

- Plans and Specifications
- Davis-Bacon Act
- Kick Back Act

- Payroll Work Hours
- Safety Standards
- Withholding of funds
- EEO requirements etc.

13. **PAYMENT TO CONTRACTOR:** (FAR Clause 52.232-5, FP Section 109)

a. Measurements and Payments (Section 109)

- Section 109.01 (SCRs), Measurement Methods:
  - Submit to CO within 24 hours for completed work
  - Submit to CO weekly for interim measurements
  - Measurement Notes form the basis for the governments receiving report for progress payments.

- Suggested that FHWA inspector & ACC's Foreman will measure work together when possible as it is completed on paysheets and both will sign. **Both parties agreed that this would be most efficient.**
- Payment Cutoff date **(ACC choose date) 25th of the month**
- FHWA available within 7 days of cutoff date to review the receiving report
- Contractor submit invoice within 7 days of cutoff date
- Proper invoice forwarded within 7 days of receipt
- Progress Payments wired 14 days after verification of invoice

b. No retained percentage is normally withheld, however on the last progress payment a small percentage may be withheld in case of error or overpayment. Retent can be withheld for violations of the labor provisions, any obligations to the government, schedule, as-builts, and for liquidated damages. If retent is withheld from any subcontractor, then the Government will withhold an equivalent amount from the Contractor.

c. Payment for materials stockpiled will be a maximum of: the lesser of 80% of the contract bid price or 100% of the invoice, pending acceptable results on the Contractor's submitted process control tests. Total payment for stockpiled materials determined on a case-by-case basis by the project engineer.

d. Item #14 of our letter is in reference to the requirement that the contractor submit a certification to prove that payment to subcontractors and suppliers has been made from previous payment received under the contract. (FAR Clause 52.232-5) Information required to be included on the certification is the amount included for work performed by each subcontractor and the total amount of each subcontract and amounts previously paid to each subcontractor. Show any retent being withheld.

(Contractor Cert/Invoice form provided by FHWA at Precon)

14. **SHOP DRAWINGS & AS-BUILT WORKING DRAWINGS (104)**

a. Refer to Subsection 104.03 for items of work requiring drawings.

b. Refer to Subsection 104.03(c) for as-built drawing requirements.

- Due to the nature of the slide repair, underdrains, slope stabilization, and rockery wall information it is imperative that as-builts be detailed and timely. As-builts must be submitted no less than every 30 days or a portion of payment will be withheld according to the subsection.

15. **INSPECTION & QUALITY CONTROL**

a. The contracting officer has the right to reject any defective material or workmanship (Ref. FAR 52.236-5)

b. No representative on the project is authorized to change any provision of the contract (Ref. FAR 52.243-4)

c. The presence or absence of a Government inspector does not relieve the contractor from any contract requirements, nor is the inspector authorized to change any term or condition of the specification without the contracting officer's written authorization (FAR 52.246-12)

d. Acceptance of work means final inspection from the contracting officer (Ref. Subsection 106.07, FP-03)

e. In case of discrepancies in the figures, quantities, etc., notify the project engineer as soon as possible. Specifications govern when there is a difference between drawings and specifications. SCRs amend and supplement the Standard Specifications for Construction of Roads and Bridges, FP-03.

f. Contractor quality control and Contractor sampling and testing (Sections 153 & 154)

- Government Furnished Lab Trailer option has been exercised and will be available for pickup at the Lakewood office the same day the notice to proceed is issued.

  The contractor has identified the Ripple Pit as being the location they would like to place the lab. Linn Pettijohn agreed to this site. He would prefer it in this location rather than a pullout, although it may make coordination of the Pit area harder.

  Discuss 153 QC vs. 154 sampling & testing vs. verification.

  There was discussion to emphasize the need for ACC to have a quality process in place that addresses both the sampling and testing of materials and the inspection of work. FHWA agreed that ACC could most likely achieve this goal with a single QC representative due to the close proximity of slide locations under construction at one time. It is important that a high level of quality be in place throughout the project for the design to function as intended. FHWA will perform verification testing at their option.

  As requested in Item #2 of our letter, please submit your written QC plan. *(QC plan received May 7, 2008)*.

- Designate qualified QC Supervisor whose primary responsibility is QC (not contractor's super, foreman) (QCS designated Paul Evers)

  Paul will be onsite full time.

  - Submit Inspector's Daily Record of Construction Operation
  - (FHWA 1413) or approved equal daily.
  - Obtain samples for QA/QC/Verification tests (The government's portion of split samples is to be delivered to the project engineer in a container suitable for shipment & labeled according to SCR section 154.02.)
  - Perform QA/QC testing (results within 24 hours)
  - Provide inspection of work
  - Exercise management control in correcting deficiencies

- Subsection 106.01, where sampling/testing procedures make reference to AASHTO, ASTM, or other standards designated as FLH T, the procedure as modified by the material manual shall govern. Copies of the Materials Manual can be obtained from our Materials Lab. See SCR's Subsection 106.01.

16. **OPERATION AND STORAGE / CONTROL OF WORK & MATERIALS**

a. Ripple & Rough Creek Pits

- Require Material Source Development Plans
- Must be used in accordance with Permits and Stipulations
- Contractor must apply for a SWPPP for each Pit.

  Contractor believes that both Pits are covered under their project SWPPP and will verify this.

- Materials must meet requirements of the contract regardless of source

b. Staging areas – (Discussion with Forests & Contractor)

Both Forests agreed to schedule a time with FHWA to drive the project area together and locate possible additional staging and/or storage areas for the contractor. This will take place as soon as the roadway is open.

Willows - Discussion with the Forests on identifying areas to gather willow cuttings outside of the project area. The Forest will meet with FHWA and flag some possible areas.

Water for Construction- ACC has been in contact with Vaughn Reservoir authorities about using water from that location. FHWA requires copies of the agreement/ permit to utilize this water. The access to the Vaughn Lake area is on Forest land and use of this area and required measures by ACC will be coordinated through FHWA with the Forest Service.

17. **LAYOUT OF WORK**

Contractor shall perform all layout work according to SCR Section 152. Check Staking at all locations and check against catch tolerances. Sites 4 & 11 may require re-cross sectioning.

The checking and catching of the slopes stakes is especially important as these areas are landslides that were surveyed in 2005. Movement may have occurred since then and this will verify if the topo is significantly changed. Re-cross sectioning will be required wherever the stakes do not catch within tolerance. Any areas that are re-cross sectioned will be sent back to FHWA for design review.

18. **GOVERNMENT FURNISHED PROPERTY AND SALVAGED MATERIALS**

a. Salvage existing object markers / signs: ACC to coordinate with FHWA

b. Aggregate materials supplied by government in Ripple & Rough Creek Pits

- Stockpiled materials:

  There are currently 3 piles of crushed aggregates in the Ripple pit designated for use by: FHWA, the County, and the Forest Service. These piles were measured at the end of the last project and should be intact. Cooperation and care will be required between all parties to use the pit concurrently and avoid using others' material.

- Riprap & Rockery Wall material:

  The Ripple Pass Pit is the intended source for this material. This pit is fractured rock and was ripable by standard equipment in all but a few areas.

- Unclassified borrow material:

  Supplied in the Rough Creek Pit is the intended source for this material.

c. Salvage and Use of aggregate materials from work sites:

At this time FHWA does not anticipate that any salvaged aggregate material will be available to the contractor for use as borrow material. FHWA will direct the use and placement of this material for Forest roads.

19. **LEGAL RELATIONS AND REPONSIBILITY TO THE PUBLIC (107)**

a. Storm Water Pollution Prevention Plan (SWPPP) (section 107)

- Submit at least 3 weeks prior to beginning construction ***(SWPPP Submitted to FHWA Not at this time)***
- Designate erosion control supervisor **(ECS designated Brian Danner)**(157)
- Contractor and subs sign approved SWPPP
- Inspections per section 107
- Post NOI on construction bulletin board
- Include Spill Prevention, Control and Countermeasures section

b. Use 'good housekeeping' practices as listed in 107.01(f).

c. Do not disturb any areas outside of the construction limits. Use established pullouts, parking areas, and intersections for turnarounds.

d. Power wash all equipment prior to entering forest. Dirty equipment will be sent away on arrival. Arrange with CO to inspect each piece of equipment upon arrival to jobsite with minimum 24 hour notice. Weed and non-native plant control is very important to the Forest.

> Forests have extensive weed control systems in place. FHWA & ACC will decide in the future where inspections of equipment entering the project site will take place. FHWA will inspect equipment and Forest will assist with inspections at their discretion.

e. Utility location is contractor's responsibility.

f. Non-Commercial areas used for material sources, disposal sites etc. require extensive environmental paperwork and permitting – see section 107.10(d).

20. **LABOR**

a. Equal Employment Opportunity: There is a requirement for Affirmative Action to ensure Equal Employment Opportunity. As requested in item #3 of our letter, please submit the name of your EEO officer and a copy of your EEO policy and your plan for implementing the EEO provisions of the contract. Contractor is required to file an EEO-1 survey report ***(EEO-1 report received May 7, 2008)***

b. Davis Bacon Act: The wage rates from **the conformed contract** shall be posted on the bulletin board.

c. Working Hours Overtime: One week is from Sunday through Saturday. Any hours over 40 per week is overtime, 1 ½ times the hourly rate.

d. Apprentices: Please utilize apprentice work force and give young people an opportunity. Approved apprentice plan paperwork required.

e. Payroll Records and Payrolls: Contractor and Subcontractors shall submit certified weekly payroll records within seven days after payment has been made. Include wages for each trade, classification, fringe benefits, withholding tax, etc. For each new employee, include on payroll the name, address and social security number. Owner/Operators also need to be shown on the payroll, including name, address, social security number, the date, and hours of work. (FAR Clause 52.222-8)

f. Withholding of Funds: Contracting Officer can withhold or cause to be withheld funds necessary to pay laborers and helpers employed by the Contractor or Subcontractors the full amount of wages required by this contract (FAR Clause 52.222-7).

g. Contract Termination: A breach of the Clauses just discussed may be cause for termination of this contract (FAR Clause 52.222-12). The government has the right to interview laborers.

21. **NOTICE OF DELAYS**

The contracting officer shall be notified promptly in writing of actual or potential delays caused by reasons other than the fault or actions of the Contractor with an accurate description and reason for the delay.

Claims for adjustments and disputes shall be in accordance with FAR Clause 52.233-1.

22. **COMPLIANCE** (Section 107)

a. The Contractor shall keep fully informed of Federal, State, Counties and local laws, ordinances, safety codes and regulations. (Including National Forest) Comply with all applicable laws, ordinances, safety codes, regulations, orders and decrees.

b. All permits and agreements obtained by the Government are included in this contract, and must be complied with. Obtain all additional permits that are required.

c. Furnish weatherproof bulletin board (107.03), erect at conspicuously accessible location on the project. Include:

1. "Equal Opportunity" Poster

2. "Notice" that the project is subject to Title 18, US criminal code Section 1020

3. "Notice to Employees" poster WH-1321 (proper pay)

4. "Beck" Poster (Employees rights concerning Union dues)

5. "Safety and Health Protection on Job" Poster

6. "General Wage Decision" for this contract

7. Company Equal employment opportunity policy

8. SWPPP Notice of Intent (NOI)

(FHWA provided posters for bulletin board to ACC)

23. **SAFETY**

a. Allow emergency vehicles continuous access through project at all times.

b. Laws enforced by Sheriff (including Speeding, Hunting, & Fire bans) Sheriff does patrol the area regularly.

c. Sanitation Facilities shall be in accordance with OSHA, state and local regulations. Contractor will not use the Forest facilities.

d. Contractor is responsible for slope stability during construction operations.

This project is in an active landslide area in which slopes are unstable, moving material. It is important that crews be aware of the dangerous condition of this material and that

appropriate measures are taken. Several of the underdrains are significantly deep as well. Grant indicated ACC plans to use a trench box for safety and to limit aggregate material needed.

e. Submit name and 24 hour phone # of traffic and safety supervisor (not the superintendent)(156) ***(designated Brian Danner & Paul Evers - local contact information to follow)***

f. Contractor's weekly safety meetings (Held daily at start of shift). ACC indicated that anyone interested is invited to attend these meetings.

g. As requested in our correspondence dated April 29, 2007, under item #8, please submit the required Accident Prevention & Health Standards Plan. ***(Received May 7, 2008)***

h. As requested in our correspondence dated April 29, 2007, under item #11, please submit the required Drug Free Workplace Plan. ***(received May 7, 2008)***

ACC's safety officer requested that all personnel on the jobsite wear hardhats and vests at all times. Also, that all project vehicles that are active have headlights on (including haul roads). FHWA volunteered to supply hard hats and vests to County and Government visitors if needed. Due to the location of project it is important that emergency services be identified and response plans are in place and discussed with crews.

24. **TRAFFIC CONTROL**

a. Submit situation-specific T.C. plan w/ staging 14 days prior to use. (156)

b. Maintain public access to all approach & access roads, parking area and pullouts except when safety hazard to general public and as allowed by contract.

c. No detours outside of the construction limits w/o approval of CO (SCR 156)

d. Coordinate expected delays to traffic with the CO.

e. Limit delays to 30 minutes per passage through project traffic per 156.04.

f. Snow removal for public traffic by Rio Blanco County at their discretion.

g. Snow removal to facilitate construction by Contractor.

h. Alternate One Way Traffic Widths – 10ft one way, 20 ft two way traffic

i. Allow emergency vehicles continuous access through project.

j. Cert that T.C. devices meet MUTCD and crash worthiness (635).

Forest & Public will be kept notified of current project roadway conditions and progress by weekly updates on the CFLHD project website. The Forest Service offices can access this information for the most current conditions and delays to relay to the public. There was some discussion about adding/ changing the advance notification signs to include distance to work site or delay time. FHWA

will change advance notification signs to include "Delays Possible". Group also discussed having a flyer to handout to visitors passing through the work zones. It was agreed no handouts due to limited nature of project and littering. FHWA will provide several copies of a project description and contact information so that flaggers will be informed and can pass this information on to the public verbally. Roadway width limitations and oversize traffic were also discussed. Oversized traffic is rare and permitted through the County. It is important that oversized traffic be alerted to the conditions far in advance of the project site so that they have opportunity to turn around.

25. **Stabilized slopes, Underdrains, & Ditches**

a. Store, handle, protect, haul, and install geogrids and geotextiles according to Manufacturer's recommendations. Including exposure to sunlight and equipment

b. Maintain uniform and neat slopes and layers within the stabilized areas

c. Underdrain and ditch profiles may be field adjusted depending on conditions and material encountered.

d. Utilize specified materials in correct locations

e. Ditch reconditioning is only directly paid in areas where underdrain is not placed

26. **Forest Issues & Questions**

- Forest will communicate with FHWA & the County on coordination of the Pit areas. Forest will work with county as well to minimize interaction in this area.
- Forest will work with FHWA to designate additional willow gathering area.
- Forests are interested in attending weekly meetings. FHWA and ACC agreed that weekly meetings will be held although location and times are unknown at this time. All parties are welcome, although attendance will be sporadic due to travel times. FHWA will update the Forest Service and the County on current issues and needs. Forests and County will be kept current on issues & needs by FHWA. ACC said they will produce minutes from each weekly meeting that FHWA will forward on to Forests & County.
- Forest emphasized that communication between all parties and the traveling public is the key to a successful project.
- White River NF requested 1 set of project plans & specs.

27. **County Issues & Questions**

- Stressed importance of the traffic control being Safe and Maintained at all times.
- Expressed the importance of keeping traffic moving and minimal delays.
- County will work with FHWA to link to Project Website.
- County will keep in contact with FHWA about road opening & snow plowing efforts.

28. **Contractor Issues & Questions**

Contractor requested 12 sets of Plans & Specs as none were forwarded at award. Additional copies of the FP are also needed.

FHWA & ACC Post-meeting on specific project details:

- Looked at geo-composite drain and if type had been agreed on. ACC will look carefully at providing dual part system to meet detail. Discussed trying to limit outlet to 1 pipe for ease of construction and outflow management.
- ACC asked FHWA to let them know the wording for the Advance notification signs – Signs have not been ordered yet.
- ACC asked when/ where willows were supposed to go. Can they plant in the spring? Willows are on existing slide areas and can be planted as soon as slopes are cleared of snow. Willows have limited storage time. See SCRs for detailed willow information.
- Discussion regarding if ACC had chosen a gasket for the anchored pipes. ACC has not chosen a gasket product yet. FHWA expressed concern of steep pipes needing gaskets and / or anchor assemblies. ACC agreed to contact supplier and find a possible gasket to use on the specified pipe as well as costs for additional gaskets.
- ACC expressed concern that roadway was not open and that work may not be able to start on May 27th due to snow. The submitted initial schedule by ACC shows starting work May 27th. FHWA believes that the summer season is more than long enough to complete the work, but Chuck Luedders agreed that if the project was still not accessible in Mid-June that FHWA would look at possible scheduling alternatives with ACC.
- ACC & FHWA discussed the roadway excavation item along with use of the Rough Creek Pit. The roadway excavation item includes the removal and placement of materials. The roadway excavation item quantity as shown in the Earthwork summary is a sum of two parts: Excavation of the roadway and placement of the existing excavated material in the borrow pit as waste (one payment); and Excavation of new material from the borrow source with placement in the roadway (second payment). FHWA emphasized to ACC that existing material utilized from roadway excavation would not be paid as additional excavation. ACC will review the earthwork summary and contact FHWA with any questions.

Pre-Construction Conference Follow-up Items:

- FHWA:
    - Provide advance sign wording to ACC.
    - Provide project website information to all parties.
    - Coordinate with County and ACC on road opening & NTP.
    - Send remote snowgage web information to ACC.
    - Provide further contact and local office information when established.
    - Coordinate with ACC on location/ time of equipment weed inspections and Weekly meetings.
    - Provide copies of plans, specs, and FPs as discussed.
    - Provide staking notes to contractor on May 16, 2008.
    - Provide project description and contact information to ACC prior to use of flaggers.
- ACC:
    - Provide further contact information and local office information when established.
    - Provide 24 hour contact information for safety & traffic control.
    - Coordinate with FHWA & Forest on accessing Vaughn Lake for water.
    - Provide information on proposed pipe gaskets to FHWA.
    - Coordinate with FHWA on location/ time of equipment weed inspections and Weekly meetings.
    - Notify FHWA prior to starting survey & staking so FHWA staff can be present if desired.
    - Submit SWPPP to FHWA for Project & Pits.
- Forests:
    - Coordinate with FHWA and County on Forest project and Ripple pit use.
    - Drive project areas together and locate possible staging / storage areas.
    - Locate and flag willow gathering areas with FHWA.
    - Coordinate with FHWA & ACC on accessing Vaughn Lake for water.
    - Coordinate with FHWA on approving pit development plans and lab location.
- Rio Blanco County:
    - Communicate road opening and snow plowing progress to FHWA.
    - Coordinate with FHWA & Forest on County project and Ripple pit use.

2A.2 POLICY ON PARTNERING

This appendix contains an excerpt from the FLH Manual, Subsection 1-C-3, Partnering.

For additional guidance on partnering, refer to Section 2.5 of this Manual.

U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

FEDERAL LANDS HIGHWAY MANUAL

Chapter 1	Program Management
Section C	Program Review and Evaluation
Subsection 3	Partnering

Transmittal 49
August 7, 1992

HFL-20

¶
1. DEFINITIONS
2. POLICY
3. GUIDANCE
4. FOLLOWUP

1. DEFINITIONS.

- PARTNERING - A formal process of bringing teams from different organizations together where they cooperate to achieve separate but mutually complimentary objectives.

- PARTICIPANT - Any of the individual employees or persons on a team who actively represents one of the organizations in the partnering process.

2. POLICY. Each Division will support and use the principles of partnering in carrying out our mission in order to achieve the highest level of quality while minimizing disputes, delays, rework, cycle time, and the costs they entail.

3. GUIDANCE.

(a) Principles.

- **Commitment.** Commitment to partnering must come from top management of all participating organizations. Commitment to partnering should be expressed by training and other resources necessary to support the process, and the empowerment of those who actually participate.

- **Equity.** The interests of all parties, whether apparently conflicting or not, are considered in creating mutual goals and strategies for achieving them through win/win thinking. The development of listening skills which enable all parties to "hear" what those interests really are, is often essential in achieving this equity.

- **Empathy and Trust.** Teamwork is possible only where there is respect for others' goals and objectives. Through the development of personal relationships and communication about each party's risks and goals, there is better understanding. With understanding, comes empathy and trust, and the possibility for a synergistic, team oriented relationship. Once this attitude is ingrained it should be reflected in normal day-to-day activities, not just at formal partnering sessions and other interaction among the parties.

(b) Practices. The formal partnering process contains four phases. These are: Partnering Design, Team Development, Partnering Implementation, and Progress Evaluation. To maximize the effectiveness of the process, professional facilitation should be obtained. The facilitator should be involved in all four phases of partnering to provide not only team building expertise, but also the impartiality which is essential to the resolution of differences that occur during the process.

- **Partnering Design.** The uniqueness of each partnering situation requires that an analysis be made of each organizations objectives. This analysis will be useful in preparation for the team building and implementation phases, and will provide baseline measures against which progress can be measured at the evaluation phase.

- **Team Development.** This phase is initiated by the use of a workshop where the facilitator and participants collectively initiate the partnering process.

  The following are the basic components of the workshop:

  - **Orientation.** The partnering orientation is conducted by the facilitator and is intended to engender the principles listed in (a). above, in all participants.

  - **Agreement.** The partnering agreement or charter documents the goals and objectives of each team. These are goals and objectives which all teams share, or which are important to one or more teams and not inconsistent with the goals and objectives of the others.

  - **Implementation Strategies.** Participants jointly develop strategies to achieve the goals and objectives they have established. Each team must particularly focus on the goal and objectives proposed by the others, since even in the absence of partnering they would focus on their own goals and objectives.

  - **Problem Solving and Escalation.** Participants jointly agree on an expeditious problem solving process. When problems cannot be resolved at the operating level, the process should clearly provide for, and not discourage escalation of the problem to the next higher level where it can be effectively resolved.

- **Partnering Implementation.** This phase of the partnering is the action stage with the actual implementation of the agreement and strategies drafted during the workshop. This phase puts partnering to work in the management of the project. In addition to day to day interaction between the teams, periodic meetings will be needed to discuss problems that develop and which may require facilitation to speed decision making and to avoid unproductive clashes.

- **Progress Evaluation.** This phase is to evaluate partnering progress and its workings on the project. The evaluation focuses on the progress made in achieving the agreed goals and objectives, as well as progress in communication, project management skills, organizational factors, leadership, and other attributes. Progress can be measured against the baseline data obtained in the design phase. It is the time to evaluate actions and celebrate successes.

In spite of best efforts to make partnering work, there may be occasions when dissolution of the agreement is necessary. Any of the principal organizations which are party to the agreement should have the option to dissolve the agreement. The Division should have clear delegation as to who can make this decision. Before the FLH party makes a decision to dissolve the agreement, delegated officials should be sure there are no reasonable actions FLH could take to resolve the reasons for the failure of the process.

(c) **Program and Project Development Partnering.** Application of partnering principles to program planning, project development and design functions offers exceptional opportunities to advance the quality and value of FLH products and services. The principles of partnering can be effectively applied with cooperating Federal, State and local agencies in such areas as:

- Program Stewardship
- Planning and Management System Implementation
- Owner Agency Design and Policy Development
- Property Owners and Public Impacted by New Projects
- Environmental Impact and Mitigation Decisions
- Project Scoping, Funding and Design Decisions

In these examples, it is probably not appropriate to expect partnering to resolve clear cut go/no go decisions on whether a project should be built, or whether there is a need for a particular policy. But given a mutual commitment to the project or the policy, partnering can alleviate the conflicts and concerns that may impede its successful implementation.

(d) **Engineering Services and Construction Contract Partnering.** Engineering services and construction contract partnering is an appropriate application of this concept in FLH. Contracting agency and contractor personnel have traditionally been adversaries, and high levels of claims and disputes are common. Partnering holds the promise of higher quality of services and products, as well as dramatic reductions in claims and unresolved disputes.

Partnering should be "offered" as an option to the contractor on all projects to the extent practical. This offer should be in a Notice to Bidders at the advertising stage, and followed up by a contact from the Division Engineer, the A/E Coordinator, or the Construction Engineer to a senior contractor executive soon after award. Even if partnering is not offered in the contract, the process can and should be used at all appropriate opportunities. The commitment should be voluntary to

be sure there is a commitment. For the same reason, related expenses for the partnering process should be shared.

During FLH's transition to the principles of partnering, the Division should target essentially all projects for partnering, eliminating only those on which the simplicity or lack of potential problems suggest that partnering is not warranted. In the future, as FLH personnel become trained in partnering skills, and as the design and construction industries become more cognizant of its benefits, the principles of partnering can and should be encouraged on smaller projects without committing to the expense of a formal, facilitated partnering process.

The key FLH and contractor participants on site should be designated "champions" of partnering for the project. They must be sure that other personnel, particularly new employees, and lower level inspectors and supervisors are adequately oriented, and understand the process. Other participants should include other "stakeholders", such as subcontractors, client agency representatives, or designers.

One of the primary benefits of partnering is a heightened level of quality awareness and improvement at an overall lower cost through reduction in paper work as "case building" for possible litigation is replaced with resolution of problems before they become disputes. This does not mean that either party is expected to forego the specific notices required by the contract, particularly those notices required to be in writing. Nor does it mean that detailed diaries are no longer appropriate. Partnering does suggest that through better understanding of the parties objectives and through trust, more communications can be verbal, and that notices of changes and differing site conditions are responded to in good faith, using the partnering process. However, in a contractual environment it is important not to be insensitive to the indicators of breakdown and dysfunction of the process. If FLH ultimately faces litigation on a contract we should be able to recognize that in a timely manner, and respond accordingly.

Partnering is not a means of discouraging contract modifications and requests for equitable adjustment from the contractor. It is a tool to achieve quality by efficiently and jointly resolving such requests and to prevent them from becoming costly disputes. Agreements reached through the partnering process must be clearly documented. If agreements constitute changes to the contract, the documentation must include a CM, appropriate cost analysis and be subject to the formal CM approval process. The use of value engineering CM's is recommended as reflecting the principles of partnering. This may result in modest increases in short-term contract growth, but long-term growth should actually be reduced as major disputes and their escalating costs are avoided.

(e) **Advance Support.** Effective A/E and construction contract partnering should be supported by activities which anticipate and minimize the causes of contract disputes. These activities might include:

- Participation in Industry and Industry/State Meetings
- Independent Constructibility and Risk Sharing Reviews of Designs
- Contractor Evaluation of FLH Designs/Specifications/Procedures
- Participation in Partnering Workshops

4. FOLLOWUP.

(a). Measurement. Ultimately partnering should have measurable effects on FLH planning, design and construction activities. Long term reduction in program growth, total cost of quality and outstanding contract claims are the benefits most clearly definable and measurable. Other benefits may be more difficult to quantify or even identify, except as reflected by the successful completion of the project.

(b). Rewarding Risk and Success. While training and workshops in partnering are available, the skills so acquired must be developed through application in actual practice. Employees should be given constructive feedback and recognition as they progress. Contractors who contribute enthusiastically to the success of the partnering process should be publicly recognized by FLH as appropriate.

(c). **Reports.** Each Division will maintain a spreadsheet showing all planned, ongoing and completed partnering efforts. The follow is a listing of the information fields required in the spreadsheet.

Project (Construction Project No. or Description of Non-construction Partnering Effort)
Status (Planned, Ongoing, Terminated or Completed)
Offered in Contract Documents? (Y or N)
Facilitated Workshop? (Y or N)
Number of Days for Workshop
Agreement Date
Evaluation Process Included? (Y or N)
Number of Status Meetings to Date (Not Including Workshop)
Status Meetings Facilitated? (Y, N or S[ome])
Comments

A copy of the spreadsheet will be submitted to the Federal Lands Highway Office within 30 days after the end of each quarter. The report for the fourth quarter of the fiscal year (October 30) will serve as a source of data for the FLH Annual Report (see FLHM 1-D-3). Additionally, that year end report should include a narrative describing overall successes, failures and lessons learned. Spreadsheet entries which have been reported as "Terminated" or "Completed" during the year may be dropped from the spreadsheet with the first quarter report in the new fiscal year (January 30). The FLHO will consolidate the information and diseminate it in other reports such as, Total Quality Management, Special Studies, Claims and Contract Growth.

(d). Additional Resource. The AGC pamphlet, **Partnering, A Concept for Success**, is recommended as a detailed outline of the partnering process and a summary of the benefits which may be derived from partnering. This pamphlet contains examples of a partnering charter [agreement], workshop agenda, and evaluation forms. The American Society of Civil Engineers, **Quality in the Constructed Project, A Guide for Owners, Designers, and Constructors**, is also recommended as a project team guide to achieving quality as a cooperative relationship.

Chapter 3 – SAFETY
TABLE OF CONTENTS

Section **Page**

3.1 General 3-1

3.2 Government Responsibility for Safety of FLH Personnel 3-2
3.2.1 Personal protective Equipment 3-2
3.2.1.1 Protective Clothing 3-2
3.2.1.2 Protective Footwear 3-2
3.2.2 Project Engineer Safety REsponsibilities 3-2
3.2.3 Operating Government Vehicles 3-2

3.3 Accidents 3-4
3.3.1 Accidents Involving Government Vehicles 3-4
3.3.2 Personal or property accidents 3-5
3.3.3 Occupational Accident Report 3-5
3.3.4 Accident/Injury Compensation Forms 3-6
3.3.5 Contractor Accidents 3-7
3.3.5.1 Work Zone Accident Report 3-7
3.3.5.2 Accident Inquiries and Investigations 3-7

3.4 Construction Safety 3-9
3.4.1 General 3-9
3.4.2 FLH Safety Responsibilities Prior to Start of Construction 3-9
3.4.3 FLH Safety Responsibilities During Construction Operations 3-12
3.4.4 High Risk Situations 3-16

LIST OF EXHIBITS

Exhibit		Page
Exhibit 3.3-A	Work Zone Accident Report	3-8
Exhibit 3.4-A	Example Approval Letter of Contractor's Safety Plan	3-11
Exhibit 3.4-B	Example Notification of a Safety Deficiency	3-14
Exhibit 3.4-C	Example Notification of Chronic Deficiencies	3-15
Exhibit 3.4-D	Summary of OSHA Trenching and Excavation Requirements	3-17

CHAPTER 3

SAFETY

3.1 GENERAL

This chapter addresses the responsibilities of FLH and the Contractor to ensure the health and safety of its employees and the public. Requirements and guidance related to the following topic areas are included:

- Personal protective equipment;
- Incident response and reporting procedures; and
- Construction safety.

3.2 GOVERNMENT RESPONSIBILITY FOR SAFETY OF FLH PERSONNEL

3.2.1 PERSONAL PROTECTIVE EQUIPMENT

3.2.1.1 Protective Clothing

The Government will provide FLH personnel with the necessary articles of special protective clothing. This includes hard hats and approved safety vests, which must be worn by FLH personnel on all construction project work sites, regardless of the relative hazard of operations.

Personnel must also wear protective clothing, such as a bright orange or yellow vest or jacket, in undeveloped areas during local hunting seasons.

3.2.1.2 Protective Footwear

FLH personnel must wear suitable footwear, normally steel-toed, laced boots. The FLH Division will, within FLH and Division guidelines, provide, or provide reimbursement for, safety (steel-toed) footwear.

3.2.2 PROJECT ENGINEER SAFETY RESPONSIBILITIES

The Project Engineer is responsible for the safety of Government employees on the project. This responsibility includes:

- becoming familiar with all prescribed accident report forms,
- promptly reporting all accidents to the COE,
- orienting new employees as to the special safety concerns of the project, and
- holding frequent safety meetings for all personnel, emphasizing those areas of danger that might be encountered on the project.

3.2.3 OPERATING GOVERNMENT VEHICLES

The Project Engineer should become familiar with regulations regarding the operation of Government vehicles and with local traffic laws and regulations. The Project Engineer must ensure that all personnel required to operate vehicles are properly licensed. The Project Engineer should withdraw authority to operate Government vehicles assigned to the project from anyone who commits serious or repeated safety violations, or who otherwise seems incapable of safely operating Government vehicles. Special situations should be discussed with the COE.

Additional safety requirements and motor vehicle management requirements applicable to the operation of Government vehicles are available in Division operating and administrative procedures.

See Section 3.4 for further guidance on monitoring and interacting with the Contractor on construction safety issues.

3.3 ACCIDENTS

3.3.1 ACCIDENTS INVOLVING GOVERNMENT VEHICLES

FLH personnel should follow the procedures outlined below if an accident occurs involving a Government vehicle.

1. **Stop immediately.**

2. **Take steps to prevent another accident at the scene.**

3. **Call a doctor or ambulance if necessary.**

4. **Notify police.**

5. **If the police question you, cooperate with their investigation.** Provide factual, succinct responses to their questions. Do not admit fault or liability. Obtain a copy of the completed police report and forward it to your COE. The COE will forward it to Legal Counsel and other appropriate individuals in your Division.

6. **DO NOT sign any paper or make any statement as to who was at fault (except to your supervisor or to a Federal Government investigator).** If the other party contacts you, limit the discussion to the information listed in Item 8 below and provide them with the name and number of Legal Counsel. Legal Counsel will be their main point of contact regarding the accident and will provide them with SF 95, *Claim for Damage, Injury, or Death,* a blank copy of which is provided in Appendix 3A.1.1.

   Also, do not discuss the accident with, or provide any information to, the other party's insurance company. When you are operating a government vehicle for Government business, the Government will handle all claims. If the other party's insurance company contacts you, direct them to Legal Counsel.

7. **Get the name and address of each witness.** Ask the witness to complete SF 94, *Statement of Witness*, contained in the *GSA Motor Vehicle Accident Reporting Kit.* A blank copy of SF 94 is provided in Appendix 3A.1.2

8. **When talking with the other party, state your name, work address, place of employment, and name of your supervisor.** Upon request, show your operator's permit and vehicle registration card. (*NOTE: Only Government-owned or leased vehicles registered in the District of Columbia or displaying state tags have registration cards.*)

9. **Complete SF 91, Motor Vehicle Accident Report, at the scene.** A blank copy of SF 91 is provided in Appendix 3A.1.3. If conditions prevent completing the form at the scene, make notes of the following:

   - Registration information for other vehicle(s), (owner's name, tag number and state serial number, and vehicle description);

   - Information on the other driver (name, address, operator's permit number, and expiration date);

- Name and address of each person involved and extent of injury, if any;
- Name and address of company insuring the other vehicle(s) and insurance policy number; and
- General information such as the location, time, sketch and measurements of accident location weather, and damage.

Take photos of the accident site and the damaged vehicle(s). Provide the photos to your COE, who will forward them to the CE and Legal Counsel.

Do not write any report (other than what is required in the SF 91) unless instructed to do so by Legal Counsel. Do not use your project diary to record details regarding the accident.

10. **Notify your supervisor and the manager of the Fleet Management Center listed on the front cover of the Vehicle Operator's Manual as soon as possible.** Provide your COE with general information about the accident and pictures if possible. Do not include details of the accident in e-mails or other written documentation. The COE will notify Legal Counsel and the CE. The CE will notify the Director of Project Delivery.

11. **If the vehicle is unsafe to operate, call the Fleet Management Center or Maintenance Control Center for instruction.** If you are unable to contact the Fleet Management Center or Maintenance Control Center due to the accident occurring after normal duty hours or on holidays, have the vehicle towed to the nearest repair shop or service station. The Fleet Management Center must be notified concerning the vehicle's location as soon as possible.

12. **Submit all reports and data to your supervisor within one working day.** (Note: If you are injured, have the police notify your supervisor who will assume your responsibilities for reporting the accident.)

13. **Injuries should be processed through your Division personnel office using a CA-1 Form.**

3.3.2 PERSONAL OR PROPERTY ACCIDENTS

All accidents must be reported to the Division Safety Officer. Accidents involving injury should be reported within 48 hours of the incident. Accidents involving property damage should be reported within 72 hours of the incident. Contact the Safety Officer with questions regarding accident reporting.

3.3.3 OCCUPATIONAL ACCIDENT REPORT

Use the internal form, Occupational Accident Report (OAR) to report all accidents (including non injury accidents involving GSA vehicles). The appropriate accident forms must accompany the OAR. Submit the completed OAR and a copy of all other applicable forms (e.g.; CA-1, CA-2, CA-16, SF-91, and SF-94) to the Safety Officer. A blank OAR form can be found in Appendix 3A.2.

3.3.4 ACCIDENT/INJURY COMPENSATION FORMS

Complete the forms discussed below, as applicable, regardless of whether or not compensation is pursued. Refer to the *Federal Injury Compensation* publication, Pamphlet CA-550, for information regarding injury compensation. Submit the original injury compensation forms to Personnel.

1. **CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation**

   The CA-1 must be completed for all traumatic injuries. See subsection d below for further requirements regarding medical examination and/or treatment. As set forth by Pamphlet 550:

   > *A traumatic injury is defined as a wound or other condition of the body caused by external force, including stress or strain. The injury must be identifiable as to time and place of occurrence and member or function of the body affected. It must be caused by a specific event or incident or series of events or incidents within a single day or work shift. Traumatic injuries include damage to or destruction of prosthetic devices or appliances, including eyeglasses and hearing aids if they were damaged incidental to a personal injury requiring medical services. (Personal Property claims can be made only under the Military Personnel and Civilian Employees' Claims Act, 31 USC 240.)*

   A blank form can be found in Appendix 3A.3.1.

2. **CA-2, Notice of Occupational Disease and Claim for Compensation**

   The CA-2 must be completed to report an occupational disease. As set forth by Pamphlet CA-550:

   > *An occupational disease is defined as a condition produced in the work environment over a period longer **than one work day** of shift. It may result from systematic infection, repeated stress or strain, exposure to toxins, poisons, fumes or other continuing conditions of the work environment.*

   A blank form can be found in Appendix 3A.3.2.

3. **CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation**

   Complete form CA-2a for an injured employee that is again disabled as a result of an original injury or occupational disease. The definition of recurrence is stated in the instructions that accompany form CA-2a. A blank form can be found in Appendix 3A.3.3.

4. **CA-16, Authorization for Examination and/or Treatment**

   Complete form CA-16 for employees requiring medical examination or treatment for traumatic injuries that is work-related. Prior approval must be obtained from the Office of Workers' Compensation Program for recurring injuries.

Submit form CA-16 within 4 hours of the request for care. Treatment may be authorized for emergency care by telephone. Forward a completed CA-16 to the medical facility within 48 hours of the emergency. A blank form can be found in Appendix 3A.3.4.

3.3.5 CONTRACTOR ACCIDENTS

3.3.5.1 Work Zone Accident Report

All accidents should be reported verbally to the COE the same day of the accident. Accidents involving fatalities are to be reported immediately to the COE and the CE. They will inform the Division Engineer. A voice mail or email alone will not suffice.

Document any type of accidents occurring within the project limits. Include information similar to that shown in the sample Work Zone Accident Report provided as Exhibit 3.3-A. Use diagrams, be sure to document traffic control signs and devices in the area, and include several photos.

The local law enforcement agency may be called in to investigate; they will then do their own report. Ask to get a copy of their report to attach to yours.

The completed report, with any attached law enforcement reports, photos and other documentation, is to be sent to the COE and Division Legal Counsel.

3.3.5.2 Accident Inquiries and Investigations

Accidents and injuries often result in inquiries from insurance investigators, lawsuits, and attorneys. Any subpoenas, depositions, or requests for information associated with accidents on the project should immediately be referred to the COE and the Division Legal counsel.

Exhibit 3.3-A Work Zone Accident Report

WDFD-27
(10/88)
Doc. #0124F:1

WORK ZONE ACCIDENT REPORT

Date: 10/7/96 Time: 1304 Lignt Conditions: BRIGHT SUN

Project Name & No.: ID PFH 63-1(3) COUNCIL - CUPRUM ROAD

Driver Names (If known): BUZZ LIGHTYEAR
1122 BOOGIE WOOGIE AVE.
TUSSON, AZ 85999

County: ADAMS Weather: CLEAR AND DRY

Location, Milepost, or Station: 63+00 TO 58+00 1 MILE N.W. OF B.O.P.

No. of Vehicles Involved: 1 Severity: ☐ Minor damage ☒ Major damage

No. of Pedestrians Involved: 0

Surface condition: Wet ___ Dry X ☐ Injury ☐ Death

Adjacent Construction Activity: NONE

Method of Traffic Control: Signs X, Temporary Barriers ___, Flaggers ___,
Pilot Car ___, Other (explain) TEMPORARY PAVEMENT MARKING

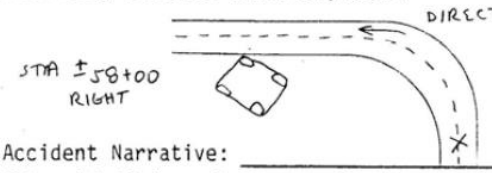
Contributing Factors: Excess speed X, Failure to yield ___, Weather ___,
Improper movement ___, Highway condition ___, Drugs/Alcohol X,
Mechanical ___, Unknown ___, Other ___

Have other accidents of similar nature occurred in this zone? NO

If yes, give dates: ___

Investigated by: (INSPECTOR) JOE FRIDAY

Accident diagram including all traffic control devices present at the time of accident, venicles involved, etc.:



Accident Narrative:
MR. LIGHTYEAR WAS DRIVING EAST ON COUNCIL CUPRUM HEADING INTO TOWN WHEN HE LOST CONTROL OF HIS TRUCK COMING AROUND A CURVE. AFTER TRYING TO CORRECT HE ENDED UP FLIPPING THE TRUCK INTO THE DITCH. FURTHER INVESTIGATION REVEALED HE WAS UNDER THE INFLUENCE, AND EXCEEDING THE POSTED SPEED LIMIT.

Resulting action:
NONE

Time and date that action was taken: ___

Name and title: Joe Friday, Inspector

3.4 CONSTRUCTION SAFETY

3.4.1 GENERAL

Federal law requires all FLH contracts to contain FAR Clause 52.236-13, Accident Prevention, which obligates the Contractor to perform work in accordance with the Safety and Health Regulations for Construction (29 CFR 1926) published by the U.S. Department of Labor. Each project office should have a copy of the OSHA regulations.

FAR Clause 52.236-13 also requires the Contractor, without separate or additional payment, to safeguard the public, Government employees, and Government property exposed to the construction. It is the Project Engineer's responsibility to see that the Contractor effectively fulfills this responsibility. FLH employees cannot be permitted to work in an environment that is unsafe in ways that are correctable or controllable. This obligation gives the Government the discretion to order correction of hazards, whether or not a specific hazard is covered by the OSHA regulations.

Accidents and injuries often result in inquiries from insurance investigators and attorneys. Any subpoenas, depositions, and requests for information associated with accidents on the project should immediately be referred to Legal Counsel through the COE. See Section 3.3 for further details.

Contracts may contain a supplement to the FAR clause that requires the Contractor to submit a proposed safety plan to FLH for review and agreement prior to beginning construction. Appendix 3A.4 contains a suggested outline for a Contractor's safety plan. It should be provided to the Contractor at or before the preconstruction conference so that they know what we expect for a safety program. Even for contracts that do not have the FAR clause supplement, the outline should be provided to the Contractor for informational purposes.

3.4.2 FLH SAFETY RESPONSIBILITIES PRIOR TO START OF CONSTRUCTION

The Project Engineer should perform the following activities prior to the start of construction.

1. At the preconstruction conference, emphasize the Contractor's safety responsibilities under FAR Clause 52.236-13, Division 100 of the Standard Specifications, and contract provisions dealing with specific subjects such as work zone traffic control and explosives.

2. Approve or otherwise respond to the Contractor's safety plan submittal for contracts including that provision. Exhibit 3.4-A is an Example Approval Letter.

3. Regardless of the contract's requirement for a safety plan, emphasize at the preconstruction conference those safety precautions that are applicable to all projects. For example:

    - Identification of Contractor employees with overall responsibility for safety management and supervision.

    - Posting of emergency procedures, including appropriate telephone numbers and locations of doctor, emergency services, and hospitals.

4. Emphasize that the Contractor, not the Project Engineer, is obligated to:

    - Perform routine safety inspections and otherwise monitor project safety.

    - Immediately correct or otherwise determine an appropriate response to complaints of safety deficiencies, whether those complaints come from Contractor employees, the Government, or the public.

    - Provide the required safety expertise to fulfill these obligations. It should not be assumed that FLH has, or will provide, such expertise.

5. Advise the Contractor that the contract requires that FLH notify the Contractor in writing of alleged safety deficiencies and that the FLH Division will notify the State or Federal OSHA office responsible for construction safety monitoring if deficiencies are chronic or remain unresolved.

6. Advise the Contractor that if it fails to immediately correct safety deficiencies, especially high risk deficiencies, the Project Engineer has authority to stop work on the affected operations until the deficiencies are corrected.

7. Advise the Contractor that the safety of public traffic and pedestrians in the vicinity of the project is of paramount concern; and that accommodation of the public will be in strict accordance with the contract or subject to the direction and approval of the Project Engineer.

8. Advise the Contractor that inspectors, testers, and other Government employees and contractors working at the site are not obligated to work under unnecessary or unreasonable risks; and that the inspection and acceptance of the work may require accommodations to protect those personnel.

9. Advise the Contractor that it will be required to provide to the Project Engineer copies of all accident reports prepared for Government agencies or insurance carriers.

Exhibit 3.4-A Example Approval Letter of Contractor's Safety Plan

U.S. Department of Transportation
Federal Highway Administration

Western Federal Lands Highway Division

610 East Fifth Street
Vancouver, WA 98661-3801
(360) 619-7700 FAX: (360) 619-7846

Shoalwater Contractors, Inc
Attn: Scott Fitpatrick
P.O. Box 1956
Bandon, OR 97412

February 17, 2009

In Reply Refer To: SL-17

Dear Mr. Fitzpatrick:

OR PFH 97-1(1), North Century Drive
Contract No. DTFH70-08-C-00009

I have reviewed the Accident Prevention Plan you submitted at the Preconstruction Conference held on February 5, 2009. The plan meets the requirements of FAR 52.236-13 and Section 107.08 of the Contract. It is therefore approved for use. I have attached your copy with an "Approved" and today's date stamped on it.

Should your plan for the construction operations change from what was envisioned under the Accident Prevention Plan, an updated plan will need to be submitted. If personnel identified in the Plan change, an updated plan will need to be submitted. If you have any questions, do not hesitate to contact me.

Sincerely yours,

Charles B. Dawson,
Project Engineer

cc: C. Johns, COE
central files

MOVING THE AMERICAN ECONOMY

3.4.3 FLH SAFETY RESPONSIBILITIES DURING CONSTRUCTION OPERATIONS

1. FLH will not normally perform periodic, comprehensive project safety inspections or safety inspections of Contractor equipment, tools, or workplace. However, if during the course of their other duties, FLH employees become aware of hazardous conditions resulting from the Contractor's known or possible violation of either OSHA regulations or reasonable standards of construction safety practice, as determined by the Project Engineer, the Contractor shall be notified immediately with a written follow up. See Exhibit 3.4-B for an example notification of a safety deficiency.

2. Allegations of safety deficiencies may come from sources outside FLH and its onsite inspection staff. Client agency employees, contractor employees, others working at the site, or private citizens may point out what they think are safety violations. These allegations should be conveyed to the Contractor in writing. The Contractor should be instructed to correct the deficiency if the Project Engineer is convinced that one exists. The Contractor will be asked to investigate the deficiency and take appropriate corrective action if there is doubt as to whether a deficiency exists.

3. All safety deficiencies identified, whether serious or minor, singular or repeated, should be considered an inadequacy within the Contractor's safety program, and the Contractor should be advised of the necessity to not only correct the deficiency, but to review and modify its safety program to prevent recurrence.

4. If the Contractor has repeated minor deficiencies or avoidable accidents (more than three in any three-month period), any serious or life threatening deficiencies, or any deficiencies that the Contractor failed to immediately correct, a copy of the written notification to the Contractor must be provided to the State or Federal agency responsible for OSHA enforcement at the project. See Exhibit 3.4-C for an example notification of chronic deficiencies. The Project Engineer should advise the COE before copying the State or Federal OSHA office. This level of safety deficiencies may also be a basis to request that the Division safety resource person assist in an overall inspection and evaluation of the Contractor's safety program. Client agency safety specialists may be invited to participate in such evaluations on a consultive basis.

   Once safety specialists have concurred in the Project Engineer's determination of chronic or unresolved deficiencies, appropriate actions under the terms of the contract, such as issuance of a stop work order, may be warranted. Except for life threatening situations, as discussed in Item 5, the COE should be advised of, and concur, in such actions.

5. When any FLH employee observes a life threatening condition resulting from the Contractor's operations, the Project Engineer will order the Contractor to immediately correct the situation. In addition, that portion of the work should be stopped until the hazard is corrected.

   When in doubt, the Project Engineer may elect to discuss the situation with the COE before taking action. However, it is generally better to act conservatively than to not take action when appropriate.

6. FLH onsite personnel are generally not trained as safety specialists, and should not directly or indirectly assume control, direction, or responsibility for the Contractor's safety program.

In advising the Contractor of apparent deficiencies, FLH personnel should not prescribe the corrective measures or procedures to be taken by the Contractor. In many cases, the Project Engineer may not know for sure whether an OSHA violation exists — for example, whether a given piece of equipment is required to have a ROPS (Roll Over Protection System) or other features. Upon notification, it is up to the Contractor to provide the expertise to determine if there is a violation, and to correct it if necessary, or demonstrate to the Project Engineer's satisfaction that no deficiency exists.

7. In addition to its contractual responsibilities, FLH has a responsibility to ensure a safe working environment for its employees, other Government employees working in the vicinity, and its other contractors (e.g. contract inspectors). None of these personnel should be required to perform inspection or other duties in an unsafe environment. If the unsafe environment is under the control of the Contractor, the Contractor's superintendent should be advised that the work requiring inspection cannot be accepted until the unsafe condition is corrected. For example, rolling operations may have to be suspended during testing if the compaction tester perceives a hazard associated with that equipment. If verbal notice proves ineffective, written notice to this effect should be provided.

Exhibit 3.4-B Example Notification of a Safety Deficiency

U.S. Department of Transportation
Federal Highway Administration

Western Federal Lands Highway Division

610 East Fifth Street
Vancouver, WA 98661-3801
(360) 619-7700 FAX: (360) 619-7846

Shoalwater Contractors, Inc
Attn: Scott Fitpatrick
P.O. Box 1956
Bandon, OR 97412

March 17, 2009

In Reply Refer To: SL-37

Dear Mr. Fitzpatrick:

OR PFH 97-1(1), North Century Drive
Contract No. DTFH70-08-C-00009

During your trench operation on March 16, 2009 near Station 96+50 Rt., several safety deficiencies were noted. I have itemized them below:

1. Some personnel were not wearing proper personal protective equipment
2. Material was spilling outside of the construction limits onto the pedestrian trail
3. Truck numbers 0345 and 0411 had backup alarms that worked only intermittently

Review your Safety Plan with your personnel to ensure they understand what is required. Check all equipment to ensure that it's safety devices are functioning properly.

If you have any questions, do not hesitate to contact me.

Sincerely yours,

Charles B. Dawson,
Project Engineer

cc: C. Johns, COE
central files

MOVING THE AMERICAN ECONOMY

Exhibit 3.4-C Example Notification of Chronic Deficiencies

U.S. Department of Transportation
Federal Highway Administration

Western Federal Lands Highway Division

610 East Fifth Street
Vancouver, WA 98661-3801
(360) 619-7700 FAX: (360) 619-7846

Shoalwater Contractors, Inc
Attn: Scott Fitpatrick
P.O. Box 1956
Bandon, OR 97412

April 17, 2009

In Reply Refer To: SL-47

Dear Mr. Fitzpatrick:

OR PFH 97-1(1), North Century Drive
Contract No. DTFH70-08-C-00009

During your blasting operation on April15, 2009 near Station 111+50 several safety deficiencies were noted. I have itemized them below:

1. Warning signs were not properly located relative to the blast zone.
2. The Blaster in Charge was not the individual listed in the approved Safety Plan.
3. Workers were entering the blast area prior to the "All Clear" being sounded.
4. Provisions for controlling fly rock were inadequate.
5. The subcontractor's personnel were not wearing proper personnel protective equipment

Several of these deficiencies were pointed out to you after the previous blast of April 10, 2009. I am directing you to review your Safety Plan. Submit an updated Safety Plan with changes correcting the noted deficiencies.

Blasting operations on the project are suspended under authority of FAR Clause 52.236-13 until the updated Safety Plan is reviewed and approved by FHWA. If you have any questions, do not hesitate to contact me.

Sincerely yours,

Charles B. Dawson,
Project Engineer

cc: C. Johns, COE
central files

MOVING THE AMERICAN ECONOMY

3.4.4 HIGH RISK SITUATIONS

FLH personnel should be alert to the following high risk safety hazards:

1. **Construction Vehicle Accidents.** This hazard area receives little mention in the OSHA regulations because of the difficulty in writing general standards that would apply to all situations. However, incidents involving construction vehicles are a leading cause of construction accidents and fatalities. If the use of construction vehicles is perceived to present unnecessary risks, the Project Engineer should advise the Contractor as to whether or not a specific OSHA violation has occurred. Possible deficiencies associated with vehicular accidents are:

    - Failure to separate pedestrian workers from heavy equipment and other construction vehicles.
    - Failure to provide working backup alarms or clearly identified signal persons instead of backup alarms.
    - Failure to adequately plan and manage the movement of vehicles in congested or low visibility conditions.
    - Failure to maintain brakes, ROPS, and other safety equipment adequately.
    - Failure to operate vehicles using due care and caution.
    - Altering “as designed” configuration or safety features of equipment.

2. **Interaction with Public Traffic.** This is an increasingly serious safety hazard due to the percentage of highway construction projects being performed under traffic. See Specification Sections 156 and 635 of the contract.

3. **Trenching and Excavation.** This is a leading cause of construction accidents and fatalities, mostly due to the sudden and unexpected nature of such accidents when required precautions are not taken. See 29 CFR 1926, Subpart P. Exhibit 3.4-D summarizes OSHA trenching and excavation requirements. The actual regulations should be reviewed for exceptions and more detailed information. It is the Contractor’s obligation to have personnel who are trained in, or otherwise competent to implement, the regulations. The Contractor should not expect FLH to provide that competence, to train the Contractor’s personnel, or to approve each trenching operation.

4. **Falls.** Scaffolding, rails, stairs, and ladders meeting OSHA standards are the primary requirement to safeguard against falls. If these measures are impractical, then personal fall arrest systems are required. If both are impractical, then the Contractor must provide guardrail at heights exceeding 10 feet 3.1 meters. The Contractor must protect vertically protruding reinforcing steel that is below walkways or where persons are working.

5. **Explosives.** Accidents often result from failure to have competent personnel in charge of blasting or failure to develop and follow a valid blasting plan. 29 CFR 1926, Subpart U, and the contract provisions contain the pertinent requirements regarding blasting and the use of explosives.

Exhibit 3.4-D Summary of OSHA Trenching and Excavation Requirements

Summary[1] of OSHA Trenching and Excavation Requirements Soil Classification

Classification	Description
Stable Rock	Solid rock which can be excavated with vertical sides which remain intact while exposed.
Type A Soil	Cohesive soil, caliche or hardpan that is not fissured, subject to vibration or other factors which would require it to be classified as a less stable material; and which has an unconfined compressive strength of at least 150 kilopascals.
Type B Soil	Cohesive soil that is fissured, subject to vibration or other factors which would require it to be classified less than Type A, but not Type C and which has an unconfined compressive strength between 50 and 150 kilopascals; granular cohesionless soils including silt, silty loam, sandy loam; angular gravel or crushed rock; previously disturbed soil.
Type C Soil	Cohesive soil with an unconfined compressive strength of less than 50 kilopascals; cohesionless soils including rounded rock, sand; submerged or saturated soil, submerged rock that is not stable; layered systems which dip into the excavation at a slope of 1:4 or steeper.

Maximum Slope and Trenching Depth Unsupported Trenches

Soil Type	Maximum Slope	Maximum Depth[2]
Stable Rock	Vertical	6.0 meters
Type A, B or C	Vertical	1.5 meters
Type A Soil	1.3:1	6.0 meters
Type A Soil (Alternate)	Vertical and 1.3:1[3]	1.1 meters 2.5 meters[4]
Type A Soil (Alternate)	Vertical and 1:1[3]	1.1 meters 3.6 meters[4]
Type A Soil (Short Term)[5]	2:1	3.6 meters
Type B Soil	1:1	6.0 meters
Type C Soil	1:1.5	6.0 meters

1. This material is a summary of OSHA regulations published in 29 CFR 1926, Subpart P, Appendix A and B. The regulations themselves are not written in SI units, and are more detailed than the summary presented here; and therefore should be used to resolve actual job site questions and interpretations.
2. Support systems for trenches over 6.0 meters deep must be designed by a registered Professional Engineer.
3. Maximum slope above vertical portion of trench.
4. Maximum total depth including vertical portion of trench.
5. Short term means 24 hours or less.
6. All soil must assumed to be Type C, unless a competent person, provided by the Contractor, following the procedures in 29 CFR 1926, Subpart P, Appendix A, determines that it is Type A or Type B.
7. See 29 CFR 1926, Subpart P, Appendix B for details regarding compound slopes, stepped slopes and permitted use of shoring and support systems.
8. Design of shoring and support systems must comply with 29 CFR 1926, Subpart P, Appendix C or D; be a commercial system used in accordance with manufacturers recommendations; or be designed by a registered Professional Engineer.

CHAPTER 3 – SAFETY

LIST OF APPENDICES

3A.1 FORMS FOR ACCIDENTS INVOLVING GOVERNMENT VEHICLES 1

3A.1.1 SF 95, Claim for Damage Injury, or Death **2**

3A.1.2 SF 94, Statement of Witness **4**

3A.1.3 SF 91, Motor Vehicle Accident Report **5**

3A.2 OCCUPATIONAL ACCIDENT REPORT (OAR) 9

3A.3 ACCIDENT/INJURY COMPENSATION FORMS 13

3A.3.1 CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation **14**

3A.3.2 CA-2, Notice of Occupational Disease and Claim for Compensation **18**

3A.3.3 CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation **22**

3A.3.4 CA-16, Authorization for Examination and/or Treatment **26**

3A.4 SUGGESTED OUTLINE FOR CONTRACTOR'S SAFETY PLAN 30

3A.1 FORMS FOR ACCIDENTS INVOLVING GOVERNMENT VEHICLES

This appendix contains copies of the following forms, which should be used to report an accident involving a Government vehicle. Be sure to visit the GSA Forms Library to verify that the most current/updated versions of the standard forms are being used.

- SF 95, Claim for Damage, Injury, or Death
- SF 94, Statement of Witness
- SF 91, Motor Vehicle Accident Report

For more information regarding the procedures to follow if such an accident occurs, refer to Section 3.3.1.

3A.1.1 SF 95, CLAIM FOR DAMAGE INJURY, OR DEATH

CLAIM FOR DAMAGE, INJURY, OR DEATH		INSTRUCTIONS: Please read carefully the instructions on the reverse side and supply information requested on both sides of this form. Use additional sheet(s) if necessary. See reverse side for additional instructions.		FORM APPROVED OMB NO. 1105-0008
1. Submit To Appropriate Federal Agency:			2. Name, Address of claimant and claimant's personal representative, if any. (See instructions on reverse.) (Number, Street, City, State and Zip Code)	
3. TYPE OF EMPLOYMENT □ MILITARY □ CIVILIAN	4. DATE OF BIRTH	5. MARITAL STATUS	6. DATE AND DAY OF ACCIDENT	7. TIME (A.M. OR P.M.)
8. Basis of Claim (State in detail the known facts and circumstances attending the damage, injury, or death, identifying persons and property involved, the place of occurrence and the cause thereof. Use additional pages if necessary.)				
9. **PROPERTY DAMAGE**				
NAME AND ADDRESS OF OWNER, IF OTHER THAN CLAIMANT (Number, Street, City, State, and Zip Code).				
BRIEFLY DESCRIBE THE PROPERTY, NATURE AND EXTENT OF DAMAGE AND THE LOCATION WHERE PROPERTY MAY BE INSPECTED. (See Instructions on reverse side.)				
10. **PERSONAL INJURY/WRONGFUL DEATH**				
STATE NATURE AND EXTENT OF EACH INJURY OR CAUSE OF DEATH, WHICH FORMS THE BASIS OF THE CLAIM. IF OTHER THAN CLAIMANT, STATE NAME OF INJURED PERSON OR DECEDENT.				
11. **WITNESSES**				
NAME		ADDRESS (Number, Street, City, State, and Zip Code)		
12. (See instructions on reverse.) **AMOUNT OF CLAIM** (in dollars)				
12a. PROPERTY DAMAGE	12b. PERSONAL INJURY	12c. WRONGFUL DEATH	12d. TOTAL (Failure to specify may cause forfeiture of your rights.)	
I CERTIFY THAT THE AMOUNT OF CLAIM COVERS ONLY DAMAGES AND INJURIES CAUSED BY THE INCIDENT ABOVE AND AGREE TO ACCEPT SAID AMOUNT IN FULL SATISFACTION AND FINAL SETTLEMENT OF THIS CLAIM				
13a. SIGNATURE OF CLAIMANT (See instructions on reverse side.)			13b. Phone number of person signing form	14. DATE OF SIGNATURE
CIVIL PENALTY FOR PRESENTING FRAUDULENT CLAIM The claimant is liable to the United States Government for a civil penalty of not less than $5,000 and not more than $10,000, plus 3 times the amount of damages sustained by the Government. (See 31 U.S.C. 3729.)			**CRIMINAL PENALTY FOR PRESENTING FRAUDULENT CLAIM OR MAKING FALSE STATEMENTS** Fine of not more than $10,000 or imprisonment for not more than 5 years or both. (See 18 U.S.C. 287, 1001.)	

95-109 **NSN 7540-00-634-4046** STANDARD FORM 95
PRESCRIBED BY DEPT. OF JUSTICE
28 CFR 14.2

3A.1.1 SF 95, Claim for Damage Injury, or Death *(Continued)*

INSURANCE COVERAGE

In order that subrogation claims may be adjudicated, it is essential that the claimant provide the following information regarding the insurance coverage of his vehicle or property.

15. Do you carry accident insurance? □ Yes If yes, give name and address of insurance company (Number, Street, City, State, and Zip Code) and policy number. □ No

16. Have you filed a claim on your insurance carrier in this instance, and if so, is it full coverage or deductible?

17. If deductible, state amount.

18. If a claim has been filed with your carrier, what action has your insurer taken or proposed to take with reference to your claim? (It is necessary that you ascertain these facts.)

19. Do you carry public liability and property damage insurance? □ Yes If yes, give name and address of insurance carrier (Number, Street, City, State, and Zip Code). □ No

INSTRUCTIONS

Claims presented under the Federal Tort Claims Act should be submitted directly to the "appropriate Federal agency" whose employee(s) was involved in the incident. If the incident involves more than one claimant, each claimant should submit a separate claim form.

Complete all items - Insert the word NONE where applicable.

A CLAIM SHALL BE DEEMED TO HAVE BEEN PRESENTED WHEN A FEDERAL AGENCY RECEIVES FROM A CLAIMANT, HIS DULY AUTHORIZED AGENT, OR LEGAL REPRESENTATIVE, AN EXECUTED STANDARD FORM 95 OR OTHER WRITTEN NOTIFICATION OF AN INCIDENT, ACCOMPANIED BY A CLAIM FOR MONEY DAMAGES IN A **SUM CERTAIN** FOR INJURY TO OR LOSS OF PROPERTY, PERSONAL INJURY, OR DEATH ALLEGED TO HAVE OCCURRED BY REASON OF THE INCIDENT. THE CLAIM MUST BE PRESENTED TO THE APPROPRIATE FEDERAL AGENCY WITHIN **TWO YEARS** AFTER THE CLAIM ACCRUES.

Failure to completely execute this form or to supply the requested material within two years from the date the claim accrued may render your claim invalid. A claim is deemed presented when it is received by the appropriate agency, not when it is mailed.

If instruction is needed in completing this form, the agency listed in item #1 on the reverse side may be contacted. Complete regulations pertaining to claims asserted under the Federal Tort Claims Act can be found in Title 28, Code of Federal Regulations, Part 14. Many agencies have published supplementing regulations. If more than one agency is involved, please state each agency.

The claim may be filed by a duly authorized agent or other legal representative, provided evidence satisfactory to the Government is submitted with the claim establishing express authority to act for the claimant. A claim presented by an agent or legal representative must be presented in the name of the claimant. If the claim is signed by the agent or legal representative, it must show the title or legal capacity of the person signing and be accompanied by evidence of his/her authority to present a claim on behalf of the claimant as agent, executor, administrator, parent, guardian or other representative.

If claimant intends to file for both personal injury and property damage, the amount for each must be shown in item #12 of this form.

The amount claimed should be substantiated by competent evidence as follows:

(a) In support of the claim for personal injury or death, the claimant should submit a written report by the attending physician, showing the nature and extent of injury, the nature and extent of treatment, the degree of permanent disability, if any, the prognosis, and the period of hospitalization, or incapacitation, attaching itemized bills for medical, hospital, or burial expenses actually incurred.

(b) In support of claims for damage to property, which has been or can be economically repaired, the claimant should submit at least two itemized signed statements or estimates by reliable, disinterested concerns, or, if payment has been made, the itemized signed receipts evidencing payment.

(c) In support of claims for damage to property which is not economically repairable, or if the property is lost or destroyed, the claimant should submit statements as to the original cost of the property, the date of purchase, and the value of the property, both before and after the accident. Such statements should be by disinterested competent persons, preferably reputable dealers or officials familiar with the type of property damaged, or by two or more competitive bidders, and should be certified as being just and correct.

(d) **Failure to specify a sum certain will render your claim invalid and may result in forfeiture of your rights.**

PRIVACY ACT NOTICE

This Notice is provided in accordance with the Privacy Act, 5 U.S.C. 552a(e)(3), and concerns the information requested in the letter to which this Notice is attached.

A. *Authority:* The requested information is solicited pursuant to one or more of the following: 5 U.S.C. 301, 28 U.S.C. 501 et seq., 28 U.S.C. 2671 et seq., 28 C.F.R. Part 14.

B. *Principal Purpose:* The information requested is to be used in evaluating claims.

C. *Routine Use:* See the Notices of Systems of Records for the agency to whom you are submitting this form for this information.

D. *Effect of Failure to Respond:* Disclosure is voluntary. However, failure to supply the requested information or to execute the form may render your claim "invalid".

PAPERWORK REDUCTION ACT NOTICE

This notice is solely for the purpose of the Paperwork Reduction Act, 44 U.S.C. 3501. Public reporting burden for this collection of information is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Director, Torts Branch, Attention: Paperwork Reduction Staff, Civil Division, U.S. Department of Justice, Washington, D.C. 20530.

SF 95 BACK

3A.1.2 SF 94, STATEMENT OF WITNESS

STATEMENT OF WITNESS *(Attach additonal sheets if necessary)*	1. DID YOU SEE THE ACCIDENT?	2. WHEN DID THE ACCIDENT HAPPEN? A. TIME — a.m. — p.m.	B. DATE

3. WHERE DID THE ACCIDENT HAPPEN? *(Give street location and city)*

4. TELL IN YOUR OWN WAY HOW THE ACCIDENT HAPPENED

5. WHERE WERE YOU WHEN THE ACCIDENT OCCURRED?

6. WAS ANYONE INJURED, AND IF SO, EXTENT OF INJURY IF KNOWN?

7. DESCRIBE THE APPARENT DAMAGE TO PRIVATE PROPERTY

8. DESCRIBE THE APPARENT DAMAGE TO GOVERNMENT PROPERTY	9. IF TRAFFIC CASE GIVE APPROXIMATE SPEED OF: a. GOVERNMENT VEHICLE MPH
	b. OTHER VEHICLE MPH

10. GIVE THE NAMES AND ADDRESSES OF ANY OTHER WITNESSES TO THE ACCIDENT *(If known)*

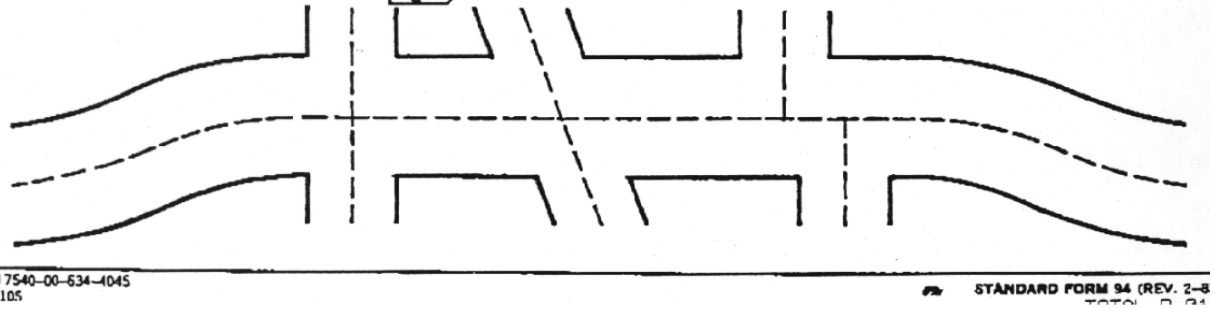
A. NAMES	B. ADDRESSES

WITNESS COM-PLETING THIS FORM	11. HOME ADDRESS *(INCLUDE ZIP CODE)*	12. WITNESS (PRINT OR TYPE NAME)	A. HOME TELEPHONE NO.
		SIGN HERE ☛	B. TODAY'S DATE

13. BUSINESS ADDRESS *(INCLUDE ZIP CODE)* — TELEPHONE NO.

14. INDICATE ON THE DIAGRAM BELOW WHAT HAPPENED:

1. Number Federal vehicle as 1—other vehicle as 2—additional vehicle as 3, and show direction of travel by arrow (*Example:* → 1 2 ←)
2. Use solid line to show path before accident —— 2 Broken line after accident - - - - 2
3. Show pedestrian by →
4. Show railroad by +++++++++++++++
5. Give names or numbers of streets or highways
6. Indicate north by arrow in this circle ○



NSN 7540-00-634-4045
94-105

STANDARD FORM 94 (REV. 2-8

3A.1.3 SF 91, MOTOR VEHICLE ACCIDENT REPORT

MOTOR VEHICLE ACCIDENT REPORT	Please read the Privacy Act Statement on Page 3	INSTRUCTIONS: Sections I thru IX are filled out by the vehicle operator. Section X, items 72 thru 82c are filled on by the operator's supervisor. Section XI thru XIII are filled out by an accident investigator for bodily injury, fatality, and/or damage exceeding $500.

SECTION I - FEDERAL VEHICLE DATA

1. DRIVER'S NAME *(Last, first, middle)*	2. DRIVER'S LICENSE NO./STATE/LIMITATIONS	DATE OF ACCIDENT

4a. DEPARTMENT/FEDERAL AGENCY PERMANENT OFFICE ADDRESS	4b. WORK TELEPHONE NUMBER ( )

5. TAG OR IDENTIFICATION NUMBER	6. EST. REPAIR COST	7. YEAR OF VEHICLE	8. MAKE	9. MODEL	10. SEAT BELTS USED
	$				☐ YES ☐ NO

11. DESCRIBE VEHICLE DAMAGE

SECTION II - OTHER VEHICLE DATA ***(Use Section VIII if additional space is needed)***

12. DRIVER'S NAME *(Last, first, middle)*	13. SOCIAL SECURITY NO./ TAX IDENTIFICATION NO.	14. DRIVER'S LICENSE NO./STATE/LIMITATIONS

15a. DRIVER'S WORK ADDRESS	15b. WORK TELEPHONE NUMBER ( )
16a. DRIVER'S HOME ADDRESS	16b. HOME TELEPHONE NUMBER ( )
17. DESCRIPTION OF VEHICLE DAMAGE	18. ESTIMATED REPAIR COST $

19. YEAR OF VEHICLE	20. MAKE OF VEHICLE	21. MODEL OF VEHICLE	22. TAG NUMBER AND STATE

23a. DRIVER'S INSURANCE COMPANY NAME AND ADDRESS	23b. POLICY NUMBER
	23c. TELEPHONE NUMBER ( )

24. VEHICLE IS	25a.OWNER'S NAME(S) *(Last, first, middle)*	25b. TELEPHONE NUMBER
☐ CO-OWNED ☐ RENTAL ☐ LEASED ☐ PRIVATELY OWNED		( )

26. OWNER'S ADDRESS(ES)

SECTION III - KILLED OR INJURED ***(Use Section VIII if additional space is needed)***

A

27. NAME *(Last, first, middle)*	28. SEX	29. DATE OF BIRTH

30. ADDRESS

31. MARK "X" IN TWO APPROPRIATE BOXES	32. IN WHICH VEHICLE	33. LOCATION IN VEHICLE	34. FIRST AID GIVEN BY
☐ KILLED ☐ DRIVER ☐ PASSENGER ☐ INJURED ☐ HELPER ☐ PEDESTRIAN	☐ FED ☐ OTHER (2)		

35. TRANSPORTED BY	36. TRANSPORTED TO

B

37. NAME *(Last, first, middle)*	38. SEX	39. DATE OF BIRTH

40. ADDRESS

41. MARK "X" IN TWO APPROPRIATE BOXES	42. IN WHICH VEHICLE	43. LOCATION IN VEHICLE	44. FIRST AID GIVEN BY
☐ KILLED ☐ DRIVER ☐ PASSENGER ☐ INJURED ☐ HELPER ☐ PEDESTRIAN	☐ FED ☐ OTHER (2)		

45. TRANSPORTED BY	46. TRANSPORTED TO

47. Pedestrian

a. NAME OF STREET OR HIGHWAY	b. DIRECTION OF PEDESTRIAN *(SW corner to NE corner, etc.)* FROM	TO

c. DESCRIBE WHAT PEDESTRIAN WAS DOING AT TIME OF ACCIDENT *(Crossing intersection with signal, against signal, diagonally; in roadway playing, walking, hitchhiking, etc.)*

NSN 7540-00-634-4041
Previous edition not usable

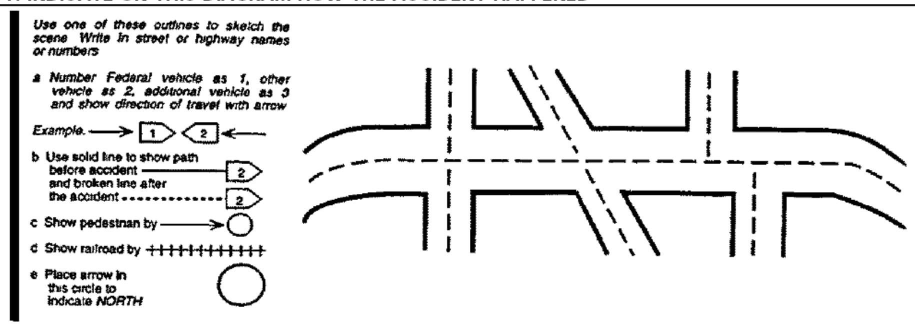
STANDARD FORM 91 (REV. 2/2004)
Prescribed by GSA-FMR 102-34.295

3A.1.3 SF 91, Motor Vehicle Accident Report *(Continued)*

SECTION IV - ACCIDENT TIME AND LOCATION *(Use Section VIII if additional space is needed.)*

48. DATE OF ACCIDENT	49. PLACE OF ACCIDENT *(Street address, city, state, ZIP Code; Nearest landmark; Distance nearest intersection; Kind of locality (industrial, business, residential, open country, etc.); Road description).*
50. TIME OF ACCIDENT AM PM	

51. INDICATE ON THIS DIAGRAM HOW THE ACCIDENT HAPPENED



52. POINT OF IMPACT *(Check one for each vehicle)*

FED	2	AREA
		a. Front
		b. R. Front
		c. L. Front
		d. Rear
		e. R. Rear
		f. L. Rear
		g. R. Side
		h. L. Side

53. DESCRIBE WHAT HAPPENED *(Refer to vehicles as "Fed" , "2", "3", etc. Please include information on posted speed limit, approximate speed of the vehicles, road conditions, weather conditions, driver visibility, condition of accident vehicles, traffic controls (warning light, stop signal, etc.), condition of light (daylight, dusk, night, dawn, artificial light, etc.), and driver actions (making U-turn, passing, stopped in traffic, etc.)*

SECTION V - WITNESS/PASSENGER *(Witness must fill out SF 94, Statement of Witness) (Continue in Section VIII.)*

A	54. NAME *(Last, first, middle)*	55. WORK TELEPHONE NUMBER ( )	56. HOME TELEPHONE NUMBER ( )
	57. WORK ADDRESS	58. HOME ADDRESS	
B	59. NAME *(Last, first, middle)*	60. WORK TELEPHONE NUMBER ( )	61. HOME TELEPHONE NUMBER ( )
	62. WORK ADDRESS	63. HOME ADDRESS	

SECTION VI - PROPERTY DAMAGE *(Use Section VIII if additional space is needed.)*

64a. NAME OF OWNER *(Last, first, middle)*	64b. WORK TELEPHONE NUMBER ( )	64c. HOME TELEPHONE NUMBER ( )
64d. WORK ADDRESS	64e. HOME ADDRESS	
65a. NAME OF INSURANCE COMPANY	65b. TELEPHONE NUMBER ( )	65c. POLICY NUMBER
66. ITEM DAMAGED	67. LOCATION OF DAMAGED ITEM	68. ESTIMATED COST

SECTION VII - POLICE INFORMATION

69a. NAME OF POLICE OFFICER	69b. BADGE NUMBER	69c. TELEPHONE NUMBER ( )
70. PRECINCT OR HEADQUARTERS	71a. PERSON CHARGED WITH ACCIDENT	71b. VIOLATION(S)

STANDARD FORM 91 (REV. 2/2004) **PAGE 2**

3A.1.3 SF 91, Motor Vehicle Accident Report *(Continued)*

SECTION VIII - EXTRA DETAILS

SPACE FOR DETAILED ANSWERS. INDICATE SECTION AND ITEM NUMBER FOR EACH ANSWER. IF MORE SPACE IS NEEDED, CONTINUE ITEMS ON PLAIN BOND PAPER.

PRIVACY ACT STATEMENT

The information on this form is subject to the Privacy Act of 1974 (5 U.S.C. section 552a). Authority to collect the information is Title 40 U.S.C. Section 491 and title 31 U.S.C. Section 7701. The information is required by Federal Government agencies to administer motor vehicle programs, including maintaining records on accidents involving privately owned and Federal fleet vehicles, and collecting accident claims resulting from accidents. Federal employees, and employees under contract, will use the information only in the performance of their official duties. Routine uses of the collected information may include disclosures to: appropriate Federal, State, or local agencies or contractors when relevant to civil, criminal, or regulatory investigations or prosecutions; the Office of Personnel Management and the General Accounting Office for program evaluation purposes; a Member of Congress or staff in response to a request for assistance by the individual of record; another Federal agency, including the Departments of Treasury and Justice, or a court under judicial proceedings; agency Inspectors General in conducting audits; private insurance and collection agencies (including agencies under contract to Treasury to collect debt), and to other agency finance offices for fiscal management and debt collection. Furnishing the requested information is mandatory, including the Social Security Number or Taxpayer's Identification Number (TIN) for use as a unique identifier to ensure accurate identification of individuals or firms in the system.

SECTION IX - FEDERAL DRIVER CERTIFICATION

I certify that the information on this form *(Sections I thru VIII)* is correct to the best of my knowledge and belief.

72a. NAME AND TITLE OF DRIVER	72b. DRIVER'S SIGNATURE AND DATE

SECTION X - DETAILS OF TRIP DURING WHICH ACCIDENT OCCURRED

73. ORIGIN	74. DESTINATION

75. EXACT PURPOSE OF TRIP

	DATE	TIME *(Include AM or PM)*		DATE	TIME *(Include AM or PM)*
76. TRIP BEGAN			**77. ACCIDENT OCCURRED**		

78. AUTHORITY FOR THE TRIP WAS GIVEN TO THE OPERATOR	79. WAS THERE ANY DEVIATION FROM DIRECT ROUTE?
☐ ORALLY ☐ IN WRITING *(Explain)*	☐ NO ☐ YES *(Explain)*
80. WAS THE TRIP MADE WITHIN ESTABLISHED WORKING HOURS?	81. DID THE OPERATOR, WHILE ENROUTE, ENGAGE IN ANY ACTIVITY OTHER THAN THAT FOR WHICH THE TRIP WAS AUTHORIZED?
☐ YES ☐ NO *(Explain)*	☐ NO ☐ YES *(Explain)*

82. COMPLETED BY DRIVER'S SUPERVISOR	a. DID THIS ACCIDENT OCCUR WITHIN THE EMPLOYEE'S SCOPE OF DUTY	b. COMMENTS
	☐ YES ☐ NO	

83a. NAME AND TITLE OF SUPERVISOR	83b. SUPERVISOR'S SIGNATURE AND DATE	83c. TELEPHONE NUMBER
		( )

STANDARD FORM 91 (REV. 2/2004) PAGE 3

3A.1.3 SF 91, Motor Vehicle Accident Report *(Continued)*

SECTION XI - ACCIDENT INVESTIGATION DATA

84. DID THE INVESTIGATION DISCLOSE CONFLICTING INFORMATION. ☐ NO ☐ YES *(If checked, explain below.)*

85. PERSONS INTERVIEWED

NAME	DATE	NAME	DATE
a.		c.	
b.		d.	

86. ADDITIONAL COMMENTS *(Indicate section and item number of reach comment).*

SECTION XII - ATTACHMENTS

87. LIST ALL ATTACHMENTS TO THIS REPORT

SECTION XIII - COMMENTS/APPROVALS

88. REVIEWING OFFICIAL'S COMMENTS

89. ACCIDENT INVESTIGATOR			90. ACCIDENT REVIEWING OFFICIAL		
a. SIGNATURE		b. DATE	a. SIGNATURE		b. DATE
c. NAME *(First, middle, last)*			c. NAME *(First, middle, last)*		
d. TITLE			d. TITLE		
e. OFFICE			e. OFFICE		
f. OFFICE TELEPHONE NUMBER			OFFICE TELEPHONE NUMBER		
AREA CODE	NUMBER	EXTENSION	AREA CODE	NUMBERf.	EXTENSION

STANDARD FORM 91 (REV. 2/2004) PAGE 4

3A.2 OCCUPATIONAL ACCIDENT REPORT (OAR)

FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

OCCUPATIONAL ACCIDENT REPORT

SECTION I

1. Reporting office or project: _____

2. Correspondence Symbol: _____

3. Report Number (Assigned by Safety Officer): _____

4. Type of mishap/primary (check one):

☐ Auto (Private) ☐ Illness ☐ Fire
☐ Auto (Gov't) ☐ Injury ☐ Other

5. Type of mishap/secondary (usually used only when type of primary mishap is an injury) (check one):

☐ None ☐ Auto (Private) ☐ Fire
☐ Auto (Gov't) ☐ Other

6. Mishap class (check one):

☐ Fatality or >$500K (non-motor vehicle) or $50K (motor vehicle)
☐ $100K - $500K (non-motor vehicle) or $15K - $50K (motor vehicle)
☐ $10K - $100K (non-motor vehicle) or $300 - $15K (motor vehicle)
☐ Under $10K or no work lost

7. Brief description of incident (40 characters or less): _____

_____

_____

_____

8. Date of incident (for chronic condition, the date the condition was diagnosed) mm/dd/yyyy:

_____

9. Time of incident: _____

10. Location of incident (address, route, mile-marker, etc.): _____

_____

_____

11. Room Number (If applicable): _____

12. Town in or nearest to where incident occurred: _____

13. Weather conditions at time of incident (if outside): _____

3A.2 Occupational Accident Report (OAR) (Continued)

14. Number of persons in vehicle or in immediate danger: _____

15. Number of persons injured or ill: _____

16. Was anyone under the influence of a narcotic drug or alcohol? _____

17. Were seatbelts worn (if applicable): _____

18. Duty status of employee involved (check one):

☐ FT – Full Time
☐ PT – Part Time
☐ TR – Trainee
☐ S - Student
☐ NA - Not Applicable

19. Was anyone involved on travel status? _____

20. What protective equipment was being used? _____

_____

21. Narrative of the incident (who, what, where, when, and how)? _____

_____

_____

_____

_____

22. Cause(s) of the incident: _____

_____

_____

23. Corrective action taken: _____

_____

_____

24. Is all information complete? Yes ☐ No ☐ If not, explain below:

_____

_____

25. Supervisor's full name: _____

26. Supervisor's title: _____

27. Date incident was first reported: _____

SECTION II - (Only injury or illness. Otherwise, proceed to Section III)

28. Full name of person ill or injured: _____

2

3A.2 Occupational Accident Report (OAR) (Continued)

29. Social Security Number: _____

30. Age: _____

31. Sex: Male ☐ Female ☐

32. Occupation (schedule – GS or WG, series and grade): _____

33. Years with Federal Highways Administration: _____

34. Injury or illness code (check one):

☐ 10 - Occupational Injury	☐ 25 - Disorders, Physical Agent
☐ 11 - Skin Disease	☐ 26 - Disorders, Repeated Trauma
☐ 22 - Dust Disease/Lungs	☐ 27 - Emotional/Mental Illness
☐ 23 - Respiratory/Toxic Agent	☐ 28 - Other Occupational Illness

35. Did this person die as a result of mishap? _____

36. Was this person permanently transferred or terminated following this incident? _____

_____

37. What is the nature of the illness/injury? _____

38. Number of lost workdays (8 hour equivalents) (Do not count the day of mishap): _____

39. Number of days restricted activity (8 hour equivalents) (Do not count the day of the mishap):

_____

40. Personnel costs related to this incident (actual costs, if available): _____

41. Have a CA-1 or CA-2 been submitted to the Safety Officer and personnel: _____

_____

SECTION III – PROPERTY DAMAGE - (If an injury occurred with a property damage report, then Section II must be completed also).

42. Description of Government property that was damaged. For a motor vehicle enter year, make, and model: _____

43. Identifying item by vehicle tag number, serial number: _____

44. Exact parts damaged: _____

45. Cost for replacement/repair of Government property. Provide estimate if exact costs are not yet known: _____

46. Estimated number of days vehicle or equipment is not available: _____

47. Additional property damaged (i.e., other Government agency, private vehicle or individual):

_____

3

3A.2 Occupational Accident Report (OAR) (Continued)

48. Provide specific information on property in Item #47: _____

49. Estimated repair/replacement costs of items listed in #47: _____

50. Is a liability claim a possibility: _____

51. Operator's Name: _____

52. Operator's job title (include schedule/GS or WG, series and grade): _____

_____

53. General experience (Years operating this general type of vehicle):_____

54. Specialized experience (Years operating this special type of equipment): _____

NOTE: This form should be completed by the employee along with their supervisor or acting supervisor, and submitted to the CFLHD Safety Officer within 72 hours of a property damage accident and within 48 hours for injury accidents. Please answer all applicable questions to the best of your ability or use the following codes if the answer is:

U – Unknown NAV – Unavailable NA – Not Applicable

CFLHD-OAR-1

4

3A.3 ACCIDENT/INJURY COMPENSATION FORMS

This appendix contains copies of the following forms, which should be completed, as applicable, regardless of whether or not compensation is pursued. Be sure to visit the Department of Labor's Forms Library to verify that the most current/updated versions of the standard forms are being used.

- CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation
- CA-2, Notice of Occupational Disease and Claim for Compensation
- CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation
- CA-16, Authorization for Examination and/or Treatment

For more information regarding these forms, refer to Section 3.3.4.

3A.3.1 CA-1, FEDERAL EMPLOYEE'S NOTICE OF TRAUMATIC INJURY AND CONTINUATION OF PAY/COMPENSATION

Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation

Reset Print

U.S. Department of Labor
Employment Standards Administration
Office of Workers' Compensation Programs

Employee: Please complete all boxes 1 - 15 below. Do not complete shaded areas.
Witness: Complete bottom section 16.
Employing Agency (Supervisor or Compensation Specialist): Complete shaded boxes a, b, and c.

Employee Data

1. Name of employee (Last, First, Middle)
2. Social Security Number
3. Date of birth Mo. Day Yr.
4. Sex Male Female
5. Home telephone
6. Grade as of date of injury Level Step
7. Employee's home mailing address (Include city, state, and ZIP code)
8. Dependents
   - Wife, Husband
   - Children under 18 years
   - Other

Description of Injury

9. Place where injury occurred (e.g. 2nd floor, Main Post Office Bldg., 12th & Pine)
10. Date injury occurred Mo. Day Yr. Time a.m. p.m.
11. Date of this notice Mo. Day Yr.
12. Employee's occupation
13. Cause of injury (Describe what happened and why)
14. Nature of injury (Identify both the injury and the part of body, e.g., fracture of left leg)

a. Occupation code
b. Type code
c. Source code
OWCP Use - NOI Code

Employee Signature

15. I certify, under penalty of law, that the injury described above was sustained in performance of duty as an employee of the United States Government and that it was not caused by my willful misconduct, intent to injure myself or another person, nor by my intoxication. I hereby claim medical treatment, if needed, and the following, as checked below, while disabled for work:

a. Continuation of regular pay (COP) not to exceed 45 days and compensation for wage loss if disability for work continues beyond 45 days. If my claim is denied, I understand that the continuation of my regular pay shall be charged to sick or annual leave, or be deemed an overpayment within the meaning of 5 USC 5584.

b. Sick and/or Annual Leave

I hereby authorize any physician or hospital (or any other person, institution, corporation, or government agency) to furnish any desired information to the U.S. Department of Labor, Office of Workers' Compensation Programs (or to its official representative). This authorization also permits any official representative of the Office to examine and to copy any records concerning me.

Signature of employee or person acting on his/her behalf _____ **Date** _____

Any person who knowingly makes any false statement, misrepresentation, concealment of fact or any other act of fraud to obtain compensation as provided by the FECA or who knowingly accepts compensation to which that person is not entitled is subject to civil or administrative remedies as well as felony criminal prosecution and may, under appropriate criminal provisions, be punished by a fine or imprisonment or both.

Have your supervisor complete the receipt attached to this form and return it to you for your records.

Witness Statement

16. Statement of witness (Describe what you saw, heard, or know about this injury)

Name of witness | Signature of witness | Date signed

Address | City | State | ZIP Code

Form CA-1
Rev. Apr. 1999

3A.3.1 CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation *(Continued)*

Official Supervisor's Report: Please complete information requested below:

Supervisor's Report

17. Agency name and address of reporting office (include city, state, and zip code) | OWCP Agency Code | OSHA Site Code | ZIP Code

18. Employee's duty station (Street address and ZIP code)

19. Employee's retirement coverage ☐ CSRS ☐ FERS ☐ Other, (identify)

20. Regular work hours From: ☐ a.m. ☐ p.m. To: ☐ a.m. ☐ p.m.

21. Regular work schedule ☐ Sun. ☐ Mon. ☐ Tues. ☐ Wed. ☐ Thurs. ☐ Fri. ☐ Sat.

22. Date of Injury Mo. Day Yr.

23. Date notice received Mo. Day Yr.

24. Date stopped work Mo. Day Yr. Time: ☐ a.m. ☐ p.m.

25. Date pay stopped Mo. Day Yr.

26. Date 45 day period began Mo. Day Yr.

27. Date returned to work Mo. Day Yr. Time: ☐ a.m. ☐ p.m.

28. Was employee injured in performance of duty? ☐ Yes ☐ No (If "No," explain)

29. Was injury caused by employee's willful misconduct, intoxication, or intent to injure self or another? ☐ Yes (If "Yes," explain) ☐ No

30. Was injury caused by third party? ☐ Yes ☐ No (If "No," go to item 32.)

31. Name and address of third party (Include city, state, and ZIP code)

32. Name and address of physician first providing medical care (Include city, state, ZIP code)

33. First date medical care received Mo. Day Yr.

34. Do medical reports show employee is disabled for work? ☐ Yes ☐ No

35. Does your knowledge of the facts about this injury agree with statements of the employee and/or witnesses? ☐ Yes ☐ No (If "No," explain)

36. If the employing agency controverts continuation of pay, state the reason in detail.

37. Pay rate when employee stopped work $ Per

Signature of Supervisor and Filing Instructions

38. A supervisor who knowingly certifies to any false statement, misrepresentation, concealment of fact, etc., in respect of this claim may also be subject to appropriate felony criminal prosecution.

I certify that the information given above and that furnished by the employee on the reverse of this form is true to the best of my knowledge with the following exception:

Name of supervisor (Type or print)

Signature of supervisor Date

Supervisor's Title Office phone

39. Filing instructions
- ☐ No lost time and no medical expense: Place this form in employee's medical folder (SF-66-D)
- ☐ No lost time, medical expense incurred or expected: forward this form to OWCP
- ☐ Lost time covered by leave, LWOP, or COP: forward this form to OWCP
- ☐ First Aid Injury

Form CA-1
Rev. Apr. 1999

3A.3.1 CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation *(Continued)*

Instructions for Completing Form CA-1

Complete all items on your section of the form. If additional space is required to explain or clarify any point, attach a supplemental statement to the form. Some of the items on the form which may require further clarification are explained below.

Employee (Or person acting on the employees' behalf)

13) Cause of injury

Describe in detail how and why the injury occurred. Give appropriate details (e.g.: if you fell, how far did you fall and in what position did you land?)

14) Nature of Injury

Give a complete description of the condition(s) resulting from your injury. Specify the right or left side if applicable (e.g., fractured left leg: cut on right index finger).

15) Election of COP/Leave

If you are disabled for work as a result of this injury and filed CA-1 within thirty days of the injury, you may be entitled to receive continuation of pay (COP) from your employing agency. COP is paid for up to 45 calendar days of disability, and is not charged against sick or annual leave. If you elect sick or annual leave you may not claim compensation to repurchase leave used during the 45 days of COP entitlement.

Supervisor

At the time the form is received, complete the receipt of notice of injury and give it to the employee. In addition to completing items 17 through 39, the supervisor is responsible for obtaining the witness statement in Item 16 and for filling in the proper codes in shaded boxes a, b, and c on the front of the form. If medical expense or lost time is incurred or expected, the completed form should be sent to OWCP within 10 working days after it is received.

The supervisor should also submit any other information or evidence pertinent to the merits of this claim.

If the employing agency controverts COP, the employee should be notified and the reason for controversion explained to him or her.

17) Agency name and address of reporting office

The name and address of the office to which correspondence from OWCP should be sent (if applicable, the address of the personnel or compensation office).

18) Duty station street address and zip code

The address and zip code of the establishment where the employee actually works.

19) Employers Retirement Coverage.

Indicate which retirement system the employee is covered under.

30) Was injury caused by third party?

A third party is an individual or organization (other than the injured employee or the Federal government) who is liable for the injury. For instance, the driver of a vehicle causing an accident in which an employee is injured, the owner of a building where unsafe conditions cause an employee to fall, and a manufacturer whose defective product causes an employee's injury, could all be considered third parties to the injury.

32) Name and address of physician first providing medical care

The name and address of the physician who first provided medical care for this injury. If initial care was given by a nurse or other health professional (not a physician) in the employing agency's health unit or clinic, indicate this on a separate sheet of paper.

33) First date medical care received

The date of the first visit to the physician listed in item 31.

36) If the employing agency controverts continuation of pay, state the reason In detail.

COP may be controverted (disputed) for any reason; however, the employing agency may refuse to pay COP only if the controversion is based upon one of the nine reasons given below:

a) The disability was not caused by a traumatic injury.

b) The employee is a volunteer working without pay or for nominal pay, or a member of the office staff of a former President;

c) The employee is not a citizen or a resident of the United States or Canada;

d) The injury occurred off the employing agency's premises and the employee was not involved in official "off premise" duties;

e) The injury was proximately caused by the employee's willful misconduct, intent to bring about injury or death to self or another person, or intoxication;

f) The injury was not reported on Form CA-1 within 30 days following the injury;

g) Work stoppage first occurred 45 days or more following the injury;

h) The employee initially reported the injury after his or her employment was terminated; or

i) The employee Is enrolled in the Civil Air Patrol, Peace Corps, Youth Conservation Corps, Work Study Programs, or other similar groups.

Employing Agency - Required Codes

Box a (Occupation Code), Box b (Type Code), Box c (Source Code), OSHA Site Code

The Occupational Safety and Health Administration (OSHA) requires all employing agencies to complete these items when reporting an injury. The proper codes may be found in OSHA Booklet 2014, "Recordkeeping and Reporting Guidelines.

OWCP Agency Code

This is a four-digit (or four digit plus two letter) code used by OWCP to identify the employing agency. The proper code may be obtained from your personnel or compensation office, or by contacting OWCP.

Form CA-1
Rev. Apr. 1999

3A.3.1 CA-1, Federal Employee's Notice of Traumatic Injury and Continuation of Pay/Compensation *(Continued)*

Benefits for Employees under the Federal Employees' Compensation act (FECA)

The FECA, which is administered by the Office of Workers' Compensation Programs (OWCP), provides the following benefits for job-related traumatic injuries:

(1) Continuation of pay for disability resulting from traumatic, job-related injury, not to exceed 45 calendar days. (To be eligible for continuation of pay, the employee, or someone acting on his/her behalf, must file Form CA-1 within 30 days following the injury and provide medical evidence in support of disability within 10 days of submission of the CA-1. Where the employing agency continue's the employee's pay, the pay must not be interrupted unless one of the provision's outlined in 20 CFR 10.222 apply.

(2) Payment of compensation for wage loss after the expiration of COP, if disability extends beyond such point, or if COP is not payable. If disability continues after COP expires, Form CA-7, with supporting medical evidence, must be filed with OWCP. To avoid interruption of income, the form should be filed on the 40th day of the COP period.

(3) Payment of compensation for permanent impairment of certain organs, members, or functions of the body (such as loss or loss of use of an arm or kidney, loss of vision, etc.), or for serious defringement of the head, face, or neck.

(4) Vocational rehabilitation and related services where directed by OWCP.

(5) All necessary medical care from qualified medical providers. The injured employee may choose the physician who provides initial medical care. Generally, 25 miles from the place of injury, place of employment, or employee's home is a reasonable distance to travel for medical care.

An employee may use sick or annual leave rather than LWOP while disabled. The employee may repurchase leave used for approved periods. Form CA-7b, available from the personnel office, should be studied BEFORE a decision is made to use leave.

For additional information, review the regulations governing the administration of the FECA (Code of Federal Regulations, Chapter 20, Part 10) or pamphlet CA-810.

Privacy Act

In accordance with the Privacy Act of 1974, as amended (5 U.S.C. 552a), you are hereby notified that: (1) The Federal Employees' Compensation Act, as amended and extended (5 U.S.C. 8101, et seq.) (FECA) is administered by the Office of Workers' Compensation Programs of the U.S. Department of Labor, which receives and maintains personal information on claimants and their immediate families. (2) Information which the Office has will be used to determine eligibility for and the amount of benefits payable under the FECA, and may be verified through computer matches or other appropriate means. (3) Information may be given to the Federal agency which employed the claimant at the time of injury in order to verify statements made, answer questions concerning the status of the claim, verify billing, and to consider issues relating to retention, rehire, or other relevant matters. (4) Information may also be given to other Federal agencies, other government entities, and to private-sector agencies and/or employers as part of rehabilitative and other return-to-work programs and services. (5) Information may be disclosed to physicians and other health care providers for use in providing treatment or medical/vocational rehabilitation, making evaluations for the Office, and for other purposes related to the medical management of the claim. (6) Information may be given to Federal, state and local agencies for law enforcement purposes, to obtain information relevant to a decision under the FECA, to determine whether benefits are being paid properly, including whether prohibited dual payments are being made, and, where appropriate, to pursue salary/administrative offset and debt collection actions required or permitted by the FECA and/or the Debt Collection Act. (7) Disclosure of the claimant's social security number (SSN) or tax identifying number (TIN) on this form is mandatory. The SSN and/or TIN), and other information maintained by the Office, may be used for identification, to support debt collection efforts carried on by the Federal government, and for other purposes required or authorized by law. (8) Failure to disclose all requested information may delay the processing of the claim or the payment of benefits, or may result in an unfavorable decision or reduced level of benefits.

Note: This notice applies to all forms requesting information that you might receive from the Office in connection with the processing and adjudication of the claim you filed under the FECA.

Receipt of Notice of Injury

This acknowledges receipt of Notice of Injury sustained by
(Name of injured employee)

Which occurred on (Mo., Day, Yr.)

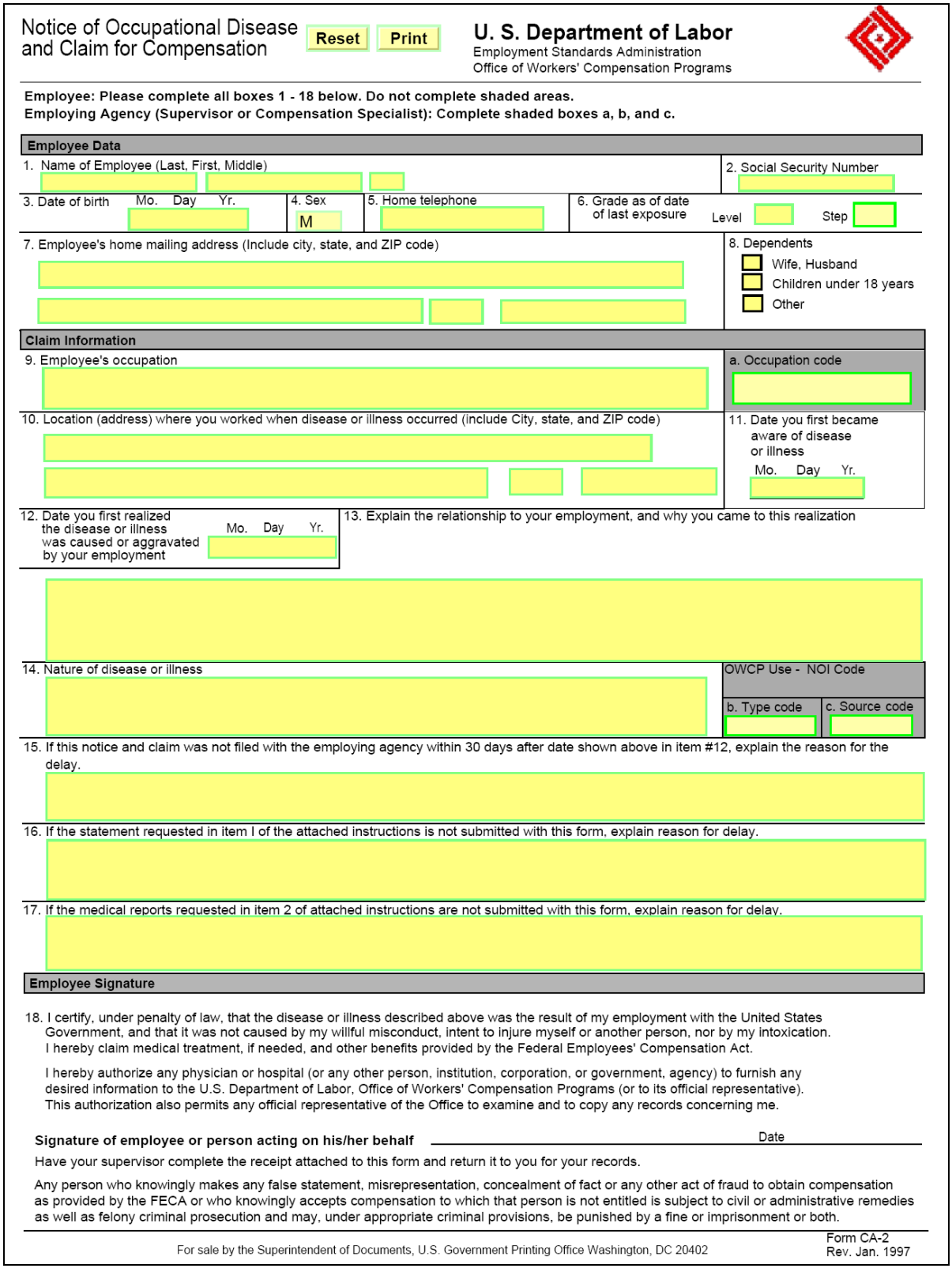
At (Location)

Signature of Official Superior | Title | Date (Mo., Day, Yr.)

*U.S. GPO: 1999-454-845/12704

Form CA-1
Rev. Apr. 1999

3A.3.2 CA-2, NOTICE OF OCCUPATIONAL DISEASE AND CLAIM FOR COMPENSATION



Notice of Occupational Disease and Claim for Compensation

Reset Print

U. S. Department of Labor
Employment Standards Administration
Office of Workers' Compensation Programs

Employee: Please complete all boxes 1 - 18 below. Do not complete shaded areas.
Employing Agency (Supervisor or Compensation Specialist): Complete shaded boxes a, b, and c.

Employee Data

1. Name of Employee (Last, First, Middle)
2. Social Security Number
3. Date of birth Mo. Day Yr.
4. Sex M
5. Home telephone
6. Grade as of date of last exposure Level Step
7. Employee's home mailing address (Include city, state, and ZIP code)
8. Dependents
   - Wife, Husband
   - Children under 18 years
   - Other

Claim Information

9. Employee's occupation
   a. Occupation code
10. Location (address) where you worked when disease or illness occurred (include City, state, and ZIP code)
11. Date you first became aware of disease or illness Mo. Day Yr.
12. Date you first realized the disease or illness was caused or aggravated by your employment Mo. Day Yr.
13. Explain the relationship to your employment, and why you came to this realization
14. Nature of disease or illness
    OWCP Use - NOI Code
    b. Type code
    c. Source code
15. If this notice and claim was not filed with the employing agency within 30 days after date shown above in item #12, explain the reason for the delay.
16. If the statement requested in item I of the attached instructions is not submitted with this form, explain reason for delay.
17. If the medical reports requested in item 2 of attached instructions are not submitted with this form, explain reason for delay.

Employee Signature

18. I certify, under penalty of law, that the disease or illness described above was the result of my employment with the United States Government, and that it was not caused by my willful misconduct, intent to injure myself or another person, nor by my intoxication. I hereby claim medical treatment, if needed, and other benefits provided by the Federal Employees' Compensation Act.

I hereby authorize any physician or hospital (or any other person, institution, corporation, or government, agency) to furnish any desired information to the U.S. Department of Labor, Office of Workers' Compensation Programs (or to its official representative). This authorization also permits any official representative of the Office to examine and to copy any records concerning me.

Signature of employee or person acting on his/her behalf Date

Have your supervisor complete the receipt attached to this form and return it to you for your records.

Any person who knowingly makes any false statement, misrepresentation, concealment of fact or any other act of fraud to obtain compensation as provided by the FECA or who knowingly accepts compensation to which that person is not entitled is subject to civil or administrative remedies as well as felony criminal prosecution and may, under appropriate criminal provisions, be punished by a fine or imprisonment or both.

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, DC 20402

Form CA-2
Rev. Jan. 1997

3A.3.2 CA-2, Notice of Occupational Disease and Claim for Compensation *(Continued)*

Official Supervisor's Report of Occupational Disease: Please complete information requested below

Supervisor's Report

19. Agency name and address of reporting office (include city, state, and ZIP Code) | OWCP Agency Code

OSHA Site Code

ZIP Code

20. Employee's duty station (Street address and ZIP Code) ZIP Code

21. Regular work hours From: ☐ a.m. ☐ p.m. To: ☐ a.m. ☐ p.m.

22. Regular work schedule ☐ Sun. ☐ Mon. ☐ Tues. ☐ Wed. ☐ Thurs. ☐ Fri. ☐ Sat.

23. Name and address of physician first providing medical care (include city, state, ZIP code)

24. First date medical care received Mo. Day Yr.

25. Do medical reports show employee is disabled for work? ☐ Yes ☐ No

26. Date employee first reported condition to supervisor Mo. Day Yr.

27. Date and hour employee stopped work Mo. Day Yr. Time ☐ a.m. ☐ p.m.

28. Date and hour employee's pay stopped Mo. Day Yr. Time ☐ a.m. ☐ p.m.

29. Date employee was last exposed to conditions alleged to have caused disease or illness Mo. Day Yr.

30. Date returned to work Mo. Day Yr. Time ☐ a.m. ☐ p.m.

31. If employee has returned to work and work assignment has changed, describe new duties

32. Employee's Retirement Coverage ☐ CSRS ☐ FERS ☐ Other, (Specify)

33. Was injury caused by third party? ☐ Yes ☐ No If "No," go to Item 34.

34. Name and address of third party (include city, state, and ZIP code)

Signature of Supervisor

35. A supervisor who knowingly certifies to any false statement, misrepresentation, concealment of fact, etc., in respect to this claim may also be subject to appropriate felony criminal prosecution.

I certify that the information given above and that furnished by the employee on the reverse of this form is true to the best of my knowledge with the following exception:

Name of Supervisor (Type or print)

Signature of Supervisor Date

Supervisor's Title Office phone

Form CA-2
Rev.Jan.1997

3A.3.2 CA-2, Notice of Occupational Disease and Claim for Compensation *(Continued)*

Disability Benefits for Employees under the Federal Employees' Compensation Act (FECA)

The FECA, which is administered by the Office of Workers' Compensation Programs (OWCP), provides the following general benefits for employment-related occupational disease or illness:

(1) Full medical care from either Federal medical officers and hospitals, or private hospitals or physicians of the employee's choice.

(2) Payment of compensation for total or partial wage loss.

(3) Payment of compensation for permanent impairment of certain organs, members, or functions of the body (such as loss or loss of use of an arm or kidney, loss of vision, etc.), or for serious disfigurement of the head, face, or neck.

(4) Vocational rehabilitation and related services where necessary.

The first three days in a non-pay status are waiting days, and no compensation is paid for these days unless the period of disability exceeds 14 calendar days, or the employee has suffered a permanent disability. Compensation for total disability is generally paid at the rate of 2/3 of an employee's salary if there are no dependents, or 3/4 of salary if there are one or more dependents.

An employee may use sick or annual leave rather than LWOP while disabled. The employee may repurchase leave used for approved periods. Form CA-7b, available from the personnel off ice, should be studied BEFORE a decision is made to use leave.

If an employee is in doubt about compensation benefits, the OWCP District Office servicing the employing agency should be contacted. (Obtain the address from your employing agency.)

For additional information, review the regulations governing the administration of the FECA (Code of Federal Regulations, Title 20, Chapter 1) or Chapter 810 of the Office of Personnel Management's Federal Personnel Manual.

Privacy Act

In accordance with the Privacy Act of 1974, as amended (5 U.S.C. 552a), you are hereby notified that: (1) The Federal Employees' Compensation Act, as amended and extended (5 U.S.C. 8101, et seq.) (FECA) is administered by the Office of Workers' Compensation Programs of the U.S. Department of Labor, which receives and maintains personal information on claimants and their immediate families. (2) Information which the Office has will be used to determine eligibility for and the amount of benefits payable under the FECA, and may be verified through computer matches or other appropriate means. (3) Information may be given to the Federal agency which employed the claimant at the time of injury in order to verify statements made, answer questions concerning the status of the claim, verify billing, and to consider issues relating to retention, rehire, or other relevant matters. (4) Information may also be given to other Federal agencies, other government entities, and to private-sector agencies and/or employers as part of rehabilitative and other return-to-work programs and services. (5) Information may be disclosed to physicians and other health care providers for use in providing treatment or medical/vocational rehabilitation, making evaluations for the Office, and for other purposes related to the medical management of the claim. (6) Information may be given to Federal, state and local agencies for law enforcement purposes, to obtain information relevant to a decision under the FECA, to determine whether benefits are being paid properly, including whether prohibited dual Payments are being made, and, where appropriate, to pursue salary/administrative offset and debt collection actions required or permitted by the FECA and/or the Debt Collection Act. (7) Disclosure of the claimant's social security number (SSN) or tax identifying number (TIN) on this form is mandatory. The SSN and/or TIN, and other information maintained by the Office, may be used for identification, to support debt collection efforts carried on by the Federal government, and for other purposes required or authorized by law. (8) Failure to disclose all requested information may delay the processing of the claim or the payment of benefits, or may result in an unfavorable decision or reduced level of benefits.

Note: This notice applies to all forms requesting information that you might receive from the Office in connection with the processing and adjudication of the claim you filed under the FECA.

Receipt of Notice of Occupational Disease or Illness

This acknowledges receipt of notice of disease or illness sustained by:
(Name of injured employee)

I was first notified about this condition on (Mo., Day, Yr.)

At (Location)

Signature of Official Superior | Title | Date (Mo., Day, Yr.)

This receipt should be retained by the employee as a record that notice was filed.

Form CA-2

3A.3.2 CA-2, Notice of Occupational Disease and Claim for Compensation *(Continued)*

INSTRUCTIONS FOR COMPLETING FORM CA-2

Complete all items on your section of the form. If additional space is required to explain or clarify any point, attach a supplemental statement to the form. in addition to the information requested on the form, both the employee and the supervisor are required to submit additional evidence as described below. If this evidence is not submitted along with the form, the responsible party should explain the reason for the delay and state when the additional evidence will be submitted.

Employee (or person acting on the Employee's behalf)

Complete items *1* through 18 and submit the form to the employee's supervisor along with the statement and medical reports described below. Be sure to obtain the Receipt of Notice of Disease or Illness completed by the supervisor at the time the form is submitted.

1) Employee's statement

In a separate narrative statement attached to the form, the employee must submit the following information:

a) A detailed history of the disease or illness from the date it started.

b) Complete details of the conditions of employment which are believed to be responsible for the disease or illness.

c) A description of specific exposures to substances or stressful conditions causing the disease or illness, including locations where exposure or stress occurred, as well as the number of hours per day and days per week of such exposure or stress.

d) Identification of the part of the body affected. (If disability is due to a heart condition, give complete details of all activities for one week prior to the attack with particular attention to the final 24 hours of such period.)

e) A statement as to whether the employee ever suffered a similar condition. if so, provide full details of onset, history, and medical care received, along with names and addresses of physicians rendering treatment.

2) Medical report

a) Dates of examination or treatment.

b) History given to the physician by the employee.

c) Detailed description of the physician's findings.

d) Results of x-rays, laboratory tests, etc.

e) Diagnosis.

f) Clinical course of treatment.

g) Physician's opinion as to whether the disease or illness was caused or aggravated by the employment, along with an explanation of the basis for this opinion. (Medical reports that do not explain the basis for the physician's opinion are given very little weight in adjudicating the claim.)

3) Wage loss

If you have lost wages or used leave for this illness, Form CA-7 should also be submitted.

Supervisor (Or appropriate official in the employing agency)

At the time the form is received, complete the Receipt of Notice of Disease or Illness and give it to the employee. In addition to completing items 19 through 34, the supervisor is responsible for filling in the proper codes in shaded boxes a, b, and c on the front of the form. If medical expense or lost time is incurred or expected, the completed form must be sent to OWCP within ten working days after it is received. In a separate narrative statement attached to the form, the supervisor must:

a) Describe in detail the work performed by the employee. Identify fumes, chemicals, or other irritants or situations that the employee was exposed to which allegedly caused the condition. State the nature, extent, and duration of the exposure, including hours per days and days per week, requested above.

b) Attach copies of all medical reports (including x-ray reports and laboratory data) on file for the employee.

c) Attach a record of the employee's absence from work caused by any similar disease or illness. Have the employee state the reason for each absence.

d) Attach statements from each co-worker who has first-hand knowledge about the employee's condition and its cause. (The co-workers should state how such knowledge was obtained.)

e) Review and comment on the accuracy of the employee's statement requested above.

The supervisor should also submit any other information or evidence pertinent to the merits of this claim.

Item Explanation: Some of the items on the form which may require further clarification are explained below.

14. Nature of the disease or illness
Give a complete description of the disease or illness. Specify the left or right side if applicable (e.g., rash on left leg; carpal tunnel syndrome, right wrist).

19. Agency name and address of reporting office
The name and address of the off ice to which correspondence from OWCP should be sent (if applicable, the address of the personnel or compensation office).

23. Name and address of physician first providing medical care
The name and address of the physician who first provided medical care for this injury. If initial care was given by a nurse or other health professional (not a physician) in the employing agency's health unit or clinic, indicate this on a separate sheet of paper.

24. First date medical care received
The date of the first visit to the physician listed in item 23.

32. Employee's Retirement Coverage.
Indicate which retirement system the employee is covered under.

33. Was the injury caused by third party?
A third party is an individual or organization (other than the injured employee or the Federal government) who is liable for the disease. For instance, manufacturer of a chemical to which an employee was exposed might be considered a third party if improper instructions were given by the manufacturer for use of the chemical.

Employing Agency - Required Codes

Box a (Occupational Code), Box b. (Type Code), Box c (Source Code), OSHA Site Code
The Occupational Safety and Health Administration (OSHA) requires all employing agencies to complete these items when reporting an injury. The proper codes may be found in OSHA Booklet 2014, Record Keeping and Reporting Guidelines.

OWCP Agency Code
This is a four digit (or four digit two letter) code used by OWCP to identify the employing agency. The proper code may be obtained from your personnel or compensation office, or by contacting OWCP.

• U.S. GPO: 2001480-204/59062

Form CA-2
Rev.Jan.1997

3A.3.3 CA-2A, FEDERAL EMPLOYEE'S NOTICE OF RECURRENCE OF DISABILITY AND CLAIM FOR CONTINUATION PAY/COMPENSATION

Reset Print

Notice of Recurrence

U.S. Department of Labor
Employment Standards Administration
Office of Workers' Compensation Programs

Employee: Complete Part A below.
Employing Agency (Supervisor or Compensation Specialist): Complete Part B.
Note: Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number.

OMB No. 1215-0167
Expires: 05-31-2011

Part A - Employee

1. Name of employee (Last, First, Middle)
2. Social Security Number
3. OWCP file number for original injury
4. Date of birth Mo. Day Yr.
5. Sex ☐ Male ☐ Female
6. Home telephone
7. Home mailing address (include city, state, and ZIP code)
8. Dependents
   ☐ Wife, Husband
   ☐ Children under 18 years
   ☐ Other
9. Name and Address of Employing Agency at time of original injury (number, street, city, state, ZIP code)
10. Name and Address of Employing Agency at time of recurrence, if other than shown in 9. If you are no longer employed with the Federal Government, complete Part C also.
11. Date and Hour of original injury (mo., day, year)
12. Date and Hour of recurrence (mo., day, year)
13. Date and Hour stopped work after recurrence (mo., day, year)
14. Date and Hour pay stopped after recurrence (mo., day, year)
15. Date and Hour returned to work (mo., day, year)
    ☐ Medical Treatment Only
    ☐ Time Loss From Work
17. Date of first medical treatment following recurrence (mo., day, year)
18. Name and address of treating physician
19. After returning to work following the original injury, were you in any way limited in performing your usual duties? (If so, explain. Also state how long these limitations continued.) ☐ Yes ☐ No
20. Describe your condition since you returned to work, including the nature and frequency of all medical treatment received.
21. Describe how and when the recurrence happened. Explain why you believe your current condition is related to the original injury.
22. Describe all injuries and illnesses which you suffered between the date you returned to work after the original injury, and the date of recurrence. Arrange for the submission of all relevant medical records.

Any person who knowingly makes any false statement, misrepresentation, concealment of fact, or any other act of fraud to obtain compensation as provided by the Federal Employees' Compensation Act (FECA), or who knowingly accepts compensation to which that person is not entitled, is subject to civil or administrative remedies as well as felony criminal prosecution and may, under appropriate criminal provisions, be punished by a fine or imprisonment or both.

I hereby claim medical treatment if needed, and up to 45 days Continuation of Pay if disabled for work.

I hereby authorize any physician or hospital (or any other person, institution, corporation, or government agency) to furnish any desired information to the U.S. Department of Labor, Office of Workers' Compensation Programs (or to its official representative). This authorization also permits any official representative of the Office to examine and to copy any records concerning me.

I certify, under penalty of law, that the information provided on this form is true and correct to the best of my knowledge.

23. Signature of employee
24. Date (mo., day, year)

Form CA-2a
Rev. Sept. 1996

3A.3.3 CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation *(Continued)*

Part B - Federal Employing Agency

25. Name and address of reporting office (include city, state, and ZIP Code) | OWCP Agency Code

ZIP Code | OSHA Site Code

26. Employee's duty station (street address and ZIP Code)

ZIP Code

27. Date of first return to FULL- TIME REGULAR duty following original injury
Mo. Day Yr.

28. Regular work hours From: ☐ a.m. ☐ p.m. To: ☐ a.m. ☐ p.m.

29. Regular work days ☐ Sun. ☐ Mon. ☐ Tues. ☐ Wed. ☐ Thurs. ☐ Fri. ☐ Sat.

30. Date of injury Mo. Day Yr.

31. Date of recurrence Mo. Day Yr.

32. Date stopped work after recurrence Mo. Day Yr. Time ☐ a.m. ☐ p.m.

33. Date pay stopped after recurrence Mo. Day Yr.

34. Dates COP paid for recurrence From Mo. Day Yr. To

35. Date returned to work after recurrence Mo. Day Yr. Time ☐ a.m. ☐ p.m.

36. Did the employee receive medical care at an agency facility due to the recurrence? If so, please attach all relevant medical records. ☐ Yes ☐ No

37. At the time of the recurrence did your agency authorize medical treatment on Form CA-16? ☐ Yes ☐ No

38. After the original injury, did you make any accommodations or adjustments in the employee's regular duties due to injury-related limitation?
☐ Yes ☐ No If so, provide full details.

39. After return to work, did the employee sustain any other injury or illness which affected performance of his or her duties? If so, provide full details.

40. Please review the statements made by the employee in Part A of this form and provide any relevant comments and additional information.

A supervisor or compensation specialist who knowingly certifies to any false statement, misrepresentation, concealment of fact, etc., in respect to this claim may also be subject to appropriate felony criminal prosecution.

41. Signature of Supervisor or Compensation Specialist (at time of recurrence)	42. Title	43. Work phone	44. Date (mo., day, year)

3A.3.3 CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation *(Continued)*

Part C - Employee

(To be completed by the employee if not employed with the Federal Government at the time of the claimed recurrence)

1. For all jobs held since you left the job held when the initial injury occurred, list the full name and address of your employers, and the inclusive dates of employment. Include any self-employment.

2. For all jobs listed in item 1 above, provide your job title, nature of duties performed, number of hours worked per week and rate of pay.

3. Describe all educational and/or vocational training received since your original injury. Include any licenses or certificates earned.

4. What was your rate of pay if you stopped work due to this recurrence?

   $ _____ per _____

5. Do you claim compensation for lost wages? ☐ Yes ☐ No

   If so, for what period? _____ through _____.

6. Have you received any pay during the period claimed? ☐ Yes ☐ No

   If so, how much and from what source? _____

NOTE: The following statement is made in accordance with the Privacy Act of 1974 (5 USC 552a) and the Paperwork Reduction Act of 1995, as amended. The authority for requesting the following information is Section 8101, et seq., Title 5 to the U.S. Code. Furnishing the requested information is required to obtain and retain benefits in order to ensure the timely filing of a notice of recurrence of disability and claim for benefits under the Federal Employees' Compensation Act (FECA). The information will be used to initiate and assist in the adjudication of the claim and failure to provide the information may prevent or delay claim processing. Additional disclosures of this information may be to: third parties in litigation; employing agencies; various individuals and organizations providing related medical rehabilitation and other services; insurance plans which may have paid related bills; labor unions; various law enforcement officials; other federal, state and local agencies (including the GAO and IRS) as appropriate; data processing contractors to the Department of Labor; debt collection agencies and credit bureaus.

7. Signature of Employee	8. Date (mo., day, year)

• U.S. GPO: 2000-467-602/39549

3A.3.3 CA-2a, Federal Employee's Notice of Recurrence of Disability and Claim for Continuation Pay/Compensation *(Continued)*

INSTRUCTIONS FOR COMPLETING FORM CA-2a
NOTICE OF RECURRENCE

DEFINITION OF RECURRENCE

A Recurrence of the Medical Condition is the documented need for additional medical treatment after release from treatment for the work-related injury. Continuing treatment for the original condition is not considered a recurrence.

A Recurrence of Disability is a work stoppage caused by:

- A spontaneous return of the symptoms of a previous injury or occupational disease without intervening cause;
- A return or increase of disability due to a consequential injury (defined as one which occurs due to weakness or impairment caused by a work-related injury); or
- Withdrawal of a specific light duty assignment when the employee cannot perform the full duties of the regular position. This withdrawal must have occurred for reasons other than misconduct or non-performance of job duties.

IF A NEW INJURY OR EXPOSURE TO THE CAUSE OF AN OCCUPATIONAL ILLNESS OCCURS, AND DISABILITY OR THE NEED FOR MEDICAL CARE RESULTS, A NEW FORM CA-1 OR CA-2 SHOULD BE FILED. This is true even if the now incident involves the same part of the body as previously affected.

INSTRUCTIONS FOR EMPLOYEE

- Review the definition of "recurrence" given above. If you believe that you have sustained a recurrence, complete Part A of this form. Attach a separate sheet of paper if needed to provide full details.
- If you worked for the Federal Government at the time of the recurrence, submit Form CA-2a to your employing agency. If you no longer work for the Federal Government, complete Parts A and C of this form and submit all materials directly to the Office of Workers' Compensation Programs (OWCP).
- If you are claiming a recurrence of disability for an occupational illness, or if all 45 days of continuation of pay (COP) have been used, you may claim wage loss on Form CA-7. The OWCP will pay compensation if the claim is approved.
- Arrange for your attending physician to submit a detailed medical report. The report should include: dates of examination and treatment; history as given by you; findings; results of x-ray and laboratory tests; diagnosis; course of treatment; and the treatment plan. **The physician must also provide an opinion, with medical reasons, regarding causal relationship between your condition and the original Injury.** Finally, the physician should describe your ability to perform your regular duties. If you are disabled for your regular work, the physician should identify the dates of disability and provide work tolerance limitations.
- If other physicians treated you after you returned to work following the original injury, obtain similar medical reports from each of them.

INSTRUCTIONS FOR EMPLOYING AGENCY

- After the employee has completed Part A, promptly complete Part B and submit the form to OWCP, unless: the claimant is still receiving continuation of pay (COP); the recurrence is for medical care only and the claim is still open; or the claimant is currently requesting neither wage-loss compensation nor payment of medical expenses. In these instances, file the form in the Employee Medical Folder.
- If COP is being paid, obtain medical evidence using Form CA-17, "Duty Status Report", as often as circumstances indicate.
- For a recurrence less than 90 days after the employee's return to work following the original injury, you may authorize required medical care using Form CA-16. For a recurrence more than 90 days after the employee's return to work, OWCP must authorize further medical care.
- For recurrences of disability which continue after the 45 days of COP have expired or which involve occupational illness, instruct the employee to file Form CA-7.

Public Burden Statement

Completion of this collection of information is estimated to vary from 15 to 45 minutes per response with an average of 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding the burden estimate or any other aspect to this collection of information, including suggestions for reducing this burden, send them to the Office of Workers' Compensation Programs, U.S. Department of Labor, Room S-3229, 200 Constitution Avenue, N.W., Washington, DC 20210.

DO NOT SEND THE COMPLETED FORM TO THE OFFICE SHOWN ABOVE.

3A.3.4 CA-16, AUTHORIZATION FOR EXAMINATION AND/OR TREATMENT

Authorization for Examination
And/Or Treatment

U.S. Department of Labor
Employment Standards Administration
Office of Workers' Compensation Programs

The following request for information is required under (5 USC 8101 et. seq.). Benefits and/or medical services expenses may not be paid or may be subject to suspension under this program unless this report is completed and filed as requested. Information collected will be handled and stored in compliance with the Freedom of Information Act, the Privacy Act of 1974 and OMB Cir. No. A-108.

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number.

OMB No.: 1215-0103
Expires: 10-31-99

PART A - AUTHORIZATION

1. Name and Address of the Medical Facility or Physician Authorized to Provide the Medical Service:

2. Employee's Name (last, first, middle)	3. Date of Injury (mo., day, yr.)	4. Occupation

5. Description of Injury or Disease:

6. You are authorized to provide medical care for the employee for a period of up to sixty days from the date shown in item 11, subject to the condition stated in item A, and to the condition indicated either 1 or 2, in item B.

A. Your signature in item 35 of Part B certifies your agreement that all fees for services shall not exceed the maximum allowable fee established by OWCP and that payment by OWCP will be accepted as payment in full for said services.

B. ☐ 1. Furnish office and/or hospital treatment as medically necessary for the effects of this injury. Any surgery other than emergency must have prior OWCP approval.

☐ 2. There is doubt whether the employee's condition is caused by an injury sustained in the performance of duty, or is otherwise related to the employment. You are authorized to examine the employee using indicated non-surgical diagnostic studies, and promptly advise the undersigned whether you believe the condition is due to the alleged injury or to any circumstances of the employment. Pending further advice you may provide necessary conservative treatment if you believe the condition may be to the injury or to the employment.

7. If a Disease or Illness is Involved, OWCP Approval for Issuing Authorization was Obtained from: (Type Name and Title of OWCP Official)	8. Signature of Authorizing Official: 9. Name and Title of Authorizing Official: (Type or print clearly)
10. Local Employing Agency Telephone Number:	11. Date (mo., day, year)
12. Send one copy of your report: (Fill in remainder of address) **U.S. DEPARTMENT OF LABOR** Employment Standards Administration Office of Workers' Compensation Programs	13. Name and Address of Employee's Place of Employment: Department or Agency Bureau or Office Local Address (including ZIP Code)

Public Burden Statement

We estimate that it will take an average of 5 minutes to complete this collection of information, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection of information, including suggestions for reducing this burden, send them to the Office of Workers' Compensation Programs, U.S. Department of Labor, Room S-3229, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

DO NOT SEND THE COMPLETED FORM TO THIS OFFICE
This form was electronically produced by Elite Federal Forms, Inc.

Form CA-16
Rev. Jan. 1997

3A.3.4 CA-16, Authorization for Examination and/or Treatment *(Continued)*

PART B - ATTENDING PHYSICIAN'S REPORT

14. Employee's Name (last, first, middle)

15. What History of Injury or Disease Did Employee Give You?

16. Is there any History or Evidence of Concurrent or Pre-existing Injury, Disease, or Physical Impairment? (If yes, please describe)
☐ Yes ☐ No

16a. ICD-9 Code

17. What are Your Findings? (Include results of X-rays, laboratory tests, etc.)

18. What is Your Diagnosis?

18a. ICD-9 Code

19. Do You Believe the Condition Found was Caused or Aggravated by the Employment Activity Described? (Please explain your answer if there is doubt.)
☐ Yes ☐ No

20. Did Injury Require Hospitalization? ☐ Yes ☐ No
If yes, date of admission (mo., day, year)
Date of discharge (mo., day, year)

21. Is Additional Hospitalization Required?
☐ Yes ☐ No

22. Surgery (If any, describe type)

23. Date Surgery Performed (mo., day, year)

24. What (Other) Type of Treatment Did You Provide?

25. What Permanent Effects, If Any, Do You Anticipate?

26. Date of First Examination (mo., day, year)

27. Date(s) of Treatment (mo., day, year)

28. Date of Discharge from Treatment (mo., day, year)

29. Period of Disability (mo., day, year) (If termination date unknown, so indicate)
Total Disability: From To
Partial Disability: From To

30. Is Employee Able to Resume
☐ Light Work Date:
☐ Regular Work Date:

31. If Employee is Able to Resume Work, Has He/She been Advised? ☐ Yes ☐ No If yes, Furnish Date Advised

32. If Employee is Able to Resume Only Light Work, Indicate the Extent of Physical Limitations and the Type of Work that Could Reasonably be Performed with these Limitations.

33. General Remarks and Recommendations for Future Care, if Indicated. If you have made a Referral to Another Physician or to a Medical Facility, Provide Name and Address

34. Do You Specialize? ☐ Yes ☐ No (If Yes, state specialty)

35. SIGNATURE OF PHYSICIAN. I certify that all the statements in response to the questions asked in Part B of this form are true, complete and correct to the best of my knowledge. Further, I understand that any false or misleading statement or any misrepresentation or concealment of material fact which is knowingly made may subject me to felony criminal prosecution.

36. Address (No., Street, City, State, ZIP Code)

37. Tax Identification Number

38. National Provider System Number

39. Date of Report

MEDICAL BILL: Charges for your services should be presented to the AMA standard "Health Insurance Claim Form" (AMA OP 407/408/409; OWCP-1500a, or HCFA 1500). Service must be itemized by Current Procedural Terminology Code (CPT 4) and the form must be signed.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

3A.3.4 CA-16, Authorization for Examination and/or Treatment *(Continued)*

INFORMATION FOR PHYSICIAN

YOUR AUTHORIZATION

- Please read Part A of Form CA-16. You are authorized to examine and provide treatment for the injury or disease described in Item 5, for a period of not more than 60 days from the date of issuance, subject to the conditions in Item 6. A physician who is debarred from the FECA program as provided at 20 CFR 10.450-457 may not be authorized to examine or treat an injured Federal employee. Authorization may be terminated earlier upon written notice from OWCP. For extension of the authorization to treat beyond the 60 day period, apply to the office shown in Part A, Item 12.

USE OF CONSULTANTS AND HOSPITALS

- Your may utilize consultants, laboratories and local hospitals, if needed. Authorize semi-private accomodations unless a private room is medically necessary. Ancillary treatment may be provided to a hospitalized employee as necessary.

REPORTS

- After examination, complete items 14 through 39, of Part B, and send your report, together with any additional narrative or explanatory material, to the address listed in Part A, Item 12. If the employee sustained a traumatic injury and is disabled for work, reports on Form CA 17, "Duty Status Report" may be required by the employing agency during the first 45 days of disability. If disability continues beyond 45 days, monthly reports should be submitted. Reports from all consultants are also required. Delay in submitted medical reports may delay

RELEASE OF RECORDS

- Injury reports are the official records of OWCP. They shall not be released to anyone nor may any other use be made of them without the approval of OWCP.

BILLING FOR SERVICES

- OWCP required that charges be itemized using the AMA standard "Health Insurance Claim Form" (AMA OP 407/408/409; OWCP-1500, or HCFA-1500). Each procedure must be identified, in Column 24 C of the form, by the applicable Current Procedural Terminology (4th edition) Code CPT 4). A copy of the form may be supplied by the employee at the time treatment is sought.

- Payment for chiropractic services is limited to charges for physical examinations, related laboratory tests, and X-rays to diagnose a subluxation of the spine; and treatment consisting of manual manipulation of the spine to correct a subluxation demonstrated by X-ray.

TAX IDENTIFICATION NUMBER

- The provider's Tax Identification Number (TIN) is an important identifier in the OWCP system. To speed processing and to reduce inaccuracy of payment, the provider's TIN (Employer Identification Number or SSN) should be shown on all reports and billings submitted to OWCP. If possible, providers should decide on a single TIN - either corporate or personal - which is used consistently on OWCP claims.

ADDITIONAL INFORMATION

- Contact the OWCP shown in item 12 of Part A.

Please Remove These Instructions Before Submitting Your Report.

3A.3.4 CA-16, Authorization for Examination and/or Treatment *(Continued)*

INSTRUCTIONS FOR AUTHORIZING OFFICIAL FOR COMPLETION OF PART A

SELECTION OF PHYSICIAN

- A Federal employee injured by accident while in the performance of duty has the initial right to select a physician of his/her choice to provide necessary treatment. The supervisor shall immediately authorize examination and appropriate medical care by use of Form CA-16 issued to either a United States medical officer/hospital or any duly qualified physician/hospital of the employee's choice.

  If the employee elects to be treated by a private physician, a copy of the American Medical Association standards billing form (AMA OP 407/408/409; OWCP-1500a) should be supplied together with Form CA-16.

  A physician who is debarred from the FECA program as provided at 20 CFR 10.450-457 may not be authorized to examine or treat an injured Federal employee.

  Generally, 25 miles from the place of injury, employing agency, or the employee's home is a reasonable distance to travel for medical care; however, other pertinent factors must also be considered.

PERIOD OF AUTHORIZATION

- Form CA-16 is valid for up to sixty days from date of issuance, and may be terminated earlier upon written notice from OWCP to the provider. It should not be used to authorize a change of physicians after the initial choice is exercised by the employee.

FEDERAL MEDICAL FACILITIES

- U.S. medical facilities include Public Health Service, Military, or VA hospitals. Federal health service facilities (health units) established under 5 USC 7901 are not U.S. medical facilities as used herein (see 20 CFR 10.400).

DEFINITION OF INJURY

- The term "injury" includes damage to or destruction of medical braces, artificial limbs and other prosthetic devices. Eyeglasses and hearing aids are included only if the damages were incidental to a personal injury which required medical services. Treatment for illness or disease should not be authorized unless approval is first obtained from OWCP.

DEFINITION OF PHYSICIAN

- The term "physician" includes doctors of medicine (MD), surgeons, podiatrists, dentists, clinical psychologists, optometrists, chiropractors and osteopathic practitioners within the scope of their practice as defined by State law. The reimbursable services of chiropractors under the FECA are limited by statute to physical examination, related laboratory tests and X-rays to diagnose subluxation of the spine; and treatment consisting of manual manipulation of the spine to correct a subluxation demonstrated by X-ray.

FORM COMPLETION

- Part A shall be completed in full by the authorizing official. The authorization is not valid unless the name and address of the physician or hospital is entered in Item 1 and the signature of the authorizing official appears in Item B. Check B1 or B2 or Item 6, whichever is appropriate. In case of illness or disease, only Box B2 may be checked.

  Show the address of the proper OWCP Office in Item 12. Send original and one copy of Form CA-16 to the medical officer or physician. If issued for illness or disease, a copy must also be sent to OWCP.

ADDITIONAL INFORMATION

- See 20 CFR and/or Chapter 810, Federal Personnel Manual (FPM).

Information for Physician - See Reverse Side

3A.4 SUGGESTED OUTLINE FOR CONTRACTOR'S SAFETY PLAN

A. **Overall Responsibility** - Who will be responsible for the on site safety program? What are the credentials (training & experience) of that person? Will they have direct authority or will their authority be through the superintendent? Who will be responsible for reporting accidents and maintaining the accident log required by OSHA?

B. **Subcontractors** -Will subcontractors be under prime's program or will they have their own program? If they have their own program, separate plans are required.

C. **Safety Policy** - How will new employees be oriented and their responsibilities explained? How will all employees be oriented to specific project hazards or the hazards of new operations? How will drug & alcohol policy be conveyed to employees?

D. **Personal Protection** -What conditions/operations will require personal protection equipment? Hardhats, ear plugs, steel toed boots, respirators, etc? Who will decide when protection is needed? Who will monitor its use?

E. **Safety Meetings** - Who will conduct meetings? What will frequency be? Who will attend? How will subjects be selected?

F. **Emergency Medical Care** - Telephone Nos. (Ambulance, Fire, Rescue). Directions. Prearrangements made - insurance, workmen's comp?

G. **First Aid** - Names of trained employees. Names of CPR trained employees

H. **Trenching and Excavating** - Who will be responsible for selecting slopes, shoring and protection systems during trenching operations? Is the person trained and competent in the revised (1989) OSHA regulations?

I. **Hazard Recognition, Reporting and Abatement** - To whom will employees report perceived hazards? How will these reports be handled? Who will correct hazards?

J. **Equipment Inspection** - Who will inspect construction and hauling equipment? Will it be inspected before shipment to project, or after? How will suppliers' equipment be inspected (e.g. asphalt hauling trucks)?

K. **Separating Pedestrians from Construction Vehicles and Public Traffic** -Are there hazards associated with pedestrians (contractor or public) moving amidst equipment and public traffic? How will these hazards be abated?

L. **Jobsite Inspections** - Who will perform jobsite inspections? What will the frequency be? Will a report be generated? How will deficiencies be corrected? Immediate order or report back to superintendent?

M. **Hazardous Materials** -Will hazardous materials be generated? Asphalt products, solvents, chemicals? What are special procedures for handling, disposing?

N. **Explosives** - See Section 205 for special requirements. What are provisions for storage and inventory control of explosives?

O. **Fire Fighting and Emergencies** - What are fire hazards requiring special attention? What resources are available for fire emergencies?

P. **Maintenance of Traffic (MOT) and the Public** - All MOT controls and operations will be per the current MUTCD. How will protection of the public, whether on foot or vehicle, be planned and coordinated? What provisions are there to separate the public from the construction activities? Who will perform inspections? What will the frequency be? Will a report be generated? How will deficiencies be corrected? Immediate order or report back to superintendent? How will the ability of the public to interfere with construction activities minimized?

Chapter 4 – LEGAL AND ENVIRONMENTAL COMPLIANCE
TABLE OF CONTENTS

Section **Page**

4.1 General 4-1

4.2 Laws to be Observed 4-2

4.3 Permits and Responsibilities 4-3
4.3.1 Materials Sources and Easements 4-3
4.3.2 Load Limits 4-3
4.3.3 Bulletin Board 4-4
4.3.4 NPDES Permits 4-4

4.4 Protection and Restoration of Property and Landscape 4-7
4.4.1 General 4-7
4.4.2 Trespassing 4-7
4.4.3 Forest, Park, and Public Lands Protection 4-7
4.4.4 Fire Prevention and Control 4-8
4.4.5 Pits and Quarries 4-9

4.5 Contractor's Responsibility for Work 4-10

4.6 Utilities 4-11
4.6.1 Government-Owned Utilities 4-11
4.6.2 Privately-Owned Utilities 4-11

4.7 Encroachments on Highway Right-of-Way 4-13

CHAPTER 4

LEGAL AND ENVIRONMENTAL COMPLIANCE

4.1 GENERAL

This chapter provides FLH field personnel with information and guidance related to various legal, environmental, and permitting requirements that may arise during a project. Roles and responsibilities of FLH and the Contractor are reviewed with respect to:

- Material source designation;
- Access and construction easements;
- Load limits;
- Compliance with NPDES permits and other regulatory requirements;
- Protection of adjacent properties from damage due to construction;
- Fire prevention and control;
- Restoration of disturbed areas; and
- Utility coordination.

4.2 LAWS TO BE OBSERVED

The Standard Specifications require the Contractor to keep fully informed of, and at all times observant of and in compliance with, all laws pertinent to the work. From a contractual standpoint, FLH has the right to monitor apparent compliance with these laws, and to invoke contract sanctions if there are violations. However, except for the specific actions addressed in this Manual, in the contract, and in the FAR, general compliance reviews and enforcement of these laws is the responsibility of specific Federal, State, or local agencies (e.g., OSHA, EPA, or the Department of Labor).

4.3 PERMITS AND RESPONSIBILITIES

4.3.1 MATERIALS SOURCES AND EASEMENTS

Often, sources of materials and easements for access and staging areas are provided in the contract. In general, the Project Engineer should have documentation on file covering designated materials sources or use of designated land outside the construction limits, including privately owned property on which FLH holds options.

Occasionally, the Contractor may request permission to use other sources or request additional easements to expedite the work. If FLH is requested to become a party to such a request, it may be necessary for the Project Engineer to make a judgment as to FLH's proper role. If it is in the Government's interest to expedite special requests for access and other purposes, the Project Engineer should furnish assistance and communicate with the permitting agency as necessary. However, if the request is solely for the Contractor's convenience or savings, action by FLH may not be appropriate. This is especially true if the quality of the proposed source is less certain than the source designated in the contract. Permits requested by a Contractor within public lands are often issued to FLH rather than the Contractor. This implies a responsibility of FLH to monitor the terms of the permits (e.g., safety, reclamation, and erosion control).

FLH will obtain required railroad crossing permits, and permits for construction over or adjacent to navigable waters as shown on the plans. If the Contractor elects to use railroad crossing or waterway privileges other than those shown on the plans, acquiring the required permits or other arrangements will usually be the Contractor's responsibility.

4.3.2 LOAD LIMITS

The specifications require the Contractor to comply with load limits on public roads in the vicinity of the project. As a practical matter, this is difficult to enforce except where materials are being delivered by the ton with weigh tickets. The Project Engineer should, however, be particularly sensitive to overloading of vehicles on public roads when there are complaints from local officials, and during periods of wet or thawing subgrade. FLH should cooperate with these officials if they present reasonable requests to protect their roads, even if this results in inconvenience to the Contractor.

In terms of FLH's contractual liability, it is preferable to have a legal order from the local official, or a strongly worded demand – that says, for example, that hauling must be temporarily discontinued or loads restricted – than for FLH to take actions based on verbal or other poorly documented requests. Actions that may be perceived as unilateral on the part of FLH could be considered a change to the contract and could subject the Government to liability for the Contractor's increased costs. When in doubt, the Project Engineer should contact the COE for advice.

On the project itself, overloads are not normally a problem through construction of the untreated base layers of the pavement structure. However, once construction of asphaltic concrete or treated layers begins, they must be protected from damage.

Although the Contractor is required to repair damage caused by overloads, there may be times when it is appropriate to prohibit heavy loads (even loads less than the legal maximum) in certain circumstances when the probability of damage is present. Again, the Project Engineer should contact the COE for advice.

4.3.3 BULLETIN BOARD

The Contractor is required to maintain a weatherproof bulletin board, accessible to all employees at the site as required by Subsection 107.03 of the Standard Specifications. The Contractor is required to post on the bulletin board the following items, which will be provided by FLH:

1. Davis-Bacon wage decision (remove pages from contract booklet).

2. EEO Poster.

3. Notice to Employees working on Federally Financed Construction Projects, Form WH 1321 (to be displayed with Davis-Bacon rates).

4. Job Safety and Health Protection poster.

5. Notice of Employee rights (Beck Poster).

6. Title 18 Criminal Code Notice.

If required by the contract or regulation, the Contractor may also have to provide and post the following items:

1. Contractor's EEO policy.
2. Telephone numbers of physicians, hospitals, or ambulances.
3. Blasting signals, if applicable.
4. Crane hoisting signals, if applicable.

4.3.4 NPDES PERMITS

The Clean Water Act of 1987 required the Environmental Protection Agency (EPA) to implement a program to regulate the quality of discharges and runoff from industrial and construction sites. This program, known as the National Pollution Discharge Elimination System (NPDES), went into effect in October 1992.

NPDES and equivalent (or more stringent) State regulations are applicable to essentially every project FLH constructs. However, these impacts differ, depending mostly on the State and local regulations in the State where the project is. In no State does the EPA itself actively monitor and enforce the NPDES process. In many States, monitoring and enforcement by State personnel is active and aggressive. Failure to comply with the requirements of the permit may result in shutdowns, injunctions, lawsuits, and other adverse actions against FLH, the Contractor, or both.

The Project Engineer should be familiar with the permit and other regulatory requirements in the State where the project is. These requirements are generally spelled out in the permit package or other documentation included in the PS&E package, or otherwise furnished by Project Development to Construction at the time of award.

In some cases, permits will be issued for a specific project; in others, FLH will operate under a NPDES General Permit.

In some cases, the anticipated construction schedule and erosion control plan will have been submitted as a part of the permitting process; in others the permit simply obligates FLH and the Contractor to have a plan and to follow best management practices. If the plan is filed with a State or local agency, it is important to know whether changes and enhancements to that plan have to also be filed or if they simply have to be documented in the project records.

In some cases, FLH is the permittee (official holder of the permit); in other cases the Contractor is designated as a co-permittee, or occasionally, the sole permittee. If permittee responsibility is transferred to, or shared by the Contractor, the Project Engineer needs to know if specific paperwork must be executed and filed to document that transfer.

Generally, inspections of erosion control devices must be made periodically (usually weekly except in arid areas) and after heavy rains. It is important to know who the permit and the contract require to make these inspections. It may be FLH; it may be the Contractor; but usually it will be a joint responsibility. There will also be specific requirements as to the format of the inspection report, who is required to sign the inspection report, and whether it is to be sent to the responsible State agency. Usually, the reports are required to simply be filed in the project files.

The permittee is always responsible for making enhancements to the erosion control plan if the construction operations, the original plan, or both result in unacceptable levels of sediment runoff. However, the Project Engineer should be wary of eliminating specific features of the original plan even if they appear to be unnecessary. Such actions should be taken only after discussions with the COE or environmental resource personnel in the FLH Division.

In many States, inspections by State personnel responsible for administering NPDES permits are common. These personnel should be treated with respect and cooperation to the extent that is possible. They will often request to see the permit, the erosion control plan, inspection reports, and related documentation. The files on this subject should be kept up to date and easily accessible. Do not tell these personnel that they have to go through Freedom of Information Act (FOIA) to see FLH files. If State inspectors issue instructions or make demands that seem to go beyond the requirements of the contract and existing permits, discuss the issue with the COE before implementing these actions - especially if the actions may result in unforeseen expenses or liability to the Government.

Whether or not the Contractor is designated as the permittee, the contract usually gives control over erosion control items and quantities to FLH and the Project Engineer. It is important therefore to cooperate with the Contractor and State authorities to ensure that there are no deficiencies in NPDES requirements due to payment disputes over additional quantities and devices. If additional funding is required for these quantities, the issue should be discussed with the COE.

If deficiencies are due to poorly scheduled construction operations, or inadequate maintenance of the erosion control measures and prosecution of the work as scheduled, then the Project Engineer must be assertive in requiring the Contractor to resolve these problems.

4.4 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

4.4.1 GENERAL

The Contractor is responsible for protecting all public and private properties adjacent to the construction from damage due to construction operations. This responsibility also extends to designated materials sources and property adjacent to haul roads. If the Contractor fails to take proper precautions or persists in performing the work in a manner that damages such property, the Project Engineer should inform the Contractor of this matter in writing. The Contractor is obligated to repair, rebuild, or otherwise restore such damaged property, or make good such damage or injury.

Occasionally there are claims against the Contractor related to damage to its own (nondesignated) materials sources or to property not directly related to the contract. FLH should try not to become involved in such disputes. However, there are times when, for political or public relations reasons, our involvement is necessary. There are also certain environmental protection laws that make the Government partially responsible even for private sites that are related to the construction project. The Project Engineer should discuss such cases with the COE prior to taking action.

Because landscape degradation often cannot be completely restored, emphasis should be placed on prevention of damage. In cases of damage, the Project Engineer should contact the appropriate representative of the agency concerned, and discuss the extent of repairs that the Contractor must make. Request a written description of the repairs so that the Contractor may be given a copy. As long as the requested repairs are reasonable, the Contractor should be given a written directive to complete them at no cost to the Government. If the requested repairs seem unreasonable or excessive, discuss the situation with the COE. If FLH orders corrective action under the contract that is later deemed excessive, FLH may ultimately be liable for the excess costs.

4.4.2 TRESPASSING

FLH should do no staking on private property without written permission from the owner. If the Contractor performs any construction operations outside the limits of the acquired right-of-way, or allows employees to trespass on private property, the Project Engineer should notify the Contractor of its liability for damage to such property. If, for any reason, additional easements or right-of-way should be necessary, the Project Engineer should notify the COE and the right-of-way specialist well in advance of the time when access is necessary to secure proper written permission for right of entry.

4.4.3 FOREST, PARK, AND PUBLIC LANDS PROTECTION

For work within or adjacent to State or National Forests, Parks, or other public lands, the specifications usually require the Contractor to comply with all regulations of the authority having jurisdiction over such lands.

The governing rule concerning sanitary facilities on Public Lands specifically requires the Contractor to obtain permits for latrine construction from the public agency having jurisdiction. It has been found that some district officers of public agencies do not allow open pit toilets (chemical toilets, minimum), while others do. The Project Engineer should clarify this matter with the Contractor before the start of construction, preferably at the preconstruction conference.

4.4.4 FIRE PREVENTION AND CONTROL

Employees of FLH and the Contractor must comply with the rules and regulations of the Forest Service, Park Service, State, or other public agency having jurisdiction over fire prevention and control. If incorporated into the contract specifically or by reference, the rules and regulations governing fire prevention and control must be enforced by the Project Engineer. The Project Engineer should therefore obtain copies of manuals of instructions and fire plans of the agency having jurisdiction. Forest Service fire control plans are sometimes included in the special contract requirements.

FLH employees are required to take appropriate action to suppress unauthorized or accidental fires on public lands, and they must immediately report fires to the nearest responsible official.

Fire prevention is an item that should be discussed at the preconstruction conference. If Forest or Park officials are not present at the conference, the Project Engineer should arrange a meeting with them and the Contractor to discuss the subject.

The specifications impose a strict obligation on the Contractor for any fires in the vicinity of the project caused by Contractor personnel. The Project Engineer should direct the attention of the Contractor to the Contract requirements before work on the Contract starts, and again when permitted burning operations begin.

When burning is allowed, the Engineer should verify that the Contractor has secured written permission from the Forest Service, National Park Service, or the local fire control authority, or any other agency having jurisdiction over the area. The special contract requirements may require the Contractor to furnish a fireguard, either as a subsidiary obligation or with the method of payment specified. When a fireguard is not required by the special contract requirement but is requested by the agency having jurisdiction over the area because of special conditions, the Project Engineer must take appropriate action to provide such a guard. The Contractor may be ordered to furnish a fireguard by contract modification if it is deemed necessary and is not provided for in the Contract.

The specifications may require the Contractor, when requested by the Federal agency having local authority, to make its forces temporarily available for fighting fires that occur in the vicinity of the project but are not caused by the Contractor. Although payment for such services is the obligation of the requesting agency, the Project Engineer should make appropriate entries in the project diary concerning the fire and the extent of the services provided by the Contractor.

4.4.5 PITS AND QUARRIES

The specifications usually require the Contractor to strip the overburden from all Government owned or designated material pits and quarries, and stockpile this overburden for later use in reclamation of the sites.

After a pit has served its purpose, waste material stored outside the pit or quarry area should be moved back into the pit. The pit then should be neatly sloped and trimmed, and the side slopes flattened to the maximum extent possible to conform to the natural ground surface. The stockpiled overburden should then be uniformly spread over the sides and bottom of the pit or quarry. No direct payment will be made for this work unless otherwise provided.

The restoration requirements for private/contractor furnished pits and quarries are generally a matter between the Contractor and the owner. However, some States have special environmental or mining requirements that may apply, and which may necessitate FLH involvement in restoration activities.

4.5 CONTRACTOR'S RESPONSIBILITY FOR WORK

The contract provides that the Contractor is not responsible for damages due to cataclysmic phenomena of nature, acts of the public enemy, or acts of Government authorities. The Contractor is responsible for other kinds of damage to the work, even damages that are not the result of the fault or negligence of the Contractor. See FAR Clause 52.236-7, Permits and Responsibilities.

When damages occur, and the responsibility for those damages is in doubt, the Project Engineer should discuss the issues with the COE. If immediate action is necessary, the Project Engineer should direct the Contractor to take the necessary steps to repair the work. If a contract modification and compensation is in order, the contract modification should be processed through normal channels (See Chapter 13). The Project Engineer will record the exact accounts of work performed, so that payment can be made on an actual cost basis if necessary.

The payment to be made to the Contractor under the foregoing conditions should be full reimbursement for restoring the work to the condition at the time of the damage, less any salvage value of removed material.

4.6 UTILITIES

Utility relocation and adjustments are to be made by the utility company unless otherwise provided in the contract. The specifications usually provide that the Government is responsible for coordinating with the utility company and attempting to have all necessary adjustments made as soon as practicable, and that no additional compensation will be allowed the Contractor for any delays, inconvenience, or damage sustained due to any interference from the utility appurtenances or the operation of moving them. However, if such delays are unforeseeable and beyond the control of the Contractor, an adjustment in contract time may be justified. Also, if the utility company fails to complete the adjustments in a reasonably expeditious manner, the Contractor may be entitled to a price adjustment in accordance with the FAR Clause 52.243-4, Changes.

The specifications also usually provide that the Contractor shall not start work in areas where damage to utilities might result in considerable expense, loss, or inconvenience, until after all arrangements necessary for the protection of the utilities have been made by either the utility company or the contractor. The Contractor also must cooperate with the utility owners in their removal and rearrangement operations.

4.6.1 GOVERNMENT-OWNED UTILITIES

Special procedures for removal and/or reconstruction of Government-owned telephone lines and other utilities have been agreed upon between FLH and some of the Regions of the Forest Service, but such procedures usually vary in minor details in the different Forest Regions. In general, all repair, reconstruction, and other telephone work should be handled by the Forest Supervisor or authorized representative. Park Service utility lines should be handled in a similar manner.

4.6.2 PRIVATELY-OWNED UTILITIES

In most cases, the work by utility companies must precede work by the Contractor in the affected area. The Project Engineer should request the COE to verify that such work has been arranged. When possible, the Project Engineer should make diary entries to document the operations of the utility companies as the adjustment or relocation work progresses. Important information to record in the diary entry includes:

- the date of beginning of the work,
- the number of personnel working each day,
- the equipment and materials used,
- disposal of any salvaged material, and the
- date of completion of the work.

When it is necessary to change the planned relocation from that shown on the plans accompanying the utility agreement, or when a significant increase in the estimated relocation costs is apparent, the COE must be immediately notified so that arrangements can be made for financing and modification of the agreement.

When costs of utility adjustments are to be reimbursed by the Government under a utility agreement, the Project Engineer's records are important to allow reasonable verification of the

utility company billing. Payment for utility adjustments can be on an actual cost, lump sum, or no cost basis. The associated observation and record keeping required of project personnel will vary based on the payment method, as described below.

1. **Actual Cost.** The operation should ideally be observed daily, and diary entries made. It is not necessary that someone be assigned full time to this work, but it is desirable that diary entries be made not less than once a day.

2. **Lump Sum.** The operation should be observed occasionally. Diary entries should be made to provide the following information: when work starts, number of personnel, equipment, progress, shutdowns and reason (if available), and date work was completed.

3. **No Cost.** In some cases the utility company must absorb its own costs for relocation as a condition of its sharing the right-of-way. The same record as for Lump Sum should be kept except where the Contractor might be delayed. When the utility adjustment is delayed or delaying the Contractor, the Project Engineer should arrange for the same records as outlined under Actual Cost above.

When utility adjustment is delayed, and the Contractor proceeds to work in the affected area or is hindered by such delay, the Project Engineer must keep adequate records in the project diary, and support them with appropriate photographs whenever practical. This information is important if the Contractor files a delay claim.

The Project Engineer may deal directly with the State or county right-of-way officials, and with public utilities on matters arising during construction. The COE will provide additional assistance and instructions when needed.

When field conditions require significant changes from plans or agreements, the Project Engineer should request the COE to arrange for a meeting with representatives from the utility company to reach a final decision on the change. Agreement modifications will be processed, funded, and approved by Division staff, based on data and estimates obtained at this joint meeting.

4.7 ENCROACHMENTS ON HIGHWAY RIGHT-OF-WAY

Where the right-of-way lies through privately owned land, the Project Engineer may become aware of the encroachment of buildings, fences, fixtures, or advertising signs on the right-of-way. The Project Engineer must determine from the plans or from the right-of-way agreement whether the removal of such items is to be by the owner or the Contractor, and, if by the Contractor, whether any salvage right has been retained by the owner or the Government. Any new encroachments, after construction has begun, must be reported to the COE, who will follow up with instructions on the proper course of action.

Chapter 5 – CONSTRUCTION SCHEDULE AND PROGRESS
TABLE OF CONTENTS

Section **Page**

5.1 General 5-1

5.2 Construction Schedules 5-2
5.2.1 General Requirements 5-2
5.2.2 Limitations on Completing Work 5-2
5.2.3 Construction Schedule Format 5-2
5.2.3.1 Preliminary Construction Schedule 5-8
5.2.3.2 Initial Construction Schedule 5-8
5.2.4 Schedule Updates 5-9

5.3 Limitation of Operations 5-11

5.4 Contract Time 5-12
5.4.1 Failure to Complete Work Within the Time Allowed 5-12
5.4.2 Methods of Adjusting Time Allowance 5-12
5.4.3 Consideration of Time Adjustments 5-13

5.5 Work Suspensions and Stop Orders 5-14
5.5.1 Definitions 5-14
5.5.2 Suspension of Contractor Operations 5-14
5.5.3 Stoppage of Contractor Operations 5-15
5.5.4 Content of Suspensions and Stop Orders 5-16
5.5.5 Content of Resumption Orders 5-19

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 5.2-A Example Bar Chart Schedule 5-4
Exhibit 5.2-B Example Critical Path Method (CPM) Schedule 5-7
Exhibit 5.5-A Example Stop Order 5-17
Exhibit 5.5-B Example Suspension Letter 5-18

CHAPTER 5

CONSTRUCTION SCHEDULE AND PROGRESS

5.1 GENERAL

This chapter provides information to assist FLH personnel in monitoring the Contractor's prosecution and progress of the work. Specific guidance is provided related to:

- Reviewing the Contractor's preliminary construction schedule and schedule updates,
- Administering contract time and time adjustments, and
- Issuing suspensions and stop orders.

5.2 CONSTRUCTION SCHEDULES

5.2.1 GENERAL REQUIREMENTS

FAR Clause 52.236-15, Schedules for Construction Contracts, and Section 155 of the Standard Specifications (FP) require the Contractor to submit a construction schedule. This construction schedule is to represent the sequence in which the Contractor plans to perform the Contract work, showing start and end dates for each work activity, including material ordering and delivery.

5.2.2 LIMITATIONS ON COMPLETING WORK

The time allowed for contract completion is the ultimate limitation or constraint on the construction activities required for the project. Numerous activities can be planned, supplied, and constructed within the contract time by recognizing the limitations on the work and the interdependence or relationship between activities of work.

Most activities are resource dependent, i.e., they rely on resources such as equipment and manpower. Other activities of work are independent and can be carried out simultaneously if sufficient resources are available, such as constructing a bridge while earthwork or paving are being completed. Some activities, however, are completely dependent on the completion of another activity, such as the sequence of excavation to embankment construction, then fine-grading, followed by placement of any base courses, and finally the asphalt paving.

Other activities, such as concrete curing or form removal, are restraints because they cannot be completed before a minimum amount of time has elapsed (i.e., seven days is required for curing and a percentage of the 28-day strength must be achieved before the forms can be removed). Other possible restraints are shop drawing approvals, traffic lane closure restrictions, limited work hours, and climatic conditions. To properly manage a construction project, all of these activities, constraints, and limitations must be logically organized and developed into a construction schedule.

5.2.3 CONSTRUCTION SCHEDULE FORMAT

The general format for the construction schedule includes a graphic representation of the sequencing of work activities and the time to complete each of these activities, and a written narrative supporting the Contractor's logic used to develop the graphic representation. Section 155 of the Standard Specifications requires the Contractor to use one of two standard formats, the Bar Chart Method or the Critical Path Method. Unless a special contract requirement specifies the use of a particular format, the choice is left to the Contractor.

1. **Bar Chart Method (BCM).** The BCM format consists of a progress bar chart and a written narrative. Subsection 155.03 of the Standard Specifications outlines the information to be included on the bar chart and in the written narrative. The bar chart typically consists of a horizontal time scale and a vertical listing of project work activities. Bars are drawn to graphically represent the span of time necessary to complete each activity. Exhibit 5.2-A contains a portion of a bar chart schedule.

Bar charts are the least sophisticated of scheduling methods because they:

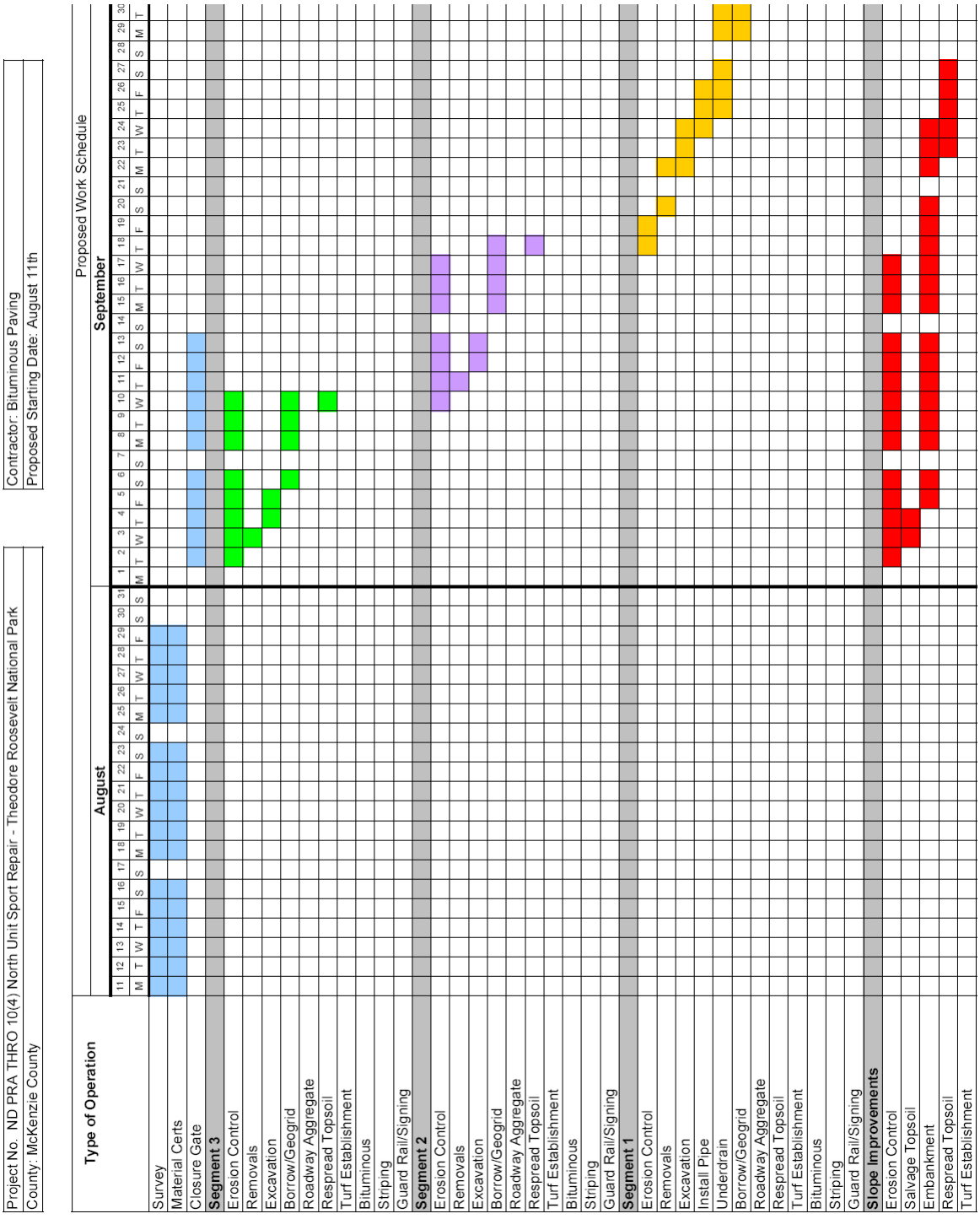
- do not show the relationships and dependencies of different work activities;
- do not tie the work to resource utilization;
- do not show float time; and are not effective in determining the overall impact (cause-effect) on the scheduled completion date resulting from a change or disruption.

As such, delay analysis is impossible to perform accurately.

Bar charts are appealing to operations personnel because they identify the general course of the work in an uncomplicated fashion, and they are easy to use in routinely monitoring the Contractor's progress. The development of a BCM schedule requires substantially less resources than a CPM schedule.

Given the lack of information shown in a BCM schedule, the narrative requirement for the BCM method is particularly important. The Contractor is required to identify anticipated resources and production rates. If during construction, the scheduled resources are not used on the project, or if the production rates are not achieved for unchanged work, it may be possible to prove that the Contractor's original schedule was defective. However, when the Government is responsible for a delay, it remains a difficult, if not impossible, job to use the BCM schedule to evaluate the impact of each delay or inefficiency encountered through the course of the project and quantify the delay for which the Government is liable.

Exhibit 5.2-A Example Bar Chart Schedule



2. **Critical Path Method (CPM).** The CPM format consists of a diagram, a tabulated schedule, and a written narrative. Subsection 155.04 of the Standard Specifications outlines the information required for each of these submittals. Relative to the BCM, the CPM is the more sophisticated and useful format and will normally be required on complex or large contracts. It represents the sequence and interdependence of work activities and time, factors in any constraints and restrictions, and clearly defines the critical activities of work. Through this maze of activities, constraints, and restrictions, lies a *critical path* sequence that cannot be altered without affecting the overall completion date. Exhibit 5.2-B contains a portion of a CPM Schedule.

   a. **The Critical Path.** The critical path is the longest chain of dependent activities that establishes the scheduled contract completion date. These dependent activities are critical activities, also described as controlling activities of work. The critical path is of obvious importance when considering the impact of a contract modification on the completion date. If a contract modification affects a critical activity, the Contractor may be entitled to a time extension. An event that causes a delay to part of the project may not increase the time required to perform the entire project unless it delays an activity on the critical path.

      On many FLH highway contracts, the critical activities are fairly obvious such that the Project Engineer and the Contractor are aware of what activities are controlling contract completion. Computer software to prepare and analyze CPMs (network analysis) or other resources (production rates, current bar chart, equipment lists, etc.) should be available to check the Contractor's schedule, determine the critical work activities, and document the reasons for granting or denying a time extension.

   b. **Float.** For work activities not on the critical path, the Contractor has some leeway as to when these non-critical work activities are started. This leeway is called float. Float is the amount of time an activity can be delayed without affecting the scheduled completion date of the contract. Float can also be defined as the amount of time between the earliest start date and the latest start date, or between the earliest finish date and the latest finish date. When the float for an activity is exceeded, it moves onto the critical path and affects the scheduled contract completion date. Activities on the critical path have no float.

   c. **No Float and Multiple Critical Path CPMs.** It is important that the Contractor assign a reasonable duration to all work activities and identify any float in the schedule. With any delay, an activity with little float can become a critical activity of work.

      A schedule with little float for most of the work activities often puts the Government at a disadvantage, because any delay may soon affect the scheduled completion and could result in a delay claim.

      CPMs with multiple critical paths should also be closely reviewed, because seldom is there more than one truly critical path. If a schedule with multiple critical paths is accepted, the Government is at a disadvantage because any delay will probably impact one of the paths. Multiple critical paths are usually created by assuming low production rates and eliminating float on noncritical activities so that the activities appear critical.

      If the Government can show that actual production and activity durations were consistently better than those assumed on the original schedule, that evidence can be

used to question whether those durations were *realistic*, and whether the activities were therefore *critical*. A new schedule can be requested on this basis. It is best to make such observations before a change or differing site condition occurs that may impact time.

Exhibit 5.2-B Example Critical Path Method (CPM) Schedule

Act ID	Description	Original Duration	Early Start	Early Finish	Total Float
GENERAL					
GAD15401	TESTING	672	22MAY08 A	23OCT08	-50h
GAD10000	NTP	0	09JUN08 A		
GAD15201	SURVEY	672	11JUN08 A	23OCT08	-50h
GAD15101	MOBILIZATION	96	16JUN08 A	27JUN08 A	
GEX15300	PIT PREP	48	16JUN08 A	27JUN08 A	
GEC15802	WATER FOR DUST CONTROL	600	17JUN08 A	17OCT08	-22h
GTC63506	TRAFFIC CONTROL	768	24JUN08 A	23OCT08	-50h
GEX62600	PIT RECLAMATION	48	13OCT08	20OCT08	-43h
GEC62511	SEEDING & MULCHING	54	14OCT08	23OCT08	-57h
GEC62301	EROSION FABRIC	57	15OCT08	23OCT08	-57h
GTC63301	PERMANENT SIGNS	22	17OCT08	21OCT08	-44h
GAD99999	PROJECT COMPLETION	0		23OCT08	-57h
AREA A (SLIDES 1 - 2)					
SITE 1					
AEC01020	SILT FENCE (SITE 1)	4	30JUL08	30JUL08	292h
ADR01040	UNDERDRAIN OUTLET @ 18+50 (SITE 1)	6	25AUG08	26AUG08	133h
ADR01060	UNDERDRAIN (SITE 1)	19	26AUG08	28AUG08	133h
ATC01080	SLIDE WORK DETOUR (SITE 1)	7	28AUG08	28AUG08	133h
ARM01100	CLEAR & GRUB (SITE 1)	4	28AUG08	29AUG08	133h
ARM01120	REM AGG SURFACING (SITE 1)	3	29AUG08	29AUG08	133h
ARM01140	STRIP & PILE TOPSOIL (SITE 1)	3	29AUG08	29AUG08	133h
AEX01160	EXCAVATE SLIDE (SITE 1)	19	15SEP08	16SEP08	57h
ARM01180	REM PIPE @ 16+97 (SITE 1)	2	16SEP08	17SEP08	60h
ADR01200	E/UB 24 CMP @ 16+97 RT (SITE 1)	8	17SEP08	17SEP08	60h
ADR01220	RIPRAP CL 3 @ 16+97 RT (SITE 1)	4	17SEP08	18SEP08	116h
AEC01240	SEDIMENT LOG RT	2	18SEP08	18SEP08	116h
AEX01260	REINFORCED BACKFILL (SITE 1)	62	02OCT08	14OCT08	-25h
AEX01280	PLACE TOPSOIL (SITE 1)	4	14OCT08	14OCT08	-25h
AEX01300	AGG SURFACING (SITE 1)	5	14OCT08	15OCT08	-25h
ATC01320	SWITCH TRAFFIC (SITE 1)	4	15OCT08	15OCT08	-23h
ADR01340	E/UB 24 CMP @ 16+97 LT (SITE 1)	5	15OCT08	16OCT08	-23h
AEX01360	DITCH GRADING (SITE 1)	3	16OCT08	16OCT08	-23h
AEC01380	SEDIMENT LOG LT	3	16OCT08	16OCT08	-18h
SITE 2					
AEC02020	SILT FENCE (SITE 2)	7	29JUL08	30JUL08	112h
ADR02040	UNDERDRAIN OUTLET @ 25+25 (SITE 2)	10	14AUG08	15AUG08	18h

5.2.3.1 Preliminary Construction Schedule

Subsection 155.02 of the Standard Specifications requires that three copies of a preliminary construction schedule (PCS) be submitted at least 7 days before the preconstruction conference. The PCS is a written narrative detailing the Contractor's contract activities for the first 45 calendar days after the NTP is issued. Seven calendar days after the preconstruction conference, the PCS must be accepted, or rejected and returned for revisions. The Contractor should not be permitted to start any work, except mobilization, traffic control (e.g., erection of construction signs), and Section 637 work (e.g., installing the field office and temporary electric service) until the PCS is approved.

The PCS should be reviewed to determine if it generally represents those activities that logically should occur in the beginning of the specific type of project. This could involve all traffic control, as on an urban road rehabilitation project; erection of an onsite batch plant for a remote paving or concrete project; or only time for material ordering and delivery for a pre-manufactured installation (e.g., precast guardwalls). The Project Engineer's review must consider the type of project and need not be overly critical. The PCS should also be used to plan and schedule the Government's initial onsite personnel and equipment needs.

5.2.3.2 Initial Construction Schedule

The Standard Specifications require that three copies of the initial construction schedule for the total contract work be submitted within 30 calendar days after the NTP is issued. This initial schedule must be accepted, or rejected and returned for revisions within 14 calendar days after receipt by the Government. This initial construction schedule, whether in the BCM or CPM format, is of particular importance. The Contractor's initial construction schedule should show how it plans to begin, sequence, and complete the principal phases of work within the time allotted by the contract.

It is the Contractor's initial construction schedule that normally warrants the most thorough review by the Government. Once accepted, this initial schedule will establish the basis against which all future schedule changes or updates and claims will be compared and justified. The Government's review should carefully consider the following:

- each work activity on the schedule and the time proposed for its completion;
- unrealistic production rates based on proposed crew size or number of equipment;
- any impractical sequencing of work activities either for contractual reasons (e.g., impermissibly staged or phased construction), physical constraints (such as assuming access where there is none), or for improper workmanship or aesthetic (e.g., placing final asphalt surface before construction of adjacent curb); and
- any actions involving the Government such as shop drawing approvals or time allotted for testing.

All reservations should be documented in writing and returned to the Contractor for resolution before final acceptance of the schedule. If it is determined that there are no contractual or supportable operational reasons for rejecting an optimistic schedule, all reservations should still

be included in the acceptance letter. By accepting an unrealistic schedule from the Contractor, the Government could be at a distinct disadvantage when defending against any future delay or impact claims.

The FAR permits the withholding of progress payments if the Contractor fails to submit its schedule within the time prescribed. Progress payments should be withheld until receipt and acceptance of the Contractor's initial construction schedule. Progress payments may be withheld, whole or in part, if schedule updates are not submitted as required. Prudent judgment should be used in withholding payment due to disagreements with the Contractor concerning its submitted schedule. Generally, if the required initial schedule has been submitted in good faith, but is not acceptable for clear, objective reasons, or if the approved schedule has proven obsolete and the Contractor has failed to submit a requested update, the maximum ten percent retainage provision contained in FAR Clause 52.232-5, Payments Under Fixed-Price Construction Contracts, is usually more appropriate than total withholding of payments. Minor problems do not normally justify the withholding of progress payments.

5.2.4 SCHEDULE UPDATES

FAR Clause 52.236-15, Schedules for Construction Contracts, and Subsection 155.06 of the Standard Specifications both require the Contractor to document actual progress on the approved construction schedule. Three copies of an updated construction schedule must be submitted at least every 8 weeks or when any delay or change occurs as outlined in the Standard Specifications. The special contract requirement may specify a different submittal frequency.

Construction schedules, especially those in the CPM format, should be updated frequently because any change in production or other events that impact time can make the schedules obsolete, may alter the critical path, and may therefore change the critical activities of work. Schedules reconstructed *after the fact* can be biased so that the true picture of the past work is not shown.

The Project Engineer should compare actual progress with the Contractor's proposed progress to determine the need for requesting revision of the construction schedule, and for taking other action determined appropriate, in consultation with the COE, such as withholding a portion of progress payments. Note that the relationship between money earned and progress is not expected to be linear throughout the project. It is often significantly skewed by high value items such as paving, and by seasonal weather constraints.

If the Contractor's progress is not satisfactory – usually defined as when the progress falls 10 percent behind the current schedule – an updated schedule should be requested, in writing. The request should ask the Contractor to identify any Government caused delays. The request should also notify the Contractor of any intent to withhold retainage due to unsatisfactory progress or to assess liquidated damages if the contract time is about to elapse. It is also prudent to request an updated schedule when issuing a major contract modification, time extension, or a directed acceleration.

All updated construction schedules should be reviewed and accepted, or rejected and returned for revisions. The review can focus on the areas of the updated schedule that have been significantly changed from the previously accepted schedule. The Contractor should identify

these changes in the narrative submittal. Any reservations should be documented in the acceptance letter.

5.3 LIMITATION OF OPERATIONS

Many FLH projects are constructed under traffic. At all times, the Contractor is required to conduct the work in a manner and sequence that ensures the least interference with public traffic. The contract may include specific constraints, such as when closures may occur, how long they may last, and when one-way operations may take place. The contract may also include one or more interim completion dates or phases that specify that certain portions of the project must be complete and open to the public before others may start.

If the Contractor is prosecuting the work in a manner that results in sections of the project being unnecessarily closed when little work is in progress, resulting in substandard accommodation of traffic, or when temporary traffic control costs to the Government are unnecessarily high due to Contractor inefficiency, the Project Engineer may require the Contractor to modify its operations to correct these problems. Because such orders are likely to result in a dispute, they should be discussed with the COE prior to issuance.

The Project Engineer and COE should have an understanding regarding situations that cause unsafe conditions or severe backups. The Project Engineer should be authorized to immediately order appropriate actions to alleviate the problem, rather than delay action, pending discussions with the COE. Such situations may be the result of the Contractor's operations, or they may relate to the need to modify or augment the specified Traffic Control Plan.

In accordance with FAR Clause 52.236-11, Use and Possession Prior to Completion, the Government has the right to order portions of the project to be opened prior to completion of the entire Contract. This clause is applicable only to a situation where the contract provides for the closure of such portions until completion of the entire Contract, but the Government elects to change the conditions of the contract and order the portions opened. Such a decision may make the Government liable for an equitable adjustment, and therefore must be considered a change, ordered in accordance with Chapter 13.

5.4 CONTRACT TIME

The time allowed for completion of the work will be based on a specified completion date as stated in FAR Clause 52.211-10, Commencement, Prosecution, and Completion of Work. All work on the project is to be completed no later than on the date specified in the contract, as adjusted under the contract provisions.

5.4.1 FAILURE TO COMPLETE WORK WITHIN THE TIME ALLOWED

If the Contractor fails to complete the work by the close of business on the specified completion date (as adjusted), the charge of contract time and the associated liquidated damages will include each calendar day between the specified completion date and the actual date of substantial completion.

Substantial completion is defined in Subsection 101.04 of the Standard Specifications as:

> *The point at which the project is complete such that it can be safely and effectively used by the public without further delays, disruption, or other impediments. For conventional bridge and highway work, the point at which all bridge deck, parapet, pavement structure, shoulder, drainage, sidewalk, permanent signing, and markings, traffic barrier, safety appurtenance, utility, and lighting work is complete.*

Liquidated damages at a reduced rate will then be charged beginning with the day after substantial completion and ending with the date of final completion and acceptance (See Subsection 108.04 of the Standard Specifications).

5.4.2 METHODS OF ADJUSTING TIME ALLOWANCE

Adjustments in contract time are permitted under the following clauses:

- FAR 52.211-10, Commencement, Prosecution, and Completion of Work
- FAR 52.211-18, Variation in Estimated Quantity
- FAR 52.242-14, Suspension of Work
- FAR 52.236-2, Differing Site Conditions
- FAR 52.243-4, Changes
- FAR 52.249-10, Default (Fixed Price- Construction)

General information regarding time extensions is included in Subsection 108.03 of the Standard Specifications, Determination and Extension of Contract Time.

Increases in contract time may be authorized as follows:

- By supplemental agreement that includes a revised fixed completion date.
- By change order that provides a unilateral revised fixed completion date for performing work for which there has been no agreement.
- By supplemental agreement issued in settlement of a claim.

- By CO's decision in accordance with FAR Clause 52.249-10, Default, and FAR Clause 52.233.1, Disputes.

5.4.3 CONSIDERATION OF TIME ADJUSTMENTS

When contract modifications are issued, consideration must be given to the modification's effect on overall Contract time. Failure to grant a time extension for increased work or changed work with a definite bearing on time for performance may result in an acceleration claim. If it is critical to maintain the original contract completion date, it may be in the Government's interest to compensate the Contractor for accelerating the work to meet the original completion date. Generally, time adjustments will not be made unless the modification or change in work is on the critical path activities.

When an adjustment in Contract time is negotiated, the proposed adjustment must be in accordance with the contract provisions and fair to both the Contractor and the Government. The actual time allowed should be tailored to the particular *change* situation, considering the *effect on non-changed work* as to total contract performance time. Consider the time of performance of the changed work and the need to acquire and mobilize/demobilize equipment to perform the work.

Unusual weather patterns impacting the work should be considered as appropriate. The Project Engineer should obtain rainfall information from local weather data centers for the past 10-year period to provide a base for any adjustments. Rainfall and other weather conditions should be documented throughout the life of the project.

Ideally, Contract time should be determined by the effect of the change on the construction schedule that is current at the time of the change. Each modification should be clear and specific as to its effect on Contract time such that all parties recognize and agree to the impact of the changed work.

A reduction in performance time to less than the original number of days allowed in the Contract is rarely necessary, but is provided for under the contract where early delivery of the facility is in the public interest. When a decrease in performance time is contemplated, the contract modification should be negotiated (a unilateral order is inappropriate) and an equitable adjustment is normally required.

The contract permits the Contractor to request a time extension if it is impossible, for reasons beyond its control, to complete the work on time. Such a request should be made prior to the expiration of the Contract time. The request must be made in writing, and it must outline the reasons and justification for the time extension, citing the Contract clause(s) that provides the basis for granting the extension. The Project Engineer should evaluate such a request and forward it, along with his/her recommendation, to the COE for a determination. Any resultant change in contract time shall be made by contract modification.

5.5 WORK SUSPENSIONS AND STOP ORDERS

5.5.1 DEFINITIONS

Note that the word *suspension* is commonly used in the FAR as meaning a suspension for the convenience of the Government pursuant to FAR Clause 52.242-14, Suspension of Work, i.e. a suspension that implies liability or potential liability to the Government. In FLH, on the other hand, the word *suspension* has been used to describe directives to suspend due to unsuitable weather or failure of the Contractor to comply with contract requirements, neither of which implies liability to the Government. The following terms are defined to distinguish between these conditions.

1. **Suspension:** An interruption, delay, or halting of all or any part of the work by, and for the convenience of the Government, or resulting from an act (or failure to act) of the CO. (See FAR 52.242-14, Suspension of Work).

2. **Stop Order:** An interruption, delay, or halting by the Government, of all or any part of the work resulting from unsuitable weather or soil conditions, an act of the Contractor, or the failure of the Contractor to act. (See Subsection 108.05 of the Standard Specifications)

5.5.2 SUSPENSION OF CONTRACTOR OPERATIONS

FAR 52.242-14 permits work to be suspended for the convenience of the Government. If a suspension is for longer than a *reasonable* time, the Contractor may be entitled to an equitable adjustment. What is *reasonable* depends on the circumstances, and the liability of the Government for not suspending should be compared to the possible additional cost due to a suspension.

For example, if the Contractor begins excavating from a Government-designated borrow source, and it becomes apparent that the material may be unsuitable for its intended use, a suspension for one day to decide if the source is in fact unsuitable would probably be reasonable. If the Government decided after one day that the source was acceptable, it could argue that no liability was incurred.

Authority to issue emergency or urgent suspensions within the window of *reasonableness* may be delegated to the Project Engineer. Once it is recognized that the suspension will result in liability to the Government, the letter or notice ordering the suspension of work, or documenting the suspension after the fact, shall be issued by the COE or the CE depending on Division delegations.

Constructive suspensions of work can occur by failure of the Government to act. For example:

- Failure to approve shop drawings or mix designs within the time period specified in the contract, or within a reasonable time if not specified.

- Failure to perform timely inspections.

- Delays due to defective specifications.

5.5.3 STOPPAGE OF CONTRACTOR OPERATIONS

The Standard Specifications permit the CO to stop the work wholly or in part due to the following:

1. **Weather or soil conditions considered unsuitable for prosecution of the work:**

   When the Contractor fails to act responsibly by voluntarily stopping operations when weather or soil conditions are unsuitable, the Project Engineer may issue a letter ordering work to stop. Normally, the Project Engineer would only take this action if the Contractor's continued work was causing damage to previously completed work or adjacent public or private property, or was otherwise causing potential liability to the Government.

   In the letter, the Project Engineer should describe the conditions that are unsuitable for work and the condition(s) under which work can be resumed.

   No order is required when the Contractor elects to stop work because of unsuitable conditions, which are usually of short duration and expected during the project duration. However, the project records should document and indicate such periods of no work.

   For completion date contracts, there is no *counting* of contract time; therefore, normal unsuitable weather or soil conditions have no effect on the completion date. However, a time extension and new completion date may be established if the Contractor can demonstrate the amount of unsuitable weather is extraordinary or unusually severe. Such a demonstration will require careful review and documentation of weather history in the project area. If the Government agrees the weather is unusually severe, the completion date may be adjusted by contract modification. Such an adjustment is not dependent on a stop order having been issued by the Government; it is only dependent on a demonstration of unusually severe weather having adversely impacted the Contractor's progress.

2. **Failure of the Contractor to:**

   a. Correct conditions unsafe for the workers or the general public.

   b. Carry out orders given by the CO.

   c. Perform any provision of the contract.

   In cases where these conditions exist, the Project Engineer should issue the Contractor a written notice covering the deficiencies that require correction. The notice should include a statement that failure to immediately take corrective action may result in the issuance of a stop order covering the work in question. At the same time, the Project Engineer should notify the COE by telephone and request instructions.

If the Contractor refuses or fails to correct the identified deficiencies, the Project Engineer may issue a stop order for periods of short duration due to reasons 1 and 2.a above. Stop orders for long durations or those due to reasons 2.b or 2.c shall be issued by, or have the concurrence of, the COE or the CE.

Stop orders should cover only those items of work that are deficient. Stopping other work may be construed as punitive; stop orders or suspensions are not to be punitive.

5.5.4 CONTENT OF SUSPENSIONS AND STOP ORDERS

Both a suspension and a stop order should follow a letter format and include the following information:

1. Date, Contractor's name and address, contract number, and project designation.

2. Reason for suspension or stop order and whether the order pertains to all work underway or only part of the work. If the suspension or stop order affects only part of the work, describe the affected portion of the work.

   Stop orders covered by Subsection 108.05 of the Standard Specifications should cite that provision.

   Suspensions of work for the convenience of the Government should cite FAR Clause 52.242-14, Suspension of Work.

3. Effective date of suspension or stop order.

4. Statement that work will not be resumed until directed in writing. For work stopped under Subsection 108.05 of the Standard Specifications, include a description of what conditions must exist before the Contractor can resume work.

5. A statement regarding the effect of the suspension or stop order on the contract time and amount. If the Government recognizes an unusually severe weather related delay, note that a contract modification may be requested adjusting contract time.

   For other stop orders covered by Subsection 108.05 of the Standard Specifications, note that there will be no change in Contract completion date or Contract amount.

   For suspensions of work for the convenience of the Government, state that any adjustment(s) to the contract completion date or amount as a result of the suspension will be made by contract modification.

The Contractor should be requested to acknowledge receipt of all suspensions and stop orders. If the Contractor's superintendent is absent, or due to strained relations, refuses to acknowledge the letter, its delivery should be noted in the diary and a copy sent to the Contractor's main office.

Examples of a stop order and a suspension are included in Exhibit 5.5-A and Exhibit 5.5-B, respectively.

Exhibit 5.5-A Example Stop Order

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Ave
Lakewood, CO 80228-1010

December 21, 2008

Refer to: HFCO-16

Mr. Charles Johnson
Project Manager
Billings Construction
459 Sky Drive
San Francisco, California 95001

Dear Mr. Johnson:

Subject: CA PFH 132-1(2), Mary Road

According to Section 153 of the FP-03, you are responsible for Contractor Quality Control Testing, providing inspection, and **exercising management control** to ensure that the work conforms to the contract requirements. Currently, foamed asphalt stabilized base course is being covered with hot asphalt concrete prior to the submission of the test results to the FHWA field office. It appears your paving operations will have completed the first lift of hot asphalt concrete pavement today, and all indications are you intend to begin the second lift of hot asphalt concrete pavement tomorrow. As of today, you have not provided any of the test results for Items 41801AB, Foamed asphalt stabilized base course, 125 mm depth. In addition, test results for Item 40101BCEB, Hot asphalt concrete pavement are behind by several days, and there is no indication of your current pay factor. Please refer to Subsection 154.04 of the FP-93, tests results on material being incorporated into the work must be reported within 24 hours. **Payment for work may be delayed or the work suspended until test results are provided**.

In accordance with Subsection 154.04, and 108.05 of the FP-03, you are hereby ordered to stop the placement of Item 40101BCEB, Hot asphalt concrete pavement until the following are provided:

1) All test results for materials incorporated into the project from the date of the notice to proceed through today's date have been provided to the FHWA project field office.
2) Submit a revised plan of operations for contractor quality control which includes specific information explaining how operations will be managed in the event material items incorporated into the work do not conform to the contract requirements.

Should you have any questions, please do not hesitate to call me at (303) 716-2155.

Sincerely yours,

Gene Dodd, P.E.
Construction Operations Engineer

BUCKLE UP AMERICA

Exhibit 5.5-B Example Suspension Letter

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 210A
Lakewood, CO 80228

September 12, 2007

In Reply Refer To: HFCO-16

Mr. Shane Williams
Project Manager
Koffee Company
101 Kamdon Blvd
Kapolei, HI 96727

Dear Mr. Williams:

The subject of this letter is HI PRA HELA 10(2), Lava Fields, Haleakala National Park, suspension of work on concrete at-grade slab. In accordance with the provisions of FAR Clause 52.242-14, Suspension of Work (Apr 1984), you are hereby directed to immediately suspend work on the construction of the at-grade concrete slab and footers as detailed on plan sheets S.1 to S.7. The suspension is for five calendar days, September 13, 2007 through September 17, 2007. You will be advised at that time if the suspension on this construction activity will continue.

This suspension is to allow the Government time to make revisions to the construction details. All other contract work is unaffected by this partial suspension. In particular, work zone traffic control surveillance and maintenance must be continued.

If you have any questions, please contact me at 720-963-3418.

Sincerely yours,

William R. Hakala, P.E.
Construction Operations Engineer

MOVING THE AMERICAN ECONOMY

5.5.5 CONTENT OF RESUMPTION ORDERS

After the reasons for a suspension or stop order have been resolved, FLH should provide a written resumption order to the Contractor to rescind the suspension or stop order. The resumption order should be signed by, or have the concurrence of, the official who signed the suspension or stop order. The order should include the following information:

1. Date, Contractor's name and address, contract number, and project designation.

2. Reference to the suspension or stop order, and identification of the item(s) of work affected by the resumption.

3. Effective date of resumption.

4. A statement regarding the effect of the suspension or stop order on the contract time and amount (See Section 5.5.4).

Resumption orders after periods of short duration may be made effective immediately if conditions permit normal resumption of the work. After long suspension periods, resumption orders should be issued sufficiently in advance of the effective date to permit the Contractor to coordinate the start-up of work. The Contractor should be requested to acknowledge receipt of all letters to resume work

Chapter 6 – SURVEYING AND STAKING
TABLE OF CONTENTS

Section		Page
6.1	General	6-1
6.2	Verification of Staking Information	6-2
6.3	Verification of Survey Control in the Field	6-3
6.4	Establishing and Referencing Centerline and/or Other Roadway Control	6-4
6.5	Permanent Monuments	6-5
6.6	Bridges	6-6
6.7	Retaining Walls	6-7
6.8	Slope Stakes	6-8
6.9	Fine Grade Control Stakes	6-11
6.10	Sight Levels	6-12

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 6.8-A Example Slope Stake and Reference Stake Markings and Notes....6-10
Exhibit 6.10-A Sight Levels....6-13

CHAPTER 6

SURVEYING AND STAKING

6.1 GENERAL

An FLH survey to obtain final design information and to set initial control for staking during construction is usually completed before the award of the construction contract. Practices vary among Divisions. Individual project situations may also vary. Some contracts will require more survey effort from the Contractor than others. Refer to the contract for specific staking responsibilities and requirements, including survey tolerances.

Survey field verification varies greatly by Division. Some Divisions perform extensive survey field verification and some perform almost none. Ultimately it is up to the Division to decide which practices within this chapter are applicable for their purposes.

6.2 VERIFICATION OF STAKING INFORMATION

All information to be provided to the Contractor and/or Contract Surveyor, both in printed and digital form, must be cross-checked against the plan sheets for consistency. This cross-check is to be performed by the Project Engineer under the guidance or with the assistance of the FLH Survey Team (if an FLH survey team is assigned to assist in this task). This cross-check is to be performed prior to the release of any staking information to the Contractor. The Project Engineer should bring any discrepancies to the immediate attention of the COE and Design Section for resolution.

6.3 VERIFICATION OF SURVEY CONTROL IN THE FIELD

Initial project surveys are usually performed by the FLH Survey Staff or a consultant surveyor under a separate contract, before the award of the construction contract. Such surveys will provide control points to be used later by the Contractor for construction, and by FLH staff for quality assurance. The Project Engineer and FLH Survey Team are responsible for verifying that the information regarding survey control in both the special contract requirements and the construction plans match what exists in the field (if an FLH survey team is assigned to assist in this task). A Survey Control Plan may be prepared by the FLH Survey Team in some Divisions, which will aid both the Project Engineer and the Construction Surveyor in the assessment. There will also be cases where additional control will be required to facilitate the performance of field checks during construction.

The Contractor has a contractual obligation to notify the Government of any alleged errors in the Government survey control. If the Contractor identifies an issue, the Project Engineer should immediately consult with the FLH Survey Team regarding an appropriate course of action. The Contractor must also be kept aware that if the Government control points are to be disturbed for any reason during construction, new control points must be set in an area that won't be disturbed, and must be verified by the Government prior to disturbance of the original points.

Any survey work needed regarding setting and resetting control points should be done as soon as possible to avoid delaying the Contractor's operations. This work can be performed in the following ways:

- By FLH Survey Staff
- By Contractor's surveyor under a Contract Modification or Miscellaneous Survey Item
- By contracting with a local Surveying Company

6.4 ESTABLISHING AND REFERENCING CENTERLINE AND/OR OTHER ROADWAY CONTROL

At some point during construction of the project, the Contractor will establish the centerline, often setting shoulder points in the same operation. The degree of accuracy depends on which phase of construction is taking place. Staking tolerances are found in the specifications.

During initial grading, the inspector can check work by measuring from the slope stakes of the slope stake reference hubs (providing the project is using reference hubs). When doing this, the inspector should line up with the reference hub or the slope stake on the other side of the road, ensuring that the centerline is intercepted at the station listed on the stake. Subgrade may be checked using any approved Division-specific method. The inspector should bring work performed outside of FHWA tolerances to the Contractor's attention for corrective action.

When finishing subgrade, fine grade control stakes (blue tops) or stakes for string lining are usually set by the Contractor. Usually, a Contractor will set the horizontal location of grade control stakes for about 1,000 meters of roadway, and will then come back to set the proper elevations. To check the work at this stage, the inspector should have a theodolite and an electronic distance measuring device. Radial survey methods can then be used. By occupying a point of known coordinates and having a similar backsight, the Contractor's grade control stakes can be checked by comparison with points set at their coordinates.

Regardless of the method chosen for checking, the Project Engineer should require as independent a check as is feasible. Occupying, or resecting from points different from those used by the Contractor, or using a different method, are possible approaches to checking the Contractor's grade control stakes. The purpose of an independent check is to lessen the chance of duplicating any error. Points set for checking may not match the Contractor's points exactly, but they should fall within tolerances.

Where construction plans show equations in the stationing, these equations must be left in, and the station ahead must not be altered. The back station may be corrected if any error or distance is found when rerunning the line. This is necessary to preserve the relation of centerline to landmarks.

If the stationing at the crossing of property lines does not agree with the original plans, it will be necessary to equate to the original station ahead. The Project Engineer should coordinate with Project Development when any changes affect the right-of-way description.

The beginning and ending stations of the project should be left as shown on the plans, unless a change has been approved by Project Development through the COE. If errors, equations, or centerline corrections cause a beginning or ending station to be in a significantly different location relative to the geometrics of the road and physical features of the right-of-way, the Project Engineer should coordinate with the COE to see if an equation station or a revision is appropriate.

6.5 PERMANENT MONUMENTS

Permanent monuments, such as United States Coast and Geodetic Survey (USCGS) monuments, Public Land corners, State coordinate points, Corps of Engineers' monuments, or property corners, might be in the way of the work. The contract should provide for reestablishment of such monuments following construction, in accordance with legal and/or agency requirements. If a monument is discovered that is not called out in the contract, the Project Engineer should contact the Construction Surveyor as soon as possible for instruction.

6.6 BRIDGES

The Government provides initial control from which the Contractor can stakeout the bridge. The Contractor determines what additional control is needed for construction purposes and is responsible for staking it. The Contractor is required to submit this staking information to the Project Engineer. The Project Engineer may consult with the FLH Survey Team to verify its accuracy.

Bridge tolerances are much tighter than roadway tolerances. The Project Engineer should allow enough time to perform checking before the Contractor's scheduled concrete operations.

6.7 RETAINING WALLS

This section is written for cast-in-place concrete, cantilever retaining walls. The Project Engineer can apply most of the ideas presented to other types of walls as well. However, each wall type (e.g., cast-in-place, reinforced earth, gabion, bin wall, keystone block, etc.) has some unique elements. For an unfamiliar wall type, the Project Engineer may contact the manufacturer to gain insight for laying it out. Actual layout is done by the Contractor.

Unlike bridges, locations of retaining walls may not be precisely established on the plans. In many situations, the contract requires the Project Engineer to field check the beginning and ending station of the wall before the Contractor can order materials or begin work.

A common method used to check the Contractor's staking involves setting an offset line parallel to the wall. The inspector measures from this line to check the wall. On walls, setting the radius points is sometimes more practical and useful. Once the footing for a wall is complete, the Contractor often places control on it. This is convenient to use. It is a good idea to check the location of the top of the form to ensure the proper batter is being obtained.

The Project Engineer may rely on the Contractor's control after checking its accuracy. Any supplemental control set by the Contractor must be verified before it may be used for construction layout.

6.8 SLOPE STAKES

This section assumes that project personnel have some experience with slope staking. If not, the Project Engineer should request or provide special training. Many survey books describe this subject only briefly in comparison to the detailed explanations provided for traversing, running levels, and other aspects of surveying. When explanations for slope stakes are given, they often relate to flat country work, which is not practical for most FLH projects. See Exhibit 6.8-A for an example of slope stake and reference stake markings and notes.

Before the Contractor does any staking, the Project Engineer should:

- Closely review the printed earthwork listings and the plotted cross-sections to understand the overall earthwork and stakeout required. Close study of plotted cross-section data proves very helpful in understanding the intended template for the road.
- Note anything appearing odd, or contrary to the plans or contract, for later field checking.
- Review the earthwork and staking data with the Contractor and its staking crew.
- Discuss write-up and color coding of slope stakes and their reference stakes, and whether or not the cuts marked on the slope stakes are to ditch grade or shoulder grade.
- Have the Contractor and its staking crew demonstrate how they will mark the catch and reference stakes. The Contractor also should explain where substantial differences between the data contained in the furnished field notes and actual ground shots will be recorded.
- Point out that care must be taken to ensure measuring is accurate, particularly when staking is done with a hand level, rod, and cloth tape.
- Instruct the Contractor to submit accurate and timely staking notes throughout the life of a project, noting that failure to furnish staking notes on time prevents or delays review of that work, and causes delay to the total operation.

Once the Contractor has started placing slope stakes in the ground, the Project Engineer should look at the staked line to see if it flows smoothly with the terrain. If there is a slope stake out of line, the Project Engineer should check the plans to see if there is a reason for it. An inlet basin for a culvert may cause a station to appear out of line. If there is no apparent reason for the misalignment, the Project Engineer should check the slope stake book and compare it to the writing on the slope stake. The Project Engineer should check data recorded on slope stakes and reference points (R.P.) for legibility, as well as for content.

The Project Engineer's method for review of the Contractor's staking depends on the equipment available. If a total-station is on the job, the Project Engineer can shoot catches (slope stake positions) in from control points. These can be compared to slope stakes the Contractor has set. Unless something was wrong with the original topographic data, the two should compare closely. The Project Engineer should check the Contractor's stakes to see that they meet the horizontal and vertical tolerances for the contract.

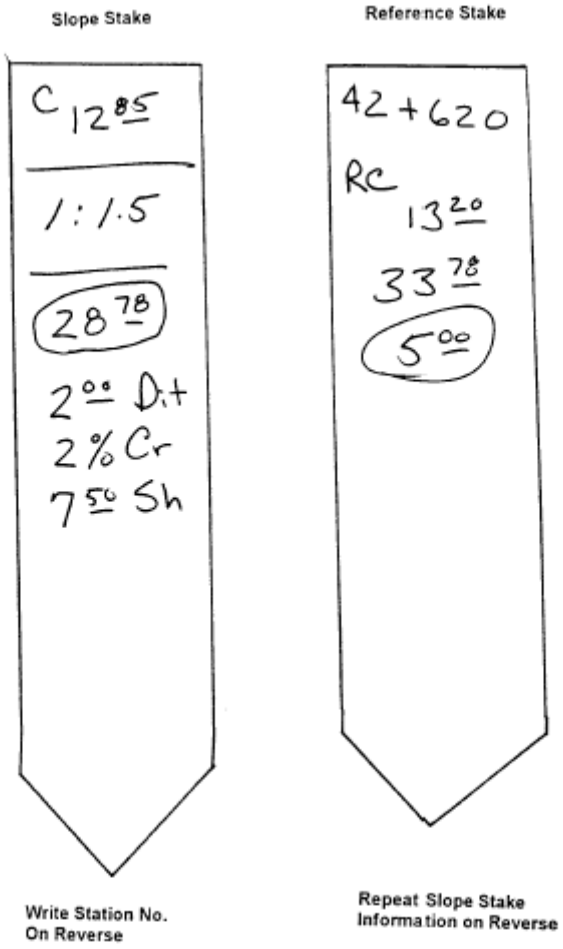
Sampling is permissible for checking staking. Unless sample size is specified, the Project Engineer may select about 10% of the stakes in any group being tested. The sample selection

method must ensure all stakes in the group have an equal selection chance. The average error in the sample is taken to represent the mean error in the work being checked. Vertical and horizontal errors are best considered separately.

If any error exceeds specification tolerances, corrective action is warranted. Some time spent at that point to determine why the error is so large will likely be worthwhile. Check both parties' equipment, methodology, and conventions, such as measuring from and to the center of stakes or hubs. Government staff might work with the Contractor's crew for a time, or observe its work very closely. The COE might be asked to provide or arrange for help if necessary to find problems.

When re-checking a rejected unit of work, one should take a new sample and proceed as described above.

Exhibit 6.8-A Example Slope Stake and Reference Stake Markings and Notes



Slope Stake
The intersection of the stake and ground is 12.85 meters above grade of ditch.
The cut slope ratio is 1 unit vertical to 1.5 units horizontal.
The stake is 28.78 meters from centerline. Some conventions show distance to bottom of slope.
(Optional) The template at this station has a 2.00 meters wide ditch. Ditch depth might be shown if it varies.
(Optional) The roadbed is crowned at 2% at this station.
(Optional) The subgrade shoulder break is 7.50 meters from centerline at this station.

Reference Stake
The stake is at Station 42+620
The stake is a reference cut (RC), 13.20 meters above the grade of the ditch.
The stake is 33.78 meters from centerline.
The stake is 5.00 meters horizontally behind the slope stake.

6.9 FINE GRADE CONTROL STAKES

Fine grade control stakes (red tops, blue tops, etc.) can initially be checked similarly to checking slope stakes. The eyeball method can show a large bust in the staking, but certainly should not be relied upon very often. The Project Engineer should require closed level loops, and should check the documentation. Taping off slope stakes or slope stake reference hubs does not ensure the required accuracy. Section 6.4 contains additional information on checking grade control stakes. Discussion of sampling in Section 6.8 may be applied to checking fine grading control points. The checking procedures are the same for all fine grading control points. Definition of various grade control stakes by color code is often in the special contract requirements.

In some situations, the grade control stakes have to be fine-tuned by the Project Engineer to get a smooth ride, to ensure proper drainage of the surface, or both. In a very curvilinear alignment, the tangent runouts can get shortchanged. The Project Engineer may have to adjust the designed superelevation to soften dips or humps.

6.10 SIGHT LEVELS

Sight levels are tools one person can use to check the crown, superelevation, or linear grade without a level and rod. These are three metal rods each welded to a small base to enable them to stand vertically unsupported. The main rod has a small *tee* section of tubing welded horizontally to the top that serves as a sight and target. To see if the three levels are all on the same plane, the inspector chooses any random cross-section of the roadway and places a level on the right shoulder, one on the center of the road, and the third on the left shoulder. The inspector then sights from one of the levels on either shoulder to the one on the other shoulder. The inspector measures the amount of crown by how far the top of the center level is above the line of sight on centerline. A string line will settle arguments. The levels are usually painted with alternating colored stripes at fixed increments.

See Exhibit 6.10-A for an illustration of the use of sight levels.

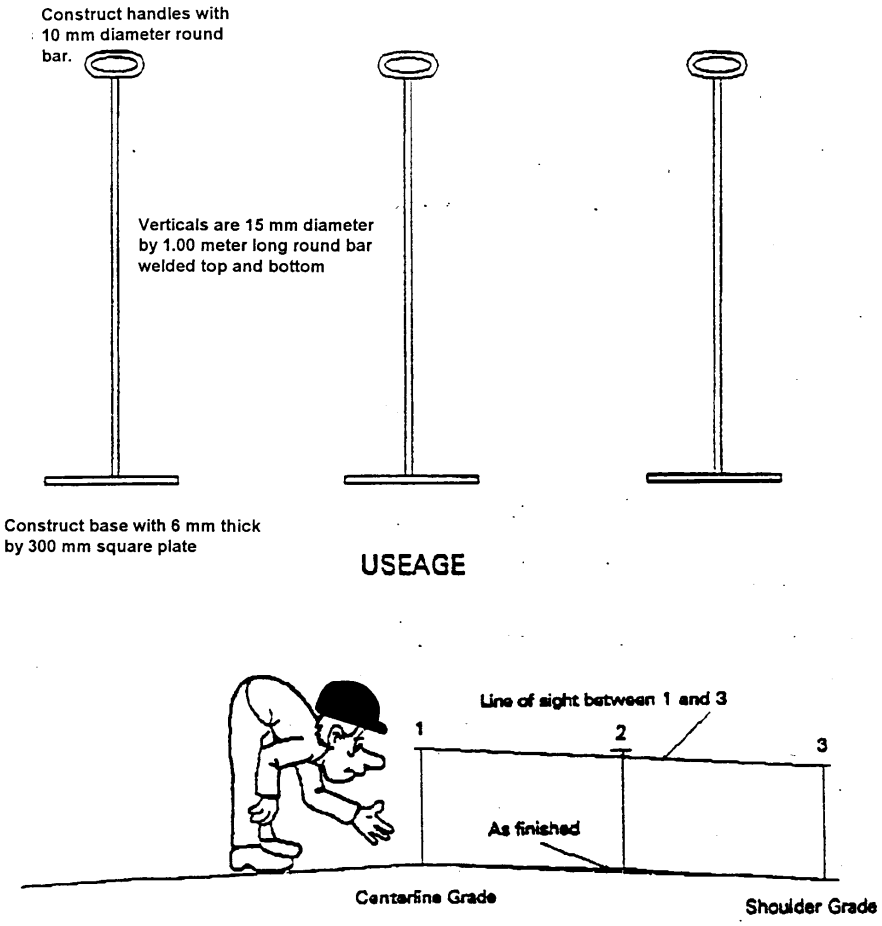
To check a roadway section that has a turnout or passing lane, the inspector places one level on centerline and another on the shoulder. Then the third level is placed in between to see that the crown at centerline is carried over the entire length of the template.

The inspector may use this same method of placing three levels across the roadway at a cross-section to check the superelevation by sighting over the top of the handles. This method also works for checking the linear grade of the roadway between stations. The inspector places two levels on consecutive control stakes and the third level in between, and sights over the top to see if they line up.

The levels give a quick check of uniformity and smoothness of the subgrade, base aggregate course, and later courses. Using levels on vertical curves, horizontal curve transitions, and curvilinear alignment will not work as described.

The main use of levels is to roughly check that the grade is conforming to the template shown in the contract drawings.

Exhibit 6.10-A Sight Levels



Chapter 7 – QUALITY CONTROL/QUALITY ASSURANCE INSPECTION
TABLE OF CONTENTS

Section **Page**

7.1 General 7-1

7.2 Character of Workers and Adequacy of Equipment 7-2

7.3 Contractor Quality Control Plan (CQCP) 7-3
7.3.1 General 7-3
7.3.1.1 FAR and FP Requirements 7-3
7.3.1.2 Traditional Inspection vs. Quality Management System 7-4
7.3.1.3 Why not just define the minimum quality control requirements in the contract? 7-4
7.3.2 Development of a CQCP 7-6
7.3.2.1 Organizational Structure 7-6
7.3.2.2 Process Control Testing 7-7
7.3.2.3 Inspection/Control Procedures 7-8
7.3.2.4 Subcontractors and Suppliers 7-10
7.3.2.5 Manufactured Materials 7-10
7.3.2.6 Records and Documentation 7-11
7.3.2.7 Personnel Qualifications 7-11
7.3.3 Acceptance of the CQCP 7-11
7.3.3.1 Minimum Necessary 7-13
7.3.3.2 Incomplete/Imperfect Plans 7-13
7.3.3.3 Conditional Acceptance 7-13
7.3.3.4 Partial Plans 7-13
7.3.4 Contract Administration 7-14
7.3.4.1 Agency Role Responding to Problems 7-14
7.3.4.2 Defective Work 7-14
7.3.4.3 Contractor Personnel Problems 7-15
7.3.4.4 Contractor Evaluation 7-15

7.4 Record and Report Preparation 7-16
7.4.1 General 7-16
7.4.2 Project Diaries and Inspector's Daily Reports (IDRs) 7-16
7.4.2.1 Project Diaries 7-16
7.4.2.2 Inspector's Daily Report (IDR) or Diary 7-18
7.4.3 Photographs 7-18

7.5 Contract Inspectors 7-22
7.5.1 General 7-22
7.5.2 Contract Inspection Contract (CIC) 7-22
7.5.3 Task Orders 7-22
7.5.4 CI Duties 7-23
7.5.5 Project Engineer Duties 7-24
7.5.6 CI Time and Attendance 7-24
7.5.7 CI Invoices 7-26
7.5.8 CI Performance and/or Conduct 7-26
7.5.9 CI and Government Furnished Equipment 7-27
7.5.10 CI Releases and Transfers 7-27

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 7.3-A Outline of CQCP Requirements per FP-03, Subsection 153.02 7-5
Exhibit 7.3-B Example CQCP Acceptance Letter 7-12
Exhibit 7.4-A Inspector's Daily Report 7-20
Exhibit 7.5-A Example Contract Inspection Time Sheet – Receiving Report 7-25

CHAPTER 7

QUALITY CONTROL/QUALITY ASSURANCE INSPECTION

7.1 GENERAL

This chapter addresses the following topics related to construction quality management:

- The Contractor's responsibility to perform work in a skillful manner, using suitable personnel and equipment;
- The contents, structure, and implementation of an acceptable Contractor Quality Control Plan (CQCP);
- Quality assurance responsibilities of FLH personnel; and
- Duties and authority of contract inspectors (CIs).

7.2 CHARACTER OF WORKERS AND ADEQUACY OF EQUIPMENT

FAR Clause 52.236-5, Material and Workmanship, requires the Contractor to perform work in a skillful and workmanlike manner. The Government may order the removal of any Contractor employee who is incompetent, careless, or otherwise objectionable. Such removal is a serious action that may subject the Government to liability if the removal is later deemed by a court to be arbitrary or in bad faith. Normally, the COE or higher CO must sign such an order.

Unless otherwise specified, FAR Clause 52.236-5 allows the Contractor to propose and use an alternate to any equipment, materials, or processes specified in the contract by catalog number, trade name, make, or other proprietary description, as long as the CO determines the equipment, material, or process proposed by the Contractor to be equal to that specified. Because FLH seldom specifies proprietary equipment, materials, or processes, this issue rarely arises. When it does, approval or disapproval should be made in good faith, as a contract modification.

FAR Clause 52.236-6, Superintendence by the Contractor, requires the Contractor to assign to the work a superintendent satisfactory to the CO. If a superintendent is deemed to be unsatisfactory and removal is contemplated, the action should be taken by the COE or higher CO as delegated. Such removal is a serious action that may subject the Government to liability if the removal is later deemed by a court to be arbitrary or in bad faith.

The Project Engineer should keep the COE fully informed of any failure on the part of the Contractor to provide suitable personnel and equipment, and actions taken or recommended.

The Project Engineer should maintain sufficient records on the Contractor's personnel and equipment to support actions and recommendations, and to document the facts in case a claim should arise or the Contractor should dispute any contract action.

7.3 CONTRACTOR QUALITY CONTROL PLAN (CQCP)

7.3.1 GENERAL

The CQCP is a framework for the Contractor's process for delivering quality construction. The plans and specifications define the expected results or outcome. The CQCP outlines how those results will be achieved. While it is not possible to determine from the CQCP whether the level of construction quality will be acceptable, it is possible to verify that the Contractor, as an organization, has addressed the basic elements of its quality process. The following guidelines address, not only what the CQCP should contain for it to be acceptable to the Government, but also how the Government should approach its quality assurance process to ensure quality without usurping the Contractor's responsibilities.

7.3.1.1 FAR and FP Requirements

FAR Clause 52.246-12, Inspection of Construction, is the foundation and basis for all contract requirements dealing with quality control and quality assurance. In summary, the clause requires the Contractor to:

- Maintain an adequate inspection system and perform inspections that will ensure contract compliance.
- Maintain inspection records and make them available to the Government.
- Assist with any testing and inspection the Government chooses to perform.
- Comply with the contract regardless of the presence of a Government inspector or whether or not Government testing has been, or will be, performed.

Failure to maintain an adequate inspection system subjects the Contractor to suspension and/or ordered correction of not just the work in question, but the inspection system itself. It also subjects the Contractor to an unsatisfactory performance rating that may be used to deny the Contractor future contracts (see Section 12.2).

In addition, under the clause, the Government may:

- Charge the Contractor for the costs of inspections and tests performed on work that the Contractor has said is ready for inspection, but is found to be in noncompliance.
- Order previously completed work to be torn apart for inspection. (If such work is in noncompliance, the Contractor will pay for the inspection and the correction of the work. If it found to be in compliance, the Government will pay for the inspection and disruption to the work.)

Note that nothing in the FAR clause requires that the Contractor's inspection system be described in writing, or that it be submitted to the Government for approval in advance of the work. These requirements are contained in Section 153 of the Standard Specifications (FP). In addition, Section 153 contains a basic outline of what should be included in the CQCP (refer to Exhibit 7.3-A**)**. The outline should be repeated for each major category of construction.

7.3.1.2 Traditional Inspection vs. Quality Management System

Traditionally, highway contractors performed the work subject to comprehensive inspecting and testing by the Government. Work that was in noncompliance was identified by this inspection and required to be corrected or replaced. Avoiding the expense of extensive correction and rework was the primary motivation for the Contractor to perform work correctly the first time. However, if Government tests and inspections were infrequent, this motivation disappeared. Contractors were, in effect, encouraged to emphasize production until the Government inspectors identified quality problems.

Under a Quality Management System (as is required by FAR Clause 52.246-12), the Contractor is obligated by the Contract to consistently perform in accordance with the Contract requirements, whether or not there is Government inspection. Failure to do so is potentially a breach of the Contract, not just a simple matter of correction or replacement.

Note that the goal of diminishing or eliminating the agency's role in the quality control process does not mean the elimination of agency personnel onsite. Current contracting practices require the presence of agency personnel for a variety of purposes, including quality assurance and acceptance of each phase of the work, and making technical decisions with respect to contract quantities and contingent work.

An effective CQCP does not depend on the oversight and interaction of agency inspectors to control quality. The work should be of consistent and acceptable quality whether or not an agency inspector is present.

7.3.1.3 Why not just define the minimum quality control requirements in the contract?

While many of the components of quality control can be defined and included in the contract, there is no "one size fits all" CQCP. Contracts should define the end results or outcomes that the agency expects. They also typically define the testing or quality assurance results that the agency needs to accept the work. But when an agency attempts to define the *how to's* of quality (equipment requirements, personnel qualifications, reports and other submittals), those requirements are typically conservative, costly, and leave little room for contractor efficiencies. One contractor may achieve quality with low paid, marginally trained personnel in combination with comprehensive inspection, testing, and supervision. Another contractor may also achieve quality, but with better qualified, well trained, and well paid employees functioning within a well designed process. The latter approach may require relatively little testing, inspection and oversight, but may require more long-term investments in quality. Either approach may meet the agency's needs, and therefore neither approach is necessarily preferable to the agency. But only the contractor can describe and document the details of its process for delivering quality, and therefore the CQCP must be unique to each contractor.

A CQCP is not a vague, feel good commitment to quality and contract compliance. It is a detailed account of how the people and processes of an individual contractor will function to deliver quality.

Exhibit 7.3-A Outline of CQCP Requirements per FP-03, Subsection 153.02

a. **Process control testing.** List the material to be tested, tests to be conducted, the location of sampling, and the frequency of testing.

b. **Inspection/control procedures.** Address each of the following subjects in each phase of construction:

1. Preparatory phase.

a) Review all contract requirements.
b) Ensure compliance of component material to the contract requirements.
c) Coordinate all submittals including certifications.
d) Ensure capability of equipment and personnel to comply with the contract requirements.
e) Ensure preliminary testing is accomplished.
f) Coordinate surveying and staking of the work.

2. Start-up phase.

a) Review the contract requirements with personnel who will perform the work.
b) Inspect start-up of work.
c) Establish standards of workmanship.
d) Provide training as necessary.
e) Establish detailed testing schedule based on the production schedule.

3. Production phase.

a) Conduct intermittent or continuous inspection during construction to identify and correct deficiencies.
b) Inspect completed phases before scheduled Government acceptance.
c) Provide feedback and system changes to prevent repeated deficiencies.

c. **Description of records**. List the records to be maintained.

d. **Personnel qualifications**.

1. Document the name, authority, relevant experience, and qualifications of person with overall responsibility for the inspection system.

2. Document the names, authority, and relevant experience of all personnel directly responsible for inspection and testing.

e. **Subcontractors.** Include the work of all subcontractors. If a subcontractor is to perform work under this Section, detail how that subcontractor will interface with the Contractor's and/or other subcontractor's organizations.

7.3.2 DEVELOPMENT OF A CQCP

The following section addresses the development of a CQCP. Although this is a Contractor responsibility, FLH personnel should be aware of the development process so that they may offer general guidance to the Contractor on required plan elements.

Unless the Contractor already has a documented company quality control plan, it may be helpful for the Project Engineer to discuss the content and level of detail required for an acceptable CQCP. Generally, the plan should include a three to six-page discussion of the basic who, what, where, when, and how, with an additional two to four pages of detailed information for each major category of work. This is not including supplemental materials such as subcontractor/supplier plans, certifications, test data, and personnel résumés. Also, if the CQCP contains a lot of repetition of contract specifications, meaningless platitudes from quality textbooks, and other fluff, its necessary length will be longer.

Quality and the processes that deliver quality is a somewhat open-ended concept. No matter how much detail is in the plan, it can always be argued that more could be, or should be included.

Appendix 7A.1 contains an example CQCP and examples of good, fair, and poor CQCP elements.

7.3.2.1 Organizational Structure

One of the first issues a Contractor, or any organization, must face when designing its QC/QA procedures, is how these systems will relate to, and impact, its organizational structure.

- **Separate Quality Staff.** Testing is a very specialized function. A Contractor may elect to hire a separate staff or subcontractor to perform testing and to generate the documentation required by FAR Clause 52.246-12 and Section 153 of the Standard Specifications. But the testing and documentation are only part of the inspection system required by the contract. Having personnel separate from production personnel perform the entire inspection system would mirror the traditional relationship between contractor and agency organizations. If a contractor has a separate quality staff, it is important to define the relationship between those personnel and the production organization. Questions to consider include:

    - What will be the disposition of failing tests/inspections?
    - Who will have authority to order production ceased? Under what circumstances?
    - What will be the conditions of restarting production?

- **Combined Staff.** Quality management experts generally discourage separating quality control personnel from production personnel. It pits one part of the organization against another. This built-in adversity is seen as both inefficient and requiring additional staff. Ideally, quality control should be achieved by developing an organizational culture that encourages quality - a culture that is embraced by everyone in the organization.* However, for an organization transitioning from a traditional to a quality management system, superimposing a QC/QA staff on its existing organization may make sense while that organizational culture is being developed.

** ISO 9000 and other recognized process standards invariably require an independent audit function to verify that the organization is performing in accordance with its required standards. However, this independent audit does not have to be included in the CQCP since FLH's quality assurance activities typically fulfill this function.*

There is no right or wrong approach with respect to this organizational issue. It is, however, important that the agency not force a conservative approach on the Contractor just because it feels more comfortable with the higher levels of redundancy and control implied by a separate quality organization. The agency pays for unnecessary redundancy through higher bid prices. It is important therefore to encourage the most streamlined and efficient process the contractor can design to deliver quality. We can always require enhancements to the process if it proves inadequate, but requiring the enhancements based on speculation or experience with other contractors on other projects is not recommended.

7.3.2.2 Process Control Testing

Testing provides a reflection of quality and the process. But only changes to the process can improve quality. Ideally, frequencies of quality control testing are dependent on characteristics of the overall process. A good process should not have to rely on extensive testing to identify defects in need of corrective action. In a transition environment however, when contractors are not used to designing comprehensive quality control systems, it may be necessary for the agency to provide guide testing frequencies to minimize the risk of serious deficiencies remaining undetected until late in the process.

It is easy to become preoccupied with testing when describing the plan. Testing is easily defined and leaves a clear documentation trail. But the organizational resources that actually will control the quality of the construction are by far, the most important part of the plan, even though describing these resources and procedures (the process) in writing is often difficult.

The contract may contain a listing of mandatory contractor testing, including sampling points, frequencies, and time limits for delivering results. This testing is intended primarily for the agency's use in documenting quality assurance and accepting the work. Some contracts require additional testing, identified as process control testing, which is intended to provide real time information during the construction and production of materials to allow the contractor to adjust or control the process and ensure that quality assurance testing at the end of the process will indicate compliance. Whether or not the contract specifies process control testing, it is up to the Contractor to address whether or not it is needed in the CQCP.

The standard acceptance plan in Section 106.05 of the contract is used for most pavement structure and structural concrete items. While much of the work is not accepted statistically, the criteria on which the statistically based plan is structured are consistent with the intended acceptance criteria of all work. In general, these criteria are as follows:

- The plan is based on an acceptable quality level (AQL) of 5 percent defects. That is, if production is uniform and no more than 1 out of every 20 quality assurance tests fails, the process can be assumed to be in control and additional process control testing (and other actions) is not indicated.

- If defects rise to 10 percent (1 out of 10 QA tests fail), that suggests additional process control testing and other actions may be indicated.

- If defects rise to 15 percent or higher (more than 1 out of 6 QA tests fail), that is approximately equivalent (depending on sample size) to a pay factor of less than 0.90. This indicates serious process control problems, and the Government may require that process to be suspended while the Contractor modifies the process control procedure (including testing) to address the problem.

In addition to those tests specifically required by the Contract, the Contractor is required to tabulate in the CQCP all process control testing that will be performed to ensure that the work and material comply with the terms of the contract when they are ultimately subjected to quality assurance testing. (Note that although process control testing is listed first in Subsection 153.02 of the Standard Specifications, it may make more sense to suggest to the Contractor that it not complete or finalize the related section in the CQCP until after the inspection/control procedures are defined.)

7.3.2.3 Inspection/Control Procedures

This is the narrative portion of the CQCP, and is the hardest part of the plan to develop and describe. Most organizations are used to intuitive processes, or processes that have evolved over time to reflect the personalities and desires of supervisory personnel. Describing and documenting these processes is often difficult. There is almost no physical limit to the length and detail included in this section. Every requirement in the Contract could precipitate a paragraph or more of detailed process control procedures to describe how that requirement will be fulfilled. From a practical point though, this is excessive.

For most typical FLH construction projects, the narrative covering inspection/control procedures should adequately address the quality process basics in two to four pages for each phase of construction (see below). This does not include testing schedules, certifications, personnel résumés, and other attachments. In addition, if the narrative includes excessive redundancies, paraphrasing of the contract, and other extraneous materials, that will add to the required length. The fact that many of the detailed requirements of the contract are not specifically addressed in the CQCP does not mean they can be ignored. The contract itself is the foundation for the outcomes expected from the CQCP.

The failure of the Contractor to inspect and control any aspect of the construction process, whether or not it is specifically addressed by the CQCP, is a basis of adverse action under the contract, which may include required enhancement to the CQCP itself.

7.3.2.3.1 Categories of Construction

A typical contract may be divided into three to five categories depending on the nature of the work and the organizations performing the work. These categories are referred to as phases in Subsection 153.02 of the Standard Specifications, but, to avoid confusion with sequential phases described below, they are referred to as categories here. For example, stakeout, erosion control, clearing, excavation, embankment, drainage, and slope protection might be grouped together as a single category of Grading and Drainage.

Sometimes how categories are defined is influenced by which subcontractors or crews do the work, since each may have its own organizational relationships. It should be left up to the Contractor to group items of work in logical categories to facilitate the development of the CQCP. Other typical categories may include:

- Pavement Structure
- Structures
- Masonry
- Safety Appurtenances
- Seeding and Landscaping
- Permanent Traffic Control
- Temporary Traffic Control

7.3.2.3.2 Preparatory, Startup, and Production Phases

The Standard Specifications require each of these three sequential phases to be addressed separately. So for five categories of construction, a five by three matrix is generated, which constitutes the inspection/control part of the CQCP.

The preparatory phase includes evaluation of equipment, materials, and other resources prior to work being started. It also involves comparing contract requirements with training and other needs.

Startup includes the additional management, training, and inspection resources usually needed when a new operation is started.

Production addresses the routine quality control resources necessary after the process is established.

7.3.2.3.3 Who, What, Where, When, and How?

For each category and phase of the operation, the CQCP should answer these questions as they relate to both the category and phase:

- **Who will be responsible for quality control during the operation?** The quality control technician or supervisor may be assigned responsibility for testing and documentation and perhaps even training and monitoring of startup. As the operation moves toward production however, foremen or other supervisory personnel will probably be assigned increasing responsibility. If the management official is too high in the organization - say the overall project superintendent - then it is less likely he/she will have the time to perform detailed quality control functions. In that case, the CQCP should specifically identify subordinate personnel.

- **What will that person do to ensure contract compliance?** What authority will the person have over operations? What portion of the time the operation is in progress will the identified person actually be present to perform quality control responsibilities? Testers and inspectors cannot control quality if their responsibilities are limited to testing, measuring, and documentation. *What* should address not only personnel, but also materials and equipment

used in the construction. These items often have stated or implied contract requirements, and the quality control system must verify that those requirements are met.

- **Where will these activities be performed?** Will optional process control testing be performed onsite, or at a commercial laboratory? Will manufactured materials be inspected at the plant, at the Contractor's facility, or at the site of work? Will the equipment be inspected at the yard, or will inspections be performed at the site?

- **When will these activities be performed?** The earlier quality control activities are performed, the more latitude the Contractor has in dealing with problems. However, when activities are performed too early, there is a risk of unforeseen changes or glitches prior to actual construction. When will test results be available? This is a key component of the CQCP, which determines largely how responsive a Contractor can be to addressing defective work.

- **How will inspections be performed?** Using a standard checklist? Using the specifications themselves (quality assurance criteria), etc.? The more generalized and vague the inspection procedures are, the more likely they will not be consistently effective. However, not having a checklist is not a cause for disapproving a quality control plan, unless a checklist is specifically required.

  The CQCP should minimize any parroting or paraphrasing of requirements in the contract, and should avoid simply promising to comply with the contract. These kinds of statements and assurances add little value. The CQCP must go beyond the contract requirements and address the Contractor's organizational process for consistently delivering those requirements.

7.3.2.4 Subcontractors and Suppliers

When subcontractors and suppliers (other than suppliers of commercial items) provide part of the work, then the CQCP needs to be clear whether their quality control responsibilities will be independent, or a part of the prime contractor's responsibilities. If they are independent, then the subcontractors or suppliers must develop their own quality process and submit it for approval through the prime. Otherwise, the prime must address how it will monitor and verify subcontractor and supplier quality as a part of its CQCP. In either case, the prime is contractually responsible for all the work, but being contractually responsible is not the same as having an active role in the quality delivery process.

7.3.2.5 Manufactured Materials

An important part of the CQCP is the process for verifying that manufactured materials comply with the requirements of the contract.

- **Commercial Items -** These are materials manufactured and sold to the general public, as opposed to materials made to the unique specifications of the agency. For most commercial items, the contractor's responsibilities are limited to verification that the materials are as required or permitted in the contract, and that the delivered materials are in fact those approved materials.

- **Non-commercial Items -** These are materials manufactured offsite, but specifically to agency specifications for a project. CQCP coverage for non-commercial items should be a separate document from the manufacturer, or the manufacture of those items should be included in the CQCP. Like critical commercial items, critical non-commercial items may have specific QC/QA requirements in the contract.

7.3.2.6 Records and Documentation

While good documentation is often a reflection of good quality control, documentation is not the same thing as quality control. Documentation should be the minimum necessary to demonstrate that the Contractor is producing work and using materials and equipment of acceptable quality.

7.3.2.7 Personnel Qualifications

While some contracts may specify qualifications for Contractor quality control and testing personnel, the initial judgment as to whether a given person is or is not qualified is generally left to the Contractor. However, during contract administration (see Section 7.3.4), the Project Engineer may be more assertive in monitoring the qualifications of these personnel.

7.3.3 ACCEPTANCE OF THE CQCP

See Exhibit 7.3-B for an example CQCP acceptance letter.

Exhibit 7.3-B Example CQCP Acceptance Letter

U.S. Department of Transportation
Federal Highway Administration

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

In Reply Refer To: HFCO-15

Mr. Pedro Astudillo
Project Manager
American Infrastructure-VA, Inc.
14900 Conference Center Drive, Suite 350
Chantilly, VA 20151

Subject: Project No. VA A-AD-48(1), Mulligan Road (Fort Belvoir Connector Road)
Construction of Mulligan Road from Pole Road to Telegraph Road
QCP For Initial Phase Of Work
Contract No. DTFH71-08-C-00031

Dear Mr. Astudillo:

This letter is in response to your correspondence of February 6, 2009, Submittal No. 00034, concerning the Quality Control Plan (QCP) for initial items of work consisting of grading, drainage, and storm and sanitary pipe operations. The QCP has been reviewed and is hereby approved for the specific categories of work addressed by the plan. If you have any questions, please contact this office at 703-404-6271.

Sincerely yours,

Douglas E. Nair, P.E.
Construction Operations Engineer

MOVING THE AMERICAN ECONOMY

7.3.3.1 Minimum Necessary

The CQCP is accepted based on whether it addresses the requirements of the contract, not on whether the agency official accepting it believes it is comprehensive enough to ensure quality.

When evaluating a CQCP, consider the following:

- Does the plan address each category of work (see Section 7.3.2.3.1)?
- For each category, does it address the preparatory startup, and production phases (see Section 7.3.2.3.2)?
- For each category and phase, does it address who, what, where, when, and how questions (see Section 7.3.2.3.3)?

CQCPs are typically conditionally approved, based on the Contractor's ability to demonstrate that the required Contract compliance can be, and is achieved. It is not determined prior to construction whether the CQCP will, or is likely to, yield acceptable quality work.

The CQCP is not just a promise or assurance that work will be performed in accordance with the Contract requirements. The Contractor has already given those assurances when signing the Contract. Simple repetition adds nothing to these assurances. However, it may make sense for the CQCP to repeat or paraphrase some contract requirements, particularly when necessary to identify how specific responsibilities and actions will be carried out. In reviewing CQCPs that are wordy, it may be helpful to highlight those items that do not repeat what is already known.

7.3.3.2 Incomplete/Imperfect Plans

If the CQCP is incomplete to the point that it conveys little or no useful information with respect to the Contractor's quality process, the plan should not be accepted. A rejection letter should specifically detail the major reasons for the rejection, and advise the contractor that the work related to plan deficiencies may not begin until an acceptable plan is submitted.

7.3.3.3 Conditional Acceptance

If the plan is apparently submitted in good faith, but numerous key information items are missing, the plan may be accepted and work permitted to begin on the condition that the Contractor will supplement the plan with the missing information within a specific time frame. Conditional acceptance is especially appropriate if most of the deficiencies in the plan relate to work that is not scheduled to begin for several weeks or months.

7.3.3.4 Partial Plans

It is possible that subcontractors, suppliers, and overall responsibilities for some latter phases of the construction will have not been arranged at the time the prime is ready to begin work on the initial phases. It is permissible for the Contractor to submit, and the agency to accept, a partial

CQCP. However, the acceptance letter should make clear that the Contractor may not begin work not covered by the plan and the agency will not perform quality assurance, accept, or pay for work not covered by the plan until the plan is supplemented to cover that work.

7.3.4 CONTRACT ADMINISTRATION

7.3.4.1 Agency Role Responding to Problems

In a quality management environment, agency personnel should seek to minimize their role in quality control procedures. This doesn't mean they should be passive, stay in the office, or avoid contact with the construction. They should instead focus on the contractor's process. Ultimately, random or spot checks should substitute for comprehensive inspection. But getting to this minimal agency role may be a transitional process. Initially, relatively high levels of agency inspection may be necessary to validate the effectiveness of the Contractor's quality control process. When problems occur, their seriousness should be clearly conveyed to the contractor. If agency inspectors are only making random checks and defective work is occasionally found, then additional defective work may remain undetected. Deficient contract performance is an indication not only of work that must be corrected or replaced; it is an indication of a failure of the CQCP itself, which must be corrected (i.e. the process must be corrected) as a condition of the work in question continuing. While the addition of agency inspectors and control efforts may result in somewhat increased quality work and less rejection, this responsibility (for inspection) is really the contractor's and such a solution is therefore not consistent with the contract.

Deficient work that is chronic (more than isolated) is evidence that the CQCP is not effective, and improvements to the plan should be required. Likewise when the agency is compelled to increase its inspection levels to compensate for poor contractor quality control, that also is evidence that the CQCP is not effective.

It is important to distinguish between the role of the agency inspector as a quality assurance person and its role as a provider of the technical information necessary to layout or build the work. The Contract terms often require information to be provided to the Contractor. They may require onsite approvals of layouts, or specific authorization for certain facets of the work. They typically require agency personnel to measure work for payment. These are activities beyond the subjects of quality control and quality assurance. Agencies may have to accommodate these time-consuming demands regardless of the effectiveness of the CQCP.

7.3.4.2 Defective Work

In a traditional program, agency inspectors are expected to identify significant quantities of defective work and order that work removed or corrected. In a quality management program, the Contractor may identify defective work, but if no defective work is identified, that is not necessarily an indication of a poor inspection system. Ideally, if the process is acceptable, there should be little or no defective work to identify. Remember Deming's No. 3 of 14 points - inspection cannot be relied on to achieve quality, it must be built into the process. The FAR'S reference to an *inspection system* (in Clause 52.246-12) is perhaps a confusing choice of words. The requirement is not about inspection per se, but about an organizational process to deliver quality.

7.3.4.3 Contractor Personnel Problems

It is tempting sometimes to focus on contractor personnel problems as the root of quality control process deficiencies. Although the Government has a right, under FAR Clause 52.236-5, Material and Workmanship, to order the removal of careless, incompetent, or otherwise objectionable contractor employees, this action should be considered a last resort. The Project Engineer in evaluating the quality control process should focus on the process, not the people, to the extent possible. Ideally it should be the Contractor's management personnel who recognize the need to remove or replace personnel; or to reorganize responsibilities and authorities on a given project. When all else fails, and there is a clear lack of responsiveness, or evidence of bad faith on the part of Contractor personnel, the removal option should be considered.

7.3.4.4 Contractor Evaluation

Deficiencies in the CQCP process directly relate to the Contractor Evaluations required by FAR Clause 36.201, Evaluation of Contractor Performance. See Section 12.2 for details of the evaluation process.

7.4 RECORD AND REPORT PREPARATION

7.4.1 GENERAL

This section addresses record preparation and reporting requirements for a typical construction project. Additional reports may be considered necessary for the proper administration of projects with unique features, or to satisfy Division-specific needs.

A uniform filing system should be established by each Division and used in the construction field offices. Uniformity in filing will simplify the training of field office personnel and reduce training time upon reassignment to other projects. A uniform filing system will help other FLH personnel who have a need to review or check project files.

Project records must be maintained properly and be readily available when needed. Much reporting is done with standard forms. Many of the more common forms are listed and their uses described throughout this manual. Some forms are made mandatory by the FAR. Special forms to meet special needs may be developed by the Project Engineer. A list of available forms should be available from the Division office. This list should include the form number, title or purpose, frequency of submission, distribution, and number of copies.

Instructions for record preparation and reporting by the Project Engineer are also included in the *FLH Field Materials Manual* and in Division administrative and technical manuals.

7.4.2 PROJECT DIARIES AND INSPECTOR'S DAILY REPORTS (IDR'S)

7.4.2.1 Project Diaries

It is mandatory that diary records be kept for each project and filed with other records when the project is complete.

The Project Engineer must maintain a diary and appropriately sign the daily entries. If the Project Engineer is absent from the project, daily entries must be made and signed by the person in charge during the absence.

Diary entries should be factual, concise, complete, and legible. Entries should avoid vague generalizations. For example, instead of simply noting "Contractor operations remain inefficient," state why they are inefficient and how long they have been that way. If there is a dispute in, say, interpretation of the specifications, try to express both (Government's and Contractor's) points of view. When a decision is made, or agreement reached on further action, state what the outcome was. If no agreement was reached, state what instructions were given to the Contractor. If an opinion is included, identify the statement as an opinion, not fact.

It is intended that information recorded in the diaries and on the Inspector's Daily Report be of sufficient detail so that the events can be reconstructed later as they actually happened. On projects where the Contractor is required to maintain records of equipment, personnel and construction operations, it is not always necessary for FLH personnel to duplicate those records. However, the Project Engineer should establish a process of reviewing, endorsing, and providing feedback on such Contractor-produced records.

The Project Engineer may find a voice recorder helpful, either for recording notes to be used at the end of the day in making diary entries, or for recording events that can later be transcribed into the diary and signed by the Project Engineer. If this occurs, there should be a notation in the diary or in the transcription.

The use of a computer to generate the diary is the standard, provided that a hard copy is generated, signed, and filed at the end of each daily entry. In the event of a dispute and litigation, it is important to clearly establish who made the entry, and when it was made.

Federal Regulations generally allow inspection of public records, such as FLH diaries, by the Contractor and even the general public. All entries should be made as if they will eventually be seen by the Contractor and others involved in the contract. Requests to inspect diaries or other records should be referred to the COE. Depending on the circumstances and Division procedures, the COE may authorize inspection and copying of limited records in the project office; or the requester may be required to make a written request to the Division pursuant to the Freedom of Information Act (FOIA). Of particular concern, however, are requests by a subcontractor or contractor that is in a dispute with another subcontractor or contractor. FLH may be obligated to protect privacy type information provided by a company doing business with the Government.

Unless otherwise directed, field measurements and notes for documenting monthly progress estimate quantities should not be recorded in the project diary.

Diaries should be considered an official Government document and must be turned in with other project records at the conclusion of a project. This also applies to any retained voice recordings.

Daily diary entries should include the following as appropriate, plus any additional pertinent information:

- Date and weather conditions.
- Project Engineer's name and hours worked.
- Names of project staff and hours worked.
- Names of visitors to the project.
- Construction work in progress, unless otherwise covered by Inspectors Daily Reports (IDRs). See Section 7.4.2.2. At a minimum, this should include a list of the equipment and labor force being used on each construction activity, and where and what the activity is.
- Comments on the progress of operations as compared to the Contractor's approved schedule.
- The substance of important conversations with the Contractor concerning conduct, progress, changes, interpretation of specifications, and similar details.
- Comments on construction safety hazards and corrective measures as appropriate.
- Discussion of erosion control and other environmental concerns as appropriate.

- Information concerning accidents occurring on the project or incidental to the construction work.

- Comments on traffic control and signing as appropriate.

- Any information not covered in other notebooks that might have a bearing in case of future disagreement, such as difficulties encountered in construction and their causes, delays caused by breakdowns of equipment, comments relative to improper use of equipment reflecting inefficient operations by the Contractor, etc.

The best record will be produced by the Project Engineer who looks ahead at potential problems, and prepares for those problems. Such a record would include:

- diary notes on equipment or material moved to the project for use,
- subsequent actual use of this equipment or material,
- pertinent conversations,
- preparatory or production work on items that may be deleted or reduced in the future, and
- situations that may lead to possible future disputes.

The record should also include all additional information that could help the Government evaluate a claim for additional compensation or time.

7.4.2.2 Inspector's Daily Report (IDR) or Diary

The project staff should fully document the Contractor's construction operations. The Inspector's Daily Record of Construction Operations may be used. A blank copy of this form is provided in Exhibit 7.4-A. This form will provide a concise, readily retrievable record of equipment, time, and work hours for each significant construction operation underway. The record will facilitate verification of the Contractor's cost in connection with any equitable adjustments or claims.

7.4.3 PHOTOGRAPHS

Photographs are an important part of the project records. They serve to document the record with respect to slides, cave-ins, floods, and other unusual occurrences; actual conditions when a contractor alleges *Differing Site Conditions*; unusual construction features or practices; accidents involving death, personal injury or property damage; encroachments within the right-of-way; and other such occurrences and conditions. They are useful in illustrating reports on experimental features and unusual construction practices, final construction reports, and other reports. They are invaluable as evidence in case a controversy develops that results in litigation. They are especially useful when a construction contract encompasses a long period of time. As memories fade and Project Engineers are transferred to other projects or retire, photographs provide direct evidence of the conditions that existed at the time the dispute arose. The old adage that "a picture is worth a thousand words" applies here.

In order to best serve the intended purpose, a photographic history of all construction projects should be made. Photographs should be taken of the construction site before construction begins, during each stage of construction as it progresses, and of the completed project. For example, during a project on which major excavation is to be accomplished, photographs should

be taken on a regular basis (perhaps as often as once a week) to document progress made by the Contractor. Such photographs should be taken from the same location and the camera should be aimed at the same reference point in order that a person looking at the pictures can actually see the progress, or lack of progress, which was made by the Contractor during a certain period of time.

If a project is of sufficient length, several reference points should be chosen by the Project Engineer from which photographs can be taken during the course of a project. Special consideration should be given to those areas along the project length where experience has shown that difficulties may be encountered. For example, if there are unusual rock formations that might be encountered as excavation progresses, that site should be chosen and photographs should be taken on a regular basis.

In addition to photographs taken from specified reference points on a regular basis, photographs also should be taken immediately after unusual occurrences and before unusual conditions are disturbed. The Project Engineer and all inspectors should have, or have easy access to a camera at all times during construction. The use of these resources should be emphasized by the Project Engineer.

Clarity and good composition are very important, as is proper identification. In some cases, it may be appropriate to place an individual or object beside the unusual condition to demonstrate the relative size of the condition. The identification record for each photograph should include the location from which the picture was taken (including references to project stations if applicable), time of day and date taken, and name of photographer. This information is particularly important for photographs that may be used as evidence in legal proceedings.

The photograph identification record should be organized so that all photographs can be easily located, and should be maintained as a part of the project filing systems.

Exhibit 7.4-A Inspector's Daily Report

US DEPARTMENT OF TRANSPORTATION
Federal Highway Adminstration

INSPECTOR'S DAILY RECORD OF CONSTRUCTION OPERATIONS

Project _____

Contractor/Subcontractor _____

_____

Date _____

Shift _____ To _____

Weather/Temp. _____

Description and Location of Work
(If using Critical Path Method, indicate (I-J) node)

A _____
B _____
C _____
D _____
E _____
F _____
G _____
H _____
I _____
J _____

NO.	LABOR CLASSIFICATION	A	B	C	D	E	F	G	H	I	J	TOTAL WORK TIME
		PRODUCTION TIME (Work Hours)										

NO.	EQUIPMENT TYPE	A	B	C	D	E	F	G	H	I	J	TOTAL WORK TIME	IDLE *
		PRODUCTION TIME (Equipment Hours)											

* B = Broken Down, W = No Available Work, P = No Operator, S = Suspended

Form FHWA-1413I (Rev. 8-90)

Exhibit 7.4-A Inspector's Daily Report *(Continued)*

Traffic Control Checked	☐ YES	☐ NO	Traffic Control Problems	☐ YES	☐ NO
Erosion Control Checked	☐ YES	☐ NO	Erosion Control Problems	☐ YES	☐ NO
Unsafe Operations	☐ YES	☐ NO	Accidents	☐ YES	☐ NO

NARRATIVE REPORT: ***Descriptions, Problems, Visitors, Materials Received, etc.***

ITEM NO.	DESCRIPTION	LOCATION - STATIONS	QTY.	REMARKS

REVIEWED BY		REPORTED BY	
SIGNATURE *(Project Engineer)*	DATE	SIGNATURE *(Inspector)*	DATE

7.5 CONTRACT INSPECTORS

7.5.1 GENERAL

The number and complexity of FLH construction contracts continues to increase yearly. At the same time, the number of available Federal employees is not increasing. This situation is creating a gap between the needs of FLH and the available resources. To fill this gap, certain contract administration support functions that are not inherently governmental, such as routine inspection and documentation, are being contracted out to private sector firms.

This section describes the duties that may be assigned to contract inspectors (CIs), their authority, their interactions with the construction contractor, and the duties and responsibilities of the Project Engineer with respect to the CI.

7.5.2 CONTRACT INSPECTION CONTRACT (CIC)

Planning and Programming (P&P), in conjunction with Construction, is responsible for initiating a contract inspection contract (CIC) with a qualified A&E or Technical Services firm to provide support services to FLH employees in administering the construction contract. Generally the services will be performed by contract inspectors (CIs) assigned to the construction project for the duration of the need. The CIC describes several standard levels of expertise for the CIs. For example, a requirement for the highest level CI might be that the individual holds a NICET Level IV certification. Also listed in the CIC are the various notice requirements for obtaining CIs and releasing them from a project. Any equipment requirements are also provided.

Prior to obtaining proposals from the prospective firms, P&P, in conjunction with Construction, estimates the number of CIs needed on future projects, and the duration of those needs. The project advertisement schedule is a tool used in this analysis. The Project Engineer may be requested by the COE to provide input into the process. Other than this, the Project Engineer will most likely have no other involvement with procuring the CIC. However, the Project Engineer should ensure that a copy of the CIC is available in the project office for reference and for monitoring the CI's performance.

Once the CIC is executed, it also establishes the hourly compensation rates, both regular and overtime, for the various levels of CIs, and the per diem rates should FLH request assistance in a remote location. Compensation rates include firm's overhead, profit, insurance, and peripheral expenses, in addition to the actual salary paid the CI.

7.5.3 TASK ORDERS

Once the CIC has been executed, the COTR will be responsible for the day-to-day management of the CIC. Normally the COTR will be a COE or other designated individual from the Construction Branch. The COTR will perform or coordinate such functions as issuing task orders to obtain CIs, monitoring the performance of the firm and approving invoices from the firm. The Project Engineer will be asked to assist the COTR in such duties, as described below.

As the construction projects on which the CIs will be needed are awarded, the Project Engineer may be asked how many CIs will be needed and of the expected timing and duration of the CI's

assignment. Or the COE, with the Project Engineer, will review the individual project needs to determine the number of CIs needed. Some questions to consider when determining the number of CIs include:

- How many shifts?
- How many different operations and their locations?
- How many FLH employees (including Professional Development Program participants and Cooperative Education participants (CO-OP's)) will be available?
- Will weather affect the operations?

Once the need for a CI has been determined, a CI task order will be prepared by the COTR (or designated individual from the Construction Branch) and issued to the firm by the CO. The order should specify the expected duration of the assignment so the firm can plan accordingly.

Normally, the Project Engineer and/or COE will request and review the résumé of each proposed CI, and may schedule an interview with the CI. This interview is to determine information that may not be readily apparent from the résumé, such as whether the proposed CI has the communicative skills and technical knowledge to perform the required duties. In some cases, the CIC may permit or require the firm to provide more than one proposed CI for each request, with the Government to choose the CI who would meet its needs through evaluation of the résumés and interviews. Interviews should be held to the minimum number necessary to identify a qualified CI. Unlike interviews to hire a Federal employee, there is no obligation to interview and rank all applicants, and then pick the most qualified. The COTR will inform the firm of the acceptance of a proposed CI. Regardless of the terms of the CIC, FLH always has the option of rejecting or removing CIs who, after being assigned, cannot perform to the required level of competence, or whose résumés falsified or misrepresented their qualifications.

7.5.4 CI DUTIES

The CIC outlines the duties that will be expected from the CI. Normally, this includes inspection duties to confirm and document that the construction contractor is complying with the terms of its contract with the Government. The FLH Project Engineer must review these duties with any CI assigned to the project.

The CI *may not provide direction* to the construction contractor, or take any other action that could be construed as committing the Government. The CI *may not order work*, including work provided for in the construction contract that requires a separate authorization from the Government (e.g. sub-excavation or erosion control devices). The CI must report the facts and circumstances to the Project Engineer in a timely manner. The Project Engineer will then provide direction to the construction contractor, or authorize the CI to convey information to the contractor. The CI *may not, in interacting with the construction contractor, be required to make subjective judgments and interpretations* as to the construction contract requirements or whether the construction contractor is in compliance with those requirements. Such judgments and interpretations shall be referred to the Project Engineer before being conveyed to the construction contractor.

The CI may be assigned to take measurements required by the contract, and complete inspection reports documenting the details of the construction Contractor's work. The CI may communicate to the contractor the results of measurements and other quantified data from the contract and other sources intended to be available to the construction contractor. This includes

communicating to the construction Contractor that the results of measurements and inspections indicate (without the need for interpretation) compliance or noncompliance with the construction contract.

Other CI duties may include assisting with the office functions (e.g. completing inspector daily reports, maintaining the materials register, assisting in completing the monthly receiving report, etc.).

7.5.5 PROJECT ENGINEER DUTIES

The Project Engineer should be sure that construction contractor management personnel understand who the CIs on the project are, what they will be doing, and the limits of their authority.

The Project Engineer assists the COTR in administering the CIC. Duties include monitoring the individual and collective performance of the CIs to ensure the requirements of the CIC are met, processing invoices, and performing similar activities as described in Sections 7.5.6 through 7.5.10.

7.5.6 CI TIME AND ATTENDANCE

Each CI is responsible for keeping track of his/her time and attendance (T & A) on the project. Every day, the CI should report his/her hours to the Project Engineer. The CI firm will most likely have some form of a time sheet that must be kept up to date by the CI. If there is no time sheet, the Project Engineer and CI can develop a form. See Exhibit 7.5-A for an example Contract Inspection Time Sheet – Receiving Report. At the end of each work period, the CI should sign the time sheet and have it countersigned by the Project Engineer. The CI then coordinates with its firm to ultimately send the invoice and time sheet to the Division office. Note that the hours of regular and overtime reported on the project time sheet do not necessarily correspond to the hours the firm is required to pay the employee under State and Federal law or its agreement with the employee (the CI). For example, CIs that report to the project late in the week may have already worked 40 hours on another (non-FLH) project, and therefore be eligible for overtime, while FLH's card may show only regular time. Holidays or sick leave may be compensable per agreement with the employee, but not under the terms of the CIC. The firm is obligated to resolve these kinds of problems in its own administrative office. FLH is not obligated to honor agreements between the firm and its employees that are inconsistent with the terms of the CIC.

Exhibit 7.5-A Example Contract Inspection Time Sheet – Receiving Report

FEDERAL LANDS HIGHWAY
CONTRACT INSPECTION TIME SHEET – RECEIVING REPORT

PROJECT NAME/NUMBER: _____

CONTRACT INSPECTOR FIRM: _____

CONTRACT INSPECTOR (NAME): _____

DATES INCLUDED ON THIS REPORT FROM _____ TO _____

Date	Regular Time	Overtime	Per Diem
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
TOTALS	_____	_____	_____

Certified Correct

CI (Signature): _____ Date: _____

Project Engineer: _____ Date: _____

COE: _____ Date: _____

Approval for Payment:

COTR: _____ Date: _____

_____

7.5.7 CI INVOICES

The CIC will specify the billing period, usually monthly. The COTR will receive the CI invoice. The CI firm must include with the invoice copies of the completed weekly T & A sheets as submitted by the CI (after being countersigned by the Project Engineer).

The COTR will compare the invoice and the inspection time sheet and forward this to the appropriate personnel for processing. Per diem expenses must also be verified.

The Prompt Payment Act applies to CIC invoices. The invoice must be paid within 30 days (as opposed to 14 days for construction contracts) after receipt by FLH, otherwise interest is due the firm.

7.5.8 CI PERFORMANCE AND/OR CONDUCT

Should a problem develop with the CI performance or conduct, the Project Engineer should contact the COE promptly. Examples of problems include:

- The CI does not demonstrate knowledge or experience of the duties assigned and/or for the level at which they were certified and hired.
- The CI is giving improper direction to the construction contractor without Project Engineer knowledge or consent.
- The CI demonstrates personal problems which affect his/her work. Examples include apparent substance abuse, chronic tardiness, belligerence, etc.
- The CI fails to recognize and report problems in a timely manner.
- The CI fails to maintain a professional relationship with employees of both FLH and the construction contractor. This means the avoidance of both fraternization and personal animosity, which might give the appearance of lack of objectivity in carrying out assigned duties.

The COE will discuss possible actions with the Project Engineer. Technically, all actions should be through the CI firm. FLH has no obligation to provide career counseling to CIs, or to deal directly with the CIs to resolve performance problems. From a practical standpoint, however, many minor problems can be resolved by providing feedback to the CI. The COTR should be kept advised on these matters. On more serious issues or when minor problems cannot be resolved on the project, the COE and the COTR should advise the CI firm and request that it either correct the problem or replace the CI.

An evaluation of the CI or the CI firm may be completed by the Division for internal purposes to document the performance of the CI or CI firm.

7.5.9 CI AND GOVERNMENT FURNISHED EQUIPMENT

The CIC will specify the type and amount of equipment to be supplied to the CI by the CI firm and by the Government. The Project Engineer should be familiar with these requirements. The firm may be required to furnish items such as vehicles, and safety items, such as hard hats. The Government may provide such things as office supplies and two-way radios and safety lights. When accountable Government property is assigned to a CI on other than a “day use” basis, the CI should be required to sign for the equipment.

7.5.10 CI RELEASES AND TRANSFERS

The CIC provides a minimum notification period in which the COTR should notify the firm that a CI will no longer be needed. Some reasons for release include: end of the project, a winter shutdown or other work slow down, or unacceptable performance by the CI. The CIC may provide that certain kinds of unacceptable performance (such as unethical behavior or an intentional violation of the terms of the CIC) may be considered so severe as to waive any notification period requirements.

If a release is contemplated for reasons other than unsatisfactory performance, and there is more than one CI at the level in question, and with the needed skills on a particular project, then the firm should be allowed to select which CI is transferred or terminated. Likewise, if FLH desires to transfer a CI from one project to another, it has no contractual right to do so, except by ordering the firm to reduce the number of assignments on one project, while increasing the assignments on the other. The COTR may suggest or offer a preference as to which CI should be released or transferred, but the final determination should be the firm’s. This is because the CIC is a technical services contract, not a personal services contract. As long as the firm can provide the required services, the selection of the CIs should be the firm’s responsibility.

CHAPTER 7 – QUALITY CONTROL/QUALITY ASSURANCE INSPECTION

LIST OF APPENDICES

7A.1 EXAMPLE CONTRACTOR QUALITY CONTROL PLANS (CQCP)..... 1

7A.1.1 Good, Fair, and Poor CQCP Elements 1

7A.1.2 Example CQCP 2

7A.1 EXAMPLE CONTRACTOR QUALITY CONTROL PLANS (CQCP)

This appendix is to be used in conjunction with the guidance provided in Section 7.3 to assist FLH contractors in preparing acceptable CQCPs.

7A.1.1 GOOD, FAIR, AND POOR CQCP ELEMENTS

Guardrail, Preliminary

Poor	Fair	Good
All guardrail materials will be checked for contract compliance before use. All employees are empowered to inspect and reject materials not complying with the contract.	All guardrail materials will be checked by the QCT for contract compliance before use. Materials not in compliance will be isolated and rejected. Survey crew will layout guardrail in accordance with the plans before construction.	Upon delivery of guardrail posts, & hardware QCT will check for proper identification, certification and damage during shipment. Before scheduled construction, components will be reinventoried, checked and compared to layout requirements. QCT will review layout procedures with the Engineer. Will coordinate with survey crew on stakeout. Will check each stakeout for possible transition problems. Will notify Engineer of opportunity to check.

Guardrail, Startup

Poor	Fair	Good
QCT will inspect guardrail crew's operations during startup. Any deficiencies will be brought to the attention of the foreman.	QCT will continuously work with stakeout crew and installation crew when operations begin, to assure a common understanding of contract requirements and standards/tolerances etc.	Prior to scheduled beginning of installation, QCT will verify that stakeout has been accomplished in accordance with requirements. QCT will go over with foreman, a checklist of required quality characteristics. Foreman will be responsible for routine quality monitoring after startup.

Guardrail, Production

Poor	Fair	Good
The QCT will periodically check on operations during construction to assure contract compliance.	The QCT will inspect installation operations everyday to verify specification compliance and document completion of each installation.	The QCT will inspect installation operations at least twice a day, verifying compliance with stakeout, as well as rail height, post plumbness, etc. The QCT [or the Foreman if QCT is not available] will document completed work and cleanup and advise the PE of such completed work for acceptance. Additional inspection/training will be provided if installation crew personnel changes or deficiencies are noted.

7A.1.2 EXAMPLE CQCP

ABC Construction Company
P O. B.. 357
Red River, CA 94781

August 18,1997

Federal Highway Administration
P. O. Box 78
Sutterville, CA 94832

Gentlemen:

Re: CA FH 93-1(3), Gold Rush Highway
Quality Control Plan

The following items comprise our Quality Control Plan (QCP) required by Subsection 153.02 of the Contract.

1. All work will be performed in accordance with the contract requirements. ABC will maintain an inspection system which assures compliance with the contract requirements. Any indication of system deficiencies whether discovered as a result of the Government's or ABC's checks and tests, will result in modifications to the system to correct these deficiencies.

2. This QCP does not endeavor to repeat or summarize contract requirements. It describes the process which ABC wIll use to assure compliance with those requirements. The QCP documents broad categories of contract work in accordance with Subsection 153.02. Necessary details dealing with minor items that may be overlooked in this plan will be addressed informally between the Quality Control Technician (QCT) and the Project Engineer (PE), as the work progresses; and will be documented in writing if so requested by the PE. It is understood that the level of QC accountability and control exercised by ABC on these items will be consistent with the details of this plan.

3. The Project Superintendent, Mr. Ralph Altway will have overall responsibility for quality control on the project. Mr. Altway has had similar responsibilities on other Federal (Corps of Engineers) and State (CALTRANS) projects. He is a NICET Level IV Technician and Certified by CALTRANS as a QC Technician.

4. Mr. Leon Williams will be the QCT for the project. He will report directly to Mr. Altway. Mr. Williams is also a NICET Level IV Technician and Certified by CALTRANS and Nevada DOT as a QC Technician. He has been employed in this role by ABC for nearly three years. He will be responsible for overseeing day-to-day construction operations from a QC standpoint. He will assure that all required tests and documentation are completed, and that the results are furnished to the Government in the time frame required. Mr. Williams is empowered to suspend any operations which he deems to be in noncompliance with the contract, and/or order corrective measures to assure compliance. Mr. Williams will complete the Inspector's Daily Record required by Subsection 153.04.

5. As the number of operations or their dispersion on the project starts to overextend Mr. Williams, QC responsibilities will specifically be assigned to ABC's supervisory personnel specifically responsible for given operations; or an assistant to him will be provided. In either case, standards of application of the QCP will be the same. The names, experience and qualifications of any personnel assuming QCP responsibilities will be provided to the Government in advance.

6. ABC has an experienced and highly professional staff that is used to the responsibility entailed by the QC requirements. We therefore do not anticipate any personnel or training problems in complying with them. If any such problems occur, ABC will take whatever actions are necessary to correct them including retraining, providing more supervision or removal of poorly functioning personnel.

7A.1.2 Example CQCP *(Continued)*

7. Grading

Preparatory Phase -

QCT will go over erosion control requirements with Project Engineer and order silt fence and other authorized materials at least two weeks before work starts.

QCT will go over clearing limits and slope limits with PE and Grading Foreman.

Startup Phase -

ABC will install silt fences and temporary culverts as necessary along Pioneer Road.

QCT will obtain materials samples for T -99 proctor tests as soon as cuts are started. Provide PE with splits of samples. Provide completed proctor worksheets within 48 hours.

Grading Foreman's name will be provided to Government as soon as known.

QCT will go over lift thickness and other contract requirements with Grading Foreman.

Production Phase –

After startup, Grading Foreman will be responsible for continuous monitoring of QC.

QCT will periodically monitor work and density with a nuclear gauge. These tests will be at about one (passing) test per 1000 m3 of compactable (non-rock) material. Final test on each lift will include a one point proctor and rock correction. QCT will advise Grading Foreman of test results.

Failing tests will be followed by appropriate corrective (reworking/recompaction] efforts, and retesting. If the rate of initial failing tests exceeds one out of five, the QCT and Grading Foreman will meet and formally document the corrective actions to the embankment construction process, which will be taken to resolve the problem.

Grading Foreman will order drying operations or more water when compaction tests or appearance of fills material indicate that moisture is a problem.

Density tests will be documented in tabular form showing date, time, location, offset, depth below grade and test result. Results will be provided to PE by the next working day.

Each day QCT will plot test results on control charts in the ABC project lab.

8. Drainage

Preparatory Phase -

QCT will obtain survey crews' stakeout notes and review culvert design prior to submittal to PE for approval. QCT will obtain approved designs and order culvert and end section materials.

Precast inlets and similar items will be obtained from Williams Precast Co. of Susanville. Copies of their materials data, mix designs and QC plan will be obtained and furnished to PE 30 days prior to start of work.

Cast-in-place concrete will be furnished under Section 601 and obtained from Sutterville Quality Concrete (SQC). QCT will obtain documentation from SQC. QCT will go over their procedures with them before production.

QCT will identify a source of backfill material to be used if natural material is too rocky or otherwise unsuitable. QCT will test the material (proctor) and provide results to PE.

QCT will inspect culvert materials upon arrival and obtain valid materials certifications and submit to PE.

7A.1.2 Example CQCP *(Continued)*

QCT will go over stakeout notes and contract requirements with pipe crew foreman prior to start of work. Pipe foreman will be identified to PE prior to start of work.

Startup Phase -

QCT will work nearly continuously with the pipe crew on the first day to verify layout procedures, bedding preparation and assembly.

QCT will go over proctor data and operation of nuclear gauge with pipe foreman. They will agree on what passing density readings are for the borrow backfill and other possible backfill materials.

QCT will go over backfill, lift thickness and density monitoring procedures.

For cast-in-place concrete, QCT will be at plant to verify QC procedures at the start of production. QCT will perform required QC at the site.

Production Phase -

Pipe foreman will be responsible for QC during construction.

QCT will visit each installation on a random basis to take density tests required by the contract. For each of these tests, a one point proctor will be run. Record of density tests will be furnished to the PE by the following working day.

For cast-in-Place concrete QCT will obtain all required documentation and furnish to PE. QCT will be at placement site enough to perform required QC tests. QCT will go over QC procedures with foreman, who will be responsible for QC when the QCT is absent

9. Subarade

Preparatory Phase -

QCT will coordinate with grading foreman and survey crew as to how subgrade will be staked, controlled and finished.

QCT will go over with grading foreman, any problems with subgrade materials quality - rocky material, clay or other unsuitable. Such materials will be used in other than subgrade locations.

Startup Phase -

QCT wIll coordinate with grading foreman and PE, the acceptable standards and tolerances for subgrade finishing.

Production Phase -

Grading foreman will be responsible for day to day QC.

Grading foreman will advise PE when each segment of subgrade is ready for acceptance.

QCT will take subgrade density tests at required frequency using nuclear gauge. One point proctors will be run about once every two to three tests or whenever materials change.

Test results will be plotted on control charts by QCT and also furnished to the PE by the next working day.

7A.1.2 Example CQCP *(Continued)*

10. Base Course

Preparatory Phase -

Base course will be obtained from Whippel Mountain Aggregates, Inc. (WMA)

QCT will obtain suppliers quality tests and samples of material for the PE at least 30 days prior to base work beginning.

QCT will perform proctor tests on base course. QCT will also perform initial gradation tests on stockpile just prior to startup.

QCT will review supplier's QC procedures including stockpiling, moisture control, process control testing, and weighing.

QCT will develop dumping spreadsheets for base course foreman.

Startup Phase -

QCT will go over delivery and dumping procedures with base course foreman.

QCT will go over spreading and compaction procedures with base course foreman.

Base course will be pugmill mixed and delivered at optimum moisture and in nonsegregated condition so that processing on the grade will be minimal.

Production Phase -

WMA will be responsible for plant QC. WMA will perform at least one gradation test per day as long as at least 80% of tests pass. Frequency will be increased if there are more failing tests.

Grading foreman will be responsible for receiving, dumping, tabulating tonnages and delivering receiving reports to PE at the end of each day.

Grading foreman will perform occasional (at least one per day) depth checks to verify spread rates.

QCT will obtain gradation samples at the required frequency. Samples will be split, with the splits delivered to the PE.

11. Asphalt Items

Preparatory Phase -

All asphalt items will be furnished by Allied Paving (AP) of Sutterville. Materials will be hauled to the site by ABC's hauling sub, and paving or installation of materials will be by ABC.

AP has a lab certified by Caltrans at the plant. Lab supervisor is William Brown, Certified Asphalt Technician in California.

QCT will obtain required mix design submittals and samples from AP and deliver to PE at least 30 days before work is scheduled to start. AP's QC/Mix Design technician is Allen Rockford who has 15 years in this position and is a certified asphalt technician in California and Nevada. Mr. Rockford will be the contact for any technical discussions during the mix approval process.

With the mix designs, AP will furnish a separate QC plan dealing with their plant operations, personnel, etc.

Startup Phase -

QCT will review all specification requirements with paving foreman prior to start of work.

7A.1.2 Example CQCP *(Continued)*

QCT will be in charge of production start up procedures. Documentation and tests will be at his directions and submitted to the PE. Full production will start when approved by PE.

Production Phase -

Paving foreman will be responsible for QC on a daily basis. QCT will conduct periodic inspections.

QCT or designee will obtain mix sample and cores. Splits will be provided to PE for acceptance. Contractor samples will be delivered to AP's plant lab for testing. Results will be provided through the QCT by the following day. We will attempt to set up a system to provide results by FAX.

AP will obtain AC samples at the plant and deliver (through QCT) to PE for testing.

Test results will be plotted on control charts in ABC's onsite lab. QCT will run QL Pay at the end of each day, or the beginning of the next. Quality problems evident either from inspections or test results will be dealt with under the direction of the QCT. Work will be suspended if problems cannot be resolved expeditiously.

12. Structural Concrete

Preparatory Phase -

Wahoo Readymix in Martin, CA will provide PC concrete under Section 552 for the box culverts. Wahoo's plant is certified by CalTrans as is their Quality Supervisor, Mr. Larry Ryland. Mr. Ryland will provide documentation [through ABC's QCT] of proposed mix design (previously approved by CalTrans) and all materials 30 days or more prior to first delivery. Wahoo will also be responsible for all plant QC and inspection of trucks.

QCT will be responsible for onsite QC operations other than the concrete mix itself, e.g. resteel, forming, concrete placement, finishing, etc. Resteel will be inspected upon delivery for proper certification, dimensions, storage, etc. QCT will be responsible for stakeout and foundation preparation prior to forming.

Startup Phase -

QCT will coordinate with Wahoo to schedule delivery operations. Wahoo will send one or more certified concrete technicians to each concreting operations. Technicians will be responsible for any final mix adjustments, delivery ticket validation, screening (air, slump, temperature) and acceptance testing as required by FHWA inspector. Cylinders will be cured onsite at ABC's lab, and taken to Wahoo's lab for breaking. QCT will advise FHWA of scheduled breaks and provide opportunity for witnessing.

QCT will inspect forming and resteel operations from their inception and work with crews to assure acceptable tolerances and other compliance. QCT will inspect placement operations including vibrating and finishing. QCT will inspect curing operations and work with ABC crews to resolve any problems. All required documentation will be completed by QCT and delivered to FHWA by the day following each placement operation.

Production Phase -

Wahoo will continue to provide onsite QC for each concrete delivery.

Once resteel and forming crews are lined out, QCT will make spot checks of their operations, plus a final inspection two hours or so prior to each placement. QCT will inspect curing. QCT will inspect all surfaces upon stripping, and go over any necessary repairs and finishing operations.

7A.1.2 Example CQCP *(Continued)*

13. Miscellaneous Items

This covers items, mostly involving installation of manufactured items such as guardrail, delineators, fencing, etc.

Preparatory Phase -

QCT will verify all certification requirements, inspect material upon delivery and submit certifications and other documentation to PE.

QCT will work with survey crew and PE to verify exact stakeout requirements and resolve any potential stakeout problems.

Startup Phase -

QCT will go over the specification requirement and stakeout data with the foreman in charge of installation.

QCT will normally be present when any operation begins to resolve problems and verify specification compliance.

Production Phase -

Foreman will normally be responsible for QC during production. QCT will make spot checks approximately once a day or more frequently if there are problems.

QCT will perform tests required by the contract and furnish results to PE. QCT will advise PE when segments of the work are ready for acceptance.

Please advise me if there are any additions or supplements you would like us to make to this QCP. If there are changes to any items (personnel, suppliers, etc.) we will attempt to provide the PE notice in advance of their impact on the work.

We need concurrence to proceed with at least the clearing and grading portion of the work by June 1 in order to stay on our schedule.

Sincerely yours,

Ralph Altway

Ralph Altway
Superintendent

Chapter 8 – PROJECT ADMINISTRATION
TABLE OF CONTENTS

Section **Page**

8.1 General 8-1

8.2 Labor Requirements 8-2

8.3 Equal Employment Opportunity Requirements 8-4
8.3.1 Nondiscrimination 8-4
8.3.2 Affirmative Action 8-4
8.3.3 Reports 8-4

8.4 Correspondence 8-6

8.5 Working Drawings 8-7

8.6 Project Status Reports 8-8

8.7 Opening of Sections of Project to Traffic 8-9

8.8 Subcontracting 8-10
8.8.1 General 8-10
8.8.2 Percent Subcontracted 8-11
8.8.3 Materials Supply Subcontracts 8-11
8.8.4 Small and Small Disadvantaged Business Concerns 8-12
8.8.5 Miller Act 8-12

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 8.2-A Contractor Payroll Checklist....8-3

CHAPTER 8

PROJECT ADMINISTRATION

8.1 GENERAL

This chapter provides guidance to assist FLH personnel in administering project requirements that are not directly related to a particular work item, but are still essential to ensuring successful project completion. Topics addressed include the following:

- Contractor compliance with respect to:
    - Certified payrolls
    - Equal Employment Opportunity (EEO) requirements
    - Subcontracting requirements, including small business/DBE set asides and prompt payment of subcontractor invoices
- Procedures related to the handling of submittals, working drawings, and correspondence;
- Preparation of project status reports; and
- Opening sections of the project to traffic.

8.2 LABOR REQUIREMENTS

Contract labor compliance requirements are included in standard contract clauses. The *FHWA Labor Compliance Manual* provides some explanation and guidance. Specific problems should be discussed with the COE, who may decide to get advice from Legal Counsel.

The Project Engineer should monitor Contractor payrolls for prompt submission and proper certification. Spot checks should be made of classifications and wage rates. Exhibit 8.2-A is an example of a Contractor Payroll Checklist. The Project Engineer should also verify that all covered personnel, including owner operators, are included on a certified payroll. Covered personnel include all who operate equipment or perform labor in the construction of the project. It does not include supplier employees working at a commercial plant or delivering materials. Nor does it include salaried professional services personnel, such as surveyors and materials testers, unless their jobs are specifically included in the contract Davis-Bacon wage decision.

The preconstruction conference should include an overview of the labor and payroll reporting requirements, and the minutes should reflect that these items were covered.

If the Contractor does not make timely submission of certified payrolls, the Project Engineer may, after written notice, withhold progress payments until the Contractor complies with this requirement. In the case of subcontractor nonsubmission, the withholding of only the subcontractor's portion of the work may be appropriate. The Project Engineer should discuss these actions with the COE to determine if they are necessary.

Exhibit 8.2-A Contractor Payroll Checklist

U.S. Department of Transportation
Federal Highway Administration

Certified Payroll Checklist
(As required in FAR Clause 52.222-3 thru 52.222-9)

Contractor/Subcontractor Name: _____

Payroll Period: _____ Date Submitted: _____

	YES	NO	N/A
General Questions:			
Payment made once a week	____	____	
Payroll submitted weekly	____	____	
Is the payroll mathematically correct	____	____	
Is overtime paid correctly (time-and-a-half)	____	____	
For Apprentice or Trainees on the payroll:**			
Are they in a registered or certified program	____	____	____
Is their wage and status shown and paid	____	____	____
Are they in the programs geographical limits	____	____	____
On each payroll for each employee:			
Full Legal Name	____	____	
Address	____	____	
Social Security Number	____	____	
Accurate Labor Classification(s)	____	____	
Minimum or Better Hourly Rate(s) Paid	____	____	
Minimum or Better Hourly Fringe(s) Paid	____	____	
Daily Hours for each Labor Classification	____	____	
Weekly Hours Worked	____	____	
Authorized Deductions Only	____	____	
Actual (Net) Wages Paid	____	____	
Required on Statement of Compliance:			
Original Signature of Contractor or paying agent	____	____	
Certifies employee information is correct	____	____	
Certifies employee has been fully paid	____	____	
Certifies wage rate and fringe benefits are correct	____	____	
Contract number	____	____	
Correct payroll number and dates	____	____	
Other issues:			
If amended, is information amended correctly	____	____	____
If amended, is payroll number correct	____	____	____
If interviews completed, do they match the payroll	____	____	____

Checked by: _____ Date: _____

**If "no" is checked on any of the questions in this section then normal labor classification must be used

8.3 EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

8.3.1 NONDISCRIMINATION

Discrimination on the basis of race, color, religion, sex, or national origin is prohibited by Federal law. The Department of Labor (DOL), Office of Federal Contract Compliance Programs (OFCCP), is responsible for enforcement and the imposition of civil sanctions (termination, debarment, etc.). OFCCP may also refer serious violations to the Justice Department for criminal prosecution.

FLH employees, as representatives of the contracting agency, have no formal authority to monitor nondiscrimination or to impose sanctions for apparent violations. However, project personnel should be alert to any indications of such violations and will report them through supervisory channels for possible referral to the OFCCP.

At preconstruction conferences, FLH will emphasize that discrimination on the basis of race, color, religion, sex, or national origin is strictly prohibited. This emphasis should be reflected in the minutes of such meetings.

Any FLH employee who receives a discrimination complaint (verbal or otherwise) or observes a case of apparent discrimination should report the incident immediately through supervisory channels for resolution or referral to the OFCCP.

8.3.2 AFFIRMATIVE ACTION

Affirmative action programs to correct past discriminatory practices are permitted by the 1964 Civil Rights Act. Monitoring and enforcement responsibilities related to affirmative action programs are delegated to the OFCCP.

At preconstruction conferences, FLH will emphasize the Contractor's obligations to engage in an effective affirmative action program. This emphasis should be reflected in the minutes of such conferences.

8.3.3 REPORTS

Correspondence related to civil rights will be maintained in the field project files. Copies of all material will be forwarded through the COE to Construction files.

Copies of the following items should be requested from the Contractor and included in the files:

1. **Notice of Subcontract Award.** This is required by FAR Clause 52.222-23, Notice Requirement for Affirmative Action to Ensure Equal Opportunity. The notice is to be submitted directly to OFCCP for each onsite (but not materials supply) subcontract exceeding $10,000.

2. **Veteran's Employment Report VETS-100.** This is required by FAR Clause 52.222-37, Employment Reports on Special Disabled Veterans and Veterans of the Vietnam Era. It must be submitted annually by September 31, to the Department of Labor.

3. **SF 100 (EEO-1).** This form is required by FAR Clause 52.222-26, Equal Opportunity. It is required to be submitted directly to the EEOC, Joint Reporting Committee, annually by September 31.

8.4 CORRESPONDENCE

All correspondence, including reports originating from the Project Engineer's office, should be signed or initialed by the Project Engineer, or the acting Project Engineer.

The Contractor and others who may need to correspond regarding the project should be advised of the FLH names and addresses with whom we prefer they correspond. Project correspondence will either be delivered to the COE or Project Engineer, depending on the Division policy. The Project Engineer will forward to the COE copies of all incoming or outgoing correspondence, and will retain a copy in the project office files. When the Contractor is corresponding with the COE, a copy is to be provided to the Project Engineer. Correspondence covering matters outside the authority of the Project Engineer should be noted for the COE's action. Copies of correspondence to State or county highway agencies may be furnished to the appropriate FHWA Division Administrator as determined by the COE.

The Project Engineer should maintain a complete list of contacts related to the project that identifies each contact's name, agency or company, phone and FAX number, and relationship to the project. This list will expedite appropriate communication of project problems and assist new personnel assigned to the project.

The handling of Contractor submittals, payrolls, test reports, and other non-correspondence items should be in accordance with Division policy as to which Divisional branch is to receive a copy.

8.5 WORKING DRAWINGS

See FAR Clause 52.236-21, Specifications and Drawings for Construction.

The contract states the time requirements for submission and approval of working drawings.

The Project Engineer should go over the Contractor's schedule for submissions at the preconstruction conference so that the Government can schedule its own resources. The Contractor should also be advised to promptly submit information on suppliers and subcontractors whose work will require Government inspection and testing, particularly offsite inspection.

Procedures for submittal and approval of working drawings will be in accordance with Division policy.

8.6 PROJECT STATUS REPORTS

The Project Engineer is required to submit a status report of project activity on a monthly basis or otherwise in accordance with Division procedures. Division procedures will specify the format and to whom the reports or information will be distributed, such as to the National Park Service or other partner agencies.

The Project Engineer should submit reports or update progress information only when the project is active, unless other instructions are received from the COE. *Active* means some type of construction or construction engineering being managed by the Project Engineer is in progress, up to and including submission of the final construction records.

The Project Engineer may also wish to, or be directed to, prepare a weekly forecast of upcoming construction operations. This is mainly used on more visible, controversial projects to keep management, the cooperating agency, and the public (through the cooperating agency) well informed of project issues. It may be a computer updated newsletter or notice. Its function is to apprise all who have legitimate interest of expected traffic delays, intermediate completions, and similar project information. The COE will be able to furnish examples of such reports.

8.7 OPENING OF SECTIONS OF PROJECT TO TRAFFIC

There are two contractual situations where the Contractor may be required to open a partially completed portion of the project to public traffic.

If the opening is a part of an overall stage construction scheme that is a part of the contract requirements, no special written order or directive is required. However, it may be prudent to go over the incomplete work involved and agree with the Contractor on the work remaining, and the Contractor's plan to protect and maintain the completed work. Generally, the Contractor is responsible for maintenance of the completed work, including correcting damage caused by vandalism and private vehicular accidents.

If the opening is unplanned (i.e. not a requirement of the contract), the Government has a right under the contract (FAR Clause 52.236-11) to order an opening, but may incur some liability for doing so. This situation should be discussed with the COE. The liability may include increased construction costs to complete under traffic, and increased maintenance and possible vandalism costs. If the Government decides to open despite this liability, a written direction signed by a CO is required.

The Contractor should be clearly advised that in neither of these two cases is the Government accepting the partially complete work and that the Contractor's responsibility for completing and maintaining the work, as appropriate, remains.

8.8 SUBCONTRACTING

8.8.1 GENERAL

Section 108.02 of the Standard Specifications allows the Contractor to subcontract a portion of the work. The FAR specifically encourages subcontracting to small, small disadvantaged, and women-owned small businesses. However, the Contractor is usually required to perform, with its own organization, work amounting to not less than 50 percent of the original contract amount. This requirement is contained in FAR Clause 52.236-1, Performance of Work by the Contractor. Some contracts may specify an alternate percentage. Contracts that are Small Business Set Asides contain FAR Clause 52.219-14, Limitations on Subcontracting, which permits a far higher percentage of the work to be subcontracted (85% less materials). For most FLH contracts, written consent to subcontract is not required. However, contractors and subcontractors may be required to furnish certain regulatory and administrative items before beginning work on a subcontract. These items are as follows:

- **SF 1413 - Statement and Acknowledgement.** A standard form in which the prime and the subcontractor certify that the standard labor provisions are included in the subcontract. This form is required for all subcontracts involving onsite (Davis-Bacon) labor. It must be submitted to the Government within 14 days of award of the prime contract or within 14 days of the award of any applicable subcontract. A blank copy is provided in Appendix 8A.1.1.

- **SF 1413S – Subcontracting Certification.** This form, a supplement to SF 1413, is designed to document the type and amount of work subcontracted, as well as identify Small Business Concerns. Prices shown should be based on the actual prices in the subcontract, regardless of the bid prices. This form should be obtained from all subcontractors, including supply subcontracts, whether they involve onsite labor or not. A blank copy is provided in Appendix 8A.1.2.

Contracts that are awarded to large business concerns and that exceed $1,000,000 (original contract amount) contain a Subcontracting Plan submitted by the Contractor immediately after award. The goals contained in the Subcontracting Plan are contractually binding and must be monitored by the Project Engineer to verify that they are met. Failure to comply with these goals may result in liquidated damages being assessed in accordance with FAR Clause 52.219-16, Liquidated Damages - Small Business Subcontracting Plan. A contractor who is operating under a Subcontracting Plan is required to submit periodic documentation to the Small Business Administration through the CO, FLHO, and DOT.

- **SF 294 - Subcontracting Report for Individual Contracts.** This form is required to be submitted semiannually on April 30 and October 30, for the semiannual periods ending March 31 and September 30, respectively. A blank copy is provided in Appendix 8A.1.3.

- **SF 295 - Summary Subcontract Report.** This form is required to be submitted annually on October 30 covering the fiscal year ending September 30. A blank copy is provided in Appendix 8A.1.4.

The Project Engineer should advise the COE when the Contractor fails to submit required documentation, when there is apparent noncompliance with the subcontracting plan, or when the invoking of liquidated damages appears warranted.

During the preconstruction conference, subcontracting requirements should be described in detail and the required certification forms should be discussed and made available. It should be made clear to the Contractor that, insofar as the Government is concerned, the prime Contractor is responsible for all work subcontracted and resubcontracted, and that all subcontracts must include the appropriate provisions of the original contract.

8.8.2 PERCENT SUBCONTRACTED

In order to verify compliance with FAR Clause 52.236-1, Performance of Work by the Contractor, it is necessary, for each subcontract, to be aware of the amount of the original contract work that the prime Contractor is performing with its own forces (labor). **If the prime Contractor's work with its own forces is less than what is required in the contract, then inform the COE.** Only onsite subcontracts that include Davis-Bacon labor are counted as work not performed by the prime. Subcontracts that involve onsite services, such as testing, surveying and inspection, are not counted unless they include at least some Davis-Bacon labor. Whether they include Davis-Bacon labor or not varies from State to State. Supply-type subcontracts do not count; nor do hauling subcontracts unless they are subject to Davis-Bacon.

FAR Clause 52.219-14, Limitations on Subcontracting, applies only to Small Business Set Asides. It allows the prime to perform as little as 15 percent of the amount of the original contract (exclusive of materials). Generally, this percentage is so low, that as long as the prime has some presence on the site, including the submission of payrolls, no further documentation is necessary to verify the 15 percent requirement. If documentation is generated, the full amounts of all materials supply subcontracts (at any tier) must be deducted from the original contract amount, and from the amounts of all subcontracts before computing the amount subcontracted.

8.8.3 MATERIALS SUPPLY SUBCONTRACTS

For purposes of understanding the percent subcontracted, it is important to define a materials supply subcontract. Such subcontracts provide for the furnishing of materials that are to be incorporated in the work, such as concrete, steel, and asphalt. Other materials, such as form lumber, explosives, or fuel, do not count as materials supply subcontracts. Such subcontracts also must be in writing before material delivery, and both parties (the Contractor and the supplier) must have mutually enforceable obligations under the subcontract. Usually the prime agrees to purchase certain quantities of materials, and the supplier agrees to a specific price for the materials. Simple price quotes or the purchase of occasional concrete from a local supplier to build headwalls would usually not count as materials supply subcontracts.

Traditionally, in accordance with the DOL regulations, materials supply subcontractors were simply called "suppliers" rather than subcontractors. That remains true in all DOL laws and regulations. However, the FAR defines suppliers as a form of subcontractor, not a separate entity. This is important when applying DBE, Prompt Payment, and other non-Labor provisions in the contract.

8.8.4 SMALL AND SMALL DISADVANTAGED BUSINESS CONCERNS

The FAR encourages small business and small disadvantaged business subcontracting. In order to be a disadvantaged business or a woman-owned business as defined by the FAR, the company must also be a small business. Whether a company is a small business is determined by standards set by the Small Business Administration (SBA) and published in Part 19 of the FAR. A company's status also depends on the nature of the work it is doing. A company might be a large business as a general highway contractor, but a small business as an asphalt supplier. Also, the Federal Aid regulations put additional limitations on the definition of "small business" that do not apply to Federal contractors. These additional definitions are such that a company could be excluded from small business programs (like DBE subcontracting) on Federal Aid projects, but still be eligible on FLH projects. Therefore, the lack of a State certification may not give an accurate indication with respect to eligibility under Federal contracting (FAR) rules. FHWA 1775 asks for information on the subcontractor's small business and socio-economic status. This is done to ensure the subcontractor's responses are consistent with the regulatory requirements and definitions. The information furnished should be checked by a designated specialist in the Division office.

8.8.5 MILLER ACT

Occasionally, subcontractors or even individuals may contact the Project Engineer about unpaid bills for labor, materials, or services furnished to the project, and may request help in collecting payment from the Contractor or subcontractors. Sometimes the Project Engineer is asked to enforce payment or to withhold funds from the Contractor to make up the nonpayment. There is no specific authority in law for the Government to take either of these actions under normal circumstances. The only direct assistance the Government can provide is to bring the reported nonpayments to the attention of the prime Contractor and its bonding company. Additional information regarding Prompt Payment and false certifications is provided in Section 9.5.5 of this manual.

The Payment Bond, required by the Miller Act, protects most subcontractors and individuals furnishing labor, materials, or services, just as a mechanics lien protects companies in the private sector. These subcontractors and individuals cannot put a lien on parts of the project, or repossess items. If the prime does not immediately resolve non payment issues with their sub contractors and suppliers, the Project Engineer should report this to the COE.

The Miller Act payment bond covers subcontractors and suppliers of material who have direct contracts with the prime Contractor. These are called first-tier claimants. Subcontractors and material suppliers who have contracts with a subcontractor, but not those who have contracts with a supplier, are also covered and are called second-tier claimants. Anyone further down the contract chain is considered too remote and cannot assert a claim against a Miller Act payment bond posted by the Contractor.

Appendix 8A.2 contains additional information regarding the Miller Act, including:

- pertinent parts of the law itself, a copy of which should be provided to subcontractors and suppliers alleging nonpayment from the prime;
- an example of a letter advising a subcontractor or supplier of its rights under the Miller Act; and

- an example of a letter informing a prime contractor of a nonpayment complaint filed by one of its subcontractors.

CHAPTER 8 – PROJECT ADMINISTRATION

LIST OF APPENDICES

8A.1 SUBCONTRACTING FORMS 1

8A.1.1 SF 1413, Statement and Acknowledgement 2

8A.1.2 FHWA 1775, Notice of Subcontract Award 3

8A.1.3 SF 294, Subcontracting REport for Individual Contracts 4

8A.1.4 SF 295, Summary Subcontract Report 8

8A.2 MILLER ACT 11

8A.2.1 Miller Act Provisions 12

8A.2.2 Example Miller Act Letter to Subcontractor 14

8A.2.3 Example Miller Act Letter to Prime Contractor 15

8A.1 SUBCONTRACTING FORMS

This appendix contains blank copies of the following forms:

- SF 1413
- SF 1413S (supplement to SF 1413)
- SF 294
- SF 295

Be sure to visit the GSA Forms Library to verify that the most current/updated versions of the standard forms are being used.

Additional information regarding the use of these forms is provided in Section 8.8.

8A.1.1 SF 1413, STATEMENT AND ACKNOWLEDGEMENT

STATEMENT AND ACKNOWLEDGMENT

OMB No.: **9000-0014**
Expires: 5/31/2011

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat, (VIR), Regulatory and Federal Assistance Division, GSA, Washington, DC 20405; and to the Office of Management and Budget, Paperwork Reduction Project (9000-0014), Washington, DC 20503.

PART I - STATEMENT OF PRIME CONTRACTOR

1. PRIME CONTRACT NO.	2.DATE SUBCONTRACT AWARDED	3. SUBCONTRACT NUMBER

4. PRIME CONTRACTOR			5. SUBCONTRACTOR		
a. NAME			a. NAME		
b. STREET ADDRESS			b. STREET ADDRESS		
c. CITY	d. STATE	e. ZIP CODE	c. CITY	d. STATE	e. ZIP CODE

6. The prime contract ☐ does, ☐ does not contain the clause entitled "Contract Work Hours and Safety Standards Act -- Overtime Compensation."

7. The prime contractor states that under the contract shown in Item 1, a subcontract was awarded on the date shown in Item 2 to the subcontractor identified in item 5 by the following firm:

a. NAME OF AWARDING FIRM

b. DESCRIPTION OF WORK BY SUBCONTRACTOR

8. PROJECT	9. LOCATION

10a. NAME OF PERSON SIGNING	11. BY *(Signature)*	12. DATE SIGNED
10b. TITLE OF PERSON SIGNING		

PART II - ACKNOWLEDGMENT OF SUBCONTRACTOR

13. The subcontractor acknowledges that the following clauses of the contract shown in Item 1 are included in this subcontract:

- Contract Work Hours and Safety Standards Act - Overtime Compensation - (If included in prime contract see Block 6)
- Payrolls and Basic Records
- Withholding of Funds
- Disputes Concerning Labor Standards
- Compliance with Davis-Bacon and Related Act Regulations
- Davis-Bacon Act
- Apprentices and Trainees
- Compliance with Copeland Act Requirements
- Subcontracts (Labor Standards)
- Contract Termination - Debarment
- Certification of Eligibility

14. NAME(S) OF ANY INTERMEDIATE SUBCONTRACTORS, IF ANY

A		C	
B		D	

15a. NAME OF PERSON SIGNING	16. BY *(Signature)*	17. DATE SIGNED
15b. TITLE OF PERSON SIGNING		

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITION IS NOT USABLE

STANDARD FORM 1413 (REV. 7/2005)
Prescribed by GSA/FAR (48 CFR) 53.222(e)

8A.1.2 SF 1413S, SUBCONTRACTING CERTIFICATION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

CONTRACT NUMBER

SUBCONTRACTING CERTIFICATION

SUPPLEMENT TO STANDARD FORM 1413

PRIME CONTRACTOR:
(NAME, ADDRESS, PHONE NUMBER)

SUBCONTRACTOR:
(NAME, ADDRESS, PHONE NUMBER)

THE SUBCONTRACTOR IS:
(check all that apply)

- ☐ Small Business Concern (SBC)
  - ☐ Small Disadvantaged Business (DBE)
  - ☐ Woman-owned Business Enterprise (WOB)
  - ☐ Veteran-owned (VET)
  - ☐ HUB Zone (HUB)
  - ☐ 8(A) Certified
- ☐ Large Business Concern (LBC) (none of the above)

ITEMS OF WORK SUBCONTRACTED

ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT PRICE	PAY UNIT	TOTAL AMOUNT

THE WORK UNDER THIS SUBCONTRACT AMOUNTS TO $ _____ (TOTAL)

PERCENTAGE OF WORK UNDER THIS SUBCONTRACT: _____ %
(PERCENT OF ORIGINAL BID AMOUNT)

Revised 4/1/08 SF1413S.WPF

8A.1.3 SF 294, SUBCONTRACTING REPORT FOR INDIVIDUAL CONTRACTS

SUBCONTRACTING REPORT FOR INDIVIDUAL CONTRACTS
(See instructions on reverse)

OMB No: **9000-0006**
Expires: 11/30/2010

Public reporting burden for this collection of information is estimated to average 55.34 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (VIR), Regulatory and Federal Assistance Division, GSA, Washington, DC 20405.

1. CORPORATION, COMPANY, OR SUBDIVISION COVERED
a. COMPANY NAME
b. STREET ADDRESS
c. CITY | d. STATE | e. ZIP CODE
2. CONTRACTOR IDENTIFICATION NUMBER

3. DATE SUBMITTED
4. REPORTING PERIOD FROM INCEPTION OF CONTRACT THRU:
☐ MAR 31 ☐ SEPT 30 YEAR
5. TYPE OF REPORT
☐ REGULAR ☐ FINAL ☐ REVISED

6. ADMINISTERING ACTIVITY *(Please check applicable box)*
☐ ARMY ☐ GSA ☐ NASA
☐ NAVY ☐ DOE ☐ OTHER FEDERAL AGENCY *(Specify)*
☐ AIR FORCE ☐ DEFENSE CONTRACT MANAGEMENT AGENCY

7. REPORT SUBMITTED AS *(Check one and provide appropriate number)*
☐ PRIME CONTRACTOR — PRIME CONTRACT NUMBER
☐ SUBCONTRACTOR — SUBCONTRACT NUMBER

8. AGENCY OR CONTRACTOR AWARDING CONTRACT
a. AGENCY'S OR CONTRACTOR'S NAME
b. STREET ADDRESS
c. CITY | d. STATE | e. ZIP CODE

9. DOLLARS AND PERCENTAGES IN THE FOLLOWING BLOCKS:
☐ DO INCLUDE INDIRECT COSTS ☐ DO NOT INCLUDE INDIRECT COSTS

SUBCONTRACT AWARDS

TYPE	CURRENT GOAL		ACTUAL CUMULATIVE	
	WHOLE DOLLARS	PERCENT	WHOLE DOLLARS	PERCENT
10a. SMALL BUSINESS CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
10b. LARGE BUSINESS CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
10c. TOTAL *(Sum of 10a and 10b.)*		100.0%		100.0%
11. SMALL DISADVANTAGED BUSINESS (SDB) CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
12. WOMEN-OWNED SMALL BUSINESS (WOSB) CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
13. HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU) AND MINORITY INSTITUTIONS (MI) *(If applicable) (Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
14. HUBZone SMALL BUSINESS (HUBZone SB) CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
15. VETERAN-OWNED SMALL BUSINESS CONCERNS *(Dollar Amount and Percent of 10c.)* (SEE SPECIFIC INSTRUCTIONS)				
16. SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS CONCERNS *(Dollar Amount and Percent of 10c)* (SEE SPECIFIC INSTRUCTIONS)				
17. ALASKA NATIVE CORPORATIONS (ANCs) AND INDIAN TRIBES THAT HAVE NOT BEEN CERTIFIED BY THE SMALL BUSINESS ADMINISTRATION AS SMALL DISADVANTAGED BUSINESSES *(Dollar Amount)* (SEE SPECIFIC INSTRUCTIONS)				
18. ALASKA NATIVE CORPORATIONS (ANCs) AND INDIAN TRIBES THAT ARE NOT SMALL BUSINESSES *(Dollar Amount)* (SEE SPECIFIC INSTRUCTIONS)				

AUTHORIZED FOR LOCAL REPRODUCTION
Previous Edition is Not Usable

STANDARD FORM 294 (REV. 9/2007)
Prescribed by GSA-FAR (48 CFR 53.219(a))

8A.1.3 SF 294, Subcontracting Report for Individual Contracts *(Continued)*

19. REMARKS

20a. NAME OF INDIVIDUAL ADMINISTERING SUBCONTRACTING PLAN	20b. TELEPHONE NUMBER	
	AREA CODE	NUMBER

STANDARD FORM 294 (REV. 9/2007) **PAGE 2**

8A.1.3 SF 294, Subcontracting Report for Individual Contracts *(Continued)*

GENERAL INSTRUCTIONS

1. This report is not required for small businesses.

2. This report is not required for commercial items for which a commercial plan has been approved, nor from large businesses in the Department of Defense (DOD) Test Program for Negotiation of Comprehensive Subcontracting plans. The Summary Subcontract Report (SF 295) is required for contractors operating under one of these two conditions and should be submitted to the Government in accordance with the instructions on that form.

3. This form collects subcontract award data from prime contractors/ subcontractors that : (a) hold one or more contracts over $550,000 (over $1,000,000 for construction of a public facility); and (b) are required to report subcontracts awarded to Small Business (SB), Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB), HUBZone Small Business (HUBZone SB), Veteran-Owned Small Business (VOSB) and Service-Disabled Veteran-Owned Small Business concerns under a subcontracting plan. For the Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), and the Coast Guard, this form also collects subcontract award data for Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs).

4. This report is required for each contract containing a subcontracting plan and must be submitted to the administrative contracting officer (ACO) or contracting officer if no ACO is assigned, semi-annually, during contract performance for the periods ended March 31st and September 30th. A separate report is required for each contract at contract completion. Reports are due 30 days after the close of each reporting period unless otherwise directed by the contracting officer. Reports are required when due, regardless of whether there has been any subcontracting activity since the inception of the contract or since the previous report.

5. Only subcontracts involving performance in the U.S. or its outlying areas should be included in this report.

6. Purchases from a corporation, company, or subdivision that is an affiliate of the prime/subcontractor are not included in this report.

7. Subcontract award data reported on this form by prime contractors/ subcontractors shall be limited to awards made to their immediate subcontractors. Credit cannot be taken for awards made to lower tier subcontractors unless you have been designated to receive an SB and SDB credit from an Alaska Native Corporation (ANC) or Indian tribe.

8. FAR 19.703 sets forth the eligibility requirements for participating in the subcontracting program.

9. Actual achievements must be reported on the same basis as the goals set forth in the contract. For example, if goals in the plan do not include indirect and overhead items, the achievements shown on this report should not include them either.

SPECIFIC INSTRUCTIONS

BLOCK 2: For the Contractor Identification Number, enter the nine-digit Data Universal Numbering System (DUNS) number that identifies the specific contractor establishment. If there is no DUNS number available that identifies the exact name and address entered in Block 1, contact Dun and Bradstreet Information Services at 1-866-705-5711 or via the Internet at http://www.dnb.com. The contractor should be prepared to provide the following information: (i) Company legal business name. (ii) Tradestyle, doing business, or other name by which your entity is commonly recognized. (iii) Company physical street address, city, state and ZIP Code. (iv) Company mailing address, city, state and ZIP Code (if separate from physical). (v) Company telephone number. (vi) Date the company was started. (vii) Number of employees at your location. (viii) Chief executive officer/key manager. (ix) Line of business (industry). (x) Company Headquarters name and address (reporting relationship within your entity).

BLOCK 4: Check only one. Note that all subcontract award data reported on this form represents activity since the inception of the contract through the date indicated on this block.

BLOCK 5: Check whether this report is a "Regular," "Final," and/or "Revised" report. A "Final" report should be checked only if the contractor has completed the contract or subcontract reported in Block 7. A "Revised" report is a change to a report previously submitted for the same period.

BLOCK 6: Identify the department or agency administering the majority of subcontracting plans.

BLOCK 7: Indicate whether the reporting contractor is submitting this report as a prime contractor or subcontractor and the prime contract or subcontract number.

BLOCK 8: Enter the name and address of the Federal department or agency awarding the contract or the prime contractor awarding the subcontract.

BLOCK 9: Check the appropriate block to indicate whether indirect costs are included in the dollar amounts in blocks 10a through 16. To ensure comparability between the goal and actual columns, the contractor may include indirect costs in the actual column only if the subcontracting plan included indirect costs in the goal.

BLOCKS 10a through 18: Under "Current Goal," enter the dollar and percent goals in each category (SB, SDB, WOSB, VOSB, service-disabled VOSB, and HUBZone SB) from the subcontracting plan approved for this contract. (If the original goals agreed upon at contract award have been revised as a result of contract modifications, enter the original goals in Block 19. The amounts entered in Blocks 10a through 16 should reflect the revised goals.) There are no goals for Blocks 17 and 18. Under "Actual Cumulative," enter actual subcontract achievements (dollars and percent) from the inception of the contract through the date of the report shown in Block 4. In cases where indirect costs are included, the amounts should include both direct awards and an appropriate prorated portion of indirect awards. However, the dollar amounts reported under "Actual Cumulative" must be for the same period of time as the dollar amounts shown under "Current Goal." For a contract with options, the current goal should represent the aggregate goal since the inception of the contract. For example, if the contractor is submitting the report during Option 2 of a multiple year contract, the current goal would be the cumulative goal for the base period plus the goal for Option 1 and the goal for Option 2.

BLOCK 10a: Report all subcontracts awarded to SBs including subcontracts to SDBs, WOSB, VOSB, service-disabled VOSB, and HUBZone SBs. For DOD, NASA, and Coast Guard contracts, include subcontracting awards to HBCUs and MIs. Include subcontracts awarded to ANCs and Indian tribes that are not small businesses and that are not certified by the SBA as SDBs where you have been designated to receive their SB and SDB credit. Where your company and other companies have been designated by an ANC or Indian tribe to receive SB and SDB credit for a subcontract awarded to the ANC or Indian tribe, report only the portion of the total amount of the subcontract that has been designated to your company.

BLOCK 10b: Report all subcontracts awarded to large businesses (LBs) and any other-than-small businesses. Do not include subcontracts awarded to ANCs and Indian tribes that have been reported in 10a above.

BLOCK 10c: Report on this line the total of all subcontracts awarded under this contract (the sum of lines 10a and 10b).

BLOCKS 11 - 16: Each of these items is a subcategory of Block 10a. Note that in some cases the same dollars may be reported in more than one block (e.g., SDBs owned by women or veterans).

BLOCK 11: Report all subcontracts awarded to SDBs (including WOSB, VOSB, service-disabled VOSBs, and HUBZone SB SDBs). Include subcontracts awarded to ANCs and Indian tribes that have not been certified by SBA as SDBs where you have been designated to receive their SDB credit. Where your company and other companies have been designated by an ANC or Indian tribe to receive their SDB credit for a subcontract awarded to the ANC or Indian tribe, report only the portion of the total amount of the subcontract that has been designated to your company. For DoD, NASA, and Coast Guard contracts, include subcontracting awards to HBCUs and MIs.

BLOCK 12: Report all subcontracts awarded to WOSBs (including SDBs, VOSBs (including service-disabled VOSBs), and HUBZone SBs that are also WOSBs).

BLOCK 13: (For contracts with DoD, NASA, and Coast Guard): Report all subcontracts with HBCUs/MIs. Complete the column under "Current Goal" only when the subcontracting plan establishes a goal.

BLOCK 14: Report all subcontracts awarded to HUBZone SBs (including WOSBs, VOSBs (including service-disabled VOSBs), and SDBs that are also HUBZone SBs).

BLOCK 15: Report all subcontracts awarded to VOSBs including service-disabled VOSBs (and including SDBs, WOSBs, and HUBZone SBs that are also VOSBs).

BLOCK 16: Report all subcontracts awarded to service-disabled VOSBs (including SDBs, WOSBs, and HUBZone SBs that are also service-disabled VOSBs).

STANDARD FORM 294 (REV. 9/2007) **PAGE 3**

8A.1.3 SF 294, Subcontracting Report for Individual Contracts *(Continued)*

BLOCK 17: Report all subcontracts awarded to ANCs and Indian tribes that are reported in Block 11, but have not been certified by SBA as SDBs.

BLOCK 18: Report all subcontracts awarded to ANCs and Indian tribes that are reported in Block 10a, but are not small businesses.

BLOCK 19: Enter a short narrative explanation if (a) SB, SDB, WOSB, VOSB, service-disabled VOSB, or HUBZone SB accomplishments fall below that which would be expected using a straight-line projection of goals through the period of contract performance; or (b) if this is a final report, any one of the six goals were not met.

DEFINITIONS

1. Direct Subcontract Awards are those that are identifed with the performance of one or more specific Government contract(s).

2. Indirect costs are those which, because of incurrence for common or joint purposes, are not identified with specific Government contracts; these awards are related to Government contract performance but remain for allocation after direct awards have been determined and identified to specific Government contracts.

DISTRIBUTION OF THIS REPORT

For the Awarding Agency or Contractor:

The original copy of this report should be provided to the contracting officer at the agency or contractor identified in Block 8. For contracts with DOD, a copy should also be provided to the Defense Contract Management Agency (DCMA) at the cognizant Defense Contract Management Area Operations (DCMAO) office.

For the Small Business Administration (SBA):

A copy of this report must be provided to the cognizant Commercial Market Representative (CMR) at the time of a compliance review. It is NOT necessary to mail the SF 294 to SBA unless specifically requested by the CMR.

STANDARD FORM 294 (REV. 9/2007) **PAGE 4**

8A.1.4 SF 295, SUMMARY SUBCONTRACT REPORT

SUMMARY SUBCONTRACT REPORT
(See instructions on reverse)

OMB No.: **9000-0007**
Expires: 2/28/2010

Public reporting burden for this collection of information is estimated to average 16.2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (VIR), Regulatory and Federal Assistance Division, GSA, Washington, DC 20405.

1. CORPORATION, COMPANY OR SUBDIVISION COVERED			3. DATE SUBMITTED
a. COMPANY NAME			
b. STREET ADDRESS			4. REPORTING PERIOD:
c. CITY	d. STATE	e. ZIP CODE	☐ OCT 1 - MAR 31 ☐ OCT 1 - SEPT 30 YEAR
2. CONTRACTOR IDENTIFICATION NUMBER			5. TYPE OF REPORT ☐ REGULAR ☐ FINAL ☐ REVISED

6. ADMINISTERING ACTIVITY *(Please check applicable box)*

☐	ARMY	☐	DEFENSE CONTRACT MANAGEMENT AGENCY	☐	DOE
☐	NAVY	☐	NASA	☐	OTHER FEDERAL AGENCY *(Specify)*
☐	AIR FORCE	☐	GSA		

7. REPORT SUBMITTED AS *(Check one)*		8. TYPE OF PLAN		
☐	PRIME CONTRACTOR	☐	INDIVIDUAL	IF PLAN IS A COMMERCIAL PLAN, SPECIFY THE PERCENTAGE OF THE DOLLARS ON THIS REPORT ATTRIBUTABLE TO THIS AGENCY.
☐	SUBCONTRACTOR	☐	COMMERCIAL PRODUCTS	
☐	BOTH			

9. CONTRACTOR'S MAJOR PRODUCTS OR SERVICE LINES

a		b	

CUMULATIVE FISCAL YEAR SUBCONTRACT AWARDS ***(Report cumulative figures for reporting period in Block 4)***

	TYPE	WHOLE DOLLARS	PERCENT (To nearest tenth of a %)
10a.	SMALL BUSINESS CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
10b.	LARGE BUSINESS CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
10c.	TOTAL *(Sum of 10a and 10b).*		100.0%
11.	SMALL DISADVANTAGED BUSINESS CONCERNS (SDB) *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
12.	WOMEN-OWNED SMALL BUSINESS (WOSB) CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
13.	HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU) AND MINORITY INSTITUTIONS *(If Applicable) (Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
14.	HUBZONE SMALL BUSINESS (HUBZone SB) CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
15.	VETERAN-OWNED SMALL BUSINESS (VOSB) CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
16.	SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS CONCERNS *(Dollar Amount and Percent of 10c).* (SEE SPECIFIC INSTRUCTIONS)		
17.	ALASKA NATIVE CORPORATIONS (ANCs) AND INDIAN TRIBES THAT HAVE NOT BEEN CERTIFIED BY THE SMALL BUSINESS ADMINISTRATION AS SMALL DISADVANTAGED BUSINESSES *(Dollar Amount)* (SEE SPECIFIC INSTRUCTIONS)		
18.	ALASKA NATIVE CORPORATIONS (ANCs) AND INDIAN TRIBES THAT ARE NOT SMALL BUSINESSES *(Dollar Amount)* (SEE SPECIFIC INSTRUCTIONS)		

19. CONTRACTOR'S OFFICIAL WHO ADMINISTERS SUBCONTRACTING PROGRAM

a. NAME	b. TITLE	c. TELEPHONE NUMBER	
		AREA CODE	NUMBER

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITION IS NOT USABLE

STANDARD FORM 295 (REV. 9/2007)
Prescribed by GSA - FAR (48 CFR) 53.219 (b)

8A.1.4 SF 295, Summary Subcontract Report *(Continued)*

20. REMARKS

21. CHIEF EXECUTIVE OFFICER

a. NAME	c. SIGNATURE
b. TITLE	d. DATE

STANDARD FORM 295 (REV. 9/2007) **PAGE 2**

8A.1.4 SF 295, Summary Subcontract Report *(Continued)*

GENERAL INSTRUCTIONS

1. This report is not required from small businesses.

2. This form collects subcontract data from prime contractors/subcontractors that: (a) hold one or more contracts over $550,000 (over $1,000,000 for construction of a public facility); and (b) are required to report subcontracts awarded to Small Business (SB), Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB), Veteran-Owned Small Business (VOSB), Service-Disabled Veteran Owned Small Business, and HUBZone Small Business (HUBZone SB) concerns under a subcontracting plan. For the Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), and the Coast Guard, this form also collects subcontract award data for Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs).

3. This report must be submitted semi-annually (for the six months ended March 31st and the twelve months ended September 30th) for contracts with the Department of Defense (DOD) and annually (for the twelve months ended September 30th) for contracts with civilian agencies, except for contracts covered by an approved Commercial Plan (see special instructions in right-hand column). Reports are due 30 days after the close of each reporting period.

4. This report may be submitted on a corporate, company, or subdivision (e.g., plant or division operating on a separate profit center) basis, unless otherwise directed by the agency awarding the contract.

5. If a prime contractor/subcontractor is performing work for more than one Federal agency, a separate report shall be submitted to each agency covering only that agency's contracts, provided at least one of that agency's contracts is over $550,000 (over $1,000,000 for construction of a public facility) and contains a subcontracting plan. (Note that DOD is considered to be a single agency; see next instruction).

6. For DOD, a consolidated report should be submitted for all contracts awarded by military departments/agencies and/or subcontracts awarded by DOD prime contractors. However, DOD contractors involved in construction and related maintenance and repair must submit a separate report for each DOD component.

7. Only subcontracts involving performance in the U.S. or its outlying areas should be included in this report.

8. Purchases from a corporation, company, or subdivision that is an affiliate of the prime/subcontractor are not included in this report.

9. Subcontract award data reported on this form by prime contractors/subcontractors shall be limited to awards made to their immediate subcontractors. Credit cannot be taken for awards made to lower tier subcontractors unless you have been designated to receive SB and SDB credit from an Alaska Native Corporation (ANC) or Indian tribe.

10. FAR 19.703 sets forth the eligibility requirements for participation in the subcontracting program.

11. See special instructions in right-hand column for Commercial Plans.

SPECIFIC INSTRUCTIONS

BLOCK 2: For the Contractor Identification Number, enter the nine-digit Data Universal Numbering System (DUNS) number that identifies the specific contractor establishment. If there is no DUNS number available that identifies the exact name and address entered in Block 1, contact Dun and Bradstreet Information Services at 1-866-705-5711 or via the Internet at http://www.dnb.com. The contractor should be prepared to provide the following information: (i) Company legal business name. (ii) Tradestyle, doing business, or other name by which your entity is commonly recognized. (iii) Company physical street address, city, state and ZIP Code. (iv) Company mailing address, city, state and ZIP Code (if separate from physical). (v) Company telephone number. (vi) Date the company was started. (vii) Number of employees at your location. (viii) Chief executive officer/key manager. (ix) Line of business (industry). (x) Company Headquarters name and address (reporting relationship within your entity).

BLOCK 4: Check only one. Note that March 31 represents the six months from October 1st and that September 30th represents the twelve months from October 1st. Enter the year of the reporting period.

BLOCK 5: Check whether this report is a "Regular," "Final," and/or "Revised," report. A "Final" report should be checked only if the contractor has completed all the contracts containing subcontracting plans awarded by the agency to which it is reporting. A "Revised" report is a change to a report previously submitted for the same period.

BLOCK 6: Identify the department or agency administering the majority of subcontracting plans.

BLOCK 7: This report encompasses all contracts with the Federal Government for the agency to which it is submitted, including subcontracts received from other large businesses that have contracts with the same agency. Indicate in this block whether the contractor is a prime contractor, subcontractor, or both (check only one).

BLOCK 8: **Check only one**. Check "Commercial Plan" only if this report is under an approved Commercial Plan. For a Commercial Plan, the contractor must specify the percentage of dollars in Blocks 10a through 16 attributable to the agency to which this report is being submitted.

BLOCK 9: Identify the major product or service lines of the reporting organization.

BLOCKS 10a through 18: These entries must include all subcontract awards resulting from contracts or subcontracts, regardless of dollar amount, received from the agency to which this report is submitted. If reporting as a subcontractor, report all subcontracts awarded under prime contracts. Amounts must include both direct awards and an appropriate prorated portion of indirect awards. (The indirect portion is based on the percentage of work being performed for the organization to which the report is being submitted in relation to other work being performed by the prime contractor/subcontractor). Do not include awards made in support of commercial business unless "Commercial" is checked in Block 8 (see Special Instructions for Commercial Plans in right hand column). Report only those dollars subcontracted this fiscal year for the period indicated in Block 4.

BLOCK 10a: Report all subcontracts awarded to SBs including subcontracts to SDBs, WOSBs, VOSBs, service-disabled VOSBs, and HUBZone SBs. Include subcontracts awarded to ANCs and Indian tribes that are not small businesses and that are not certified by the SBA as SDBs where you have been designated to receive their SB and SDB credit. Where your company and other companies have been designated by an ANC or Indian tribe to receive SB and SDB credit for a subcontract awarded to the ANC or Indian tribe, report only the portion of the total amount of the subcontract that has been designated to your company. For DOD, NASA, and Coast Guard contracts, include subcontracting awards to HBCUs and MIs.

BLOCK 10b: Report all subcontracts awarded to large businesses and any other-than-small businesses. Do not include subcontracts awarded to ANCs and Indian tribes that have been reported in 10a above.

BLOCK 10c: Report on this line the grand total of all subcontracts (the sum of lines 10a and 10b).

BLOCKS 11 through 16: Each of these items is a subcategory of Block 10a. Note that in some cases the same dollars may be reported in more than one block (e.g., SDBs owned by women); likewise subcontracts to HBCUs or MIs should be reported on both Block 11 and 13.

BLOCK 11: Report all subcontracts awarded to SDBs (including WOSB, VOSB, service-disabled VOSBs, and HUBZone SB SDBs). Include subcontracts awarded to ANCs and Indian tribes that have not been certified by SBA as SDBs where you have been designated to receive their SDB credit. Where your company and other companies have been designated by an ANC or Indian tribe to receive SDB credit for a subcontract awarded to the ANC or Indian tribe, report only the portion of the total amount of the subcontract that has been designated to your company. For DOD, NASA, and Coast Guard contracts, include subcontract awards to HBCUs and MIs.

BLOCK 12: Report all subcontracts awarded to WOSBs (including SDBs, VOSBs (including service-disabled VOSBs), and HUBZone SBs that are also WOSBs).

BLOCK 13: (For contracts with DOD, NASA and Coast Guard): Enter the dollar value of all subcontracts with HBCUs/MIs.

BLOCK 14: Report all subcontracts awarded to HUBZone SBs (including WOSBs, VOSBs (including service-disabled VOSBs), and SDBs that are also HUBZone SBs).

BLOCK 15: Report all subcontracts awarded to VOSBs, including service-disabled VOSBs (and including SDBs, WOSBs, and HUBZone SBs that are also VOSBs).

BLOCK 16: Report all subcontracts awarded to service-disabled VOSBs (including SDBs, WOSBs, and HUBZone SBs that are also service-disabled VOSBs).

BLOCK 17: Report all subcontracts awarded to ANCs and Indian tribes that are reported in Block 11, but have not been certified by SBA as SDBs.

BLOCK 18: Report all subcontracts awarded to ANCs and Indian tribes that are reported in Block 10a but are not small businesses.

SPECIAL INSTRUCTIONS FOR COMMERCIAL PLANS

1. This report is due on October 30th each year for the previous fiscal year ending September 30th.

2. The annual report submitted by reporting organizations that have an approved company-wide annual subcontracting plan for commercial items shall include all subcontracting activity under commercial plans in effect during the year and shall be submitted in addition to the required reports for other-than-commercial items, if any.

3. Enter in Blocks 10a through 16 the total of all subcontract awards under the contractor's Commercial Plan. Show in Block 8 the percentage of this total that is attributable to the agency to which this report is being submitted. This report must be submitted to each agency from which contracts for commercial items covered by an approved Commercial Plan were received.

DEFINITIONS

1. Direct Subcontract Awards are those that are identified with the performance of one or more specific Government contract(s).

2. Indirect Subcontract Awards are those which, because of incurrence for common or joint purposes, are not identified with specific Government contracts; these awards are related to Government contract performance but remain for allocation after direct awards have been determined and identified to specific Government contracts.

SUBMITTAL ADDRESSES FOR ORIGINAL REPORT

For DOD contractors, send reports to the cognizant contract administration office as stated in the contract.

For Civilian Agency Contractors, send reports to the awarding agency:

1. NASA: Forward reports to NASA, Office of Procurement (HS), Washington, DC 20546

2. OTHER FEDERAL DEPARTMENTS OR AGENCIES: Forward report to the OSDBU Director unless otherwise provided for in instructions by the Department or Agency.

FOR ALL CONTRACTORS:

SMALL BUSINESS ADMINISTRATION (SBA): Send "info copy" to the cognizant Commercial Market Representative (CMR) at the address provided by SBA. Call SBA Headquarters in Washington, DC at (202) 205-6475 for the correct address if unknown.

STANDARD FORM 295 (REV. 9/2007) **PAGE 3**

8A.2 MILLER ACT

This appendix contains additional information regarding the Miller Act, including:

- pertinent parts of the law itself, a copy of which should be provided to subcontractors and suppliers alleging nonpayment from the prime;
- an example of a letter advising a subcontractor or supplier of its rights under the Miller Act; and
- an example of a letter informing a prime contractor of a nonpayment compliant filed by one of its subcontractors.

For additional information, refer to Section 8.8.5.

8A.2.1 MILLER ACT PROVISIONS

CONTRACTS TO BE ACCOMPANIED BY A PAYMENT BOND FOR

PROTECTION OF LABORERS AND PERSONS FURNISHING MATERIALS

"MILLER ACT" 40 US CODE

270a.

(a) Before any contract, exceeding $25,000 in amount, for the construction, alteration, or repair of any public building or public work of the United States is awarded to any person, such person shall furnish to the United States the following bonds, which shall become binding upon the award of the contract to such person, who is hereinafter designated as "contractor":

(1) A performance bond with a surety or sureties satisfactory to the officer awarding such contract, and in such amount as he shall deem adequate, for the protection of the United States.

(2) A payment bond with a surety or sureties satisfactory to such officer for the protection of all persons supplying labor and material in the prosecution of the work provided for in said contract for the use of each such person. Whenever the total amount payable by the terms of the contract shall be not more than $1,000,000 the said payment bond shall be in a sum of one-half the total amount payable by the terms of the contract. Whenever the total amount payable by the terms of the contract shall be more than $1,000,000 and not more than $5,000,000, the said payment bond shall be in a sum of 40 per centum of the total amount payable by the terms of the contract. Whenever the total amount payable by the terms of the contract shall be more than $5,000,000, the said payment bond shall be in the sum of $2,500,000.

(b) The contracting officer in respect of any contract is authorized to waive the requirement of a performance bond and payment bond for so much of the work under such contract as is to be performed in a foreign country if he finds that it is impracticable for the contractor to furnish such bonds.

(c) Nothing in this section shall be construed to limit the authority of any contracting officer to require a performance bond or other security in addition to those, or in cases other than the cases specified in subsection (a) of this section.

(d) Every performance bond required under this section shall specifically provide coverage for taxes imposed by the United States which are collected, deducted, or withheld from wages paid by the contractor in carrying out the contract with respect to which such bond is furnished. However, the United States shall give the surety or sureties on such bond written notice, with respect to any such unpaid taxes attributable to any period, within ninety days after the date when such contractor files a return for such period, except that no such notice shall be given more than one hundred and eighty days from the date when a return for the period

was required to be filed under the Internal Revenue Code of 1954. No suit on such bond for such taxes shall be commenced by the United States unless notice is given as provided in the preceding sentence and no such suit shall be commenced after the expiration of one year after the day on which such notice is given.

270b.

(a) Every person who has furnished labor or material in the prosecution of the work provided for in such contract, in respect of which a payment bond is furnished under this Act and who has not been paid in full therefor before the expiration of a period of ninety days after the day on which the last of the labor was done or performed by him or material was furnished or supplied by him for which such claim is made, shall have the right to sue on such payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute said action to final execution and judgment for the sum or sums justly due him: Provided, however, that any person having direct contractual relationship with a subcontractor but no contractual relationship expressed or implied with the contractor furnishing said payment bond shall have a right of action upon the said payment bond upon giving written notice to said contractor within ninety days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material for which such claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or supplied or for whom the labor was done or performed. Such notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the contractor at any place he maintains an office or conducts his business, or his residence, or in any manner in which the United States Marshall of the district in which the public improvement is situated is authorized by law to serve summons.

(b) Every suit instituted under this section shall be brought in the name of the United States for the use of the person suing, in the United States District Court for any district in which the contract was to be performed and executed and not elsewhere, irrespective of the amount in controversy in such suit, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material was supplied by him. The United States shall not be liable for the payment of any costs or expenses of any such suit.

270c.

The Comptroller General is authorized and directed to furnish, to any person making application therefor who submits an affidavit that he has supplied labor or materials for such work and payment therefor has not been made or that he is being sued on any such bond, a certified copy of such bond and the contract for which it was given, which copy shall be prima facie evidence of the contents, execution, and delivery of the original. Applicants shall pay for such certified copies such fees as the Comptroller General fixes to cover the cost of preparation thereof.

270d.

The term "person" and the masculine pronoun as used throughout this ACT shall include all persons whether individuals, associations, copartnership, or corporations.

8A.2.2 EXAMPLE MILLER ACT LETTER TO SUBCONTRACTOR

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 210A
Lakewood, CO 80228

January 8, 2008

Refer To: HFCO-16

Mr. John Johnson
Pills Construction
123 Hills Street
San Bruno, CA 87224

Dear Mr. Johnson:

This is in response to your January 6 telephone call requesting assistance in collecting contract payments you assert the prime contractor, TQ Contracting, has improperly withheld from you on NM PFH 134-1(2), Quantum Road.

Please be advised that the Federal Acquisition Regulations (FAR) limit Federal contracting agencies' response to subcontractor reports of nonpayment to determine if progress payments have been made in compliance with the Prompt Payment Act. The prime contractor is encouraged to make timely payment if it is due (FAR Clause 32.112-1).

If it appears that payment or interest is due, we will pursue the matter with the prime contractor and encourage payment. Please note, however, that Federal contracting agencies are prohibited from withholding progress payments owed to prime contractors because subcontractors have not been paid (FAR Clause 28.106-7).

In addition, you may choose to pursue a claim for payment under the Miller Act, Title 40, United States Code, Section 270a-d, which requires the prime contractor to provide a payment bond on the contract, binding itself through its surety to pay all legitimate claims of its subcontractors and suppliers.

Copies of the Miller Act and the payment bond on this contract are enclosed for your information. Please note that neither the Miller Act, the contract, nor any other Federal and State law or regulation creates any right to pursue a claim for prime contractor nonpayment directly against the Federal Highway Administration.

Sincerely yours,

Leo De Paula
Construction Operations Engineer

Enclosures

8A.2.3 EXAMPLE MILLER ACT LETTER TO PRIME CONTRACTOR

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 210A
Lakewood, CO 80228

January 8, 2008

Refer To: HFCO-16

Mr. Bill Swift
TQ Contracting
125 Billing Street
San Rafael, CA 87654

Dear Mr. Swift:

We are in receipt of a report from Pills Construction, a subcontractor on NM PFH 134-1(2), Quantum Road, for which your firm is the prime contractor. The report alleges that they have not been paid in accordance with the payment terms of the subcontract for supplying aggregate base on the subject project.

Pursuant to Federal Acquisition Regulations (FAR) Clause 32.112-1, please provide me with information on whether you have made payment to Pills Construction in compliance with the Prompt Payment Act (31 United States Code, Chapter 39).

The information requested includes whether the work was performed in compliance with the subcontract, any payment made to the subcontractor for performing the work, including applicable Prompt Payment interest and any progress payment for the work made to you by the Federal Highway Administration. If you have not made a payment which is due, I encourage you to do so, including any accrued interest.

Please note that, in order to avoid payment of a late penalty, a prime contractor is required to issue a written notice of any subcontractor payment withholding to the subcontractor, with a copy to the Contracting Officer (CO), specifying the amount withheld, causes for the withholding pursuant to the terms of the subcontract, and remedial actions required of the subcontractor in order to receive payment (FAR Clause 52.232-27(d)(3) and (g), Prompt Payment for Construction Contracts). Accordingly, please provide the CO and the subcontractor with any required notices of withholding.

As I am sure you are aware, a contractor may not request payment of withheld amounts from the Government until the contractor has certified to the CO that the subcontractor is entitled to payment of such amount (FAR Clause 52.232-27(h)). The CO must initiate administrative or other remedial action if the contractor's certification of payment of a subcontractor accompanying its payment request to the Government is inaccurate (FAR Clause 32.112-1). Such action may include referral to the Department of Transportation, Office of Inspector General, for investigation of a false certification.

There is another possible scenario that might apply to a prime contractor's failure to pay a subcontractor. If a contractor discovers, after making a payment request to the Government, but before paying the subcontractor, that all or part of the payment due the subcontractor is subject to

8A.2.3 Example Miller Act Letter to Prime Contractor *(Continued)*

withholding under the terms of the subcontract, then the contractor must provide notice of the amount and cause of withholding to the subcontractor, with a copy to the CO, pay the subcontractor within 7 days of correction of the performance deficiency or incur Prompt Payment interest, and notify the CO of the date and amount of subsequent payment after correction (FAR Clause 52.232-27(e)).

When this scenario applies, a contractor is obligated to pay the Government Prompt Payment interest from the eighth day after receiving payment from the Government of amounts withheld from the subcontractor until the performance deficiency is corrected or the contractor certifies a reduced payment amount (FAR Clause 52.232-27(e)(6)). If this scenario applies, please provide the required notices so that we can determine the amount of interest that you owe the Government.

If you have any questions on this matter, you may contact me at 720-963-3634.

Sincerely yours,

Leo De Paula
Construction Operations Engineer

Chapter 9 – MEASUREMENT AND PAYMENT
TABLE OF CONTENTS

Section **Page**

9.1 General 9-1

9.2 Pay Notes and Computations 9-2
9.2.1 General 9-2
9.2.2 Computations and Supporting Documents 9-2

9.3 Probables and Construction Engineering Costs 9-4

9.4 Measurement of Quantities 9-5
9.4.1 General 9-5
9.4.2 Quantity Significant Figures 9-6
9.4.3 Computation of Earthwork Quantities 9-7
9.4.3.1 General 9-7
9.4.3.2 Computation Methods 9-7
9.4.3.3 Documentation and Verification 9-8
9.4.3.4 Cross-Sections 9-8
9.4.3.5 Wastage 9-8
9.4.4 Measurement of Materials (Weight Basis) 9-8
9.4.4.1 Documentation 9-8
9.4.4.2 Moisture Content Correction 9-9
9.4.4.3 Accuracy of Weighing Devices 9-10

9.5 Progress Payments 9-11
9.5.1 General Requirements 9-11
9.5.2 Prompt Payment 9-11
9.5.3 Government's Receiving Report Generated from the Progress Payment Report 9-12
9.5.4 Contractor Invoices 9-14
9.5.5 Subcontractor Work and Payments 9-17
9.5.6 Preparatory Work and Stockpiled Materials 9-21
9.5.6.1 Preparatory Work 9-21
9.5.6.2 Stockpiled Materials 9-21
9.5.7 Adjustments to Contractor's Invoice 9-23
9.5.8 Retainage and Liquidated Damages for Poor Progress 9-23
9.5.9 Pre-Final Payment 9-24

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 9.5-A Example Project Engineer's Receiving Report 9-13
Exhibit 9.5-B Example Contractor's Invoice 9-15
Exhibit 9.5-C Example Prompt Payment Letter 9-19
Exhibit 9.5-D Guidelines for Nonpayment Complaints from Subcontractors 9-20
Exhibit 9.5-E Guidelines for Percentage Payments for Partially Complete Work 9-22

CHAPTER 9

MEASUREMENT AND PAYMENT

9.1 GENERAL

This chapter addresses:

- Measurement and payment of contract work items,
- Progress payments,
- Partial payment for preparatory work and stockpiled material,
- Retainage and liquidated damages, and
- Pre-final payment.

Refer to Section 12.7 for information related to final payment after project acceptance.

9.2 PAY NOTES AND COMPUTATIONS

9.2.1 GENERAL

Quantities should be documented in accordance with the contract requirements and Division procedures.

The number and content of pay notes and computation documentation depends upon the type of construction involved. Each Division will issue instructions or guidelines for standard notes and methods of computations. In any case, notes must be recorded neatly, clearly, in an uncrowded manner, and in sufficient detail to be easily understood. Too much detail is better than too little.

Original entries accepted by the Project Engineer, but later determined to be in error or no longer applicable, are not to be deleted. A new pay note will be created to record any changes to an original pay note entered in error or containing incorrect quantities.

Pay notes should be organized in chronological order, follow a logical order of progression throughout the duration of the project, and be summarized for each payment period. The pay notes should show the following, at a minimum:

- the date,
- item number,
- item description,
- location of measurement,
- total quantity of the measurement, and
- the names of the persons who made and checked the computations.

Computation sketches, photos, remarks, and similar clarification, should be included within or attached to the pay note. Each pay note must be designated as interim or final.

When records are required to be kept by Contractor personnel, the Project Engineer should go over the required format, timeliness, and content, and provide constructive feedback to the Contractor if the records are deficient.

Pay notes are used as source documentation for work that necessitates field measurement, stakeout, or verification.

9.2.2 COMPUTATIONS AND SUPPORTING DOCUMENTS

Pay notes and measurements are converted to quantities for progress payments by the computations required or implied in the contract. For simple items, the computations may be included in the pay notes.

For complex items, it may be necessary to use a computer spreadsheet or other calculation format, to supplement the pay notes.

The pay notes for each specific item should be summarized for each payment period for entry into the progress payment or final payment.

Pay notes and any supporting documentation should be retained in hard copy for each item active for that payment period.

9.3 PROBABLES AND CONSTRUCTION ENGINEERING COSTS

As part of the monthly progress payment procedure, the Project Engineer should estimate the total expected quantity for each item - its *probable*. The contract quantity may be used for each item initially, unless there is information to the contrary. Quantities are then updated based on best available information as the project progresses. The Project Engineer prepares the estimate of probables, consulting with the COE or designers as needed for computation factors and methods. The Project Engineer may wish to refer to design calculations for any item for which the estimated probable quantity is significantly different from the contract quantity.

Probable quantities translate to probable costs. If there is a significant net change to the contract amount due to changes in probable quantities, Division procedures may compel the processing of a contract modification to obtain additional funding. This need must be anticipated as far in advance as possible to avoid surprises and *emergency* reprogramming of funds.

The Project Engineer should monitor records of construction engineering cost and maintain an estimate of the probable construction engineering cost to complete the project. Such estimates should be compared to the amount assigned to the project. Any significant difference should be discussed with the COE. The Project Engineer should consult with the COE for assistance in finding and interpreting Division financial records.

9.4 MEASUREMENT OF QUANTITIES

9.4.1 GENERAL

The Standard Specifications prescribe methods of measuring quantities but are not intended to be all-inclusive. Refer to the plans, special contract requirements, and to this chapter of the construction manual for measurement details.

Each *technical* section of the Standard Specifications contains a subsection entitled *Measurement*, stating what is to be measured and how it is to be measured. Further, the *Payment* subsection of each section states how work is covered by the payment. Work that is not specifically identified for payment is assumed to be a subsidiary obligation and no payment is required.

Occasionally, plans and special contract requirements will change the standard methods of measurement and payment, or will include provisions for measurement and payment for items not in the Standard Specifications.

Before making any measurements on a project, the Project Engineer should study the plans, specifications, and special contract requirements to determine first, what is to be measured, and second, how it is to be measured.

There are three basic methods of measuring contract items – *contract quantity or lump sum*, *staked or ordered quantity*, and *as constructed quantity*.

1. **Contract Quantity or Lump Sum.** For these items, the work authorized by the contract is verified and paid for. No detailed remeasurement is required. Changes or correction of errors must be documented by a contract modification. Examples of payment by contract quantity would be mobilization and structural concrete (usually).

   Contract quantity items should be supported by a signed and dated pay note, stating the item of work has been completed satisfactorily and is in substantial conformity with the plans and specifications.

2. **Staked or Ordered Quantity.** This method applies to work that is staked out or ordered by the Project Engineer. The quantity is defined before such work is performed, and the Contractor receives payment for this quantity. Again, although the Project Engineer must verify that the work is done, no detailed remeasurement is required. An example of this would be a design-build contract.

3. **As Constructed Quantity**. Under this method, work authorized by the contract or the Project Engineer is performed, measured, computed (if necessary), and paid for, subject to FLH inspection. Examples of this method would be paving items paid by the ton, subexcavation of soft spots, and watering.

9.4.2 QUANTITY SIGNIFICANT FIGURES

The minimum number of significant decimal places to which quantities should be measured, computed, and reported is generally dependant on the value or bid price of an individual unit; and with the degree of precision with which it is practical to measure the item.

FLH computer programs for the receiving report (progress or final estimate) generally allow up to four figures to the right of the decimal point. However, usually not all of these figures are required to be significant.

For progress estimates, the methods used to measure quantities may sometimes be faster but less accurate than methods used for final payment. For this reason, progress payment quantities may be (but are not required to be) less precise than final quantities. For progress estimates, the minimum reported precision for any contract item should be the quantity that has a value between $10 and $100. For final payment, the minimum reported precision for any contract item should be the quantity that has a value between $1 and $10.

Quantities should generally be computed or measured to at least one significant figure more than the minimum required for reporting.

If the measurement and computational methods used yield significant figures beyond the minimum required, it is at the discretion of the Project Engineer whether or not to round the total to the minimum precision indicated. Once quantities are computed and reported on progress estimates, it is not recommended that they later be rounded arbitrarily to a lesser number of significant figures, especially for items that have been completed and for which subcontractors have been paid.

Items specified as contract quantity items should always be reported for final payment with the same precision implied in the contract.

Items measured by weigh tickets should be reported to the same precision as the ticket for both progress and final payments.

Examples:

(1) Item 20101 Clearing and Grubbing is bid at $3,500 per hectare. One hundredth (.01) hectare is valued at $35. Therefore, report clearing and grubbing quantities for progress payments to a precision of not less than 0.01 hectare. Report the final quantity to a precision of not less than 0.001 hectare.

(2) Item 60103 Concrete is bid at $18,500 lump sum. One thousandth (.001) of one percent is valued at $18.50. Therefore, report this lump sum item to a precision of not less than 0.001 percent for progress payments.

(3) Item 25303 Gabions is bid at $167.00 per cubic meter. One tenth (0.1) of a cubic meter is valued at $16.70. Therefore, report gabion quantities for progress payments to a precision of not less than 0 .1 cubic meter. Report final payment to a precision of not less than 0.01 cubic meter.

(4) Item 62902 Roving is bid at $0.85 per square meter. One hundred (100) square meters has a value of $85.00. Therefore, report roving quantities for

progress payments to a precision of at least 100 square meters Report the final quantity to a precision of at least 10 square meters.

9.4.3 COMPUTATION OF EARTHWORK QUANTITIES

9.4.3.1 General

Electronic computation of earthwork quantities is standard procedure. It may be necessary or desirable, however, to make supplementary earthwork quantity computations on the project for minor alignment, grade, or slope changes, or for other reasons. These supplementary computations may be performed on computer-based software, or by manual calculations if necessary. The relationship to the main design computations should be clearly documented and checkable by others.

A pay note should include all of the current documentation used to pay for earthwork (i.e., the master quantity printout along with each supplement or correction to those quantities). Each document referenced should be dated or otherwise identified. Obsolete or superseded computations should not be included with current documentation.

9.4.3.2 Computation Methods

Unless otherwise provided in the special contract requirements or otherwise approved by the Project Engineer as providing equivalent accuracy, excavation quantities for payment are to be computed by the average end area method, with no correction for curvature. This method uses the average area of end sections (taken at right angles to the centerline) and the centerline distances between end sections.

To avoid distorted balancing of earthwork quantities in areas of sinuous alignment through heavy sidehill construction, correction for curvature may be necessary. Such correction will be for the purpose of balance only, and payment will be made for uncorrected excavation quantities unless otherwise provided in the special contract requirements. In the case of contract modification work, the difference between actual and computed excavation quantities should be discussed with the Contractor during negotiation, as this difference may impact costs and quoted prices.

The cross-section areas generally are obtained either by direct computation from slope stake notes or by plotting and computing the section. Direct computation of areas from slope stakes is preferable because it is usually less time consuming. Planimetering of plotted sections is sometimes used for design, but is not acceptable for documentation of payment because it is less accurate and cannot be checked except by repeating the process.

A number of commercial earthwork software packages are available which compute quantities using cross-sections and end areas, or equivalent techniques. If commercial earthwork software is not available, there are several acceptable methods of manually computing cross-section areas such as the average end area method.

9.4.3.3 Documentation and Verification

Cross-section notes will be entered directly in a preformatted slope stake field book. Electronic data collectors may also be used if the Division procedures support them. Field books for slope staking may be duplicate (no carbon required) type. If used, the original must be retained in the book to serve as the permanent record. The second copy may be detached to facilitate computing. This permits mailing data to the Division without exposing the original to loss. Likewise, if electronic data is collected, a copy should be retained prior to sending the diskette to the Division.

The maximum interval for cross-sectioning should usually be 20 meters, with intermediate sections taken as necessary to catch all breaks in terrain. For pay purposes, the volumes must be computed and checked mathematically, and all computations should be documented in field books, on computer printouts, or on cross-section rolls. Each document should be uniquely identified and referenced in the Summary Book. The Summary Book should contain a tabulation of the following: station to station; prism excavation and/or embankment volume; and any other quantities involved, such as subexcavation, waste, and channel changes. Grouping may be between balance point stations, or for example, every 500 meters when balances are infrequent. Plan quantities may be entered in the Summary Book originally, whether or not they are a specified basis for payment. Measured quantities may be added to, or substituted for, the plan quantities after computation and checking. Whenever changes or new sections are substituted, the referencing should be clear. The old sections should be discarded or identified as *superseded.*

9.4.3.4 Cross-Sections

The taking of cross-sections after completion of the grading is not normally required. Ordinarily, cross-sections will not be necessary except in areas where there is a dispute with the Contractor, where slides are involved, or in rock cuts involving overbreak or underbreak. In rock excavation, where it is necessary to determine the allowable overbreak, plotting of the cross-sections may be necessary.

9.4.3.5 Wastage

When borrow is paid for in its original location (borrow pit), the use of unclassified excavation must be carefully monitored to ensure unnecessary waste does not occur, which would increase the need (and payment) for borrow. Typical waste problems might be fill slopes that are too wide, not breaking down and incorporating rock into fills, not conserving potential topping material, and wasting acceptable quality material just because it is too wet or haul distance is excessive.

9.4.4 MEASUREMENT OF MATERIALS (WEIGHT BASIS)

9.4.4.1 Documentation

For materials paid for on a weight basis, a daily summary of all weighed and accepted loads should be generated. Either custom software or a spreadsheet is acceptable for this summary.

The summary should be filed with the tickets indicating certified weight and acceptance. The summary should also be included with the pay note. Separate summary reports are best used for each contract item when more than one item is being produced at once.

9.4.4.1.1 Standard Tickets

When standard tickets are used, the weigher should fill them in completely, except for the station of placement, and should deliver the original and duplicate to the truck driver, and retain the triplicate. If an original is lost or missing at the end of the shift and delivery on the road was accomplished, the triplicate may be used to verify the quantity, provided it can be confirmed that the material was delivered.

9.4.4.1.2 Scale Tickets

When approved recording scales are used, the details regarding checking and delivering material will vary according to the form of the tickets, but must be arranged so as to provide both the weigher and checker with a record of each load and the Contractor with a ticket issued as each load is weighed. When the recording scales accommodate tickets in duplicate only, it will be necessary for the weigher to keep a complete tabulation showing ticket number, tare, total weight, and pay weight. Both tickets will then be given to the truck driver. The checker on the road will fill in the station of placement, initial both copies, return the duplicate to the truck driver, and retain the original.

Weighing by an accredited public weighmaster is acceptable, provided the same basic procedures as described above are used.

9.4.4.1.3 Tare Weights

Tare weights of each empty truck are to be determined at least twice daily and at such other times as the Project Engineer directs. It is important that tare weights be determined at random times during the day, and that the random selection process not be controlled by the truck driver or biased toward weighing when the fuel tanks are empty. The tare weights (and the date and time determined) should be recorded.

9.4.4.2 Moisture Content Correction

Where direct reading platform scales (those on which tares may be set on one beam and weight of load read directly on the other) are used, the tare weight should be recorded (automatically or manually) on each ticket to give additional assurance that the correct tare weight was in fact set on the scale prior to reading the net weight. When belt scales, batch scales, or other devices weigh the net weight of material without depending on gross truck weight, the ticket will be considered satisfactory if only net weight is shown. If scales of these types are used, a notation of scale type should be made in the diary.

Unless otherwise specified in the special contract requirements, no deduction will be made from aggregate weights for moisture content. When such deduction is specified, its method of determination should be specified. If a correction is required but no method specified, the

deduction may be based on the daily average moisture content determined by heat drying no less than three representative samples taken at random intervals from each 8-hour production. Depending on contract requirements, the actual deduction will probably be for *excess* moisture (i.e., the difference between actual and optimum moisture).

9.4.4.3 Accuracy of Weighing Devices

The Standard Specifications require weighing devices to be accurate within 0.5 percent throughout the range of use, and to be inspected, tested, and sealed as often as the Project Engineer may deem necessary to ensure continued accuracy. For noncommercial scales, the Project Engineer should request a copy of the inspection documentation for the project files. For commercial scales, the documentation may be requested if deemed necessary.

Before starting each day's weighing operations, and several times during the day, zero balancing of the scales must be carefully checked. This consists of setting the scale indicators at zero when the scale is unloaded and checking the beam. The beam should swing freely and evenly, equidistant from the top and bottom of the trig loop. For multiple-beam scales, each beam should be balanced individually and then collectively. Any beam not actually used should be securely fastened into zero position so it cannot be mistakenly used with other beams.

Adjustments and repairs of weighing devices are the responsibility of the Contractor. FLH personnel may adjust the balance bar but must not perform other adjustments or repairs.

If the Project Engineer has reason to doubt the accuracy of a weighing device at any time, the Contractor should be required to stop weighing operations and have the weighing device tested and sealed.

The National Institute of Standards and Technology (NIST), Handbook 44 is the standard by which scales are tested and sealed. FLH Divisions will provide applicable parts of this document, and appropriate training, to field personnel that routinely perform detailed scale inspections. Otherwise, problems that are not resolved by the Contractor to the satisfaction of the Project Engineer, should be referred to the COE, who may engage a technical consultant.

9.5 PROGRESS PAYMENTS

9.5.1 GENERAL REQUIREMENTS

The processing of progress payments became a substantially more complex process with the *Prompt Payment Act of 1982*, including amendments to the Act and additional administrative requirements by the Office of Management and Budget (OMB). These requirements are included in FAR Clause 52.232-5, Payments Under Fixed Price Construction Contracts, FAR Clause 52.232-27, Prompt Payment for Construction Contracts, and Subsection 109.08, Progress Payments, within the Standard Specifications. These clauses appear in each contract and should be reviewed in detail.

9.5.2 PROMPT PAYMENT

Some of the basic requirements of the Prompt Payment Act are as follows:

- The Government is required to make payment to the Contractor within 14 days after a valid invoice is received at the designated billing office from the Contractor.
- The Government must advise the Contractor in writing within 7 days if the invoice is defective.
- The Government is obligated to pay the Contractor interest if payment is not made in a timely manner.
- The Contractor may invoice only subcontractor's work for which it is committed to paying the subcontractor within 7 days of payment by the Government.
- The Contractor may be obligated to pay interest to the Government and an interest penalty to the subcontractor on any amounts for subcontractor work for which it invoices and receives payment from the Government, but then fails to pay the subcontractor within 7 days.
- The Government is not to become involved in disputes between subcontractors and contractors, beyond providing a copy of the Contractor's payment bond to the requesting subcontractor and withholding interest from the Contractor for nonpayment of a subcontractor for subcontracted work for which the Contractor has been paid.

The payment and invoice process as well as the Contractor's obligations in this process should be emphasized at the preconstruction conference. In particular the Contractor should understand that failure to provide required materials documentation, test reports and certifications will result in nonpayment for the work in question.

While the Project Engineer should avoid getting involved in disputes between the prime and subcontractors, the interest on amounts due subcontractors sometimes makes the Government have a stake in the dispute. This means the Contractor should be requested to resolve such disputes and advise the Project Engineer of how they are resolved - at least to the extent we are satisfied that there were no Prompt Payment violations. It should be made clear to the Contractor that FLH is not a policing or audit agency; and if disputes linger on, or appear to

indicate improper actions of the Contractor prejudicial to the Government, FLH will have no choice but to request intervention of an appropriate legal authority such as the DOT Office of the Inspector General.

9.5.3 GOVERNMENT'S RECEIVING REPORT GENERATED FROM THE PROGRESS PAYMENT REPORT

Under the Prompt Payment Act and ensuing regulations, the Government must generate a receiving report from the progress payment report. Its purpose is to validate the accuracy of the Contractor's invoice. See Exhibit 9.5-A for an example of a Project Engineer's receiving report. Together these items initiate payment.

In order for payment to be made, the Contractor's invoiced quantity and unit price for any item must not exceed the receiving report quantity and unit price for that item. Therefore, the Contractor must have access to measurement, quantity, and pay factor information that only the Project Engineer may have, at the time the receiving report is prepared (e.g., allowances for partially completed work or computation of quantities based on survey notes which only the Government has access to). The Project Engineer must provide, or concur with, all measurement, quantity, and pay factor information on the receiving report, in writing or in a meeting with the Contractor's representative at a mutually agreeable time within 7 days after the estimate cutoff date. While the Project Engineer should be reasonable in resolving disputes or differences with the Contractor on what the receiving report should include, the Project Engineer has the final say (within the terms of the contract), and agreement on the content of the receiving report is not required.

The Project Engineer should not include on the receiving report work for which the Contractor has not provided the required documentation, test results, or certifications.

All quantities shown on the receiving report must be supported by pay notes and other supporting data. The basis of percentage payments, and temporary items like stockpiled materials should also be documented by a pay note. Any material pay factor adjustment to contract unit prices should be documented with a QL-Pay printout or manual computations.

The receiving report should show all Contract items and probable quantities to facilitate monitoring of the probable Contract amount. Probable quantities are normally not provided to the Contractor unless they are requested, or unless the Contractor needs to know this information (e.g., to order materials). This information may sometimes generate a request for a contract modification; however, it is generally better to be forthright with the Contractor than to obscure information. All quantities and pay items associated with contract modifications should be listed separately and identified with the number of the contract modification. Adjustment of a unit price based on a material pay factor or other specific contract provisions will not require a new item or a contract modification, but the pay factor should be identified as interim on the receiving report if it is to be subject to further adjustment.

Proposed adjustments to the Contractor's invoice (see Section 9.5.7) may be shown on the receiving report; however, if their approval is not delegated to the Project Engineer, they are considered tentative until approval of the progress payment in the Division office.

Exhibit 9.5-A Example Project Engineer's Receiving Report

ID FS ERFO 2005(1)-29(1) 12/20/2006
CREEK BRIDGE 09:36:42

Contract No. DTFH70-06-C-00015 Supporting Data for Estimate No. 2 Paying $183,450.14 from 11/01/2006 to 12/06/2006 Page 1

Item No.	Description	Unit	Price	Probable Quantity	Account Number 1 Quantity	Account Number 1 Amount	Account Number 2 Quantity	Account Number 2 Amount	Account Number 3 Quantity	Account Number 3 Amount
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM	$14,814.88	5,037.06						
				9,777.82			9,777.82	$9,777.82		
15401-0000	CONTRACTOR TESTING	LPSM	$4,915.35	1,671.22						
				3,244.13			3,244.13	$3,244.13		
15501-0000	CONSTRUCTION SCHEDULE	LPSM	$2,785.44	1,643.41						
				1,142.03			1,142.03	$1,142.03		
15701-0000	SOIL EROSION CONTROL , STREAM DIVERSION	LPSM	$24,526.48	18,394.86						
				6,131.62			6,131.62	$6,131.62		
15705-0100	SOIL EROSION CONTROL, SILT FENCE	LMFT	$6.97	115						
				115			115	$801.55		
20102-0000	CLEARING AND GRUBBING	LPSM	$2,528.40	1,896.30						
				632.10			632.10	$632.10		
20304-2000	REMOVAL OF BRIDGE	LPSM	$10,013.88	5,006.94						
				5,006.94			5,006.94	$5,006.94		
20403-0000	UNCLASSIFIED BOREHOLE	CUYD	$31.80	450.0						
				250.0			250.0	$7,950.00		
55101-1100	STEEL H-PILES, IN PLACE	LMFT	$222.76	252.2						
				219.8			219.8	$48,962.65		
55401-1000	REINFORCING STEEL	LB	$3.09	0						
				2,256			2,256	$6,971.04		
55504-0000	PRE-FABRICATED STEEL BRIDGE INSTALLATION (Government Provided)	LPSM	$34,390.63	1,000.00						
				33,390.63			33,390.63	$33,390.63		
60101-0000	CONCRETE	CUYD	$3,002.01	0.3						
				21.7			21.7	$65,143.62		
63501-0000	TEMPORARY TRAFFIC CONTROL	LPSM	$2,808.77	2,106.58						
				702.19			702.19	$702.19		
64625-1000	MAINTENANCE, TOILET	EACH	$100.21	2	2	$200.42				
CM0001-A	Item## 25101 - Class V Riprap by tons	ton	$36.86	453.7						
				709.3			709.3	$26,144.80		
MOB-1	Item## 25101 Class V Riprap	LS	$4,108.20	0.0	-1.0	-$4,108.20				
MOB-2	Item## 55101 H-Piles	LS	$28,643.20	0.00	-1.00	-$28,643.20				
						-$32,550.98		$216,001.12		$0.00

9.5.4 CONTRACTOR INVOICES

The Contractor's invoice package must contain the items listed in Section 109 of the Standard Specifications. See Exhibit 9.5-B for an example of a contractor's invoice. The contract specifies where the invoice must be sent or delivered in order for the 14-day turnaround to start. This may be either the FLH Division Office or the project office. It is important to stamp or note the receipt date on the invoice. It is also important to know the maximum time the billing office may retain the invoice for processing without exceeding the 14-day limit for payment.

There are generally three major components of a Contractor invoice:

- Tabulation of quantities and unit prices. No quantity for an individual item should exceed the quantity for that item on the Government's receiving report. However, quantities for certain items may be less. For example, if a subcontract provided that certain work not be paid for until complete, payment would then be based on the lower (Contractor's) quantity (see Section 9.5.5).

- Accounting of subcontractors, with the total amounts, amounts previously paid, and amounts to be paid from this estimate.

- Signed certification conforming to FAR Clause 52.232-5(c).

FAR Clause 52.232-27, Prompt Payment for Construction Contracts, requires interest penalties and similar adjustments to also be included in the invoice — that is, if the Contractor previously invoiced the Government for work that it then withheld from a subcontractor, it is required to show the interest penalty (credit to the Government) on the invoice. We expect this sort of adjustment to be very infrequent. However, if the occasion arises, and the Contractor needs the correct current interest rate, the information should be obtained from the COE.

Exhibit 9.5-B Example Contractor's Invoice

Project No.: _____Project Name: _____

Contract No.: _____ Award date: _____

The certification, Subcontractor listing, and attached itemized request for payment of $_____ serves as the contractor's invoice for work performed during the period indicated below, and under the contract cited.

CONTRACTOR CERTIFICATION

[FAR Clause 52.232-5 & FAR 52.232-27]

I hereby certify, to the best of my knowledge and belief, that:

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of Chapter 39 of Title 31, United States Code; and
(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

_____ _____
Contractor Company Name Date signed

Submitted by: _____ _____
Print name and Title Estimate Number

Submitted by: _____ _____ through _____
Signature Dates for Progress payment period

Subcontractor	SF1413 Submitted Y/N	Total Amount of Subcontract	Previous Payments	Amount Included in this Estimate*	Cumulative Retent through this Estimate

* Excludes any retent included in the right-most column. ___ Check if continued on additional page WFLHD 500 Rev. 6/07

Exhibit 9.5-B Example Contractor's Invoice *(Continued)*

Continued from page 1: page 2 of 2

Project No.: _____Project Name: _____

Contract No.: _____ Award date: _____

Subcontractor	SF1413 Submitted Y/N	Total Amount of Subcontract	Previous Payments	Amount Included in this Estimate*	Cumulative Retent through this Estimate

9.5.5 SUBCONTRACTOR WORK AND PAYMENTS

The term subcontractor as used in the payment clauses means not just onsite subcontractors, but supply, equipment rental, and service subcontractors as well. The Contractor may withhold payment from a subcontractor for cause - such as producing defective work (whether or not the Government considers it defective), or not completing its work on time. However, the Contractor cannot invoice the Government for work for which it is temporarily withholding payment from the subcontractor. *Temporarily* means the Contractor recognizes an obligation to pay the subcontractor as soon as the subcontractor corrects the defective work.

If the Contractor does invoice the Government for work performed by a subcontractor, it must pay the subcontractor within 7 days of receiving payment from the Government. Failure to make payment results in an interest penalty due from the Contractor to the Government. Interest continues as long as the Contractor has received payment from the Government, but fails to pay the subcontractor. If the Contractor has violated the terms of the subcontract by failure to make payment, it may owe a second interest penalty to the subcontractor. Generally, the Government is not a party to the latter obligation, and the Project Engineer should not attempt to monitor or enforce subcontract provisions.

If the withholding from the subcontractor is permanent, that is considered a defacto reduction in the amount of the subcontract and should be reported in the invoice documentation as such. For example: A subcontractor building a box culvert is unable to obtain credit to buy ready mix concrete. The prime purchases the concrete and deducts payment from the subcontractor's payments. This transaction reduces the amount of the subcontract. The prime may invoice the Government for the full amount of the completed work, and is not obligated to pay interest to the subcontractor or to the Government.

The Prompt Payment Act takes precedence over the terms of the contract. For example, the contract may provide that temporary traffic control devices are paid at 50% on delivery to the site. However, the Contractor may have a subcontract that provides payment at 5% per month for the first 20 months of the contract. In this case, the Contractor may invoice the Government only for the amounts it will pay the subcontractor, plus a proportionate share of any overhead and profit markup if applicable. The Project Engineer will often not have enough information to know if a significant difference exists between the payment terms in the subcontract and those in the contract. A comparison of the tabulation of the status of all subcontract payments required by Subsection 109.08 of the Standard Specifications, with the Project Engineer's knowledge of how much subcontracted work has been paid for under the contract, may reveal problems that should be raised to the Contractor.

Complaints from subcontractors who say they have not been paid have two implications under the contract. The first is a possible Miller Act claim by the subcontractor against the Contractor's surety. The second is a possible violation of the Prompt Payment Act, if the payment in question was invoiced to the Government and paid to the Contractor, but not passed on to the subcontractor.

See Section 8.8.5 for a discussion of the Miller Act, and Appendix 8A.2.2 for an example of a Miller Act - Prompt Payment Letter to a Subcontractor. Copies of such letters should be normally provided to the Contractor. The Project Engineer should discuss unusual situations, such as allegations of fraud or other criminal activity, with the COE.

If there is an apparent violation of the Prompt Payment Act, FLH should write to the Contractor detailing the allegations and facts as we know them, and request a written explanation from the Contractor. See Exhibit 9.5-C for an example of a prompt payment letter. Note that the Government's only interest in underpayments to subcontractors is possible violations of the Prompt Payment Act and the interest that might therefore be due the Government. The Government should avoid becoming involved in disputes between the Contractor and its subcontractors; and should not order the Contractor to pay its subcontractors. Our position is simply that if the Contractor is not paying the subcontractors, it cannot invoice the Government for their work.

Exhibit 9.5-D summarizes guidelines for handling subcontractor/supplier complaints of nonpayment.

Exhibit 9.5-C Example Prompt Payment Letter

U.S. Department of Transportation
Federal Highway Administration

Western Federal Lands
Highway Division

610 E 5th Street
Vancouver, WA 98661

December 23, 2008

Ms. N. Neidelstrom
Project Manager
ABC Construction
Any Town, USA

Dear Ms. Neidelstrom:

This is to acknowledge your notice of nonpayment related to materials provided on this project which is being administered by this office of the Federal Highway Administration.

In accordance with the Miller Act (Title 40, United States Code. Section 270), the prime contractor, XYZ Construction, submitted a payment bond, under which it bound itself through its bonding company (surety) to pay all legitimate claims of its subcontractors and suppliers under the contract. A copy of the pertinent sections of the Act (and the Payment Bond for the contract) is enclosed.

NOTE: The following paragraph may be omitted if the complainant obviously does have a contractual relationship with the prime. DELETE these instructions.
If you do not have a direct contractual relationship with the prime contractor, you must notify the prime contractor in writing of your request for payment within ninety days of the last day you performed the labor or furnished the supplies. You have the right, after failing to receive a response to your request for payment from the prime contractor, to file a claim under the Miller Act.

In addition, this contract is subject to the terms of the Prompt Payment Act. This law obligates the contractor to make payment on any work performed by subcontractors and which it invoices to and is paid by the Government. If you provide this office with a detailed accounting of the work you have performed on the contracts, and the date/amounts you have been paid for the work, we will evaluate if there has been an apparent violation of the Prompt Payment Act.

If you choose to file a claim under the Miller Act, please contact ***Jane Doe***, WFLHD Construction Operations Engineer. Please note that neither the Miller Act, the contract, nor any other Federal or State laws or regulations creates any right for you to bring this type of claim directly against the Federal Highway Administration; or the United States Government; or permits payment by the Government directly to you. Your exclusive recourse under the law is against the prime contractor and its surety. If you have any further questions on this matter please contact this office.

Sincerely yours,

_____
Project Engineer

Exhibit 9.5-D Guidelines for Nonpayment Complaints from Subcontractors

Complaint	Response
Verbal complaint from subcontractor or supplier of nonpayment.	Verbally advise subcontractor/supplier that no action can be taken unless a written complaint is provided.
	Verbally advise subcontractor/supplier that in order to ascertain a violation of the Prompt Payment Act, the Government needs a detailed statement of payments under the subcontract, dates payments made, and amounts subcontractor/supplier believes were due on those dates.
	Verbally advise contractor's superintendent of complaint and remind him/her of Prompt Payment Act requirements.
	Document all exchanges in diary. No further action in absence of written statement/complaint.
Written complaint from subcontractor/supplier of nonpayment, but without detailed accounting of amounts paid and dates.	Furnish copy of bond and Miller Act information to subcontractor/supplier.
	Request a statement of payments under the subcontract, dates payment made, and amounts subcontractor/supplier believes were due on those dates.
	No further action unless statement of payments is provided.
Written complaint from subcontractor/supplier of nonpayment, including detailed accounting of amounts paid and dates.	Furnish copy of bond and Miller act information to subcontractor/supplier.
	Compare subcontractor/supplier's detailed statement of payments, Contractor accounting of subcontractor payments, and Government's payments for contract items known to be part of the subcontract.
Subcontractor statement of payments generally agrees with Contractor's accounting and amounts paid by Government for subcontracted work.	No further action. Subcontractor may have recourse under Miller Act, but no apparent Prompt Payment Act violation.
Subcontractor statement indicates payments less than corresponding invoiced percentages of contract items associated with the subcontract.	Write letter to Contractor requesting resolution of payment discrepancies.
Contractor fails to respond to letter requesting resolution of alleged underpayment.	Notify Contractor in writing that without an adequate response to nonpayment allegations, further invoices including the payment in question must be presumed to be defective.
	Refer file to Legal Counsel for possible referral to DOT Office of Inspector General as false claim.
Contractor responds that payment information provided by subcontractor/supplier is in error and that all payments have been made in accordance with the Prompt Payment Act, but does not provide credible evidence that this is the case.	Refer file to Legal Counsel for advice on possible nonpayment of invoices and referral to DOT Office of Inspector General as false claim.
Contractor responds in a way that confirms that payments made to subcontractor/supplier have been less than those invoiced the Government for the contract items associated with the subcontract.	On next invoice, require Contractor to debit appropriate interest from next progress payment. Require debit of overpayment unless Contractor pays subcontractor/supplier by then.

9.5.6 PREPARATORY WORK AND STOCKPILED MATERIALS

9.5.6.1 Preparatory Work

General mobilization and preparatory work for starting construction is included in the Mobilization pay item. See Section 151 of the Standard Specifications. Preparatory work, or the beginning stages of work on a particular item, should be included in the Contractor's invoice and paid as an agreed percentage of that item. While it is possible to pay preparatory work on an actual expenses basis, this is not recommended because it entails additional bookkeeping and control to prevent overpayment. See Exhibit 9.5-E for guidelines related to percentage payments for partially complete work.

9.5.6.2 Stockpiled Materials

Stockpiled materials may be included in the Contractor's invoice and paid for as one or more separate (temporary) line items, provided:

- The materials are stored onsite or otherwise under the control of the Contractor. If materials are stored offsite, the Contractor must provide documentation that it has acquired title to the materials. A paid invoice from the supplier to the Contractor is normally adequate. However, title does not necessarily mean the Contractor has paid for the materials. Under the Prompt Payment Act, the obligation to pay for the materials does not begin until payment is received from the Government.

- The materials are designated for incorporation into the work. In contrast, materials such as form lumber, explosives, and diesel fuel cannot be paid as stockpiled materials.

- Test reports, certifications, or other reasonable documentation indicates that the materials comply with contract requirements, or that the item into which they will be incorporated will comply with those requirements.

Payment for stockpiled materials is intended to allow the Contractor to order materials sufficiently in advance of the work to avoid delivery delays. Payment does not constitute acceptance of the material, although the Government may argue that it legally owns the materials in the event of a default. It is also not intended as a means of providing advance payments. Payments must represent the reasonable value of the materials as compared to the bid prices for the work into which they will be incorporated. Whenever there is payment for stockpiled materials, such payment is covered by the conditions of the Prompt Payment Act (i.e., the Contractor is required to make payment to the subcontractor (supplier) within 7 days of receiving payment from the Government).

As the materials previously paid for are incorporated into the work and paid under contract items, the temporary line item created to pay for them must be reduced or zeroed out accordingly.

Exhibit 9.5-E Guidelines for Percentage Payments for Partially Complete Work

Description	Allowance (Cumulative)
Clearing and Grubbing	
Felled and slashed	35
Bucked and piled (slashings, brush and logs)	60
Grubbed	75
Burned or chipped and removed	98
Substantially complete including cleanup	100
Excavation and Embankment	
Pioneered	5
Drilled	20
Blasted	35
Roughed out to grade	85
Roadbed finished to grade	90
Slopes seeded	98
Substantially complete including cleanup	100
Structural Excavation	
Excavation Complete	85
Backfill complete	98
Substantially complete including cleanup	100
Aggregate Courses	
Crushed and stockpiled onsite	50
Placed on roadway	80
Spread, compacted and tested	98
Substantially complete including cleanup	100
Asphalt Pavements	
Aggregates crushed and stockpiled onsite	50
Placed, compacted and tested	98
Substantially complete including cleanup	100
PCC Pavement	
Forms set	35
Concrete in place	90
Forms removed and testing complete	98
Substantially complete including cleanup	100
Concrete Structures	
Falsework erected	10
Forming complete	20
Concrete in place	80
Forms removed	90
Concrete tested and finished	98
Substantially complete including cleanup	100
Steel Structures	
Falsework erected	10
Steel in place	80
Bolting and welding complete	90
Painting complete	98
Substantially complete including cleanup	100

Notes:

(1) These percentages are typical. They may be adjusted based on a detailed analysis of circumstances on a given project.
(2) Whenever partially complete work entails continuing maintenance, an appropriate percentage should be retained to cover those costs.

9.5.7 ADJUSTMENTS TO CONTRACTOR'S INVOICE

Generally, any change that the Government makes to the Contractor's invoice invalidates the certification accompanying the invoice and should therefore be avoided. However, if an error in the Contractor's invoice is based on erroneous information that the Government provided or failed to provide at the onsite meeting before the invoice was submitted, we should try to reconcile the error administratively rather than declare the invoice to be defective. Such reconciliations or corrections can be handled by phone, with a follow-up confirmation in writing to the Contractor.

Certain additions or adjustments discussed in Section 109 of the Standard Specifications may be made to the Contractor's invoice. These adjustments may be documented on the receiving report or generated separately. The adjustments generally relate to retent, liquidated damages, or other liabilities to the Government, which are handled outside the normal contract items. Some of these items, like liquidated damages, may be in dispute. It is awkward to ask a Contractor to certify to the correctness of liquidated damages at the same time they are being contested. It is therefore acceptable for the Government to make such adjustments administratively after the invoice is received. These adjustments do not make the certification invalid.

Any adjustments to the Contractor's invoice that are an adverse action (i.e., retent, liquidated damages, or other liabilities to the Government) should be documented by written notice to the Contractor explaining the reason for the adjustment, and, if temporary, the conditions under which the Government would rescind the adjustment. The Division should have procedures to assign responsibility for initiating this notice.

9.5.8 RETAINAGE AND LIQUIDATED DAMAGES FOR POOR PROGRESS

Retainage or retent is money withheld from progress payments. FAR Clause 52.232-5(e) permits the retent of 10 percent of any progress payment when progress is unsatisfactory. See Section 5.4 for a discussion of administration of contract time. Unsatisfactory progress means one of the following:

- Contractor is significantly behind the approved construction schedule.
- Contractor is following a construction schedule that shows completion beyond the contract completion date (or time).
- Contractor does not have an approved construction schedule, or the originally approved schedule has been rendered obsolete and invalid, thereby making it impossible to determine if progress is satisfactory.

Retent is not applied to the entire amount of payments to date, but only to those payments earned since progress became unsatisfactory. Withholding of additional retent is discontinued as soon as progress and the approved schedule are demonstrated to be consistent. However, previously withheld retent will continue to be withheld until the Contractor demonstrates an ability to complete the project by the contract completion date (as modified by any contract modification or incentives).

Once the contract completion date has passed without completion, the Government is to withhold liquidated damages for each day of delay, in accordance with Subsection 108.04 of the Standard Specifications.

Whereas retent is a discretionary condition of the contract, liquidated damages are mandatory unless there is a contract modification modifying or waiving them. If substantial retent and liquidated damages are being withheld, it is reasonable to estimate what the final amount of liquidated damages will be, and to assess a combined amount of retent and current liquidated damages not to exceed this amount. This is done by reducing the retent to some number less than 10 percent. The Project Engineer should discuss this situation with the COE before taking action.

When Contract time is in dispute, or when there is recognized entitlement to additional time that has not yet been quantified, the CO may modify the Government's assessment of retent and liquidated damages pending the resolution of the contract time issue. If this occurs, the COE should be involved in any decision, and the Contractor should be advised in writing as to the conditions of any such arrangement.

9.5.9 PRE-FINAL PAYMENT

The provisions of the Prompt Payment Act apply to final payments as well as progress payments, except that final payment is required in 30 days rather than 14. For final payment, the Government is permitted to withhold a reasonable sum pending the checking of final quantity records. Because the Contractor cannot sign an accurate final invoice/voucher or claims release until this checking process is complete, an attempt should be made to minimize retainage due solely to the checking. It is recommended that not more than one percent of the contract amount be withheld pending the checking of final quantities. If additional amounts are outstanding after the work is complete, a pre-final or additional progress payment is recommended to reduce the amount being withheld solely to protect the Government during the checking process. This does not include retainage for cause, such as liquidated damages or failure to provide certifications and other required documentation. If extenuating circumstances suggest that larger amounts be withheld to protect the Government, this should be discussed with the COE.

Chapter 10 – MAJOR CONSTRUCTION PROCESSES
TABLE OF CONTENTS

Section **Page**

10.1 Introduction 10-1

10.2 Clearing and Grubbing 10-2
10.2.1 Clearing and Grubbing 10-2
10.2.1.1 Preliminary Review and Approval 10-2
10.2.1.2 Construction Inspection 10-2
10.2.1.3 Measurement 10-4
10.2.1.4 Documentation 10-4
10.2.2 Removal of Structures and Obstructions 10-4
10.2.2.1 Preliminary Review and Approval 10-4
10.2.2.2 Construction Inspection 10-5
10.2.2.3 Measurement 10-5
10.2.2.4 Documentation 10-5
10.2.3 Excavation and Embankment 10-5
10.2.3.1 Preliminary Review and Approval 10-5
10.2.3.2 Construction Inspection 10-7
10.2.3.3 Measurement 10-15
10.2.3.4 Documentation 10-15
10.2.4 Soil Erosion Control 10-16
10.2.4.1 Preliminary Review and Approval 10-16
10.2.4.2 Construction Inspection and Maintenance 10-16
10.2.4.3 Measurement 10-17
10.2.4.4 Documentation 10-17
10.2.5 Structural Excavation 10-17
10.2.5.1 Preliminary Review and Approval 10-17
10.2.5.2 Construction Inspection 10-18
10.2.5.3 Measurement 10-18
10.2.5.4 Documentation 10-18
10.2.6 Watering 10-18
10.2.7 Finishing Roadbed 10-19
10.2.7.1 Preliminary Review and Approval 10-19
10.2.7.2 Construction Inspection 10-19
10.2.7.3 Measurement 10-19
10.2.7.4 Documentation 10-19

10.3 Aggregate Base and Subbase Courses 10-20
10.3.1 Aggregate Base and Subbase Courses 10-20
10.3.1.1 Preliminary Review and Approval 10-20
10.3.1.2 Construction Inspection 10-22
10.3.1.3 Measurement 10-24
10.3.1.4 Documentation 10-24
10.3.2 Dust Palliatives 10-25
10.3.2.1 Preliminary Review and Approval 10-25
10.3.2.2 Construction Inspection 10-25
10.3.2.3 Measurement 10-25
10.3.2.4 Documentation 10-25

10.4 Asphalt Construction 10-27
10.4.1 Hot Asphalt Concrete Pavement 10-27
10.4.1.1 Preliminary Review and Approval 10-27

TABLE OF CONTENTS
(Continued)

Section **Page**

10.4.1.2 Construction Inspection 10-27
10.4.1.3 Measurement 10-41
10.4.1.4 Documentation 10-41
10.4.1.5 References 10-42
10.4.2 Open-Graded Asphalt Friction Course 10-42
10.4.2.1 Preliminary Review and Approval 10-42
10.4.2.2 Construction Inspection 10-43
10.4.2.3 Measurement 10-43
10.4.2.4 Documentation 10-43
10.4.3 Open-Graded Emulsified Asphalt Pavement (OGEAP) 10-43
10.4.3.1 Preliminary Review and Approval 10-43
10.4.3.2 Construction Inspection 10-45
10.4.3.3 Measurement 10-48
10.4.3.4 Documentation 10-48
10.4.4 Dense-Graded Emulsified Asphalt Pavement 10-48
10.4.4.1 Preliminary Review and Approval 10-48
10.4.4.2 Construction Inspection 10-48
10.4.4.3 Measurement 10-48
10.4.4.4 Documentation 10-49
10.4.5 Single or Multi-Course Asphalt Surface Treatments 10-49
10.4.5.1 Preliminary Review and Approval 10-49
10.4.5.2 Construction Inspection 10-49
10.4.5.3 Measurement 10-52
10.4.5.4 Documentation 10-52
10.4.5.5 References 10-52
10.4.6 Minor Asphalt Concrete 10-53
10.4.6.1 Preliminary Review and Approval 10-53
10.4.6.2 Construction Inspection 10-53
10.4.6.3 Measurement 10-53
10.4.6.4 Documentation 10-53

10.5 Concrete and Structures 10-54
10.5.1 Portland Cement Concrete 10-54
10.5.1.1 Preliminary Review and Approval 10-54
10.5.1.2 Construction Inspection 10-56
10.5.1.3 Measurement 10-56
10.5.1.4 Documentation 10-57
10.5.1.5 References 10-57
10.5.2 Concrete Structures 10-57
10.5.2.1 Preliminary Review and Approval 10-57
10.5.2.2 Construction Inspection 10-65
10.5.2.3 Measurement 10-77
10.5.2.4 Documentation 10-78
10.5.2.5 References 10-79
10.5.3 Prestressed Concrete 10-80
10.5.3.1 Preliminary Review and Approval 10-80
10.5.3.2 Construction Inspection 10-80
10.5.3.3 Measurement 10-81
10.5.3.4 Documentation 10-81
10.5.3.5 References 10-82
10.5.4 Reinforcing Steel 10-82
10.5.4.1 Preliminary Review and Approval 10-82

TABLE OF CONTENTS
(Continued)

Section **Page**

10.5.4.2 Construction Inspection 10-83
10.5.4.3 Measurement 10-84
10.5.4.4 Documentation 10-86
10.5.4.5 References 10-86
10.5.5 Piling 10-86
10.5.5.1 Preliminary Review and Approval 10-86
10.5.5.2 Construction Inspection 10-89
10.5.5.3 Measurement 10-91
10.5.5.4 Documentation 10-91
10.5.5.5 References 10-92
10.5.6 Steel Structures 10-92
10.5.6.1 Preliminary Review and Approval 10-92
10.5.6.2 Construction Inspection 10-93
10.5.6.3 Measurement 10-95
10.5.6.4 Documentation 10-95
10.5.6.5 Reference 10-95
10.5.7 Painting of Structures 10-95
10.5.7.1 Preliminary Review and Approval 10-95
10.5.7.2 Construction Inspection. 10-96
10.5.7.3 Measurement 10-97
10.5.7.4 Documentation 10-97
10.5.7.5 References 10-98
10.5.8 REhabilitation of Concrete Structures 10-98
10.5.8.1 Preliminary Review and Approval 10-98
10.5.8.2 Construction Inspection 10-99
10.5.8.3 Measurement 10-99
10.5.8.4 Documentation 10-99

10.6 Miscellaneous Construction 10-101
10.6.1 Drainage Structures 10-101
10.6.1.1 Preliminary Review and Approval 10-101
10.6.1.2 Construction Inspection 10-102
10.6.1.3 Measurement 10-103
10.6.1.4 Documentation 10-103
10.6.2 Guardrail and Concrete Barriers 10-103
10.6.2.1 Preliminary Review and Approval 10-103
10.6.2.2 Construction Inspection 10-104
10.6.2.3 Measurement 10-104
10.6.3 Fence 10-104
10.6.3.1 Preliminary Review and Approval 10-104
10.6.3.2 Construction Inspection 10-104
10.6.3.3 Measurement 10-106
10.6.3.4 Documentation 10-106
10.6.4 Curb, Gutter, Waterways and Sidewalk 10-106
10.6.4.1 Preliminary Review and Approval 10-106
10.6.4.2 Construction Inspection 10-107
10.6.4.3 Measurement 10-109
10.6.4.4 Documentation 10-109
10.6.5 Signing, Delineators, and Striping 10-110
10.6.5.1 Preliminary Review and Approval 10-110
10.6.5.2 Construction Inspection 10-111
10.6.5.3 Measurement 10-112

TABLE OF CONTENTS
(Continued)

Section **Page**

10.6.5.4 Documentation 10-112
10.6.6 Slope Protection 10-112
10.6.6.1 Preliminary Review and Approval 10-112
10.6.6.2 Construction Inspection 10-113
10.6.6.3 Measurement 10-113
10.6.6.4 Documentation 10-113
10.6.7 Landscaping 10-114
10.6.7.1 Preliminary Review and Approval 10-114
10.6.7.2 Construction Inspection 10-114
10.6.7.3 Measurement 10-115
10.6.7.4 Documentation 10-115
10.6.8 Maintenance of Traffic 10-116
10.6.8.1 Preliminary Review and Approval 10-116
10.6.8.2 Construction Inspection 10-117
10.6.8.3 Measurement 10-122
10.6.8.4 Documentation 10-122

LIST OF EXHIBITS

Exhibit		Page
Exhibit 10.5-A	Allowable Bearing on Sandy Soils	10-60
Exhibit 10.5-B	Allowable Bearing on Clayey Soils	10-62
Exhibit 10.5-C	Checklist for Falsework Inspection	10-67
Exhibit 10.5-D	Report of Field Changes to Falsework/Formwork	10-70
Exhibit 10.5-E	Evaporation Rates in Hot Weather	10-76
Exhibit 10.5-F	Identification Marks - ASTM Standard Bars	10-83
Exhibit 10.5-G	ASTM Standard Reinforcing Bars	10-85
Exhibit 10.5-H	Pile Driving Equipment Data Sheet	10-88
Exhibit 10.5-I	Pile Driving Record	10-90
Exhibit 10.5-J	ASTM Standard Structural Bolts	10-94
Exhibit 10.6-A	Basic Checklist for Traffic Control	10-119

CHAPTER 10

MAJOR CONSTRUCTION PROCESSES

10.1 INTRODUCTION

This chapter discusses construction activities. The chapter is divided into sections for each of the major categories of work (e.g., clearing and earthwork, aggregate and subbase, etc). These sections are then further subdivided to provide discussion of each individual item or type of work (e.g., clearing and grubbing, removal of structures and obstructions, etc.). These subsections each contain instructions, illustrations, suggestions, or references concerning the following:

1. Preliminary Review and Approval

2. Construction Inspection

3. Measurement

4. Documentation

5. Reference Materials (if appropriate)

The material within this chapter should not be considered all-encompassing and, in fact, will not be appropriate in all situations. It does not offer cookbook solutions to problems, but rather suggestions to help FLH personnel identify and avoid situations that could lead to problems and, if problems do occur, ideas to facilitate their resolution.

Much of the material presented deals with construction processes, procedures, and equipment, particularly whether or not they are consistent with appropriate quality standards. This manual is not intended to provide Project Engineers with a level of expertise such that they can intervene and act on behalf of the Contractor. The Contractor is expected to provide a sufficient level of expertise to properly calibrate and use its equipment. If that is not happening, the problem should be addressed as a management problem that the Contractor must resolve to continue with the work.

10.2 CLEARING AND GRUBBING

10.2.1 CLEARING AND GRUBBING

10.2.1.1 Preliminary Review and Approval

The vegetation and debris to be cleared, grubbed, removed, and disposed of under this section, includes all surface objects, trees, stumps, roots, and other protruding obstructions within the designated limits except such objects as are designated to remain in place or are to be removed under other contract items.

Before clearing and grubbing operations begin, the Project Engineer should perform or direct the performance of the following:

- Clearly mark the limits of all areas in which the Contractor will be performing work. It should be made clear to the Contractor what access has been provided for the Contractor and for those property owners adjacent to the project.

- Go over the job with the Contractor and discuss the work to be done and any special details. Such details should include:

    - Trees to be saved,
    - Stakes and survey control points to be preserved,
    - All known utilities that could be damaged during clearing operations,
    - General clearing procedures and disposal of materials, and
    - Topsoil requirements, including any special requirements that require the removal of topsoil prior to grubbing.

- Review all timber agreements and discuss with the Contractor the ownership of the timber and any special hauling or branding requirements.

- Clearly mark all trees, shrubs, survey or historical markers, objects of historical or archeological value, etc., that are to be preserved or remain in place, and make the Contractor aware of their location.

- Go over erosion control requirements. See Section 10.2.4.

- Review the disposal requirements for slash, stumps and nonmerchantable timber. Discuss permits and special requirements for burning with the Contractor.

10.2.1.2 Construction Inspection

Inspection is usually a matter of intermittent checks, once the Contractor's supervision and understanding of requirements has been verified. Special circumstances such as a high degree of environmental sensitivity in some National Parks may dictate more frequent reviews. The inspector will usually be concerned with the items discussed in Sections 10.2.1.2.1 through 10.2.1.2.7 below.

10.2.1.2.1 Equipment and Methods

The choice of equipment and methods used for this work is usually left to the Contractor, so long as the work is performed in a satisfactory manner. However, there may be limitations to the Contractor's choice as dictated by the specifications, common sense, or local laws and regulations (e.g., specific control of the use of explosives in congested areas).

10.2.1.2.2 Removal of Trees, Undergrowth, Stumps, and Roots

Trees, stumps, and large roots should be removed from excavation areas to a depth sufficient to prevent such objectionable material from becoming mixed with the material being incorporated in the embankment. These areas to be excavated will normally require grubbing to remove small bushes, vegetation, rubbish and other objectionable material. For areas under large fills, consult the contract to verify the fill heights for which stumps may remain and not be grubbed.

10.2.1.2.3 Removal of Material Outside Clearing Limits

It may be desirable to remove downed timber, etc., outside the originally established limits for clearing and grubbing. When there is no item for *Individual Removal of Trees*, or when these situations are not covered in the special contract requirements, the inspector should refer the situation to the Project Engineer for consideration as a contract modification.

10.2.1.2.4 Preservation of Objects Designated to Remain

Precautionary measures must be taken to protect objects designated to remain in place from damage during clearing and grubbing and other construction operations. These objects may include trees, shrubs, survey or historical markers, objects of historical or archaeological value, utilities, and similar items. Clearly marking such objects and making the Contractor aware of their location will help ensure their preservation.

Trees close to the top of high cut slopes should not be designated for preservation as they may become a traffic hazard or threaten the stability of the slopes.

Trees at the bottom of fill slopes should be removed beyond the slope limits, including rounding, unless tree wells or similar provisions for protecting them are included in the contract.

10.2.1.2.5 Timber to be Saved

When merchantable timber is to be saved, it must be trimmed, sawed, and stockpiled in accordance with the special contract requirements. When there is no suitable place along the highway to stockpile timber to be saved, it may be necessary to clear an additional area for stockpiling. The length of haul of this timber to stockpile areas should be kept to a minimum. The areas of such additional clearing should be included in the measurement for payment, and approved by the Project Engineer in cooperation with land owning agency.

10.2.1.2.6 Rehandling

The Contractor is entitled to no additional payment in the event of any rehandling of refuse caused by an order from the Forest Service or other legal authority to delay burning. Such orders should be requested in writing and should be conveyed to the Contractor in a manner which makes it clear they have not been initiated by Federal Lands as a contractual action.

10.2.1.2.7 Hazards

Clearing and grubbing operations, particularly in dense, tall timber regions, can be very dangerous. Federal Lands personnel should make certain that the Contractor's operation does not endanger them, result in potential hazards to the traveling public, or create damage to existing facilities in or adjacent to the right-of-way.

10.2.1.3 Measurement

Methods of measurement must be consistent with the contract. Specifications should be reviewed closely for any exceptions to the general practice of including all area designated for clearing in the measured quantity, whether some parts require physical clearing effort or not. For example, the area of existing roads lying within the area staked for clearing are not deducted from the area otherwise measured unless the contract specifically provides for such deduction.

10.2.1.4 Documentation

The Project Engineer is responsible for documentation of the required compliance with the specifications, and for the field measurement notes and computations for pay quantities. Compliance is usually documented by IDR or diary entries, and photographs. Original (authorized) quantities are generated and adjustments and additions may be required throughout the clearing process. Quantities are summarized in a pay note, with indications as to when each section is complete or partially complete noted and reflected in the computations. Whether field measurements and/or computations are made by Contractor or Government crews, the Project Engineer must arrange for reasonable verification processes. Collect load tickets for merchantable timber hauled off the project when required by the contract or timber agreement.

10.2.2 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

10.2.2.1 Preliminary Review and Approval

Before operations begin, the Project Engineer should go over the project with the Contractor and clearly identify any structures and obstructions to be removed. When the bid schedule does not contain a bid item for removal of structures and obstructions, removal within the designated construction limits should be considered a subsidiary obligation of the Contractor. However if the obstruction was not apparent during the bidding, and so unusual that it could not reasonably have been anticipated, the Contractor may make a case that it is compensable as a

differing site condition. There may also be instances when it is desirable to remove structures that are not within these limits. In such cases, if the removal of such structures is not covered in the special contract requirements, they should be considered for a contract modification.

10.2.2.2 Construction Inspection

As with clearing operations, precautionary measures must be taken to protect objects designated to remain in place from damage during these operations. Clearly marking such objects in the company of the Contractor will help ensure their preservation.

To aid in documentation, the project should be reviewed just after award to verify the location and quantity of obstructions as indicated in the plans.

10.2.2.3 Measurement

The method of measurement must be consistent with the Contract. Usually removal items are measured by *each* or *lump sum*. For items measured by length or area, measure the item in place before removal.

10.2.2.4 Documentation

The Project Engineer is responsible for documentation of the required compliance with the specifications. and for the field measurement notes and computations for pay quantities. For each structure or obstruction to be removed, the Project Engineer should document the location, measured quantity (if appropriate), date of removal, and place of disposal (if known).

10.2.3 EXCAVATION AND EMBANKMENT

10.2.3.1 Preliminary Review and Approval

The specifications provide that all suitable excavated material should be used in the formation of embankment, subgrade, shoulders, slopes, bedding and backfill of structures, and for other purposes shown on the plans or as directed. The specifications also provide authority for making changes in the plans and specifications during the course of construction to adjust them to field conditions. Changes that affect the Contractor's unit costs or time of performance may warrant an equitable adjustment.

If the Contract requires the Contractor to furnish embankment material from sources of its own choosing, and if excavation from the roadway prism is incidental to an embankment pay item, the Project Engineer is usually concerned only with material quality, compaction, and geometrics.

Likewise, if the Contract indicates that borrow may be necessary, but no pay item for borrow is provided, the Project Engineer should prudently *monitor* quantities, especially noting how they are generated and how they are used, but normally is not required to actively *manage* these quantities.

Other contracts will require embankments to be constructed, or constructed in part, from materials to be excavated, and excavation will be a pay item. This is the predominant design scheme in many areas of Federal Lands work, particularly for projects in rugged terrain. The intent (which is also a condition of the Contract) is for the grading work to *balance*. That is, the cuts are to provide adequate material to make the fills. If that is not possible, then a borrow item, and often a source for that borrow, is provided. The designer must estimate how much the excavated material will shrink or swell compared to its original in-place volume as it is placed and compacted in the embankments. Soil is usually expected to shrink in volume as it is compacted at optimum moisture; whereas rock will swell upon excavation and placement in an embankment. The Project Engineer should attempt to monitor the early grading work for verification of the designer's shrink-swell adjustment factors. This will sometimes provide lead time to correct for errors, perhaps by adjusting slopes in areas not worked, or by adjusting grades or alignment, or by finding waste or borrow areas. Failure to make the earthwork balance when the Contract indicates that it does, may result in a dispute over disposal of excess excavation or the importation of necessary borrow.

It is the responsibility of the Engineer to recommend or make changes found necessary to meet field conditions encountered during the progress of the work. It may be necessary to flatten slopes for stability or revegetation. Where more rock is encountered than anticipated, economy will dictate the steepening of slopes. Changes in grade, alignment, and/or slopes may be necessary to balance quantities, avoid wasting materials, and minimize overruns in excavation quantities. In making or recommending changes, the Project Engineer should be guided by Chapter 13 of this manual and instructions from the COE. Insofar as possible, the need for contract modifications should be anticipated and issued before the Contractor starts grading operations in the areas involved. However, it should be kept in mind that changes that increase the Contractor's cost or time of performance can have an additional effect on the cost of the remaining work.

Periodic inspection of the construction of side slopes and drainage ditches is necessary. If the Contractor excavates outside the slope stakes, or below subgrade except as required, gouges or undercuts the slopes, or causes significant overbreak, the Project Engineer should immediately advise the Contractor, in writing, that the specifications do not permit payment for such material. Before the work is accepted, the roadway should be reasonably close to the required alignment, grade, and cross section.

The Project Engineer should discuss with the Contractor the importance of exercising care in blasting operations to ensure landscape preservation in National Forests and National Parks, and protection of abutting privately-owned property, where such property is involved. The Project Engineer should ensure that the Contractor's Blasting Plan reflects this level of concern prior to approving it.

The Project Engineer should observe the Contractor's methods of drilling, blasting, and other grading operations for compliance with the protection and restoration of property provisions of the Contract. The Standard Specifications provide for restoration (at the expense of the Contractor) of any landscape features damaged by Contractor operations. However, the objective should be to avoid such damage in the first place.

If blasting causes a scattering of material beyond construction limits, the land owner or agency should be consulted in the presence of the Contractor to determine an acceptable method of removing the material without further damage to the property. In the event that damage results

to privately-owned property, and repairs are not promptly made by the Contractor, the COE should be consulted and appropriate action taken.

10.2.3.2 Construction Inspection

Inspection at random intervals will usually be adequate if decisive corrective action is ordered relative to any deficiencies found.

10.2.3.2.1 Materials

Preliminary sampling and testing of excavation, borrow, and subgrade materials normally will have been performed for design purposes prior to award of the contract. The preliminary design data furnished to the Project Engineer may include classification, moisture-density relationship, and color and texture of the soils sampled during the preliminary soil survey.

Samples need to be taken during construction to verify that classification, moisture-density relationships, soil stiffness, and other assumptions made during the design are consistent with the actual constructed conditions. The sampling requirements are detailed in the table at the end of Section 204 of the Standard Specifications. It is the responsibility of the Project Engineer to see that sufficient supplementary samples are taken and tested.

The Contract normally makes specific quality requirements for the subgrade and other portions of the embankment. Verification of those quality requirements is a part of the Project Engineer's responsibility.

The soils and/or pavement design report is provided to the Project Engineer from the designer. The report may provide the most significant factors considered in design, including traffic loading, soil support values, and climatic and environmental conditions. It will aid in making an assessment as to whether the conditions encountered differ from design assumptions. The Project Engineer and/or COE should contact the Pavements or Geotech groups responsible for site investigations and roadway/embankment design if significant variances in site conditions are encountered.

Additional information on sampling and testing is contained in Chapter 7 of this manual.

10.2.3.2.2 Borrow

When borrow excavation is included in the bid schedule, the Contractor is required to furnish necessary material from sources designated in the Contract, or from sources the Contractor provides. In either case, the material must meet the gradation and quality requirements of the Contract. In accordance with Section 204 of the Standard Specifications, borrow used when roadway excavation material would have been available will be deducted from the borrow volume (i.e., such use of borrow will not paid for). It is intended that borrow material not be placed until after all reasonably accessible roadway excavation has been used, or will be used. Contractors who, for reasons of efficiency want to bring in borrow before all excavation has been performed, should be advised that they run the risk of having borrow quantities reduced if excavated material is left over.

For projects requiring a significant quantity of material hauled in for embankment construction, the contract may specify the use of embankment material from the Contractor's selected sources. The Contractor is then paid for the quantity of embankment rather than excavation or borrow. Any excavation required on such a project would be considered incidental to the embankment pay item, or would be called out as a separate pay item.

Selected borrow for topping is often specified on grading projects where soil conditions are poor. This material is obtained from Contractor provided sources, and will usually have more stringent gradation and quality limits specified than borrow for embankment construction.

The selected borrow for topping item may be reduced (or eliminated) if a suitable substitute is found in the excavation or borrow operations. Unless the Contract specifically requires such materials to be identified and used in the subgrade, the change would require a contract modification.

Even if better materials are ordered conserved for subgrade use, it is generally not economically practical that such materials be excavated and stockpiled, and later used in the work. Conservation for topping should be accomplished by leaving the material in its original position, whenever practical.

When a source of borrow material proposed by a Contractor for use has not been previously tested and approved, the Contractor must submit records of exploration and testing to support a request for approval. Split samples can also be requested, obtained, and tested by the central laboratory to verify the material quality. If the source is not an open commercial source, environmental and archeological clearances may also be required. Approval of the source should be made to apply only to those portions from which acceptable material can be obtained.

Other sources of borrow, other than those contemplated in the design, may be required to provide material of the quality and quantity necessary to complete the project. When additional borrow sources are necessary and it is determined that the Government will provide them, before locations are staked, the Project Engineer should obtain the concurrence of the COE and the approval of the local Forest or Park Service officials (where such jurisdictions are involved). If the sites are on private lands, right-of-way agreements shall be executed and any question of royalty settled before they are staked. However, it is very unusual for Federal Lands to attempt to negotiate a borrow site on private land, especially in the midst of an ongoing contract.

If additional right-of-way or an easement is required to expand a designated location, the Project Engineer should obtain necessary property descriptions and forward them to the COE for appropriate action. The COE should also be consulted relative to any permits likely to be required. These might relate to State mining laws, laws governing wetlands, etc.

Whenever practicable, a borrow source should be located outside the limits of view of the project. In timbered country, they should be located a minimum of 325 feet (100 meters) from the roadway, in open country a minimum of 1,000 feet (300 meters).

It is sometimes faster and no more expensive to assign responsibility for the source of any required borrow material to the Contractor, and structure the contract or contract modification on that basis.

10.2.3.2.3 Topsoil

When the plans or specifications provide for removal and storage of suitable topsoil, only soil that can sustain a growth of vegetation should be conserved. Most soil will sustain growth if properly fertilized. If the Project Engineer has doubts, the Federal land management agency associated with the project may be able to help. That is, the Forest Service, National Park Service, or Fish and Wildlife Service may employ specialists locally who can be consulted. Additional information regarding topsoil thicknesses and distribution across the project is available within the Geotechnical report.

10.2.3.2.4 Presplitting Rock Cuts and Blasting Plans

Before starting drilling operations for presplitting rock cuts, as specified in the specifications, the Contractor is required to provide a drilling and blasting plan. The drilling and blasting plan is to document the Contractor's plan for accomplishing the work. Its approval or acceptance by Federal Lands does not absolve the Contractor of responsibility for using proper drilling and blasting methods to achieve the required results. The Project Engineer should evaluate the plan, and bring to the attention of the Contractor all apparent weaknesses or proposed procedures that are contrary to the Contract. The Project Engineer should closely inspect initial operations, methods being used, and the results obtained. When satisfactory results are not obtained, the Project Engineer should direct the Contractor to prepare a revised plan.

Critical factors in successful presplitting are hole diameter and spacing, hole deviation, charge distribution, and confinement. Test blasts, as required by the Standard Specifications, will help determine the optimum drill pattern for each job. In practice, it has been found that denser, less fractured, and more homogenous material allows for larger hole diameters, less explosives, and greater distance between holes, a combination that typically yields better results.

Successful presplitting operations commonly indicate a spacing of 1.3 to 2.5 feet (0.4 to 0.75 meters), center to center, and a hole diameter of 2 to 4 inches (50 to 100 millimeters). Charges taped at 1 to 3 feet (0.3 to 1.0 meter) intervals to a down line of detonating cord with heavier loads placed at the bottom of the hole have been used; however, lighter loads are required in weak rock masses. Explosives packaged in long narrow cardboard tubes that can be coupled into a continuous column as they are placed in the hole can be used in place of the taped loads. These have proven to be effective.

Hole depth in presplitting is limited by the difficulty in drilling accurately aligned holes. This is dependent on the quality of the rock mass. Deviation of greater than 6 inches (150 millimeters) from the desired shear plane will give inferior results. Generally, 50 feet (15 meters) is the maximum depth that can be used without significant deviations of alignment unless unusually large diameter holes are permitted.

Presplitting can be accomplished in conjunction with the primary blast by delaying the primary holes so that the presplitting holes will fire ahead of them. Shooting far in advance of primary excavation can be troublesome if the rock characteristics change and the load causes excessive shatter in weaker areas. By carrying the presplitting only one-half shot in advance of the primary blasting, the knowledge gained from the primary blasts regarding the rock can be applied to subsequent presplitting shots. In this manner, the loads can be modified if necessary, and less risk is involved as compared to presplitting the full length of the neat excavation line before starting the primary blasts.

The above considerations are typical of the issues addressed by the Contractor in the Blasting Plan. It is not Federal Lands' intent to order methods and procedures beyond those in the Contract. Certainly if the Contractor has difficulty achieving required results, these and other issues should be discussed with the Contractor and with trained blasting specialists if the Project Engineer needs assistance in dealing with certain technical issues.

Although not normally required, some contracts may, for aesthetic reasons, require the removal or obliteration of remaining drill holes in cut faces. For this reason, pre-splitting is rarely used on FLH projects. Cushion blasting is the preferred means of controlled blasting on most projects, and has its own set of requirements. For instance, some allowance for overbreak is often provided, requirements for scaling are generally included, and cut-to-cut controls are generally tighter to manage volumes.

10.2.3.2.5 Prewatering Excavation Areas

In some areas, prewatering of excavation areas by sprinkling, flooding, or irrigation provides more uniform distribution of moisture with less water than truck watering in the embankments. This will also reduce the need for manipulation of the soil on the roadbed.

When prewatering is used and water is specified as a pay item, the Project Engineer must closely observe and evaluate the prewatering operations to avoid payment for wasted water. The special contract requirements may limit the pay quantity to the amount required to provide the proper moisture content for compaction to specified densities.

10.2.3.2.6 Slope Rounding and Warping

Slopes are to be rounded as indicated on the plans. The method of measurement and basis for payment is specified in the Contract.

The Project Engineer should encourage the Contractor to perform the slope rounding as a part of rough grading operations, rather than doing it as a special operation after slopes are otherwise finished. This will usually minimize the work involved and improve its overall quality.

In order to obtain the reasonably smooth and uniform surfaces required by the specifications, slopes should be warped and adjusted to harmonize with existing landscape features. The Project Engineer can help ensure the desired results by carefully reviewing the slope stakes on the ground and ordering appropriate adjustments before grading work begins.

10.2.3.2.7 Waterways and Ditches

Satisfactory drainage often is difficult to secure, particularly in flat country. Except when ponds are specified, waterways should drain quickly and efficiently away from the highway. Cut ditches should be flared out away from the roadbed at the end of the cuts and extended on the natural ground to a point where water will not discharge along the junction of the fill slope and the natural ground. Abrupt changes in these outlet ditch grades should be avoided to prevent erosion or silting. If possible, the flow line slope of waterways should not exceed that which is proper for the material. Where that slope is exceeded on steep grades, the Project Engineer should consult with the COE to determine the need for additional cross drains, paving of

waterways, or other corrective measures to prevent scour. Extra wide sections require special consideration, especially when super elevation may increase scour or erosion potential.

Where considerable surface drainage over the top of a high cut appears likely, the Project Engineer should consult the COE regarding the measures to be taken. One method of correction would be the construction of ditches above the cut to intercept and lead the flow to natural drainage courses. Such ditches should be far enough away from the edge of the cut to prevent seepage sufficient to cause sliding, and should not be so steep as to cause erosion. Unless shown on the plans, construction of such ditches in sensitive areas, such as on Park or Parkway projects, should not be undertaken without the agreement of appropriate Park Service officials. Right-of-way for such ditches may be a consideration for some projects.

10.2.3.2.8 Subdrainage

Thorough attention to subdrainage is essential to the life of the road and will result in reduced maintenance costs. Should the Project Engineer suspect the presence of subsurface water in such quantity as to affect the stability of the roadbed, and if corrective measures have not been provided in the plans and specifications, appropriate action should be taken to correct the problem. Mitigation of excess water may be accomplished by the simple installation of underdrains under certain conditions. Other conditions may require special investigation and more involved designs using geotextiles or other methods. The Project Engineer should consult with the COE or FLH specialists when simple underdrains are deemed inadequate for the field conditions.

Section 10.6.1 of this manual contains information on the construction of underdrains.

10.2.3.2.9 Embankment Foundation Preparation

The quality of embankment construction depends on the proper preparation of the foundation. The presence of subsurface slippage planes, soft or saturated material, and springs or seepage are some of the conditions that may cause embankment failures. These conditions require careful attention and should be brought to the attention of the Geotechnical Engineer if not already described in the Geotechnical Report.

The plans and/or special contract requirements will usually provide corrective measures for unstable foundation conditions known to the designer. Some may not become known until exposed by clearing and grubbing. Before embankment construction begins, all embankment areas should be examined to determine the need for corrective treatment. Some areas of questionable support may only require subgrading. Others will require extensive systems of underdrains, filter blankets, rock trenches, or rock embankment.

During the construction of embankments on hillsides, particular attention should be given to obtaining the best possible interlock between sloping original ground surfaces and the new embankment. Sufficient benches should be excavated to ensure a firm bearing on solid material. Payment for the benching will depend on how the specifications are written. If not addressed in the specifications, a contract modification may be required.

One of the most frequent points of embankment failure is the area where the roadway changes from excavation to embankment. It is advisable to explore these areas for possible need of

underdrains to remove seepage water. The benching operation described above should be very carefully followed in these transition areas.

The Project Engineer should consult the COE if the embankment area where the foundation treatment and/or items provided in the Contract seem inadequate for the actual field conditions.

10.2.3.2.10 Embankment Failures -- Causes and Corrective Measures

Embankment failures or displacements are due mainly to improper design or construction, or both. Four major causes of embankment failures are discussed below. The design should be based on a thorough exploration of foundation conditions and available embankment materials. Serious failures occurring or expected during project construction should be corrected on the basis of subsurface investigation and analysis. The Project Engineer should consult the COE and the responsible Geotechnical Engineer to arrange for such investigation and analysis.

1. **Failure due to weight of the embankment displacing soft foundation material.**

   This failure is usually characterized by an en masse drop and lateral movement of a portion of the fill.

   To provide a satisfactory embankment over a soft foundation, three approaches may be taken:

   a. Removal and replacement of soft soil with suitable material. This may be the most economical method to depths of about 3 feet (1 meter).

   b. Reduction of applied shearing forces. This can be accomplished by reducing the height of the embankment, using light-weight material in the embankment, and by either flattening the side slopes or by using toe berms.

   c. Strengthening of the soft foundation soil. This can often be accomplished through consolidation. Drainage ditches may be used to lower the water table and consolidate the foundation soil under its own weight. Foundation strength may be allowed to keep pace with increase in load by providing adequate time for foundation consolidation. A sand blanket placed directly on the soft foundation soil, or vertical sand drains in combination with a sand blanket, will increase the allowable rate of consolidation. This rate must be controlled by field measurements during construction.

   Pavement failures due to excessive consolidation of the soft foundation soil may be reduced by removing the soft material, providing sufficient time for consolidation before paving, or by accelerating the consolidation by the use of a temporary surcharge and one of the drainage methods noted above.

2. **Failure due to loss of stability of embankment through impounding of hillside seepage water causing saturation.**

   This type of failure is usually identified by characteristic sloughing of part or all of the fill. When opened up, the impounded water will usually gush out until the hydrostatic pressure is relieved. Prevention of such failures usually lies in providing for the escape of seepage

water by means of subdrains or placement of very porous material in the lower part of the fill.

3. **Failure due to the weight of embankment causing movement on a well defined slippage plane in the underlying foundation.**

   This type of embankment failure is generally characterized by bodily movement of the fill, without sloughing. The usual correction is to intercept and remove the subsurface water by trenching or placing subdrains above the fill.

4. **Failure due to horizontal stresses produced by the weight of the fill being greater than the corresponding shearing resistance.**

   This condition occurs when the slopes are too steep for the height of the fill and the type of the material, or when the material is insufficiently compacted. Proper compaction and correct slope design are both essential for permanent fill stability.

10.2.3.2.11 Embankment Compaction

The need for adequate compaction of embankments should be strongly emphasized. Compaction of the lower portions is necessary to prevent settlement and provide stable slopes. It is important in the upper portions to provide bearing capacity, control volume change, and provide uniformity.

All embankments are to be compacted in accordance with the Contract specifications. The specifications normally do not prescribe the type of compaction equipment to be used. Unless otherwise specified in the special contract requirements, the Contractor is free to use equipment of its own choice, provided it will compact the embankment in accordance with the Contract requirements.

The Contractor is required to bring the embankment material to a moisture content suitable for compaction and to compact the embankment until it consistently meets the Contract requirements.

It is the responsibility of the Project Engineer to verify that the moisture-density relationship of each type soil to be used in embankments is determined in accordance with the test methods specified. In most contracts, the actual sampling testing and documentation will be the responsibility of the Contractor. As discussed in Section 10.2.3.2.1 of this manual, this will require use of preliminary soil data and supplementary sampling and testing of any soils encountered during construction that are different from those sampled during the preliminary soil survey.

The specifications usually require density tests of compacted embankment material to be made in accordance with AASHTO T 310, or other approved methods. Actual requirement will be identified in the contract. The Project Engineer should make observations and reviews of density tests to ensure that prescribed procedures are being used, required density is being attained, and adequate documentation is being maintained.

If more than one type of soil is being compacted into embankments, the selection of the proper moisture-density curve becomes as important as the density test itself. It may be necessary to

use a family of curves (AASHTO T 272) in combination with a one point proctor in order to select the proper curve.

In gravelly or rocky soils, a coarse particle correction (AASHTO T 224) or a family of curves may be necessary to correct for differing percentages of coarse particles in the field as compared to the original proctor. This is especially true when a nuclear gauge is used in gravelly soils. A sample may be required in order to compute a coarse particle correction each time a density test is taken.

During construction, a record of all relative density tests should be maintained on a chart drawn to convenient scale. This may be done on a roll of cross-section paper with both plan and profile plotted as horizontal lines. Depth and location tests and retests can thus be easily shown in relation to grade and centerline station.

The success of compaction operations is dependent to a large extent on proper moisture control. If the proper amount of moisture is uniformly distributed throughout the embankment layer, rarely will there be any difficulty in obtaining satisfactory compaction, provided the thickness of the layer does not exceed the capabilities of the roller being used. The common tendency to construct earth embankments at moisture contents on the dry side of *optimum* makes the task of securing uniform moisture distribution and satisfactory compaction more difficult. Usually, it is better to begin compaction with the moisture content slightly high; however, in humid areas it may be better to begin with the moisture content near optimum.

The mixing and blending of soils and water should be thorough. Large clods and lumps must be broken down to ensure a uniformly moist condition. Whenever it is necessary to blend moisture into very plastic clays, heavy plowing and turning of the soil will usually do the job satisfactorily; however, in certain extreme cases, some type of mechanical mixer may be needed.

When adding water to a layer of material, care must be taken to avoid overlapping or gapping between successive passes of the water distribution equipment. Wet or dry streaks are undesirable and should be avoided. Application of water should begin on one side of the embankment and progress across to the other side to avoid having wet or dry streaks in the center of the embankment. It is better to make several light applications rather than one heavy application of water.

In lieu of applying water to material in the embankment to attain the proper moisture content for compaction, the excavation or borrow areas may be prewatered as discussed in Section 10.2.3.2.5.

In using density tests to determine the adequacy of compaction, recognition should be given to causes of variations in test results that are to be expected when using this method of compaction control. Exact representative samples are seldom possible. When it is not possible to properly perform meaningful tests due to high rock content or for other reasons, explanation as to why the tests were not made should be entered on the form provided for recording the test results.

10.2.3.2.12 Disposal of Surplus Material (when off-site disposal is not a Contractor responsibility)

Unavoidable waste or surplus from roadway and structure excavation is to be utilized, to the maximum extent practical, to widen embankments, flatten slopes, and provide parking areas. Proper distribution is necessary to secure uniform appearance of the finished roadway. Boulders or rocks brought to the surface by scarifying generally are to be covered in embankments or disposed of as authorized by the Contract.

The necessity for widening of embankments should ideally be determined early enough that such widening may be incorporated in the originally planned embankment. If surplus material is developed after the nearby embankments have been completed, it should be used to fill pockets on the uphill side of embankments, or hauled and wasted in other suitable disposal areas.

Proposed disposal sites for any significant quantity of unanticipated surplus material should be discussed with the COE and representatives of cooperating agencies. There may be a need to obtain or modify permits in accordance with State or Federal regulations.

10.2.3.2.13 Finishing Earthwork

Before the finishing operations begin, the Project Engineer should carefully check the roadway to see that the earthwork is in reasonably close conformity with the staked lines, grades and cross sections. The Standard Specifications require the roadway to be finished to reasonably smooth and uniform surfaces. Refer to Section 1.4.4 for a discussion of tolerances not explicitly specified.

10.2.3.3 Measurement

Refer to Section 9.4.3 of this manual, and to the appropriate measurement sections in the Contract. The Standard Specifications detail what is and is not to be included as excavation and embankment.

Most excavation and embankment items are paid as staked quantities (i.e. the computer generated quantities based on field cross section and slope stakes). Often secondary measurements are taken to modify the original quantities (e.g. when a slope is laid back).

Adjustments to authorized quantities may also be appropriate, if, for example, the Contractor wastes material that could be used, or uses excavation for rip-rap, which necessitates it being replaced by borrow or expanded excavation.

Some quantities are measured in place. For example, subexcavation is often inspected as it is excavated, and the limits of the excavation are determined at that time.

10.2.3.4 Documentation

Refer to Section 9.4.3 of this Manual.

Generally, basic documentation will consist of the computer generated quantities. The computer run should be dated, cross-referenced, and included with the pay note. Obsolete versions of computer runs should be destroyed or clearly marked as "superseded". Adjustments to the computerized quantities should be in subsequent pay note entries. It should be possible at any time for someone unfamiliar with the project to refer to the specific pay notes for this item and to follow the cross references back to the detailed quantities authorized and accomplished.

10.2.4 SOIL EROSION CONTROL

10.2.4.1 Preliminary Review and Approval

Construction activities that are subject to high erosion risk include clearing and grubbing, earthwork, ditch construction, haul roads, culvert installation, channel changes, pier or abutment work in streams, temporary stream crossings, borrow pit operation, and hydraulic or mechanical dredging.

The Contract will contain an Erosion Control Plan that reflects special concerns, measures to protect resources, and permit requirements. The Contractor may submit an alternate plan for approval, but the alternate plan must comply with Contract requirements, constraints and permits. No work on any segment of the project may begin until the required erosion control devices associated with that segment are installed.

Approval of alternate plans should be based on compliance with the requirements and constraints in the Contract, and, if applicable, requirements and constraints in the permit and in the regulatory requirements of the local water quality agency. If the Project Engineer encounters approval/disapproval issues that are not addressed by these documents, the subject should be discussed with the COE.

It is required that the Contractor incorporate all permanent erosion control features into the project at the earliest practicable time. This commitment should be reflected in the proposed progress schedule. If the Contractor subsequently fails to adhere to the schedule and is forced to install additional temporary devices or seeding because the site is not ready for permanent devices or seeding, FLH may take the position that the cost of the additional devices is not compensable under the Contract.

The effectiveness of the erosion control measures should be reviewed and updated prior to any winter shut down or expected event having the potential to cause erosion. Sediment traps, settling basins, stage seeding, mulching, temporary slope drains, special berms, terraces, ditches and/or dikes, temporary seeding, sodding, contouring, benching, serrated slopes, erosion control matting, silt fence or other approved devices may be placed in the construction contract to control soil erosion and stream pollution.

10.2.4.2 Construction Inspection and Maintenance

NPDES permits typically require inspections of control devices at least once per week or once every two weeks and within 24 hours of rainfall events greater than a half inch (13 millimeters). Prior to beginning each major construction operation phase, the Project Engineer should make

a detailed inspection of the project with the Contractor's representative to verify that the approved schedule remains adequate and to go over details not covered in that schedule. Once control devices are installed, additional quality assurance inspections should also be made periodically to verify the adequacy of the plan. The contract may require the Contractor to conduct, participate in, and/or document these inspections. Otherwise the Project Engineer is responsible for them.

If inspections identify inadequacies in either the Erosion Control Plan or the performance of specific control devices, corrections must be made. If control devices demonstrate the need for maintenance or replacement, such activities should be conducted immediately. All inspections and maintenance actions must be documented and maintained in a separate file on the project site.

10.2.4.3 Measurement

Measurement for erosion control devices normally starts with the quantities authorized in the Contract, which are based on the specified Erosion Control Plan. If the plan is modified or quantities are adjusted, written authorization for the modifications is required. Once the devices are installed, there should be documentation in the IDRs or in the pay notes that each of the authorized installations has been accomplished. If additional quantities, beyond those authorized in the Contract are required, a contract modification may be necessary.

10.2.4.4 Documentation

Basic documentation for erosion control items consists of the following:

- The Contract or alternate approved plan for erosion control devices that is maintained to reflect field conditions.
- Documentation/authorization for quantities in excess of those provided in the Contract.
- Inspection documentation that the required devices have been installed, are effective and have been maintained for the duration of need.

The pay note documentation should be cross-referenced to these items, or these items can be included as referenced documents within the pay note.

10.2.5 STRUCTURAL EXCAVATION

10.2.5.1 Preliminary Review and Approval

Excavation for structures is usually bid at prices considerably higher than unclassified excavation. This is largely due to the smaller quantities, difficult access and special foundation preparation and backfill requirements that are included in the bid price for structural excavation. It is the latter requirement that requires the most inspection and approval efforts.

10.2.5.2 Construction Inspection

Inspection is required after excavation and foundation preparation has occurred to verify that the foundation materials and their compaction meet the Contract requirements. During backfill, verify that the backfill materials meet contract requirements and that compaction also meets those standards.

Inspection frequency should be random until it is verified that the Contractor is doing a good job controlling the quality process. Inspection frequencies may then be reduced further. Major, critical structures should receive more inspection, especially the approval of the foundation prior to placement of forms for footings.

When the Contractor is backfilling structures, particular attention should be paid to the placement and construction of drainage materials. Drainage construction should not deviate from specified materials, such as aggregate backfill or geosynthetics. Drainage materials have been selected specifically for the soil/rock setting to ensure long-term drain performance. Any proposed changes to the drainage plan by the Contractor should be approved by the COE and the Geotechnical Engineer.

10.2.5.3 Measurement

Structural excavation is often not included as a bid item and no measurement is performed. When it is included, measurement is usually a staked quantity controlled by ground elevation [after unclassified excavation is removed], and vertical planes 18 inches (450 millimeters) from the structure. There is no remeasure of quantities outside those vertical planes, nor is there remeasure of quantities inside the planes not excavated [e.g. adjacent to a footing]. Sometimes additional excavation is ordered because the foundation does not meet the design expectation. These quantities may be ordered to a specific depth - say 8 inches (200 millimeters), or excavation may be performed under inspection and measured after a suitable foundation is exposed.

10.2.5.4 Documentation

If structural excavation is a pay item, documentation requirements include the original ground elevation, or computed elevations after unclassified excavation is removed if that is appropriate.

Actual computations of structural excavation should be the theoretical volumes below the natural ground or unclassified excavation. These quantities should be verified in the field after being performed. Volumes not excavated should not be paid for (e.g. if the Contractor excavated against natural ground instead of forming). Additional quantities should not be paid for unless the Project Engineer ordered a footing lowered or expanded.

10.2.6 WATERING

See Section 10.2.3.2.5 for a discussion concerning watering for embankment construction.

Unless otherwise provided in special contract requirements, only that water necessary for dust control is measured for payment. Documentation may be a tally of loads of haul vehicles. This

may be maintained by the Contractor, so long as the Project Engineer performs verification at checks at reasonable intervals. The tally of loads should include the time of complete discharge of each load to discourage accidental double counting. The determination of haul vehicle capacity should be witnessed by an FLH inspector. Determination should preferably be by weight if scales are available, or otherwise by meter, or computed volume (least preferred).

10.2.7 FINISHING ROADBED

10.2.7.1 Preliminary Review and Approval

On new grading construction, finishing of the roadbed is usually a subsidiary obligation of the Contractor under other items of the Contract. Similarly, on projects providing for a base or surface course on a previously constructed roadbed, the *finishing* or preparation of the previously constructed roadbed is usually a subsidiary obligation.

When a project includes a section of new grading, plus construction of a base or surface course on a previously graded section as well as on the new work, it is common though not universal practice to include a bid item for *finishing previously constructed roadbed*. This is done for the primary purpose of permitting a Contractor to bid the surfacing items without the necessity of prorating the costs of preparing the old roadbed. In such cases, payment will be limited to the length of the old roadbed. If no such item is provided, the work is a subsidiary obligation.

10.2.7.2 Construction Inspection

The work is required to be performed in accordance with the specifications, whether there is a pay item or the work is subsidiary to other items. Inspection should include surface tolerances, compaction, a visual inspection for soft spots and unsuitable materials.

10.2.7.3 Measurement

Unless there is a pay item for this work, there is no measurement for payment.

10.2.7.4 Documentation

Documentation should verify that each section of roadbed has been inspected, tested if necessary, measured if necessary, and accepted prior to construction of subsequent layers.

10.3 AGGREGATE BASE AND SUBBASE COURSES

10.3.1 AGGREGATE BASE AND SUBBASE COURSES

10.3.1.1 Preliminary Review and Approval

10.3.1.1.1 General

Prior to placing base or subbase materials, the subgrade must meet grade and template requirements. This can usually be checked well enough with sight levels (see Section 6.10). Sight levels are especially useful when fine grading stakes have been knocked out. And, they are useful for checking quarter crown and critical superelevation transition sections, whether or not stakes remain.

The subgrade should also be checked for large rocks (over 6 inches (150 millimeters)) in the surface. These will shine or reflect through subsequent aggregate and paving courses placed over them.

The thickness of bases, as shown on the typical sections of the plans, is based on the strength of subgrade soil, climatic conditions, traffic, and other factors. Base courses should be placed to the thickness shown on the plans unless subsequent determination indicates a different thickness is required, as might be the case if subgrade material proved significantly different than design expectations. The pavement report or other documentation provided with the design package should indicate the assumptions made to design the pavement structure. Discuss with the COE when doubt exists as to subgrade adequacy.

The Contractor should develop a spread rate for the aggregate course prior to starting the spreading operation. The spread rate converts the tonnage (metric tonnage) of each truck to the number of feet (meters) along centerline which that tonnage (metric tonnage) should cover. These computations should be checked by the Project Engineer. The spread rate should be based on the wet density at two percent or so above minimum density.

Example (U.S. Customary):

Maximum Density (Dry) - 135 lb/ft^3

Optimum Moisture - 8.0%

Maximum Density (Wet) - 145 lb/ft^3

Target Density (97%) - 141 lb/ft^3

Spread Depth - 6 inch; Bottom Width - 30 ft; Top Width - 26 ft

Area - 13.9 ft^2

Spread Factor - 141 × 13.9 = 1960 lb/ft

So a truck with a 66,000 lb net load would cover a spread of 33.7 feet.

Example (SI):

Maximum Density (Dry) - 2160 kg/m^3

Optimum Moisture - 8.0%

Maximum Density (Wet) - 2333 kg/m^3

Target Density (97%) - 2263 kg/m^3

Spread Depth - 150 mm Bottom Width - 9.2 m Top Width - 8.0 m

Area - 1.29 m^2

Spread Factor - 2263 × 1.29 = 2919 kg/m

So a truck with a 30,000 kg net load would cover a spread of 10.28 meters.

Once laydown has started, the Contractor should perform depth checks and width measurements in order to verify the computed spread rate. When the operation is fine tuned to the point that plan dimensions are being achieved, the Project Engineer must consider yield. It is necessary to calculate as early as possible how well the yield, in say stations per ton (metric ton), will match the contract quantity for the item, if the entire course is completed at the same rate. This information will bear on questions of project funding adequacy, materials source capacity, and any necessity to negotiate relative to significant variation from plan quantity.

10.3.1.1.2 Materials

It is the responsibility of the Project Engineer to see that required samples are taken and tested in accordance with the specifications. This applies whether the sampling and testing is to be performed by the Government or the Contractor.

1. **Preliminary Sampling and Testing.**

   Laboratory tests for a source approval determination of quality will be made before base or surface course material is produced or shipped. Where the source proposed for use has not been previously explored, tested, and approved, it is the responsibility of the Project Engineer to coordinate the approval process. The COE, as well as Division materials specialists, etc. will usually be involved in the approval decision. If the source has been proposed by the Contractor, the specifications may require submission of exploration and test data. The COE will advise the Project Engineer on the status of the Contractor's submission, and how any approval letter is to be written when the decision is made.

2. **Sampling and Testing by the Contractor.**

   Whether or not contractor testing is specified, it is the responsibility of the Contractor to effectively control the quality and contract compliance of the material being produced. The specifications include requirements for a contractor inspection system, pursuant to FAR Clause 52.246-12.

   It is to the mutual advantage of the Contractor and the Government that the product comply with the specifications at the time of production. However, in the event of deficiencies, blending of filler and other adjustments by the Contractor prior to final mixing and blending may correct those deficiencies. Conversely, material that is found to comply with

specifications at the time of sampling at the crusher may be contaminated during further handling so that it fails when tested for acceptance.

While base and subbase specifications are for the most part end result type, the Contract will often specify proper handling and storage of materials. Therefore, if the Project Engineer comes to believe a Contractor's handling and storage processes will result in quality problems, there is contractual basis for requiring process improvements. The COE should be consulted if there is disagreement with the Contractor.

3. **Sampling and Testing for Acceptance.**

Gradation, liquid limit, plastic limit, plasticity index, moisture and density, and other job control sampling and testing required by the specifications will typically be performed in the field. Consult the contract specifications to determine the frequency and type of testing to be performed by the contractor as part of the process control. The Contractor is responsible for establishing gradation target values, and this should be based on test results obtained during production.

The aggregate base material will be tested for acceptance based on samples taken from the windrow or roadway after final blending and prior to compaction. The frequency of samples and tests can be determined from the Contract specifications.

Aggregate base control sieves for a project will be specified along with the target values and the allowable deviation from the target value. Aggregate base gradation conformance to contract requirements will be evaluated under Section 106.05 of the Standard Specifications. A final pay factor will be calculated based on Subsection 106.05. During production, it is advisable to review the pay factor of test results to date to alert the contractor to a reduced pay factor due to material not conforming to the submitted target values and the allowable deviation from the target value.

See Materials Manual for more information.

10.3.1.2 Construction Inspection

10.3.1.2.1 Inspection Intensity

The inspection of a high production base or subbase operation will usually require the full attention of one competent inspector even if personnel furnished by the Contractor are testing, weighing, and recording the receipt of materials on the grade. This inspector will be busy performing the following activities:

- verifying the work of the Contractor personnel,
- designating and monitoring samples,
- inspecting subgrade ahead,
- verifying dimensions of materials placed,
- keeping complete records of Contractor equipment and personnel usage, and
- consulting with the Contractor and Project Engineer.

If Government personnel are verifying compaction or are receiving materials, these personnel will be able to relieve the inspector of part of the duties described above, perhaps to the point the inspector can monitor some other project operation also.

10.3.1.2.2 Mixing with Water

The Contractor may mix the base course by the stationary plant method, the travel plant method, or the road mix method. When the Contractor elects to use the road mix method, special attention should be given to the following:

- Excess water should not be added in such a manner that the subgrade bearing capacity is detrimentally affected.
- Water should be added uniformly and not in a manner that might promote segregation.

If the Contractor uses a stationary pugmill plant and storage hopper, it may be necessary to baffle the flow into the hopper to reduce segregation of the aggregates.

10.3.1.2.3 Compacting

The moisture density relationship for base and subbase materials is commonly determined in a central laboratory, but a field laboratory can usually perform the tests if time is short. The laboratory requires a sample of the aggregate and knowledge of the Contractor's target values.

The Project Engineer should require sufficient moisture determinations of the base course material to ensure proper compaction. With the typical material, this moisture content will be between 5 and 8 percent at the time of compaction. The amount necessary will vary with the specific gravity, surface texture, and grading of the aggregate. Preliminary tests made in the Division or other designated laboratory will show the percentage of moisture necessary for proper compaction and maximum density. It is essential that the proper amount of water be uniformly mixed with the aggregate before spreading and compaction is started. Base course must be rolled sufficiently and with such weight and type of roller as will ensure specified compaction. Excess water will cause flushing of fines to the surface under compaction. Rolling should be stopped in such cases until the excess water is removed, usually through windrow processing and evaporation. Water draining from haul vehicles is usually a sign of excessive water in the mixture. This condition should be corrected before placement and compaction operations are allowed to continue.

10.3.1.2.4 Stockpiling Aggregates

The Contractor may elect to stockpile base course aggregate prior to placement. However since testing for acceptance does not take place until placement, this is frequently a situation where a Contractor may initially test the material and document compliance but is later unable to meet gradation requirements.

With or without observing proper stockpiling techniques, the Contractor is responsible for providing aggregate that meets the specified grading requirements upon incorporation into the

project. However, compliance with specified handling and storage requirements might mean an overall pay factor of 1.0, as opposed to say 0.75 if proper procedures are not followed.

10.3.1.3 Measurement

The method of measurement will be in accordance with the Contract. If the measurement is by the ton (metric ton), the scales must meet the requirements of the specifications. Project Engineers should not confuse checks of contractor weighing, with checking of the scales. One is a personal integrity issue, the other relates to equipment.

10.3.1.4 Documentation

The area of documentation is one that is closely scrutinized by internal and external reviews, and deserves the Project Engineer's careful attention.

Delivery records should be checked against weigh records to verify that material weighed was incorporated into the project. As a minimum, the number of loads invoiced should be checked against the number of loads delivered every day. Spot checks of actual tickets against the invoice summary should also be performed routinely.

Weight and delivery records, as described for bituminous mixes in Section 10.4.1.4, are also suitable for this work. When the specifications stipulate Contractor weighing, the Project Engineer should periodically verify weights recorded. For platform scales, this is accomplished by taking a truck weighed under normal circumstances and circulating that truck back across the scales and reweighing the vehicle in the presence of an FLH inspector.

This verification process is to be documented in the permanent weigh records. Verification loads are to be selected so as to preclude knowledge or anticipation by Contractor personnel. The Project Engineer and Contractor should have a documented understanding of acceptable tolerances, and what is to be done if they are exceeded. The recommended tolerance for a single check is 110 pounds (50 kilograms), but the average of several checks should be 33 pounds (15 kilograms) or less. If there is evidence of biased or erratic weighing, the COE should be consulted. The Government may want to consider requiring the removal of the weigh person, and/or applying a correction factor to all invoiced weights.

For belt-scale weighing, a previously weighed truck should also be periodically directed to a properly certified platform scale. This verification should be documented in the permanent scale records. In rural areas, this may require a long trip to find such a scale.

In all cases if the Contractor has an English unit scale which otherwise meets Contract requirements, there is no requirement to provide a metric scale if invoices and other documentation are submitted in metric units.

Occasionally it may be necessary to haul material by the cubic yard (cubic meter) when measurement is specified by the ton (metric ton). The Project Engineer should keep this type of variation from the specified measurement to a minimum. Where such contract variation is approved, the Contractor should be required to establish the ton per cubic yard (metric ton per cubic meter) ratio by weighing a load of known volume on certified scales. This documentation, along with truck volume measurements, should become a part of the permanent record.

When the specifications stipulate volumetric measurement in the hauling vehicle, the Project Engineer should verify the measurement of the volume to be hauled by each hauling vehicle. In certain instances, it may be necessary to haul less than the capacity of the truck. When this occurs, the volume being hauled and documented should be accompanied by a written agreement between the Government and Contractor as to the volume to be paid per hauling vehicle.

When applicable, a copy of the QL-Pay printout should be included in the project documents for each estimate and for final payment.

10.3.2 DUST PALLIATIVES

10.3.2.1 Preliminary Review and Approval

Review the Contractor's plan for controlling traffic during application and curing. Review supplier certifications to ensure that the specified palliative is being provided.

10.3.2.2 Construction Inspection

The preparation of the roadbed may vary with the type of dust palliative used (i.e. sometimes the top inch or two of material is left more loose). The roadbed to be treated should be brought to the proper template and compacted. Just prior to treatment, the surface should be dampened. Application rates should be determined and equipment calibrated. Determine application rates according to Section 306 of the Standard Specifications. Runoff is to be avoided, particularly in the vicinity of lakes and streams. Recommendations from the supplier should be evaluated and discussed with the COE and local division technical specialist.

10.3.2.3 Measurement

Dust palliative materials are normally paid by the ton (metric ton) in concentrate form unless specified differently in the contract. If materials are not used, the Contractor should be requested to document the quantities involved and to remove them from the project without payment. However, if the Contractor makes a convincing argument that such materials are not returnable and have no further value, the Project Engineer may have to consider paying for all or part of the leftover quantities and ordering them removed under a contract modification. For this reason it is important to plan quantities carefully and communicate with the Contractor as to what will be needed and what will happen to leftovers.

Application of dust palliatives will be paid separately by the square meter, or by the station. The Project Engineer or Inspector should reach agreement with the Contractor on the quantities involved in each application.

10.3.2.4 Documentation

Required documentation includes certifications or other acceptable quality documentation.

Invoices or weigh tickets should be submitted to document quantity of materials. Daily records of applications should be included in a pay note to document that item.

10.4 ASPHALT CONSTRUCTION

10.4.1 HOT ASPHALT CONCRETE PAVEMENT

10.4.1.1 Preliminary Review and Approval

The contract defines the Contractor's responsibility with respect to the production and placement of asphalt mixes. The Project Engineer should be prepared with knowledge of proper construction procedures.

As a part of the Contractor Quality Control Plan (CQCP) approval process, the Contractor's process control procedures should be reviewed both from a procedural standpoint and from a quantitative view. Equipment, screens, scales, etc., should be inspected and the test methods examined. Care must be taken to ensure that the Contractor testing personnel do not construe the approval of QC equipment and methods as acceptance of the material produced.

The Project Engineer should ensure that the mix design samples are adequate in size, representative of the material being produced, and that they are submitted as soon as reasonably possible. The shipment of the asphalt and antistrip agent samples should be coordinated through the suppliers, and the central laboratory notified of their impending arrival.

After the mix design is completed, the Project Engineer should review and compare it with the design criteria to understand the approval process/criteria. The Project Engineer should make certain that the Contractor understands that the asphalt cement content used in FLH mixes is a percentage of the total mix, not a percentage of the dry aggregate.

Before production of the mix begins, the statistical evaluation procedures should be thoroughly discussed with the plant personnel and any problems or questions concerning the procedures resolved before conflicts arise.

Prior to the commencement of paving operations, it is desirable for the Project Engineer and the Contractor to get together for a pre-paving conference. This is an opportunity for both parties to familiarize themselves with the contract requirements and share their plans for proceeding with paving operations. Such collaboration goes a long way toward minimizing surprises during paving and promotes good working relations.

10.4.1.2 Construction Inspection

10.4.1.2.1 Plant Operations

10.4.1.2.1.1 General

There are, in general, two types of plant operations: (1) the permanently located commercial plant with multiple production operations; and (2) the portable plant, erected on or near the project to produce solely for the project.

The inspection and quality control of asphalt plant operations is a Contractor or producer responsibility and covered in the CQCP. The Project Engineer may ask for documentation and verification that this QC process is effective and may perform verification inspections. Generally FLH oversight of Contractor QC is less necessary at commercial plants.

At the commercial plant site, or as soon as the portable plant is set up and ready to operate, the Contractor QC specialist should make a thorough examination of the plant layout, including storage areas and component parts of the equipment. If the storage areas or any part of the equipment fails to comply with the requirements, corrective measures must be taken before operations begin.

There are two general types of asphalt concrete mixing plants: the batch plant and the continuous mixing plant. Continuous mixing plants include pugmill mixing plants (very rare) and dryer drum plants. In the batch plant, the aggregates are proportioned by weight and the bituminous material proportioned by weight or volume. In the continuous plants, the aggregates and asphalt binder are proportioned by volume base correlated to weight; or in the case of the dryer drum plant, provided with positive weight measurement (belt scales) to allow regulation of the feed gates and permit automatic correction for variations in load.

10.4.1.2.1.2 Inspection of Plant Equipment

a. **Pugmill Mixer**

In order to properly understand the asphalt plant, it is necessary to become thoroughly familiar with the specification requirements and with the particular type of equipment being used. The components of a batch plant and continuous mix plant utilizing a pugmill for mixing are essentially the same. The main difference is the method used to proportion the components into the pugmill mixer. The dryer drum mixer uses an entirely different concept for mixing the aggregates and asphalt binder and will be discussed separately. As an additional aid for plant inspections, the functions of the most important components of the batch and continuous bituminous plants and some of the factors to be considered during the inspection are discussed below.

1. **Asphalt Binder Storage Tanks.** Storage tanks must be of sufficient capacity to maintain continuous operation while allowing for delay in asphalt binder shipments. They must be equipped with heating devices and must be able to hold the material at the required temperatures.

   Storage tanks must be inspected by Contractor or producer QC personnel to see that they are free of foreign material and any asphalt material other than that to be used in the mix. They must also not admit water, fuel oil, or other foreign substances. Steam coils used for heating should be checked for leaks before any asphalt binder is unloaded and again when the material is first heated. The asphalt binder lines and fittings must be adequate to provide proper circulation between the storage tanks and the plant. All pipes and fittings should be steam or oil-jacketed or otherwise insulated to prevent heat loss.

2. **Cold Aggregate Feeder.** The cold aggregate feeder used with a portable plant is generally equipped with four bins, adjustable gates, reciprocating feeders and an endless belt to carry the proportioned aggregate to the dryer elevator. A commercial

plant is generally equipped with separate bins, adjustable gates and a tunnel and conveyor system. In either system, the gates must be adjusted so that the aggregates, in the proper amount and size, are delivered to the plant to maintain uniform production.

3. **Dryer.** From the cold feeder, the aggregate is elevated to the dryer where it is dried and heated to the required temperature. The component parts of the dryer are: (1) a revolving cylinder, usually from 3 to 10 feet (1 to 3 meters) in diameter, and from (20 to 40 feet (6 to 12 meters) long; (2) a burner, which is either gas or oil fired; and (3) a fan, which may be considered part of the dust collector system, but its primary function is to provide the draft air for combustion in the cylinder. The cylinder is equipped with longitudinal cups or channels, called lifting flights, which lift the aggregate and drop it in veils through the burner flame and hot gases. The slope of the cylinder, its speed of rotation, diameter, length, and the number of flights, control the length of time required for the aggregate to pass through the dryer.

   The aggregate passes from the dryer to the hot elevator through a discharge chute near the burner end of the dryer. The sensing element of a thermometric instrument should be located in this discharge chute to record or indicate the temperature of the aggregate as it passes from the dryer.

   Dryers must heat the aggregate uniformly. To prevent coating the aggregate with fuel oil, the burners and draft must be adequate for total combustion of the fuel. Because of possible damage to the asphalt binder, the heating system should be checked to ensure that overheating of the aggregates is avoided.

4. **Dust Collector.** All plants are required to be equipped with dust collectors. This is necessary to reduce air pollution and to return dust to the hot elevator when needed to meet aggregate grading requirements.

   In operation, a fan exhausts the draft air from the upper end of the dryer into the dust collector system. This draft air, containing dust particles, vapor, and gases enters the dust collector at the upper periphery and goes upward. The heavier dust particles are separated by centrifugal force into the collector shell and fall to the bottom. The heavier dust will be reintroduced into the flow of aggregate or wasted as required by the specifications or grading requirements.

   To comply with established air pollution limitations, the use of a scrubber or other suitable device to practically eliminate dust particles from the exhaust air of hot mix asphalt plants is sometimes required. The Contractor is to comply with all Federal, State, and local laws and ordinances. The more stringent rules normally apply.

5. **Hot Elevators.** Hot elevators must be protected so as to prevent chilling of the aggregate or the blowing away of fines.

6. **Screening Unit.** The heated aggregates are elevated, usually by a bucket elevator, to a screening unit, which separates the aggregate into the required number of size fractions and deposits the various sizes into the graded aggregate bins. The screening unit on most plants is the flat table vibrating type, usually equipped with four decks. The size of the screens on the decks varies with the type of hot mix

asphalt to be produced. The top deck is covered with a scalping screen which removes all oversize material and discharges this material into a reject chute.

Screens should be examined and a record made of their dimensions, length, size, and rotation or vibrating speed. They should not clog nor overflow during normal operations. Holes or breaks in a screen should be repaired promptly.

7. **Hot Aggregate Bins.** These bins hold the heated and screened aggregates in various size fractions required for the type of mixture being produced. The bottom of each bin is fitted with a discharge gate which can be operated manually or automatically. Each bin must be equipped with an adequate overflow pipe.

   Inspection of the bins should include an examination of the partitions to see that they are tight, free of holes, and of sufficient height to prevent the intermingling of aggregate sizes. The closure of discharge gates must be positive enough to prevent leakage into the weigh box. Other leakage from bins and the accumulation of aggregates in the corners or elsewhere is to be avoided.

8. **Scales (Batch Plants).** On batch plants, a weigh hopper for the aggregates is located directly under the graded aggregate bins. The weigh hopper is suspended on the weighing mechanism, generally equipped with a springless dial scale on which the weight of aggregate from each bin is marked accumulatively so that the last mark will read the total amount of aggregate in each batch. The hopper must be large enough to hold the batch of dry aggregate without overflowing or reaching the bin gates.

   The asphalt binder can be weighed in a special bucket or can be measured by a meter for each batch.

   The scales are required to be inspected and sealed. When the plant is ready to operate, the scales should be cleaned and each part carefully checked. It is imperative that the asphalt binder scale and the aggregate scale be checked daily. The indicating heads must be functioning properly, that is, balanced with the dial at zero. The scale levers and knife edges must move freely. If the weigh hopper is rubbing against some part of the plant or is being supported by one of the structural members, the indicated weight of the material in that hopper will be incorrect.

9. **Graded Aggregate Bin Control Gates (continuous plants).** Up to the point of discharge from the graded aggregate bins, the function of the continuous mix plant and the batch plant are essentially the same. In continuous mixing plants, the proportioning of the separate sizes of aggregate is accomplished through the adjustable gates on the feeder of the gradation unit, which deposits the aggregates onto the elevator to be delivered to the pugmill. The asphalt binder is delivered to the pugmill through a calibrated metering pump. The aggregate feeder and the asphalt binder pump are required to have interlocking circuits to ensure that proportions of aggregate and the asphalt binder remain constant, regardless of variations in the rate of production. Before production begins, calibration of the flow of aggregates from each feeder gate must be made.

10. **Pugmill Mixer.** After proportioning, the aggregate and the asphalt binder are introduced into the pugmill for mixing. The asphalt plant is equipped with a pugmill

mixer, which consists of twin shafts equipped with paddles for mixing the ingredients into a homogeneous mass. Efficient mixing is dependent upon the number and shape of the paddle tips, speed of the mixing shafts, length of mixing time, temperature of the materials, quantity of materials in the mixer, and the clearance between the paddle tips and the liner plates. The mixers of batch mix plants and continuous plants are essentially of the same design, except for the variation in arranging the paddle tips.

In the batch plant mixer, the materials are dumped into the center of the mixer and paddle tips are arranged to give an end-to-center mixing or a run-around (figure eight) mixing pattern. The material is held in the mixer for the required mixing time and then discharged through the discharge gate into the transporting vehicles or storage hopper. The mixer must be equipped with an automatic timing device to automatically regulate the dry-mixing and wet-mixing periods, and a batch counter to accurately record the number of batches produced.

In a continuous mix pugmill, the materials are introduced in one end of the mixer and the paddle tips are set to transport the materials to the discharge end as the mixing is accomplished. The mixing pressure varies with the height or weight of material in the pugmill, which can be controlled by: (1) raising the dam on the discharge end of the mixer to hold the material in the mixing unit for a longer period of time at a depth that will intensify the mixing action; and (2) adjusting or reversing the pitch of the paddles to retard movement of material through the pugmill.

Linings, sides, bottoms, and gates of the mixer should be inspected to see that there are no leaks. Paddle tips and/or liner plates must be replaced or adjusted when they show excessive wear or when clearance exceeds the specified amount.

b. **Dryer Drum Mixers**

In dryer drum mixers, the aggregate is coated with the asphalt binder by spraying asphalt binder into the veil of aggregate during the drying and heating process as opposed to the mechanical mixing of a pugmill in the batch plant. The most important components of the dryer drum plants and some of the factors to be considered during the inspection are discussed below.

1. **Cold Aggregate Feeder.** The cold aggregate feeder is basically the same as that used with a batch type plant discussed above with the exception that the main belt feeding the dryer is equipped with a weigh bridge, which is used to monitor the amount of aggregate being fed into the plant at any given time. This weigh bridge is interconnected with the asphalt pump so that the appropriate amount of asphalt binder is added for the mix. Weights obtained from the weigh bridge include moisture in the aggregates, which must be taken into account to arrive at the dry weight of aggregate. Since dryer drum plants do not have screening units and hot aggregate bins, it is very important that the stockpiled aggregates be of the proper grading, are not segregated, and that the gate openings on the cold feeders are properly calibrated for the mix design.

2. **Dryer.** The dryer in this type plant not only heats and dries the aggregate, but is also the mixing chamber for the asphalt and aggregate. In a parallel flow plant, the aggregate enters the drum at the burner end and is lifted by the flights and veiled

through, and in front of the flame, thus protecting the asphalt binder from direct flame contact. Newer dryer drum plants are equipped with a flame shield to protect the asphalt binder from the flame, but even with these plants good veiling of the aggregate is also necessary. In a counter-flow drum mix plant, the aggregate enters the drum from the upper end and moves toward the burner, which is located at the lower end of the drum. The aggregate moves down the drum against the flow of the exhaust gases in a counter-flow direction. No asphalt binder is introduced into the aggregate within the main portion of the drum. The mixing of the binder material with the dried and heated aggregate is accomplished completely outside of the exhaust gas stream, either behind or underneath the burner. In some plants, the mixing unit is folded around the outside of the aggregate dryer drum portion of the plant. In order to ensure a good veil of aggregate, the plant must be operated within the capacity range recommended by the manufacturer. The asphalt binder is introduced into the middle one-third of the drum through a spray pipe.

3. **Dust Collector.** Dust collectors on a dryer drum plant are the same as for batch plants as discussed above.

4. **Storage Silo.** Since a dryer drum is a continuous operation, the asphalt mixture is transported from the drum by a hot elevator to a storage silo. The silo should be of sufficient size to allow continuous operation of the plant and should be insulated to prevent temperature drop in the mix during storage. Silos should be designed so that segregation of the mixture will be minimized during charging. This is accomplished by using a rotating chute, batcher, or ladder.

5. **Controls.** Modern plants are fully automated with control panels that can provide a variety of data pertaining to the plant operation. The inspector should become familiar with the data output available for the plant to be used.

10.4.1.2.1.3 Calibration of Plants

It is not intended that FLH personnel take the lead in the calibration of plants. Commercial plants approved by a State highway agency should not have to be recalibrated for FLH mixes provided documentation of their calibration and accuracy is available. For portable plants, calibration should be a part of the Contractor's QC Plan and subject to the review of the Project Engineer.

The scales (both aggregate and asphalt binder on batch plants, and the apron feeders and asphalt binder on continuous plants) should be calibrated before production is started. General information and/or suggestions for consideration by the Project Engineer are provided below.

a. **Batch Plants.** The specifications require that noncommercial (project) plant scales be inspected, tested, and sealed after relocation but not less than once per year. Commercial plant scales must be sealed in accordance with acceptable local/industry practice. However, portable plants may be used for a reasonable period of time prior to sealing, providing field testing indicates compliance with the accuracy specified.

   For batch plant scales, field testing may be performed as follows: Asphalt binder and aggregate hoppers should first be balanced with the dial or beam reading zero, making sure that all weighing equipment operates freely. Accuracy of the scales should then be

checked at various points within the anticipated operating range, using standard weights required to be furnished by the Contractor. Since it is not required that the Contractor have sufficient standard weights to reach full capacity of the aggregate hopper, the maximum number of weights available should first be placed in the hopper and the weigh beam balanced or the dial read. The weights should then be removed and aggregate dumped in the hopper to bring the beam back to balance or to give the same reading on the dial. The standard weights should again be placed in the hopper and a new balancing or reading obtained. The operation of adding weights, balancing, and replacing weights by an equivalent amount of aggregate is then repeated until the full capacity of the hopper is reached.

b. **Continuous Plants.** Continuous plants use a positive displacement asphalt pump. Discharge is measured through a meter similar in operation to the ordinary water meter. Rate of discharge is varied either by an adjustment on the pump or by changing the sprocket drive combination. The pump may be calibrated at different rates of discharge by taking initial and final meter readings for a measured length of time. This should be done with the specified grade of asphalt brought to the required temperature and after the pump has been run long enough to eliminate all air from the lines and for the pump to reach operating temperature.

   The asphalt meter may be checked from time to time by comparing the difference in meter readings with the known amounts of asphalt binder that have been run through the plant. These known amounts may be obtained from the weights of asphalt binder delivered to the job or by asphalt binder storage tank measurements using the appropriate calibration curves.

   Proportioning of aggregates in a continuous plant is by volume rather than by weight as in the batch plant. Calibration involves converting these volumes to weights. Discharge from the different bins is obtained by varying the rate of discharge by adjustments of a gate over an apron feeder. Continuous plants are normally equipped with gates for simultaneously diverting the discharge from its normal path to the pugmill to sampling cans - one can for each bin. The amount of aggregate discharged into each can for a given number of shaft revolutions and at various gate openings is weighed. From this data, calibration charts can be prepared that will show the proportionate rate of discharge for each particular type and grading of aggregate used in the calibration. The aggregate for calibration should be dried and screened in the same manner as will be used during construction. In other words, a “dry run” will be made with aggregate fed to the dryer, with dryer screens operated in the same manner as for actual plant-mix production. Calibration will normally start with the gate openings set at about 2 inches (50 millimeters) and then graduated to openings corresponding to the maximum capacity of the plant.

   To facilitate calibration, the Contractor should have available a copy of the manufacturer’s operating instructions, which will show the operating speed of the feeder and the asphalt pump delivery rate for the various sprocket sizes. The sprocket size for the asphalt pump must be checked, for the delivery rate required, by weighing the amount of material pumped into a container over a carefully timed interval.

c. **Dryer Drum Plant.** Calibration of a dryer drum plant consists of setting the cold feeder gates for each aggregate size and setting the asphalt pump for the proper asphalt binder content. The pump should be set for the desired percent asphalt binder based on the

rate of the aggregate feed as determined from the cold feed weigh bridge, remembering that the percent moisture in the aggregate must be deducted from the cold feed weight.

10.4.1.2.1.4 Inspection of Plant Operations

a. **General.** With today's fully automated hot plants, rarely is the plant found to be the cause for the construction of poor quality hot asphalt concrete pavement. The plant QC specialist should be familiar with the operation of the plant, and be able to monitor gate openings, scale settings, timer settings and temperature controls. Such things as screening units, bins, mixers and overflow vents should be checked to ensure they are functioning properly.

   End result specifications place the responsibility for quality control with the Contractor. The Project Engineer should be familiar with the Contractor's quality control plan and monitor the results for any indication of change that could affect the quality of the work being produced. It is important that FLH personnel and the Contractor cooperate fully in order to produce a high quality, acceptable paving material.

   During production, the QC specialist should make periodic checks of:

   - Cold feeder gates and overflow vents for any overflow of the graded aggregate bins;
   - Temperature of aggregates, bituminous material, and mixture;
   - Proper dryer operation;
   - Weighing and mixing operations; and
   - Mixture in trucks for uniformity in appearance.

   The Project Engineer should see that the haul tickets are properly made out and issued for each truckload of mixture delivered, and must see that the daily totals are promptly obtained, checked, entered on the daily report, and made a part of the permanent project records.

b. **Operation of Cold Feeders.** The first and most important aggregate proportioning is done at the cold feeders. To provide the proper flow of the right sizes of aggregates, the proper sizes of aggregate must be in the stockpiles and kept from segregating and intermixing, and the feeder gates must be kept adjusted and free from obstruction. Enough material must be maintained in all bins to provide a positive and uniform flow.

   Plant QC should include observation of the equipment feeding the plant from the stockpiles and of the uniformity of the material fed to the dryer unit. Segregated aggregates fed through the dryer will result in uneven drying and heating, which, in turn, will result in nonuniform screening and ultimately in a nonuniform mix.

   The specifications will normally require that the materials be separated into a minimum of two stockpiles. One pile will normally contain that fraction retained on a No. 4 (4.75 mm) sieve, and that the other fraction passes the No. 4 (4.75 mm) sieve. The cold feed bins must be constructed so that there is no intermingling of any sizes of material.

c. **Screens and Bins.** The size and relative amount of fine aggregate controls the voids in the mix, which in turn controls the proper proportion of asphalt in the mix. Every effort

should be made to hold the grading uniform. Segregation occurring in the fine-aggregate bin can be corrected by properly placed chutes and baffles.

The coarse aggregate bin should be inspected occasionally for a carryover of the fine material. Carryover can be corrected by installing a section of a larger-opening screen, reducing the rate at which the material passes over the screen, or changing the length, diameter, pitch, or speed of the screen. The presence of more than 5 percent of smaller sized material in any bin is an indication that excessive carryover is occurring and screens are either clogged or overloaded.

Sampling of aggregates prior to mixing with asphalt binder may most conveniently be made of the dried and screened aggregates in the different bins. Most plants, either of the batch or continuous types, are equipped with sampling trays that make sampling from each bin quite easy.

d. **Checking of Asphalt Content.** Probably the most common cause of failure in asphalt paving mixtures is the incorrect asphalt content. Incorrect asphalt content can be caused by inaccurate scales (asphalt and/or aggregate), variation in aggregate grading, absorptive qualities of aggregates used, or poor interpretation of preliminary test results. Attention must be paid to the lever systems of the scales on the mixing plant to be sure they are functioning properly.

e. **Mixing.** The method of charging the mixer, which gives a homogeneous mixture in the least possible time, is the desired method to adopt for the job. The most commonly used method of charging is by dropping the weighed batch into the mixer and thoroughly mixing dry for a period of a few seconds before adding the asphalt binder.

The mixer should produce a uniform distribution of asphalt binder throughout its length. The introduction of the asphalt binder by means of a spray bar over the entire length of the mixer aids in obtaining uniform distribution.

Temperature of the aggregate has a marked effect on the mixture. If the aggregate is too cold, a nonuniform distribution of asphalt binder through the mixture will result. If too hot, the aggregate will cause excessive hardening of the asphalt binder and will result in a too thin coating on the coarse aggregate with a corresponding excess of asphalt in the fine aggregate portion.

The requirements for limiting the temperature of the aggregates are in the specifications. The temperature can be measured most conveniently on the mixture immediately after discharge from the plant.

During the actual mixing process, the QC process should include frequent observation of the following:

- the operations from the mixing platform with notation of the care used by the operator in weighing each size of aggregate and the asphalt binder;
- the time interval for mixing the dry aggregate;
- whether or not the asphalt bucket is well drained; and
- the time of mixing the asphalt binder and aggregate.

The inspector should also note the action of the mixture in the mixer box to determine uniformity of mixing and the tendency toward segregation. The movement of the mixture is controlled by the position of the mixer blades. Variations in uniformity can usually be eliminated by changing the position of the blades. This must be done by trial. When the blades are satisfactorily set, they seldom need further attention.

Attention should also be given to the mixer-box to see (1) that the liners and blades are so set that all of the material will be incorporated into the mixture and that none lies in the bottom of the box to be dropped out eventually as an unmixed or partially mixed combination, and (2) that the discharge gate of the mixer box is neither unduly worn nor improperly seated. Its condition can usually be determined by observing the bottom of the box from the time the dry aggregate is introduced until the completed mixture is dropped. If a thin stream of dust and fine aggregate sifts from the gate during the dry-mix period, or a rich mixture of asphalt and fine aggregate seeps through during the wetmix period, this indicates that the gate does not fit tightly. If, as the gate opens to discharge the mixture, a stream of dry, uncoated aggregate appears first, there is indication that the gate lining is worn, or the mixer blades are not picking up the aggregate. In either case, the Contractor should take the necessary action to eliminate the problem. No useful purpose is served by accurately preparing and weighing the components of the mixture if they are not combined properly. A satisfactory mix is of uniform coating and appearance, free from segregated areas or heavy smoking. No more mixing should be employed than is necessary to completely and uniformly coat the coarse aggregate. The manufacturer's rated capacity should not be exceeded, nor should the minimum specified mixing time be underrun.

Mixers should be cleaned daily with hot dry aggregate and with hand tools if necessary. The cleaning should not be so thorough, however, as to polish the mixer sides. This may occur with the hot dry aggregate cleaning. Cleaning with oil should not be permitted.

Where continuous mixers with volumetric proportioning devices are used, the QC process should include a check of the accuracy of the proportioning devices and require any necessary adjustments before production of the mixture is begun. The Contractor should have available descriptive literature and instructions published by the plant manufacturer for the particular plant being used in order to facilitate the checking of adjustments of the equipment.

During the operation of drum mixer plants, the inspector should review and observe operating data of the control panel and should inspect the stockpiles and cold feed for segregation and quality. Aggregate, mixture and asphalt binder temperatures should be checked periodically. Any deficiencies found should be pointed out to the Contractor and corrective measures taken.

10.4.1.2.2 Road Operations

10.4.1.2.2.1 General

It is the responsibility of the Project Engineer or the paving inspector to verify that the paving operations are performed in accordance with the contract. They must be thoroughly familiar

with the plans and specifications, the Contractor's plan of operations, necessary traffic control procedures, and construction equipment to be used.

Prior to paving operations, the paving inspector should thoroughly check the surface on which the pavement is to be placed. The surface should be checked for correct grade and template and all damaged areas, depressions or potholes repaired to give a firm and unyielding paving base. If the surface is a base or subgrade, a prime coat is often required. If so, it must be thoroughly cured. When an existing pavement is to be resurfaced, the surface must be cleaned of dirt and other extraneous matter and all weak areas repaired. If a leveling course is to be applied, the existing surface should be checked and the roughest areas marked to receive that course. A tack coat, when required, should be applied to paved surfaces. The tack coat should be applied to the width and length required for not more than the day's operation.

For prime and tack coats Contractor QC personnel should document that equipment including meters is in proper repair and the coverage rates are properly calculated and applied. For more detailed guidance refer to the FLH *Guidelines for Using Prime and Tack Coats*. (http://www.cflhd.gov/techDevelopment/completed_projects/pavement/prime-tack/)

The pavement edges should be marked by stringline or paving guideline sufficiently in advance to ensure continuity in the paving. These should be set and nailed to the surface at intervals that will permit the line to be held taut, and checked to be sure that the required pavement width is secured. When necessary, an electronic sensor line is set rigidly supported to the required grade.

10.4.1.2.2.2 Inspection of Paving Equipment

The paving inspector should make an inspection of the Contractor's paving equipment, checking the condition and adjustment of the component parts of the laydown machine and rollers. This equipment should have already been subject to the Contractor's QC process. Therefore, if deficiencies are noted, the Contractor should be advised to modify that process. By making this inspection prior to beginning paving operations, obvious deficiencies in the condition of the equipment may be discovered and corrected, thus avoiding delays once the work is underway and ensuring that the best possible surface is obtained.

Listed below are some of the more important details the inspector should check during the inspection of the paving equipment.

a. **Paving Machines.** The inspector should become familiar with the mechanical features of the paver to be used on the project, so that an intelligent appraisal of the condition and adjustment of the machine may be made. Operating details and instructions for adjustments are contained in the manufacturers' handbooks. These handbooks should be available to Contractor QC personnel as well as the Engineer and inspectors. The Contractor QC person should check the general features listed below before starting paving operations:

   - On all paving machines the operating motor should be checked for proper governor operation and vibration at operating speeds.
   - On track mounted machines, track linkage must be correctly adjusted and checked for excessive wear.

- On pneumatic-tired machines, all tires should be inflated to the recommended pressures, and the drive chains checked for correct adjustment and for excessive wear.
- The screed should be free from excessive play, and have the correct adjustment for crown and tilt.
- Screed plates should be checked for excessive wear, and the screed heating burner for operating efficiency. Screed extensions must be in the same true plane and flush with the screed bottom. Vibrators on the vibrating screed should be checked for proper operation.
- Automatic grade or thickness control should be checked for proper operation with ski or other device(s) as required.

b. **Rollers.** Check steel-wheel rollers to see that

- the wheels are capable of rolling in a true plane and are free from flat spots or ridges;
- the steering and driving mechanism are free of excessive play or backlash; and the
- motor and driving transmission free of oil leaks.

The rollers must have scrapers for keeping the rollers clean and wetting pads to keep the rollers wet so they do not pick up the newly placed mat during the rolling operation. Water and a wetting agent should be used, not a petroleum based product.

With the widespread use of vibratory rollers for compaction of asphalt mixtures, the laydown inspector should become familiar with their operation. A variety of information is available covering the use of vibratory rollers and the effects of vibratory compaction variables such as frequency, amplitude, mixture, and construction parameters such as gradation, aggregate characteristics, type and amount of asphalt binder, environmental conditions, lift thickness and type of base. The inspector should become familiar with the rollers to be used and the adjustments that can be made to control frequency and amplitude. The adjustment of these two variables can have a marked effect on the compaction of the mixture. Roller operators have a tendency to “set it and forget it,” so the QC process should require frequent verification that settings are correct.

10.4.1.2.2.3 Spreading and Finishing

The specifications require the use of a paver for spreading and finishing the mixture. In irregular areas the mixture may be spread and finished by other suitable tools or equipment.

The paving inspector’s routine duties are to collect load tickets from the Contractor’s laydown foreman, and to verify that they are complete and that depths and spread distances are being controlled effectively. At the end of the day, the inspector must sign a daily weight record attesting to the acceptance of the total weight. The inspector’s principal duty is to ensure construction of a pavement to the correct grade and template as set forth in the plans, and with a surface texture and riding surface as required by the Contract.

To achieve these results, the inspector must monitor the Contractor’s QC process and periodically check the surface to be paved, the mixture in the trucks, surface texture behind the machine, rolling operations, and paved surface with a straight-edge or string line for the proper crown and smoothness.

When ready to start paving operations, the screed should be heated to the proper temperature and the grade controls set to construct the transverse joint. This must be carefully checked to ensure good riding qualities and conformity with the tolerance requirements before the paver is allowed to proceed. Particular care should be exercised in setting the thickness control device to assure attainment of the spread and crown desired. When matching the edge of a previously laid section of pavement, the paver screed should overlap the existing edge from 1 to 2 inches (25 to 50 millimeters) and the thickness controls should be adjusted to leave the material slightly higher (as a rule of thumb, the mixture will compact ¼ inch per 1 inch of loose mix) than the previously laid section of pavement. Overlapping this edge will force enough material into this area to ensure that the joint is completely filled and moisture proof. The height of the material above the previously laid edge should adjusted so that when the longitudinal joint is properly compacted, the pavement will be uniform in cross section and within the tolerances specified.

The use of any hauling unit with a frame that comes into contact with the paving machine or which bears down on the machine while dumping, should not be permitted. The result either or both of these conditions will be a rough surface.

As the paving proceeds, the grade or thickness control devices must be adjusted to give the spread as required by the plans. As continuity of operations is essential to secure a good pavement surface, the speed of the paver should be regulated to avoid stopping and starting.

By observing the surface texture behind the machine, and checking the surface with a straightedge, a malfunction in the paver or segregation of mixture may be detected. The inspector should insist on prompt action to locate and correct any trouble that occurs. Some of the most common difficulties encountered are listed below, along with the possible cause:

- **Wavy Surface (short choppy waves)**
    - Worn or poorly adjusted tracks or drive chains;
    - Truck driver setting brakes too tightly;
    - Excessive paving machine speed.
- **Wavy Surface (long waves)**
    - Excessive variation in the amount of mix carried in the auger box;
    - Rolling too early;
    - Roller operating too fast;
    - Over controlling the screed.
- **Excessively Open Surface Texture:**
    - Improper adjustment of the tamper bar;
    - Improper speed of tamper bar;
    - Screed plate rough or galled;
    - Excessive machine speed.
- **Varying Surface Texture:**
    - Insufficient mixing;
    - Over mixing;
    - Overheating of the mixture;

- Dry mixing period too long;
- Segregation of mix in trucks;
- Worn or damaged screed plate.

- **Bleeding Patches on Surface:**

  - Asphalt binder not uniformly mixed;
  - Excessive moisture in mix;
  - Excessive prime or tack coat.

- **Irregular Rough Spots in Pavement:**

  - Roller standing on fresh surface;
  - Abrupt reversing of roller;
  - Trucks backing into machine;
  - Poor workmanship on transverse joints.

All pavers are required to be equipped with automatically controlled screeds. Automatic control of transverse slope as well as proper elevation must be maintained to obtain the required surface. When this unit malfunctions, it tends to compound its errors; therefore, the paver must be stopped immediately, the pavement corrected, and the malfunction located and corrected before preceding with the operations. Essentially, the automatic grade control unit divorces the screed from the upward and downward movement of the floating arms that attach the screed to the machine, and transfers this control to the unit equipped with a sensor element that travels on a rigidly set or traveling guideline.

When the pavement is constructed in more than one course, the longitudinal joint should be offset from each preceding course with the surface course joint being in the center of the pavement. The screed should overlap the previously laid lane from 1 to 2 inches (25 to 50 millimeters) to ensure that enough material is available to completely fill the joint.

10.4.1.2.2.4 Compaction

The Contractor is required to furnish the rollers and establish the rolling pattern required to arrive at the density necessary to meet the specifications. The compactive effort should be completed at the highest temperature possible within the mix design limits. The relationship between rolling and temperature must be maintained consistently in order to get consistent compaction results. It is recommended that the breakdown rolling be completed at temperatures above 200 °F (95 °C) and that pneumatic rollers be included in the compaction process.

10.4.1.2.2.5 Smoothness/Roughness

Most paving or overlay projects include a smoothness/roughness specification with incentives and disincentives. Refer to the contract for test methods and data compilation guidelines.

Bumps or rejected areas must be corrected before the final pay factor is determined. Any corrective action proposed by the Contractor is subject to the Government's approval. Often grinding or grinding with an emulsion flush is not an acceptable correction because the

appearance and physical characteristics of the surface are even less desirable than the rough payment.

10.4.1.3 Measurement

Payment is normally made on a tonnage (metric tonnage) basis for all material delivered, incorporated in the work and accepted. The appropriate specification should be reviewed concerning the testing and inspection of the scales. It should be understood that payment is to be made for the weight of the complete mixture with no deductions for any required additives, and the measurements should be made on this basis. See Section 9.4.4 for details of weight measurement.

Asphalt binder, when paid for separately, may be measured in one of two ways. One method of measurement is made using the suppliers' weigh tickets, with any asphalt binder not utilized (waste or returned) being deducted from the total; the second method uses the asphalt content test results.

10.4.1.4 Documentation

The requirements for documentation fall into two categories: quality and quantity.

10.4.1.4.1 Documenting Quality

The quality of asphalt binder will be documented using the certificate of compliance that accompanies each shipment and the test results of the samples taken at the hot plant.

The quality of the mix is documented with the volumetric, gradation and asphalt content test results and the verification tests performed in a separate laboratory. All tests should be noted on control charts or other production records so that when results are available there is a clear visual representation as to when problems occurred and where the material is on the project.

10.4.1.4.2 Documenting Quantity

Quantity documentation for the asphalt binder consists of the suppliers weigh tickets or quantity computations based on asphalt content test results.

The weigh tickets for the loads of mixture with the signature of both the weigh person and the spread person will serve as documentation of quantities involved in the project. These tickets should show the project number, the item number, the date delivered, and the truck number. A record of the empty truck weights is also necessary. Two weighings per shift of the empty trucks is required - at least one with the fuel tank full or nearly so. An adding machine tape or computer printout, indicating the item number, date, and project, will serve as documentation for each day's production. It should also indicate the persons who computed and checked the quantity.

A copy of the QL-Pay printout should be included in the project documents for each estimate and for final payment.

For final payment, a copy of the smoothness data summary and computation worksheet is necessary. Paving quantities to which smoothness pay adjustments are made are determined in accordance with the Contract.

When estimates are paid, quantities should not include tonnage (metric tonnage) for which Contractor test results are delinquent.

10.4.1.5 References

The following are suggested source and/or reference materials for Project Engineers and inspectors on Hot Asphalt paving projects.

- **National Asphalt Pavement Association (NAPA)**
  - *TAS-15 Rolling and Compaction of Asphalt Pavement*
- **AASHTO, FAA, FHWA, NAPA, USACE, APWA, and NACE**
  - *Hot-Mix Asphalt Paving Handbook*
- **Asphalt Institute**
  - *MS-4 Asphalt Handbook*
  - *MS-6 Asphalt Pocketbook of Useful Information*
  - *ES-9 Factors Affecting Compaction*
- **Federal Highway Administration**
  - *ED-88-028 Hot Mix Bituminous Paving Manual*
- **Center for Transportation Research, Bureau of Engineering Research, the University of Texas at Austin**
  - *Compaction of Asphalt Mixtures and the Use of Vibratory Rollers*

10.4.2 OPEN-GRADED ASPHALT FRICTION COURSE

10.4.2.1 Preliminary Review and Approval

See Section 10.4.1.1.

10.4.2.2 Construction Inspection

The guidelines given in Section 10.4.1.2. should be followed in the inspection of the plant and laydown equipment. Because of the characteristics of the mix, some points will merit special emphasis.

Normally the depth of the course will be only slightly thicker than the size of the largest aggregate, so the elimination of all over size aggregate is a must. The nature of the mix makes repair work behind the screed almost impossible, so it is imperative that control of the mixing and laydown operations is such that problems are corrected before the mix reaches the screed.

Necessary consolidation will be normally attained with one pass of a nonvibrating steel roller. Care must be exercised to avoid over rolling of the mix. Traffic, especially hauling units, must be kept off the newly placed mat until it has completely hardened or shoving and/or rutting will occur.

The temperature constraints given in the specifications should be strictly observed. Experience has shown that the quality of the completed mat is directly related to the weather conditions at laydown; the warmer the better.

10.4.2.3 Measurement

See Section 10.4.1.3.

10.4.2.4 Documentation

See Section 10.4.1.4.

10.4.3 OPEN-GRADED EMULSIFIED ASPHALT PAVEMENT (OGEAP)

10.4.3.1 Preliminary Review and Approval

10.4.3.1.1 General

The Project Engineer may obtain from the Federal Lands Division an excellent reference publication entitled, *A Basic Asphalt Emulsion Manual*, coded FHWA-IP-79-1 (Two volumes). Volume 1, entitled *Understanding and Using Emulsions* should be of particular interest to project personnel. Volume 2, *Mix Design Methods* may also be of value.

Many of the practices used for hot asphalt concrete pavement are also applicable to open-graded emulsified asphalt cold mixes. Only significant differences will be discussed in this section. The reader should therefore consult Section 10.4.1 in conjunction with this section.

The major difference is that an open-graded emulsion cold mix has few fines and requires no heat for mixing and placing. Mixture handling characteristics of hot mixes are controlled by the temperature of the material. The thickness of the emulsified asphalt coating controls these

characteristics in the cold mix. As the emulsion *breaks*, the mixture viscosity increases rapidly, thereby making these mixes less forgiving than hot mixes during construction. They do, however, produce a very flexible pavement when properly placed.

Both aggregate gradation and moisture content can affect the behavior of the emulsion as it is mixed into the aggregate. These will also affect the behavior of the mixed material as it is transported to the grade and placed through the paving machine.

Emulsified asphalt is composed of finely sheared microscopic sized particles of asphalt binder suspended in a solution of water, emulsifying agent, and oil distillate. Emulsified asphalt specifications place a minimum limit on the percent of asphalt binder residue; a minimum and maximum limit on the percent of oil distillate and the penetration of the asphalt binder residue; and a minimum limit on the ductility of the asphalt binder residue. Other values are also specified for particle charge, coating ability, and water resistance. All of these characteristics of the emulsified asphalt affect the behavior of the emulsion during the handling, mixing and laydown operations when producing an open-graded emulsified asphalt pavement. The effects of these emulsified asphalt properties are not all the same.

The stability of the emulsified asphalt prior to incorporation into the aggregate will be determined primarily by the type and amount of emulsifying agent. The stability referred to is the ability of the emulsified material to remain an emulsion. In other words, the emulsion's resistance to the coagulation of the asphalt particles to form the residual asphalt binder. This coagulation is generally called "breaking". Primary factors influencing the behavior of the mixed emulsified asphalt and aggregate are:

- The type and amount of emulsifying agent;
- The amount of moisture in the aggregate;
- The gradation of the aggregate and,
- The amount of manipulation the mixture is subjected to between introduction of the emulsion and placement through the paver.

These factors, along with the influence of the other emulsified asphalt properties, will generally be reflected in the performance of the completed pavement.

Controlling the moisture in the aggregates is an area of critical concern. Excellent results have been obtained when dryers were used to dry wet aggregates. However, for economic reasons, drying is usually not specified. A uniform, low aggregate moisture content is necessary to use the specified amount of emulsified asphalt in the mix. As in all asphalt mixes, it is important to have a positive interlock between the aggregate and asphalt feed systems.

The adherence to aggregate gradation specifications is also extremely important, more so than for standard hot mixed asphaltic concrete. A fractional percent more than the specified amount of minus No. 200 (75 µm) material can greatly increase mixture viscosities in the mixing chamber and/or paver. These increased mixture viscosities are sufficient to cause operational difficulties that result in rough riding pavements. Because its viscosity changes with temperature, it is advisable to maintain uniform emulsified asphalt temperatures. A 18 °F (10°C) change in emulsified asphalt temperature will produce a noticeable viscosity change. Higher emulsified asphalt viscosities will allow the aggregate to hold more asphalt. The temperature of

the aggregate should also be kept uniform and compatible with the asphalt temperature. Changes in either temperature will affect uniformity of the pavement.

10.4.3.1.2 Source Approval

The requirement for a very clean, surface dry aggregate at the time of mixing with emulsified asphalt should be kept in mind when reviewing Contractor proposed material sources. This requirement should be particularly stressed when writing source approval letters to the Contractor. This is especially so if the proposed source will require special handling to produce aggregates that are both clean and surface dry. Refer to more detailed discussion of source approval in Section 11.2.

10.4.3.1.3 Mix Design

The mix design is a process to determine how much emulsion the proposed aggregate can hold and to determine the compatibility of aggregate and emulsion (electrostatic charge). Visual observations are made on the mixing characteristics in the laboratory. These tests generally are simple processes. There should be no delay in furnishing materials to the FLH laboratory that is doing, or reviewing, the design. Emulsions may react negatively to certain aggregates due to their chemical composition; therefore, the aggregate or the emulsion may need changing. Maximum possible time for adjustments should be provided by early submission of materials for mix design or mix design review.

10.4.3.1.4 Pre-Operations Conference

The Project Engineer should confer with the Contractor prior to laydown operations. In addition to the usual topics of a prepaving conference, there is need to ensure adequate sand or other suitable blotter material is available, as well as proper application equipment. This is necessary both to apply material to the surface of the newly placed mix, as is usually specified; and to quickly cover any problem area to facilitate traffic and/or environmental protection. The potential traffic need would include any roads used to haul from the plant to the project, because leakage from the haul vehicles can be expected to occur.

10.4.3.2 Construction Inspection

10.4.3.2.1 General

It is desirable to have a materials specialist available from the Division to assist the Project Engineer during the initial paving start-up, through field testing of the design.

The Project Engineer should plan for at least as large an inspection force as for a hot mix operation, and to spend much personal time at inspection. This is due to the sensitivity of the material to minor changes in mix composition and in changes in the weather. It also relates to the extreme difficulty that might occur as a result of such sensitivity.

10.4.3.2.2 Plant Operations

The comparatively simple plant usually used for OGEAP is one of its strong points. The inspector needs to be concerned mainly with feed operations to the pugmill. These include the usual concerns for any uncontrolled mixing of separate piles of aggregate through stockpile overlap or misfeeding of separate cold feed bins. Aggregate moisture content also needs to be watched closely. Small changes in aggregate gradation or moisture content can be very critical with these mixes. For example, when working from a stockpile having wet and dry areas, a careless loader operator can vary the moisture content of the aggregate entering the pugmill. The non-uniform moisture content will vary the asphalt content of the mix because it is controlled by the aggregate belt scale feeding the pugmill. An increase in aggregate moisture content over that established during plant calibration will increase the percent of emulsified asphalt to the aggregate. The more free moisture, the less emulsion the mix will hold. Too much water on the aggregate will therefore mean excessive dripping from the trucks and less asphalt for binder in the mix.

If the loader operator were to load aggregate with too many fines, a different problem might result. With finer aggregate in the mix, the emulsion might break too early. If it breaks in the pugmill, the Contractor might be delayed while cleaning up the mess. If it breaks in the paver or prior to raking, some very rough pavement might be laid because of the severe handling problems.

The point of introduction of emulsion into the pugmill is important. This is one adjustment to be considered when the emulsion is breaking either too early or too late, or if the aggregates are not being properly coated.

10.4.3.2.3 Roadway Operations

Vertical joints at connections to existing pavement must be square cut since the comparatively coarse aggregate will not accommodate “feathering”. It is, however, sometimes possible to make special mixes using 3/8 or 1/4 inch (9.5 mm or 6.3 millimeter) minus dense graded aggregates for preleveling or for making approaches where feathering is necessary. These mixes will probably require a different type emulsion than that used for the mainline paving. Otherwise, these preleveling and feathering operations might best be done with a dense graded hot mix if it is available. In either case, a contract modification should be considered unless this was covered in the specifications.

Ideally, the OGEAP should begin to change from a brownish color to black, within about 100 feet (30 meters) of the paver. The rate at which OGEAP changes color is highly dependent on the environmental conditions. If it is a very hot sunny day vs. a cooler partly cloudy day, the time for the emulsion to break will differ greatly. This color change signals the emulsion breaking. That is, the separation of the asphalt and the water. If this is not occurring in that distance, there are several adjustments which can be made. Probably the most important consideration is whether or not the emulsion will have broken sufficiently to withstand rainfall within four hours after placement. A check for this condition is pouring water from a gallon jug onto the completed pavement. One should look for the water to flow out from the pavement edge where it contacts the lower non-porous layer. When the water runs out, a paper towel is placed in it to determine if asphalt binder is being carried out of the pavement with the water. It is difficult to tell if the water contains asphalt binder because it may be discolored by the emulsifiers. After the paper towel has dried, it is possible to see any asphalt binder present. It

is not uncommon for some emulsion and/or emulsifier to discolor water for several days after laydown. Actions must then be taken to prevent damage to the environment, especially waterways.

If it is determined from the above test that the break is too slow, the mixing time should be increased slightly. The additional shearing action on the emulsified asphalt in the mix, as it is mixed more, will accelerate the break. This can be accomplished by:

- Introducing the emulsion into the pugmill nearer to the aggregate entrance, and/or
- Placing a dam at the output of the pugmill.

If the break is still too slow in occurring, the next step would normally be to change the emulsion formula slightly. The Project Engineer cannot make this change nor can the Contractor. For this reason it is advisable for the Contractor to have a representative from the emulsion supplier on the project until the operation is running smoothly. A final last resort adjustment is to add portland cement to the aggregate prior to the introduction of the emulsified asphalt. A very small amount, usually not more than 0.3 percent by weight of the dry aggregate, is normally sufficient to dehydrate the aggregate enough to permit continued operation. The portland cement is usually added to the aggregate feed belt by a screw auger feeding from a small hopper. The screw auger should be interlocked with the aggregate feed belt in the same manner as the asphalt supply pump.

It is okay if the emulsion turns black during the transport or laydown operation, provided it passes through the paver and can be laid without causing irregularities in the pavement surface. These irregularities usually will take the form of the mat tearing under or behind the paver screed. Occasionally, it may be difficult to maintain proper lift thickness because of the harshness of the mix. When these conditions occur, the emulsion is breaking too soon and mixing time should be reduced. This can also be done by introducing the emulsion more toward the output end of the pugmill. If the pugmill has a dam installed in the output, it should be removed. If these adjustments do not provide the necessary increase in break time, other places in the process should be considered where a reduction can be made in the physical manipulation of the mix prior to its passing under the paver screed. When all of these measures have been implemented and the emulsion is still breaking too early, a change in the emulsion formula will usually be required to correct the condition. Again, this change will require the assistance of the emulsion supplier's representative and will result in a loss of time.

Traffic can usually be accommodated immediately after the addition of the blotter or choker aggregates following the initial rolling. The pavement should soon develop enough stability to support even heavily laden logging trucks, provided the aggregate particles have the specified fracture percent. The load carrying capability of the pavement is determined by the interlock of aggregate particles, not by the type and/or amount of asphalt binder. The asphalt binder serves only to keep the aggregate particles in place in the pavement. The type and amount of asphalt binder determines how well and how long these particles will remain in place. The stability of the placed and compacted mix should continue to increase with time as the asphalt binder stiffens with age.

The pavement can be expected to remain much more flexible than a hot mix for a comparatively long time. Problems may occur with turning, stopping, and any other traffic pattern exerting extreme stress on the mat. For example, a truck with a locking brake might gouge the pavement seriously, several hours after placement. For this reason, traffic control should be

established which will minimize the occurrence of these stresses. Reshaping and compaction is sometimes possible while the mix is in this state. However, the results are never as good as prevention would have been. If portland cement has been added, the set will be quicker and harder and it will be more difficult to correct rough areas.

10.4.3.3 Measurement

OGEAP will be measured by the ton (metric ton) of total mix, with the emulsion and mineral filler [portland cement] also paid separately by the ton (metric ton). If emulsion is invoiced or metered by the gallon (liter) it is converted to tons (metric tons) at the rate of 240 gallons per ton (1000 liters per metric ton). Refer to Section 10.4.1.3 for additional measurement instruction.

10.4.3.4 Documentation

See above. Refer to Section 10.4.1.4 for documentation instructions.

10.4.4 DENSE-GRADED EMULSIFIED ASPHALT PAVEMENT

10.4.4.1 Preliminary Review and Approval

Dense-graded emulsified asphalt concrete is a mixture similar to hot asphalt concrete except that the bituminous material and additives, when required, are of such a nature that the mixture may be transported, stockpiled, and placed cold. The contract specifications designate the types of materials to be used in the mix. The special contract requirements will provide the combinations of materials, based on local conditions. There are some special kinds of dense-graded emulsified asphalt concrete that are patented and hence their use is subject to approval of the patent owner and to the payment of a royalty.

The controls expressed in Section 10.4.1.1 also apply to this section with the following additions and/or exceptions:

Mixing Temperature. Control of the temperature will be in accordance with the contract requirements.

10.4.4.2 Construction Inspection

See Section 10.4.1.2.

10.4.4.3 Measurement

See Section 10.4.1.3.

10.4.4.4 Documentation

See Section 10.4.1.4.

10.4.5 SINGLE OR MULTI-COURSE ASPHALT SURFACE TREATMENTS

10.4.5.1 Preliminary Review and Approval

For a chip seal or multi-layered treatment, if required by the Contract involved, a representative sample of this aggregate and asphalt should be sent to the Division laboratory for a mix design, to determine the application rate of asphalt and aggregate. This design should be reviewed to ensure that the application rates are sufficient to produce enough residual asphalt to provide proper embedment of the aggregate.

A good rule of thumb is that 40 percent of the most prevalent size aggregate will be embedded in the residual asphalt. It is important to remember when using emulsified asphalt, that it is normally shipped at a 70/30 ratio of asphalt to water, with the water being only a carrier that has no effect on the holding of the aggregate. A chip seal with insufficient asphalt applied has little or no chance of success.

The traffic control plan should be discussed thoroughly prior to the start of the work, since keeping the traffic off the newly worked area is important to both the success of the treatment and to public relations. An asphalt splattered car or a broken windshield is no laughing matter.

10.4.5.2 Construction Inspection

10.4.5.2.1 Distributor and Spreader Inspection

Prior to commencing operations, it is imperative that the distributor and aggregate spreader are inspected and calibrated, so that the material can be uniformly applied throughout the project. Areas of particular interest include the following:

a. Asphalt Distributor

    1. Spray Bar

        a) All nozzles same size and are free of clogs
        b) All nozzles at same angle - (15° to 30° - as recommended by manufacturer)
        c) Bar height is appropriate and constant regardless of load
        d) Spray pattern is uniform with the proper overlap (double or triple coverage)

    2. Bitumeter

        a) No build up on wheel
        b) Dial easily readable

    3. Pumps and Circulation System

a) Instantaneous shut off
b) Pressure variations with relative ease

b. Aggregate Spreader

1. Storage Bin

a) Truck hook functioning properly
b) Feeder belts operating

2. Spreader Box

a) Gates spreadable
b) Spreader wheel operable
c) Speedometer or tachometer functioning
d) Oversize or scalping screens in place and in good condition

10.4.5.2.2 Application Rates

When the Inspector/Project Engineer is satisfied that the equipment is functional, the calculations necessary to obtain the desired rate of application can be made. The variables in the application rates of asphalt from a distributer are: vehicle speed, spray bar width, and the pump discharge rate. Normally, the spray bar width is held constant throughout the passes. Often the alignment and grade of the roadway will limit the speed of the vehicle. For a typical prime coat application, the sequence could be as shown below.

a. Establish bar width: 36 foot (10.5 meter) roadway plus widening--use three passes at 12 feet = 4 yards (3.5 meters) each.

b. Establish practical vehicle speed: For this example, use 5 mph (8 kph). 5 mph/60 min/hr = 440 feet per minute = 145 yards per minute (8 kph/60 min per hour = 133 meters per minute).

c. Asphalt characteristics: A typical example desired application 0.35 gal/yd^2 (1.6 L/m^2) of CSS-1at 60°F (15°C). Asphalt as delivered = CSS-1 with specific gravity of 0.966 at a temperature of 175°F (80°C).

d. Correct asphalt for temperature: 0.35 ÷ 0.971 (factor from Asphalt Institute Pocketbook) = 0.36 gallons at 175°F (1.6 ÷ 0.971 = 1.65 liters at 80°C).

e. Calculate pump discharge rate required: (0.36 gal/yd^2) × (145 yd/min) x (4 yd^2/yd) = 209 gal/min [(1.65 L/m^2) × (133 m/min) x (3.5 m^2/m)] = 768 L/min]

f. Shoot test section: ~100 feet (30 m). Observe coverage and penetration, adjust rate if needed, note gallons (liters) used and distance covered. Complete distributer load.

g. Check applied rate: (___gal)÷(yd × 4 yd) = ___gal/yd^2

[(___L)÷(m × 3.5 m) = ___L/m^2]

If the existing roadway is paved, brooming will be required prior to the application of a tack or seal coat. The broom should be checked for uneven wear, and observed during operation to ensure that no ridges of dirt are left on the roadway. The brooming should start at the centerline and proceed toward the shoulder.

When the construction requires the spreading of aggregates over the freshly sprayed asphalt, the specifications will usually require a self-propelled, two-axle, pneumatic-tired spreader. The application rate is controlled by the speed of the spreader and the opening size of the gate controls. The chip spreader's calibration across the entire chipper head should be checked. Placing a container of known area (e.g. 1 yd^2 or m^2), and weighing the stone deposited will give the Project Engineer an indication of whether or not the spreader is properly calibrated. Adjustments to the speed and/or the control gates should be made until the desired tolerance is attained. When placing aggregates on the freshly applied asphalt, it is imperative that the spreader be as close to the asphalt distributor as possible. At no time should more than 1 minute elapse between the asphalt spray and the chip spread. The rolling should take place using rubber-tired rollers, treadless tires only, as close to the spreader as possible. All rolling must be completed before the asphalt has set. Over rolling or late rolling can break the bond between the stones and asphalt. If the application rate of asphalt and aggregate is rapid, more than one roller will be required.

The application of chips should be a single layer of stones, with small separation between stones. Avoid over-application of aggregate; this will result in none of the stones being correctly embedded. After the chips have been applied, brooming with light, even pressure may be required to remove the excess aggregate.

Application of a chip seal should never be attempted under adverse weather conditions. The stones should be as free of dust as possible. When using an asphalt binder, the aggregate surface should be dry. When using emulsified asphalt, the aggregate should be in a surface-damp condition. There are many factors that will affect the success or failure of a chip seal. Any combination of them can cause a less than satisfactory result. Things to look out for are:

- **Cool weather.** Placement of a chip seal when air temperatures are lower than the minimum specified or when subsequent nighttime temperatures are particularly cold (i.e. 40°F or 4°C) may lead to excessive chip loss and immediate failures.

- **Dirty aggregate.** Fine material that remains on the aggregate can create a "barrier" between the asphalt and aggregate that will not allow the aggregate to bond or adhere to the asphalt. The end result can be aggregate that pops out or dislodges.

- **Insufficient asphalt**. Chips are dislodged and/or chip embedment is less than 40%.

- **Excessive asphalt.** Bleeding, slick areas, loss of friction.

- **Excessive aggregate.** Poor embedment and improper orientation of the aggregate for the seal. This also adds more cost due to wasted aggregate that will need to be removed by brooming operations.

- **Over-diluted emulsion.** Same as insufficient asphalt.

- **Dust, dirt, moisture on roadway.** Bond between roadway and chip seal prevented.

- **Improper spray bar and nozzle geometrics or operations.** Streaking or drill marks present.

10.4.5.3 Measurement

If payment for asphalt is by the ton (metric ton), measurement can be made by weighing or by using weights from the suppliers weigh tickets. If payment is by the gallon (liter), measurement can be made either by converting the weight to gallons at 60°F (liters at 15°C) or by measuring the liquid in the tanks or hauling units and converting to gallons at 60°F (liters at 15°C). For emulsions no correction for temperature is required. The factor of 240 gallons per ton (1000 liters per metric ton) is always used. In any event, there must be a deduction for unused or wasted material.

Aggregates, if paid for by the cubic yard (cubic meter), are to be measured in the hauling units or by converting weights to cubic yard (cubic meters). If payment is by the ton (metric ton), material must be weighed in accordance with the procedures in Chapter 9.

10.4.5.4 Documentation

Documentation requirements are similar to those in Section 10.4.1.4. In addition, if aggregates are measured in hauling units, a system for documenting measurement and delivery must be devised to fit the circumstances involved.

During the course of the work, there should be periodic comparisons of the materials spread on the road vs. those invoiced for payment. If, due to the difficulty in controlling storage tank quantities, wasted materials, and those not used, the Project Engineer decides the weight-based invoices are unreliable, the use of daily spread computations/tabulations may be directed to be used for payment instead.

10.4.5.5 References

Useful reference materials for multi- or single-layer asphalt surface Course treatments.

- FHWA Pavement Presevation Check list series: 2 Pocket guide on Chip Seal application
  - **http://www.fhwa.dot.gov/Pavement/preservation/ppcl02.pdf**
- Asphalt Institute
  - *ES-ll Asphalt Surface Treatments*
  - *ES-12 Asphalt Surface Treatments Construction Techniques*
  - *MS-6 Asphalt Pocket Book of Useful Information*
  - *MS-19 A Basic Asphalt Emulsion Manual*

10.4.6 MINOR ASPHALT CONCRETE

This item is to provide materials from local or commercial sources where the use or quantity involved does not justify the use of more stringent and comprehensive FLH materials specified in Section 10.4.1.

10.4.6.1 Preliminary Review and Approval

The contract requirements define the required certifications and documentation to be submitted by the Contractor prior to the supplying of the mixture. These should be reviewed and approved if the proposed mix meets contract requirements. If the mixture is designed to meet a local agency specifications, contact should be made with the agency and the adequacy of the mix for the purposes intended verified. If serious doubts as to the quality of the product arise, an alternate submittal should be requested, or mix design and quality tests should be taken per Section 10.4.1.1.

10.4.6.2 Construction Inspection

See Section 10.4.1.2.

10.4.6.3 Measurement

Weigh tickets from the material producer can be used as measurement of the amount delivered.

10.4.6.4 Documentation

Copies of the producer's certifications for the asphalt binder and the mixture will serve to document the quality of the product. Signed weight tickets will document the quantity delivered.

10.5 CONCRETE AND STRUCTURES

10.5.1 PORTLAND CEMENT CONCRETE

10.5.1.1 Preliminary Review and Approval

10.5.1.1.1 Mix Design

Responsibility for concrete mix design is normally assigned to the Contractor. Documentation is submitted by the Contractor to FLH. The mix design data is approved, rejected or conditionally approved by the Project Engineer (if so delegated) or the COE, after concurrence of materials specialists. Normally, FLH will not do verification testing of the mix. However, if the FLH elects to do verification testing, the Contractor should be so advised and samples requested as early as possible. The procedure may be appropriate when the following occurs:

- The specified concrete is required to have unusually high strength or other characteristics for which the producer has no historic records or data.
- The concrete is composed of components from sources not previously used for structural concrete by FLH or another organization.
- The concrete contains an admixture or additive; e.g. high range water reducer or fly ash for which the producer has no experience or production data.

In any case, it is the FLH's prerogative whether or not to do mix design verification testing.

Approval is based on the quality and other specification requirements of the component materials; and whether the mix will comply with the strength, air and water/cement ratio requirements during production. Regardless of air, water and strength indicators under laboratory conditions, the Contractor remains obligated to comply with these specifications during production.

10.5.1.1.2 Batching Procedures

The Contractor is assigned responsibility for batch plant procedures. The Project Engineer may elect to perform occasional batch plant inspections prior to the start of production or at other times during production. The FLH will not normally perform full time plant inspection during every batching operation. The Contractor's/supplier's QC plan should address batch plant quality control.

Batch Plant Inspection Checklist:

- Storage, uniformity and identification of aggregates, cement and admixtures.
- Quality Control tests and their documentation.
- Facilities to weigh or otherwise measure components.
- Batch ticket documentation procedures.
- Facilities to measure, control and adjust for aggregate moisture.

- Facilities to heat or cool concrete during adverse weather operations.
- Facilities to mix and deliver concrete.
- Truck cleanout facilities and procedures.

10.5.1.1.3 Volumetric Batching

Volumetric batching, where aggregates, cement, water and admixtures are metered and mixed continuously is permitted by the specifications. Since volumetric batching eliminate most variability in batching and mixing time, it can result in more consistent mixes, especially when high range water reducers are used. Detailed requirements for volumetric batching are contained in AASHTO M 241. Some of the pertinent sections of AASHTO M 241 are reproduced here for information:

- **Control Devices.** If volume proportioning is employed, devices such as counters, calibrated gate openings, or flowmeters must be available for controlling and determining the quantities of the ingredients discharged. In operation, the entire measuring and dispensing mechanism must produce the specified proportions of each ingredient.

- **Manufacturer's Recommendations.** The recommendations of the equipment manufacturer in the operation of the equipment and in calibrating and using the various gauges, revolution counters, speed indicators, or other control devices should be followed.

- **Visibility and Access.** All indicating devices that bear on the accuracy of proportioning and mixing of concrete shall be in full view and near enough to be read by the operator while concrete is being produced. The operator shall have convenient access to all controls.

- **Checking.** The proportioning and indicating devices shall be individually checked by following the equipment manufacturer's recommendations as related to each individual concrete batching and mixing unit.

- **Accuracy.** Adequate standard volume measures, scales, and weights shall be made available for checking the accuracy of the proportioning mechanism. The device for the measurement of the added water shall be capable of delivering to the batch the required quantity within the accuracy of +1 percent; the device shall be so arranged that the measurements will not be affected by variable pressures in the water supply line.

- **Yield Check.** Essentially, the volume of concrete discharged from the mixer is checked by first weighing the amount of concrete discharged during some number of revolutions, or as determined by some other output indicator. This is followed immediately by a determination of the mass of concrete per cubic foot (cubic meter). The mass of concrete discharged divided by the mass per cubic foot (cubic meter) is equal to the number of cubic feet (cubic meters) mixed and discharged during the chosen interval. The accuracy of the output indicator is thus checked by this expedient.

- **Yield Sample.** It is recommended that about 2.5 to 3.0 cubic feet (0.07 to 0.09 cubic meters) be discharged for this purpose. This amount of concrete will weigh from 375 to 485 pounds (170 to 220 kilograms) and can be discharged into, and contained in a small steel drum or other suitable container, which in turn can be placed on a scale of adequate capacity. The output of a batcher-mixer unit may be indicated by the number of revolutions,

travel of a belt, or changes in gauge readings; if so, these figures should be used as a measure of output.

- **Proportioning Check.** Whenever the sources or characteristics of the ingredients are changed, or the characteristics of the mixture are noted to have changed, the Project Engineer may require a check of the fine aggregate content and the coarse aggregate content by use of the washout test. If the sources or ingredients change, this may constitute a new mix design according to the specifications. Essentially, in the washout test, 1 cubic foot (0.025 cubic meter) of concrete is washed through a No. 4 (4.75 mm) sieve and a No. 100 (150 µm sieve); that retained on the No. 4 (4.75 mm) sieve is normally considered coarse aggregate, and that passing the No. 4 (4.75 mm) and retained on the No. 100 (150 µm sieve) is considered fine aggregate. The mass of the retained aggregates should then be compared to theoretical masses computed from the mix design data. Significant differences suggest that the design mix is no longer being produced.

- **Water.** The rate of water supplied the continuous mixer shall be measured by a calibrated flowmeter coordinated with the cement and aggregate feeding mechanism, and with the mixer. The rate shall be capable of being adjusted in order to control slump at the desired levels and to determine that the maximum water/cement ratio is being met.

- **Admixtures.** Liquid admixtures shall be dispensed through a controlled flowmeter.

10.5.1.2 Construction Inspection

See Sections 10.5.2, 10.5.3, and 10.5.4 for procedures relative to falsework, forms, reinforcing steel and other incidentals.

During concrete placement inspection operations, the Project Engineer or inspector is normally concentrating on the placement at the structure, while the Contractor's QC personnel should assume responsibility for placement at the structure, completion of the batch ticket, quality control of discharge operations, and all required tests. During the first one or two placement operations, extra attention by the Project Engineer may be needed to ensure that the Contractor properly assumes this responsibility. The Contractor, however, should not be permitted to rely on FLH for quality control. After the first few placement operations, intermittent monitoring of concrete inspection should be sufficient.

Concrete Discharge Inspection Checklist:

- Completion and receipt of batch ticket.
- Control of additional water or admixtures.
- Control of time of mixing and discharge.
- Temperature, unit mass, and slump of mix.
- Control of air content.
- Quality assurance test results to document quality of mixture.

10.5.1.3 Measurement

Concrete is normally included in the contract item in which it is incorporated. When concrete is paid as structural concrete, it is complete and in place in the structure. Quantities are usually

determined by the theoretical dimensions of the structure and paid as a contract quantity or lump sum. The Project Engineer should have access to design computations, and should not have to recompute concrete quantities in the absence of evidence that they are in error.

10.5.1.4 Documentation

See *FLH Field Materials Manual* for guidelines for materials related documentation.

10.5.1.5 References

- *Design and Control of Concrete Mixtures,* Portland Cement Association.
- *ACI Manual of Concrete Inspection,* American Concrete Institute.
- *CRSI Manual of Standard Practice,* Concrete Reinforcing Steel Institute.

10.5.2 CONCRETE STRUCTURES

10.5.2.1 Preliminary Review and Approval

The following items normally require attention before concrete placement.

10.5.2.1.1 Contract Requirements

The Project Engineer and inspectors should have reviewed in detail all requirements of the contract. Any questions should be resolved with the COE, in consultation with the Bridge Engineer as may be necessary.

10.5.2.1.2 Submittals

The Contract will normally require a number of submittals for approval prior to the start of certain work activities. It is important that the Contractor and the Project Engineer communicate as to the schedule for these submittals, the estimated time it will take to review and approve them, and what the approval criteria will be. Sometimes these approvals go beyond the stated requirements in the Contract, and are required to be based on industry standards or even regulatory requirements.

At the same time, the Project Engineer and the COE must be in agreement on the issue of submittals, specifically which ones will be approved by the COE or Bridge Engineer and which ones the Project Engineer will approve.

The COE or Division policy may require the Project Engineer to review submittals for completeness prior to transmitting to the Division. The Project Engineer should keep the Contractor advised of the status of submittals. If the Project Engineer knows there are serious problems with a submittal, but the Bridge Engineer hasn't officially disapproved it yet, the Contractor should be told verbally so that plans and schedules can be adjusted.

10.5.2.1.3 Falsework and Forms

10.5.2.1.3.1 Falsework Design

The Contractor's submittal should include:

- All loads (such as finishing machine), location of loads, and loading assumptions (e.g. associated with rate of concrete placement for vertical members).
- Species and grade of lumber, all dimensions (span, width, thickness) of members and forms, allowable stresses used, calculated deflections, type, and size of bracing.
- Type, size and capacity of connections (bolts, hangers, spikes, nails, etc.).
- Manufacturer's recommendations or tests for manufactured assemblies.
- Bearing value of supporting materials, wind, and other external load assumptions.

If the drawings are not complete, they should be returned to the Contractor to be completed before forwarding to the Bridge Engineer. Unless the special contract requirements waive the standard requirement, the drawings must be prepared and sealed by a licensed registered Professional Engineer.

10.5.2.1.3.2 Contractor's Schedule and Equipment

The Contractor's intentions for scheduling, rate of placement, equipment to be used, curing material, etc., should be discussed in order to adequately plan inspection and testing and to be sure the Contractor has adequately planned the placement operation.

10.5.2.1.3.3 Foundation Bearing Capacity

The bearing capacity of foundation material is required to be determined by the Contractor and reflected in the design assumptions of the falsework. The determinations may be based on standard tables, or in cases of marginal material or disputed assumptions, the Project Engineer may insist on actual tests. Exhibit 10.5-A, Allowable Bearing on Sandy Soils; and Exhibit 10.5-B, Allowable Bearing on Clayey Soils, may be used by the Project Engineer to confirm the Contractor's assumptions.

Tests and assumptions must be based on a worst case condition, i.e. if the foundation may become saturated during construction, the design must be based on that condition. Alternatively, the Contractor should include a drainage plan in the falsework drawings submitted for approval. The plan must provide an effective means of draining the area around the falsework for the duration of its use.

When tests are required, they may be simple static load vs. settlement tests, or more in-depth tests as may be suggested by the Contractor, and agreed to by the Project Engineer. The Project Engineer should be confident that the test reflects the capacity of the foundation, and

not just a layer of good material overlaying poorer material. Steel scaffolding type falsework is particularly vulnerable to foundation problems because of its sensitivity to differential settlement/loading.

Exhibit 10.5-A Allowable Bearing on Sandy Soils

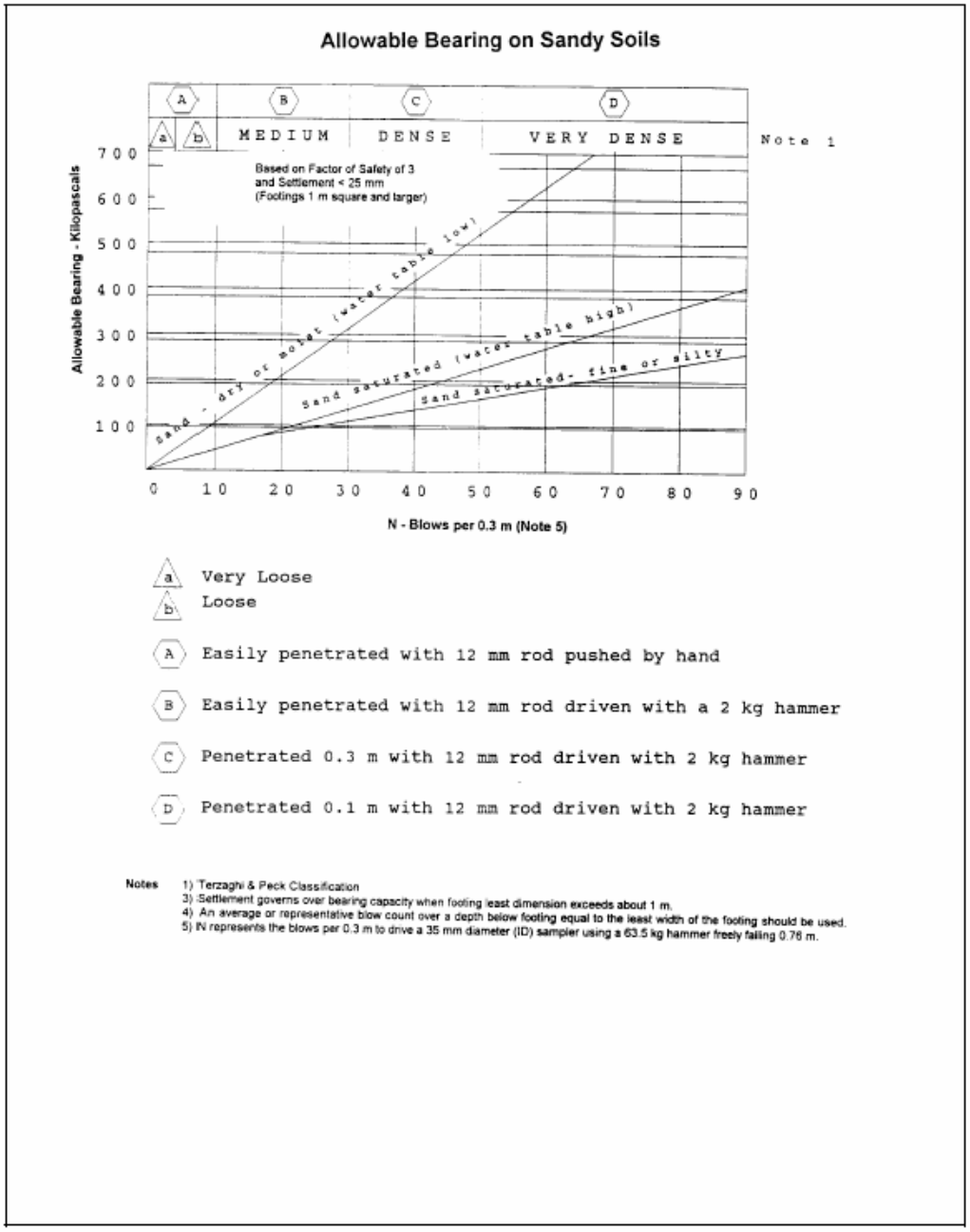
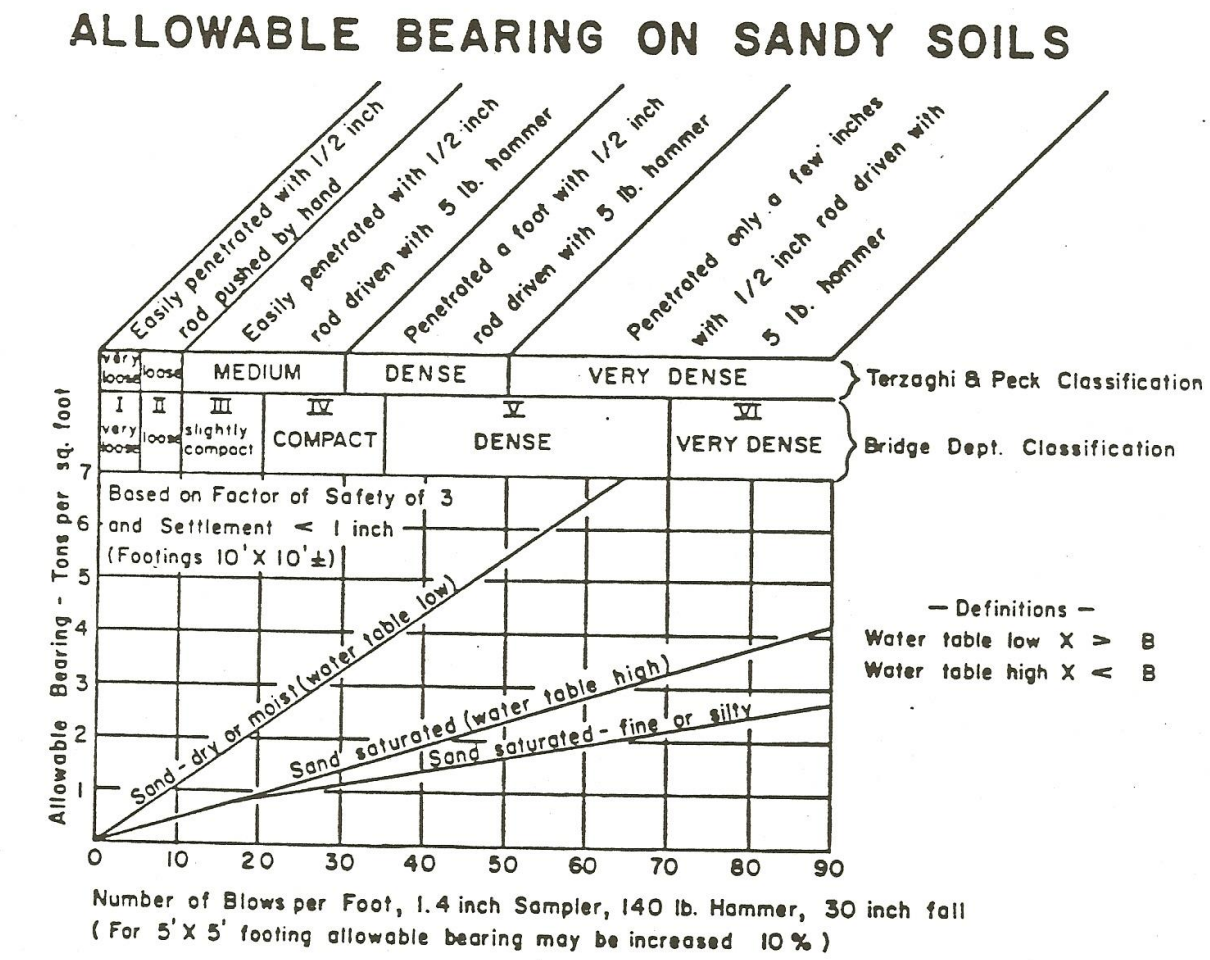
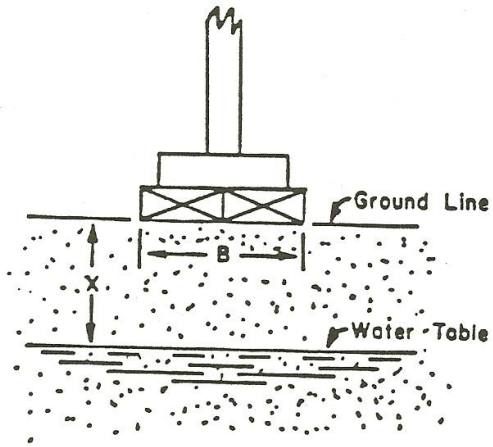


Exhibit 10.5-A Allowable Bearing on Sandy Soils (US Customary)





Major matters affecting bearing capacity

1) Position of water table
2) Relative density of sand
3) Width of footing "B"

Source: CALTRANS Falsework Manual

Exhibit 10.5-B Allowable Bearing on Clayey Soils

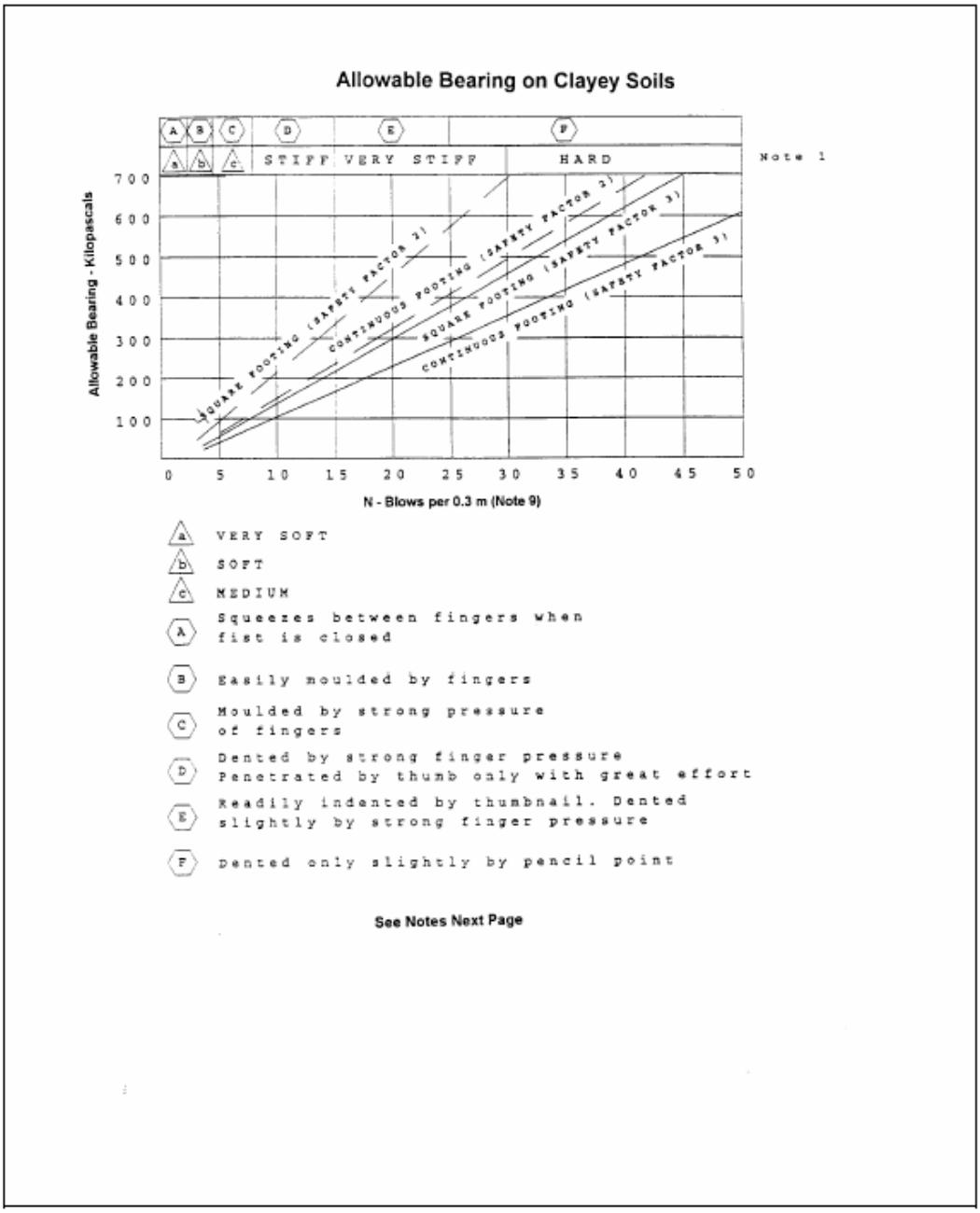


Exhibit 10.5-B Allowable Bearing on Clayey Soils *(Continued)*

Notes:

1) Terzaghi & Peck Classification

3) Weak strata at some distance below footings may in cases cause more settlement than soil layers immediately below the footings.

4) Desiccation of clay near the surface will result in higher blow counts. An average or representative blow count over a depth below footing equal to the least width of the footing should be used.

5) For same unit pressure, large footings settle most. This is particularly so where clay strata are involved.

6) Greatest settlements may generally be expected at centers of loaded areas.

7) Consolidation and settlement tend to increase with the following:

Softness of the clayey material.

Thickness of the compressible strata.

Closeness of clay stratum to ground surface.

Amount proposed loading exceeds past loading.

Width of footing or loaded area.

Height of water table.

Liquid limit.

Time.

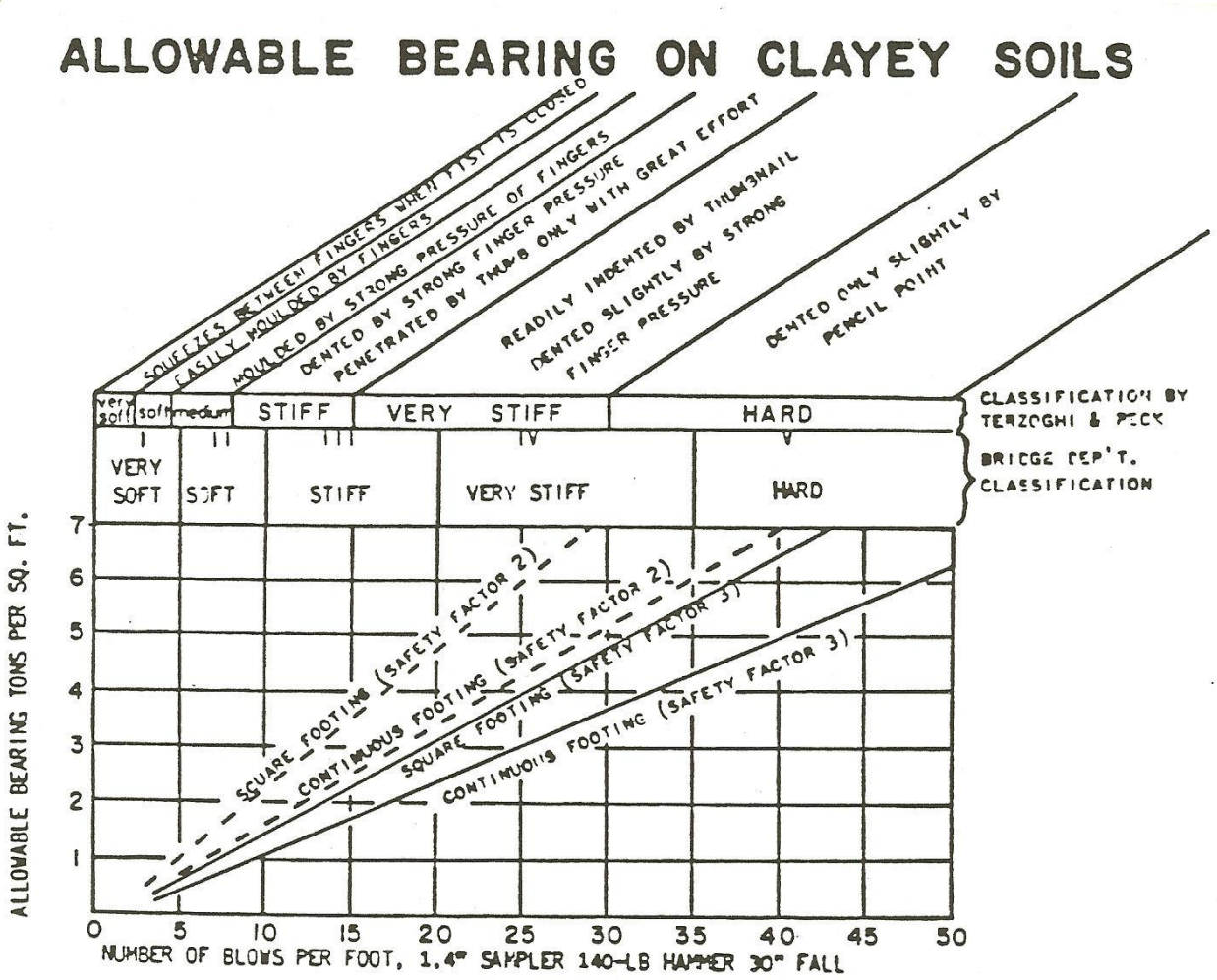
8) Shear failures are most apt to occur when:

Footings are small.

Settlements are large.

9) N represents the blows per 0.3 m to drive a 35 mm diameter (ID) sampler using a 63.5 kg hammer freely falling 0.76 m.

Exhibit 10.5-B Allowable Bearing on Clayey Soils (US Customary)



BEARINGS AS GIVEN ABOVE WILL GENERALLY BE CONSERVATIVE FOR CLAYEY SOILS.

WEAK STRATA AT SOME DISTANCE BELOW FOOTINGS MAY IN CASES CAUSE MORE SETTLEMENT THAN SOIL LAYERS IMMEDIATELY BELOW THE FOOTINGS.

FOR SAME UNIT PRESSURE, LARGE FOOTINGS SETTLE MOST. THIS IS PARTICULARLY SO WHERE CLAY STRATA ARE INVOLVED.

GREATEST SETTLEMENTS MAY GENERALLY BE EXPECTED AT CENTERS OF LOADED AREAS.

SETTLEMENTS TEND TO INCREASE WITH THE FOLLOWING:

1) SOFTNESS OF THE CLAYEY MATERIAL.
2) THICKNESS OF THE COMPRESSIBLE STRATA.
3) CLOSENESS OF CLAY STRATUM TO GROUND SURFACE.
4) AMOUNT PROPOSED LOADING EXCEEDS PAST LOADING
5) WIDTH OF FOOTING OR LOADED AREA.
6) HEIGHT OF WATER TABLE.
7) LIQUID LIMIT.

SHEAR FAILURES ARE MOST APT TO OCCUR WHEN:

1) FOOTINGS ARE SMALL.
2) SETTLEMENTS ARE LARGE.

10.5.2.1.3.4 Used Materials

When used materials are anticipated for the falsework design, it is the Contractor's responsibility to identify and reflect appropriate reductions in sections or maximum working loads. The documentation should be a part of the falsework submittal. When the materials are finally incorporated into the falsework structure, it must be verified that the assumptions on which the design was based are consistent with the apparent condition of those materials. If the Project Engineer has a basis to question any of these materials, they should be rejected unless the Contractor conducts tests or otherwise clearly demonstrates their validity.

10.5.2.1.4 Stakeout

The Government should furnish the Contractor data on the permanent or semi-permanent control points by which the structure is to be staked and constructed. If the initial control points will not be usable for checking during construction, then the Project Engineer should set and check additional control points or reference lines for checking. The Contractor should be held responsible for all control points, reference lines, and other surveying for the proper layout of the structure.

10.5.2.1.5 Quality Control Plan

See Section 10.5.1 for concrete requirements. The CQCP should have been submitted and approved prior to concrete placement. The CQCP should address the duties, responsibilities and authority of all management and QC personnel. The plan should adequately address the responsibility of supplier QC personnel.

10.5.2.2 Construction Inspection

10.5.2.2.1 Excavation

The excavation and foundation for both the structure and the falsework must conform to the contract requirements or design assumptions and must be excavated to the required elevation. The excavation for footings must be dewatered prior to concrete placement unless underwater placement is approved.

10.5.2.2.2 Falsework

10.5.2.2.2.1 Consistency with Approved Design

The Contractor is required to arrange for inspection of the falsework prior to concrete placement by a licensed professional engineer; and to certify in writing that the installation conforms to the approved design, contract requirements and acceptable engineering practice. The Engineer should coordinate with the Contractor to participate in this inspection. Exhibit 10.5-C, Checklist for Falsework Inspection, is a good outline for the inspection of falsework prior to concrete

placement. Deviations from the approved drawings must be approved and concisely documented in the files with a copy to the Bridge Engineer, through the COE. Any changes to the materials, type of manufactured assembly, connections, footings or dimensional configurations of the various components of the falsework must also be approved and documented.

Exhibit 10.5-C Checklist for Falsework Inspection

CHECKLIST FOR FALSEWORK INSPECTION

Project: _____ Portion of Structure: _____

Partial: _____ Final: _____ Date: _____

A. All Falsework

Item	Insp.	Date
1. Approved shop drawings with all appendices and attachments available onsite.		
2. All components identified as consistent with approved drawings. Identification should be by dimensional checks and/or manufacturer's model numbers when available. Special grade lumber should be verified by markings. No significant damage (repairs, welds, holes, cut, etc.) to any component unless the damage is considered in the design computations.		
3. Bearing capacity of footing foundations checked and confirmed consistent with design assumptions.		
4. No standing water or washouts in vicinity of foundations which may have reduced the bearing capacity.		
5. Footings, beams and leveling blocks dimensionally correct and in form contact.		
6. Elevation adjustments made with full contact shims or paired/properly sized wedges.		
7. Columns, towers and vertical members checked for maximum spacing and plumbness in both directions. Plumbness should be within 3.5 millimeters in one meter.		
8. Lateral and diagonal bracing in place and attached per approved drawings.		
9. All components protected from adjacent traffic and construction vehicles.		
10. Tell-tales in place and checked.		

Exhibit 10.5-C Checklist for Falsework Inspection *(Continued)*

B. Steel Tower/Screw Jack Falsework

Item	Insp.	Date
1. All steel support frames, jacks and assembly parts are in accordance with manufacturer's model numbers and as approved in the falsework drawings. All components are free of dents, bends, cracked welds and corrosion.		
2. Base plates in firm contact with footing or sill, and with decking support system. Plates should be attached if required by the approved drawings.		
3. Adjustment screws snug against frame legs. Alignment devices in place inside legs to prevent rotation. Screws not over extended.		
4. No gaps between adjacent tiers of frame legs. If gaps cannot be closed by adjustment screws without putting the frame out of plumb, the frame may be out of square and should be replaced.		
5. Each tier of frames must have cross bracing or diagonal bracing.		
6. Locking devices on bracing are properly closed and tight, and not damaged.		
7. If exterior bracing for lateral stability is required, the devices which fasten this bracing to the frame system much be securely attached in accordance with manufacturer's recommended standards and as required by the approved falsework drawings. Check cable clamps, tubing clamps and timber to steel connections.		

10.5.2.2.2.2 Changes

Requests for approval of all changes will normally be through the COE to the Bridge Engineer. When the Project Engineer has substantial experience and structural knowledge, the COE may delegate the authority to approve minor deviations to suit field conditions or the availability of materials, if it is evident by inspection that the deviation neither increases the stress in, nor the deflection of, any falsework member beyond the maximum value allowed by the specifications; and does not reduce the load-resisting ability of the falsework system as a whole. Substantial (other than minor) changes may not be informally field approved. The following are examples of substantial changes that would entail a formal request and submittal from the Contractor with all supporting calculations and literature:

- A change in the size, spacing or placement of any primary load carrying member.
- A change in the method of providing lateral or longitudinal stability.
- Any change, however minor, which affects the falsework to be constructed over or adjacent to traffic opening.
- A revised concrete placing sequence, if it materially affects the stresses in load-carrying members.

All changes must be formally documented. The internal form, Report of Field Changes to Falsework/Formwork, (Exhibit 10.5-D), is provided as the mechanism to accomplish this documentation or initiate approval.

Exhibit 10.5-D Report of Field Changes to Falsework/Formwork

REPORT OF FIELD CHANGE TO FALSEWORK/FORMWORK

Project: _____ Date: _____

Portion of Structure: _____

Description of Change: _____
_____
_____
_____
_____
_____
_____

Action Taken: _____
_____
_____
_____
_____
_____

Change: ____ Approved By ____ Discussed With _____Date: _____
____ Waiting Approval ____ Contractor Proceeding ____ Work Suspended
____ Need Decision By _____(Date) ____ See Drawings or Attachments
____ Other

Comments: _____
_____
_____
_____
_____

Distribution: Construction Operations Engineer, Bridge Engineer, Project Files

10.5.2.2.2.3 Piling

Piles driven for falsework should be inspected for bearing capacity and alignment. The procedures in Section 551 of the Standard Specifications should be used to estimate bearing capacity.

10.5.2.2.2.4 Timber Members

Timber members should be checked to verify that they are the proper grade (if a grade is required or assumed) and dimension, and are not damaged or defective. The dimensions in question should be actual dimensions, not the nominal dimensions, unless the design is based on nominal dimensions. Required blocking should be included in the design submittal. Additional blocking, shimming and wedging should be kept to a minimum; and should be used primarily to ensure full bearing and to make fine adjustments in elevation.

10.5.2.2.2.5 Steel Members

Steel members must be inspected carefully for loss of section due to welding, holes or web openings. Welded splices, should be inspected visually for obvious defects; however, radiographic inspection or other methods of nondestructive testing are not required unless the Project Engineer's visual inspection suggests the welds are defective. If the falsework design is based on steel other than A36 (A36M) grade, the Contractor must produce a certification or other evidence that actual steel furnished is the required grade.

Field welds designed up to 850 pounds per inch (150 Newtons per millimeter) of 1/8 inch (3 millimeter) fillet weld may be accepted based on visual inspection. If higher values are required, welding and inspection must be in accordance with AWS D1.1.

10.5.2.2.2.6 Manufactured Assemblies

Steel shoring components should be inspected before assembly to verify that all components are a part of the approved system. Components should also be inspected for dents, bent members, cracked welds, rewelding and corrosion. Such members must be rejected. After erection, the systems must be plumb, jacks installed at the top and bottom and in firm contact, all connections fitted together evenly, and locking devices in good working order. Screw jacks must not be extended beyond the manufacturer's recommendations, and must be fitted with the proper hardware to be compatible with the frame legs and held firmly in line with the axis of the leg. Other manufactured assemblies should similarly be inspected and verified as being used consistently with the approved drawings and the manufacturer's recommendations.

10.5.2.2.2.7 Exterior Bracing

Exterior bracing must be included in the falsework design when multi-tiered structures, wind loading or other factors cause concern with respect to lateral loads and stability. Exterior bracing should be checked for adequate sizes and for adequacy of connections. Cable connections must be tight and secure.

10.5.2.2.2.8 Traffic Openings

Openings through falsework for public traffic requires enhanced design standards in the vicinity of the opening to minimize the risk of damage due to errant vehicles. Falsework members installed adjacent to, or over traffic openings must be immediately temporarily braced until the entire system is in place and permanent restraints in place. Minimum vertical and horizontal clearance should be provided at all times and verified immediately upon erection.

10.5.2.2.2.9 During Concrete Placement

a. **Tell Tales.** Prior to concrete placement, the Contractor should install tell-tales under the structure. A tell-tale is a rigid strip of vertical wood, metal or fiberglass (25 mm by 50 mm lumber is common) reaching from the underside of the formwork to a pin or stake driven firmly into the ground. The end of the pin is free, and is marked before concrete placement so that during placement settlement can be monitored. Tell-tales should be installed near the vertical supports for the falsework, but sufficiently away from falsework foundations which may settle.

b. **Incipient Failure.** As concrete is being placed, the falsework and tell-tales should be inspected at frequent intervals. The following items, in particular, are indications of incipient failure, where immediate response is required.

- Excessive compression at the tops and bottoms of posts and under the ends of stringers.
- Pulling of nails in lateral bracing; movement or deflection of braces.
- Excessive deflections of stringers; tilting or rotation of joists or stringers.
- Excessive settlement of tell-tales [0.4 inch (10 millimeters)] more than the anticipated settlement).
- Posts or towers moving out of plumb.
- The sound of falling concrete, cracking timbers or popping welds.

Any response to these problems should address safety issues first, including the possible evacuation of the site. The safety of workers and the public is more important than technical issues.

10.5.2.2.3 Form Layout

The Contractor's surveyors should have checked all forms as to exact location and elevation. The Project Engineer or inspector may review this process or make spot checks. After initial process check type reviews, comprehensive checking by FLH should not be necessary.

10.5.2.2.4 Reinforcing Steel

See Section 10.5.4.

10.5.2.2.5 Deck Forms

The Contractor is responsible for setting deck forms and reinforcing steel and screed rails to grade. If all of these items are not set properly, they will not relate properly and the deck will be too thick, too thin, or the steel will not have sufficient cover.

After the screed rails are set, the entire deck placement plan should be checked in the presence of the Project Engineer or inspector. Note that when the screed is supported by the deck overhang rather than by girders, these supports must be firm enough so that there is no significant variability or *bounce* in the screed elevation. The deck should be checked on a 10 to 15 foot (3 to 5 meter) grid over the entire deck surface. The Contractor should check the thickness of the deck (from the screed to the deck form) at each grid point as well as the reinforcing steel cover. Minor adjustments should be made by raising or lowering the deck forms (assuming the screed rails and settings have previously been verified as good).

If the adjustments are of such number and magnitude as to indicate the deck is not ready to be checked, the Inspector should arrange with the Contractor to come back at a later time or day when the Contractor believes the deck will be ready. It is inappropriate for the Project Engineer or FLH inspector to be a part of the routine deck grade setting process.

10.5.2.2.6 Cleanup

All debris, water, ice, etc. should be removed from the forms before concrete placement is authorized.

10.5.2.2.7 Concrete Placement

The Contractor is responsible for quality control during concrete placement. FLH's role should be one of overview and verification. If the Contractor is not properly assuming the quality control responsibility, the problem should be addressed in specific terms. See the contract clauses relative to inspection of construction, material and workmanship.

Normally, small and medium sized placement operations should require only one FLH inspector once initial starting problems are worked out. The inspector should not be reluctant to request Contractor assistance whenever necessary.

The following items require attention during concrete placement.

a. **Concrete Discharge.** See Section 10.5.1.2.

b. **Placement and Vibration.** Concrete should be placed near its final location by pump, bucket, buggy or chute. Vibration is essential to avoid air pockets under re-steel and in corners.

c. **Form Alignment.** Tall or slender forms such as those for columns should be monitored for alignment as the placement progresses.

d. **Deck Surfaces.** The Contractor should be making spot checks with a 10 foot (3 meter) straight edge to ensure proper surface tolerances. Particular attention must be paid to surfaces beyond the limits of the finishing machine.

e. **Scheduling of Concrete Delivery.** Occasionally, due to poor scheduling of trucks or equipment breakdowns, the delivery of concrete may not be continuous as is required by the specifications. If this happens, it is important that the Contractor take all appropriate action to minimize damage due to *cold joints*. Such action may consist of the following:

- Shading and/or fogging exposed concrete faces to prevent drying.
- Using a vibrator to keep the exposed concrete face plastic. This can be done for 2 hours or more if the concrete is cool [less than 68 °F (20 °C)].

It is emphasized that these are emergency actions of limited useful duration. More drastic action, such as constructing an emergency construction joint or a total washout of a partial concrete placement operation, should be required whenever the structure may have been weakened.

When the Contractor's scheduling problems are chronic and avoidable, the Project Engineer should communicate the deficiencies in writing and direct the Contractor to take corrective action such as furnishing standby equipment.

10.5.2.2.8 Curing and Protection

Curing materials and water must be available to begin curing as soon as initial set has taken place and the water sheen has disappeared.

In cold weather, the equipment required by the Contractor's approved cold weather concreting plan must be available and ready to install.

Curing compound, mats, water, etc. must be applied as soon as possible. The Contractor should not wait until a large deck pour is completely finished before starting to apply these materials.

When forms are stripped before the curing period is over, curing materials must be applied immediately.

When a curing compound is used there should be periodic verification that it is being applied full strength at the required rate.

Particular attention must be given to sidewalk and curb construction joints that are obstructed by steel during the deck placement. A curing compound is normally not usable in these areas. Wet burlap or other acceptable procedures must be used to ensure that these areas are kept moist during placement and continuously during the curing period.

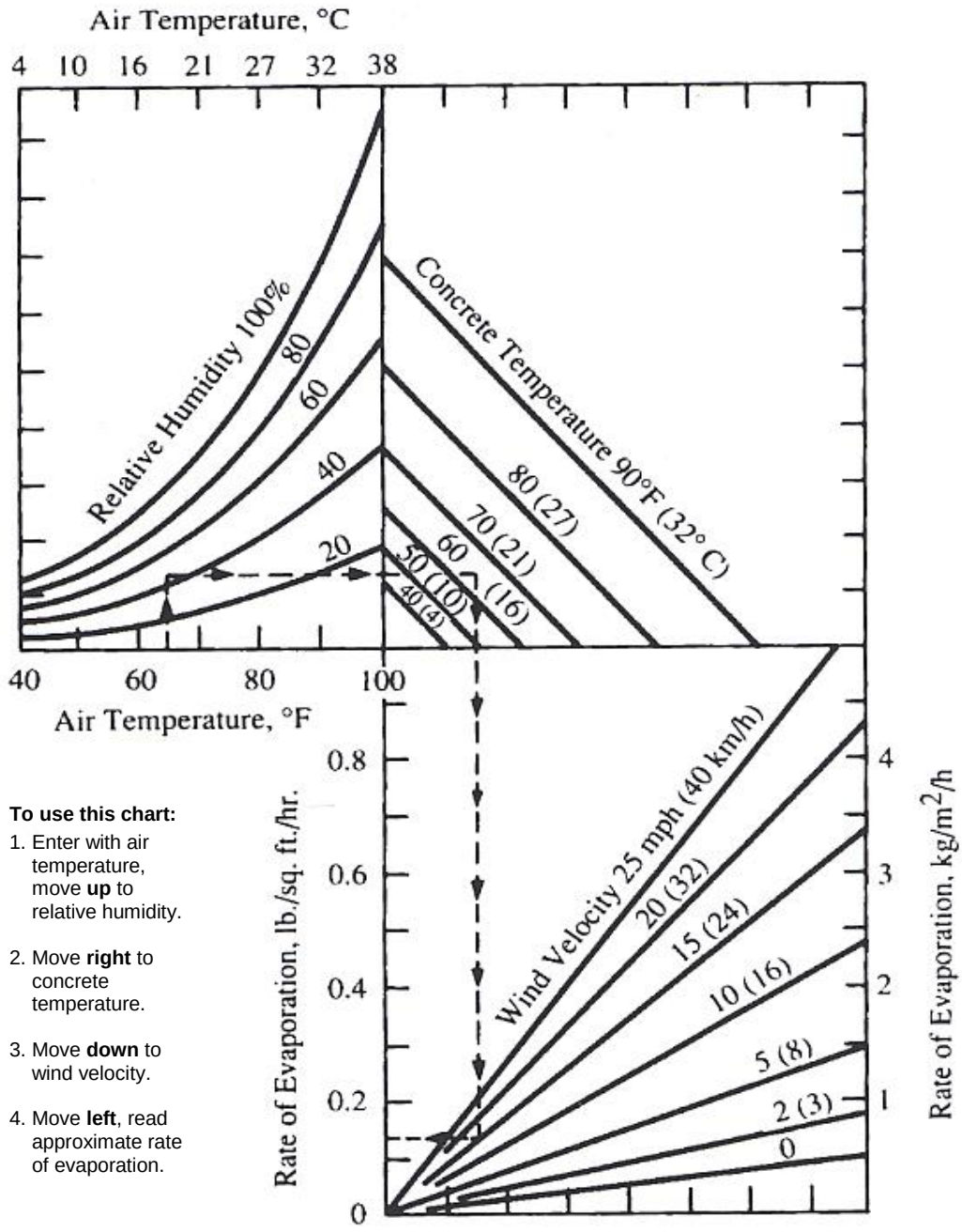
10.5.2.2.9 Hot Weather Concreting

Before concreting in hot weather, the Contractor should be required to compare the proposed procedures with the requirements of the Contract to determine if procedures are adequate. The following factors affect the evaporation rate of surface moisture from concrete:

- **Air Temperature** - If anticipated daytime air temperature is too high, night time (lighted) operations may be the only alternative.
- **Wind Speed** - Wind screens may be necessary to ensure relatively calm conditions and reduce evaporation.
- **Humidity** - In dry areas, fogging equipment may be used up wind from the placement operations to raise the humidity.
- **Concrete Temperature** - Through the use of ice as part of the mixing water, or other means, the concrete temperature should be held low enough to conform to anticipated conditions.

Exhibit 10.5-E, Evaporation Rates in Hot Weather, shows the relationship among these factors.

Exhibit 10.5-E Evaporation Rates in Hot Weather



Note: Example shown by dashed lines is for an air temperature of 65 °F, relative humidity of 45 percent, concrete temperature of 65 °F, and a wind velocity of 15 miles per hour. This results in a rate of evaporation of 0.13 pounds per square foot per hour.

10.5.2.2.10 Cold Weather Concreting

Before concrete placement, when air temperatures might be less than 35°F (2°C) during the curing period, the Contractor must have an approved plan for maintaining the minimum temperature. This plan should address the following:

- **Concrete Temperature** - Provisions may be required at the plant to heat mixing water or aggregates in order to achieve minimum temperature.
- **Forms and Insulation** - Depending on circumstances, forms may have to be designed with insulation, or similar precautions such as flooding of footings or layers of straw may be used to avoid freezing.
- **Heat** - If artificial heat is required, the Contractor should have a comprehensive system of monitoring and maintaining. There should also be special precautions to be sure that moisture is maintained for curing during the heating process.
- **Thermometer** - Depending on contract requirements, either the Contractor or the Government is required to furnish a thermometer to monitor temperature during curing.

10.5.2.2.11 Removal of Forms and Falsework

Falsework must not be removed so as to produce excess stresses in the concrete. The contract may require minimum percentages of 28-day strength be reached prior to form removal. It is permissible to use statistically based prediction techniques to determine if the minimum strengths have been achieved.

The specifications may contain specific requirements regarding the removal of falsework, or a removal plan may be required as a part of the falsework submittal. Whether or not an approved removal plan is required, to prevent damage to the completed structure, and to maintain the safety of the public and onsite personnel, the Contractor's removal plan should be discussed with the Project Engineer ahead of time. This is particularly important with respect to removal operations adjacent to, or over traffic openings. If temporary bracing was required during installation, then it is also required during removal unless another method of maintaining stability is provided.

Waterproof (metal, sealed etc.) forms that are part of the curing process may not be removed during the curing period unless provisions are made for continuing that process during stripping and finishing. These provisions may include curing compound, water spray, and wet burlap, or combinations thereof.

10.5.2.3 Measurement

10.5.2.3.1 Contract Quantities

Structural concrete is normally paid as a part of a lump sum item or on the basis of quantities computed by the designer and specified in the plans. It should not be necessary to recompute

or verify these quantities unless discrepancies are brought to the attention of the Project Engineer. If discrepancies are alleged, the Project Engineer may elect to check only the parts of the structure in question, or all concrete may be recomputed. The designer may be asked for assistance if checking becomes necessary.

10.5.2.3.2 Staked or Ordered Quantities.

When final quantities are not specified in the plans, or when these quantities are adjusted or corrected, payment is normally on a staked or ordered quantity basis. The Project Engineer should determine in the field the required minimum dimensions of the structural element involved (e.g., a subfooting), and provide the Contractor with these authorized dimensions. These dimensions become the basis of the computed quantity. Upon completion, the inspection verifies that the structural element has been constructed within acceptable tolerances, but no detailed remeasurement is required. If the Contractor elects to construct slightly greater dimensions, no additional payment is necessary.

10.5.2.3.3 Measured Quantities

Occasionally the contract may authorize payment on a measured quantity basis. This method implies a higher level of control during construction, since the Government is going to pay for all concrete placed. This method is usually used when concrete is authorized to fill a void of unknown or odd dimensions. Measurement may be simply based on the quantity of concrete batched and placed if dimensions are inaccessible.

10.5.2.4 Documentation

The following is a list of minimum requirements for documentation of construction of concrete structures:

10.5.2.4.1 Falsework

All changes to actual falsework as compared to the approved design should be documented on the form, Report of Field Change t o Falsework/Formwork (Exhibit 10.5-D).

The Checklist for Falsework Installation (Exhibit 10.5-C), is an outline of what the Contractor's QC and inspection personnel should be checking to document compliance with FAR Clause 52.246-12, with Section 552 of the Contract, and with OSHA Regulations, Sections 1926.700, 1926.701 and 1926.702. This checklist is provided to assist the inspector in documenting an independent check of the Contractor's procedures and the ultimate conformity of the falsework to the approved drawings. If the Contractor is not competently performing these functions, a Directive ordering corrective action must be issued. At that point, if the Project Engineer thinks it would be helpful to provide the Contractor with a copy of the checklist for guidance, that is permissible. However, the Project Engineer should be wary of moving toward a situation where the Contractor's inspection/quality control responsibilities are usurped by comprehensive FLH inspection procedures.

Prior to the beginning of concrete placement the Contractor is required to provide a certification by a licensed Professional Engineer that the installation has been inspected and conforms to the approved design.

10.5.2.4.2 Forms and Steel

A notation is appropriate in an IDR, a pay note, or in-placement records that falsework, forms and steel have been checked for compliance with the contract.

10.5.2.4.3 Quantities

If payment is by contract or plan quantity, that quantity should be referenced in a pay note. If payment is by ordered (computed) quantity, complete documentation of these computations is required.

If payment is by measured quantities, batched quantity with deduction for estimated non-usage, should be documented. Except if the contract provides that payment be made for all quantities which the Government orders, wastage will not be deducted.

10.5.2.4.4 Placement Record

The placement record should detail the structural component placed, conditions, problems, time, etc. This information should be filed with or cross-referenced to load tickets and test reports.

10.5.2.4.5 Curing and Heating

Diary entries or supplemental records must document inspection during curing/heating periods to verify temperatures and presence of moisture.

Approximations are adequate for progress payments if plan quantities are used for final payment. Usually approximations are based on an approximate breakdown of the plan quantities. Use of batched quantities for approximation is discouraged since errors may accumulate over several placement operations.

10.5.2.5 References

Same as Section 10.5.1.5, plus:

- *Form Work for Concrete*, American Concrete Institute

10.5.3 PRESTRESSED CONCRETE

10.5.3.1 Preliminary Review and Approval

10.5.3.1.1 Shop Drawings

All prestressed components must have shop drawings approved by the Bridge Engineer prior to fabrication.

10.5.3.1.2 Equipment and Facilities

Equipment and facilities, especially in the case of temporary fabrication sites, must be approved. Facilities for curing require special attention. See Section 10.5.3.1.3 for more information relative to remote sites.

10.5.3.1.3 Inspection and Testing

For remote fabrication sites inspection and testing may be arranged commercially or through a State highway department. The Materials Engineer or Quality Assurance Engineer will arrange this when requested.

10.5.3.1.4 Moving, Transporting and Stressing

It will be necessary to have an approved procedure for evaluating concrete strength in preparation for transporting or stressing the elements. A statistically based early strength prediction procedure is acceptable for this purpose.

10.5.3.2 Construction Inspection

Intermittent inspection is required at each stage of the operation. Comprehensive inspection is usually necessary during concrete placement and tensioning of steel.

10.5.3.2.1 Beds and Forms

Forms should be inspected for dimensions and stability. Anchorage tie downs should be available as required.

10.5.3.2.2 Reinforcing Steel and Inserts

See Section 10.5.4. Ducts and inserts for voids must be located accurately and tied down to counteract buoyancy.

10.5.3.2.3 Pretensioning

Strands must be clean and acceptably free of corrosion immediately prior to concrete placement. Tensioning systems must be supported by approved calculations and verification after tensioning. Thermal effects, slippage and elongation must be considered.

10.5.3.2.4 Concrete Placement

See Section 10.5.4. High frequency internal and/or external vibrators are often necessary to consolidate low slump concrete in congested forms for prestressed elements. High slump concrete utilizing a high-range water reducer is sometimes appropriate if requested by the fabricator and approved in accordance with the Contract.

10.5.3.2.5 Post Tensioning

Tensioning should comply with the approved shop drawings. Ten to twenty percent of ultimate load should be applied to take up slack before measurement of elongation. Anchorage and tensioning devices must perform without apparent defects.

10.5.3.2.6 Grouting

A guide to good practice is that grouting should be performed within 5 days of tensioning unless special anticorrosion precautions are taken. Ducts should be flushed and blown out with compressed air before grouting. Components of the grout shall have been previously approved prior to use. Pumps and gauges must be in proper working order with backups available.

10.5.3.3 Measurement

Prestressed elements are normally paid as a lump sum or plan quantity item. No additional measurement is required. If post tensioning is paid separately, the Contractor may be requested to furnish a breakdown for progress payment purposes. Even if it is not paid separately, the value of the post tensioning should not be paid in progress payments until the work is actually done.

10.5.3.4 Documentation

In addition to normal concrete and reinforcing steel documentation required by Sections 10.5.1.4 and 10.5.4.4, the following items should be addressed:

10.5.3.4.1 Materials Records and Certifications

Documentation should include prestressing wire and grout components.

10.5.3.4.2 Tensioning Records

Identification of member and prestressing wire used, jacking equipment, elongation calculations, gauge readings or other verification computations showing assumed slippage, compression, etc.

10.5.3.4.3 Stress Transfer

Concrete records should indicate that the required concrete strength has been achieved prior to stress transfer.

10.5.3.4.4 Equipment

Calibration records should be available and checked for all jacking equipment used in the operation.

10.5.3.5 References

- *Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products*, Prestressed Concrete Institute.
- *Post-Tensioning Manual,* Post-Tensioning Institute.

10.5.4 REINFORCING STEEL

10.5.4.1 Preliminary Review and Approval

The Contractor should submit shop drawings or cut sheets for all reinforcing steel prior to fabrication. It is normally not necessary to submit routine cut sheets to the Bridge Designer for approval. They should be fully reviewed and approved or noted differences marked and returned to the Contractor by the Project Engineer.

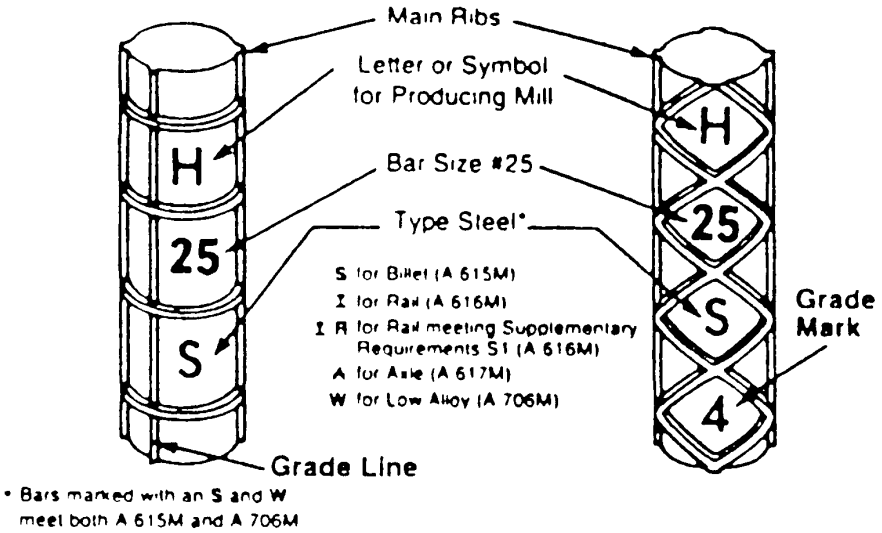
If the plans include a design reinforcing steel detail, these sheets may be used to compare to and approve the cut sheets. However, the fabricator may make minor changes in bar lengths to account for shortening at bends, etc.

The epoxy coating process may be subject to independent inspection arranged by the Materials Engineer or Quality Assurance Engineer. This inspection may be by FLH specialists, State inspectors or a commercial testing firm.

Upon delivery of the steel, the Project Engineer should be furnished certifications and mill test reports for all reinforcing steel. The documentation must be provided before the steel is paid for. Bars must be identified by markings as to grade, mill, size, and type of steel. Exhibit 10.5-F, Identification Marks - ASTM Standard Bars, may be used to verify that the bars and certification grades indicated are the same.

It is not necessary for the Project Engineer to check dimensions of all steel upon delivery, as it is often difficult until it is placed in the forms. A cursory check should be made to verify the entire shipment has been received as represented by the documentation.

Exhibit 10.5-F Identification Marks - ASTM Standard Bars



Grade 400 and above

10.5.4.2 Construction Inspection

Except for epoxy coated bars, reinforcing steel requires only intermittent inspection until a portion of a structure is complete and ready for concrete placement. Inspection should then be comprehensive in conjunction with approval to proceed with the placement. Upon delivery, epoxy coated bars should be checked for cracks, pinholes, and coating thickness. Special equipment may be obtained for checking the thickness and completeness of coating.

10.5.4.2.1 Storage and Handling

Reinforcing steel must be stored where it will be protected from dirt and grease. Minor rust is not normally a problem for non-coated steel, but it should be protected when stored in marine environments where major rust and scaling is likely.

10.5.4.2.2 Placing and Tying

Bars must be supported and tied so as not to deflect significantly under construction and concrete placement conditions. Refer to CRSI guidelines for specifics. Deck steel should not be used to support buggy ramps or other heavy equipment. CRSI and ACI contain tolerances for minimum cover, vertical and lateral placement, as well as minimum frequency of ties.

Proper placement of deck steel is particularly important. The procedure described in Section 10.5.2.2.5 should be used to verify proper placement and cover for deck reinforcing steel.

10.5.4.2.3 Placement of Concrete

Prior to concrete placement, steel must be cleaned of form release agents or any other detrimental substances. In hot weather it may be necessary to shade reinforcing steel and/or spray with fresh water to cool it to less than 90°F (32°C).

After concrete placement, splice bars and other protruding bars must be cleaned of concrete splatter.

10.5.4.3 Measurement

Reinforcing steel is normally paid on a plan quantity basis. No remeasurement or computational checks are necessary. However, if changes are ordered by the Government or significant errors are discovered in the plans, the quantities should be adjusted to provide for these changes or errors. Minor adjustments in bar lengths to conform to fabrication standards are not considered significant.

Exhibit 10.5-G, ASTM Standard Reinforcing Bars, may be used to compute quantity changes in reinforcing steel.

Exhibit 10.5-G ASTM Standard Reinforcing Bars

BAR SIZE MARK		Nominal Diameter	Nominal Area	Nominal Mass
US (Standard) AASHTO M31. M42, or M53	US (Metric) ASTM A 615M-96a	in (mm)	in^2 (mm^2)	lb/ft (kg/m)
3	10	0.11 (9.5)	0.376 (71)	0.375 (0.560)
4	13	0.20 (12.7)	0.668 (129)	0.500 (0.994)
5	16	0.31 (15.9)	1.043 (199)	0.625 (1.552)
6	19	0.44 (19.1)	1.502 (284)	0.750 (2.235)
7	22	0.60 (22.2)	2.044 (387)	0.875 (3.042)
8	25	0.79 (25.4)	2.670 (510)	1.000 (3.973)
9	29	1.00 (28.7)	3.400 (645)	1.128 (5.060)
10	32	1.27 (32.3)	4.303 (819)	1.270 (6.404)
11	36	1.56 (35.8)	5.131 (1006)	1.410 (7.907)
14	43	2.25 (43.0)	7.650 (1452)	1.693 (11.38)
18	57	4.00 (57.3)	13.600 (2581)	2.257 (20.24)

Minimum Yield Strength Grade (f_y)		Grade Mark
English (ksi)	Metric (MPa)	
40.0		None
43.5	300	None
50.0		None
50.8	350	None
58.0	400	4 or one line
60.0		60 or one line
60.9	420	4 or one line
72.5	500	5 or two lines
75.4	520	5 or two lines

10.5.4.4 Documentation

The following are minimum documentation requirements for reinforcing steel:

- Certification and mill test reports must be on file covering all reinforcing steel.
- For epoxy coated reinforcing steel inspection reports covering the coating process, as well as inspection reports on condition after delivery should be on file.
- Prior to each concrete placement, diary entries or a placement report must document that all steel to be incorporated in that placement has been checked as to size, location, cover, etc.
- All changes in contract quantities must be documented by detailed computations.

10.5.4.5 References

- *Placing Reinforcing Bars*, Concrete Reinforcing Steel Institute (CRSI).
- *Manual of Standard Practice*, CRSI

10.5.5 PILING

10.5.5.1 Preliminary Review and Approval

10.5.5.1.1 Test Piles

Test piles are several ordinary piles driven in advance of ordering the remainder of the piles, in order to better estimate the order length of the remainder and to minimize cutoffs and splices. Test piles are normally tested only by their driving characteristics. If test piles are required, it must be determined if the test pile lengths are specified or if they must be ordered. If the latter is the case, the Project Engineer should consult with the COE to agree on the order lengths. The Geotechnical Report should also be consulted to determine appropriate test pile lengths

10.5.5.1.2 Load Tests

Static load tests may be used to determine if dynamic driving characteristics, based on Pile Driving Analyzer (PDA) measurements, give an accurate estimate of actual capacity. Load tests are very expensive and not normally performed in highway structure construction, except for experimental work and under unusual [usually friction pile] situations. PDA measurements have been found to commonly underestimate actual pile capacity, and are generally used as the sole driving resistance acceptance criterion. The requirement for this type of pile measurement should be addressed in the Geotechnical Report.

If one or more load tests are required, all equipment as well as the layout of the tests must be approved by FLH prior to the test.

10.5.5.1.3 Pile Lengths

Some contracts may specify the order lengths of piles, or minimum tip elevations, but normally the Project Engineer must furnish order lengths based on test pile results. The determination of pile length often involves economic decisions. For example, if the cost of splices is considerable, it may be wise to order slightly excess lengths to minimize splices. Some contracts require the Contractor to determine lengths, but provide payment only for the piles actually driven.

10.5.5.1.4 Piling Hammers and Equipment

Proposed pile hammers and equipment must be submitted to FLH for approval prior to driving. Geotechnical personnel should be available to assist in evaluating equipment. Hammers must be large enough to ensure some penetration (usually at least 1/8 inch (3 mm) per blow) at the design bearing; however, too large a hammer can damage some piles, or may not be able to reach full energy at the pile capacity. Exhibit 10.5-H, Pile Driving Equipment Data Sheet, shows the information required to approve pile driving equipment.

Exhibit 10.5-H Pile Driving Equipment Data Sheet

Pile Driving Equipment Data Sheet

Contract No.: _____ Structure Name and/or No.: _____

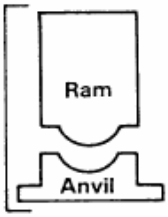
Project: _____

_____ Pile Driving Contractor or Subcontractor: _____

County: _____

(Piles driven by)

Hammer Components



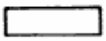
Hammer

Manufacturer: _____ Model: _____

Type: _____ Serial No.: _____

Rated Energy: _____ at _____ Length of Stroke

Modifications: _____



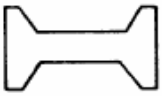
Capblock (Hammer Cushion)

Material: _____

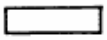
Thickness _____ Area: _____

Modulus of Elasticity – E _____

Coefficient of Restitution-e _____



Pile Cap — Helmet / Bonnet / Anvil Block / Drivehead — Weight: _____



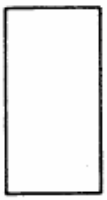
Pile Cushion

Cushion Material: _____

Thickness: _____ Area: _____

Modulus of Elasticity – E _____

Coefficient of Restitution _____



Pile

Pile Type: _____

Length (in Leads) – _____

Weight/meter _____

Wall Thickness: _____ Taper: _____

Cross Sectional Area _____

Design Pile Capacity: _____ (Tons)

Description of Splice: _____

Tip Treatment Description: _____

Note: If mandrel is used to drive the pile, attach separate manufacturer's detail sheet(s) including weight and dimensions.

Submitted By: _____ Date: _____

10.5.5.2 Construction Inspection

Pile driving requires essentially continuous inspection in order to verify bearing.

10.5.5.2.1 Equipment

Check hammer weight, cushion, leads and pile alignment.

10.5.5.2.2 Preparation

Have the Contractor mark piles and provide a stationary scale on the leads in order to monitor penetration. The inspector should have computed or otherwise know the minimum blows per 25 mm necessary for design bearing.

10.5.5.2.3 Driving

The hammer must operate at full stroke in order to attain the specified energy. This is important when determining the blow per 1 inch (25 millimeter) from which bearing capacity is determined. Low pile resistance may initially cause the hammer to function at less than full energy. Exhibit 10.5-I, Pile Driving Record is a convenient form for recording pile driving information.

Once a pile has reached design tip elevation and the specified bearing has not been reached, it may be prudent to wait a period of time and try driving again. Anticipated “set up” times are typically described in the Geotechnical Report. Often, in granular soils, consolidation will have taken place and bearing will have been achieved at the time of driving.

Exhibit 10.5-I Pile Driving Record

Pile Driving Record

PROJECT: DATE:
CONTRACTOR: INSPECTOR:
STRUCTURE: PILE LOCATION:

STATE STAMP ON PILE (Y or N):
PILE NUMBER: PILE TYPE/SIZE: LENGTH(ft): BATTER:
PAY LENGTH: PILE TIP ELEV.: CUTOFF ELEV:

HAMMER MAKE/MODEL:
THROTTLE SETTING:
HAMMER CUSHION TYPE/THICKNESS:
PILE CUSHION TYPE/THICKNESS:

DEPTH (Feet)	BLOWS	STROKE/ PRESSURE	DEPTH (Feet)	BLOWS	STROKE/ PRESSURE	DEPTH (Feet)	BLOWS	STROKE/ PRESSURE	DEPTH (Feet)	BLOWS	STROKE/ PRESSURE
0.00			35.00			70.00			105.00		
1.00			36.00			71.00			106.00		
2.00			37.00			72.00			107.00		
3.00			38.00			73.00			108.00		
4.00			39.00			74.00			109.00		
5.00			40.00			75.00			110.00		
6.00			41.00			76.00			111.00		
7.00			42.00			77.00			112.00		
8.00			43.00			78.00			113.00		
9.00			44.00			79.00			114.00		
10.00			45.00			80.00			115.00		
11.00			46.00			81.00			116.00		
12.00			47.00			82.00			117.00		
13.00			48.00			83.00			118.00		
14.00			49.00			84.00			119.00		
15.00			50.00			85.00			120.00		
16.00			51.00			86.00			121.00		
17.00			52.00			87.00			122.00		
18.00			53.00			88.00			123.00		
19.00			54.00			89.00			124.00		
20.00			55.00			90.00			125.00		
21.00			56.00			91.00			126.00		
22.00			57.00			92.00			127.00		
23.00			58.00			93.00			128.00		
24.00			59.00			94.00			129.00		
25.00			60.00			95.00			130.00		
26.00			61.00			96.00			131.00		
27.00			62.00			97.00			132.00		
28.00			63.00			98.00			133.00		
29.00			64.00			99.00			134.00		
30.00			65.00			100.00			135.00		
31.00			66.00			101.00			136.00		
32.00			67.00			102.00			137.00		
33.00			68.00			103.00			138.00		
34.00			69.00			104.00			139.00		

REMARKS:

10.5.5.2.4 Splicing

Splicing procedures must be approved and splicing must be performed in a skillful manner. Welding, in particular, must be performed under controlled conditions by a certified welder.

10.5.5.2.5 Drilled Piles

Some piles must be drilled or augered. Examples are concrete piles that are cast in place, and some steel and concrete piles that are predrilled to a specified tip elevation to accommodate poor driving conditions, or installed in a newly constructed embankment.

If the specifications require drill holes and casings to be inspected, the Contractor's QC plan should cover most of this effort. Minimum embedment in rock may be a specified criterion. Periodically the inspector should make verification inspection and the Contractor should be asked to furnish assistance.

Often, cast-in-place piles must be cast in a dry casing or hole. This can require difficult sealing and dewatering.

10.5.5.3 Measurement

Measurement requirements depend on how pile related contract items are structured. The specifications must be read carefully before setting up a documentation system. Generally, all piles ordered by the Government must be paid for, but if the Contractor is required to determine order lengths, only pile lengths driven are paid for.

Often splices are paid for, but not always. Usually splices in piles less than the order length are not paid for.

10.5.5.4 Documentation

Comprehensive documentation is necessary for all pile driving operations. The following are minimum requirements:

- Pile layout, structure and numbering system
- Type of hammer and other equipment
- Material certifications for piling
- Driving log for each pile, identifying the following:
    - Penetration/blow counts
    - Pile lengths
    - Splices
    - Computed tip elevation
    - Computed Bearing
    - Time to restrike/redrive
    - Restrike blow counts
    - Summary of Pay Items

10.5.5.5 References

- *Design and Installation of Driven Pile Foundations,* by Hal W. Hunt, Associated Pile and Fitting Corporation.
- *Inspectors Manual for Pile Foundations*, Deep Foundations Institute, P.O. Box 359, Springfield, New Jersey 07081.
- *Design and Construction of Pile Driven Foundations*, FHWA, Demonstration Projects Division.
- *A Pile Inspector's Guide to Hammers*, Deep Foundations Institute, as above.

10.5.6 STEEL STRUCTURES

10.5.6.1 Preliminary Review and Approval

10.5.6.1.1 Shop Drawings

All shop drawings for major steel structures should be submitted for approval to the Bridge Engineer.

10.5.6.1.2 Fabrication

The Materials Engineer, Quality Assurance Engineer or Bridge Engineer will arrange for inspection of fabrication.

10.5.6.1.3 Falsework

Falsework for steel structures must be approved as required by Section 10.5.2.2.2.

10.5.6.1.4 Welding

If field welding is required, the Bridge Engineer should evaluate the need for specialized field inspection or testing if appropriate.

10.5.6.1.5 Bolts

The Contractor is required to provide a calibrated torque wrench for inspection of high strength bolts.

10.5.6.1.6 Certifications

All materials must be accompanied by certifications. Structural plate and associated welds should be documented by mill test results and other required tests.

10.5.6.2 Construction Inspection

Intermittent inspection of all operations is normally adequate, except for welding and bolt tightening which require comprehensive inspection.

10.5.6.2.1 Delivered Steel

Upon delivery, steel should be checked for proper documentation, including mill test reports, certifications, and inspection reports.

Any significant damage may require repairs. The Bridge Engineer should be consulted if this is the case. Steel should be stored to be protected from the weather. This is especially true if it is to be stored for a long duration. If at the time of erection, excessive mill scale and rust has built up on unpainted bearing surfaces, these surfaces may require sandblasting prior to assembly.

10.5.6.2.2 Falsework and Erection Equipment

Facilities for erection must be installed to conform to the approved working drawings and erection plan.

10.5.6.2.3 Erection

All bearing plates must be placed within acceptable tolerances. Bearing surfaces must match or be ground smooth. Required gaps in expansion joints should be checked prior to securing the fixed end of spans.

10.5.6.2.4 Bolted Splices

If splice plates are temporarily removed, match marking should be checked to ensure proper replacement.

When heavy hexagon bolts and heavy semifinished hexagon nuts are used, a hardened washer must be installed under the bolt head or nut, whichever is the element being turned. Heavy hexagon bolts can be identified by three radial lines, the legend A-325, and the manufacturer's mark on the top of the head. Heavy semifinished hexagon nuts can be identified by three circumferential marks, or by the number "2" and the manufacturer's mark on at least one face. The bolts and nuts may be washer faced but these faces do not take the place of a hardened washer.

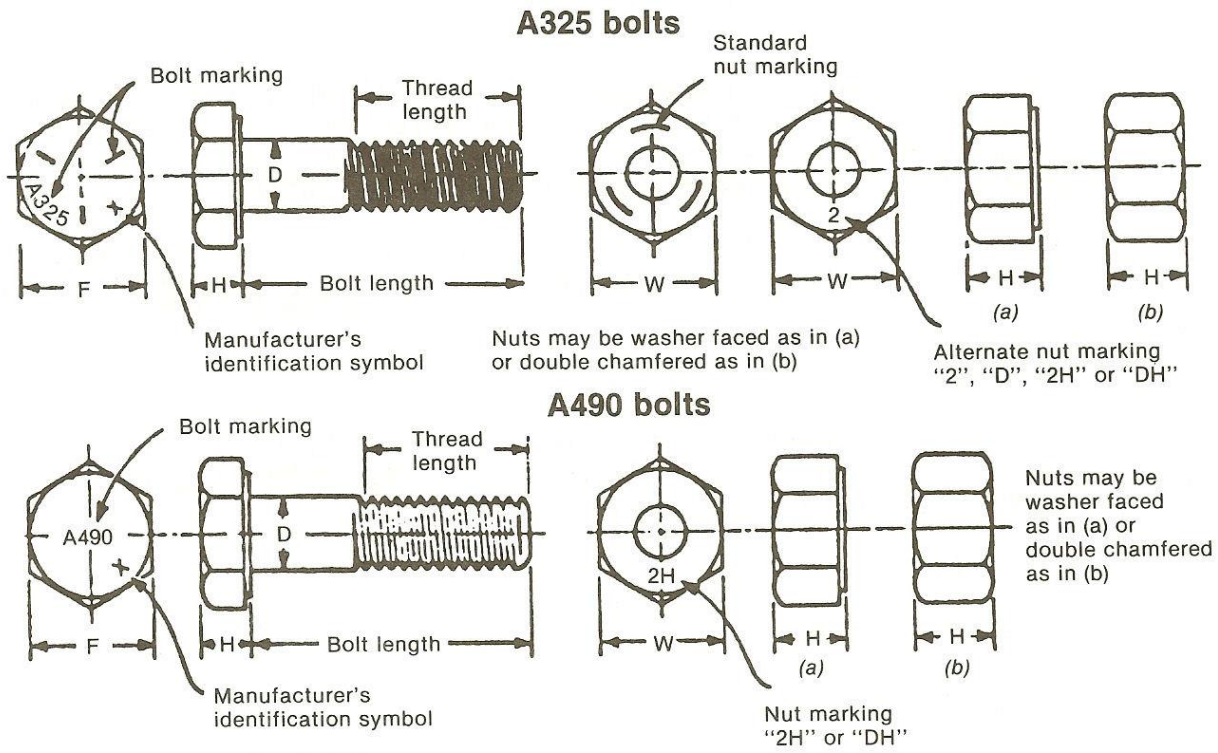
See Exhibit 10.5-J for standard markings of A-325 bolts. Washer dimensions can be found in the Standard Specifications.

Calibrated torque wrenches must be used to check all tightening operations. When impact wrenches are used, a constant check should be maintained on the initial phase of the work to ascertain that the bolt tensioning is slightly in excess of the minimum value given in the table on bolt tension and torque values in the Standard Specifications.

AASHTO M 164 (AASHTO M 164M), Type 1 bolts, nuts, and washers are used with A36 (A36M) steel and other steels which are to be painted. AASHTO M 253 (AASHTO M 253M), Type 3 or AASHTO M 164 (AASHTO M 164M), Type 3 bolts, nuts, and washers are to be used with weathering steels.

The Contractor is required to conduct quality assurance checking of the torque of bolts in each connection. Generally, not less than 10 percent or two bolts per connection should be checked. Quality assurance checking must be in the presence of the Project Engineer.

Exhibit 10.5-J ASTM Standard Structural Bolts



ASTM Standard Structural Bolts

10.5.6.2.5 Welding

All field welding must be performed by welders certified for the specific types of welds to be performed. The Project Engineer may request documentation of welder certification.

10.5.6.2.6 Painting

See Section 10.5.7.

10.5.6.3 Measurement

Structural steel is always paid by lump sum or plan quantity. No remeasurement or computations are necessary. If an error is discovered or change is made, weights specified in the AISC Manual of Steel Construction may be used to compute changes. However, it is likely some additional cost data may be necessary to more accurately assess the increase or decrease in the Contractor's costs.

10.5.6.4 Documentation

Mill test reports, certifications and shop inspection reports are required for all structural steel. Diary entries made during erection of steel should indicate all problem areas and solutions.

The systematic means of checking bolt tightening should be documented.

10.5.6.5 Reference

- *Steel Construction Manual*, American Institute of Steel Construction (AISC)

10.5.7 PAINTING OF STRUCTURES

10.5.7.1 Preliminary Review and Approval

Paint certifications must be provided prior to beginning painting.

If color samples and approval of color are required, this must be coordinated with the Contractor and the approving official.

Environmental concerns may have to be addressed, especially if there is nearby private property, traffic, or if lead or other highly toxic paints are used. In any case, the Contractor should be asked how any problems or potential problems will be mitigated.

If removal of old paint is a part of the Contract, the Contractor may be required to test, and, if necessary, dispose of the debris as hazardous waste. Laws and regulations may put constraints on how such debris is collected and stored prior to disposal. Negative pressure

enclosures may also be required. In enclosure, workers and FLH inspectors may have to take special health precautions to address the presence of lead and other toxins.

10.5.7.2 Construction Inspection.

Inspection is normally intermittent at each stage of construction.

10.5.7.2.1 Surface Preparation

The specifications should contain specific requirements as to surface preparation. Mill scale, dirt, and loose paint must always be removed. Sandblasting of deteriorated areas and perhaps the entire structure may be required. The specific requirements must be reviewed with the Contractor to be sure they are understood. In the event that Steel Structures Painting Council's (SSPC) sandblasting standards are specified, these standards should be obtained for reference. The presence of oil or grease may necessitate a solvent cleaning.

For some paints and conditions, neither surface preparation nor actual painting can be done outside certain ranges of air temperature, humidity, and dew point. For marginal cases the necessary equipment and expertise should be obtained. Generally, final surface preparation and coating application should not proceed unless the surface temperature is at least 5°F (3°C) higher than the dew point. Or, if a spot on the steel is moistened with a damp cloth, it should dry within 15 minutes if the dew point is low enough to paint.

When there are airborne pollutants in the area (steam, dust, chemicals), additional precautions may be necessary.

10.5.7.2.2 Equipment

The equipment selected by the Contractor should comply with the specifications, be clean, and in good working order. The procedure for determining thickness should be discussed with the Contractor. Initial readings should be taken on bare surfaces and the prime coat to use as a base for measuring subsequent coats.

10.5.7.2.3 Paint

Mixing of paint together with all specified additives is the single most important operation prior to application. Paint must be mixed until it becomes smooth, homogeneous, and free of surface "swirls" or pigment lumps. All settlement in the bottom of cans must be thoroughly mixed with the liquid.

It is often useful to tint second coats of prime or other intermediate coats in order for the painter to monitor coverage.

10.5.7.2.4 Paint Application

Paint must be applied in a uniform and consistent manner. Special attention to coverage is necessary in corners, behind stiffeners and bolts. Brush application may be necessary in these areas.

10.5.7.2.5 Film Thickness

Wet film thickness gauges may be used by the Contractor for process control. Dry film thickness gauges are used by the Project Engineer for verification. Chalk is useful to mark deficient areas. If deficient areas are numerous, the Contractor should be advised that the job is deficient, and ordered to check and correct it; i.e., the Inspector is not obligated to spend many hours identifying deficiencies if it is clear that the job is not ready for acceptance. Remember that the thickness gauge measures total thickness, so it is necessary to establish average readings for the prime coat(s) in order to calculate the thickness of the finish coat.

10.5.7.2.6 Multiple Coats

When more than one coat is to be applied and dust and pollution are in the air, it may be necessary to clean the surface before each coat is applied.

10.5.7.2.7 Special Tests

In addition to dry film thickness readings, some projects may require special tests such as pinhole/holiday detection, or adhesive testing (ASTM D 3359). The ASTM test method may be obtained from the Materials Engineer. The pinhole/holiday detection test requires special equipment.

10.5.7.2.8 Samples

Although paint is normally accepted by certification, FLH may, at its discretion, take samples and have them tested (usually commercially).

10.5.7.3 Measurement

Painting is normally a subsidiary obligation or paid as a lump sum. That being the case, no measurement of quantities is necessary. Changes or added quantities may be negotiated based on changes in areas painted.

10.5.7.4 Documentation

Certifications are required for all paint. Certifications and paint containers should be marked as to lot number and date of manufacture. The contract may require specific test data supporting the certifications.

For surface preparation, the IDRs should document inspection results and approvals. Photographs of passing and failing surfaces are helpful. Photographs of corners, splices, bolts and other hard to clean areas are more so.

The Project Engineer should maintain documentation of the intermittent inspections leading up to the dry film thickness measurements after each coat. The results of dry thickness readings should be documented as well as retesting (if necessary) and final acceptance.

10.5.7.5 References

- *Steel Structures Painting Manual, Volume 1, Good Painting Practice*, Steel Structures Painting Council (SSPC)
- *Steel Structures Painting Manual, Volume 2, Systems and Specifications*, Steel Structures Painting Council (SSPC)

10.5.8 REHABILITATION OF CONCRETE STRUCTURES

10.5.8.1 Preliminary Review and Approval

Rehabilitation specifications are normally detailed and method oriented. The Project Engineer should go over them in detail with the Contractor to establish necessary controls at each phase. There are normally areas shown on the plans designated for removal or corrective action. The Project Engineer must ascertain if these are “estimated” areas requiring extensive rechecking prior to authorizing the Contractor to proceed with the work, or if they have already been checked and it is acceptable to begin work.

All materials and equipment used by the Contractor are usually subject to approval prior to commencement. Traffic control procedures must also be reviewed in detail to determine if all potential problems have been properly anticipated. Equipment approval is particularly important because if such equipment is too heavy or too large it may damage additional portions of the structure as defective areas are removed.

When the specifications say “all unsound concrete is to be removed,” it is important to reach an understanding with the Contractor as to who has the authority to designate this concrete. If the Contractor can perform responsibly, there is nothing wrong with giving Contractor QC personnel limited authority to expand designated areas if they are defective, with the understanding that such areas will be added to pay quantities. If, however, the Government wants to retain complete control of the removal process, it will be necessary to assign inspectors to the operation nearly full time to approve removal or to expand areas as necessary.

In any case, it is important to discuss these problems and reach at least tentative understandings before work begins.

10.5.8.2 Construction Inspection

Inspection required for rehabilitation work is nearly continuous. Problems, changes, and the frequent necessity to approve each stage of the work necessitate this.

10.5.8.2.1 Bridge Decks

Removal operations, using approved equipment, must remove all defective concrete without significant damage to the structure. Milling must be deep enough to accommodate the overlay. Defective areas must be identified by sounding or more sophisticated procedures. Usually two stages are necessary: one to identify initial removal areas and one to check/or identify additional areas.

The COE and the Bridge Engineer (designer) should be apprised if the conditions during removal are drastically different from the conditions depicted in the contract.

Joints, reinforcing steel, and miscellaneous hardware often require repair, and the actual conditions are often not as depicted in the plans.

Replacement concrete should be inspected as required by Sections 10.5.1.2 and 10.5.2.2 as modified by any additional requirements in the contract.

10.5.8.2.2 Concrete Pavement

The contract normally has specific requirements as to slab removal, replacement, and sealing. As with bridge decks, it is necessary to respond to conditions as they actually exist if those conditions are different than those depicted in the plans.

Repair of expansion joints in concrete pavement is particularly important. Dowels that are out of line or installed improperly will defeat the purpose of the repair work.

10.5.8.3 Measurement

The contract will normally have a wide variety of pay items for rehabilitation work. The most important consideration is the determination of how additional quantities will be measured; i.e., will the Contractor have authority to perform numerous quantities of additional work and expect that work to be measured for payment. Or will only the Project Engineer have authority to authorize additional work. The answers are different for different situations, but understandings should be reached before work is started.

10.5.8.4 Documentation

Complex documentation is required for rehabilitation work. Removal, replacement, and repair items must be documented in detail, usually with drawings or sketches.

All material must be documented with certifications or test and inspection results.

Photographs are particularly important for rehabilitation work because they provide good feedback so that future designs can be improved.

10.6 MISCELLANEOUS CONSTRUCTION

10.6.1 DRAINAGE STRUCTURES

10.6.1.1 Preliminary Review and Approval

10.6.1.1.1 Pipe Culverts and Storm Drains

After the project has been slopestaked, the Project Engineer should analyze the approximate design of drainage culverts as shown on the plans, and if required, make or recommend adjustments or redesign to meet field conditions.

The contract may require that the Contractor perform this analysis and submit proposed adjustments to the Project Engineer for approval; or it may be silent on this issue, which means the Project Engineer must perform the analysis and make the adjustments prior to authorizing the Contractor to order materials and install the culvert.

The analysis will usually require that stakeout data at the culvert installation be taken and plotted in order to verify the design.

Careful consideration should be given to the following pertinent factors:

1. **Location of Structure.** The alignment and grade of the channel adjacent to the inlet and outlet of the proposed structure should be carefully studied to ensure efficient operation. If the location for any structure as indicated on the plans appears incorrect, the Project Engineer must take the necessary action to properly correct the situation, contacting the COE if there are technical or procedural questions.

2. **Type and Size of Structure.** Based on actual field conditions, the Project Engineer may come to question the type of a structure, arch versus round culvert perhaps, or the size. The Project Engineer should review design information in these situations, and should consult the COE if the question persists. Prior to establishing the lengths of manufactured culverts, the Project Engineer should review with the Contractor how culvert length are cut or manufactured. If culverts only come in say 0.25 meter or 1.0 meter increments, they should be ordered that way if possible. However, if this would involve technical compromises or waste, the culvert should be staked as necessary and the Contractor should deal with the odd length, and cutting problem.

3. **Limiting Heights of Fill.** The Project Engineer must see that the design gauge or strength of culvert pipes meets the prescribed design criteria for the heights of fill to be placed over them, if either the fill or culvert varies from what was anticipated by the designer. The design criteria are normally shown on the plans. If not, this information will be furnished by the COE via the appropriate design office personnel.

   Past culvert design methods increased metal thickness to control pipe deflection. The present emphasis, however, is on the use of proper bedding and backfill to control pipe deflection. This method has produced fill height tables with less pipe thickness for

corresponding maximum fill heights. It has also, of course, increased the need for care in inspecting bedding and backfill.

10.6.1.1.2 Underdrains

Adequate design of underdrains at the time of preliminary engineering and preparation of plans is often difficult or impossible due to limited information and time. The Project Engineer must therefore carefully evaluate the conditions on the project as the work progresses, and require underdrains as conditions warrant.

The location and depth of underdrains are governed by the characteristics of the particular soil involved, the location of the water to be intercepted, and the terrain. Numerous alternate perforated pipe materials are acceptable and have been approved for use. Prior to installation, it should be determined which material the Contractor intends to furnish from the list of specified alternates. Then their properties should be reviewed for compliance with specifications.

All available alternate pipe materials are not approved for installation beneath the traveled way. The Project Engineer must check to ensure any proposed pipe materials different from those designated on the plans are acceptable. This information can be obtained from the COE via appropriate Division personnel.

When geotextile fabric is used, the certified physical properties as well as the performance tests require review prior to installation to ensure compliance with the specifications. Division procedures may require samples for additional testing.

Granular backfill material is a vital component to the complete system. The Project Engineer is responsible for arranging evaluation of the location and volume of underground water to be carried and the permeability of the intended granular backfill material when there is any doubt the true situation was known to the designer. A change in the design of the system may be required. Assistance should certainly be requested when failure of an expensive or environmentally sensitive portion of a project seems possible. Assistance from Geotechnical, hydraulics and other design personnel may be arranged through the COE.

10.6.1.2 Construction Inspection

Once the Project Engineer and/or Inspector have reached an understanding with the contractor on proper installation, inspection of routine installations should be an occasional, as opposed to a constant task. Underdrains may require closer attention, particularly if the *design* is being done as excavation proceeds.

10.6.1.2.1 Pipe Culverts and Storm Drains

The Project Engineer must ensure a stable foundation is being prepared for all structures. Stable foundation, rock foundation, and yielding foundation all require different methods of bedding. Construction requirements and instructions will usually be found in the specifications and project plans. Information on good practice may be obtained from any of several publications available to the Project Engineer.

Silting around an inlet or outlet is caused by retarding the velocity of the stream just above or below the culvert. If sedimentation is anticipated, erosive velocities should be reduced by means of a broken grade line, stilling basins, or spillways. In unusual situations, the matter should be referred to the COE for special consideration. For pipe installation and construction procedures, refer to the CSPI publication, *Handbook of Steel Drainage & Highway Construction Products* or ACSPA publication, *Installation Manual for Corrugated Steel Drainage Structures.*

10.6.1.2.2 Underdrains

In general, the underdrain gradient should be not less than 2 percent, and stringline or grade points set by instrument should be used to eliminate pockets.

Installation for underdrain systems often reveal sources of underground water adjacent to the excavated trench and the inspector should be alert to the need for branch connections.

Outlets to underdrain pipes should be located so as not to interfere with future maintenance, be subject to damage or blockage, and cause erosion problems.

10.6.1.3 Measurement

Methods of measurement are described under the appropriate section of the Standard Specifications, Special Contract Requirements, and/or Project Plans. They should be reviewed with the Contractor in the early stages of the project, to avoid arguments later when the Contractor compares invoice length to pay length. Any confusion should be resolved early, before a significant quantity of pipe is buried.

10.6.1.4 Documentation

The Project Engineer should ensure there is a record of the field check for compliance of materials to specifications, normally by signed and dated notes and copies of invoices or certifications.

Field measurement records are required along with records of computation of all pay quantities. These measurements, computation, locations, and pay quantities should be recorded in the pay notes.

10.6.2 GUARDRAIL AND CONCRETE BARRIERS

10.6.2.1 Preliminary Review and Approval

Field conditions unknown to the designer and/or changes in the design may result in changes in guardrail needs for the project. The Project Engineer must carefully evaluate all field situations to determine if guardrail can be eliminated or if guardrail should be installed in areas where changes have occurred.

Field changes that affect drainage or slope flattening should be consistent with the 404 Permit, or an amended permit must be secured. The Project Engineer should notify the COE as soon as any permit deficiencies are known or suspected. The permit process can be a long time, so early review is best.

The AASHTO publication, *Roadside Design Guide*, is the guide for the Project Engineer when evaluating changes.

10.6.2.2 Construction Inspection

Once the Project Engineer has approved the location, length and termini of all installations, inspection should be intermittent.

Culverts and structures near guardrail areas should be checked to prevent damage during guardrail post or anchor installation.

Wooden guardrail post installation should be monitored to discourage installers shortening post lengths upon encountering impenetrable objects. Look for saw dust or cut off ends. Also areas with extra length posts specified will require extra monitoring. If problems are encountered, they should be dealt with as violations of the Contractor's QC management responsibilities.

In areas of contorted geometrics and unusual superelevation configurations, rail must be checked to ensure design height above ultimate finished grade.

10.6.2.3 Measurement

Methods of measurement must be done in accordance with instructions found in specifications.

10.6.3 FENCE

10.6.3.1 Preliminary Review and Approval

The right-of-way line is nominally the fence line, however, unless otherwise directed, the fence will be located 1 foot (0.3 meter) inside the right-of-way line. The purpose for installing fence is usually to keep livestock off of the highway. For the fence to be most effective, the wire and the livestock should be on the same side of the post. One exception to this rule is when placing fence on sharp curves the wire must be on the outside of the curve. Another exception is when the cooperating agency wants the fence on the road side for aesthetic reasons.

10.6.3.2 Construction Inspection

Fence inspection requires the Project Engineer to ensure that the fence is properly installed. This entails checking for the following:

- Post and wire spacing and gate, cattleguard, and brace panel locations are in accordance with the plans and specifications.

- The Contractor has a QC system to check all fence materials delivered to the project for compliance with specifications.
- Wood posts are of the specified soundness, quality, straightness and physical dimensions.
- Wire is of the proper gauge and meets contract requirements.
- Steel posts have the proper weight, length, cross section and finish.
- Cattleguard materials comply with contract requirements.

It is usually necessary for the Contractor to grade the fence line before installing fence, particularly if woven wire is being installed. The amount of grading to be done depends on the terrain and cover and should be held to a minimum. The unnecessary removal of native vegetation encourages weed growth and erosion. The Contractor will probably be inclined to do too much grading rather than too little, particularly if equipment such as a motor patrol is used. To prevent unnecessary disturbance, it may be necessary to require the use of hand tool grading methods. Care must be taken to preserve stakes, reference points, bench marks, etc.

It is the Contractor's responsibility to establish post locations, and the inspector is responsible for checking to see that the spacing is correct. When checking post location and spacing, it is advisable to keep in mind that the brace panels are the "anchors" for runs of fence and strong vertical post installation is necessary to provide an adequate anchorage. Line posts should be checked to make sure they are on line and plumb. Vertical alignment can be checked quickly with a makeshift plumb bob, and occasional post holes should be checked for proper depth.

Posts should be set vertical, tightly tamped, or set in concrete. Those set in concrete should be properly cured for 7 days before having wire stretched to them. The top of the concrete should be crowned to provide drainage away from the post.

When the Contractor is stretching and fastening wire to the posts, the inspector should bear in mind the following:

- Wire should be stretched from panel to panel and not between single posts.
- The top wire should be stretched first, wrapped around the post, and fastened back on itself.
- Removal of enough barbs or stays to allow for wrapping the wire around the post and back on itself will make for a nice tight wrap splice.
- Stretching the top wire first places the maximum pull on the post and the lower wires can then be added without loosening the first wires.
- Stapling should begin in the middle of the runs and progress to the ends to ensure a uniformly tight fence.
- Staples should be driven at about a 45° angle to the centerline of the post to minimize splitting.
- Staples should be driven slightly downward on level runs and over hills and slightly upward into the post in draws or depressions where the wire has a tendency to lift.

- Staples should not be driven over barbs and not driven deep enough to pinch the wire. This allows the wire to move freely through the staple to allow for expansion and contraction.

When crossing ditches or gullies, *deadmen* should be installed to keep the fence in position. This helps keep the wire from pulling posts out of the ground and plugs holes that livestock might otherwise use to go through the fence.

Wire spacing should be checked periodically. The use of a notched lath or stick can be used to simplify this procedure. Appearance of a fence is very important. A sound fence can be an attractive fence, but a fence that does not provide a pleasing appearance is a detriment to the project whether or not it is structurally sound.

10.6.3.3 Measurement

Fence is usually measured by the foot (meter) along the top wire from outside to outside of end post for each run of fence. Gates are usually measured by the each for the type and size specified in the contract. Cattleguards are usually measured by the each for the type and size specified in the contract.

Unless the plans and specifications indicate otherwise, any related work necessary to construct fence, gates, and cattleguards is not paid for separately but is considered to be included in the price paid for these items. Examples of work for which the Contractor may feel entitled to extra pay might be the installation of deadmen and any clearing and grubbing necessary to construct the fence.

10.6.3.4 Documentation

Clear, concise records must be kept of each type of fence, gate, and cattleguard installed. Information to be kept should include location, installation date, type, size, or length installed as well as any special details of construction. This might include the removal and disposal of existing facilities, any changes in type or locations, labor and equipment used, or any other information that may be considered pertinent. Certifications of compliance for manufactured materials incorporated in the work must also be included.

10.6.4 CURB, GUTTER, WATERWAYS AND SIDEWALK

10.6.4.1 Preliminary Review and Approval

Curbs primarily contain, control, and direct surface runoff to inlets, catch basins, outlet ditches, and other drainage control features, but they also serve to define the limits of the roadway and help confine vehicular traffic to the traveled way. They are a part of the roadway that is most visible to the public and as such, finished appearance is of utmost importance.

The inspector should begin by becoming familiar with the layout details shown on the plans. Curb and gutter profile should be closely checked to minimize constructing *birdbaths*. The location of curb and gutter must be closely coordinated with other drainage features to ensure construction of an efficiently functioning drainage control system.

10.6.4.2 Construction Inspection

10.6.4.2.1 Preparation

It is the Contractor's responsibility to set stakes for these items, but it is the inspector's responsibility to check the accuracy of those stakes. Particular care must be taken on checking the profile grade when roadway grades are relatively flat. Steeper grades tend to minimize the potential for *birdbaths*, but grades are still important from the standpoint of appearance. Steeper grades tend to magnify irregularities in profile grade. Horizontal alignment is primarily important from the standpoint of appearance. Existing edges of pavements or sidewalks cannot be depended on for accurate line and grade and often, the final alignment must be an *eyeball* adjustment.

Waterways will often have to be slightly deeper where steep downhill slopes transition to flatter slopes. Waterways may also need special treatment on the outside of horizontal curves where water may have a tendency to overflow. The typical curb and gutter cross section will normally show a gutter cross slope intended to keep the water in the gutter and away from the roadway. With gutter installations on the high side of a superelevation, the design should provide for an inlet or ditch to get rid of the water before it crosses the road. Then the slope on the gutter should be transitioned to match the superelevation of the roadway.

Curb, gutter, and sidewalk is normally placed on a foundation of compacted crushed aggregate base course. Before placing this crushed aggregate, the existing soil must be brought to the proper grade and compacted. Any soft, muddy or unstable material must be removed, replaced, and compacted with good stable material. Nonuniform or inadequate compaction of the crushed aggregate or underlying soil will result in settlement of the curb, gutter, and sidewalk, creating drainage problems and increased maintenance costs.

When waterways and similar structures are placed on very steep slopes, the use of highly permeable foundation material should be avoided; otherwise piping under the structure can cause undermining.

10.6.4.2.2 Concrete Placement and Finishing.

Concrete design, production, placement, and testing is to be performed in accordance with the appropriate sections of the specifications as indicated on the plans.

Immediately prior to placing concrete, the forms and compacted base course should be moistened with water. It is desirable for the material with which the plastic concrete comes into contact to be damp, but standing water (puddles) should not be allowed. For proper curing of the concrete to occur, the mixing water in the concrete must be retained. This is achieved through prewetting and proper curing procedures.

Proper consolidation of the concrete is important and often neglected. Proper vibration of such a small (shallow) mass of concrete is not easily accomplished, but should be required.

The reason for consolidating (compacting) the concrete is to mold it in and around the forms and imbedded parts such as reinforcement, and to eliminate rock pockets and entrapped air.

Placement is more easily accomplished if the slump is to the high side of the specification range but finishing and forms stripping may be delayed. Concrete should be placed in the forms as close as possible to its final position. Any vibration or manipulation of the mixture should be only that necessary to form a dense, consolidated mass.

Strikeoff or screeding is the process of striking off excess concrete to bring the top surface to the proper grade. In manual methods, the device used is called a straightedge; however, in some instances it may be curved to achieve the desired template. It may be desirable, for instance, for a sidewalk to have a slightly curved surface to facilitate drainage. The screed, or straightedge, is moved across the concrete in a sawing motion as it progresses with a slight surplus of concrete ahead of it to fill the low areas as it passes.

Edging, jointing, and floating all must take place somewhat simultaneously. Edging densifies and compacts the concrete slab next to the form where floating and troweling are less effective, making it more durable and less vulnerable to spalling and chipping. Jointing, when properly done, can control unsightly random cracking. Contraction joints can be formed with the use of a jointing tool or form material and should be approximately 1/8 inch (3 mm) wide. Expansion joints are normally 3/4 inch (20 mm) and formed with some type of preformed joint material. Spacing should be as indicated on the plans.

Floating accomplishes several things. It imbeds the aggregate particles just beneath the surface; it removes imperfections in the surface; and it keeps the surface open so excess moisture can escape. Floating produces a relatively even texture that has good slip resistance and is a good finish for sidewalks. In some cases it may be necessary to lightly roughen the surface with a broom to achieve a good nonskid surface. Overworking of the surface during finishing should be avoided, as this will bring an excess of water and fine material to the surface and defects can result. Floating, or finishing, should not commence until the plastic concrete has lost its initial sheen of moisture. No water should be added to the surface during finishing operations. The tendency is to float the surface too soon while the concrete is too soft.

If slip form installation is used, the Contractor's QC plan should address significant quality issues, particularly grade control, foundation preparation, and density. Sometimes slipform crews have a tendency to overtake the grading crews.

10.6.4.2.3 Final Finishing and Curing

Forms should be removed as soon as the concrete has taken its initial set. This will permit the timely repair of minor defects in the surface with mortar (1 part cement/2 parts sand). The curbs should be inspected for irregularities in line and grade. Since the concrete is still plastic, minor adjustments in alignment can be made by placing a long board against the curb and striking it with a sledge hammer.

After final finishing and while the concrete is still moist, it should be cured in accordance with specification requirements. If curing is accomplished with the use of some form of covering to retain the moisture (e.g., moist burlap or mats), the covering must be checked periodically to ensure the concrete remains moist for the required curing period (usually 3 days). If curing compounds or seals are used, care must be taken to ensure it is sprayed uniformly over the entire exposed surface area of the concrete. The purpose is to seal in the moisture in the concrete so care must be taken to achieve this result. During the curing period, the concrete must also be protected from damage by people and vehicles. Sidewalks being cured with clear

or lightly pigmented curing compound are particularly susceptible to pedestrian traffic because to some, it may not appear to be fresh concrete. Clear curing compound normally has a slight pigment that aids in monitoring proper coverage but will dissipate soon after application.

10.6.4.2.4 Asphalt Installations

Asphalt curbs and waterways usually require an experienced crew and special equipment. Increased asphalt content is necessary since compaction will not be as high as with paving mixes. However, the Contractor should have a means to get reasonably good compaction and a tight surface texture.

10.6.4.3 Measurement

Concrete curb and curb and gutter combination is usually paid for by the foot (meter) measured along the front face of the curb at finished grade elevation. While in theory measurement should be on an *as staked* or *as ordered* basis, in reality it is easier to measure after construction. However lengths and areas clearly not authorized by the Project Engineer, should not be paid for.

Measurement is normally continuous through drainage structures and curb cuts (driveways).

Sidewalks are usually measured and paid for by the square yard (meter) of finished surface. Items often found in a sidewalk such as junction boxes, valve boxes, etc. are normally not deducted from the measured quantity for sidewalk as long as these individual appurtenances have a surface area of one square yard (meter) or less. It is always advisable to check the method of measurement for these particular items in the specifications to determine how they should be measured.

10.6.4.4 Documentation

Records should show the following:

- date the forms were ready,
- dates concrete was placed,
- type of curing utilized, weather conditions,
- name of inspector and description of work inspected,
- quantities placed, and
- any corrective actions that may be taken.

A brief narrative of the concrete placement operations becomes invaluable if it is necessary to retrace events should some type of failure occur.

Concrete quality records should be kept to reflect the specification requirements in the contract. If the specifications allow acceptance by certification, the certification should be checked to ensure specification requirements are met.

10.6.5 SIGNING, DELINEATORS, AND STRIPING

10.6.5.1 Preliminary Review and Approval

10.6.5.1.1 Signing

The Project Engineer should, when possible, review the plans and specifications applicable to the permanent signing well in advance of the actual placement. The following areas should be reviewed:

- Sign location for possible obstructions to visibility and possible right-of-way problems;
- Effectiveness of locations;
- Appropriateness of the sign message for the situation; and
- Adequacy of signs to convey guidance, regulation or needed information to the traveling public.

If there are any changes considered to be necessary for complete and accurate signing, the Project Engineer should coordinate these matters with the appropriate designer and COE.

10.6.5.1.2 Delineators

Although delineators are one of the last items to be constructed, it is important to generally review the standards and specifications early on with the Contractor so it is known exactly what hardware is needed from the supplier. The Contractor should also be made aware of its responsibilities related to staking and placing the delineators.

10.6.5.1.3 Striping

Although striping is one of the last items to be constructed, it is important to generally review the applicable standards and specifications early on with the Contractor so the material and equipment needs are known.

The plans should contain a striping location plan. If not, the Project Engineer should consult with the designer for help in arriving at a suitable plan.

If the striping location plan does not provide detailed information concerning location for no-passing zones, the Project Engineer should not *eyeball* such. The *Manual on Uniform Traffic Control Devices* is very specific concerning layouts for no-passing zones. Special equipment and know how is required to determine where the no-passing zones should be located. Again, consult with the designer for help.

10.6.5.2 Construction Inspection

10.6.5.2.1 Signing

The construction inspection should generally consist of the following:

1. **Specifications.** Check the sign hardware for conformance with the applicable standard plan and specifications.

2. **Layout & Legend**. Check the sign locations and applicability of sign legends as per the approved plans.

3. **Alignment**. Check the sign panel alignment as per applicable standard plan and/or the *Manual on Uniform Traffic Control Devices*.

4. **Night Check**. When permanent signing is complete, drive the project at night as a final check as to the clarity and visibility of the signing network.

10.6.5.2.2 Delineators

Prior to actual placement of the delineators, the Project Engineer should discuss with the Contractor the appropriate horizontal spacing and lateral offset for the delineators. Usually the actual staking of the delineators will be done by the Contractor using the spacing guide provided in the plans.

The Project Engineer should be ensured during the course of delineator placement that the placement locations are adequate. In the absence of a Standard Plan for delineator placement, the Project Engineer should use the *Manual on Uniform Traffic Control Devices* for delineator placement criteria.

The Project Engineer should take the necessary precautions to ensure that the delineator posts are materially acceptable.

10.6.5.2.3 Striping

Prior to actual placement of pavement markings, the Project Engineer should discuss with the Contractor the general process that will be required to develop a specification product. This discussion should include the following:

1. **Equipment**. The requirements for the paint application machine.

2. **Geometrics**. The geometrics of the paint stripe, including the stripe width and skip pattern.

3. **Application Rates**. The application rates for the paint and beads.

4. **Temperature**. The application temperatures.

5. **Preparation**. Necessary preparatory work prior to striping.

During the actual placement of paint stripes, the Project Engineer should randomly check the application rates for the stripes and beads. This check should be recorded appropriately.

10.6.5.3 Measurement

Signs and delineators are usually paid for by each; therefore, no physical measurement is required for pay quantities.

When payment is by the square foot (meter), computations should be based on the dimensions shown in the plans, after occasional verification. Striping materials are normally paid by the foot (meter) for each type of striping. Measurement of broken lines includes gaps. Measurement based on centerline stationing is adequate for conventional roadways.

When paint for striping is paid for by the gallon (liter), measurement should be based on the quantity used after a yield check to verify coverage in an acceptable range (plus or minus 10 percent recommended). Wastage or quantities outside the acceptable range should be deducted.

10.6.5.4 Documentation

Adequate recorded notes bearing a validated acceptance statement for each sign installation along with appropriate certification for sign face material is acceptable in a pay note record for payment justification.

The installed delineators should be physically counted and the actual number recorded in a pay note. The pay note entry should contain a validated acceptance statement, which will be used as the source document for payment justification.

The record should also include documentation concerning FLH's physical evaluation of the weight and cross-section properties of the delineator posts. This does not have to be part of the source document. Documentation should include certifications for beads and paint based on AASHTO standards.

The Contractor should furnish the Project Engineer with correspondence documenting the total gallons (liters) of paint used. The Project Engineer should check the application rate with a yield analysis. The actual quantity for payment along with the yield analysis should be documented in a pay note. This and the certifications as discussed above will be source documents for payment justification.

10.6.6 SLOPE PROTECTION

10.6.6.1 Preliminary Review and Approval

Section 404 of the Clean Water Act requires permits for the alteration of banks within waters or wetlands. The Project Engineer must be aware of conditions that require a permit and verify that the 404 permit was obtained. Stipulated conditions contained in the permit should be reflected in the plans, and in any event should be adhered to during construction.

Riprap is discussed in the specifications and will generally call for a certain gradation and quality requirements and will probably be paid for under a riprap item. Slope protection may be used to accomplish the same intent but will more than likely be produced from unclassified excavation and may be specially sorted or preserved material paid for as a normal unclassified excavation or embankment item. It will probably not have a specified gradation or quality requirement.

References to riprap that follow will also generally pertain to slope protection.

Field conditions unknown to the designer and/or changes in the design may result in change of beginning and ending points for riprap. The area where riprap is to be placed should be reviewed after field staking to be sure intended bank stabilization or erosion prevention will be accomplished. Field changes should fit the 404 Permit, or an amended permit secured. The Project Engineer should notify the COE as soon as any permit deficiencies are known or suspected. The permit process can take a long time, so early review is best.

Sources proposed by Contractors for rock riprap should be considered as described in Chapter 11 herein, and the project specifications.

10.6.6.2 Construction Inspection

Foundation trenches, when required, must be constructed and measured for payment as detailed on the project plans prior to placement of riprap.

Filter blankets and/or filter fabric, when required, must be placed on the prepared slope prior to placement of riprap. Except as inspector presence is required for these purposes, or to make or review riprap quantity records depending on basis of payment, slope riprap need only be inspected at critical points.

10.6.6.3 Measurement

Method of measurement must be in accordance with instructions found in the specifications. Riprap is normally measured in place, but may also be weighed, or perhaps be incidental to the excavation item.

10.6.6.4 Documentation

The Project Engineer is responsible for arranging documentation of the required compliance with specifications and for the field measurement notes and computation for all pay quantities. However, if payment is incidental to another item(s), diary records may well be adequate. If measured in the haul vehicle, weigh ticket collection is appropriate. Photographs are particularly helpful after a flood in documenting that subsequently covered riprap was placed.

10.6.7 LANDSCAPING

10.6.7.1 Preliminary Review and Approval

Commercially produced landscaping materials including seed, fertilizer, mulch and irrigation hardware are normally accepted by certification. Topsoil, sod, and plants may be inspected and accepted on delivery, or agreement may be reached with the Contractor for inspection and preliminary approval of the source. The Project Engineer may request assistance from the COE if the source is a long way away or if more expertise is needed.

It is important to meet and reach agreement with the landscaping Contractor prior to beginning work. Such agreement should include:

- Use of previously approved or certified materials only.
- Final layout or staking of limits of the work.
- Level of inspection and notice to the Government when work is to be done.
- Limitations of planting seasons.
- Groupings of plant areas for purpose of acceptance and/or beginning of plant establishment period.

In the very rare situation where there is a separate landscaping contract related to a construction contract, it is important that the construction contractor be advised of the landscaper's schedule and intentions in order to prepare all areas for planting in a timely manner. Although the two contractors are obligated to cooperate, the Government is obligated to provide reasonable site availability to the separate landscape contractor.

10.6.7.2 Construction Inspection

Landscaping requires intermittent inspection at the completion of various phases.

Comprehensive inspection is normally required at the beginning of seeding operations and perhaps for the duration of such operations if the Contractor seems incapable of functioning responsibly without inspection.

10.6.7.2.1 Seeding and Sod

The limits of the work must clearly be communicated to the Contractor by stakes or by the continuous direction of the inspector.

Quantities for seeding should have already been computed by the inspector so that yield and quantity checks of seed, fertilizer, mulch, etc. can be made.

10.6.7.2.2 Plants

The Project Engineer may locate and stake each individual plant or group of plants, or the Contractor may simply be advised to rely on the plans if the plans are detailed enough to use without staking.

Holes for plants must be prepared in accordance with the plans and specifications including all topsoil, mulch, and fertilizer as required.

Plants that are significantly damaged through mishandling, drying or freezing must be rejected even if they were previously accepted.

10.6.7.2.3 Establishment Periods

The beginning and end of establishment periods for each plant or group of plants should be clearly understood by the Contractor and so documented. On large, complex projects, acceptance by large groupings is recommended to avoid the necessity of keeping track of individual plants. Normally, replacement of dead plants is required only at the end of the establishment period, and there is only one establishment period; i.e., a new establishment period is not started if a dead plant is replaced. However, all plants must be simultaneously alive at final acceptance.

10.6.7.2.4 Watering and Maintenance

Normally, if there is an establishment period, the Contractor is responsible for watering and maintenance during that period without additional compensation. If payment is provided for watering, the Project Engineer or inspector must exercise some control over when it is needed and how much is needed.

10.6.7.3 Measurement

Items paid by the square yard (square meter) or area measurement are measured parallel to the ground surface. Measurement should be made prior to installation of the work, and copies of computation should be furnished to the Contractor for use in settlement with its subcontractor.

Plants are normally paid by the unit of each. Payment may be made for planting except that if there is an establishment period, the contract may authorize a retent until the end of the establishment period. A 25 percent retent is suggested if none is specified.

If watering is measured for payment, the Contractor may be requested to keep a daily log of quantities and placement locations. Occasional checks of the adequacy of this log will usually suffice unless there is reason to suspect it is not being properly kept.

10.6.7.4 Documentation

Certifications or inspection reports are required for all materials. Quantity computations for items paid by area may be recorded in the pay notes.

Plants require documentation as to:

- when planted,
- scheduled end of establishment period,
- condition at end of establishment period, and

- when replaced (if so ordered).

For water, the log completed by the Project Engineer, or the Contractor if authorized, should show each load, quantity, time, and where placed. If the Contractor is keeping the log, it should be collected and reviewed daily.

10.6.8 MAINTENANCE OF TRAFFIC

10.6.8.1 Preliminary Review and Approval

At the time of the Preconstruction Conference, the Contract Traffic Control Plan should be reviewed with the Contractor. Modifications within the latitude of the contract will be made depending on the Contractor's plan of operations and existing field conditions. The Project Engineer will then direct the Contractor, in writing, to furnish the required devices.

Prior to beginning construction, the Project Engineer will reach an understanding with the Contractor relative to the following items:

- The identity of Contractor personnel directly responsible for traffic control and maintenance of devices.
- Procedures for anticipating the need for, and ordering, of signs and traffic control devices. In situations where there is high attrition or substantial lead time in ordering replacements, spare signs and replacements should be ordered and stockpiled.
- Procedures for setting up and removing groups of devices.
- Procedures for inspecting, cleaning and maintaining devices.
- Procedures for off-duty hours inspections.
- Procedures for covering or removal of unnecessary signs.
- Training and procedures to be followed by flaggers.
- Training and instruction of other Contractor personnel.
- Procedures for movement of Contractor equipment through the project.
- Facilities for employee parking.
- Emergency (accident) procedures.
- Storage of equipment and materials.

Substantive points deriving from these discussions should be documented in the project files.

The continuing effectiveness of the Contractor's traffic control procedures will require monitoring by the Project Engineer. This monitoring will be systematic and thorough until it is determined that the Contractor's procedures are adequate. At that point, the Project Engineer's efforts can

be reduced to periodic monitoring. Monitoring efforts will include after hours, nighttime, and non-workday situations.

A dialog should be established between FLH personnel and the local policing authority, which will result in feedback on the effectiveness of the traffic control schemes, warnings of potential deficiencies, and advice on possible improvement. The police should be supplied with emergency telephone numbers of the Contractor and FLH personnel who can take action to restore major traffic control devices that are destroyed or damaged.

As a part of normal field reviews, COEs and other FLH personnel will review the adequacy of the traffic control procedures, discuss findings, and ensure necessary corrective actions are taken by the Contractor.

10.6.8.2 Construction Inspection

10.6.8.2.1 General

All FLH project staff should be cognizant of the quality and effectiveness of the Contractor's traffic control. On complex projects with high exposure, an experienced inspector should be assigned to have primary responsibility for monitoring the Contractor's traffic control. The Contractor, however, should not be allowed to let FLH assume responsibility for the traffic control. If this seems to be happening due to lack of commitment by the Contractor, written notice should be provided.

The following are guidelines for evaluation of construction traffic control.

- Work sites should never present a surprise to the motorist. Thus, frequent or abrupt changes in geometrics should be avoided. Well-delineated transitions, long enough to accommodate driving conditions and the speeds vehicles are realistically expected to travel, should be provided at lane drops, reductions in roadway or lane width, detours, etc.

- The roadway should be kept clear of obstacles as much as possible. Flaggers, other workers, and objects such as traffic-control devices and construction equipment should not be permitted in the roadway except when their useful presence clearly outweighs the hazards they present.

- Obsolete pavement markings should be removed in such a manner as to eliminate any misleading cues to drivers under all conditions of light and weather. Where temporary pavement markings are required, consideration should be given to use of highly visible markings that can be easily placed and removed, such as raised reflective markers.

- On very short-term maintenance projects, removing existing markings for the projects' duration may be more hazardous to both workers and motorists than leaving the markings in place. If so, special attention must be paid to providing additional guidance by other traffic control measures to overcome the misleading effect of the markings left in place. Special treatment should be given to areas where a joint between pavements of different colors or textures may create a misleading cue.

- All devices used in the traffic-control setup should be clearly visible to motorists at all times. This means they must be adequately reflectorized or illuminated, as appropriate, and kept clean and in good repair. All devices should be removed immediately when no longer needed. Signs that do not apply to the existing conditions should be removed, completely covered, or turned so as not to be read by passing motorists.

- Areas outside the traveled way should be designed to accommodate errant vehicles. Equipment, materials, and debris should be located as far from the roadway as possible, and protected by effective, safe barriers when within 30 feet (10 meters) of the roadway. Barriers are warranted at work site locations where the severity of a collision with a roadside feature would be greater than with the barrier or where encroaching traffic may threaten workers safety.

- All vehicles, including workers' and Contractor's, should be prohibited from parking adjacent to the traffic lanes. Special parking areas, well out of the recovery area, should be designated.

- Provisions should be made for disabled vehicles or other emergency situations on all but the shortest projects. If it is impossible to provide a continuous, substantial shoulder throughout the project, other alternatives should be provided, such as periodic turn-outs or heavy patrolling of the project.

- When a firm schedule and final traffic control plan have been decided on, a public information campaign should be conducted to alert motorists. Often the local government or cooperating agency will assist in such efforts. The amount and type of effort will depend on the type of control (short time, off-peak periods, etc). In addition, cooperation of the responsible enforcement agencies should be enlisted.

- Work sites should be carefully monitored under varying conditions of traffic volume, light, weather, etc., to ensure that traffic-control measures are operating effectively.

Exhibit 10.6-A is a basic checklist for construction traffic control, usable by inspectors and Contractor personnel in the monitoring of work zones. Consult the project plans, specifications and design narrative for additional requirements.

Adverse answers to any of these questions should result in action to eliminate or minimize the problem.

Exhibit 10.6-A Basic Checklist for Traffic Control

CHECKLIST FOR TRAFFIC CONTROL INSPECTION

Project: _____ Inspector : _____

Date: _____

1. **Advance Signing**

Item	Yes	No	Comment
a. Are signs clean, visible, and well maintained?			
b. Are inappropriate signs removed or completely covered?			
c. Do the signs concisely tell the driver exactly what to do (preferred) or what to expect?			
d. Is delineation and channelization adequate if the driver fails to heed the advance signing?			

2. **Hazards**

Item	Yes	No	Comment
a. Are hazards in the construction zone delineated properly?			
b. Is it clear how pedestrians, bicycles as well as cars are to pass through the construction zone safely?			
c. Are there hazardous conflicts with construction traffic?			
d. Is opposing traffic clearly and effectively separated?			
e. Are "blind" or unexpected hazards given special attention?			
f. Is the roadway surface being properly maintained?			

Exhibit 10.6-A Basic Checklist for Traffic Control (Continued)

3. **Delineation**

Item	Yes	No	Comment
a. Is the path through the construction zone clearly delineated with drums or other suitable devices.?			
b. Is delineation adequate in nighttime or bad weather conditions?			

4. **Flaggers**

Item	Yes	No	Comment
a. Are flaggers clearly visible with advance signing?			
b. Are flaggers effectively in control of traffic?			

10.6.8.2.2 Analysis of Accident Data

On all projects, and in particular complex projects with high exposure, the Project Engineer should analyze the circumstances of accidents occurring in and around the work zone. This procedure should involve contacts with the policing agency, including a request to obtain copies of accident reports. Analysis should be critical of the Contractor's traffic control; i.e., even if an accident was caused by driver error, a better traffic control scheme may have prevented it. There should be periodic feedback to Project Development as to the effectiveness of standards for construction traffic control.

10.6.8.2.3 Detours

For the protection of the public, or for the protection of the highway from damage during storms or particular construction operations, the Contractor may find it advisable to bypass traffic over detours in lieu of maintaining traffic along the improvement as provided by the contract documents. Such a change will require the issuance of a contract modification. The detour may be opened to traffic after the general plan has been approved by proper authority and the contract modification approved. In order that the State or County may be advised, and the public in turn notified several days in advance of the opening, the Project Engineer should notify the COE of the exact date that the highway will be closed and the detour put into use. The same procedure of notification will be followed in the case of special detours shown on the plans. This procedure need not be followed when traffic is bypassed around a structure, or other work, for comparatively short distances and for short periods of time. This type of bypass will generally be considered as maintaining traffic along the traveled way.

Under emergency conditions, the Project Engineer may close a highway to traffic for the protection of life and property without prior approval, but the COE should be notified as soon as possible. Should such circumstances arise, the Project Engineer must immediately notify law enforcement and local authorities having jurisdiction over the road.

If a highway is closed without prior warning to the public, the Contractor should be required to station flaggers at each barricade to advise the public that the road is closed, why it has been closed, what detours can be used to best reach desired destinations, and the approximate length of time the highway will be closed. Detours and temporary roads must be adequate to accommodate the volume and type of traffic using them. Unless otherwise proved in the plans, they should be two-way roads of sufficiently high standard that traffic may be maintained with safety and without undue inconvenience to the traveling public. The Contractor cannot be expected to improve the standards or raise the surface of an existing road used as a detour, without compensation. Whenever a detour is to be discontinued and the highway opened to traffic, the Project Engineer must so notify the jurisdictional authority.

The permission to close or not close a public road to traffic is considered a condition of the contract and therefore, the Contractor should not be permitted to close a road solely for convenience unless:

1. The COE obtains approval

2. The cooperating agency concurs and

3. An equitable price reduction or determination that the closure is in the Government's interest is made.

10.6.8.2.4 Nonconstruction Traffic Control

No FLH survey or other activities should be attempted on or adjacent to a traveled roadway without traffic warning/control procedures conforming to Part VI of the *Manual on Uniform Traffic Control Devices* and other FLH standards. When such activities are performed adjacent to a construction project, the Contractor may be ordered (and paid) to provide proper signing and control. Otherwise the party chief or team leader should arrange for such signs and devices prior to embarking on the assigned task.

10.6.8.3 Measurement

Orders for traffic devices should include replacement or standby devices if high attrition is expected and delays in ordering replacements are anticipated. Once ordered, the Contractor is responsible for reordering and replacing devices at no additional cost.

If the Contractor's maintenance of traffic control devices is deemed unsatisfactory, the Government may withhold payment for such devices and ultimately may make permanent deductions in accordance with FAR Clause 52.246-12(f). If this is done, there must be written notice of the deficiency giving the Contractor the opportunity to take corrective action.

10.6.8.4 Documentation

Inspections and deficiencies should be documented in the project diaries or IDRs along with the corrective action ordered and accomplished.

Chapter 11 – MATERIALS
TABLE OF CONTENTS

Section **Page**

11.1 General 11-1

11.2 Source Approval 11-2
11.2.1 General 11-2
11.2.2 Government Provided Sources 11-2
11.2.3 Contractor-Located Sources 11-3

11.3 Material Production 11-4
11.3.1 Number of Samples to Submit for Verification Testing 11-4
11.3.2 Material Not Meeting Contract Requirements 11-4
11.3.3 Pay Factor Projections 11-5

11.4 Material Storage 11-6

11.5 Sampling and Testing 11-7
11.5.1 Records and Reports of Materials 11-7

11.6 Acceptance 11-8
11.6.1 Determining Acceptance 11-8
11.6.1.1 Visual 11-8
11.6.1.2 Certification 11-8
11.6.1.3 Measured and Tested 11-9
11.6.1.4 Statistical 11-9
11.6.2 Non-Conforming Material or Work 11-10

CHAPTER 11

MATERIALS

11.1 GENERAL

Materials incorporated into highway work are of three basic types:

1. Off-the-shelf commercial items, which are represented by the manufacturer as meeting a standard or industry specification (e.g., guardrail, traffic paint, and culvert pipe).

2. Commercial items manufactured specifically to meet the requirements of FLH, or that are of sufficient criticality to require inspection and quality assurance by FLH or an organization engaged by FLH (e.g. structural steel and precast structural elements). Testing and inspection of commercial items, other than off-the-shelf items will generally be conducted at the site of manufacture by specialists engaged by FLH. Often, State DOT personnel will be engaged to perform these quality assurance functions. Tests for locally produced materials will be performed by Contractor or FLH personnel as per the contract requirements.

3. Items manufactured at or near the site of work by the Contractor, subcontractor, or supplier, and that are subject to routine inspection and quality assurance procedures by FLH (e.g., asphaltic concrete and aggregate base course).

This chapter provides guidance for source approval, sampling and testing, and acceptance of materials produced at the project, as well as guidance for accepting commercially produced or manufactured items.

Specific materials requirements are stated in the Standard Specifications, special contract requirements, and plans. The *FLH Field Materials Manual* is the primary guide for sampling and testing materials.

11.2 SOURCE APPROVAL

11.2.1 GENERAL

The Standard Specifications require the Contractor to notify the Project Engineer of all proposed sources of materials at the earliest date possible. These sources should be reported immediately to the COE so that necessary arrangements may be made for the testing of materials. If the Contractor is to do sampling and testing (e.g., as for Contractor-proposed sources of crushed aggregates), the COE will make known, before the work is started, any requirements relative to the size and numbers of samples not otherwise explicit in the contract.

The Standard Specifications usually provide the Contractor the option to furnish materials from sources shown on the plans or described in the special contract requirements, or from Contractor-furnished sources. In any case, the Contractor is to determine the amount of equipment and character of the processing required to produce specification materials.

11.2.2 GOVERNMENT PROVIDED SOURCES

Copies of all preliminary engineering, materials, and subsurface data, such as soil profiles, boring log data, materials sources, borrow area diagrams, material source options, use permits, and test reports, should be on file at the project office. The Project Engineer should consult with the COE to ensure that all preliminary materials information has been made available.

If the Contractor attempts, using reasonable and accepted industry processing practices, to produce specification material from a Government source, and is unable to do so, the Contractor may be eligible for an equitable adjustment for increased costs incurred in producing material from a new source. This additional compensation may include the costs of equipment moves and setup, additional haul, and additional costs, if any, of producing the material. To determine if the situation calls for a contract modification, the COE and appropriate specialists will have to evaluate the situation and agree that the Government source is not acceptable.

The Contractor is responsible for producing a material that meets gradation and plasticity requirements by appropriate crushing, screening, and even reasonable wastage. On the other hand, processing cannot change characteristics such as soundness, abrasion, or stripping resistance of the aggregate, nor the quantity of material in the deposit. Therefore, the Government is responsible for the ability of its proposed sources to yield material of the character and quantity indicated in the contract.

Care should be taken to ensure that all reasonably available material is secured from a source before the Contractor is authorized to move to a new source. Different formations in sources and other factors affecting production should not be used as reasons for abandonment, when acceptable material can be reasonably produced.

Extraction methods, land use, and quantities of material located on U.S. Government property should be discussed with a representative of the land managing agency prior to beginning construction to ensure understanding of what is in the contract.

11.2.3 CONTRACTOR-LOCATED SOURCES

The Contractor is required to submit certain information relative to any proposed materials source other than a source shown by the Government in the contract as acceptable. The COE will, with consultation with Materials, review the Contractor's test results and quantity data before approving and authorizing Contractor-located sources.

Exploration requirements to demonstrate aggregate source quality can be found in the contract.

11.3 MATERIAL PRODUCTION

The FP identifies the production sampling and testing requirements in the table included at the end of each section ordering the work (e.g., Section 301, Section 401, etc.). Review these tables to determine what sampling and testing is required during production of the intended item(s).

11.3.1 NUMBER OF SAMPLES TO SUBMIT FOR VERIFICATION TESTING

To determine the number of samples required for verification testing, FLH quality assurance personnel should do the following:

- As the Contractor is producing material, obtain the Government's split of all samples taken by the Contractor. Forward the split samples to the Materials Lab for verification testing according to Division procedures.
- Compare the lab's results to the Contractor's results to verify the quality control process.
- If the Contractor's results are verified, only submit 10% (at random) of the remaining samples. You should still obtain all of the split samples, but hold the other 90% at your project office until all of that particular material has been placed on the project and you have discussed material disposition with the COE or Materials Engineer.

The test results must also be reviewed to determine compliance with the Contract specifications. Because gradation target values would not be established at this point, the test results should indicate consistent production that is within the broadband specification limits. Consult with the COE or Materials Engineer to discuss all quality control test results.

If the test results indicate even the smallest of problems, Division policy may require that the Project Engineer forward all samples to the Materials Lab for testing until you and the COE are confident that problems are corrected and that acceptable material is being produced. Alert the Contractor to the problems and do not hesitate to obtain assistance from the Materials Engineer.

11.3.2 MATERIAL NOT MEETING CONTRACT REQUIREMENTS

If the test results indicate that the material does not meet the requirements for one or more characteristics, the Contractor is required to modify its material production methods. It may be necessary to issue a stop work order for material production. The Contractor may want to continue at its own risk. Every situation and project is different, but it is suggested that you do not allow the Contractor to proceed with production. If production proceeds, it could result in 40,000 tons of unacceptable material instead of 1,000 tons. Also, allowing the Contractor to proceed doesn't solve the problem. It only pushes the issue to a later, and more costly, point in the project.

The stop work order is a serious action, and it must be discussed with the COE and CE before issuance.

11.3.3 PAY FACTOR PROJECTIONS

Enter the production test results into the QL-Pay program to project the pay factor. For most items, the pay factor can be reasonably predicted if the material is handled properly and segregation is minimized. For items such as paving aggregates, which usually have multiple stockpiles, it becomes difficult to predict the pay factor because the blend ratios usually won't be established until after crushing is complete.

In both cases, you can also compare the results of the materials lab with the Contractor's results. This may help identify any procedural problems that the Contractor may be having with its testing program.

11.4 MATERIAL STORAGE

The Contractor is responsible for handling and storing materials in a manner that preserves their quality and fitness for the work. If the Project Engineer comes to believe the Contractor's handling and storage operations will be detrimental to quality, and the belief continues after consultation with, and/or suggestions to the Contractor, the Project Engineer should consult with the COE regarding directed operations and/or payment for preliminary work. The Government always has the right to retest materials to verify that they have not been degraded by contract operations or the lack of adequate protection. The Government can decline to make advance payment for materials that are not being stored and protected from degradation.

11.5 SAMPLING AND TESTING

The *FLH Field Materials Manual* explains verification of Contractor testing as well as independent assurance sampling and testing, including required frequency. The Project Engineer will need to monitor these functions or at least be aware of the requirements, and advise the COE and Materials Engineer when construction operations require them to perform required functions.

Pursuant to FAR Clause 52.246-12, Inspection of Construction, the Contractor must maintain an adequate inspection system to ensure the work conforms to contract requirements (see Chapter 7). The Project Engineer should review all test reports for accuracy and completeness, whether the test was performed on the project, by designated laboratories, or other inspection agency. Commercially produced products that are shipped to the project, whether or not quality assurance documentation is required, should be physically inspected by the Contractor upon delivery. Spot checks by FLH personnel should verify that these inspections are effective.

The *FLH Field Materials Manual* provides details as to the nature of quality assurance documentation required for various type of materials.

Sampling and testing requirements are contained in the specifications. Detailed instructions are in the *FLH Field Materials Manual*.

11.5.1 RECORDS AND REPORTS OF MATERIALS

It is the responsibility of the Project Engineer to maintain a file at the project office of all tests made, both in the field or elsewhere, to indicate the quality of all materials delivered to the project and used in the construction. All test reports should show the source of the samples, the quantity represented, and where, when, and by whom the sampling and testing was done. The record should also show whether the material is accepted or rejected.

Copies of FHWA test reports are to be furnished to the Contractor.

Forms for recording of field testing operations are described in the *FLH Field Materials Manual*.

Frequencies at which quality control, verification, and independent assurance samples are to be taken should conform to the contract requirements; otherwise guidance in the *FLH Field Materials Manual* should be used.

Sample sizes to be submitted for testing should conform to the contract requirements; otherwise guidance in the *FLH Field Materials Manual* should be used.

Material records should be checked by the Materials Engineer prior to payment of the final voucher.

11.6 ACCEPTANCE

There are four methods of acceptance -- certification, visual, measured and tested, and statistical. The four acceptance methods are defined in Subsections 106.02 through 106.05 of the Standard Specifications. The *Acceptance* subsection of the section ordering the work (e.g., 301, 401, etc.) will identify the acceptance method(s) for the particular items of work provided under that section.

With respect to acceptance, construction materials will fall into one of the following categories:

- Those found to exceed minimum specification requirements and are accepted at a pay factor exceeding 1.00, as per a statistically based acceptance plan in the contract.
- Those found to be in reasonably close conformance with the specifications and are therefore accepted at full payment.
- Those not in reasonably close conformance but deemed technically serviceable and therefore accepted at reduced payment, as provided by a contract acceptance plan or as mutually agreed upon if there is no acceptance plan.
- Those not in reasonably close conformance, and not deemed technically serviceable, which are therefore rejected and required to be removed, replaced, or acceptably corrected.

11.6.1 DETERMINING ACCEPTANCE

FLH personnel should follow the guidance provided below to determine the acceptability of materials.

11.6.1.1 Visual

To evaluate material for acceptance in accordance with Subsection 106.02 of the Standard Specifications, visually inspect the material for compliance with the Contract and prevailing industry standards. Use engineering judgment to determine if the material is satisfactory. Document that you have visually verified that the material has no defects and meets the contract requirements. File your documentation according to Division procedures.

This check should be performed as soon as possible. If you can check the material before it is incorporated into the work, do so. If it is only possible to check the material after placement, do so as soon as practicable so as to avoid unnecessary rework on the part of the Contractor.

11.6.1.2 Certification

A certification should accompany material that is to be evaluated for acceptance under Subsection 106.03 of the Standard Specifications. The certification should document that the material meets the specifications. Check the certification for evidence that the Contractor verified that the certification is acceptable. If they haven't, continue with your check, but also notify the Contractor that they are expected to review the certifications before passing them on to you. Perform your check before the material is incorporated into the project work.

Verify the certification meets the required specification. Subpart 2.42 of the *FLH Field Materials Manual* provides detailed guidance on certifications. You may have to refer to AASHTO, ASTM, or the contract to find out what the requirements are. If the certification is acceptable, notify the Contractor of its acceptability. If the certification is not acceptable, notify the Contractor that the certification is incomplete, incorrect, or both. File the approved certification in accordance with Division procedures.

11.6.1.3 Measured and Tested

If the material was produced offsite, the Contractor will need to provide the required test results. Review these test results according to the process for certifications in Section 11.6.1.2 of this manual.

If the material is produced onsite, or if the work is performed on-site, review the test results or the work itself to ensure compliance with the specifications. If the work does not meet the specification, the Contractor is required to correct or replace it, or request to have the work accepted at a reduced price. Section 11.6.2 provides more guidance on handling work or material that doesn't meet the contract requirements.

If the Contractor is required to perform production testing on material accepted by the measured and tested method, enter these test results in QL-Pay. That will allow you to track the test results and ensure the material is consistent and meeting contract requirements.

The timing of this check is similar to the guidance provided for visual acceptance.

11.6.1.4 Statistical

For work that is to be accepted statistically in accordance with Subsection 106.05 of the Standard Specifications, enter the test results into QL-Pay. Print a copy of the QL-Pay report to provide to the Contractor. Compare FHWA results with the Contractor's results to ensure agreement on the QL-Pay status

Before determining the final pay factor for any material, provide all of the QL-Pay files to the COE and other appropriate materials personnel to verify the final pay factor.

The test results, the variance from the target value, and the number of test results will all affect the pay factor. Depending on the standard deviation and number of tests, a lot with several test results outside the specification limit could have a pay factor above or below a 0.90.

If the pay factor falls below 0.90, Subsection 106.05 requires the Contractor to stop production. In the event this occurs, prepare correspondence to the Contractor indicating that the current pay factor is below 0.90, and under Subsection 106.05 of the contract, they are required to stop production. Provide a short synopsis of what is out of tolerance (specify the characteristic or sieves) and request that they make changes to the material or process. If the change is significant, the Contractor may request to terminate the current lot and start a new lot.

If the Contractor is obtaining the material from a stockpile, and all production is complete, it may be necessary for them to do additional screening or processing. If the material has already been placed by the time the test results are received and verified, reprocessing may not be

practical. Section 11.6.2 provides more guidance on handling work or material that doesn't meet the contract requirements.

11.6.2 NON-CONFORMING MATERIAL OR WORK

If the material or work does not meet the Contract requirements, the Contractor has three options (See Subsection 106.01 of the Standard Specifications). They are:

1. remove and replace the defective material or work,
2. correct the defect, or
3. propose to have the material or work accepted at a reduced price.

Depending on the situation, 1) or 2) may or may not be practical. The earlier the defect is found, the more opportunity there is to correct it. If the Contractor is obtaining the material from a stockpile, and all production is complete, it may be necessary for them to do additional screening or processing. Corrective action (or removal and replacement) would be required on the material already placed. Care should be taken when evaluating materials after a Contractor's corrective efforts. One common misconception is that an individual sample and test result represents a discrete quantity of material. However, poor quality materials often contain both passing and failing quantities. One passing test may be due solely to chance.

In fact, any quantity of material is collectively represented by all the samples taken from it. Any corrective effort should be applied to the whole of any material represented by a series of samples, unless additional testing convincingly isolates the defective areas. After corrective action, additional testing must be used to verify that the corrective actions were effective.

If the material has already been placed by the time the test results are received, reprocessing may not be practical, and the Contractor may propose to have the material or work accepted at a reduced price. To accept nonconforming materials at reduced payment two things must happen. The Government must make a determination that the materials will serve the purpose intended, and the Contractor and the Government must agree on the amount of the reduced payment. In this situation, the Project Engineer should coordinate very closely with the COE and Materials personnel. The Materials personnel will provide the technical advice, but the Project Engineer and the COE have to weigh the overall risks and determine the appropriate administrative action.

Because 1) or 2) ultimately result in conforming material or work, no further administrative action is required. However, if the Contractor proposes to have the work accepted at a reduced price, the Government is allowing a deviation to the contract, and a contract modification is necessary. The modification should address the this-for-that tradeoff. The Government gets a lesser product than it originally bargained for, and the Contractor gets less compensation than they originally bargained for.

When determining the value of the price reduction, coordinate with the Materials Engineer for materials items, and the COE for other work items. Section 2.45 of the *FLH Field Materials Manual* provides detailed guidance on price reduction values.

Chapter 12 – PROJECT CLOSEOUT
TABLE OF CONTENTS

Section **Page**

12.1 General 12-1

12.2 Contractor Performance Evaluation 12-2

12.3 Final Construction Report 12-5

12.4 As-Constructed Plans 12-6

12.5 Disposition of Records 12-9

12.6 Feedback 12-10
12.6.1 Forms of Feedback 12-10
12.6.2 Feedback Report 12-10

12.7 Final Payment 12-12
12.7.1 General 12-12
12.7.2 Final Payment Designations 12-12
12.7.3 Final Progress Payment Report 12-13
12.7.4 Final Voucher 12-13
12.7.5 Contractor's (Claims) Release 12-17
12.7.6 Letters of Acceptance by Cooperating Agencies 12-21
12.7.7 Letter of Acceptance by FLH 12-21
12.7.8 Final Voucher Assembly 12-23
12.7.9 Payment of Claims 12-23

LIST OF EXHIBITS

Exhibit **Page**

Exhibit 12.2-A SF 1420, Performance Evaluation – Construction 12-3
Exhibit 12.6-A Feedback Report 12-11
Exhibit 12.7-A Example Final Voucher – No Exceptions 12-14
Exhibit 12.7-B Example Final Voucher – With Exception for Pending Dispute 12-15
Exhibit 12.7-C Example Final Voucher – With Exception for Plant Establishment 12-16
Exhibit 12.7-D Example Contractor's Release – No Pending Dispute 12-18
Exhibit 12.7-E Example Contractor's Release – With Pending Dispute 12-19
Exhibit 12.7-F Example Contractor's Release – With Plant Establishment Exception 12-20
Exhibit 12.7-G Example Letter of Final Acceptance 12-22

CHAPTER 12

PROJECT CLOSEOUT

12.1 GENERAL

This chapter contains policies and procedures related to:

- Preparing a Contractor performance evaluation,
- Drafting a Final Construction Report,
- Preparing As-Constructed Plans,
- Providing formal feedback to designers and other personnel,
- Maintaining project records, and
- Issuing final payment to the Contractor.

12.2 CONTRACTOR PERFORMANCE EVALUATION

FAR Clause 36.201, Evaluation of Contractor Performance, requires a performance evaluation of most contractors. While there are certain exceptions, it is safe to assume one will be required for each highway construction contract.

The CE or other delegated CO will prepare the official evaluation, using SF 1420, Performance Evaluation - Construction Contracts, as shown in Exhibit 12.2-A. The Project Engineer will provide recommendations, or alternatively, the Project Engineer and COE may meet to jointly prepare the evaluation.

Although most contractors are evaluated as satisfactory or better, it is important to understand the process for dealing with serious or chronic unsatisfactory performance.

Evaluations are made of the following five individual elements, plus an overall evaluation:

- Quality of Work,
- Timely Performance,
- Effectiveness of Management,
- Compliance with Labor Standards, and
- Compliance with Safety Standards.

The first of these five elements, Quality of Work, essentially overlaps the Contractor's inspection system requirements under FAR Clause 52.246-12, Inspection of Construction. That is, a Contractor that fails to maintain an effective quality control (inspection) system, will generally warrant an unsatisfactory rating in the Quality of Work category. Deficient contractors must be clearly notified of the deficiencies and provided an opportunity to correct them.

The Project Engineer should be aware that if it is contemplated to rate a Contractor's performance as *unsatisfactory*, the project records should clearly support that rating; and the Contractor should have been advised of the unsatisfactory performance during the course of the contract, and failed to correct such performance.

Evaluations may be shared with other contracting agencies and private entities. FLH Divisions may participate in the Corps of Engineers' Construction Contractor Appraisal Support System (CCASS), which make evaluations available to other participating Federal agencies.

Evaluations may be used in part to determine Contractor responsibility prior to award of sealed bid contracts and to evaluate past performance as a part of source selection for a negotiated contract.

If the prime contractor's performance would be evaluated as satisfactory but for the performance of a major subcontractor, it is permissible to execute a separate evaluation of the subcontractor, following the same rules as if they were a prime.

Exhibit 12.2-A SF 1420, Performance Evaluation – Construction

FOR OFFICIAL USE ONLY *(WHEN COMPLETED)*

PERFORMANCE EVALUATION (CONSTRUCTION)

1. **CONTRACT NUMBER** DTFH71-02-C-00074
2. **CEC NUMBER**

IMPORTANT: Be sure to complete Part III - Evaluation of Performance Elements on reverse.

PART I - GENERAL CONTRACT DATA

3. **TYPE OF EVALUATION** *(X one)*: [ ] INTERIM *(List percentage _____%)* [X] FINAL [ ] AMENDED
4. **TERMINATED FOR DEFAULT**: [ ]

5. **CONTRACTOR** *(Name, Address, and ZIP Code)*
Metro Paving Corporation
5470 Lafayette Place
Hyattsville, MD 20781

6.a. PROCUREMENT METHOD *(X one)*: [ ] SEALED BID [X] NEGOTIATED

b. TYPE OF CONTRACT *(X one)*: [X] FIRM FIXED PRICE [ ] COST REIMBURSEMENT [ ] OTHER *(Specify)*

7. **DESCRIPTION AND LOCATION OF WORK**
PROJECT PRA-GWMP 909(1) - LETTER CONTRACT
CLAUDE MOORE COLONIAL FARM, ENTRANCE RELOCATION, IN
FAIRFAX COUNTY, VIRGINIA

Construction of a new two-lane asphalt paved entrance road into CMCF Administrative Office Building and the addition of a bypass lane to the Turner-Fairbanks Highway Research Center access located near the CIA entrance off of the George Washington Parkway. The work involved clearing and grubbing, erosion control, roadway embankment construction, pavement and roadway drainage construction, and the installation of a chain link fence and gate.

8. **TYPE AND PERCENT OF SUBCONTRACTING**
Small Business Concern = 0.0 %
Non-Small Business Concern 0.0 %
Small Disadvantaged Business Concerns = 0.0%
Women-Owned Small Business Concern = 0.0%

	a. AMOUNT OF BASIC CONTRACT	b. TOTAL AMOUNT OF MODIFICATIONS	c. LIQUIDATED DAMAGES ASSESSED	d. NET AMOUNT PAID CONTRACTOR
9. FISCAL DATA ▶	$ 265,000.00	$ 145,732.13	$ 0.00	$ 410,732.13

	a. DATE OF AWARD	b. ORIGINAL CONTRACT COMPLETION DATE	c. REVISED CONTRACT COMPLETION DATE	d. DATE WORK ACCEPTED
10. SIGNIFICANT DATES ▶	9/18/2002	11/27/02	12/9/03	12/9/03

PART II - PERFORMANCE EVALUATION OF CONTRACTOR

11. **OVERALL RATING** *(X appropriate block)*: [ ] OUTSTANDING [X] ABOVE AVERAGE [ ] SATISFACTORY [ ] MARGINAL [ ] UNSATISFACTORY *(Explain in Item 20 on reverse)*

12. **EVALUATED BY**

a. ORGANIZATION *(Name and Address (Include ZIP Code))*	b. TELEPHONE NUMBER *(Include Area Code)*	
Federal Highway Administration 21400 Ridgetop Circle, Sterling, VA 20166	703-404-6271	
c. NAME AND TITLE	d. SIGNATURE	e. DATE
Douglas E. Nair Construction Operations Engineer		

13. **EVALUATION REVIEWED BY**

a. ORGANIZATION *(Name and Address (Include ZIP Code))*	b. TELEPHONE NUMBER *(Include Area Code)*	
Federal Highway Administration 21400 Ridgetop Circle, Sterling, VA 20166	703-404-6260	
c. NAME AND TITLE	d. SIGNATURE	e. DATE
Thomas J. Scott, Jr. Construction Engineer	Thomas J. Scott Jr. Digitally signed by Thomas J. Scott Jr. DN: cn=Thomas J. Scott Jr., c=US, o=EFLHD, ou=HFCO-15, email=Thomas.Scott@fhwa.dot.gov Date: 2009.01.28 09:37:08 -05'00'	1/29/2009

14. **AGENCY USE** *(Distribution, etc.)*

DD FORM 2626, JUN 94 EXCEPTION TO SF 1420 APPROVED BY GSA/IRMS 6-94

Reset

Exhibit 12.2-A SF 1420, Performance Evaluation – Construction *(Continued)*

FOR OFFICIAL USE ONLY *(WHEN COMPLETED)*

PART III - EVALUATION OF PERFORMANCE ELEMENTS

N/A = NOT APPLICABLE O = OUTSTANDING A = ABOVE AVERAGE S = SATISFACTORY M = MARGINAL U = UNSATISFACTORY

15. QUALITY CONTROL	N/A	O	A	S	M	U
a. QUALITY OF WORKMANSHIP			X			
b. ADEQUACY OF THE CQC PLAN	X					
c. IMPLEMENTATION OF THE CQC PLAN	X					
d. QUALITY OF QC DOCUMENTATION	X					
e. STORAGE OF MATERIALS			X			
f. ADEQUACY OF MATERIALS				X		
g. ADEQUACY OF SUBMITTALS				X		
h. ADEQUACY OF QC TESTING				X		
i. ADEQUACY OF AS-BUILTS	X					
j. USE OF SPECIFIED MATERIALS				X		
k. IDENTIFICATION/CORRECTION OF DEFICIENT WORK IN A TIMELY MANNER			X			

16. EFFECTIVENESS OF MANAGEMENT	N/A	O	A	S	M	U
a. COOPERATION AND RESPONSIVENESS			X			
b. MANAGEMENT OF RESOURCES/ PERSONNEL			X			
c. COORDINATION AND CONTROL OF SUBCONTRACTOR(S)				X		
d. ADEQUACY OF SITE CLEAN-UP				X		
e. EFFECTIVENESS OF JOB-SITE SUPERVISION				X		
f. COMPLIANCE WITH LAWS AND REGULATIONS				X		
g. PROFESSIONAL CONDUCT			X			
h. REVIEW/RESOLUTION OF SUBCONTRACTOR'S ISSUES	X					
i. IMPLEMENTATION OF SUBCONTRACTING PLAN	X					

17. TIMELY PERFORMANCE						
a. ADEQUACY OF INITIAL PROGRESS SCHEDULE			X			
b. ADHERENCE TO APPROVED SCHEDULE			X			
c. RESOLUTION OF DELAYS			X			
d. SUBMISSION OF REQUIRED DOCUMENTATION				X		
e. COMPLETION OF PUNCHLIST ITEMS				X		
f. SUBMISSION OF UPDATED AND REVISED PROGRESS SCHEDULES						
g. WARRANTY RESPONSE	X					

18. COMPLIANCE WITH LABOR STANDARDS						
a. CORRECTION OF NOTED DEFICIENCIES				X		
b. PAYROLLS PROPERLY COMPLETED AND SUBMITTED				X		
c. COMPLIANCE WITH LABOR LAWS AND REGULATIONS WITH SPECIFIC ATTENTION TO THE DAVIS-BACON ACT AND EEO REQUIREMENTS				X		
19. COMPLIANCE WITH SAFETY STANDARDS						
a. ADEQUACY OF SAFETY PLAN				X		
b. IMPLEMENTATION OF SAFETY PLAN				X		
c. CORRECTION OF NOTED	X					

20. REMARKS *(Explanation of unsatisfactory evaluation is required. Other comments are optional. Provide facts concerning specific events or actions to justify the evaluation. These data must be in sufficient detail to assist contracting officers in determining the contractor's responsibility. Continue on separate sheet(s), if needed.)*

The project was constructed under a letter contract for which the completed work was covered under a warranty of 5 years. The warranty period has expired, an inspection of the project has been completed and there are no warranty issues outstanding. In performing the work the contractor was very cooperative and was very open to changes and modifications as they occurred. The contractor produced a quality product with absolute minimal Government supervision or oversite.

DD FORM 2626 (BACK), JUN 94

12.3 FINAL CONSTRUCTION REPORT

Final construction reports are required for all FLH projects. The Project Engineer is required to draft final reports for assigned projects. The Project Engineer and the COE are responsible for ensuring that the final construction report is completed. The report is to be drafted within two months of partner agency acceptance of the construction project. Guidelines for preparing the final report and an example report are provided in Appendix 12A.1.

12.4 AS-CONSTRUCTED PLANS

As-Constructed Plans are required on all FLH projects. If the contract does not require the Contractor to provide such plans, the Project Engineer must record plan changes on full-scale prints as changes occur. Regardless of whether the Contractor or the Project Engineer prepares the As-Constructed Plans, the following items are to be covered:

1. **Plans**

   a. **Alignment.** All revised alignment should be shown. Where bearings, curve data, etc., do not change, the data should be checked for accuracy.

   b. **Changes.** Changes in construction limits, if any, should be shown.

   c. **Bridges.** Stations of all bridge ends should be shown.

   d. **Ties.** Ties to any additional found corners should be shown.

   e. **Approach Roads.** The constructed location of all road approaches are to be shown.

   f. **Right-of-Way.** All right-of-way adjacent to private property is to be shown with care for correctness.

   g. **Monuments.** All monuments should be shown.

   h. **Utilities.** All utilities should be shown (e.g., gas, water, commercial power, sewers, etc.), including new, existing, abandoned, and removed facilities.

   i. **Underdrains.** Location, size, and depth of underdrains should be shown.

   j. **Channel Changes.** As-constructed channel changes should be shown.

   k. **Crossings.** Elevations for all aerial and underground crossings of utilities should be shown. (One should not attempt to measure directly from the road to the sag in overhead crossings.)

2. **Profile**

   a. **Grades.** Corrected grades and grade points of intersection (P.I.s) should be shown.

   b. **Equations.** All equations and stationing should be shown.

   c. **Culverts.** Correct culvert lengths, type, invert elevations, and stations are to be shown. Skew angles and as-built grades should be shown.

   d. **Extensions.** On culvert extensions, the length of existing pipe, as well as extension, should be shown.

3. **Permanent Bench Marks**

   a. Monuments. Data on monuments should be shown.

b. Datum. Datum used for levels should be shown.

4. **Retaining Walls**

Limits and type of wall are to be shown on profile sheets.

5. **Guardrail**

Corrected stationing, lengths, and offsets from edge of pavement or travel lane, if different than original plans, should be shown.

6. **Fencing**

Construction limits of fencing in relation to centerline should be shown.

7. **Typical Sections**

Any revisions in both dimensions and materials should be shown. Also, stations, if termini were revised, should be shown.

8. **Bridges**

Any changes in bridge plans should be shown. If built without changes, it should be indicated on the plans that no changes were made.

Information required for bridges includes the following:

a. **Subsurface Log.** A log of foundation material encountered if substantially different than information shown on plans. Log sheets should be attached to plans if necessary or convenient.

b. **Pile Driving Records.** Pile driving records including size, length, type, bearing, and tip elevation should be included. Record sheets should be attached to plans if necessary or convenient.

c. **Elevations.** Footing and seal elevations, if different than plan, should be included.

d. **Changes.** Any changes in plan or dimensions should be noted, including any major changes in reinforcing. (for example, development length, reinforcement size, main reinforcement spacing).

e. **Post-Tensioning.** After completion of the structure post-tensioning, the as-constructed plans should record the stressing sequence, jacking force, duct size and layout, additional rebar or changes in concrete dimensions to accommodate the contractor's proposed post-tensioning system, and whether one end or two end stressing, etc. The revised working drawings should be attached to the as-constructed plans if necessary. The working drawings are the approved drawings submitted by the contractor

f. **Construction Sequence.** Changes to the construction or concrete placement sequence should be recorded on the as-constructed plans if different from the as-advertised contract plans (for example, sequence for placing concrete deck).

g. **Bearings.** Bearing orientation angle should be recorded on the as-constructed plans if different from the as-advertised contract plans. Measure the orientation angle using the centerline of bearings and the centerline of girders.

h. **Expansion Joints.** The actual clearance at each expansion joint and the clear distance between the end of the superstructure and the abutment backwall should be recorded on the as-constructed plans along with the atmospheric temperature at the time of measurement

At the completion of the project, the hard copy of the as-constructed plans or the electronic copy in PDF format of the as-constructed plans, should be sent to the FLH Division office.

12.5 DISPOSITION OF RECORDS

The Project Engineer should send the original or a copy (in accordance with Division procedures) of all correspondence received from contractors to the Division Headquarters for inclusion in the central, official file.

Division procedures relative to checking of payment information and project records should be followed. The Project Engineer should arrange for checking of pay records and other source records as they are completed, rather than all at once at completion. This will provide early notice of any deficiencies in record keeping, and therefore facilitate more efficient management of the contract.

The Project Engineer should deliver all project records, electronic and hard copy, to the appropriate Division office upon completion of a project.

Project records of internal matters, transfers, T&A reports, service contracts no longer in effect, etc., should be disposed of at the end of each construction season or when the project is completed, in accordance with Division policy.

12.6 FEEDBACK

Feedback concerning the causes of contract modifications from the construction staff to the project designers and other appropriate personnel is encouraged, and is necessary to evaluate and improve the FLH design/construct process. The FLH, *Project Development and Design Manual*, Chapter 13 is devoted to feedback and should be reviewed for further information.

12.6.1 FORMS OF FEEDBACK

The feedback systems, in addition to the contract modifications themselves, range from informal communications, such as telephone calls and *Minute Memos*, to field reviews and management reviews of contract modifications procedures. Other feedback items are as follows:

- Trip reports from Construction, Materials, and Design staff.
- Contractor claims and resulting evaluations and reports.
- Reviews of Contractor initiated Value Engineering Change Proposals (VECPs).
- Formal program management reviews or audits of contract modifications and contract modification procedures.
- Feedback form reports.
- Surveys and correspondence from owner or maintaining agencies, such as requests for modifications, post-construction problems, and environmental concerns or commitments.

12.6.2 FEEDBACK REPORT

At present, a feedback form is being used in the FLH Divisions. (See Exhibit 12.6-A for a sample feedback form) Although the procedure might vary within the Divisions, the form is basically handled in the following manner:

1. The originator, usually the Project Engineer, states the problem with a recommended solution and sends the form to the COE.
2. The COE concurs and/or comments on the proposal and forwards the form to the relevant offices. The form includes space for the appropriate offices to enter what process changes or other action was taken, or to add comments.
3. When the dissemination is complete, a copy of the completed form circulates back to the COE and the originator of the form.
4. The COE usually prepares a quarterly report of all feedback obtained and distributes it to the relevant offices, such as Materials or Project Development.

Exhibit 12.6-A Feedback Report

FEEDBACK REPORT

To: _____

From: _____

Date: _____

Instructions:

1. One problem per report.
2. May be completed in pencil or ink.
3. Forward original and 1 copy to Division office.
4. Retain a copy for your records.

Project Name: _____

Type of Contract: _____
(Grading, Base, Paving, Bridge, etc.)

List any problems encountered in the plans, specifications or administration of your contract, any problem associated with Division support services or any deficiencies where correction action or improvements can be incorporated into upcoming projects. Timely submission is essential for implementation of corrective actions.

Problem: _____

(attach additional pages if more space is needed)

Corrective Action Taken and Improvements Recommended for Future Projects: _____

Division Staff Comments: _____

Action Recommended and by Whom: _____

☆U.S. GOVERNMENT PRINTING OFFICE: 1988 0 – 220-051 : QL 3

12.7 FINAL PAYMENT

12.7.1 GENERAL

As soon as the project is accepted and all quantities are checked, the COE, or designee depending on Division procedures, must prepare a final payment report together with a final voucher and claims release for the Contractor's signature. The final voucher should cover all known and acknowledged remaining payments under the contract. If disputes that are not resolvable remain at the time the final voucher is prepared, a second (or possible third) final voucher may be required at sometime in the future. Unlike progress payments, no separate invoice from the contractor is required for final payment. The SF 1034 is the final invoice as soon as it is signed by the contractor. The Prompt Payment Act requires payment within 30 days of the signed final voucher and claims release being received by the paying office. FLH procedures require that the signed final voucher be included in the final voucher assembly prior to being submitted to the CO or delegate for approval.

12.7.2 FINAL PAYMENT DESIGNATIONS

There are two basic types of final payment. The final voucher should clearly identify which type is being processed.

- **Final Payment (Final Settlement).** This designation applies to contracts where there are no unresolved disputes or claims and where the payment indicated will release both parties (the Government and the Contractor) from further contractual obligations and liabilities. If there have been previous claims or disputes that are being resolved by this final payment, this designation should also be used.

- **Final Payment (Exception).** This designation applies to contracts where there are unresolved disputes or claims, or where the contract is to be kept open for a contractually valid reason - for example, if a plant establishment warranty must elapse prior to final acceptance. The claims release must specifically list the exception(s) and the exception(s) must be summarized on the face of the voucher. The purpose of the final voucher is then to close all issues other than the one(s) for which exceptions are identified.

Note that the last progress payment could be followed by a Final Payment (Exception) designating a claim. If a CO's decision subsequently acknowledges partial liability for the claim, but the Contractor still refuses to agree that the issue is resolved, then the payment resulting from the CO's decision should be processed as another Progress Payment. Then if settlement of the claim is ultimately negotiated, final settlement could be processed.

Each division will designate the number of copies of the final voucher and claims release that are to be sent to the Contractor for signature.

If a Final Payment (Final Settlement) voucher is not returned by the Contractor within 90 days, the Division may process it as a final settlement in order to close the account. In that case, the words "Not signed/returned" should be typed in the Contractor's signature block. Legal advice should then be sought if events suggest that the Contractor subsequently wants to reopen the contract.

All payment vouchers, progress and final, should be numbered sequentially regardless of their designation. The corresponding progress report must have the same number.

12.7.3 FINAL PROGRESS PAYMENT REPORT

This document is prepared after the Division has checked all notes, quantities, and supporting data. It is given a sequential number following the last Progress Payment Report supporting a progress (or prefinal payment), with the designation of "Final" listed on the report.

After the final Progress Payment Report is prepared, the Project Engineer should contact the Contractor to find out if the superintendent wants to go over the quantities and other issues like contract time before being sent the voucher.

12.7.4 FINAL VOUCHER

Standard Form 1034, *Public Voucher for Purchases and Services Other Than Personal*, is required for any final payment.

For an exception final voucher, pending claims or disputes must be listed on the face of the final voucher and a corresponding statement must contain a statement matching or concisely summarizing the statement on the Contractor's Release. See Section 12.7.5 below. If there are no claims or disputes, the release language shown on Exhibit 12.7-A should be used. If there are claims or disputes the language shown on Exhibit 12.7-B is typical. The dollar amount of the proposed final payment must match the dollar amount indicated on the corresponding final Progress Payment Report. The Contractor's designated representative is required to sign the voucher and Contractor's Release, show his/her title, and enter the date of signing.

When plant establishment warranties or similar obligations go beyond the completion of all work, a final voucher with exception should be processed to document that there are no outstanding issues, other than the warranty in question. See Exhibit 12.7-C.

Exhibit 12.7-A Example Final Voucher – No Exceptions

SF 1034, released 8/4/99.

Standard Form 1034
Revised October 1967
Department of the Treasury
1 TFM 4-2000
1034-121

PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

VOUCHER NO.

U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT AND LOCATION
U.S. Department of Transportation
Federal Highway Administration
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, VA 20166

DATE VOUCHER PREPARED

SCHEDULE NO.

CONTRACT NUMBER AND DATE
DTFH71-08-C-00014 4/30/2008

REQUISITION NUMBER AND DATE

PAID BY

PAYEE'S NAME AND ADDRESS
Taylor Construction, Inc.
7314 Columbus St.
P.O. Box 110
New Vienna, IA 52065

DATE INVOICE RECEIVED

DISCOUNT TERMS

PAYEE'S ACCOUNT NUMBER

SHIPPED FROM TO WEIGHT

GOVERNMENT B/L NUMBER

NUMBER AND DATE OF ORDER	DATE OF DELIVERY OR SERVICE	ARTICLES OR SERVICES (Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)	QUANTITY	UNIT PRICE COST	UNIT PRICE PER	AMOUNT (1)
		Final Estimate No. 4 - FINAL PAYMENT. This is final settlement of construction of project PRA-HEHO 10(1), 100(1). Final settlement is specifically conditioned upon the execution of the Contractor's Release attached hereto and incorporated herein. By: Title: Date:				

(Use continuation sheet(s) if necessary) **(Payee must NOT use the space below)** **TOTAL** 0.00

PAYMENT:
- ☐ PROVISIONAL
- ☐ COMPLETE
- ☐ PARTIAL
- ☒ FINAL
- ☐ PROGRESS
- ☐ ADVANCE

APPROVED FOR =$ 0.00

EXCHANGE RATE =$1.00

DIFFERENCES

BY (2)
Donald W. Miller

TITLE
Director, Project Delivery

Amount verified; correct for payment

(Signature or initials)

Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment.

(Date) *(Authorized Certifying Officer)* Financial Manager *(Title)*

ACCOUNTING CLASSIFICATION

PROJ: 1515196470003 ORG: 1519001148 TASK: 540.00.F170.19

PAID BY

CHECK NUMBER ON TREASURER OF THE UNITED STATES

CHECK NUMBER ON *(Name of bank)*

CASH $

DATE

PAYEE (3)

1 When stated in foreign currency, insert name of currency.
2 If the ability to certify and authority to approve are combined in one person, one signature only is necessary; otherwise the approving officer will sign in the space provided, over his official title.
3 When a voucher is receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary", or "Treasurer", as the case may be.

FOR

TITLE

Previous edition usable NSN 7540-00-900-2234

PRIVACY ACT STATEMENT

The information requested on this form is required under the provisions of 31 U.S.C. 82b and 82c, for the purpose of disbursing Federal money. The information requested is to identify the particular creditor and the amounts to be paid. Failure to furnish this information will hinder discharge of the payment obligation.

Exhibit 12.7-B Example Final Voucher – With Exception for Pending Dispute

SF 1034, released 8/4/99.

Standard Form 1034
Revised October 1967
Department of the Treasury
1 TFM 4-2000
1034-121

PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

VOUCHER NO.

U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT AND LOCATION
U.S. Department of Transportation
Federal Highway Administration
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, VA 20166-6511

DATE VOUCHER PREPARED

SCHEDULE NO.

CONTRACT NUMBER AND DATE
DTFH71-03-C-00047 9/24/2003

REQUISITION NUMBER AND DATE

PAID BY

PAYEE'S NAME AND ADDRESS
Virgin Islands Asphalt Products Corporation
P.O. Box 1549
Kingshill, USVI 00851-1549

DATE INVOICE RECEIVED

DISCOUNT TERMS

PAYEE'S ACCOUNT NUMBER

SHIPPED FROM TO WEIGHT

GOVERNMENT B/L NUMBER

NUMBER AND DATE OF ORDER	DATE OF DELIVERY OR SERVICE	ARTICLES OR SERVICES (Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)	QUANTITY	UNIT PRICE COST	UNIT PRICE PER	AMOUNT (1)
		Semi-Final Estimate No. 5 - FINAL PAYMENT (EXCEPTION). This is final settlement for the construction of U.S. Virgin Islands St. Croix Project VI Q NH-9999(68) and final settlement is specifically conditioned upon the execution of the Contractor's Release attached hereto and incorporated herein. This is final settlement with the exception of the unresolved dispute concerning the pay factor of Item 40101AD, as described in letter dated May 25, 2006. By: Title: Date:				

(Use continuation sheet(s) if necessary) **(Payee must NOT use the space below)** **TOTAL** $0.00

PAYMENT:
- ☐ PROVISIONAL
- ☐ COMPLETE
- ☐ PARTIAL
- ☒ FINAL
- ☐ PROGRESS
- ☐ ADVANCE

APPROVED FOR =$ 0.00

EXCHANGE RATE =$1.00

DIFFERENCES

BY (2)
Donald W. Miller

TITLE
Director, Project Delivery

Amount verified; correct for payment

(Signature or initials)

Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment.

(Date) *(Authorized Certifying Officer)* Financial Manager *(Title)*

ACCOUNTING CLASSIFICATION

PROJ: 1515789999068 ORG: 1578000000 TASK: 540.00.6320.78

PAID BY

CHECK NUMBER ON TREASURER OF THE UNITED STATES

CHECK NUMBER ON *(Name of bank)*

CASH $

DATE

PAYEE (3)

1 When stated in foreign currency, insert name of currency.
2 If the ability to certify and authority to approve are combined in one person, one signature only is necessary; otherwise the approving officer will sign in the space provided, over his official title.
3 When a voucher is receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary", or "Treasurer", as the case may be.

FOR

TITLE

Previous edition usable NSN 7540-00-900-2234

PRIVACY ACT STATEMENT
The information requested on this form is required under the provisions of 31 U.S.C. 82b and 82c, for the purpose of disbursing Federal money. The information requested is to identify the particular creditor and the amounts to be paid. Failure to furnish this information will hinder discharge of the payment obligation.

Exhibit 12.7-C Example Final Voucher – With Exception for Plant Establishment

SF 1034, released 8/4/99.

Standard Form 1034
Revised October 1967
Department of the Treasury
1 TFM 4-2000
1034-121

PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

VOUCHER NO.

U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT AND LOCATION
U.S. Department of Transportation
Federal Highway Administration
Eastern Federal Lands Highway Division
21400 Ridgetop Circle
Sterling, VA 20166-6511

DATE VOUCHER PREPARED

SCHEDULE NO.

CONTRACT NUMBER AND DATE
DTFH71-03-C-00047 9/24/2003

REQUISITION NUMBER AND DATE

PAID BY

PAYEE'S NAME AND ADDRESS
Virgin Islands Asphalt Products Corporation
P.O. Box 1549
Kingshill, USVI 00851-1549

DATE INVOICE RECEIVED

DISCOUNT TERMS

PAYEE'S ACCOUNT NUMBER

SHIPPED FROM | TO | WEIGHT

GOVERNMENT B/L NUMBER

NUMBER AND DATE OF ORDER	DATE OF DELIVERY OR SERVICE	ARTICLES OR SERVICES (Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)	QUANTITY	UNIT PRICE COST	UNIT PRICE PER	AMOUNT (1)
		Semi-Final Estimate No. 5 - FINAL PAYMENT (EXCEPTION). This is final settlement for the construction of U.S. Virgin Islands St. Croix Project VI Q NH-9999(68) and final settlement is specifically conditioned upon the execution of the Contractor's Release attached hereto and incorporated herein. In accordance with Subsection 626.16 payment of $17,175.00 is withheld pending satisfactory completion of the plant establishment period. By: Title: Date:				

(Use continuation sheet(s) if necessary) **(Payee must NOT use the space below)** **TOTAL** $0.00

PAYMENT:
- ☐ PROVISIONAL
- ☐ COMPLETE
- ☐ PARTIAL
- ☒ FINAL
- ☐ PROGRESS
- ☐ ADVANCE

APPROVED FOR =$ 0.00

EXCHANGE RATE =$1.00

DIFFERENCES

BY (2)
Donald W. Miller

TITLE
Director, Project Delivery

Amount verified; correct for payment

(Signature or initials)

Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment.

(Date) | *(Authorized Certifying Officer)* | Financial Manager *(Title)*

ACCOUNTING CLASSIFICATION

PROJ: 1515789999068 ORG: 1578000000 TASK: 540.00.6320.78

PAID BY

CHECK NUMBER ON TREASURER OF THE UNITED STATES

CHECK NUMBER ON *(Name of bank)*

CASH $

DATE

PAYEE (3)

1 When stated in foreign currency, insert name of currency.
2 If the ability to certify and authority to approve are combined in one person, one signature only is necessary; otherwise the approving officer will sign in the space provided, over his official title.
3 When a voucher is receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary", or "Treasurer", as the case may be.

FOR

TITLE

Previous edition usable NSN 7540-00-900-2234

PRIVACY ACT STATEMENT
The information requested on this form is required under the provisions of 31 U.S.C. 82b and 82c, for the purpose of disbursing Federal money. The information requested is to identify the particular creditor and the amounts to be paid. Failure to furnish this information will hinder discharge of the payment obligation.

12.7.5 CONTRACTOR'S (CLAIMS) RELEASE

Form DOT F 4220.4 Contractor's Release is required to be executed by the Contractor as a condition of processing any final payment. Contract information, contractors name and address, and final payment amount should be completed by the designated closing official and sent to the Contractor with the final Progress Payment Report and final voucher. Exhibit 12.7-D illustrates a typical Contractor's release with no exceptions.

If there are claims or disputes, they should be summarized, including dollar amount and reference to the Contractor's request letter or claim, in Item No. 1 of the form. Exhibit 12.7-E illustrates a typical claims release with a pending dispute. Note that although the word "claim" appears on the form, any dispute should be listed if the Contractor insists that it is an impediment to final settlement.

Exhibit 12.7-F illustrates a release with an exception for the plant establishment period.

Exhibit 12.7-D Example Contractor's Release – No Pending Dispute

DEPARTMENT OF TRANSPORATION **CONTRACTOR'S RELEASE**	**CONTRACT NO.** DTFH71-08-C-00014
CONTRACTOR *(Name and address)* Taylor Construction, Inc. 7314 Columbus St. P.O. Box 110 New Vienna, IA 52065	SUM OF Zero Dollars and Zero Cents. DOLLARS ($) 0.00

In consideration of the sum stated above, which has been paid or is to be paid to the Contractor, or his assignees, the Contractor, upon payment of the said sum by the UNITED STATES OF AMERICA (hereinafter called the Government), does remise, release, and discharge the Government, its officers, agents, and employees, of and from all liabilities, obligations, claims, and demands whatsoever under or arising from the said contract, except:

1. Specified claims in stated amounts or in estimated amounts where the amounts ar not susceptible of exact statement by the Contractor, as follows:

2. Claims, together with reasonable expenses incidental thereto, based upon the liabilities of the Contractor to third parties arising out of the performance of this contract, which are not known to the Contractor on the date of the execution of this release and of which the Contractor gives notice in writing to the Contracting Officer within the period specified in the said contract: and

3. Claims for reimbursement of costs (other than expenses of the Contractor by reason of his indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under any provisions of the said contract relating to patents.

The Contractor agrees, in connection with patent matters and with claims which are not released as set forth above, that he will comply with all provisions of the said contract, including without limitation those provisions relating to notifications to the Contracting Officer and relating to the defense or prosecution of litigation.

IN WITNESS WHERE OF, this release has been executed this _____ day of _____

WITNESSES

_____
(Contractor)

_____ BY _____

_____ TITLE _____

NOTE: *In the case of a corporation, witnesses are not required, but the certification below must be completed.*

CERTIFICATE

I, _____ , certifiy that I am the_____ secretary of the corporation named as Contractor in the foregoing release; that _____ who signed said release on behalf of the Contractor was then _____ of said corporation; that said release was duly signed for and in behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

(CORPORATE SEAL)

_____

Form DOT F 4220.4

Exhibit 12.7-E Example Contractor's Release – With Pending Dispute

DEPARTMENT OF TRANSPORTATION

CONTRACTOR'S RELEASE

CONTRACT NO. DTFH71-03-C-00047

CONTRACTOR *(Name and address)*

Virgin Islands Asphalt Products Corporation
P.O. Box 1549
Kingshill, USVI 00851-1549

SUM OF

Zero Dollars and Zero Cents

DOLLARS ($) 0.00

In consideration of the sum stated above, which has been paid or is to be paid to the Contractor, or his assignees, the Contractor, upon payment of the said sum by the UNITED STATES OF AMERICA (hereinafter called the Government), does remise, release, and discharge the Government, its officers, agents, and employees, of and from all liabilities, obligations, claims, and demands whatsoever under or arising from the said contract, except:

1. Specified claims in stated amounts or in estimated amounts where the amounts ar not susceptible of exact statement by the Contractor, as follows:

This is final settlement with the exception of the unresolved dispute concerning the pay factor on Item 40101AD, as described in letter dated May 25, 2006.

2. Claims, together with reasonable expenses incidental thereto, based upon the liabilities of the Contractor to third parties arising out of the performance of this contract, which are not known to the Contractor on the date of the execution of this release and of which the Contractor gives notice in writing to the Contracting Officer within the period specified in the said contract: and

3. Claims for reimbursement of costs (other than expenses of the Contractor by reason of his indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under any provisions of the said contract relating to patents.

The Contractor agrees, in connection with patent matters and with claims which are not released as set forth above, that he will comply with all provisions of the said contract, including without limitation those provisions relating to notifications to the Contracting Officer and relating to the defense or prosecution of litigation.

IN WITNESS WHEREOF, this release has been executed this _____ day of _____

WITNESSES

_____
(Contractor)

_____ BY _____

_____ TITLE _____

NOTE: *In the case of a corporation, witnesses are not required, but the certification below must be completed.*

CERTIFICATE

I, _____, certify that I am the _____ secretary of the corporation named as Contractor in the foregoing release; that _____ who signed said release on behalf of the Contractor was then _____ of said corporation; that said release was duly signed for and in behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

(CORPORATE SEAL)

_____

Form DOT F 4220.4

Exhibit 12.7-F Example Contractor's Release – With Plant Establishment Exception

DEPARTMENT OF TRANSPORATION
CONTRACTOR'S RELEASE

CONTRACT NO. DTFH71-03-C-00047

CONTRACTOR *(Name and address)*

Virgin Islands Asphalt Products Corporation
P.O. Box 1549
Kingshill, USVI 00851-1549

SUM OF

Zero Dollars and Zero Cents

DOLLARS ($) 0.00

In consideration of the sum stated above, which has been paid or is to be paid to the Contractor, or his assignees, the Contractor, upon payment of the said sum by the UNITED STATES OF AMERICA (hereinafter called the Government), does remise, release, and discharge the Government, its officers, agents, and employees, of and from all liabilities, obligations, claims, and demands whatsoever under or arising from the said contract, except:

1. Specified claims in stated amounts or in estimated amounts where the amounts ar not susceptible of exact statement by the Contractor, as follows:

Payment of $17,175.00 is withheld pending satisfactory completion of the plant establishment period.

2. Claims, together with reasonable expenses incidental thereto, based upon the liabilities of the Contractor to third parties arising out of the performance of this contract, which are not known to the Contractor on the date of the execution of this release and of which the Contractor gives notice in writing to the Contracting Officer within the period specified in the said contract: and

3. Claims for reimbursement of costs (other than expenses of the Contractor by reason of his indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under any provisions of the said contract relating to patents.

The Contractor agrees, in connection with patent matters and with claims which are not released as set forth above, that he will comply with all provisions of the said contract, including without limitation those provisions relating to notifications to the Contracting Officer and relating to the defense or prosecution of litigation.

IN WITNESS WHEREOF, this release has been executed this _____ day of _____

WITNESSES

_____
(Contractor)

_____ BY _____

_____ TITLE _____

NOTE: *In the case of a corporation, witnesses are not required, but the certification below must be completed.*

CERTIFICATE

I, _____, certify that I am the _____ secretary of the corporation named as Contractor in the foregoing release; that _____ who signed said release on behalf of the Contractor was then _____ of said corporation; that said release was duly signed for and in behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

(CORPORATE SEAL)

_____

Form DOT F 4220.4

12.7.6 LETTERS OF ACCEPTANCE BY COOPERATING AGENCIES

Written acceptance by cooperating agencies (State, county, Forest Service, National Park Service, etc.) is desirable prior to the acceptance of the project by FLH. Obtaining acceptance may be by letter to the cooperating agency requesting acceptance by endorsement of the letter.

For contracts with a landscaping or similar warranty clause, there should be an acceptance at the conclusion of construction of all work except the warranted work, followed by a second acceptance of only the warranted work at the conclusion of the warranty period.

12.7.7 LETTER OF ACCEPTANCE BY FLH

The Contractor should be notified of the cessation of contract time charges promptly after completion of the work. A letter of final acceptance (or limited acceptance in the case of warranted work) should be issued to the Contractor as soon as concurrence in final acceptance is received from the cooperating agencies. See Exhibit 12.7-G for an example letter of final acceptance.

If there are disputes pending, it may be appropriate to write a more somber acceptance letter, stating that, “You will have the opportunity to reserve the right to pursue specific claims and disputes by listing a brief reference to, and the associated dollar amount of each.”

Exhibit 12.7-G Example Letter of Final Acceptance

U.S. Department of Transportation
Federal Highway Administration

Western Federal Lands Highway Division

610 East Fifth Street
Vancouver, WA 98661-3801
(360) 619-7700 FAX: (360) 619-7846

August 31, 2007

In Reply Refer To: HFL-17

Carey Foster, President
North Star Paving & Construction, Inc.
35743 Kenai Spur Highway, Suite A
Soldotna, AK 99669

Dear Ms. Foster:

Final Project Acceptance
AK PFH 42(7), Howling Dog Creek Culvert
Contract No. DTFH70-07-C-00004

In accordance with the general provisions of the contract, you are hereby advised that work performed by your company on the subject project was inspected and found to be complete as of August 21, 2007.

Contract time will not be charged after August 18, 2007, the date in which you were substantially complete. While you are relieved of further maintenance obligations, you are not relieved of your other responsibilities under your contract until final payment is made by approval of the final payment voucher.

On behalf of the US Forest Service, Alaska Department of Transportation and Public Facilities, and the Federal Highway Administration, I would like to express our gratitude for the quality of work and cooperative attitude exhibited during this construction project. Hopefully the future will afford us the opportunity to work together to deliver another quality project.

Sincerely yours,
Original Signed by
Steven F. Hinz, P.E.

Steven F. Hinz, P.E.
Construction Operations Engineer

cc: Central Files
Bill Welton, Project Engineer
Paul Rettinger, Construction Quality Assurance Specialist Ent CStates 9/3/07

MOVING THE AMERICAN ECONOMY

12.7.8 FINAL VOUCHER ASSEMBLY

When the signed final voucher and claims release are returned, a final voucher assembly is prepared based on Division management and fiscal needs. The assembly is submitted for signature of the CO or designee and (funds) certifying officer in accordance with Division procedures. At a minimum, the final voucher assembly should include the following:

- Final Voucher (SF 1034) signed by the Contractor;
- Contractor's Release (DOT F 4220.4) signed by the Contractor;
- Final Progress Payment Report;
- Copy of letter of acceptance by FLH to the Contractor;
- Letters of acceptance by cooperating agencies;
- Materials certification; and
- Contractor performance evaluation (per Division policy).

In addition to the items listed above, Division procedures may require one or more of the items detailed in Section 12.3 for the Final Construction Report.

12.7.9 PAYMENT OF CLAIMS

Standard Form 1034 will be used for payment of any monies awarded to a Contractor in settlement of a claim after completion of the project. Acceptance of this voucher by the Contractor, and payment thereof, constitutes final and complete settlement of the contract.

Vouchers covering this type of payment will be accompanied by copies of all CO's decisions, justifications, and other pertinent documents in support of the payment. The documents accompanying the voucher to the Division Office must include a revised final receiving report supporting the revised final contract amount.

If there is a CO's Decision acknowledging entitlement, but the issue remains outstanding as a claim, the amounts acknowledged should be paid as a progress payment, with the claim referenced on the voucher and claim release form. See Section 12.7.2.

CHAPTER 12 – PROJECT CLOSEOUT

LIST OF APPENDICES

12A.1 FINAL CONSTRUCTION REPORT 1

12A.1.1 Final Report Guidelines **1**

12A.1.2 Sample Final Report **5**

12A.1 FINAL CONSTRUCTION REPORT

This appendix contains guidelines and an example report to assist personnel in preparing final construction reports.

12A.1.1 FINAL REPORT GUIDELINES

II. Project Description

A. **Project Identification.** Project number, project name, name of park, forest, Indian reservation, etc., route number, county, state, should all be included.

B. **Description of Work.** Should be described in brief narrative form. The various activities that went into the job should be included. The description of work in the contract should be referenced for guidance.

C. **Environmental Considerations.** Any extraordinary environmental considerations pertinent to the project should be described. All clearances and/or permits obtained for the project should be listed.

III. Project Data

A. **Specifications.** The standard Federal or State specification that was the basis for project specifications should be included.

B. **Termini.** The beginning and ending of the project should be described in terms of stations and/or other significant and reasonably precise information. For National Park Service projects, the Road Inventory Program (RIP)/Bridge Program (BIP) Section(s) should be referenced.

C. **Length.** Mainline length is to be summarized. Incidental road lengths are to be shown separately.

D. **Width.** The predominant width of paved roadway and shoulders should be included. Any significant changes in the typical section stations should be noted.

E. **Pavement Structure.** The depth of wearing course, binder, base stone, etc., should be included.

F. **Structures.** The type, length, and location should be described. (BIP Section and structure number are to be referenced for NPS projects.)

G. **Contract Number and Date.** See Original contract.

H. **Contracting Officers.** Contracting Officer(s), and others involved in administering the contact and project should be listed; these include COE, CE, and DE.

I. **Contract Bid Amount.** Amount from original contract.

J. **Engineer's Estimate.** Amount from the original Engineer's Estimate.

K. **Final Contract Amount.** Amount from the Final Progress Payment Report.

L. **Contract Time.** Any significant dates should be shown. These include the award date, date of notice to proceed, original completion date, authorized extended completion date, date of substantial completion, date of actual completion, and date of final acceptance. Any periods of liquidated damages, special periods for plant establishment, stream work restrictions, etc. should be summarized.

M. **Contractor.** The contractor's name, address, and category (i.e., small business, DBE, etc.) should be shown.

N. **Subcontractors.** All first tier and large second tier subcontractors' names should be listed along with a description of the work each was involved in. The category of each (i.e., small business, DBE, WBE, etc.) should be shown, along with the original or reported amount of each subcontract. If the prime contract required a subcontracting plan, the comparison of goals with levels achieved should be shown.

O. **Construction Engineering Costs.** The total FLH costs, including contract inspection costs should be shown. These costs as a percentage of the final contract amount (construction costs) should be computed and shown. [(CE+ CI) x 100/contract amount] (As Partner agencies require, Divisions may report Preliminary Engineering and Construction Engineering costs together under this section.)

P. **Maintaining Agency.** The agency responsible for maintenance of the road the project is on should be identified.

IV. Construction

A. **Materials.** Sources of significant raw materials and manufactured items and their quality indicators are to be listed (e.g., for aggregates: include type, wear, soundness, specific gravities; for bituminous mixes: include grading used, densities, average asphalt content; etc.). Manufacturers, suppliers, and fabricators of significant structural items and assemblies are to be listed. Problems encountered in materials control, if significant, should be described. Quantities of recycled materials incorporated in the work should be shown. The pay factor for any item where it was other than 1.0 (100%) should be indicated.

B. **Experimental or New Features.** Any significant experimental, demonstration, new, innovative, or unusual features, methods, and/or materials should be described. A separate report may be referenced, if one is available, or being written. Funding of special work, if separate from basic contract funds, should be explained.

C. **Changes & Problems.** Contract modifications, with a brief description of each, are to be listed. The amount of each and any associated time change are to be described.

Problems encountered, including delays, *unusual* weather, traffic control, design and construction changes, and errors, are to be discussed. Be constructive, factual, and identify personal opinions when they are used.

A general description of *significant* plan versus field differences should be written. Any overrun or underrun items of 15 percent or more should be explained.

Conditions encountered that might *significantly* and adversely affect future maintenance, design, or construction are to be described.

D. **Recommendations.** Based on experience from the project, any recommendations for future design, construction, and maintenance should be made. Staff specialists, such as the Bridge Design Engineer, Geotech Engineer, etc., should be consulted in advance of making recommendations that relate to their work. It should be kept in mind that the report may be distributed widely.

E. **Claims.** Each claim with a brief description and status or disposition should be listed. "No known claims" should be indicated if such is the case. If a claim is in litigation, a note should be attached reminding the COE to clear the report through the Regional Counsel prior to its being finished.

The resolution of significant disagreements that did not become formal claims should be described. Any pertinent supplemental agreements should be referenced.

V. Construction Engineering

A. **Project Personnel.** Names (not grades) of Project Engineer and major staff should be listed. Inclusive dates if there has been more than one Project Engineer should be shown.

B. **Contract Inspection.** If contract inspection services were used, describe the character of these service (e.g., number of personnel, assignment durations, nature of inspection duties, etc.).

C. **Other Contacts.** Name(s) and title(s) of cooperating agency personnel directly involved with the project, and other individuals who have impacted the work or its time for completion should be listed.

D. **Partnering.** If the project was partnered, the process should be summarized, along with the principal participants. Overall results should be described.

VI. Appendix

A. **Title Sheet, Location Map and Typical Sections.** As-built sections (include bridge sections and layouts) should be included.

B. **Tabulation of Bids.**

C. **Final Voucher Assembly.** See Section 12.7.8

D. **Project Materials Certification.** See FLH Field Materials Manual.

E. **Project Photographs.** Before and after pictures should be included. These should not be repetitious (e.g., shot after shot of a completed paving project). Critical stages of major operations should be shown (e.g. excavation and embankment operations, including benching, structure foundation, and falsework in place – anything which would be useful at a later date should a slide, structural, or other failure occur). Views of new or experimental features or equipment should be shown. The report should not be loaded with pictures showing the same thing, or standard, or insignificant operations. At a minimum, a date and caption should be included.

F. **Special Reports.** If appropriate, copies of reports on special or experimental features incorporated into the project should be included.

12A.1.2 SAMPLE FINAL REPORT

EXAMPLE

FINAL CONSTRUCTION REPORT

Project NASA 1(2)
Goddard Space Flight Center

I. PROJECT DESCRIPTION

A. **Project Number –** Project NASA 1(2) was located in Greenbelt, MD, in Prince Georges County.

B. **Description of Work –** This project consisted of the rehabilitation of the roadway and bridge that connected the Goddard Space Flight Center (GSFC) complex, of the National Aeronautics and Space Administration (NASA), with the Baltimore Washington Parkway. Only the ramps that provided connection to the northbound lanes of the Parkway were included in this project.

The work included removal and replacement of bridge superstructure; cleaning and painting of the structural steel girders; shotcrete repairs of the substructure; 1-½ inch asphalt pavement overlay of the access road and ramps; replacement of concrete medians and guardrails; shoulder work; new signs and pavement marking; and other miscellaneous work.

Schedule A consisted of all the bridge, concrete approach, and roadway work between 67 meters from the end of western approach slab and 58 meters from the eastern approach slab.

Schedule B consisted of completing the roadway work along the GSFC's access road from both end of the Schedule A work, and also consisted of the roadway work along the ramps to and from northbound Baltimore Washington Parkway.

Both schedules were awarded.

C. **Environmental Considerations –** GSFC prepared an Environmental Record Of Consideration, dated March 1, 1996, in accordance with NHB8800.11 and CFR 1500 guidance, and with a determination of categorical environmental exclusion. The Maryland Historical Trust issued a letter, dated July 16, 1995, stating that the proposed work will not have an adverse effect on eligible historic properties, structures, and archeological sites, or significantly alter the appearance of the structure. The National Park Service (NPS) issued a Special Use Permit to GSFC, signed by the Center Director on October 21, 2002, which was also checked as having a National Environmental Protection Agency Compliance of categorically excluded.

II. PROJECT DATA

A. **Specifications –** Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-96 (Metric).

B. **Termini –**

NASA Access Road:	Construction began at 426 meters from the east end of the bridge deck, and continued west to the limit of work at the fork for the ramps to and from the southbound lanes of the Parkway.
Ramp from northbound Parkway:	Between the Access Road and the limit of work at 171 meters along the ramp.
Ramp to northbound Parkway:	Between the Access Road and the limit of work, at 242 meters along the ramp.

C. **Length –**

NASA Access Road	0.742 kilometers (km)
Ramp from northbound Parkway	0.171 km
Ramp from southbound Parkway	0.242 km
Total length	1.155 km

D. **Width –**

Access Road: From the GSFC gate to the northbound parkway ramps – four 6.71-meter lanes (2-each way), plus widening, with a 1.22-meter concrete median and 2.74-meter shoulders. Thereafter, two 4.88-meter lanes (1-each way), with a 1.22-meter concrete median and variable shoulders.

Bridge Approaches: 11.5 meters of clear roadway, with 4.88-meter travel lanes (1 each way).

Ramps: Single 4.88-meter lane, with 1.83 to 2.74 meter-shoulders.

E. **Pavement Structure –**

The existing asphalt pavement of the NASA Access Road and the ramps, to and from the Baltimore Washington Parkway, were overlaid with 40 millimeters (mm) of 12.5-mm Superpave hot asphalt concrete pavement. The paved shoulder section was constructed of 130-mm of 19.0-mm Superpave hot asphalt concrete pavement and 40-mm of 12.5-mm Superpave hot asphalt concrete pavement.

F. **Structures –**

The bridge is a six span steel girder bridge over the Baltimore Washington Parkway, along the access road to the GSFC.

Bridge Inspection Program Number: 2170-001P

Length: 117.544 meters back to back of backwalls.

Width: 12.7 meters wide concrete deck, with 11.5 meters of clear roadway. There are two 4.88 meter travel lane on the bridge (1-each way).

G. **Contract Number and Date –**

DTFH71-03-C-00018 – January 18, 2003

H. **Contracting Officers –**

Melisa L. Ridenour,	Division Engineer
Donald W. Miller,	Director, Project Delivery
Wanda A. Peffer,	Contracting Officer
Eduardo A. Calderon,	Construction Engineer
Douglas E. Nair,	Construction Operation Engineer

I. **Contract Bid Amount –** $1,998,026.00 Schedule A
$335,583.00 Schedule B

J. **Engineer's Estimate –** $1,960,000.00 Schedule A
$310,000.00 Schedule B

K. **Final Contract Amount –** $2,353,798.89

L. **Contract Time –**

Award Date:	January 18, 2003
Notice to Proceed:	February 28, 2003
Original Completion date:	June 16, 2004
Authorized Extension Granted:	117 Days
Revised Completion Date:	October 11, 2004
Date Substantially Complete:	July 09, 2004
Date All Work Complete:	October 12, 2004
Liquidated Damages Accessed:	None

M. **Contractor –**

Martins Construction Corporation Small Business Concern (SBC)
6950 North Fairfax Drive
Arlington, Virginia 22213

N. **Subcontractors –**

A. Annandale, Inc. SBC
P.O. Box 249
Dumfries, VA 22026
Permanent Pavement Markings $16,684.50

Arthur Construction Company 2847 Cherry Branch Lane (WBE) Herndon, VA 20171	Disadvantage Business Enterprise (DBE) Woman Owned Business Enterprise	
Shoulder Reconditioning		$86,904.00
Central Atlantic Contracting Company 1550 S. Philadelphia Road Aberdeen, MD 21001		
Groove Bridge Deck		$44,000.00
DBA HM Welding 1751 Henrique Street Falls Church, VA 22043	SBC	
Welding		$6,000.00
Prince Construction Co. Inc. 1111 Good Hope Road SE. Washington, DC. 20020	DBE	
Install Bridge Reinforcing Steel		$36,606.80
DMR Associates, Inc. 4334 Hanover Pike Manchester, MD 21102		
Weld Expansion Dams		$21,390.00
Guardrails Etc, Inc. 4010 North Point Boulevard Baltimore, MD 21222	DBE - WBE (Section 8)	
Timber Guardrail		$190,905.25
Locust Lane Farms Inc. 3202 Locust Way Mitchellville, MD 20716	SBC	
Turf Establishment		$625.00
Paint City Contractors, Inc. 4054 North Point Boulevard Baltimore, MD 21222	SBC	
Bridge Painting		$370,000.00
The Lane Construction Corporation Senate Asphalt Division P.O. Box 71080, SW Station Washington, DC. 20024		
Asphalt Paving		$79,155.00
Safety Grooving & Grinding, LP Central Atlantic Contracting Company 1550 South Philadelphia Blvd. Aberdeen, MD 21001		

Bridge Deck Grooving $3,780.00

The Marksmen Company SBC
P.O. Box 239
Centreville, MD 21617
Shotcrete Repairs $89,280.00

O. **Construction Engineering Costs –**

EFLHD PE Costs:	$322,952.00
EFLHD CE Costs:	$140,000.00
CI Costs:	$152,908.00
Total Costs:	$615,860.00

Percent of the Final Contract Amount – 26.16

P. **Maintaining Agency –**

Goddard Space Flight Center/National Aeronautics and Space Administration

III. CONSTRUCTION

A. **Materials –**

Item No. 30101E: Aggregate Base, Grading E, and

Item No. 30101Z: Aggregate Base, Grading C or D ((MD-DOT Grading GAB Option)

Supplier: Aggregate Industries, PLC – Bladensburg Terminal
6401 Golden Triangle Drive
Greenbelt, MD 20770

Material: Crushed Aggregate – Millville Quarry, Maryland

Approved Job Mix Design:

Sieves	Target Value (Percent Passing)	Allowable Deviation (Percent)	Specification (Percent Passing)
50.0 mm	100	-	100
37.5 mm	100	5	95-100
19.0 mm	86	6	79-92
9.5 mm	65	7	58-72
4.75 mm	47	6	41-55
600 µm	18	4	14-22
75 µm	8.0	3.0	5.0-11.0

Maximum Dry Density:	147.6 pounds per cubic foot (pcf)
Optimum Moisture Content:	5.7 percent
Bulk Specific Gravity (Sp/Gr):	2.83
Sodium Sulfate Soundness:	0.7 percent
LA Abrasion:	22 percent wear
Fractured Faces:	100 percent
Liquid Limit:	21
Plasticity Index:	Non-plastic
California Bearing Ratio:	185 percent

Pay Factor: *(provide only if other than 1.0)*

Item No. 41801BAD: Superpave Asphalt Concrete Pavement, 12.5 mm Nominal Maximum Size Aggregate, < 0.3 ESAL, Type 4 Pavement Smoothness

Supplier: LarFarge North America, Inc. – Branchville Plant No. 3
10000 Beaver Dam Road
Cockeyville, MD 21030

Aggregates:

Frederick #7 — 15 percent
LaFarge North America, Inc.
Frederick, MD

Bulk Sp/Gr: 2.076
Apparent Sp/Gr: 2.736
Absorption: 0.4 percent
LA Abrasion: 22 percent
Sodium Sulfate Soundness: 1.8 percent

Churchville Birdeye — 30 percent
LaFarge North American, Inc.
Churchville, MD

Bulk Sp/Gr: 2.978
Apparent Sp/Gr: 3.070
Absorption: 0.5 percent
LA Abrasion: 20 percent
Sodium Sulfate Soundness: 0.2 percent

Frederick Washed No.10 — 35 percent
LaFarge North America, Inc.
Frederick, MD

Bulk Sp/Gr: 2.663
Apparent Sp/Gr: 2.728
Absorption: 0.9%
Sodium Sulfate Soundness: 0.7%

Frederick Dry No. 10 — 20 percent
LaFarge North American, Inc.

Frederick, MD

Bulk Sp/Gr: 2.586
Apparent Sp/Gr: 2.738
Absorption: 2.10%
Sodium sulfate Soundness: 0.7%

Asphalt Binder Grade and Source: PG 64-22
Valero Energy Corporation
Baltimore, MD

Antistripping Additive: None required

Job Mix Design Properties:

Sieves	Target Value (Percent Passing)	Allowable Deviation (Percent)	Specification (Percent Passing)
19.0 mm	100	-	100
12.5 mm	98	-	90-100
9.5 mm	91	6	85-97
4.75 mm	64	6	58-70
2.36 mm	38	6	32-44
1.18 mm	23	-	-
600 µm	14	4	10-18
300 µm	10	3	7-13
150 µm	8	-	-
75 µm	5.8	2.0	3.8-7.8

Asphalt Content – 5.3 (± 0.5) percent of total mix
Maximum Theoretical Specific Gravity: 2.553
Dust/Asphalt Ratio: 1.09
Voids in Mineral Aggregate (VMA): 17.2 percent
Voids Filled with Asphalt (VFA): 65.0 percent

Pay Factor: *(provide only if other than 1.0)*

Item No. 41801CA: Superpave Asphalt Concrete Pavement, 19.0 mm Nominal Maximum Size Aggregate, <0.3 ESAL,

Supplier: LarFarge North America, Inc. – Branchville Plant No. 3
1000 Beaver Dam Road
Cockeyville, MD 21030

Aggregates: Frederick No. 57 35 percent
LaFarge North America, Inc.
Frederick, MD

Bulk Sp/Gr: 2.712
Apparent Sp/Gr: 2.742

Absorption: 0.4 percent
LA: Abrasion: 22 percent
Sodium Sulfate Soundness: 1.8 percent

Churchville Birdeye 30 percent
LaFarge North America
Churchville, MD

Bulk Sp/Gr: 2.987
Apparent Sp/Gr: 3.070
Absorption: 0.5 percent
LA Abrasion: 20 percent
Sodium Sulfate Soundness: 0.2 percent

Frederick No.10 15 percent
LaFarge North American, Inc.
Frederick, MD
Bulk Sp/Gr: 2.586
Apparent Sp/Gr: 2.738
Absorption: 2.10 percent
Sodium sulfate Soundness: 0.7 percent
Sand Equivalent: 86

Frederick Washed No.10 10 percent
LaFarge North American, Inc.
Frederick, MD

Bulk Sp/Gr: 2.663
Apparent Sp/Gr: 2.728
Absorption: 0.9 percent
Sodium Sulfate Soundness: 0.7 percent
Sand Equivalent: 92

York Sand (Belvedere) 10 percent
York Building Products
Perryville, MD

Bulk Sp/Gr: 2.570
Apparent Specific Gravity: 2.610
Absorption: 0.8 percent
Sodium Soundness: 1.8 percent
Sand Equivalent: 60

Asphalt Binder Grade and Source: PG 64-22
Valero Energy Corporation
Baltimore, MD

Antistripping Additive: None required

Job Mix Design Properties:

Sieves	Target Value (Percent Passing)	Allowable Deviation (Percent)	Specification (Percent Passing)
25.0 mm	100	-	100
19.0 mm	95	-	90-100
12.5 mm	79	6	73-85
9.50 mm	69	6	63-75
4.75 mm	46	6	40-52
2.36 mm	28	6	22-34
1.18 mm	19	-	-
600 µm	13	4	9-17
300 µm	9.0	3	6-12
150 µm	6.0	-	-
75 µm	5.2	2.0	3.2-7.2

Asphalt Content – 4.3 (± 0.5) percent of total mix
Maximum Theoretical Specific Gravity: 2.595
Dust/Asphalt Ratio: 1.21
VMA: 14.3 percent
VFA: 63.5 percent

Pay Factor: *(provide only if other than 1.0)*

Used 40 tons of base asphalt. No tests were performed and no cores were taken. Acceptance based on Suppliers approved mix design.

Item 55202DC: Structural Concrete, Class D (AE), for Substructure (bridge abutments)
Item 55207DN: Structural Concrete, Class D (AE), for Approach Slabs, Type 1
Item55210B: Repair Concrete
And
Item No. 61601: Concrete Slope Paving

Class of Concrete: D (AE)

Supplier: Aggregate Industries-Mid Atlantic – Crofton Plant
6401 Golden Triangle Drive – Suite 400
Greenbelt, MD 20770

Mix Requirements: Minimum Strength – 4000 pounds per square inch (psi) in 28 days
Minimum Cement Content – 607 pounds per cubic yard (pcy)
Maximum Water/Cement Ratio – 0.40
Maximum Slump – 4.0 or 8.0 inches (with Sikament 2000)
Minimum Air Content – 5.0 percent

Portland Cement:	AASHTO M85, Type I/II LaFarge North American 5700 Chemical Road Baltimore, MD 21226-0746	488 pcy
Slag Cement:	NewCem Brand (AASHTO M-302, Grade 120) LaFarge North American Sparrow Point Plant 2001 Wharf Road Baltimore, MD 21219	162 pcy
Fine Aggregate:	Natural Sand (AASHTO M-6, Class A) Aggregate Industries Brandywine Plant Brandywine, MD Clay lumps and/or friable particles – 0.2 percent Coal and lignite – 0.02 percent Organic impurities – Plate 1 Passing 75 µm sieve – 0.9 percent Sand Equivalent Value: *(provide if available)* Fineness Modulus – 2.64 Bulk Sp/Gr at Saturated Surface Dry (SSD) – 2.63 Sodium Sulfate Soundness – 0.8 percent Absorption – 0.5 percent	1317 pcy
Course Aggregate:	No. 57 Dolomite Limestone (AASHTO M-80, Class A) Aggregate Industries Bladensburg Terminal Clay lumps and/or friable particles – 0.2 percent Coal and lignite – 0.0 percent SSD Bulk Sp/Gr – 2.83 LA Abrasion, grading B – 15 percent Sodium Sulfate Soundness – 1.2 percent Adherent Coating: *(provide if available)*	1800 pcy
Water:	Potable (city water main)	254 pcy

Fly Ash: *(provide if used)*

Air Entrainment:	Slika AEA-14 (AASHTO M-154) Slika Corporation 201 Politic Avenue Lyndhurst, NJ 07071	3.3 ounces per cubic yard
Water Reducer: (High Range)	Sikament 2000 (AASHTO M-194, Types A and F) Slika Corporation 201 Politic Avenue Lyndhurst, NJ 07071	42.2 ounces per cubic yard

Average Test Results: Slump = 3.75 inches

Air content = 5.8 percent
Temperature = 79º F
28-day cylinder breaks = 4910 psi

Pay Factor: *(provide only if other than 1.0)*

Approach Slabs Reinforcing Steel: Epoxy Coated (Same as Item 55402)

Slope Paving Reinforcement: W2.9/W2.9, 6 gage, 6-inch x 6-inch, steel wire mash, from Ivy Steel & Wire Company

Supplier: National Capital Industries
P.O. Box 287
Bladensburg, MD 20170

Item No.55202DE: Structural Concrete Class D (AE) For Bridge Deck (lightweight); and

Item No. 55207DK: Structural Concrete Class D (AE) For Parapets (lightweight)

Class of Concrete: D (AE)

Supplier: Aggregate Industries-Mid Atlantic – Crofton Plant
6401 Golden Triangle Drive – Suite 400
Greenbelt, MD 20770

Mix Requirements:
Minimum Strength – 4000 psi in 28 days
Minimum Cement Content – 607 pcy
Maximum Water/Cement Ratio – 0.44
Maximum Slump – 4.0 or 8.0 inches (with Sikament 2000)
Minimum Air Content – 5.0 percent

Portland Cement:	AASHTO M85, Type I/II *(Same as Item 55202DC)*	488 pcy
Slag Cement:	NewCem Brand *(Same as Item 55202DC)*	162 pcy
Fine Aggregate:	Natural Sand *(Same as Item 55202DC)*	1301 pcy
Course Aggregate: (Lightweight)	Carolina Solite – Aquadale, NC Plant (AASHTO M-195) Solite Corporation P.O. Box K 28 Richmond, VA 23228 Organic impurities (color) – No change Clay Lumps – 0.0 percent Loss of ignition – 0.12 percent Pop outs – None Shrinkage at 28-days – 0.034 percent Stain test – No stain Unit Weight (dry loose) – 47.0 pcf SSD Bulk Sp/Gr – 1.46 Absorption – 5.4 percent	875 pcy
Water:	Potable (city water main)	288 pcy
Air Entrainment:	Slika AEA-14 *(Same as Item 55202DC)*	3.3 ounces per cubic yard
Water Reducer:	Plastocrete 162 (AASHTO M-194, Type A Slika Corporation 201 Politic Avenue Lyndhurst, NJ 07071	26.0 ounces per cubic yard
Water Reducer: (High Range)	Sikament 2000 (AASHTO M-194, Types A and F) Slika Corporation *(Same as above)*	42.2 ounces per cubic yard

Average Test Results:
Slump = 3.9 inches
Air content = 5.8 percent
Temperature = 79º F
28-day cylinder breaks = 4980 psi

Pay Factor: *(provide only if other than 1.0)*

Item No. 55212A: Concrete Color Finish

Material:
- Primer: FX-460 Primer
- Surface: FX-460 Breathable Masonry Coating
  Color No. 25630 of Federal Standard 595B Colors

Supplier: Fox Industries, Inc.
3100 Falls Cliff Road
Baltimore, MD 21211

Item No. 55402: Epoxy Coated Reinforcing Steel

Type: AASHTO M-31, Grade 60

Coating: Scotchkote 413
3M, Inc.
New Ulm, MN
Or
720A009 Greenbar Fusion Bond Epoxy Powder Coating
Valspar Corporation
Charlotte, NC

Supplier: Gerdau Ameristeel

Fabrication Plant: York Reinforcing Steel
York, PA

Item No. 55502: Bridge Expansion Joints

Supplier: Eddy's Welding Inc.

Fabrication Plant: Ellicott City, MD

Joint Seal: Delastic E-3000
D.S. Brown Company
North Baltimore, OH

Item No. 55601CA: Aluminum Bridge Rail
(Conforms to FP-96, Table 717-3)

Supplier: L.B. Foster Company

Fabrication Plant: Pittsburgh, PA

Item No. 56303A: Bridge Paint System

Surface Preparation: Society for Protective Coatings Specification – SSPC-SP 5, white metal blast cleaning; using steel grit (with recycling equipment).

Paint System: FP-96, Table 563-1 – System Number 1

Supplier: Finnaren and Haley Paint & Coatings, Inc.
901 Washington Street
Conshohocken, PA 19428

Primer: Indurazine FB Zink (Inorganic) 15216/151195
Intermediate: Indulon 824 MIL-DTL-2441B, Type IV Primer White 824100/824801
Surface: Indurathane 890 Acrylic Urethane 890000/890800
Color No. 36306, of Federal Standard 595B Colors

Item No. 56601F: Shotcrete, 50 mm Depth (Item not used)

Item No. 56601K: Shotcrete, 100 mm Depth (reinforced)

Subcontractor: The Marksmen Company

Material: Bay Bridge Shotcrete Low Rebound (with fibers)
American Stone Mix, Inc.
8320 Bellona Avenue
Towson, MD 21204-2086

Mix Requirements: Minimum Strength – 3200 psi at 7 days
5370 psi at 28 days

Mix Design: Strength – 4000 psi at 3 days and 8000 psi at 28 days
Water/Mix Ratio – 0.1 maximum

Average Test Results: 4700 psi at 2 days and 5560 psi at 7 days

Reinforcement wire: (Same as Item 61601)

Item No. 61503B: Portland Cement Concrete Median

Class of Concrete: A (AE)

Supplier: Aggregate Industries-Mid Atlantic – Crofton Plant
6401 Golden Triangle Drive – Suite 400
Greenbelt, MD 20770

Mix Requirements: Minimum Strength – 3000 psi in 28 days
Minimum Cement Content – 611 pcy
Maximum Water/Cement Ratio – 0.49
Maximum Slump – 4.0 inches
Minimum Air Content – 4.0 percent

Portland Cement: AASHTO M85, Type I/II 458 pcy
(Same as Item 55202DC)

Slag Cement:	NewCem Brand *(Same as Item 55202DC)*	153 pcy
Fine Aggregate:	Natural Sand *(Same as Item 55202DC)*	1295 pcy
Course Aggregate:	No. 57 Dolomite Limestone *(Same as Item 55202DC)*	1800 pcy
Water:	Potable (city water main)	288 pcy
Air Entrainment:	Slika AEA-14 *(Same as Item 55202DC)*	3.3 ounces per cubic yard
Water Reducer:	Plastocrete 162 *(Same as Item 55202DE)*	26.0 ounces per cubic yard

Average Test Results:
Slump = 4.1 inches
Air content = Not determined
Temperature = 81º F
7-day cylinder breaks = 2770 psi

Item No. 61701G: Guardrail System SBTA

Subcontractor: Guardrails Etc., Inc.

Material:
Chromated Copper Arsenate treated Southern Pine lumber (AASHTO M-168)
G.E. Frisco Company
Upper Marlboro, MD

0.375-inch, corrosion resistant, steel backing elements and hardware
Wilton Corporation
Flinksburg, MD

B. **Experimental or New Features –**

None.

C. **Changes & Problems –**

1. Changes

Contract Modification (CM) No. 0001 was an unilateral administrative CM issued to correct an error found on line 21 of the Standard Form 1442 Solicitation, Offer and Award dated November 4, 2002, for this contract. This CM changed the calendar days for the contract completion from issuance of Notice to Proceed included on line 21 from 534 calendar days to 475 calendar days.

There was no change in contract amount, or the time that was part of the Contractor's bid.

CM No. 0002 was issued to allow for the combining of construction Stages III and IV, and the total closure of the bridge to traffic during Stages III and IV. As a result, a new pay item was created to give the government a credit of $10,216.56, and the pay item for moving temporary concrete barriers was deleted, as it was no longer needed.

The items for selective cleaning, removal of signs, and 50 mm shotcrete were deleted due to actual field conditions being different than anticipated. Also, the estimated quantities of various other items were adjusted because of existing field conditions being different than originally anticipated, the combining of Stages III and IV, or the government's decision to exercise the option to add Schedule B to the contract, which is addressed in CM 0003 below.

Net contract increase = $43,486.60 No change in contract time.

CM No. 0003: The Government exercised the option by adding the performance of Schedule B to the contract.

Due to the delay of the government in issuing this CM, an additional 15 calendar days were added to the time bid by the contractor for Schedule B. The contract completion date was changed from June 16, 2004 to July 31, 2004.

Net contract increase = $335,583.00 Contract time increase = 45 calendar days.

CM No. 0004: CM 0003 contained an exception that allowed for a future extension of contract time for guardrail work. Because of the delay in issuing CM 0003, the contractor required an extensive amount of additional time in order to obtain enough material for the steel backing timber guardrail that was beyond their control. Therefore, the contract completion date was changed from June 16, 2004, to October 11, 2004.

No change in contract amount. Contract time increase = 72 calendar days.

CM No. 0005 issued a credit to the Contractor for the unused lane rental days, as specified in the contract, for 27 days at $400.00 per day. A new pay item was created to pay the contractor the $10,800.00 amount of this credit.

At the request of NASA, a new pay item was established for rumble strips to be placed prior to the entrance to the GSFC compound. Also, the final quantities of 35-pay items were adjusted due to changes made and existing field conditions being different than originally anticipated.

Net contract decrease = ($23,296.71) No change in contract time.

Significant Overruns and Underruns

Schedule A

Item 20303AC: Removal of Concrete Slope paving underran by 17.1 percent due adjustments made to match existing field conditions.

Item 20303AEB: Removal of Portland Cement Concrete Median overran by 90.6 percent because part of Schedule B quantity needed to be removed during Schedule A operations.

Item 20307: Sawcutting Pavement underran by 57.7 percent by combining Stages 3 and 4 of Schedule A.

Item 20401: Roadway Excavation underran by 100 percent; this work was performed during Schedule B operations.

Item 20803: Structural Backfill underran by 44 percent, due to actual field measurements as compared to estimated quantities.

Item30101Z: Aggregate Base, Grading C or D overran by 97 percent; this quantity was underestimated.

Item 30306A: Shoulder Reconditioning underran by 50 percent due to variations in actual field measurements as compared to estimated quantities.

Item 41801BAD: Superpave Asphalt Concrete Pavement, 12.5mm underran by 77.7 percent due to performing the majority of the work during Schedule B operations.

Item 41801CA: Superpave Asphalt Concrete Pavement, 19.0mm overran by 128 percent due to part of Schedule B work being done during Schedule A operations..

Item 55210: Repair Concrete underran by 18.2 percent due to existing field conditions being different than anticipated.

Item 56601F: 50mm Shotcrete underran – This item deleted due to existing field conditions being worse than anticipated. (See Item 55601K below.)

Item 55601K: 100mm Shotcrete overran by 560 percent due actual field conditions; repairs were more extensive than was anticipated.

Item 56101: Structural Concrete Bonding underran by 95 percent due to the increased depth of the shotcrete repairs.

Item 61503B: Portland Cement Concrete Median underran by 100 percent; the work was performed during Schedule B operations.

Item 61601: Concrete Slope Paving underran by 17.1 percent due to actual field conditions warranted a smaller quantity be removed.

All traffic control items, 63503A through 63526, had quantities different than those originally estimated, which was caused by the combining of Stages III and IV under CM 0002.

Schedule B

Item 20302RB: Removal of Portland Cement Concrete Curb underran by 50.5 percent due to NASA's decision to leave some of the existing curb in place.

Item 20401: Roadway Excavation underran by 63 percent because an existing paved shoulder was utilized in the construction of the turnaround area.

Item 30101E: Aggregate Base, grading E overran by 94 percent due the existing shoulders being lower than shown on the typical plan sheets.

Item 30306A: Shoulder Reconditioning underran by 49.5 percent due actual field conditions being different than anticipated.

Item 41801BAD: Superpave Asphalt Concrete Pavement 12.5mm overran by 20 percent. Due to existing field conditions, this item was also used as a wedge and level course prior to placing the surface course.

Item 41801CA: Superpave Asphalt Concrete Pavement 19.0mm underran by 68 percent due to the utilization of the existing paved shoulder when constructing the turnaround area.

Item 62403: Furnishing and Placing Topsoil underran by 38.3 percent due to adjustments made to match existing field conditions.

Item 62509: Turf Establishment overran by 200 percent due to adjustments made to match existing field conditions.

Item 63401BA: Pavement Markings, type B, solid overran 52.0 percent due to variations in actual field measurements as compared to estimated quantities.

2. Problems

The gate to the complex was damaged several times by incoming traffic. To help alleviate this problem, thermoplastic rumble strips were added to the eastbound NASA Access Road, at the request of GSFC, to warn motorist of the gate ahead.

D. **Recommendations –**

None.

E. **Claims –** None.

IV. CONSTRUCTION ENGINEERING

A. **Project Personnel –**

Martin German, Project Engineer/COTR

B. **Contract Inspection –**

Ben Rent, KCI Technologies, Level 3 inspector. His primary duties were onsite of inspection of bridge and roadway construction.

C. **Other Contacts –**

Goddard Space Flight Center:
Tim Regan, Project Manager

National Park Service:
Charles Borders, Project Manager

D. **Partnering –**

Informal partnering was successfully implemented on this project, and a good relationship was maintained between all shareholders.

Chapter 13 – CONTRACT MODIFICATION
TABLE OF CONTENTS

Section **Page**

13.1 Overview 13-1

13.2 Authority 13-2
13.2.1 Administrative/Technical Concurrences 13-2

13.3 Types of Contract Modifications 13-3
13.3.1 Bilateral Contract Modifications (Supplemental Agreements) 13-3
13.3.2 Unilateral Contract Modifications (Change Orders) 13-3
13.3.2.1 Change Orders 13-4

13.4 Contract Clauses 13-7
13.4.1 FAR Clause 52.243-4, Changes 13-7
13.4.2 FAR Clause 52.249-10, Default 13-7
13.4.3 FAR Clause 52.236-2, Differing Site Conditions 13-7
13.4.4 FAR Clause 52.242-14, Suspension of Work 13-8
13.4.5 FAR Clause 52.211-18, Variation in Estimated Quantity (VEQ) 13-8

13.5 Time Extensions in Contract Modifications 13-9
13.5.1 Compensable Delays 13-9
13.5.2 Excusable Delays 13-9
13.5.2.1 No Impact Costs under an Excusable Delay 13-10
13.5.2.2 Required Notice for Excusable Delay 13-10
13.5.2.3 Acts of God and Weather Delays 13-10

13.6 Contract Modification Process 13-12
13.6.1 Identify the Need for a Contract Modification 13-14
13.6.2 Coordinate with FHWA and External Agencies 13-14
13.6.2.1 Land Owning and Road Owning or Maintaining Agencies (U.S. Forest Service, County, State DOT, NPS, etc.) 13-15
13.6.2.2 FHWA 13-15
13.6.2.3 Cooperating Agencies 13-16
13.6.3 Identify Scope of Work 13-16
13.6.4 Request Contractor to Prepare a Proposal 13-17
13.6.5 Prepare an Independent Government Estimate 13-17
13.6.5.1 Cost Based IGEs 13-18
13.6.5.2 Price-Based IGEs 13-26
13.6.6 Complete a Procurement Request (PR) 13-27
13.6.7 Determine if Cost and Pricing Data are Required 13-28
13.6.8 Analyze the Contractor's Proposal 13-28
13.6.8.1 Techniques for Analyzing the Contractor's Proposal 13-29
13.6.8.2 Using the Techniques to Analyze the Proposal 13-30
13.6.9 Accept the Contractor's Proposal or Perform Additional Fact Finding 13-31
13.6.10 Prepare a Negotiation Memorandum 13-31
13.6.11 Negotiate with the Contractor 13-32
13.6.11.1 The Government's Negotiator 13-32
13.6.11.2 Agenda for Negotiations 13-32
13.6.11.3 Dealing with New Information 13-32
13.6.11.4 Negotiation Minutes 13-32
13.6.12 Complete the Negotiation Memorandum 13-32
13.6.13 Amend the PR 13-32

TABLE OF CONTENTS
(Continued)

Section **Page**

13.6.14 Determine What Type of Contract Modification to Issue 13-33
13.6.14.1 Bilateral Contract Modification 13-33
13.6.14.2 Bilateral Contract Modification with Exceptions 13-33
13.6.14.3 Unilateral Contract Modification 13-33
13.6.15 Prepare the Contract Modification 13-33
13.6.15.1 Contract Modification 13-33
13.6.15.2 Supporting Documentation 13-34
13.6.16 Send the Contract Modification to the Contractor for Signature 13-34
13.6.17 Review, Approve, and Distribute Contract Modication 13-34

LIST OF EXHIBITS

Exhibit		Page
Exhibit 13.3-A	SF 30, Amendment of Solicitation/Modification of Contract	13-5
Exhibit 13.6-A	Contract Modification Process	13-13
Exhibit 13.6-B	Contract Modification Database Report	13-35

CHAPTER 13

CONTRACT MODIFICATION

13.1 OVERVIEW

The following chapter provides guidance and the requirements for developing and processing contract modifications. The Project Engineer and/or the COE is responsible for the tasks listed in the process, except as otherwise noted. Throughout the process, the Project Engineer should coordinate with the COE.

A contract modification is a negotiated acquisition. Part 15 of the Federal Acquisition Regulations (FAR) prescribes the policies and procedures governing negotiated acquisitions. The process outlined on the following pages is based on FAR Part 15, the Transportation Acquisition Manual (TAM), and the Transportation Acquisition Regulations (TAR). The process applies to all contract modifications except contract modifications written to exercise an option (FAR Part 17). The process does not apply to resolution of claims submitted under FAR Part 33.

To the maximum extent possible, a separate modification should be prepared for each situation. Avoid combining multiple unrelated issues in the same modification.

13.2 AUTHORITY

Only COs acting within the scope of their CO warrant are authorized to execute contract modifications on behalf of FHWA. Except for life-threatening or emergency situations, other FHWA personnel or its representatives shall not:

- act in such a manner as to cause the Contractor to believe that they have authority to bind the FHWA
- direct or encourage the Contractor to perform work that could be the subject of a contract modification

The delegation of authority letter, issued to the Contractor between the time of award and issuance of the notice to proceed, identifies the specific levels of authority for a particular project. The Project Engineer has authority to negotiate modifications up to the dollar amount approved by the CO in the negotiation memorandum (See Section 13.6.10).

13.2.1 ADMINISTRATIVE/TECHNICAL CONCURRENCES

Administrative delegations of authority might require consultations or concurrences from appropriate Division offices prior to the issuance of some types of CMs. Written documentation of consultations and concurrences is important, especially if obtained using telephone or other verbal means, and should include names, dates, and a summary of the discussion. None of these delegations is related to CO authority or who signs the contract modification.

13.3 TYPES OF CONTRACT MODIFICATIONS

Contract modifications are either bilateral or unilateral. Both types are explained in detail below.

13.3.1 BILATERAL CONTRACT MODIFICATIONS (SUPPLEMENTAL AGREEMENTS)

A bilateral modification (supplemental agreement) is a contract modification that is signed by the Contractor and the CO. Bilateral modifications, for example, are used to:

- reflect agreement of the parties to modify the terms of the contract
- make negotiated equitable adjustments resulting from the issuance of a change order
- definitize letter contracts

The supplemental agreement is the preferred type of contract modification and the most often used on FLH construction projects. This type of contract modification is issued bilaterally; that is, both the Contractor and the Government sign the document to mutually agree to all conditions of the contract modification. The equitable adjustment - a change in the contract price, time, and/or some other aspect - is also agreed to.

A Contractor's statement of release (similar to that shown in FAR Clause 43.204) should be included in a supplemental agreement. The statement releases the Government from any subsequent claims and confirms that all elements of the modification within the supplemental agreement have been addressed and resolved. The following is an example release statement:

> *By signature below, the Contractor agrees that payment and time adjustments as provided herein release the Government from any and all liability under this Contract for further compensation or adjustments relating to this modification.*

13.3.2 UNILATERAL CONTRACT MODIFICATIONS (CHANGE ORDERS)

A unilateral modification is a contract modification that is signed only by the CO. Unilateral modifications are used, for example, to:

- allow performance and payment of work without agreement on terms and conditions (i.e. price and time) of the modification
- make administrative changes
- exercise an option included in the contract
- issue termination notices
- issue change orders (see Section 13.3.2.1)

Administrative change orders are unilateral CMs created for purposes such as to change and account number or document changes that do not impact the right of the Contractor. These kinds of changes are made with administrative change orders.

13.3.2.1 Change Orders

FHWA contracts contain a Changes clause that permits the CO to make unilateral changes within the general scope of the contract (see Section 13.4.1). If halting or impeding the required work would adversely affect the Government's interest, a change order should be issued. A change order is a written directive, signed by the CO, requiring the Contractor to make a change without the Contractor's consent. A change order allows the Contractor to proceed with the work even though the terms and conditions of the contract modification have not been definitized. Change orders are not typically forward priced and therefore they require two documents: the change order (using SF 30 – See Exhibit 13.3-A) and a supplemental agreement reflecting the resulting equitable adjustment in contract terms.

Include the following in the change order:

- scope of work
- a specific timetable for definitizing a bilateral contract modification
- a not-to-exceed estimate of cost, which is used to obligate funds for the modification

Although issuance of a change order allows the Contractor to begin work before the Contractor and the Government have reached agreement on the terms and conditions of the modification, a change order does not negate the contract modification process outlined in Section 13.6. The Project Engineer and/or COE must still coordinate with FHWA and external parties, develop an approximate cost estimate, and secure an approved procurement request prior to having the CO approve the change order.

Exhibit 13.3-A SF 30, Amendment of Solicitation/Modification of Contract

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES

2. AMENDMENT/MODIFICAITON NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicble)*

6. ISSUED BY CODE	7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*	(X)	9A. AMENDMENT OF SOLICIATION NO.
	☐	9B. DATED *(SEE ITEM 11)*
	☐	10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED *(SEE ITEM 13)*

CODE	FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a)By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPIRATION DATA *(If required)*

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
☐	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
☐	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.*) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
☐	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
☐	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (*Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		*(Signature of Contracting Officer)*	

NSN 7540-01-152-8070
Previous edition unusable

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA FAR (48 CFR) 53.243

Exhibit 13.3-A SF 30, Amendment of Solicitation/Modification of Contract *(Continued)*

INSTRUCTIONS

Instructions for items other than those that are self-explanatory, are as follows:

(a) Item 1 (Contract ID Code). Insert the contract type identification code that appears in the title block of the contract being modified.

(b) Item 3 (Effective date).

(1) For a solicitation amendment, change order, or administrative change, the effective date shall be the issue date of the amendment, change order, or administrative change.

(2) For a supplemental agreement, the effective date shall be the date agreed to by the contracting parties.

(3) For a modification issued as an initial or confirming notice of termination for the convenience of the Government, the effective date and the modification number of the confirming notice shall be the same as the effective date and modification number of the initial notice.

(4) For a modification converting a termination for default to a termination for the convenience of the Government, the effective date shall be the same as the effective date of the termination for default.

(5) For a modification confirming the contacting officer's determination of the amount due in settlement of a contract termination, the effective date shall be the same as the effective date of the initial decision.

(c) Item 6 (Issued By). Insert the name and address of the issuing office. If applicable, insert the appropriate issuing office code in the code block.

(d) Item 8 (Name and Address of Contractor). For modifications to a contract or order, enter the contractor's name, address, and code as shown in the original contract or order, unless changed by this or a previous modification.

(e) Item 9, (Amendment of Solicitation No. - Dated), and 10, (Modification of Contract/Order No. - Dated). Check the appropriate box and in the corresponding blanks insert the number and date of the original solicitation, contract, or order.

(f) Item 12 (Accounting and Appropriation Data). When appropriate, indicate the impact of the modification on each affected accounting classification by inserting one of the following entries.

(1) Accounting classification _____
Net increase $_____

(2) Accounting classification _____
Net decrease $_____

NOTE: If there are changes to multiple accounting classifications that cannot be placed in block 12, insert an asterisk and the words "See continuation sheet".

(g) Item 13. Check the appropriate box to indicate the type of modification. Insert in the corresponding blank the authority under which the modification is issued. Check whether or not contractor must sign this document. (See FAR 43.103.)

(h) Item 14 (Description of Amendment/Modification).

(1) Organize amendments or modifications under the appropriate Uniform Contract Format (UCF) section headings from the applicable solicitation or contract. The UCF table of contents, however, shall not be set forth in this document

(2) Indicate the impact of the modification on the overall total contract price by inserting one of the following entries:

(i) Total contract price increased by $ _____

(ii) Total contract price decreased by $ _____

(iii) Total contract price unchanged.

(3) State reason for modification.

(4) When removing, reinstating, or adding funds, identify the contract items and accounting classifications.

(5) When the SF 30 is used to reflect a determination by the contracting officer of the amount due in settlement of a contract terminated for the convenience of the Government, the entry in Item 14 of the modification may be limited to --

(i) A reference to the letter determination; and

(ii) A statement of the net amount determined to be due in settlement of the contract.

(6) Include subject matter or short title of solicitation/contract where feasible.

(i) Item 16B. The contracting officer's signature is not required on solicitation amendments. The contracting offier's signature is normally affixed last on supplemental agreements.

STANDARD FORM 30 (REV. 10-83) **BACK**

13.4 CONTRACT CLAUSES

The authority to change the contract and make adjustments to the contract amount originates from the various FAR clauses. The majority of contract modifications are authorized by the Changes clause. The Changes clause and the other most commonly used FAR clauses are described below. For more information on any particular clause, contact your COE or refer to *Administration of Government Contracts* by Nash and Cibinic.

13.4.1 FAR CLAUSE 52.243-4, CHANGES

The Changes clause gives the Government the right to make unilateral changes in the work *within the general scope of the contract*, including changes to the plans and specifications, the method of work, Government-furnished materials, and the time allowed for contract completion. The Changes clause also provides the means under the contract for the Government to make an equitable adjustment for *constructive changes* and defective plans or specifications.

A "constructive change" is an unintentional change order issued either verbally or in writing. Many constructive changes arise from differing interpretations of the plans or specifications or from the Project Engineer's insistence on a certain method for the Contractor to use to do the work. Paragraph (b) of the changes clause, requires the Contractor to give written notice of a constructive change.

The term "within the general scope of the contract" is defined as work that "should be regarded as fairly and reasonably within the contemplation of the parties when the contract was entered into." Changes outside the scope of the contract are referred to as "cardinal changes" and are not within the authority of the Construction Branch.

13.4.2 FAR CLAUSE 52.249-10, DEFAULT

The Default clause serves two purposes. First, it allows the Government to terminate the Contractor's right to proceed if the Contractor has not performed with due diligence, or if the Contractor has not completed work within the time specified in the contract. Second, the clause allows for an adjustment to contract time if the Contractor or its subcontractor is delayed due to: acts of God or the public enemy, acts of the Government in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the Government, fires, floods, epidemics, quarantine restriction, strikes, freight embargoes, and unusually severe weather. Under the Default clause, the Contractor is only entitled to time extensions; there is no provision for monetary compensation.

13.4.3 FAR CLAUSE 52.236-2, DIFFERING SITE CONDITIONS

The Differing Site Conditions clause provides a remedy for situations where the actual physical conditions at the work site are materially different than either the conditions represented in the contract (Type I Differing Site Condition) or the conditions that would normally be encountered during work of that nature in the particular area (Type II Differing Site Condition).

13.4.4 FAR CLAUSE 52.242-14, SUSPENSION OF WORK

The Suspension of Work clause allows the Government to suspend, delay, or interrupt the Contractor's work for the period of time that is appropriate for the convenience of the Government. If the Government suspends, delays, or interrupts the Contractor's performance for an unreasonable period of time, the Contractor is entitled to an adjustment for the increase in the cost of performance. Under the Suspension of Work clause, the Contractor is not entitled to profit. See Section 5.5 for additional information on suspensions.

13.4.5 FAR CLAUSE 52.211-18, VARIATION IN ESTIMATED QUANTITY (VEQ)

The VEQ clause allows an adjustment to the contract when the actual quantities vary by more than 15 percent from the bid schedule quantities. Adjustments are allowable only if the Contractor's costs increase or decrease due solely to the variation. The unit price adjustment must reflect only reduced performance costs realized due to economies of scale on overrun units or increased performance costs experienced due to loss of efficiency on underrun units. The clause does not provide a remedy for situations where the Contractor lost money due to a low bid, or where the Contractor gained a windfall profit due to a high bid. The VEQ clause cannot be used for price adjustments in situations where the increase or decrease in quantity was caused by a differing site condition, a bid quantity error, or a contract change.

13.5 TIME EXTENSIONS IN CONTRACT MODIFICATIONS

A time extension can be included in the equitable adjustment allowed in a contract modification issued under the remedy/relief clauses of the contract, such as the Changes Clause or the Differing Site Conditions Clause. Refer to Section 5.4 for additional information regarding contract time.

13.5.1 COMPENSABLE DELAYS

Contract modifications that grant time extensions for events that are the responsibility of the Government may address the indirect costs associated with the delay.

Examples of costs that may be associated with compensable delays are as follows:

- **Home Office Overhead.** For work associated with changes and differing site conditions, overhead is usually audited as a percentage of direct costs. However, for a delay or time extension that is lengthy compared to the work in the contract modification, the Contractor may attempt to justify overhead on a daily rate basis. When a contract modification includes both added work (costs) and delay or extended performance associated with the same work, overhead costs should not be paid on both a percentage and daily rate basis. Costs used to establish the home office overhead rate can include home office rental, staff salaries, utilities, etc.

  The Eichleay formula is a recognized method for calculating home office overhead damages associated with construction delays.

- **Field Supervision and Overhead.** These types of costs include salaries and vehicles of supervisory personnel at the project site, utility bills, site offices and laboratories, etc.

- **Equipment.** This type of cost includes standby costs for the Contractor's equipment that is on the site and idle due to the contract modification - even if the equipment is unrelated to the contract modification. The Contractor must show that it was the event precipitating the contract modification that caused the equipment to remain idle and on the site. The equipment rates used to compute the costs are generally the standby rates, unless additional operating time was also required by the contract modification.

- **Traffic Control.** This cost type includes additional costs for the increased period that traffic control is required due to the contract modification.

13.5.2 EXCUSABLE DELAYS

Delays which are not the fault or responsibility of the Government but are also due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor are excusable delays. Paragraph (b) of the Default Clause (FAR Clause 52.249-10) addresses excusable delays. Below are some examples of delays listed in the Default Clause that are normally considered excusable. (This list is not intended to be all inclusive.)

- Acts of God or of the public enemy.

- Acts of the Government in either its sovereign or contractual capacity.
- Acts of another contractor in the performance of a contract with the Government.
- Fires.
- Floods.
- Epidemics.
- Quarantine restrictions.
- Strikes.
- Freight embargoes.
- Unusually severe weather.
- Delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractor or supplier.

13.5.2.1 No Impact Costs under an Excusable Delay

A contract modification recognizing an excusable delay under the Default Clause, FAR Clause 52.249-10(b), should grant only additional contract time. The clause does not provide for payment to the Contractor for costs resulting from the delay (including indirect or impact costs).

13.5.2.2 Required Notice for Excusable Delay

FAR Clause 52.249-10(b)(2) requires that the Contractor, within 10 days from the beginning of any delay, notify the CO in writing of the cause(s) of the delay. Like most other notice requirements, in order to be enforced, the Government may be required to show that it was prejudiced by a lack of timely notice.

13.5.2.3 Acts of God and Weather Delays

Acts of God have been defined by the Comptroller General as follows:

> *...some inevitable accident which cannot be prevented by human care, skill, or foresight, but results from natural causes such as lightening, tempest, floods, and undulations.*

Delay due to a tornado, earthquake, abnormal drought or other natural disaster can be excusable. If the weather is abnormally severe (as compared to the normal weather for the location and time of year) then a time extension can usually be granted. Normal weather, including rain, snow, drought, etc. is not considered an *Act of God* under the FAR. Averages, based on minimum of the last ten years of data, are often used as the comparison to establish

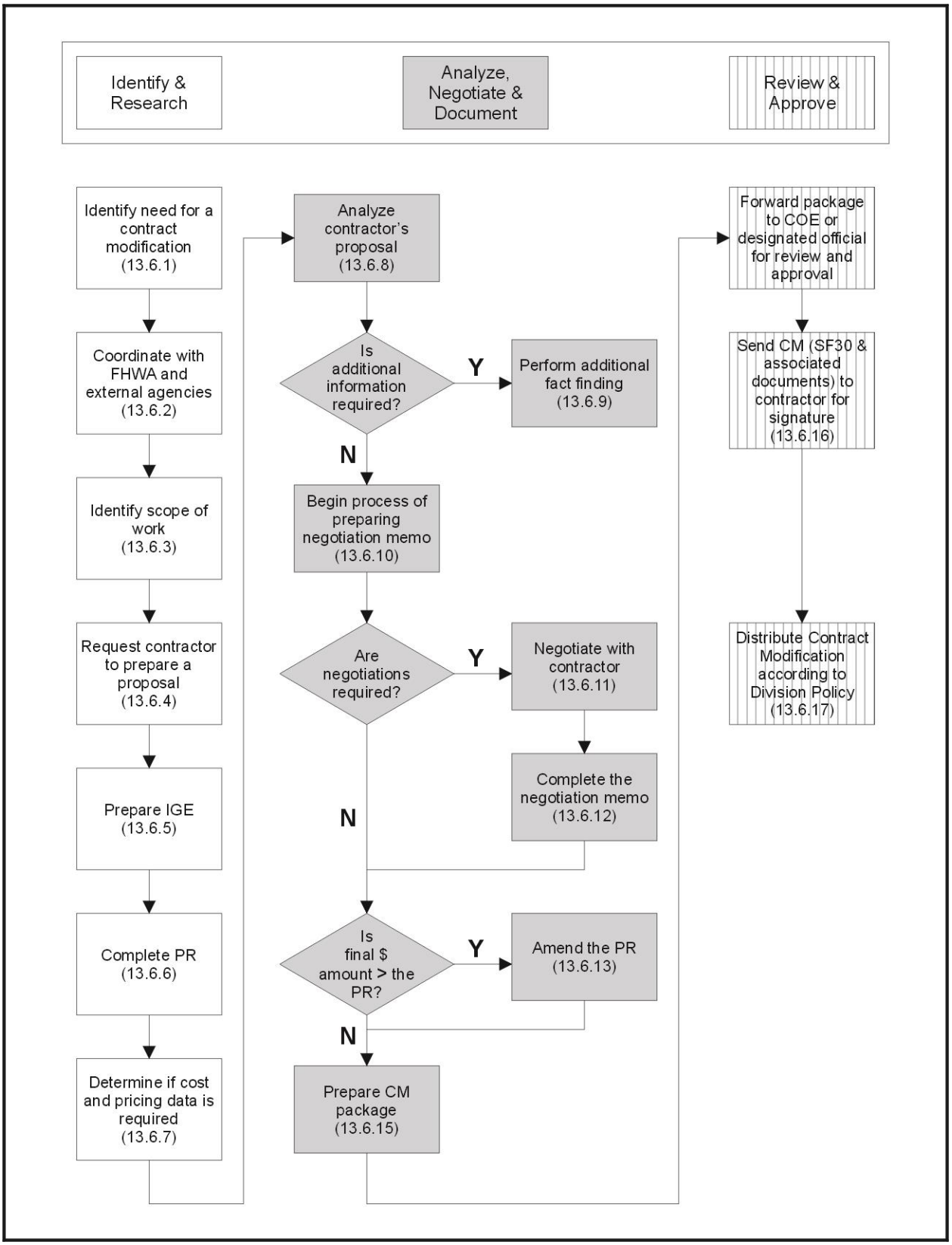
extremes in weather. This data is typically compiled monthly. However, an analysis of long term or chronic bad weather should look at the entire period in question - or even the entire period of the Contract - since unusually good weather sometimes offsets unusually bad weather when extended periods are evaluated.

13.6 CONTRACT MODIFICATION PROCESS

The process shown in Exhibit 13.6-A and described in Sections 13.6.1 through 13.6.17 outlines the requirements for developing, preparing, and executing a contract modification. While the process applies to the majority of contract modifications, the steps may be reordered or modified depending on the situation.

The Project Engineer and/or COE are responsible for completing the process and ensuring the COE is kept involved and informed throughout the process. As the three Divisions may have specific process differences, see your Division policies.

Exhibit 13.6-A Contract Modification Process



13.6.1 IDENTIFY THE NEED FOR A CONTRACT MODIFICATION

Contract modifications are initiated for a multitude of reasons. In general, the land-owning agency, a cooperating agency, the Contractor, or FHWA can identify the need for a contract modification. Typical situations that may necessitate a modification are listed below.

- Land-Owning Agency
    - Provide an alternate materials source
    - Paving of campgrounds or parking areas
- Road Maintaining or Owning Agency
    - Stockpiling aggregate for owner's use
    - Change work restrictions listed in the contract
- Resource or Regulatory Agency
    - Change environmental restrictions listed in the contract
    - Revise culvert pipe details to improve fish passage
    - Revise revegetation plans
- Contractor
    - Correction of an error or omission in the plans or specifications
    - Price adjustment for acceptance of work or material that does not conform to the contract requirements
    - Value engineering proposals
    - Equitable adjustments for differing site conditions or variations in quantity
    - Time extensions for excusable delays
- FHWA
    - Change in the plans or specifications
    - Adjustments for suspensions or terminations for convenience
    - Correction of an error or omission in the plans or specifications
    - Adding work not provided for in the plans and specifications
    - Substituting or deleting work
    - Accelerating work
    - Changing method of measurement
    - Changing time (notice to proceed, winter shutdowns, fixed completion date)
    - Close-out project account

13.6.2 COORDINATE WITH FHWA AND EXTERNAL AGENCIES

Once the need for a modification has been identified, it is essential for the Project Engineer and/or COE to coordinate with the parties who may have an interest in the modification. This coordination should continue throughout the development of the modification. Coordination with the appropriate parties will ensure the modification is developed properly and issued timely.

Also, the earlier an interested party is brought into the process, the greater the likelihood that the modification will be developed smoothly and successfully.

The parties that are most commonly involved in the contract modification process and their roles in the process are listed below. As this list is not all-inclusive, use judgment and discretion in selecting who will be involved for the particular situation.

Document the cross-functional team members' involvement and concurrence with the development of the contract modification. Include this documentation with the modification support data.

13.6.2.1 Land Owning and Road Owning or Maintaining Agencies (U.S. Forest Service, County, State DOT, NPS, etc.)

The Project Engineer and/or COE will need the agency's concurrence in context of all changes. Although some modifications may not affect the road owners, it is a good idea to keep them informed of all modifications. It allows them to be a partner in the project and results in a smoother running project. If the road owner requests the modification, this request should be provided in writing. Depending on the scope of the modification, the road owner may need to provide approval and funding. In general, the same guidelines exist for the landowners as for the road owners.

13.6.2.2 FHWA

13.6.2.2.1 Financial/Program Manager

This individual will establish the availability of funds for the proposed modification. If funds are not currently available, the Financial/Program Manager will research other funding avenues. For modifications estimated to be greater than $50,000 or modifications developed during the last quarter of the fiscal year, notify the Financial/Program Manager of the approximate dollar amount prior to refining the scope of the modification. The availability of funds can severely impact both the scope and the timing of the modification.

13.6.2.2.2 Project Manager (Project Development) and Designer

The Project Manager and Designer are your main points of contact for nearly all contract modifications. Communication with them is critical to identifying both the underlying reasons for particular design details or specifications, as well as commitments (to owning, maintaining, and resource agencies) that may be impacted by the modification. They can also assist in coordinating with other FHWA technical specialists.

13.6.2.2.3 Environmental Engineer or Specialist

Contact the Environmental Engineer or Specialist if there is any possibility that the proposed modification might have environmental or permit consequences, or might alter the

environmental mitigation features established in the contract. The Environmental Engineer or Specialist will coordinate any permit requirements.

13.6.2.2.4 Materials Team

Coordinate proposed changes to materials specifications (gradation, sand equivalent, pavement structure, material sources, etc.) with the Materials Team.

13.6.2.2.5 Bridge Team

Discuss proposed changes to structures (bridge, retaining wall, box culvert, etc.) with the Bridge Team.

13.6.2.2.6 Hydraulics Team

Coordinate proposed modifications to culverts and major erosion control features with the Hydraulics Team.

13.6.2.2.7 Geotechnical Team

Coordinate proposed modifications to geotechnical features (slopes, retaining walls, pavement structure, material sources, etc.) with the Geotechnical Team.

13.6.2.3 Cooperating Agencies

Cooperating agencies include: National Park Service, State Fish and Game, U.S. Fish and Wildlife, National Marine Fisheries Services, U.S. Army Corps of Engineers, U.S. Forest Service, State Departments of Transportation, Bureau of Land Management, military, Local Government Agencies, and similar entities.

13.6.3 IDENTIFY SCOPE OF WORK

Identification of a clear and concise scope of work will enable the Contractor to develop its price proposal and will provide a basis for negotiations. The scope of work needs to include sufficient detail for the Contractor to reasonably develop its proposal. The scope of work may be revised based on information provided in negotiations or discussions with the Contractor.

Include the following in the scope of work:

- General description of the proposed modification
- Location
- Preliminary specifications and design details
- Quantity of work
- Restrictions on when and how the work can be performed

13.6.4 REQUEST CONTRACTOR TO PREPARE A PROPOSAL

Once the scope of work has been identified, prepare a letter requesting the Contractor to develop a price proposal for the proposed modification. Include the following in the letter:

- Proposed modification number (Note: To the extent possible, modifications should be numbered sequentially. If an earlier proposed contract modification is voided, do not use that number for your new modification)
- Scope of work
- Request to prepare a price proposal for the identified scope of work
- Preferred pricing format (square meter, lump sum, day, etc.)
- Time
- Date by which the price proposal should be submitted to the Project Engineer and/or COE

A good request to the Contractor would resemble that shown below.

> *Dear "Contractor:"*
>
> *As discussed with you on January 16, FHWA plans to have you pave the section of road between Stations 10+00 and 20+00. This added work will be covered in Contract Modification No. 006.*
>
> *Please submit a price proposal based on the following information:*
> - *Place hot asphaltic concrete pavement between Stations 10+00 and 20+00*
> - *3-inch depth, 24-foot width, see Plan Sheet A.2 for typical section*
> - *Comply with Section 401 specifications*
> - *Place the pavement in one lift*
> - *Estimated quantity is 450 tons*
> - *Work will be measured and paid by the ton*
> - *Work will be paid under Item M02 40101, Hot Asphaltic Concrete Pavement*
>
> *The paving between Station 10+00 and Station 20+00 must be completed by September 14, 2008.*
>
> *Please submit your price proposal to me by February 20, 2008.*

13.6.5 PREPARE AN INDEPENDENT GOVERNMENT ESTIMATE

IGEs are required for all priced contract modifications except modifications to exercise fixed priced options (FAR Part 17).

A well-prepared IGE is essential if the Government is to receive a fair and reasonable price for the contract modification work. Without an accurate IGE, the Government has no basis upon which to evaluate the Contractor's proposal. Therefore, it is imperative to prepare the IGE prior to receiving the Contractor's proposal and to not base the IGE on data furnished by the

Contractor. The level of detail should be commensurate with the complexity and value of the modification.

Sign and date the IGE once it is completed. Also, label the top of the IGE "For Official Use Only." Do not disclose the IGE prior to conducting negotiations with the Contractor.

IGEs can be cost-based or price-based, as explained in Sections 13.6.5.1 and 13.6.5.2, respectively.

13.6.5.1 Cost Based IGEs

Step 1. Describe the general scope of the work, the location, and site characteristics.

Include this information in the Background section of the IGE.

A good understanding of what the work entails is critical to developing an accurate IGE. In developing the scope of work, consider the following questions:

- What needs to be constructed, performed, or changed?
- What quantities are involved?
- Where will the work occur?
- What type of site conditions will be encountered?

Example

This IGE calculates the cost to excavate 52,500 cubic yards of material and place it in fills. The additional excavation work will occur between Station 9+500 and 14+200. While the contractor has the right to place the material anywhere within the 10 mile project limits, most of the excavated material will be placed between Stations 9+000 and 14+800.

The material to be excavated consists of silty gravels. No rock excavation is expected and the geotech report indicates that all of the material will be suitable.

Step 2. Determine HOW the work will be performed – high level.

Include this information in the Background section of the IGE.

The purpose of this step is to engage the critical thinking needed for Step 3. Explain the concept and how the work will be performed logistically. List the required equipment, labor, and materials. Do this at a high level. The details will be added in Step 4.

Example

Most of the cuts are near large embankments. Therefore, the equipment will be a blend of dozer push and off-road trucks. Material will be placed with another D6 dozer, rollers and water trucks. Most of the excavation for the change will be sliver cuts, which is drastically different than the 20401 work covered in the original bid item.

Step 3. Is the nature of the work similar to an existing contract item?

Step 2 identified how the Contractor is likely to approach the work. If this approach is similar to an existing bid item or an item in a recent and competitively bid contract, you may be able to use the unit price for that item. Skip to the *Price-Based IGEs* section (Section 13.6.5.2) for more information on using bid item prices for the IGE. If the approach identified in Step 2 is not similar to an existing bid item or an item in a recent and competitively bid contract, it will be necessary to develop the IGE based on the cost of the work as outlined in Step 4 below.

Example

The 20401 quantity in the original contract consisted of major cuts and fills. This is drastically different than the 20401 work in the modification.

Step 4. Determine the method of measurement.

Include this information in the Background section of the IGE.

At some point in the IGE process, the method of measurement must be identified. The various methods of measurement are defined in Section 109 of the Standard Specifications. When selecting a method, consider the accuracy as well practicality. For example, the most accurate way to measure borrow might be by the ton, but if no scales are available, it would be sensible to use truck measure (cubic yards) to establish the quantity rather than having the Contractor mobilize scales.

Step 5. Determine what equipment will be used to perform the work and its cost.

Include this information in the Equipment Support Data section of the IGE.

First, identify the type and size of equipment that will be used to perform the work. Consider what is reasonable for the nature of the work, but also factor in what the Contractor has available at the site. For example, if a D4 dozer would be able to perform the work, but the Contractor's smallest dozer at the project is a D8, it may be more cost effective to use the D8 since it wouldn't require an additional mobilization. Identify the type of equipment (loader, front end), the brand name (Caterpillar), the model number (950G), and the year manufactured (2004).

Second, determine the cost. For Contractor-owned equipment, the preferred method is to use the Contractor's equipment rates, computed by a certified public accountant. However, these rates are often difficult to obtain and therefore the U.S. Army Corps of Engineer's (USACE) Construction Equipment rates are most commonly used. For rented equipment, always use the actual rented rate, adjusted as explained below. Rates derived from other equipment manuals (e.g., Blue Book, etc.) should be used with direction from the COE.

U.S. Army Corps of Engineer's Equipment Rates

The U.S. Army Corps of Engineer's publishes equipment rates for twelve regions across the United States. Go to http://www.nww.usace.army.mil/cost to find the rates for the region in which the project is located.

Rental Rates

If the equipment is rented, the corresponding rental rate should be used. When IGE equipment rates are based on rental rates, be sure to document how the rental rate was determined (e.g., phone call quote, faxed quote, etc.).

Rental companies usually lease equipment by the month or week. To determine the hourly rate for equipment rented on a monthly basis, divide the monthly rate by 176 hours. (Reference: *Contract Administration Core Curriculum Participant's Manual and Reference Guide* 2006, Page 85.) To determine the hourly rate for equipment rented on a weekly basis, divide the weekly rate by 40 hours.

Step 6. Determine the duration of the modification work.

Include this information in the Time Support section of the IGE.

The duration (working days) needs to be calculated to determine the overall cost of the modification. Duration is based on the quantity of work to be performed and the production rate. The production rate is based on the nature of the work, site conditions, equipment capability, and other factors. Production rates can be based on estimates for similar work under similar conditions (e.g., 150 cubic yards/hour as in Example 1 below) or can be calculated based on the detailed situation using project experience or references such as the Caterpillar Performance Handbook. Example 2 below shows how to calculate the duration for removing and disposing of slide material.

Example 1

Most of the work will be a blend of dozer push and off-road truck haul since most of the cuts are near larger embankments. Therefore a conservative production rate is 150 cy/hour.
Duration = 52,500 cy ÷ 150 cy/hr = 350 hours = 35 days (Assuming 10-hour workdays)

Example 2

Worksheet for Calculating Haul Duration

Assumptions			
Quantity	5250	ton	Note: Assumed 145 pcf for mud slide material as it has the consistency of concrete
Longest Haul Length	1	miles	
Shortest Haul Length	1	miles	
Hours per shift	10	hours/day	
Load and Dump rate	10	minutes each	Note: High load and dump rate due to NPS having to check each load for unexploded ordinance.
Avg. truck speed	30	mph	
Capacity of truck	14	ton	
No. of trucks	3	trucks	

Production Rates & Duration								
Avg. 1- way haul dist =	1	miles						
Time for one way trip =	1	miles	/	30	mph	X 60 min/hr =	**2.0**	**minutes**
Cycle time	Load	10						
	Haul	2.0						
	Dump	10						
	Return	2.0						
	Total	**24**	**min**					
Loads per truck per day =	10	hours/day	X 60 min/hr	÷	24.0	min/load =	25.0	loads/trk day
						USE	**25**	**loads/trk day**
Daily production =	3	trucks X	14	tons/ trk X	25	lds/ trk day =	**1050**	**tons/day**
Duration =	5250	tons /	1050	tons/day =	5.0	days		
						USE	**5.0**	**days**

Step 7. Determine labor requirements and costs.

Include this information in the Labor Support Data section of the IGE.

Labor requirements are based on the nature of the work and the equipment used. There are two ways to calculate labor costs – using the Davis-Bacon rates in the contract or using the actual payroll rates. Either method is acceptable but the actual payroll rate might be higher than Davis-Bacon and therefore would yield a more accurate estimate of the Contractor's cost.

Davis-Bacon

To determine the labor rate using the Davis Bacon rates, go to the *Minimum Wage Schedule* in the contract. First identify which classification the employee falls under (e.g., carpenter, power

equipment operator, etc.). Then determine the appropriate group and zone (if applicable) for the project.

In addition to the employee's wages and fringe benefits, the Contractor also incurs indirect costs such as: FICA, Medicare; state and federal unemployment taxes; workers compensation; general liability insurance premiums; paid vacation and sick leave; and health, dental and/or disability insurance premiums paid by the company. These costs are commonly referred to as payroll burden. Payroll burden rates vary from company to company, so request the rate from your Contractor.

Note that when calculating the overtime rate, the sum of the base rate and zone are multiplied by 1.5, then the fringe benefits are added. Do not multiply the fringe benefits by 1.5.

Also, it's important to know whether the Contractor pays fringe benefits in cash to the employee, or if the fringe benefits are placed in a bona fide benefit program. If they are paid in cash, payroll burden is applied to the fringe benefits. If they are paid into a program, payroll burden is not applied to the fringes benefits. Check the Contractor's payroll to determine how they pay fringe benefits.

Example

!! Note - This example assumes the fringe benefits are <u>paid in cash</u> to the employee. Thus, payroll burden is applied to the base rate <u>and</u> fringe amount.

Labor Rate - Regular Time

Labor Description	Group	Base Rate	Zone	Fringe	Subtotal	28% Burden	Total Hourly Rate
Carpenter	-	$28.41	-	$11.16	$39.57	$11.08	$50.65
Flagger	5	$19.22	-	$10.10	$29.32	$8.21	$37.53
Laborer	3	$23.03	-	$10.10	$33.13	$9.28	$42.41
Operator, Group 2	2	$30.07	-	$10.35	$40.42	$11.32	$51.74
Operator, Group 3	3	$29.21	-	$10.35	$39.56	$11.08	$50.64
Operator, Group 4	4	$28.59	-	$10.35	$38.94	$10.90	$49.84
Truck Driver	3	$24.65	-	$10.00	$34.65	$9.70	$44.35

total regular hourly rate = (base rate + zone + fringe) x (1 + % burden)

Labor Rate - Overtime

Labor Description	Group	Base Rate	Zone	OT Rate	Fringe	Subtotal	28% Burden	Total OT Hourly Rate
Carpenter	-	$28.41	-	$42.62	$11.16	$53.78	$15.06	$68.83
Flagger	5	$19.22	-	$28.83	$10.10	$38.93	$10.90	$49.83
Laborer	3	$23.03	-	$34.55	$10.10	$44.65	$12.50	$57.15
Operator, Group 2	2	$30.07	-	$45.11	$10.35	$55.46	$15.53	$70.98
Truck Driver	3	$24.65	-	$36.98	$10.00	$46.98	$13.15	$60.13

total overtime hourly rate = [(1.5 x (base rate + zone)) + fringe)] x (1 + % burden)

Step 8. Determine specific material requirements, specifications, and costs.

Include this information in the Materials sections of the IGE.

To accurately identify the material costs, the requirements or specifications must be known. Consider the following questions:

- What is the aggregate gradation?
- What class of concrete?
- What type of geotextile?
- What size of culvert?, etc.

It is also important to know the shipping cost if applicable. Include state or local sales taxes as well.

The most accurate estimate of material costs is to call the supplier for a quote. If possible, get more than one quote – this ensures the price is reasonable, plus it will be useful information during negotiations.

Example

Material: ⅜" Grout
Specification: 235 lb/cy cement, 67 lb/cy fly ash, 1,598 lb/cy sand, 252 lb/cy water
Supplier: Ardstone of Columbia Falls is the only supplier within 100 miles
Price Quote: $140/cy for material; an additional $14/cy for delivery to Glacier National Park
Total Price: $154/cy

Step 9. Summary Section of the IGE

Transfer information such as the item quantity, production rate, duration, equipment rates, labor rate, and material costs to the Summary section. Fill in the hours and units to calculate the respective costs.

The Summary section shows the equipment, labor, and material costs. It also includes overhead, profit, and bond amounts, and shows the final unit price for the IGE.

The person who prepared the IGE should sign and date the Summary section.

Step 10. Add overhead.

Include this information in the Summary section of the IGE.

The Contractor is entitled to overhead on all modification work, regardless of the operative FAR clause.

Overhead compensates a Contractor for costs not included in their direct equipment, labor, or material rates. The Contractor's overhead rates generally range from approximately 7% to 14%, but rates as high as 22% are not uncommon for small companies. A reasonable rate to use for the IGE is 10%, but use the Contractor's audited rate if you have it.

Overhead is applied to all direct costs (e.g., equipment, labor, and materials).

Step 11. Add profit.

Include this information in the Summary section of the IGE.

The Contractor is entitled to profit as defined by the particular FAR clause the work falls under. For example, profit is allowed on modifications under the Changes, Variation in Estimated Quantity, and Differing Site Condition clauses, but when determining compensation for work under the Suspension of Work clause, the Contractor is not entitled to profit.

Profit is applied to all direct and indirect costs (e.g., equipment, labor, materials, and overhead).

The rate of profit should fairly reflect the nature of the work and the risks involved. If the modification work is more difficult than the original contract work, a higher profit rate may be warranted. When the modification is priced after the costs have been incurred, a lower rate of profit may be appropriate. Profit rates between 5% and 15% are generally acceptable, depending on the nature of the work.

If the work is performed by a subcontractor, the subcontractor is entitled to overhead and profit, and the prime contractor is entitled to those markups as well. Prime contractor markup usually ranges between 5% and 15% for overhead and profit. Some prime contractors request a combined markup for overhead and profit and some may show them separately.

The following example shows how to compute subcontractor overhead and profit, and prime contractor markup.

Example

Equipment, labor, and material subtotal		$608,527.50
Subcontractor Overhead	10%	$60,852.75
	subtotal =	$669,380.25
Subcontractor Profit	7%	$46,856.62
	subtotal =	$716,236.87
Prime Contractor Markup	5%	$35,811.84
		$752,048.71
Bond	0.60%	$4,512.29
	total =	$720,749.16
	Item quantity (cubic yards)	52,500
	unit price (per cubic yard)	**$13.73**

Step 12. Add bond cost.

Include this information in the Summary section of the IGE.

Just after a contract is awarded, the Contractor must secure a performance bond. The purpose of this bond is to guarantee the project will be completed, either by the Contractor or through its surety. At the end of the contract, if the final contract amount is higher than the award amount,

the bond premium is adjusted upward. If the final amount of the contract is less than the award amount, the Contractor receives a credit.

Each modification (whether they increase or decrease the contract amount) should include an amount for the bond premium. This is usually between 0.5% and 1.5% depending on the volume of work. To determine the actual percentage the Contractor is paying, review the bond documentation submitted for the initial mobilization payment.

Apply the bond premium to the final price of the modification (e.g., direct and indirect costs, and profit) as in the example above.

Step 13. Determine effect on other contract work.

Include this information in the Time Support section of the IGE.

A more difficult part of the IGE is determining the modification's impact on other work. Some questions to consider include the following:

- Does the modification work disrupt the Contractor's haul for another item?
- Does the modification work take resources away from other contract work?
- Does the modification work push other contract work into a later time period, thus affecting fuel or material prices, or causing additional remobilization costs?
- Does the modification work change how a Contractor was going to approach other contract work?

If the answer is yes, the impact must be defined (i.e., what equipment and labor for how many hours) and the costs must be estimated as outlined in this section.

Step 14. Determine the modification's effect on the contract fixed completion date.

Include this information in the Time Support section of the IGE.

The IGE not only needs to estimate the Contractor's price to perform work, but also how the contract fixed completion date is affected. The two main sources for analyzing time impact are common sense and the Contractor's construction schedule.

Review the Contractor's schedule and consider the following:

- Is the modification work on the critical path?
- Does the modification work affect when critical path work can be performed?
- Does the modification work take resources away from critical path work?
- If the modification adds time to the critical path, does it push the fixed completion date into a less (or more) favorable season?

13.6.5.2 Price-Based IGEs

In Step 3 of Section 13.6.5.1, you determined whether or not it was appropriate to consider using a bid item from an existing contract as your IGE price.

Ideally, the following conditions should be met before using an existing bid item price (from the subject contract or another contract):

- the contract from which the bid price is obtained must be a competitively bid contract;
- the contract from which the bid price is obtained must have been awarded within the last 12 months; and
- two or more contractors must have provided bids. The engineer's estimate does not count as a bid.

While it is also best if the nature and quantity of the work is similar, adjustments may be made to reflect any disparities.

If the conditions in the above bullets are met, develop the IGE using one of the options described in Sections 13.6.5.2.1 through 13.6.5.2.3 below.

13.6.5.2.1 Preferred Option - Use Bid Tabs from Current Contract

1. Review the bid tabs from your awarded contract.
2. Compare your contractor's price to the other bidders' prices (for the particular item).
3. Look at the other bidders' prices. If there are any outliers – high or low, eliminate them from consideration. Average the other prices.
4. If your contractor's price is comparable, say within 10 or 15 percent of the average of the other bidders, use your contractor's price for your IGE, then make adjustments as described in Section 13.6.5.2.3 below.
5. If your contractor's price is not comparable, use the average price that you developed in Item 3 above. It is important to note that while the average bid price developed in Item 3 is your IGE price, it is not necessarily your negotiation objective. When the contractor's bid price is lower than the average price (as determined in Item 3), your initial negotiation objective should be the contractor's price. If the contractor can justify why its price for the modification work should be higher than its original bid price, it is acceptable to negotiate a price between the original bid price and your IGE.

13.6.5.2.2 Less Preferred Option – Use Bid Tabs from Other Contracts (Bid History Browser)

This method is less preferred because it introduces many variables, such as:

- Is the project in the same area/state?
- Is the work really of a similar nature?
- Were the contractors faced with the same risk?

If you are confident the bid items from other contracts are similar, use the bid history data as a price source. Find three or more contracts with the most similarity to the current contract (quantity, location, site conditions, etc.). Ideally, the requirements listed in the bullets above should be met (i.e., competitively bid contracts; awarded within last 12 months; two or more bidders). Review the prices and throw out any outliers and average the remaining prices..

13.6.5.2.3 Least Preferred Option – Use Price Agreed to in a Previous Modification

Sometimes the items in a modification will be similar to items in a previously executed modification. It is acceptable to use unit prices from the previously executed modification ONLY if:

- Unit prices in the previous modification were estimated as provided in this manual,
- The quantity is similar,
- The situation / nature of work is similar, and
- The price from the previous modification is truly fair and reasonable for the new modification.

When using prices from the existing contract or another contract, always consider the following adjustments:

- Location
- Haul distance
- Different materials
- More or less quantity
- Difference in how work will be performed
- Inflation
- Fuel prices

Include the following information in the price-based IGE:

- Description of work (Step 1)
- How the work will be performed (Step 2)
- Justification for using bid prices (Step 3)
- Method of measurement (Step 4)
- Determine the duration (Step 6)
- Summarize (Step 9)
- Determine effect on other contract work (Step 13)
- Determine effect on contract fixed completion date (Step 14)

13.6.6 COMPLETE A PROCUREMENT REQUEST (PR)

Use the IGE as the starting point for establishing the PR dollar amount. The PR must be approved before any modification work begins and before you commence negotiations with the Contractor.

Funds for the proposed modification can originate from two places:

- Within the Contract

  These are project funds that will not be used due to quantity underruns or unused incentives. In the quantity underrun case, the contract modification should delete the unnecessary items and quantities in order to make those funds available for the added work in the modification. If funds for the added work will come from unused incentives, specify which item(s) the funds are coming from (e.g., Item 40101, Item 30101, etc.). Before using incentive money as a source of funds for the modification, ensure that the incentive money is definitely unneeded. Even though funds for a modification are provided by 'within the contract' sources, the Financial Manager needs to approve the PR. This will facilitate proper tracking of funds. Specific Division policy will dictate the need for this type of PR.

- Outside the Contract

  These funds come from the respective Federal Lands Highway Program (Forest Highway, Park Road and Parkways, etc.).

13.6.7 DETERMINE IF COST AND PRICING DATA ARE REQUIRED

Cost or pricing data may be required in the event the modification exceeds $650,000 aggregate (i.e., consider both increases and decreases when determining the price adjustment). This requirement does not apply when unrelated and separately priced changes for which cost or pricing data would not otherwise be required are included for administrative convenience in the same modification.

If the IGE is greater than $650,000 (aggregate), the COE or other designated official should review the FAR and advise you on the cost or pricing data requirements for your particular situation. If the IGE is greater than $650,000 and it is determined that Cost or Pricing Data is not required, document the exception used and the basis for using it. Include this information in the negotiation memorandum (see Section 13.6.10).

For modifications less than $650,000 (add the amount of increase to the amount of decrease of like items to determine whether the threshold is met), you should not request the Contractor to provide cost or pricing data.

13.6.8 ANALYZE THE CONTRACTOR'S PROPOSAL

When you compare the Contractor's proposal to the IGE, you are trying to determine:

- if the Contractor and you have the same understanding of the scope of work,
- if their overall price is comparable to yours,
- what elements of the proposal you agree and differ on, and
- what the fair and reasonable price actually is.

13.6.8.1 Techniques for Analyzing the Contractor's Proposal

There are three techniques for analyzing a Contractor's proposal:

- price analysis,
- cost analysis, and
- profit analysis.

13.6.8.1.1 Price Analysis

Price analysis is the process of examining and evaluating a proposed price without evaluating its separate cost elements or proposed profit.

Various price analysis methods may be used to ensure a fair and reasonable price, given the circumstances surrounding the modification. Examples of such methods include, but are not limited to, the following:

- Comparing proposed prices with IGEs.
- Comparing contract unit prices with proposed prices for the same or similar items.
- Comparing proposed prices with historical bid data for similar items.

13.6.8.1.2 Cost Analysis

Cost analysis is the review and evaluation of the separate cost elements and profit in a Contractor's proposal, and the application of judgment to determine how well the proposed costs represent what the cost of the modification should be. When performing cost analysis, your goal is to determine if the costs are:

- *reasonable* (i.e. are the estimated hours accurate for the type of work; are the equipment costs based on audited rates or USACE rates, etc.),

- *allocable* (are the charged costs associated with the item – for example, is the Contractor charging excavation costs to an unrelated culvert change), and

- *allowable* (FAR Part 31 contains a list of specific cost items that are unallowable on Government contracts. Examples include bad debts, contributions and donations, entertainments, and losses on other contracts.).

Various cost analysis techniques and procedures may be used to ensure a fair and reasonable price, given the circumstances surrounding the modification. Examples of such techniques include, but are not limited to, the following:

- Comparing the individual cost elements of the Contractor's proposal to:

    - actual costs previously incurred by the same Contractor
    - independent government cost estimates
    - various cost schedules (USACE equipment rates, Means, etc.)

- Verifying cost or pricing data and evaluating cost elements, including:

- the necessity for, and reasonableness of, proposed costs, including allowances for contingencies
- the application of audited or negotiated indirect cost rates and labor rates

13.6.8.1.3 Profit Analysis

Both the Government and the Contractor should be concerned with profit as a motivator of efficient and effective modification performance. Negotiations aimed merely at reducing prices by reducing profit, without proper recognition of the function of profit, are not in the Government's best interest. Negotiation of extremely low profits, use of historical averages, or automatic application of predetermined percentages to total estimated costs do not provide proper motivation for optimum modification performance.

If cost or pricing data is required, use the 'structured approach' (FAR Clause 15.404-4) to determine the amount of profit.

When cost or pricing data is not required, determine the amount of profit as follows. If a change or modification calls for essentially the same type and mix of work as the basic contract and is of relatively small dollar value compared to the total contract value, the Government may use the basic contract's profit rate as the pre-negotiation objective for the modification. For post-priced modifications, the Contractor's risk has been eliminated. This factor should be considered when determining the profit rate for post-priced modifications.

13.6.8.2 Using the Techniques to Analyze the Proposal

When Cost or Pricing Data is not required, applicability of the techniques mentioned above will depend on what level of analysis you are conducting.

Since your first request to the Contractor was for a 'price' proposal (i.e., no cost breakdown), the initial analysis technique should be price analysis. Compare the Contractor's bottom line price to the IGE price. If the Contractor's price is comparable to the IGE price, it is not necessary to obtain additional information from the Contractor or to conduct further analysis.

If the Contractor's price is not within an acceptable range of the IGE, you should consider requesting a cost breakdown of the Contractor's proposal (see Section 13.6.9). Using the Contractor's cost breakdown, you then can perform cost analysis to determine where the difference originates and which elements of the proposal you need to discuss with the Contractor. For example, you and the Contractor may agree on the type of equipment needed for the work, but may differ significantly on the cost per hour or the number of hours required to perform the work. The purpose of the cost analysis is to identify the elements that you are going to negotiate with the Contractor. In addition, you will develop your negotiation objective based on what you have gleaned from analyzing the Contractor's cost proposal.

When the Contractor's proposed price is significantly lower than the IGE, you need to ensure you and the Contractor completely understand the scope of work. Do not automatically agree to a price that is significantly lower than the IGE, thinking it's a good deal for the Government. On the other hand, if you and the Contractor clearly agree on what is involved with performing the work, don't feel obligated to negotiate them upward.

When Cost or Pricing Data is required, you will need to analyze the Contractor's proposal using cost, price, and profit analysis.

13.6.9 ACCEPT THE CONTRACTOR'S PROPOSAL OR PERFORM ADDITIONAL FACT FINDING

If the Contractor's price proposal is determined to be fair and reasonable, or if you have enough information to formulate your negotiation objective, proceed to Section 13.6.10.

If your prices differ appreciably from the Contractor's and you cannot accept their price as is, you should request more information from the Contractor. Ask them to provide you with a cost breakdown of the work. This breakdown should include:

- equipment types, rates, and hours;
- labor rates and hours;
- material costs; and
- overhead and profit.

A good request for additional information would resemble the following:

> *Dear "Contractor:"*
>
> *I have received and reviewed your February 20 price proposal for CM 002. Your price for the new 40101 work is significantly higher than the government's estimate. In order for me to evaluate the reasonableness of your price, I request that you provide a cost breakdown for the work identified in my February 1 letter. In this breakdown, please include: equipment types, hours, and rates for the various operations; labor rates and hours; material costs (including any quote from subs or suppliers); and overhead and profit.*
>
> *To expedite resolution of this modification, I would appreciate if you could provide the cost breakdown to me by March 3.*

13.6.10 PREPARE A NEGOTIATION MEMORANDUM

The negotiation memorandum is required for all proposed modifications. The pre-negotiation elements required by FAR 15.406-1 and TAM 1215.406-170, and the negotiation documentation required by FAR 15.406-3 and TAM 1215.406-370 are addressed in the negotiation memorandum.

The three main purposes of the negotiation memorandum are to:

1. establish the Government's negotiation position;

2. obtain the contracting officer's approval of the negotiation objectives (if necessary) or the proposed final price; and

3. justify fair and reasonable pricing.

Project Engineers are not authorized to accept the Contractor's price or negotiate with the Contractor until the appropriate CO has approved the proposed price/objective.

13.6.11 NEGOTIATE WITH THE CONTRACTOR

The goal of negotiations is to reach agreement on a fair and reasonable price. A fair and reasonable price does not require that agreement be reached on every element of cost, nor is it mandatory that the agreed price be within the Government's initial negotiation position. Successful negotiations depend on good faith and fair dealing, and an understanding of both parties' interests.

13.6.11.1 The Government's Negotiator

In most cases, the Project Engineer and/or the COE is the Government's negotiator. The Project Engineer is approved to negotiate within the dollar range approved by the CO in the negotiation memorandum.

13.6.11.2 Agenda for Negotiations

The agenda can play an important part in negotiations and should be prepared by the Project Engineer and/or COE. Some negotiators will initially discuss non-controversial elements at the negotiations in order to create a climate of cooperation; others prefer to start by bringing up an issue where the Government has strength to create positive momentum. In any case, all elements of the contract modification must be clear to both parties, including the work involved, any unusual features or technicalities, time required for work, and impacts on other work.

13.6.11.3 Dealing with New Information

During negotiations, a new concept or additional information that alters the basics of the pre-negotiation objectives could be brought forth. Review the new information, and if additional time for study is required, advise the Contractor and reschedule the negotiations as appropriate.

13.6.11.4 Negotiation Minutes

The Project Engineer should document each negotiation session with minutes of the negotiations. These minutes may be used to complete the negotiation memorandum.

13.6.12 COMPLETE THE NEGOTIATION MEMORANDUM

Complete the negotiation memorandum.

13.6.13 AMEND THE PR

If the final negotiated amount is greater than the "total estimated cost" shown on the PR, the PR will require an amendment to the higher cost.

13.6.14 DETERMINE WHAT TYPE OF CONTRACT MODIFICATION TO ISSUE

13.6.14.1 Bilateral Contract Modification

If the Contractor and the Government have reached full agreement on the work, price, and time considerations included in the modification, issue a bilateral modification and include the release language (SF 30, Block14) as specified by Division Policy.

13.6.14.2 Bilateral Contract Modification with Exceptions

When only a portion of a modification can be agreed upon, prepare a bilateral modification, identifying the agreed upon elements, as well as the elements where no agreement was reached. For instance, if the contract modification increases the borrow excavation, equipment rental, and traffic control quantities, and the Contractor agrees with prices for the borrow excavation and equipment rental, but not the traffic control items, the modification (SF-30a) should state:

> *In consideration of the equitable adjustments paid pursuant to this contract modification, the Contractor hereby releases the Government from any and all liability under this contract due to any facts or circumstances arising out of this contract modification, except for direct and indirect costs for the following:*
>
> *Temporary Concrete Barrier*
> *Type A Warning Light*
>
> *The Contractor reserves the right to pursue further administrative action on Temporary Concrete Barrier and Type A Warning Light as established within this supplemental agreement under FAR Clause 52.233-1, Disputes.*

In the "exception," specifically state whether the exceptions apply to direct costs only, indirect costs (overhead, profit, impact, delay, etc.) only, or to both direct and indirect costs. Clear and concise wording is essential when writing exceptions to the release language.

13.6.14.3 Unilateral Contract Modification

If FHWA and the Contractor cannot reach agreement, the CO should issue a unilateral contract modification. Exhaust all possibilities for getting a bilateral modification (or bilateral with exceptions) before issuing a unilateral contract modification.

Unilateral modifications are also used to issue change orders (see Section 13.3.2).

13.6.15 PREPARE THE CONTRACT MODIFICATION

13.6.15.1 Contract Modification

The contract modification consists of the following:

- SF-30 (See Exhibit 13.3-A)
- Associated support documents for the SF-30 as specified by Division Policy
- Plans, details, specifications, drawings or other data required to clearly state the nature and scope work required by the modification

13.6.15.2 Supporting Documentation

Include the following documents with the support package:

- Procurement Request (amended if applicable)
- IGE
- Contractor's price proposal
- Negotiation Memorandum
- Documentation of cross-functional team involvement and concurrence
- Pertinent Correspondence
    - Contractor
    - FHWA (memos, e-mails, client and contractor correspondence)
    - Miscellaneous (client, resource agency, etc.)
- Records of any relevant discussions or field reviews
- Certification for cost or pricing data (if required)
- Concurrence from client agencies if needed, including commitments of any funding they may provide
- Complete the Contract Modification Database Report (see Exhibit 13.6-B). The Contract Modification Database Report is used to measure the amount of and reasons for contract growth. The Database Report is also used to track modification timeliness. Complete the report and include it with the contract modification package.

13.6.16 SEND THE CONTRACT MODIFICATION TO THE CONTRACTOR FOR SIGNATURE

Once the contract modification is approved by the COE, it can be sent to the Contractor.

13.6.17 REVIEW, APPROVE, AND DISTRIBUTE CONTRACT MODICATION

Distribute the contract modification according to Division Policy.

Exhibit 13.6-B Contract Modification Database Report

CONTRACT MODIFICATION - DATABASE REPORT

STATE | PROJECT NUMBER | CONTRACT NUMBER

CM NO. | AMEND NO. | TOTAL GROSS INCREASE | TOTAL GROSS DECREASE | TOTAL TIME INCR/DECR | DATE CM ISSUED

AGREEMENT BY CONTRACTOR

- (•) MUTUALLY AGREED
- ( ) UNILATERAL

PROJECT RELATED CHANGE

ITEM	GROSS INCREASE	GROSS DECREASE	TIME INC/DEC	REASON FOR CHANGE	INIT BY
TOTAL	$0.00	$0.00	0		

NON-PROJECT RELATED CHANGE

ITEM	GROSS INCREASE	GROSS DECREASE	TIME INC/DEC	REASON FOR CHANGE	INIT BY
TOTAL	$0.00	$0.00	0		

CODES

CODES FOR CONTRACT ITEM EFFECTED
- 01 - DBE INCENTIVE (108)
- 02 - PROJECT REQUIREMENTS (151-158)
- 03 - EROSION CONTROL
- 04 - EARTHWORK (201-213)
- 05 - STRUCTURAL EMBANKMENT (251-258)
- 06 - AGGREGATE COURSE (301-309)
- 07 - ASPHALT PAVEMENT (401-417)
- 08 - PCC PAVEMENT (501-502)
- 09 - BRIDGE CONSTRUCTION (551-565)
- 10 - INCIDENTAL CONSTRUCTION (601-637)
- 11 - DRAINAGE (CULVERTS/DITCHES)
- 12 - SEEDING/LANDSCAPING
- 13 - TRAFFIC CONTROL
- 14 - MATERIAL SPECS
- 15 - OTHER _____

CODES FOR REASON FOR CHANGE
- 01 - ERROR IN CONTRACT
- 02 - OMISSION IN CONTRACT
- 03 - ACT OF GOD
- 04 - DIFFERING SITE COND. (RE. FAR 52.236-2)
- 05 - EMERGENCY
- 06 - NONCOMPLIANCE W/CONTRACT REQ.
  (eg. reduced payfactor for non-conforming work)
- 07 - INADEQUATE LEGAL CLEARANCES (PERMITS)
- 08 - AUTHORITY OF THIRD PARTY
  (non-fhwa, non-contractor)
- 09 - TECHNICAL OR VALUE IMPROVEMENT
  (eg. VE proposal, contractor proposed improvement)
- 10 - FINALIZED QUANTITY
- 11 - CLAIM RESOLUTION
- 12 - ADDED SCHEDULE WORK
- 13 - OTHER _____

CODES FOR INITIATED BY
- 01 - FHWA CONSTRUCTION
- 02 - FHWA OTHER
- 03 - OWNING AGENCY
- 04 - OTHER AGENCY
- 05 - CONTRACTOR
- 06 - OUTSIDE PARTY
- 07 - OTHER _____

CONTRACTUAL EFFECTS OF CHANGE

CHECK ALL THAT APPLY

- ☐ 01 - ADDED WORK
- ☐ 02 - OVERRUNS/UNDERRUNS
- ☐ 03 - DELETED WORK
- ☐ 04 - TECHNICAL IMPROVEMENT TO CONTRACT
- ☐ 05 - VALUE ENGINEERING
- ☐ 06 - OTHER VALUE IMPROVEMENT
- ☐ 07 - SUSPENSION/DELAY/TERMINATION
- ☐ 08 - EXPERIMENTAL FEATURES
- ☐ 09 - COMPENSATION FOR INDIRECT COSTS
- ☐ 10 - DISPUTE OR CLAIM
- ☐ 11 - REDUCED PAYMENT FOR NONCOMPLYING WORK
- ☐ 12 - CERTIFIED COST OR PRICING DATA REQUIRED
- ☐ 13 - CERTIFIED COST/PRICING DATA & AUDIT REQUIRED
- ☐ 14 - DBE INCENTIVE

H:\USR\CONSTR\FORMS\NEWCMDB.WPF

CHAPTER 14

REFERENCES

Federal Lands Highway Manual, Chapter Subsection 1-C-3, Partnering

Partnering, A Concept for Success, Associated General Contractor (AGC), Washington, DC

A Guide to Partnering for Construction Projects, Corps of Engineers, Mobile District, January 1990

Partnering Implementation Guide, Eastern Federal Lands Highway Division

Partnering Guide for Arizona Department of Transportation, by Colonel Charles E. Cowan

Managing Conflict on Construction Contracts (Partnering), by Norman C. Anderson