

| AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT | | | 1. CONTRACT ID CODE | PAGE OF PAGES | |
|--|--|--|--|---|------------------|
| 2. AMENDMENT/MODIFICATION NO. 0001 | | | J | 1 | 7 |
| 3. EFFECTIVE DATE 26-Aug-2003 | | 4. REQUISITION/PURCHASE REQ. NO. W22W9K-3198-8088 | | 5. PROJECT NO.(If applicable) | |
| 6. ISSUED BY CODE DACA27 USA ENGINEER DISTRICT, LOUISVILLE ATTN: CELRL-CT 600 DR. MARTIN LUTHER KING PLACE ROOM 821 LOUISVILLE KY 40202 | | 7. ADMINISTERED BY (If other than item 6) CODE DACA27 MILITARY/RESERVE TEAM 600 DR. M. L. KING, JR. PL., RM 821 ATTN: TOM E. DICKERT LOUISVILLE KY 40202-2230 | | | |
| 8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code) | | | X | 9A. AMENDMENT OF SOLICITATION NO. DACA27-03-B-0008 | |
| | | | X | 9B. DATED (SEE ITEM 11) 21-Jul-2003 | |
| | | | | 10A. MOD. OF CONTRACT/ORDER NO. | |
| | | | | 10B. DATED (SEE ITEM 13) | |
| CODE | | FACILITY CODE | | | |
| 11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS | | | | | |
| <input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offer 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 you 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 APPROPRIATION DATA (If required) | | | | | |
| 13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14. | | | | | |
| 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 <input type="checkbox"/> is not, <input type="checkbox"/> 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.) DACA27-03-B-0008, Access Control Point & Cantonment Fencing, Fort Knox, Kentucky, is hereby amended as follows: SEE ATTACHED SUMMARY OF CHANGES | | | | | |
| 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) | | |
| | | | TEL: _____ EMAIL: _____ | | |
| 15B. CONTRACTOR/OFFEROR | | 15C. DATE SIGNED | 16B. UNITED STATES OF AMERICA | | 16C. DATE SIGNED |
| _____ (Signature of person authorized to sign) | | | BY _____ (Signature of Contracting Officer) | | 26-Aug-2003 |

SUMMARY OF CHANGES**DACA27-03-B-0008, AMENDMENT 0001**

NOTE: The Bidding Event has been changed to 12 September 2003 at 1:00 P.M. Louisville Time.

A COMPLETED BIDDING SCHEDULE FORM AND SF 1442 FROM THE BIDDERS SHALL BE PROVIDED BY FAX TO (502) 315-6194 OR EMAIL TO tom.e.dickert@lrl02.usace.army.mil IMMEDIATELY FOLLOWING THE COMPETITIVE BIDDING EVENT.

The following changes apply to Divisions 00 and 01 and to the Access Control Point project.

SPECIFICATION CHANGES:

The following specification sections are deleted in their entirety:

| | | |
|-------|-------|-------|
| 00800 | 02300 | 16520 |
| 01356 | 02721 | |
| 01500 | 02741 | |
| 02220 | 08411 | |

The attachments to Section 00800 are not deleted and remain part of the solicitation.

The following specification sections are added:

00800(Amend #0001)
01356(Amend #0001)
01500(Amend #0001)
01572(Amend #0001)
01670(Amend #0001)
01781(Amend #0001)
02090(Amend #0001)
02220(Amend #0001)
02300(Amend #0001)
02721(Amend #0001)
02741(Amend #0001)
07320(Amend #0001)
08411(Amend #0001)
16520(Amend #0001)

DRAWING CHANGES:

The following drawings are deleted in their entirety:

G-001
C-110
C-111

CD-101
CD-102
CD-103
CD-104
CD-105

CS-101
CS-102
CS-103
CS-104
CS-105
CS-106

CG-101
CG-102
CG-103
CG-104
CG-105

CU-104
CU-105

C-101
C-102
C-103
C-104
C-130 thru C-146
C-151
C-156
C-160
C-170
C-174
C-175
C-176
C-184
C-185
L-105

The following drawings are added:

G-001
C-110
C-111
C-112
C-113
C-114

CD-101
CD-102
CD-103
CD-104
CD-105

CS-101
CS-102
CS-103
CS-104
CS-105
CS-106

CG-101
CG-102
CG-103
CG-104
CG-105

CU-104
CU-105

C-101
C-102
C-103
C-104
C-151
C-156
C-160
C-170
C-174
C-175
C-176
C-184
C-185
C-188
L-105

Option 01:

E-104-O1
E-105-O1
E-106-O1
E-107-O1
E-108-O1
E-109-O1

Option 07:

A-101-O7
A-102-O7
A-303-O7
A-304-O7
S-101-O7
S-502-O7

Option 08:

CD-105-O8
CD-106-O8
CS-104-O8
CS-105-O8
CG-104-O8
CG-105-O8
CU-104-O8
CU-105-O8
C-105-O8
C-121-O8
C-122-O8
C-155-O8
L-103-O8

Narrative Changes to Drawings:

1) C-110 and C-111, as issued by this Amendment.

For each Typical Section, change the label "PREPARED SUBGRADE TO 100% MAX. DRY DENSITY" in all occurrences to read, "PREPARED SUBGRADE"

2) CG-102, CG-103, CG-104, CG-105, CG-104-O8 and CG-105-O8 as issued by this Amendment.

Add the following note:

"The boring logs show existing fill in several areas that are to be paved. When existing fill is encountered in areas to be paved, the contractor shall proof roll the area under the supervision of a registered Geotechnical Engineer. If the existing fill passes proof rolling, the fill may remain in place. Any area of existing fill failing proof rolling shall be identified immediately to the contracting officer for further direction."

3) S-501, Add the following note:

"31. The foundation requirements listed on this sheet and as specified in Section 02315 shall also apply to the Tank Monument foundations shown in details E6 and G6 below.

4) S-501, General Note #3. Delete this note in its entirety.

5) E-101:

In the upper right hand corner, at notation beginning "Pull box for Extension...Depository. Add the following: "The Contractor shall install the conduit from the gate controller to the pull box and install the pull box as shown."

6) E-802, detail A2. Add the following note:

"Note 2: the contractor shall install pull wires in each conduit."

7) L-105, issued by this Amendment

Detail E2, Add the following note.

" 4. The Median Wall shall start at STA 0+00 and be 9 inches tall. The wall shall transition from 9 inches tall to full height within 10 feet and be at full height (42 inch) at STA 0+10."

The following has been modified:

BIDDING SCHEDULE – AMDT 0001

| <u>ITEM NO.</u> | <u>SUPPLIES/SERVICES</u> | <u>QUANTITY</u> | <u>UNIT</u> | <u>AMOUNT</u> |
|-----------------------------------|---|-----------------|----------------|----------------|
| 0001 | Access Control Point & Cantonment Fencing | 1 | LUMP SUM | \$_____ |
| | | | Total Base Bid | \$_____ |
| 0002 | Option 1 – Communications Ductbank | 1 | LUMP SUM | \$_____ |
| 0003 | Option 2 – Museum Fencing | 1 | LUMP SUM | \$_____ |
| 0004 | Option 3 – Floating Barrier | 1 | LUMP SUM | \$_____ |
| 0005 | Option 4 – Tank Display Monument at Visitor’s Control Center | 1 | LUMP SUM | \$_____ |
| 0006 | Option 5 – Tank Display Monument at Gate House (West) | 1 | LUMP SUM | \$_____ |
| 0007 | Option 6 – Tank Display Monument at Gate House (East) | 1 | LUMP SUM | \$_____ |
| 0008 | Option 7 – Install Clay Tile Roof Visitor’s Control Center & Gate House | 1 | LUMP SUM | \$_____ |
| 0009 | Option 8 – Construct Optional Road Alignment & Demolition of Weigh Scale Structures | 1 | LUMP SUM | \$_____ |
| Total Base Bid and Options | | | | \$_____ |

NOTE: BIDDING WILL BE DONE ON-LINE.
SEE INSTRUCTIONS

SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following has been modified:

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

| Goals for minority participation for each trade | Goals for female participation for each trade |
|--|---|
| 11.2% Bullitt Co., KY 9.6% Meade/Hardin Co., KY | 6.9% |

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Hardin, Meade,

and Bullitt Counties in Kentucky.

(End of provision)

(End of Summary of Changes)

SECTION 00800

SPECIAL CLAUSES

6/03

PART 1 GENERAL

1.1 DESCRIPTION

This solicitation is comprised of the work of two separate military construction projects, the Access Control Point and the Cantonment Fencing. The provisions of Division 00 and Division 01 apply to both projects. Otherwise, the projects are "stand alone"; that is, the plans and technical specifications for each project apply only to that project.

1.2 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Small Tool Usage Plan; G, RE

Labor, Equipment and Material Reports; G, RE

Pollution Prevention Plan; G, RE

Updated Network Analysis; G, RE

Quality Control Plan; G, RE

SD-05 Design Data

Equipment-in-Place List; G, RE

Maintenance and Parts Data; G, RE

Aggregate Sources; G, RE

Purchase Orders; G, RE

Progress Photographs

Site Plan;G, RE

Dirt and Dust Control Plan; G, RE

Construction and Demolition (C&D) Waste Management Plan; G, RE

Activity Environmental Analysis

SD-07 Certificates

Warranties; G, RE

Insurance; G, RE

Updated Network Analysis;G, RE

DA Form 3337; G, RE

SD-11 Closeout Submittals

As-Built Drawings; G, RE

Mechanical Room Layout; G, RE

Preliminary Network Analysis; G, RE

Complete Network Analysis; G, RE

Updated Network Analysis; G, RE

1.3 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (APR 1984) FAR
52.211-10.
2 Jan 96

The Contractor shall be required to commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, prosecute said work diligently, and complete the entire work ready for use not later than 365 calendar days after date of receipt of notice to proceed. The time stated for completion shall include as-built drawings, O&M manuals, operational tests/reports/training/instructions, equipment lists, and final cleanup of the premises.

1.4 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000) FAR 52.211-12.
Oct 00

a. If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$780.00 for each calendar day of delay until the work is completed or accepted.

b. If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

1.5 TIME EXTENSIONS (SEPT 2000) FAR 52.211-13

Oct 00

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide for an equitable readjustment of liquidated damages under the new completion schedule.

1.6 NOT USED

24 Feb 92

1.7 CONTRACT DRAWINGS AND SPECIFICATIONS (AUG 2000) DFARS 252.236-7001

19 Sept 2000

(May 2002)

a. At award, the Government will furnish the Contractor a compact disk containing all technical contract documents. This disk will include a complete set of drawing files and technical specification files which have all amendments incorporated. The disk will contain drawing files in CALS Type 4 format and technical specifications in PDF format.

The CALS files and the PDF files are being provided for the Contractor's use in printing hard copies of contract documents.

In addition, native CADD files and Specsintact files are provided in accordance with "AS-BUILT DOCUMENTS" paragraph for the Contractor's use in developing as-built plans and specifications.

b. The Contractor shall--

- (1) Check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting Officer of any discrepancies;
- (4) Be responsible for any errors which might have been avoided by complying with paragraph (b); and
- (5) Reproduce and print contract drawings and specifications as

needed.

c. Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

d. The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

CANTONMENT FENCING

INDEX AND GENERAL

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| X02 | Index of Drawings | |
| X03 | Area Map and Key Plan (Gates & Guardrail) | |
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ACCESS CONTROL POINT

GENERAL

***0001**

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| CS-100 | OVERALL SITE DEMOLITION PLAN | |
| CS-101 | SITE PLAN | 8/22/03 |
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***0001**

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| E-103 | PARTIAL SITE PLAN #3 | |
| E-104 | PARTIAL SITE PLAN #4 | |
| E-105 | PARTIAL SITE PLAN #5 | |
| E-106 | SITE PLAN COMMUNICATIONS DUCTBANK OPTION NUMBER 1 | |
| E-201 | ELECTRICAL FLOOR PLANS VISITOR'S CONTROL CENTER | |
| E-202 | ELECTRICAL FLOOR PLANS GATEHOUSE | |
| E-801 | DETAILS | |
| E-802 | DETAILS | |
| E-803 | SCHEDULES | |
| E-804 | LIGHT FIXTURE DETAILS | |
| E-805 | LIGHT FIXTURE DETAILS | |
| OPTION 01 | | |
| E-104-01 | PARTIAL SITE PLAN | |
| E-105-01 | PARTIAL SITE PLAN | |
| E-106-01 | SITE PLAN | |
| E-107-01 | SITE PLAN | |
| E-108-01 | SITE PLAN | |
| E-109-01 | SITE PLAN | |
| OPTION 07 | | |
| A-101-07 | GENERAL INFORMATION | |
| A-102-07 | VISITOR'S CONTROL CENTER ROOF | |
| A-303-07 | BUILDING SECTION AND DETAILS | |
| A-304-07 | BUILDING SECTION AND DETAILS | |
| S-101-07 | GATEHOUSE FRAMING PLAN | |
| S-502-07 | VISITORS' CONTROL CENTER MISC. DETAILS | |
| OPTION 08 | | |
| CD-105-08 | DEMOLITION PLAN | |
| CD-106-08 | DEMOLITION PLAN | |
| CS-104-08 | SITE PLAN | |

ELECTRICAL

| <u>Sheet Ref No.</u> | <u>Sheet Description</u> | <u>Revision Date</u> |
|----------------------|-------------------------------------|----------------------|
| CS-105-08 | SITE PLAN | |
| CG-104-08 | GRADING PLAN | |
| CG-105-08 | GRADING PLAN | |
| CU-104-08 | UTILITY PLAN | |
| CU-105-08 | UTILITY PLAN | |
| C-105-08 | PAVEMENT STRIPING AND SIGN LOCATION | |
| C-121-08 | ROADWAY PROFILE | |
| C-122-08 | ROADWAY PROFILE | |
| C-155-08 | STORM SEWER PROFILE | |
| L-103-08 | PLAN | *0001 |

1.8 AS-BUILT DOCUMENTS

3 November 1998 (Version 1)

1.8.1 General

This section covers the completion of [as-built drawings](#) and as-built specifications, as a requirement of the contract.

1.8.1.1 As-Built Drawings

An as-built drawing is a construction drawing revised to reflect the final as-built conditions of the project because of modifications, changes, corrections to the project design required during construction, submittals and extensions of design. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings that are revised to be used for the "RECORD DRAWING AS-BUILTS".

1.8.1.2 As-Built Specifications

As-built specifications are the construction specifications as modified by changes (contract mods, ACO approved variations from the construction specifications which did not result in contract mods).

1.8.2 Maintenance of Working As-Built Drawings

The Contractor shall revise 2 sets of paper prints by red-line process to show the as-built conditions during the prosecution of the project. These as-built marked prints shall be kept current on a weekly basis and available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. Changes must be reflected on all sheets affected by the change. The working as-built marked prints will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor before submission of each monthly pay estimate. The working as-built drawings shall show the following

information, but not be limited thereto:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

b. The location and dimensions of any changes within the building structure.

c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

d. Additional as-built information that exceeds the detail shown on the Contract Drawings. These as-built conditions include those that reflect structural details, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations and layouts, equipment, sizes, mechanical room layouts and other extensions of design, that were not shown in the original contract documents because the exact details were not known until after the time of approved shop drawings. It is recognized that these shop drawing submittals (revised showing as-built conditions) will serve as the as-built record without actual incorporation into the contract drawings. All such shop drawing submittals must include, along with the hard copy of the drawings, CADD files of the shop drawings in a commercially available digital format, compatible with the Using Agency System (see paragraph "Computer Aided Design and Drafting (CADD) Drawings"). All shop drawings which require submittal of CADD files are indicated in the submittal register located at the end of this section.

e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

f. Changes or modifications which result from the final inspection.

g. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.

h. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.

i. If fire protection and fire detection related systems are included

in this project, the as-built drawings will include detailed information for all aspects of the systems including wiring, piping, and equipment drawings.

1.8.3 Retainage

The Contractor shall include in his schedule of values, the cost of as-built document preparation. This value shall include all requirements of this clause:

- Maintenance of working as-built drawings
- Maintenance of working as-built specifications
- Conversion of submittals and other miscellaneous documents into electronic files
- Creation of "Record As-Built Drawings & Specifications" (either by CADD dwgs and Specsintact specifications or by manually prepared documents as specified herein.)
- Creation of a CD containing all required files.
- Submittal of as-built documents in the required media forms and numbers of copies

If the Contractor fails to maintain the working as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of bringing the as-built documents up to date. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of working as-built documents.

1.8.4 Preliminary Submittal

Six (6) weeks before occupancy of this facility by the Government, the Contractor shall submit one (1) set of the original working as-built drawings to the Contracting Officer for review and approval. These working as-built marked drawings shall be neat, legible and accurate. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, the working as-built marked drawings will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the working as-built marked drawings are found to contain errors and/or omissions, they will be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the working as-built marked drawings to the Contracting Officer within 10 calendar days.

1.8.5 Preparation of Final As-Built Drawings

Upon approval of the working as-built prints submittal, the Contractor will be furnished, by the Government, one set of contract drawings in CADD (if not previously provided) with all amendments incorporated, to be used for final as-built drawings. Any contract modifications that were developed by revision of contract drawing CADD files, will already have the modifications reflected in the files provided to the Contractor. These contract drawings will be furnished in the format specified in paragraph

"Computer Aided Design and Drafting" (CADD). These drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, adding such additional drawings as may be necessary. These drawings are part of the permanent records of this project and the Contractor shall be responsible for the protection and safety thereof until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

In the event the Contractor accomplishes additional work which changes the as-built conditions of the facility, after submission and approval of the working as-built drawings, he shall be responsible for the addition of these changes to the working as-built drawings and also to the final as-built documents.

1.8.6 Markings and Indicators

Changes shall be annotated with a triangle and sequential number at the following locations:

- a. bottom of the revised detail
- b. right hand and bottom border aligned with the revised detail
- c. the revision block of the title block.

Separate markings shall be made for each modification negotiated into the contract.

1.8.7 Preparation of Final As-Built Specifications

Final as-built specifications shall be prepared in Specsintact and the electronic files shall be placed on the same CD-ROM that contains the as-built CADD files, if applicable. The front sheet of the specifications shall contain an identification which clearly labels the specifications as representing as-built conditions and shall be dated with the date of the submittal.

1.8.8 Preparation of Other As-Built Documents

All other non-electronic documents which may include design analysis, catalog cuts, certification documents that are not available in native electronic format shall be scanned and provided in an organized manner in Adobe .pdf format.

1.8.9 Submittal of Final As-Built Documents

At the time of Beneficial Occupancy of the project, Final As-Built documents shall be provided to the Contracting Officer in the formats described in paragraph "Computer Aided Design and Drafting (CADD)".

1.8.10 Partial Occupancy

For projects where portions of construction are to be occupied or activated before overall project completion, including portions of utility systems, as-built drawings for those portions of the facility being occupied or activated shall be supplied at the time the facility is occupied or activated. This same as-built information previously furnished must also be shown on the final set of as-built drawings at project completion.

1.8.11 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality to that of the originals. Line work, line weights, lettering, layering conventions, and symbols shall be the same as the original line work, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same guidance specified for original drawings. Three dimensional (3D) elements shall be placed in files in their proper locations when using 3D files with spatially correct elements. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD media files supplied by the Government. All work by the Contractor shall be done on files in the format in which they are provided. Translation of files to a different format, for the purpose of As-Built production, and then retranslating back to the format originally provided, will not be acceptable. These contract drawings will already be compatible with the Using Agency's system when received by the Contractor. The Using Agency uses AutoCAD Release 14 CADD software system. The media files will be supplied by the Contractor to the COR on ISO 9660 Format CD-ROM. The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make all required corrections, changes, additions, and deletions.

a. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 5 mm³/16 inch high. All other contract drawings shall be marked either "AS-BUILT" drawing denoting no revisions on the sheet or "REVISED AS-BUILT" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

b. Revision markers defined in paragraph "Markings and Indicators" shall be placed as follows:

- (1) at the detail, placed in the design file where the revised graphics are located and the revision was placed.
- (2) right hand and bottom border in the drawing sheet file
revision block of the title block in the drawing sheet file.

c. After receipt by the Contractor of the approved working as-built prints and the original contract drawings files the Contractor shall,

within 30 calendar days, make the final as-built submittal. This submittal shall consist of 2 sets of completed final as-built drawings on separate media consisting of both CADD files (compatible with the Using Agency's system on electronic storage media identical to that supplied by the Government) and Mylars; 2 blue line prints of these drawings and the return of the approved marked working as-built prints. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with its CADD system. All paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.8.12 NOT USED

1.8.13 Payment

No separate payment will be made for as-built drawings required under this contract, and all costs in conjunction therewith, shall be considered a subsidiary obligation of the Contractor.

1.9 NOT USED

1.10 EQUIPMENT DATA

15 June 1990

Real Property Equipment

Contractor shall be required to make an [Equipment-in-Place list](#) of all installed equipment furnished under this contract. This list shall include all information usually listed on manufacturer's name plate. The form is part of SPECIAL CLAUSES and is included following the SPECIAL CLAUSES, so to positively identify the piece of property. The list shall also include the cost of each piece of installed property F.O.B. construction site. For each of the items which is specified herein to be guaranteed for a specified period from the date of acceptance thereof, the following information shall be given: The name, serial and model number address of equipment supplier, or manufacturer originating the guaranteed item. The Contractor's guarantee to the Government of these items will not be limited by the terms of any manufacturer's guarantee to the Contractor. Furnish the list as one (1) reproducible and three (3) copies to the Contracting Officer thirty (30) calendar days before completion of any segment of the contract work which has an incremental completion date.

[Maintenance and Parts Data](#)

The Contractor will be required to furnish a brochure, catalog cut, parts list, manufacturer's data sheet or other publication which will show detailed parts data on all other equipment subject to repair and maintenance procedures not otherwise required in Operations and Maintenance Manuals specified elsewhere in this contract. Distribution of directives shall follow the same requirements as listed in paragraph above.

1.11 PHYSICAL DATA (APR 1984) FAR 52.236-4.
2 January 1996

Data and information furnished or referred to below is furnished for the Contractor's information. The Government will not be responsible for any interpretation or conclusion drawn from the data or information by the Contractor.

Physical Conditions indicated on the drawings and in the specifications are the result of site investigations by surveys, borings, test pits and probings.

Weather Conditions. The Contractor shall make his own investigations as to weather conditions at the site. Data may be obtained from various National Weather Service offices located generally at airports of principal cities, the nearest to this project being:

Godman Army Airfield, Ft. Knox, Ky
Louisville, Airport

Historical data for all areas may be obtained from:

U. S. Department of Commerce
National Climatic Center
Federal Building
Asheville, N. C. 28801

Transportation Facilities. Roads and railroads in the general area are shown on the drawings. Access ways shall be investigated by the Contractor to satisfy himself as to their existence and allowable use.

1.12 UTILITIES (APR 1984) FAR 52.236-14 (Para. 1.12.a.(1) & 1.12.a.(2) only).
15 June 1990

a. Obtain digging permits prior to start of excavation by contacting the Contracting Officer 15 calendar days in advance. Scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground, where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated to be specified or removed but indicated or discovered during scanning in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

b. Availability and Use of Utility Services

(1) The Government will make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(2) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

(3) Electric Power for Small Tools not exceeding 20 amperes and 115 volts will be furnished from existing outlets at no cost to the Contractor, subject to proper use, and that total estimated consumption will not exceed 1,000 kilowatts per month. The Contractor's [Small Tool Usage Plan](#) shall be submitted for determination of estimated consumption. In the event the estimate exceeds the above allowance, the requirements for other utilities will apply.

(4) Drinking Water is not available at the site. The Contractor shall make provisions to provide bottled water for Contractor employees.

c. Alterations to Utilities

Where changes and relocations of utility lines are noted to be performed by others, the Contractor shall give the Contracting Officer at least thirty (30) days written notice in advance of the time that the change or relocation is required. In the event that, after the expiration of thirty (30) days after the receipt of such notice by the Contracting Officer, such utility lines have not been changed or relocated and delay is occasioned to the completion of the work under contract, the Contractor will be entitled to a time extension equal to the period of time lost by the Contractor after the expiration of said thirty (30) day period. Any modification to existing or relocated lines required as a result of the Contractor's method of operation shall be made wholly at the Contractor's expense and no additional time will be allowed for delays incurred by such modifications.

d. Interruptions of Utilities

(1) No utility services shall be interrupted by the Contractor to make connections, to relocate, or for any purpose without approval of the Contracting Officer.

(2) Request for Permission to shut down services shall be submitted in

writing to the Contracting Officer not less than seventeen (17) days before date of proposed interruption. The request shall give the following information:

- (a) Nature of Utility (Gas, L.P. or H.P., Water, etc.)
- (b) Size of line and location of shutoff;
- (c) Buildings and services affected.
- (d) Hours and date of shutoff.
- (e) Estimated length of time services will be interrupted.

(3) Services shall not be shutoff until receipt of approval of the proposed hours and date from the Contracting Officer.

(4) Shutoffs which will cause interruption of Government work operations as determined by the Contracting Officer shall be accomplished during regular non-work hours or on non-work days of the Using Agency without any additional cost to the Government.

(5) Operation of valves on water mains will be by Government personnel. Where shutoff of water lines interrupts service to fire hydrants or fire sprinkler systems, the Contractor shall arrange his operations and have sufficient material and personnel available to complete the work without undue delay or to restore service without delay in event of emergency.

(6) Flow in gas mains which have been shut off shall not be restored until the Government inspector has determined that all items serviced by the gas line have been shut off.

1.13 NOT USED
24 February 1992

1.14 LAYOUT OF WORK (APR 1984) FAR 52.236-17
15 June 1990

a. The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at his own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

b. In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

1) Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

2) Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.15 LINES, GRADES AND LIMITS

15 June 1990

The Contractor shall be responsible for all layout required to properly control the work under this contract as determined by the Contracting Officer. The Contractor shall also furnish at his own expense, all string line, nails, and materials and labor as may be required in laying out the work.

20 Feb 2002

1.16 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) FAR 52.236-1

15 June 1990

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 20 percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

a. For purposes of this paragraph "WORK BY THE CONTRACTOR" is defined as prime Contractor direct contract labor (including testing and layout personnel), exclusive of other general condition or field overhead personnel, material, equipment, or subcontractors. The "TOTAL AMOUNT OF WORK" is defined as total direct contract labor (including testing and layout personnel), exclusive of other general condition or field overhead personnel, material, or equipment.

b. Within 7 days after the award of any subcontract, either by himself or a subcontractor, the Contractor shall deliver to the Contracting Officer a completed SF 1413, "Statement and Acknowledgment." The form shall include the subcontractor's acknowledgement of the inclusion in his subcontract of the clauses of this contract entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act-Overtime Compensation," "Apprentices and Trainees," "Compliance with Copeland Regulations," "Withholding of Funds," "Subcontracts," "Contract Termination-Debarment," and "Payrolls and Basic Records." Nothing contained in this contract shall create any contractual relation between the subcontractor and the Government.

1.17 SUPERINTENDENCE OF SUBCONTRACTORS
24 February 1992

a. The Contractor shall be required to furnish the following, in addition to the superintendence required by CONTRACT CLAUSE: SUPERINTENDENCE BY THE CONTRACTOR.

(1) If more than 50 percent and less than 70 percent of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(2) If 70 percent or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

b. If the Contracting Officer, at any time after 50 percent of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirements for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.18 IDENTIFICATION OF EMPLOYEES
15 June 1990

The Contractor shall be responsible for furnishing an identification badge/card to each employee prior to the employees work on-site, and for requiring each employee engaged on the work to display identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of the employee. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

1.19 NOT USED

1.20 WARRANTY OF CONSTRUCTION (MAR 1994) ALTERNATE 1 (APR 1984) FAR
52.246-21I
15 January 1998

a. General Requirements

(1) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 1.20.a.(10) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(2) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(a) As a part of the one year warranty inspection, the Contracting Officer will conduct an infrared roof survey on any project involving a membrane roofing system. This survey will be conducted in accordance with ASTM C1153-90, "Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging". In accordance with paragraph 1.20.a.(3) and 1.20.a.(4) below, the Contractor shall be required to replace all damaged materials and to locate and repair sources of moisture penetration.

(3) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(a) The Contractor's failure to conform to contract requirements;
or

(b) Any defect of equipment, material, workmanship, or design furnished.

(4) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(5) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(6) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(7) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(a) Obtain all [warranties](#) that would be given in normal commercial practice;

b) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(c) Provide names, addresses, and telephone numbers of all

subcontractors, equipment suppliers, or manufacturers with specific designation of their area of responsibilities if they are to be contacted directly on warranty corrections; and

(d) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(8) In the event the Contractor's warranty under paragraph of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(9) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(10) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(11) Defects in design or manufacture of equipment specified by the Government on a "brand name and model" basis, shall not be included in this warranty. In this event, the Contractor shall require any subcontractors, manufacturers, or suppliers thereof to execute their warranties, in writing, directly to the Government.

b. Performance Bond

(1) The Contractor's Performance Bond will remain effective throughout the construction warranty period and warranty extensions.

(2) In the event the Contractor or his designated representative(s) fails to commence and diligently pursue any work required under this clause, and in a manner pursuant to the requirements thereof, the Contracting Officer shall have a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Contracting Officer shall have the work performed by others, and after completion of the work, may make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

(3) Following oral or written notification of required warranty repair work, the Contractor will respond as dictated by para. 1.20.e. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor as outlined in the paragraph 1.20.b.(2) above.

c. Pre-Warranty Conference

MFG WARRANTY(IES) EXPIRE

EQUIPMENT WARRANTY
GOVERNMENT FURNISHED EQUIPMENT

MFG MODEL NO.

SERIAL NO.

CONTRACT NO.

DATE EQUIP PLACED IN SERVICE

MFG WARRANTY(IES) EXPIRE

(d) If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag. The Contractor warranty expires (warranty expiration date) and the final manufacturer's warranty expiration date will be determined as specified by para. 1.20.a.

(2) Execution. The Contractor will complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment.

(3) Payment. The work outlined above is a subsidiary portion of the contract work, and has a value to the Government approximating 5% of the value of the Contractor furnished equipment. The Contractor will assign a value of that amount in the breakdown for progress payments mentioned in the Contract Clause: PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS.

(4) Equipment Warranty Tag Replacement. As stated in para. 1.20.d, the Contractor's warranty with respect to work repaired or replaced shall run for one year from the date of repair or replacement. Such activity shall include an updated warranty identification tag on the repaired or replaced equipment. The tag shall be furnished and installed by the Contractor, and shall be identical to the original tag, except that the Contractor's warranty expiration date will be one year from the date of acceptance of the repair or replacement.

e. Contractor's Response to Warranty Service Requirements. Following oral or written notification by the Contracting Officer or an authorized representative of the installation designated in writing by the Contracting Officer, the Contractor shall respond to warranty service requirements in accordance with the "Warranty Service Priority List" and the three

categories of priorities listed below.

First Priority Code 1 Perform on site inspection to evaluate situation, determine course of action, initiate work within 24 hours and work continuously to completion or relief.

Second Priority Code 2 Perform on site inspection to evaluate situation, determine course of action, initiate work within 48 hours and work continuously to completion or relief.

Third Priority Code 3 All other work to be initiated within 5 work days and work continuously to completion or relief.

The "Warranty Service Priority List" is as follows:

Code 2 Air Conditioning Systems

- a. Recreational support.
- b. Air conditioning leak in part of building, if causing damage.
- c. Admin buildings with ADP equipment not on priority list.

Code 1 Electrical

- a. Power failure (entire area or any building operational after 1600 hours).
- b. Traffic control devices.
- c. Security lights.

Code 2 Electrical

- a. Power failure (no power to a room or part of building).
- b. Receptacle and lights.
- c. Fire alarm systems.

Code 1 Gas

- a. Leaks and breaks.
- b. No gas to family housing unit or cantonment area.

Code 2 Plumbing

- a. Flush valves.
- b. Fixture drain, supply line commode, or water pipe leaking.
- c. Commode leaking at base.

Code 1 Roof Leaks

Temporary repairs will be made where major damage to property is occurring.

Code 2 Roof Leaks

Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Location of GFP:

Installation of Property Warehouse. Exact location to be coordinated with Resident Engineer.

b. The Contractor is required to transport the property to the jobsite at its own expense.

c. Each item of property to be furnished under this clause shall be identified in the Schedule by quantity, item, and description.

| <u>Quantity</u> | <u>Item</u> | <u>Description</u> |
|-----------------|-------------|---|
| 1 | Guard House | Custom CK4676-2SW BRIV Booth with Decorative Exterior and Standing Seam Roof, manufactured by Delta Scientific Corp., Valencia CA |

1.25 NOT USED

1.26 PROJECT SIGN
1 August 1996

General. The Contractor shall furnish and erect at the location directed one project sign.

Exact placement location will be designated by the Contracting Officer. The panel sizes and graphic formats have been standardized for visual consistency throughout all Corps operations.

Panels are fabricated using HDO plywood with dimensional lumber uprights and bracing.

All legends are to be painted in the sizes and styles as specified by the graphic formats shown at the end of this section. The signs (including back and edges), posts and braces shall be given two coats of Benjamin Moore No. 120-60 poly-silicone enamel or approved equal before lettering. The 4' x 4' right section of the project sign shall be white with black lettering. The 2' x 4' left section shall be Communication Red (CR) with white lettering.

Black - Federal Standard 595a Color Number 27038
White - Federal Standard 595a Color Number 27875
Red - PANTONE 032

An example of the sign including mounting and fabrication details are also provided at the end of this section.

Name of the project shall be as follows:

Fort Knox Access Control Point and Cantonment Fencing

Name of the designer shall be as follows:

Jacobs Engineering and the Louisville District

Erection and Maintenance

a. The signs shall be erected at the designated location(s). Signs shall be plumb and backfill of post holes shall be well tamped to properly support the signs in position throughout the life of the contract. The signs shall be maintained in good condition until completion of the contract, shall remain the property of the Contractor, and shall be removed from the site upon completion of work under the contract.

b. The Corps of Engineers logo will be provided by the Contracting Officer.

Payment. No separate payment will be made for furnishing and erecting the project signs as specified and costs thereof shall be considered a subsidiary obligation of the Contractor.

1.27 NOT USED

1.28 WAGE RATES
1 February 1995

The decision of the Secretary of Labor, covering rates of wages, including fringe benefits to be paid laborers and mechanics performing work under this contract, is attached hereto. The payment for all classes of laborers and mechanics actually employed to perform work under the contract will be specified in the following contract clauses: DAVIS-BACON ACT, CONTRACT WORK HOURS AND SAFETY STANDARDS ACT, and THE COPELAND ACT.

1.29 PURCHASE ORDERS
15 June 1990

Five copies of all purchase orders, for items requiring shop inspection, showing firm names and addresses, shall be submitted to the Contracting Officer when orders for materials are placed. Orders shall be so worded or marked that each item, piece or member can be definitely identified on the drawings. Purchase prices are not necessary and may be obliterated from the copies of the purchase orders furnished.

1.30 INTERFERENCE WITH TRAFFIC AND PUBLIC AND PRIVATE PROPERTY
15 June 1990

The Contractor at all times shall dispose his plant and conduct the work in such manner as to cause as little interference as possible with private and

public travel. Damage (other than that resulting from normal wear and tear) to roads, shall be repaired to as good a condition as they were prior to the beginning of work and to the satisfaction of the Contracting Officer.

1.31 SEQUENCE OF WORK
15 September 1995

The contractor shall develop a phasing plan that incorporates the following traffic management requirements:

***0001**

a. Until such time as the actions described in subparagraphs b. and c. occur, the entrance and exit ramps to and from US 31W will remain open to traffic except at those times the Government closes the access for security purposes. The contractor will be granted access to the work site from this entry/exit point. At specified times of the day, generally between 6:00 and 8:00 AM the contractor should anticipate a large volume of vehicle traffic entering the installation and from 4:00 to 5:30 PM exiting the military installation. Between these times the entrance may be closed to traffic. The exit lanes from Gold Vault Road are open to traffic at all times unless closed by the Government. The existing barriers and traffic control devices in and near the Gold Vault intersection will be moved by the government so as not to interfere with the construction. the Contractor shall coordinate with the Contracting Officer at least two weeks in advance. ***0001**

b. Bullion Boulevard between Park Road and Gold Vault Road will be closed to all traffic during the entire construction period from a date agreed to between the contractor and the Resident Engineer following the notice to proceed. Gold Vault Road shall remain open as the only access at this point for all in-bound and out-bound traffic while the work along Bullion from Gold Vault to Park is performed and until closing Gold Vault and the remaining section of Bullion to US 31W is necessary.

c. At such time as progress in the work dictates, the contractor will notify the Government of a proposed date for closing Gold Vault Road and intersection and the access to and from 31W in order to complete the work in this area. The intersection and roadway for both in-bound and out-bound traffic will at that time be closed until construction is complete.

***0001**

d. The Contractor shall provide and install temporary signs and barricades closing Bullion Blvd immediately south of Park Road and immediately north of Gold Vault road and maintain same for the entire construction period. Warning signs announcing the planned closure shall be erected at Park Road for existing traffic and at Gold Vault road for entry traffic a minimum 14 calendar days prior to the approved closure date. Two weeks prior to implementing the road closures described in subparagraph c. above, the Contractor shall erect warning signs notifying traffic of the planned closure. At the time of closing Gold Vault Road and access to bullion Blvd from US31W, the Contractor

shall erect or relocate signs and barricades closing Gold Vault and the entrance lanes from US31W. Prior to closing the entrances to Bullion Blvd from US31W, the Contractor shall contact KDOH and request a road closure sign be posted on the highway for traffic in both directions announcing the road closure. At construction completion, notify KDOH and request signs be removed.

e. During the construction period, access to the Bullion Depository entrance shall remain open. Prior to the closure of Gold Vault and access from US31W, the Contractor shall ensure that construction activities do not restrict this access. Once work begins at Gold Vault Road, the Contractor shall provide temporary access for traffic entering the Bullion Depository. This temporary access shall be coordinated with the Resident Engineer as part of the phasing plan and shall be altered as construction progresses. Barriers shall be located as necessary to provide access to the Depository and preclude exposing construction hazards to Depository traffic. *0001

1.32 NOT USED

1.33 COMPLIANCE WITH POST/BASE REGULATIONS

1 August 1996

a. The site of the work is on a military reservation and all rules and regulations issued by the Commanding Officer covering general safety, security, sanitary requirements, pollution control and traffic regulations, shall be observed by the Contractor. Information regarding these requirements may be obtained by contacting the Contracting Officer, who will provide such information or assist in obtaining same from appropriate authorities.

b. Contractor personnel shall park only in areas authorized by the Contracting Officer.

1.34 EQUIPMENT AND OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)

EFAR 52.231-5000

20 March 1997

a. This does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.

b. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership

and Operating Expense Schedule, Region II. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time of negotiations shall apply.

c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

d. When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the Contracting Officer shall request the Contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Cover Sheet.

e. Whenever a modification or equitable adjustment of contract price is required, the contractor's cost proposals for equipment ownership and operating expenses shall be determined in accordance with the requirements of SPECIAL CONTRACT REQUIREMENT: EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. A copy of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule" is available for review at the office of the District Engineer, Room 821, 600 Dr. Martin Luther King, Jr. Place, Louisville, Kentucky, or a copy may be ordered from the Government Printing Office at a cost of \$11.00 by calling telephone no. (301) 953-7974.

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1.35 LABOR, EQUIPMENT, AND MATERIAL REPORTS

15 June 1990

Daily Equipment Report. The Contractor shall submit a daily report of all Contractor-owned or rented equipment at the jobsite. A similar report is required for all subcontractor equipment. The subcontractor's report may be separate or included with the Contractor's report provided the equipment is adequately identified as to ownership. The required equipment report shall include each item of equipment (hand-operated small tools or equipment excluded) on the job and shall specifically identify each item as to whether it is Contractor-owned or rented, shifts, hours of usage, down time for repairs, and standby time. Identification of the equipment shall include make, model and plant number of all items. Separate identification by a key sheet providing these data may be utilized with the daily report indicating the type of equipment and the equipment plant numbers. The format of the Daily Equipment Report will be as approved by the Government in the field.

Labor, Equipment & Material Reports for Extra Work/Cost. A Report shall also be submitted by the Contractor listing any labor, equipment and materials expended on and/or impacted by any change order directed by the Government and for which total price/time agreement has not been reached. These requirements also apply to subcontractors at any tier. The same Report is required at any time the Contractor claims or intends to claim for extra costs whether or not there is Government recognition (constructive changes). This requirement is in addition to any Contractor "Notice" or "Reservation of Rights". Submittal of such a report will not be construed as satisfying the "Notice" required under the "Changes" clause or any other clause. But, absence of such Reports submitted to the Government contemporaneously with the alleged extra work/cost will be considered as evidence that no such extra work/cost occurred that are chargeable to the Government.

The Report shall be detailed to the degree required by the Government in the field and shall contain the following as a minimum:

- a. The cause of the extra labor, equipment or materials costs.
- b. For extra labor - Indicate crew, craft, hours, location and cost. Describe nature or type of extra costs, i.e, extra work, overtime, acceleration, interference, reassignment, mobilizations and demobilizations, supervision, overhead, type of inefficiency, etc.
- c. For extra equipment - Indicate type and description, hours, location, cost; whether working, idle, standby, under repair, extra work involved, etc.

d. For extra materials - Indicate type and description, where used, whether consumed, installed or multi-use, quantity, cost, extra work involved, etc.

e. Affected activities - Relate to Contract Schedule (Network Analysis); demonstrate whether delay or suspension is involved.

f. Segregate all entries by prime and each subcontractor.

g. Summarize costs daily and by cumulative subtotal or with frequency required by the Government.

This report will not be considered as evidence that any of the alleged extra costs actually occurred. The report will be used to check against over obligation of funds for change orders directed prior to price/time agreement and to track alleged extra costs the Contractor considers otherwise chargeable against the Government. The Government may respond at any interval to either challenge, amend or confirm the report. Absence of a Government response is not to be considered acquiescence or denial. The Government may order work stoppage if deemed necessary to avoid overobligation of funds. The frequency of the report shall be daily or as otherwise approved by the Government representative in writing.

1.36 NOT USED

1.38 NOT USED

1.38 NOT USED

1.39 **PROGRESS PHOTOGRAPHS**

18 Nov 1999)

The Contractor shall, during the progress of the work, furnish the Contracting Officer photographs, slides, digital photos (furnished on CD-ROM) and negatives depicting construction progress. The photographic work furnished shall be commercial quality as determined by the Contracting Officer. The photography shall be performed between the first and fifth of each month and the photographs, slides and negatives delivered to the Contracting Officer not later than the 15th of each month taken. A maximum of six views from different positions shall be taken as directed to show, inasmuch as possible, work accomplished during the previous month. At least, one set of photographs, slides and negatives will be made at completion of the contract, after final inspection by the Contracting Officer. The photographs shall be 8"x10" color prints and the slides 35 mm color. Each photograph and slide shall be identified on the face of the picture or the border of the slide giving date made, contract title and number, location of work, as well as a brief description of work depicted. Each negative will be identified with the same information on a sheet of paper by cross-referencing to the number on the negative. Two copies of

photographs and slides, along with the original negatives of each view taken, shall be furnished to the Contracting Officer by the time stipulated above. No separate payment will be made for these services and all costs in connection thereto shall be considered a subsidiary obligation of the Contractor.

1.40 NOT USED

1.41 **INSURANCE**--WORK ON A GOVERNMENT INSTALLATION (SEP 1989) FAR 52.228-5.
17 July 1992

The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(1) Coverage complying with State laws governing insurance requirements, such as those requirements pertaining to Workman's Compensation and Occupational Disease Insurance. Employer's Liability Insurance shall be furnished in limits of not less than \$100,000.00 except in states with exclusive or monopolistic funds.

(2) Comprehensive General Liability Insurance for bodily injury coverage shall be furnished in limits of not less than \$500,000 per occurrence.

(3) Comprehensive Automobile Liability Insurance for both bodily injury and property damage, shall be furnished in limits of not less than \$200,000.00 per person, \$500,000.00 per accident for bodily injury, and \$20,000.00 per accident for property damage. When the Financial Responsibility or Compulsory Insurance Law of the State, requires higher limits, the policy shall provide for coverage of at least those higher limits.

Before commencing work under this contract, the Contractor shall submit to the Contracting Officer in writing that the required insurance certification has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe, or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

The Contractor shall insert the substance of this clause, including this paragraph, in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

1.42 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM
March 2002

RMS shall be maintained in accordance with Section 01312 QUALITY CONTROL SYSTEM (QCS).

1.43 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. ER 415-1-15
(31 OCT 89)
2 January 1991

This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Default: Fixed Price Construction". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

| | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| (11) | (8) | (6) | (6) | (5) | (4) | (5) | (4) | (4) | (4) | (4) | (6) |

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated listed above, the Contracting Officer will convert any qualifying delays to

calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

1.44 USE OF INCLINOMETER FOR LONG BED DUMP TRUCKS (DACF BULLETIN 25 MARCH 1993)

4 June 1993

The recommendation of EM 385-1-1, Section 16.B.15, is mandatory for this project.

1.45 AVAILABILITY OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1).
17 May 2000

As covered by CONTRACT CLAUSE "ACCIDENT PREVENTION", compliance with EM 385-1-1 is a requirement for this contract. Copies may be purchased for \$31.00 each at the following address:

United States Government Bookstore
Room 118, Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222-4003
Telephone: (412) 395-5021 FAX: (412) 395-4547

Or downloaded from the following website:

<http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm>

1.46 FIRE PROTECTION DURING CONSTRUCTION (MIL-HDBK-1008c Para. 1.6)
15 April 1991

The Contractor is alerted to the requirements of Contract Clause "CLEANING UP" and more specifically to the requirements for fire protection during construction spelled out in EM 385-1-1 and NFPA No. 241 Building Construction and Demolition Operations. This item must be covered in the submittal required under Contract Clause "ACCIDENT PREVENTION".

1.47 NOT USED

1.48 NOT USED

1.49 NOT USED

1.50 CONSTRUCTION HAZARD COMMUNICATION
1 November 1991

The Contractor is required to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1926.59). This standard is designed to inform workers of safe and appropriate methods of working with hazardous substances in the workplace. The standard has five requirements, and every hazardous or potentially hazardous substance used or stored in the work

area is subject to all five. They are:

(1) Hazard Evaluation. Any company which produces or imports a chemical or compound must conduct a hazard evaluation of the substance to determine its potential health or physical hazard. The hazard evaluation consists of an investigation of all the available scientific evidence about the substance. The Contractor is required to assure that all producers (manufacturer/distributors) have performed these evaluations and transmit the required information with any hazardous materials being used or stored on the project site. From the hazard evaluation, a substance may be classified as a health hazard, or a physical hazard. These classifications are then further broken down according to type:

| <u>Health Hazards</u> | <u>Physical Hazards</u> |
|--|---------------------------|
| Carcinogens | Combustible liquids |
| Irritants | Compressed gases |
| Sensitizers | Explosives |
| Corrosives | Flammables |
| Toxic substances | Organic peroxides |
| Highly toxic substances | Unstable substances |
| Substances harmful to specific organs or parts of the body | Water-reactive substances |

(2) Warning Labels. If a chemical is hazardous or potentially hazardous, the producer or importer must affix a warning label to every container of that chemical before it leaves his facility. The Contractor must assure these labels are attached and legible. The label must identify the chemical, state the hazard, and give the name and address of the producer or importer. If the hazardous substance is transferred to another container, that container must then be labeled, tagged, or marked with the name of the chemical and the appropriate hazard warning. Warning labels should be replaced immediately if they are defaced or removed.

(3) Material Safety Data Sheets. The producer or importer must also supply a material safety data sheet (MSDS). The Contractor must keep these available in the work area where the substance is used, so that the people using the substance can easily review important safety and health information, such as:

The hazard possible from misuse of the substance
Precautions necessary for use, handling, and storage
Emergency procedures for leaks, spills, fire and first aid
Useful facts about the substance's physical or chemical properties

(4) Work Area Specific Training. Because of hazardous substance may react differently depending on how it is used or the environment of the work area, the Contractor must conduct work area specific training; special training which takes the Contractor's operations, environment,

and work policies into consideration. Work area training presents:

The hazardous substances which are present in the work place and the hazards they pose

Ways to protect against those hazards, such as protective equipment, emergency procedures, and safe handling

Where the MSDS's are kept, and an explanation of the labeling system

Where the Contractor's written Hazard Communication Program is located

(5) The Written Hazard Communication Program. In accordance with OSHA requirements, the Contractor must prepare a written Hazard Communication Program. This document will be included in the Contractor's Accident Prevention Plan. This document states how the Contractor plans to ensure that hazardous materials are appropriately labeled, how and where MSDS's will be maintained, and how employees will be provided with specific information and training.

1.51 NOT USED

1.52 [MECHANICAL ROOM LAYOUT \(ORL\)](#)
24 February 1992

Detailed mechanical room layout drawings shall be submitted for approval in accordance with [SD-04](#) Section [01330](#). Layout drawings shall show location and maintenance clearances for all mechanical room equipment, and all utility runs/chases for mechanical, electrical, telephone and other similar systems. Drawings shall be submitted at the same time as the submittals for the equipment to be located within the Mechanical Room.

1.53 NOT USED

1.53 NOT USED

1.54 NOT USED

1.55 NOT USED

1.56 NOT USED

1.57 PARTNERING
August 1996

In order to most effectively accomplish this contract, the Government proposes to form a partnership with the Contractor to develop a cohesive building team. It is anticipated that this partnership would involve the Corps of Engineers, the Contractor and primary subcontractors. This partnership would strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership would be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs.

1.58 NOT USED

1.59 CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT PLAN
16 July 1999

a. The Contractor is required to submit for government approval a detailed C&D Waste Management Plan within 30 days after contract award and prior to initiating any site clearance or C&D work.

b. Specific elements to be addressed in the plan are as follows:
Designated individuals on the contractor's staff who are responsible for C&D waste prevention and management.

(1) Actions that will be taken to reduce solid waste generation (including use of more efficient facility design and construction processes, reduced packaging and packing materials, supplier take-back programs, etc.). Description of the specific approaches to be used in recycling/reuse of the various materials generated, including, as appropriate, the specification of areas and equipment to be used for processing, sorting, and temporary storage of C&D wastes.

(2) Characterization of the waste to be generated during the C&D project, to include types and quantities of waste materials. The characterization should address site waste materials, building materials, packaging, packing, wastes generated by construction equipment, wastes generated by site offices, and wastes generated by the workforce on-site.

(3) Landfill and/or incinerator name, tipping fee amounts, projected cost of disposing of all trash and waste materials in the landfill/incinerator, as if there would be no salvage or recycling on the project.

(4) Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing

agencies, and public arts programs that accept used materials (e.g., Habitat For Humanity, national materials exchange networks).

(5) A list of specific waste materials that will be salvaged for resale, salvaged and reused, and recycled; the recycling facilities that will be utilized; and copies of their permits and/or registrations.

(6) Identification of materials that cannot be recycled/reused with a written justification. All disposed materials including anticipated hazardous wastes must include names of haulers and disposal sites, and copies of their permits and/or registrations.

(7) Anticipated net cost savings determined by subtracting contractor program management costs and the cost of salvage (deconstruction), separating, and recycling from the following:

(1) revenue from the sale of salvaged products and materials;
(2) revenue from the sale of recycled products and materials;
(3) revenue from the return of materials; and
(4) incineration and/or landfill tipping fees saved due to diversion of materials.

(8) The plan must cover the following materials if the material is applicable to the specific project:

| | |
|----------|----------------------|
| Asphalt | Gypsum |
| Concrete | Plastic |
| Soil | Polystyrene |
| Metal | Porcelain |
| Wood | Corrugated cardboard |
| Brick | Carpet |

c. Firms and facilities used by the contractor for recycling, reuse, and disposal shall be appropriately permitted for the contractor's intended use, to the extent required by federal, state, and local regulations. The contractor shall maintain records of disposition of the materials, including all copies of manifests, origin, and disposal forms, and bills of lading. All facility, landfill, and hauler permits showing USEPA and state registration numbers shall be maintained and shall be available to the contracting officer when requested.

d. The Contracting Officer shall review the C&D waste management plan in coordination with the environmental office within 7 calendar days of submittal. Where the contracting officer determines that the contractor has diligently explored all feasible methods to reduce C&D waste, the plan shall be approved, or approved with comment. Where it is determined that the contractor has not diligently explored all feasible methods, the contracting officer shall request a resubmittal.

e. All revenues generated by reusing, returning, salvaging, or recycling materials, as well as costs avoided by reduced tipping and

incineration fees as compared to conventional disposal shall accrue to the contractor's benefit and be reported to the Contracting Officer. Where an on-site Army C&D landfill is the only available disposal facility, the Contractor will be charged the prevailing commercial rate.

1.60 NOT USED

1.61 NOT USED

1.62 NOT USED

1.63 NOT USED

1.64 NOT USED

1.65 NOT USED

1.66 NOT USED

1.67 NOT USED

1.68 NOT USED

1.70 NOT USED

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1.73 NOT USED

1.74 NOT USED

1.75 NOT USED

1.76 NOT USED

1.77 NOT USED

1.78 NOT USED

1.79 NOT USED

1.80 NOT USED

1.81 NOT USED

1.82 POLLUTION PREVENTION PLAN 27 August 2001

In accordance with the National Pollutant Discharge Elimination System (NPDES) Permit, a Pollution Prevention Plan has been developed as part of this project. This plan has been developed to meet the erosion and sediment control requirements for the State of Kentucky. The Contractor will implement the Pollution Prevention Plan (PPP) that was prepared by the U.S. Army Corps of Engineers as shown on the plans, and as directed in these specifications. This (PPP) which will be provided to the contractor as part of these documents must be implemented in accordance with the NPDES permit. Notify the Contracting Officer at least 48 hours prior to starting excavation work.

1.83 ELECTRICAL UTILITY SERVICE

The overhead electrical service along Bullion Boulevard at the site will be relocated and reinstalled by the electrical utility service company, Nolin RECC. Nolin will also perform other work as shown on the drawings. The contractor shall coordinate the electrical installation described in the contract with the utility service as required.

1.84 GEOTECHNICAL INVESTIGATION

A Geotechnical Investigation was conducted at the site. A copy of the boring logs are included at the end of this section. The boring locations are shown on Drawing CD 103 and 104. Boring #12 was taken in the borrow are shown on the Location Drawing.

1.85 SCAFFOLDING
July 2003

The following requirements supplement EM 385-1-1. In the event of a

conflict between these requirements and EM 385-1-1, the more strict requirement shall take precedence.

All scaffold systems shall be erected, inspected and disassembled under the direction of a competent person. The competent person must be present and on site during these operations. The qualifications and training of the competent person and the crew performing the work shall be submitted to the Contracting Officer and accepted prior to commencement of the work. All scaffold systems must be inspected daily and certified as usable prior to use each days use by the competent person. Scaffolds shall also be inspected and certified by the competent person upon completion of any changes to the scaffolding system i.e. adding or removing a level or etc. The competent person must be present and on site during these changes to the scaffold system. The contractor shall develop a system that notifies all parties of the certification status. The use a red/green tag system denoting the serviceability is an acceptable certification system.

A scaffold erection plan shall be submitted for all scaffold systems regardless of type scaffold to be used. This plan shall include erection and dismantling operations and all manufacture's details of the system and shall demonstrate compliance with EM 385-1-1. The plan shall be accepted by the Contracting Officer prior to the erection of the scaffold. This plan shall be reviewed at the preparatory and initial meetings with all parties involved in the scaffolding operation and use thereof. In the event others crafts will be using the scaffolding system, they shall also be briefed on the proper use of the system.

Every level of conventional and masonry type scaffolding systems shall be fully planked and include handrails and toe boards. The contractor is advised that he must analyze the added weight of this requirement on the capacity of the scaffold system and adjust his operations accordingly. All personnel erecting and dismantling scaffolds must be protected by a personal fall protection system.

Access to any type scaffold system above 6 (six) feet shall be by stair tower.

***0001**

1.86 BID OPTIONS

The following Bid Options are established for this solicitation.

- a. Option 01 - Communications Duct Bank. Construct the duct bank as shown on drawing E-103-08 thru E-109-08.**
- b. Option 02 - Museum Fencing (Reference sheet C208B1).**
- c, Option 03 - Floating Barrier (Reference sheet C201).**
- d. Option 04 - Tank Display Monument at Visitor's Control Center,**

Drawing CS-103.

Construct the Tank Display Monument, associated grading, and sidewalk with handicapped access; the foundation structure is as shown on detail A3, drawing A-103 detail A3, drawing S-102 and detail A2, drawing A-201. Provide landscape plantings as MondoGrass (OJ) as shown on L-101. Install lighting circuits and fixtures for Monument as shown on drawing E-103.

In the event this option is not awarded, the area shall be graded to match surrounding terrain and sod installed.

e. Option 05 - Tank Display Monument, Gate House (West), Drawing CS-104.

Construct the Tank Display Monument and associated grading; the foundation structure is as shown on detail A6, drawing A-103; detail A6, drawing S-102; and, detail D2, drawing A-201. Provide landscape plantings MondoGrass (OJ) in accordance with drawing L-102. Install lighting circuits and fixtures for Monument as shown on drawing E-104.

In the event this option is not awarded, the area shall be graded to match surrounding terrain and seeded.

f. Option 06 - Tank Display Monument, Gate House (East), Drawing CS-104.

Construct the Tank Display Monument and associated grading; the foundation structure is as shown on detail A6, drawing A-103; detail A6, drawing S-102; and, detail D2, drawing A-201. Provide landscape planting, Mondo Grass (OJ), in accordance with drawing L-102. Install lighting circuits and fixtures for Monument as shown on drawing E-104; provide and connect lighting circuit to panel GP-1.

In the event this option is not awarded, the area shall be graded to match surrounding terrain and seeded.

g. Option 07 - Install Clay Tile Roof on the Visitor's Control Center and Gate House, in accordance with Drawings A-101-07, A-102-07, A-303-07, A-304-07, S-101-07 and S-502-07 and specification Section 07320 Clay Tile Roofing.

If this option is exercised, delete Key Note 10 on Drawings A-201, A-202, A-301, A-302.

Base Bid is the standing seam metal roof.

h. Option 08 - Construct Optional Road Alignment and Demolition of Weigh Scale Structures, in accordance with Drawings CD-105-08, CD-106-08, CS-104-08, CS-105-08, CG-104-08, CG-105-08, CU-104-08, CU-105-08, C-105-08, C-121-08, C-122-08 C-155-08, L-103-08 and E-105-08

and specification Section 02220 Demolition.

In the event this option is awarded the above drawings shall be used in place of drawings CD-105, CD-106, CS-104, CS-105, CG-104, CG-105, CU-104, CU-105, C-105, C-121, C-122, C-155, L-105 and E-105.
*0001

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION NOT USED

-- End of Section --

SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES

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SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

2000 Kentucky Department of Transportation, Standard Specifications.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|-------------|--|
| ASTM D 3786 | (1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method |
| ASTM D 4439 | (1995) Standard Terminology for Geotextiles |
| ASTM D 4491 | (1992) Water Permeability of Geotextiles by Permittivity |
| ASTM D 4533 | (1991) Trapezoid Tearing Strength of Geotextiles |
| ASTM D 4632 | (1991) Grab Breaking Load and Elongation of Geotextiles |
| ASTM D 4751 | (1995) Determining Apparent Opening Size of a Geotextile |
| ASTM D 4873 | (1995) Identification, Storage, and Handling of Geotextiles |

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01355 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Mill Certificate or Affidavit; FIO, C.

1.4 MEASUREMENT AND PAYMENT

Storm water pollution prevention measures as defined in this section will not be measured or paid for separately, but shall be considered incidental to the contract lump sum price for All Other Work.

PART 2 - POLLUTION PREVENTION PLAN - CONTROLS AND PROCEDURES

2.1 POLLUTION PREVENTION PLAN

The controls and measures required by the Contractor are described below.

2.1.1 Stabilization Practices

The stabilization practices to be implemented shall include permanent seeding, temporary seeding, and mulching. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

2.1.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

2.1.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

2.1.3 Structural Practices

The structural practices that will be utilized include temporary gravel construction entrances, silt fence with rock overflow rock check dam, rock filter dam, etc. On his daily CQC Report, the Contractor shall record the dates when any structural control is installed and whenever repairs are made or when the sediments are removed from behind the control.

2.2 ANTICIPATED SEQUENCE OF ACTIVITY

a. Place erosion control measures in locations that are in close proximity to those shown on the drawings. Additional erosion control measures may be required to comply with the NPDES once construction begins. Any changes to the plan as herein described, will require an amendment.

b. Surface water flowing towards the construction area will be diverted around the disturbed areas to reduce the erosion potential.

Silt Fences, Straw Bale Dams/Filters and Inlet Protection shall be properly constructed to detain runoff and trap sediment.

c. Construct new amenities including utilities, buildings, pavements, parking areas and sidewalks.

d. Landscape and grade remaining areas according to the drawings.

e. Upon completion of the project, remove all the temporary controls and take any sediment that is removed to a site designated by the contracting officer. Any areas disturbed by the removal of the temporary controls shall be seeded and mulched within 24 hours.

f. NOTE: The contractor controls the actual sequence, however, the sediment controls must be established prior to initiation of work in any area.

2.3 DEMONSTRATION OF COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS

All activities conducted under this contract will be performed in accordance with federal, state and local regulations. The construction contractor's specifications require compliance with all applicable regulations.

2.4 POLLUTION PREVENTION PLAN AND NOTICE OF INTENT

The contractor will implement the Pollution Prevention Plan (PPP) as shown on the plans and directed in these specifications. This plan must be implemented in accordance with the NPDES permit. A notice of Intent (NOI) has been prepared and submitted to the State of Kentucky. The contractor shall maintain a copy of the PPP in their construction trailer. Any changes made to the plan must be documented and approved by the Contracting Officer.

2.5 INVENTORY FOR POLLUTION PREVENTION PLAN

The materials or substances listed below are expected to be present onsite during construction:

These are examples of materials that could be Hazardous Materials and an inventory must be kept. This list is not comprehensive but for illustration only. The contractor must maintain and update their Hazardous Materials list and inventory forms.

- | | | | |
|--------------------|--------------------|-------------|--------------------------|
| - Concrete | Fertilizer | Detergents | Petroleum Based Products |
| - Paints) | Cleaning Solvents | Metal Rebar | Wood |
| enamel & | | | |
| latex | | | |
| - Sealant | Concrete Additives | Tar | Asphalt |
| - Structural Steel | | | |

2.6 OFFSITE VEHICLE TRACKING

A stabilized construction entrance is to be provided by the Contractor to help prevent vehicle tracking of sediments off site. The contractor will be responsible for cleaning the roads daily to remove any excess mud, dirt, or rock deposited by the vehicle traffic. Dump trucks used to carry excavated material shall be checked prior to exiting the site for large amounts of

soil accumulations on the wheels and chassis. A vehicle wash area shall be established as shown on the drawings.

PART 2 PRODUCTS

3.1 COMPONENTS FOR SILT FENCES

3.1.1 Filter Fabric

The geotextile shall comply with the requirements of **ASTM D 4439**, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of **0 to 120 degrees F**. The filter fabric shall meet the following requirements:

MINIMUM SPECIFICATIONS
FOR SILT FENCE FABRIC

| Physical Property | Woven fabric | Non-Woven Fabric |
|--|----------------------|----------------------|
| Filtering Efficiency | 85% | 85% |
| Tensile Strength at 20% elongation: | | |
| Standard Strength * | 30 lbs./linear in. | 50 lbs./linear in. |
| Extra Strength | 50 lbs./linear in. | 70 lbs./linear in. |
| Slurry Flow Rate | 0.3 gal./min./sq.ft. | 4.5 gal./min/sq.ft. |
| Water Flow Rate | 15 gal./min./sq.ft. | 220 gal./min./sq.ft. |
| UV Resistance | 70% | 85% |

* If using standard strength fabric a 14 gauge, 6-inch mesh wire fence is needed for support

TEST PROCEDURES: ASTM D 4632, ASTM D 4533, ASTM D 3786, ASTM D 4491, ASTM D 4751

3.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used, and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.

3.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

3.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

3.2 GEOTEXTILE FABRIC

Geotextile fabric for use under Temporary Gravel Construction Entrance shall be a geotextile for subgrade stabilization Type III Fabric as specified in

Section 845 of the Kentucky Department of Transportation (KDOT) 2000 Standard Specifications.

PART 4 EXECUTION

4.1 INSTALLATION AND CONSTRUCTION

4.1.1 Temporary Gravel Construction Entrance/Exit:

1. Avoid locating on steep slope or at curves in public roads.
2. Remove all vegetation and other objectionable material from the foundation area, and grade and crown for positive drainage.
3. If slope towards the road exceeds 2%, construct a 6-inch to 8-inch high water bar with 3:1 side slopes across the foundation area about 15 feet from the entrance diverting runoff from the road.
4. Install pipe under the access road if needed to maintain proper drainage.
5. Place geotextile fabric on the graded foundation to improve stability.
6. Place stone to dimensions shown on design detail sheet C78.
7. Divert all surface runoff and drainage from the stone pad to a sediment control structure.
8. At completion of project, remove temporary access and restore area to existing condition.

4.1.2 Temporary Seeding:

1. Test soil to determine its nutrient level or apply a 12-12-12 fertilizer at a rate of 400 to 600 pounds per acre.
2. Work fertilizer into the soil 2 to 4 inches deep with a disk or rake operated across the slope.
3. Select a seed mixture and application rate appropriate for this site. Consult the county SWCD office for assistance.
4. Apply seed uniformly with a drill or cultipacker seeder, or by broadcasting, and cover to recommended depth.
5. If drilling or broadcasting, firm the seedbed with a roller or cultipacker.
6. Mulch seeded area to increase seeding success.

4.1.3 Permanent Seeding:

1. Test soil to determine pH and nutrient levels and apply any lime or fertilizer recommended for the type seed being used. Consult the county SWCD office for assistance.
2. Till the soil to obtain a uniform seed bed, working the fertilizer and lime into the soil 2 to 4 inches deep with a rake operated across the slope.
3. Select a seeding mixture and application rate appropriate for this site. Consult the county SWCD office for assistance. Type of seed should be based on site condition, soil pH, intended land use and expected level of maintenance.
4. Apply seed evenly with a drill or cultipacker seeded or by broadcasting and cover to a depth of 1/4 to 1/2 inch.
5. If drilling or broadcasting, firm the seedbed with a roller or cultipacker.

6. Mulch all seeded areas. Note: If seeding is done with a hydroseeder, fertilizer and mulch can be applied with the seed in a slurry mixture.

4.1.4 Mulching:

1. Apply at the rate recommended.
2. Spread uniformly with no more than 25% of the ground surface visible.
3. If straw or hay is used it must be anchored immediately.

4.1.5 Silt Fence and Rock Overflow:

1. Prepare an access route to the fence to provide for cleanout.
2. Along the entire intended fence line, dig a 8-inch deep flat-bottomed or V-shaped trench.
3. On the down slope side of the trench, drive the wood or steel support posts into the ground as shown in Design Detail, with a maximum spacing of 8 feet if fence is supported by wire or 6 feet if extra strength fabric is used with no wire support.
4. Fasten support wire (if used) to the up slope side of the post and extend it 8-inches into the trench.
5. Run a continuous length of geotextile fabric in front of the support wire and posts, avoiding joints, particularly at any low points in the fence line.
6. Fabric may be of a woven or non-woven type with filtering efficiency and tensile strength and containing UV inhibitors and stabilizers to ensure 6 month minimum life at temperatures 0 to 120 degrees Fahrenheit.
7. If joint is necessary, nail the overlap to the nearest post with lath.
8. Place bottom 12-inches of the fabric in the 8-inch deep trench, extending the remaining 4-inches towards the up slope side.
9. Backfill the trench with compacted earth or gravel.
10. If using a pre-packed commercial silt fence, follow manufacture's installation instructions.
11. Typical silt fence design is shown on design detail sheet C48.
12. Silt fence rock overflow is shown on design detail sheet C48.

4.1.6 Rock Check Dam:

1. Excavate a cutoff trench into the creek banks, and extend it a minimum of 18 inches into the abutment.
2. Place the rock in the cutoff trench and channel as shown on design detail sheet C48. Maximum height of dam is 2 feet with a minimum of 9 inches between top of dam and top of banks.
3. If more than one dam is used in the drainage way then place riprap downstream of the lower most dam a distance of 6 feet.

4.1.7 Rock Filter Dam:

1. Clear and grub the area under the dam, removing and properly disposing of all root mats, brush and other debris.
2. Grade the earth abutment no steeper than 2H:1V.
3. Excavate a cutoff trench at the centerline of the dam and extending all the way up the earth abutments and backfill with compacted earth fill.

4. Smooth the dam foundation.
5. Cover the entire foundation, including both abutments, with geotextile fabric, making sure the upstream strips overlap the downstream strips at least 1 foot.
6. Construct the dam as shown on design detail C48.

4.1.8 Sediment Trap:

1. Clear and grub the area under the dam, removing and properly disposing of all root mats, brush, rocks and other debris.
2. Excavate the area, stockpiling any surface soil having high amounts of organic matter.
3. Clear the sediment pool to facilitate sediment clean-out.
4. Situate the spillway barrel (CMP) on a firm, even foundation.
5. Place around the barrel a 4-inch layer of moist, clayey, workable soil and compact by hand to at least the density of the foundation soil.
6. Perforate the lower half of the riser in each outside valley with 1/2-inch holes spaced 3-inches apart (or use manufactured perforated riser)
7. Embed the riser a minimum of 12-inches into concrete.
8. Surround the riser with 2 feet of KY #3 stone.
9. Install a trash guard (bars 2 to 3 inches apart) at the top of the riser.
10. At the pipe outlet, install a riprap (KY Class II channel lining) apron at least 5 feet wide and 10 feet long to a stable grade.
11. Scarify the base of the embankment before placing fill.
12. Place the most permeable soil in the downstream toe and the least permeable soil in the center portion of the dam.
13. Compact the fill material in 6-8 inch layers over the length of the dam.
14. Protect the spillway barrel with 2 feet of hand compacted fill before traversing with equipment.
15. Construct and compact embankment to 6 inches above design elevation to allow for settling.
16. Place a reference stake at the sediment clean-out elevation.

4.1.9 DIVERSION DIKES

Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. The Contractor shall ensure that the diversion dikes are not damaged by construction operations or traffic.

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded.

4.2 INSPECTION AND MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good

and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following inspection and maintenance procedures shall be followed to maintain the protective measures in good working order.

All measures that are being utilized will be inspected at least once each week and after each storm event. An inspection report shall be written after each inspection. Once a problem is found or sediment has reached the clean-out elevation, corrective action shall commence within 24 hours. Inspections shall continue until the controls are removed or the vegetative cover is firmly established. All reports must be maintained on the job site in a file exclusively for the Pollution Prevention Plan.

4.2.1 Temporary Gravel Construction Entrance/Exit Pad:

1. Reshape pad as needed for drainage and runoff control.
2. Topdress with clean stone as needed.
3. Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing can only be used if the water is conveyed into a sediment basin.
4. Repair any broken road pavement immediately.

4.2.2 Temporary Seeding:

1. Inspect to see if vegetative stands are adequately established; re-seed if necessary.
2. Check for erosion damage and repair; re-seed and mulch if necessary.

4.2.3 Permanent Seeding:

1. Inspect until the stand of grass is successfully established.
2. Repair damaged, bare or sparse areas by filling any gullies, re-fertilizing, overseeding or re-seeding, and mulching.
3. If cover is sparse or patchy, review seed type chosen, soil fertility, moisture conditions, and mulching; then repair the affected area either by over-seeding or by reseeding and mulching after re-preparing the seedbed.
4. If vegetation fails to grow, additional soil testing will be needed and the SWCD office will need to be consulted.
5. Add additional fertilizer based on soil testing results.

4.2.4 Mulching:

1. If washout, breakage, or erosion is present, repair the surface, then re-seed, re-mulch.

4.2.5 Silt Fence and Rock Overflow:

1. Inspect for fabric tears, start of decomposition, or any other problem that can render the fence ineffective, and replace the effected portion.
2. Remove deposited sediment when it reaches half the height of the fence at its lowest point or is causing the fabric to bulge.
3. During clean-out be careful to not undermine the fence.

4. Remove deposited sediment from behind the rock overflow when it reaches half the height of the rock overflow.

4.2.6 Rock Check Dam:

1. Inspect channel between dams and downstream of lower most dam for erosion. Place channel lining as needed.
2. Remove accumulated sediment behind dam as needed to maintain channel capacity.
3. Add rock to dam as needed to maintain design cross-section.
4. When dams are no longer needed, remove the rock and stabilize channel, using channel lining if necessary

4.2.7 Rock Filter Dam:

1. Inspect after each rainfall event of 0.5 inches or more.
2. Remove sediment once it reaches the elevation indicated by the clean-out stake.
3. Check dam and abutments for erosion, piping, or rock displacement, and repair immediately.
4. If the basin does not drain between storms, replace the stone on the upstream face of the dam.
5. If the basin drains too rapidly following a storm event add additional gravel to the upstream face of the dam.
6. Once the contributing drainage area has been stabilized, remove the sediment from the basin, the gravel filter and the rock dam, disposing of the material as directed by the contracting officer. Smooth the site to blend with the surrounding area and stabilize.

4.2.8 Sediment Trap:

1. Inspect the sediment basin after each storm event of 0.5 inches or more.
2. Remove and properly dispose of sediment once it reaches the stake representing the clean-out elevation.
3. Periodically check the embankment and outlet for erosion damage, piping, settling, seepage, or slumping along the toe or around the barrel and repair immediately.
4. Remove trash and other debris from the riser and pool area.
5. Clean or replace the gravel around the riser if the pool does not drain properly.
6. Remove the basin after the drainage area has been permanently stabilized, inspected and approved. Do so by draining any water, removing the sediment to a designated disposal area, smoothing the site to blend with surrounding area, then stabilize.

- End of Section-

Ft. Knox ACP

*** SAFETY PAYS ***
** AMENDMENT NO. 0001 **

August 22, 2003

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

02/97

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.1.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display, identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

***0001**
The Contractor shall carefully conserve any utilities furnished without charge. **Water will be furnished without charge.** ***0001**

1.2.2 Temporary Connections

***0001**
The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines. ***0001**

***0001** ***0001**

0001**0001**

1.2.3 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.2.4 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

0001*1.2.5 Electricity**

The Contractor shall make all arrangements and pay all costs for electrical service required directly with NOLIN RECD. ***0001**

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown on the drawings. The signs shall be erected within 15 days after receipt of the notice to proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

***0001**

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. **Specific requirements are detailed in Paragraph 1.3.1, 00800. The Contractor shall locate barricades on Bullion Blvd and Gold Vault Road as stated in the Section referenced above.** The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected

from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads.

The Contractor shall be responsible for the repair of any damage to roads caused by construction operations. ***0001**

1.4.1 Barricades

***0001**

The Contractor shall erect and maintain temporary barricades to limit public access to **the construction** areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night. **Barricades shall be placed in accordance with Paragraph 1.3.1, Section 00800 of this Contract.** ***0001**

1.5 CONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.5.2 Storage Area

The Contractor shall construct a temporary 6 foot high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

1.5.3 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

1.5.4 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage

purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

1.5.5 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

1.5.6 New Building

In the event a new building is constructed for the temporary project field office, it shall be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. It shall be equipped with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. It shall be provided with a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building shall be waterproof, shall be supplied with heater, shall have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities shall be furnished. The windows and doors shall be screened and the doors provided with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins shall be non-removable. The windows shall be arranged to open and to be securely fastened from the inside. Glass panels in windows shall be protected by bars or heavy mesh screens to prevent easy access to the building through these panels. In warm weather, air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F, shall be furnished. Any new building erected for a temporary field office shall be maintained by the Contractor during the life of the contract and upon completion and acceptance of the work shall become the property of the Contractor and shall be removed from the site. All charges for telephone service for the temporary field office shall be borne by the Contractor, including long distance charges up to a maximum of \$75.00 per month.

1.5.7 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.6 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory,

the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

1.7 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

1.8 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.9 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01572

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

02/03

PART 1 GENERAL

1.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.2 MANAGEMENT

The Contractor shall take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state, and local regulations.

1.3 PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and prior to initiating any site preparation work. The plan shall include the following:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation.
- c. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. Characterization, including estimated types and quantities, of the waste to be generated.
- e. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on

the project.

f. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.

g. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.

h. Identification of materials that cannot be recycled/reused with an explanation or justification.

i. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

1.4 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.5 COLLECTION

The necessary containers, bins and storage areas to facilitate effective waste management shall be provided and shall be clearly and appropriately identified. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated as follows:

1.5.1 Source Separated Method

Waste products and materials that are recyclable shall be separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. The Ft. Knox Recycling Center shall be contacted for a list of recyclable materials (502) 624-5026.

1.6 DISPOSAL

Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.6.1 Reuse

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project.

1.6.2 Recycle

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

1.6.3 Waste

Materials with no practical use or economic benefit shall be disposed at the landfill.

- a. Ft. Knox has a Construction and Demolition Debris (CDD) Landfill. All CDD materials that cannot be recycled and are not considered solid waste (trash) shall be delivered to the landfill on a periodic basis. The landfill is operated by Red River Services and should be contacted for procedures, limitations and requirement. Contact Greg Knight, (502)942-9511.
- b. Solid waste shall be segregated from CD and recyclables, collected in approved containers and delivered to Red River Services for disposal.
- c. The Contractor shall be responsible for all costs associated with disposal in the landfill. The price for landfill disposal shall be at the prevailing commercial or other negotiated rate.

-- End of Section --

SECTION 01670

RECYCLED / RECOVERED MATERIALS

12/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247

Comprehensive Procurement Guideline for
Products Containing Recovered Materials

1.2 OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. EPA designated products specified in this contract comply with the stated policy and with the EPA guidelines. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3 EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Various sections of the specifications contain requirements for materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials. These items, when incorporated into the work under this contract, shall contain at least the specified percentage of recycled or recovered materials unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4 EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

-- End of Section --

SECTION 01781

OPERATION AND MAINTENANCE DATA

12/01

PART 1 GENERAL

1.1 SUBMISSION OF OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01330, "Submittal Procedures."

1.1.1 Package Quality

Documents must be fully legible. Poor quality copies and material with hole punches obliterating the text or drawings will not be accepted.

1.1.2 Package Content

Data package content shall be as shown in the paragraph titled "Schedule of Operation and Maintenance Data Packages." Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.

1.1.3 Changes to Submittals

Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M Data. Changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

1.2 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.2.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation:

1.2.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all operating conditions.

1.2.1.2 Operator Prestart

Include procedures required to set up and prepare each system for use.

1.2.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown

operating procedures including the control sequence for each procedure.

1.2.1.4 Normal Operations

Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

1.2.1.5 Emergency Operations

Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.2.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

1.2.1.7 Environmental Conditions

Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.2.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

1.2.2.1 Lubrication Data

Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":

- a. A table showing recommended lubricants for specific temperature ranges and applications.
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- c. A Lubrication Schedule showing service interval frequency.

1.2.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

1.2.3 Corrective Maintenance (Repair)

Include manufacturer's recommended procedures and instructions for correcting problems and making repairs.

1.2.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.2.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.2.3.3 Maintenance and Repair Procedures

Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.2.3.4 Removal and Replacement Instructions

Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.2.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.2.4 Corrective Maintenance Work-Hours

Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

1.2.5 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.2.6 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog

1.2.6.1 Warranty Information

List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

1.2.6.2 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.2.6.3 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.2.6.4 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.3 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

1.3.1 Data Package 1

- a. Safety precautions
- b. Maintenance and repair procedures
- c. Warranty information
- d. Contractor information

- e. Spare parts and supply list

1.3.2 Data Package 2

- a. Safety precautions
- b. Normal operations
- c. Environmental conditions
- d. Lubrication data
- e. Preventive maintenance plan and schedule
- f. Maintenance and repair procedures
- g. Removal and replacement instructions
- h. Spare parts and supply list
- i. Parts identification
- j. Warranty information
- k. Contractor information

1.3.3 Data Package 3

- a. Safety precautions
- b. Normal operations
- c. Emergency operations
- d. Environmental conditions
- e. Lubrication data
- f. Preventive maintenance plan and schedule
- g. Troubleshooting guides and diagnostic techniques
- h. Wiring diagrams and control diagrams
- i. Maintenance and repair procedures
- j. Removal and replacement instructions
- k. Spare parts and supply list
- l. Parts identification
- m. Warranty information
- n. Testing equipment and special tool information
- o. Contractor information

1.3.4 Data Package 4

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Emergency operations
- f. Operator service requirements
- g. Environmental conditions
- h. Lubrication data
- i. Preventive maintenance plan and schedule
- j. Troubleshooting guides and diagnostic techniques
- k. Wiring diagrams and control diagrams
- l. Maintenance and repair procedures
- m. Removal and replacement instructions
- n. Spare parts and supply list
- o. Corrective maintenance man-hours
- p. Parts identification
- q. Warranty information
- r. Personnel training requirements
- s. Testing equipment and special tool information
- t. Contractor information

1.3.5 Data Package 5

- a. Safety precautions
- b. Operator prestart
- c. Start-up, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Environmental conditions
- f. Preventive maintenance plan and schedule
- g. Troubleshooting guides and diagnostic techniques
- h. Wiring and control diagrams

- i. Maintenance and repair procedures
- j. Spare parts and supply list
- k. Testing equipments and special tools
- l. Warranty information
- m. Contractor information

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 02090

DEMOLITION OF BUILDINGS WITH LEAD CONTAINING PAINT

PART 1 GENERAL

1.1 INTENT

a. Two small structures (guard shacks) located at the entrance on Bullion Boulevard will be demolished (Base Bid). In addition, 2 small buildings near the existing scales will be demolished (Option Bid). The intention of this specification is to summarize the requirements of the contractor to protect his workers in accordance with the OSHA in Lead Construction Standard detailed in 29 CFR 1926.62. This standard is intended to reduce the occupational health hazard of lead exposure and must be applied to all occupational exposures to lead in construction work in any amount. The intent of this specification is also to summarize requirements for protection of environmental contamination due to demolition activities. In addition, requirements for segregation, testing and disposal of waste resulting from the demolition are summarized.

b. The contractor is required by 29 CFR 1926.62 to perform an initial exposure assessment to determine if any employee may be exposed to lead at or above the action level of 30 ug/m³ as an 8-hour TWA. As per the standard the contractor must perform initial air monitoring or present objective data, demonstrating that under any conditions or activity involving lead exceedences at or above the action level does not exist. During initial air monitoring activities, or until a negative exposure assessment has been achieved all employees must wear respiratory protection when performing certain listed high exposure "trigger tasks" as defined by the standard.

c. This document only summarizes requirements of the OSHA standard for convenience purposes and is not all-inclusive. All requirements of 29 CFR 1926.62 are to be strictly followed along with all other applicable Federal, State and local regulations.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2 1979 Fundamentals Governing the Design and Operation of Local Exhaust Systems

ANSI Z88.2 1980 Respiratory Protection

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.134 Respiratory Protection
29 CFR 1910.132 - Personal Protective Equipment Standard
29 CFR 1910.1200 Hazard Communication
29 CFR 1926.55 Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.57 Ventilation
29 CFR 1926.62 Lead in Construction Standard
40 CFR 260 Hazardous Waste Management Systems: General

40 CFR 261 Identification and Listing of Hazardous Waste
40 CFR 262 Generators of Hazardous Waste
40 CFR 263 Transporters of Hazardous Waste
40 CFR 264 Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265 Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268 Land Disposal Restrictions
49 CFR 172 Hazardous Materials Tables and Hazardous Materials Communications Regulations
49 CFR 178 Shipping Container Specification

MILITARY SPECIFICATIONS (MIL)

NOT USED

UNDERWRITERS LABORATORIES INC. (UL)

UL 586 1990 High-Efficiency, Particulate, Air Filter Units

CORPS OF ENGINEERS

EM385-1-1 - Safety and Health Manual U.S. Army Corps of Engineers, 3 September 1996

1.3 DEFINITIONS

1.3.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

1.3.2 Area Monitoring

Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

1.3.3 Physical Boundary

Area physically roped or partitioned off around a lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" will mean the same as "inside lead control area."

1.3.4 Certified Industrial Hygienist (CIH)

As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.3.5 Change Rooms and Shower Facilities

Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

1.3.6 Decontamination Room

Room for removal of contaminated personal protective equipment (PPE).

1.3.7 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

1.3.8 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

1.3.9 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

1.3.10 Lead Control Area

An area isolated by physical boundaries to prevent unauthorized entry of personnel. It may consist of an enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal/demolition operations or in those cases, when an enclosed lead control area is not practical, restriction of access into the area may be accomplished by roping off the area or by providing some other form of physical boundary constraint.

1.3.11 Lead Permissible Exposure Limit (PEL)

Fifty (50) micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.3.12 Personal Monitoring

Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

Monitoring should be targeted for employees who would be anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25% of the work crew or at a minimum of two employees, whichever is greater during each work shift.

1.4 QUALITY ASSURANCE

1.4.1 Medical Examinations

Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.62 and 29 CFR

1910.1200. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1926.62 within the last year.

1.4.1.1 Medical Records

Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

1.4.2 CIH or Their Designated Representative Responsibilities:

- a. Certify training.
- b. Review and approve lead-containing paint demolition plan for conformance to the applicable referenced standards.
- c. Inspect the demolition work for conformance with the approved plan.
- d. Direct monitoring.
- e. Ensure work is performed in strict accordance with specifications at all times.
- f. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

1.4.3 Training

Train each employee performing demolition, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

1.4.3.1 Training Certification

Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.4.4 Respiratory Protection Program

- a. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least Annually thereafter as required by 29 CFR 1926.62.
- b. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134, CFR 1926.62, and 29 CFR 1926.55.

1.4.5 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1910.1200.

1.4.6 Not Used

1.4.7 Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62.

1.4.8 Pre-Construction Conference

Along with the CIH, meet with the Contracting Officer or his designated representative to discuss in detail the lead-containing paint demolition work plan, including work procedures and precautions for the work plan.

1.5 SUBMITTALS

Submit the following in accordance with Section C-01300, "Submittals." The testing laboratory qualifications and lead-containing demolition plan shall be approved by the government. All other submittals will be for informational purposes only.

1.5.1 Manufacturer's Catalog Data

- a. Vacuum filters
- b. Respirators

1.5.2 Not Used

1.5.3 Statements

- a. Qualifications of CIH
- b. Exposure assessment documentation
- c. Testing laboratory qualifications
- d. Lead-containing paint demolition plan
- e. Rental equipment notification
- f. CIH approval of work plan (signature, date, and certification number)
- g. Respiratory protection program
- h. Hazard communication program

1.5.3.1 CIH Qualifications

Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

1.5.3.2 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.5.3.3 Written Lead Compliance Plan

In accordance with 29 CFR 1926.62 (e)(2)(I), the contractor shall submit a detailed job-specific plan of the work procedures to be used in the demolition of the buildings. The written compliance plan should include but is not limited to:

- a. Details of the planned exposure assessment or a discussion of the objective data utilized from a previous project.

- b. A description of equipment and materials, controls, crew size, job responsibilities, and operations and maintenance procedures for each activity in which lead is emitted.
- c. A description of specific control methods (e.g., abatement process election, wet methods). For engineering controls, include supporting engineering plans and studies used to select methods.
- d. Technology considered in meeting the PEL.
- e. Air monitoring data documenting sources of lead emissions.
- f. A detailed implementation schedule for the lead compliance plan, including the schedule for inspections by a competent person.
- g. A description of the lead work practice program that will be used to control worker exposures. (This includes the use of protective work clothing and equipment, hygiene facilities and practices, and housekeeping practices.
- h. A description of arrangements made among contractors on multi- contractor work sites to inform affected employees (including bystanders) of potential lead exposures, and to clarify responsibilities with regard to control of those exposures.

1.5.4 Air Monitoring

Submit monitoring results to the Contracting Officer within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.5.5 Not Used

1.5.6 SD-18, Records

- a. Certification of medical examinations
- b. Employee Training certification

1.6 REMOVAL OF MATERIALS

1.6.1 Title to Materials

Lead containing materials resulting from demolition work, except those classified as hazardous waste (if applicable), will become the property of the Contractor and will be disposed in accordance with this specification.

1.7 EQUIPMENT

The contractor shall furnish the Contracting Officer or his designated representative with one complete set of personal protective equipment daily, as required by the CIH, for entry into and inspection of the demolition work within the lead controlled area. Required personal protective equipment may include, but is not limited to fitted respirators and whole body covering including appropriate foot, head, and hand protection. PPE shall be provided by the contractor and will remain the property of the contractor.

1.7.1 Respirators

Respirators will comply with the requirements of 29 CFR 1910.134. Furnish

appropriate respirators approved by the NIOSH, Department of Health and Human Services, for use in atmospheres containing lead dust.

1.7.2 Special Protective Clothing

Special protective clothing will be worn as per the Lead Compliance Plan (sec 1.5.3.3) and in accordance with OSHA 29 CFR 1910 .132. Reduction of levels of protective clothing can only be performed after approval from the CIH.

1.7.2.1 Furnished Clothing

Protective clothing shall be provided in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to use of a respirator are over 50 µg/m³ of lead as an 8-hour TWA. The contractor shall provide for the cleaning, laundering, and disposal of protective clothing and equipment as needed.

1.7.2.2 Protective Clothing Handling

The contractor shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change area which prevents dispersion of lead outside the container. The container shall be labeled as follows:

"CAUTION: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations."

1.7.3 Rental Equipment Notification

If rental equipment is to be used during lead-containing paint handling, removal, or demolition, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer.

1.7.4 Vacuum Filters

UL 586 labeled HEPA filter must be used.

PART 2 NOT USED

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Notification

Notify the Contracting Officer 20 days prior to the start of any demolition work where elements with lead containing coatings or paint are present.

3.1.2 Not Used

3.1.3 Protection of Existing Work to Remain

Perform demolition work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

3.1.4 Boundary Requirements

Establish a lead control area to prevent the spread of lead dust, paint chips, or debris of lead-containing paint and restrict access to the area. Provide physical boundaries around the lead control area by roping off the area or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

3.1.5 Not Used

3.1.6 Not Used

3.1.7 Change Room and Shower Facilities

Item 3.1.7 will only be required in case of a positive exposure assessment according to Section 3.1.11 of this specification. Provide clean change rooms and shower facilities (if feasible), within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

3.1.8 Mechanical Ventilation System

Item 3.1.8 will only be required in case of a positive initial determination according to Section 3.1.11 of this specification. If exposure is in excess of the PEL, the following control devices may be implemented:

- a. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.62.
- b. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the certified industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.
- c. If air from exhaust ventilation is re-circulated into the work place, the system shall have a high efficiency particulate air filter with reliable back-up filter and controls to monitor the concentration of lead in the return air and to bypass the re-circulation system automatically if it fails. Air may be re-circulated only where exhaust to the outside is not feasible.

3.1.9 Personnel Protection

Item 3.1.9 will only be required in case of a positive initial determination according to Section 3.1.11 of this specification. Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

3.1.10 Warning Signs

Item 3.1.10 will only be required in case of a positive initial determination, according to Section 3.1.11 of this specification. Provide warning signs at approaches to lead control areas, if the exposure will be above the PEL. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.1.11 Exposure Assessment

a. The contractor shall comply with all provisions of 29 CFR 1926.62 (d). Until the contractor performs an employee exposure assessment, the contractor shall implement appropriate protective measures in accordance with 29 CFR 1926.62.

b. The personal protective clothing and controls shall be used as long as employee exposure is greater than the PEL. The CIH will be responsible for determining the exposure level and appropriate personal protective equipment.

3.1.12 Exposure Assessment Requirements

Until an exposure assessment has been performed, the contractor shall provide the employees with the interim protection outlined in 29 CFR 1926.62. The personal protective clothing, controls, and hygiene facilities shall be used as long as employee exposure is greater than the PEL.

3.1.13 Additional Exposure Assessment

After the initial exposure assessment, additional assessments shall be conducted whenever there has been a change of equipment, process, control, personnel, or a new task has been initiated.

3.2 WORK PROCEDURES

The contractor shall perform demolition in accordance with the demolition plan (specification 02220 and 01572), and the written Lead Compliance Plan (section 1.5.3.3 of this specification). Use procedures and equipment required to limit exposure to lead during demolition activities in accordance with 29 CFR 1926.62. Dispose of demolition debris, paint chips and associated waste in compliance with federal, state, and local requirements.

3.2.1 Personnel Exiting Procedures

Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:

- a. Vacuum themselves off using the HEPA vacuum.
- b. Remove protective clothing in the decontamination room, and place them in an approved container.
- c. Shower(if required by CIH).
- d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

3.2.2 Monitoring

Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

a. The CIH or the IH Technician under the direction of the CIH shall be on the job site directing the monitoring, and inspecting the work to ensure that the requirements of the Contract have been satisfied during the entire demolition operation.

b. Take personal air monitoring samples on employees who are anticipated to

have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air monitoring samples, signed by the CIH, within 72 hours after the air samples are taken. Notify the Contracting Officer within 2 hours of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area. Contractor must notify each employee in writing of the results which represent the employees exposure as per 29 CFR 1926.62.

3.2.2.1 Monitoring During Paint Disturbance

Perform personal and area monitoring during demolition activities as required by 29 CFR 1926.62. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. At least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of lead contamination.

3.3 NOT USED

3.4 NOT USED

3.5 CLEANUP AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area.

3.5.2 Certification

The CIH shall certify the following in writing: air monitoring results are less than 30 micrograms per cubic meter inside and outside the lead control area, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust at the work site. Do not remove the lead control area or roped-off boundary and warning signs prior to the Contracting Officer's receipt of the CIH's certification. Re-clean areas showing dust or residual paint chips.

3.5.3 Testing of Demolition Debris

a. Waste Products shall be separated into the following categories:

1) Old woodwork, walls, roofing, plaster, windows, doors, concrete block debris, (all the debris associated with the demolition of the building).

2). Disposable work clothes and respirator filters Rags, sponges, mops, HEPA filters, air monitoring cartridges, and other materials used for testing, and cleanup

b. The waste produced by demolition (only aforementioned point a) has been determined to be non hazardous waste; therefore, testing is not required and may be disposed in accordance with the project specifications (01572). The Contractor must evaluate, in accordance with 40 CFR 261 for hazardous waste, the waste described on points b. to determine if they are hazardous.

3.5.4 Disposal of Lead Contaminated Hazardous Waste

a. Collect lead-contaminated hazardous waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing which may produce airborne concentrations of lead particles. Label the containers in accordance with 49 CFR 172. Dispose of lead-contaminated waste material at an EPA permitted hazardous waste treatment, storage, or disposal facility off Government property.

b. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. The Contracting Officer or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed to each drum.

c. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

3.5.4.1 Disposal Documentation

Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

3.5.5 Disposal of Lead Contaminated Non-Hazardous Waste

Any portion of the segregated waste products which does not test as hazardous by the testing requirements stated above, may be disposed at an approved Landfill.

3.5.6 Payment for Hazardous Waste Disposal

Payment for disposal of hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility certifying the amount of lead-containing materials delivered is returned and a copy is furnished to the Government.

-- End of Section --

SECTION 02220

DEMOLITION

05/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6 (1990) Safety Requirements for Demolition Operations

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

ARI Guideline K (1997) Containers for Recovered Fluorocarbon Refrigerants

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61-SUBPART M National Emission Standard for Asbestos

40 CFR 82 Protection of Stratospheric Ozone; Refrigerant Recycling

49 CFR 173.301 Shipment of Compressed Gas Cylinders

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25 (June 2000) Storage and Handling of Liquefied and Compressed Gases and Their Full and Empty Cylinders

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M Requisitioning and Issue Procedures

MIL-STD-129 (Rev. N) Marking for Shipment and Storage

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 GENERAL REQUIREMENTS

***0001**

Do not begin demolition until authorization is received from the Contracting Officer. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily, unless otherwise directed, to avoid accumulation at the demolition site.

Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified. *0001

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Work Plan; G

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1.

SD-07 Certificates

Demolition plan; G

Notifications; G

Notification of Demolition and Renovation forms; G

Submit proposed demolition and removal procedures to the Contracting Officer for approval before work is started.

SD-11 Closeout Submittals

Receipts

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," safety requirements shall conform with ANSI A10.6.

1.4.1 Notifications

Furnish timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61-SUBPART M. Notify the Regional Office of the United States Environmental Protection Agency (USEPA) and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61-SUBPART M.

1.4.2 Receipts

Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped to the Defense Depot, Richmond, Virginia.

1.5 DEBRIS CONTROL

Prevent the spread of debris and avoid the creation of a hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.6.2 Existing Work

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government; any damaged items shall be repaired or replaced, at Contractor's expense, as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement must have Contracting Officer approval.

1.6.3 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas so as to ensure effectiveness and to prevent displacement.

1.6.4 Trees

Trees within the project site which might be damaged during demolition, and which are indicated to be left in place, shall be protected by a 6 foot high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the work under this contract shall be replaced, at Contractor's expense, in kind or as approved by the Contracting Officer.

1.6.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Contracting Officer. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.6.6 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by the Contracting Officer.

1.9 Required Data

Demolition plan shall include procedures for coordination with other work in progress.

1.10 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Structures

***0001**

Existing structures indicated shall be removed. Interior walls, other than retaining walls and partitions shall be removed. **Existing concrete slabs**

shall be removed once the structure is demolished and removed. Sidewalks, curbs, gutters and street light bases shall be removed as indicated. Show existing conditions of adjoining construction and site improvements, that might be misconstrued as damage caused by building demolition operations. Submit before Work begins.

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*0001

3.1.2 Demolition Firm Qualifications

An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

3.1.3 Refrigerant Recovery Technician Qualifications

Certified by EPA-approved certification program.

3.1.4 Regulatory Requirements

Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

3.1.5 Standards

Comply with ANSI A10.6.

3.1.6 Predemolition Conference

Conduct conference at Project site.

*0001

3.1.7 Utilities and Related Equipment

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer. If utility lines are encountered that are not shown on drawings, contact the Contracting Officer for further instructions.

3.1.8 Paving and Slabs

Sawcut concrete and asphaltic concrete paving and slabs as indicated to a depth of 2 inches below existing adjacent grade.

3.1.9 Locksets on Swinging Doors

The Contractor shall remove all locksets from all swinging doors indicated to be removed and disposed of. Contractor shall give the locksets to the Contracting Officer after their removal.

*0001

3.2 SITE RESTORATION

3.2.1 Below-Grade Areas

a. Rough grade below-grade areas ready for further excavation or new construction.

b. Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 2 Section EARTHWORK.

3.2.2 Site Grading

Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades. *0001

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award.

Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment indicated on plans to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated on plans to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site, as directed within 5 miles of the work site.

Contractor shall salvage items and material to the maximum extent possible.

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

Salvaged items to remain the property of the Government shall be removed in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage shall be repaired or replaced to match existing items.

Containers shall be properly identified as to contents. The following items reserved as property of the Government shall be delivered to the areas designated by the Contracting Officer.

3.3.4 Unsalvageable Material

Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of in the disposal area designated by the Contracting Officer. The fill in the disposal area shall

be uniformly graded to drain. Combustible material shall be disposed of off the site.

3.4 CLEANUP

***0001**

Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

***0001**

-- End of Section --

SECTION 02300

EARTHWORK

12/97

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

- AASHTO T 180 (1997) Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457 mm (18-in) Drop
- AASHTO T 224 (1996) Correction for Coarse Particles in the Soil Compaction Test

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM C 136 (1996a) Sieve Analysis of Fine and Coarse Aggregates
- ASTM D 422 (1963; R 1998) Particle-Size Analysis of Soils
- ASTM D 1140 (1997) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
- ASTM D 1556 (1990; R 1996el) Density and Unit Weight of Soil in Place by the Sand-Cone Method
- ASTM D 1557 (1991; R 1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
- ASTM D 2487 (1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D 2922 (1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- ASTM D 4318 (1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP. Satisfactory materials for grading shall be comprised of stones less than 8 inches, except for fill material for pavements and railroads which shall be comprised of stones less than 3 inches in any dimension.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. The Contracting Officer shall be notified of any contaminated materials. The Contractor shall provide the services of a registered Geotechnical Engineer to supervise and observe any necessary proof rolling.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Testing required for classifying materials shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

1.2.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum density. Since ASTM D 1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve shall be expressed as a percentage of the maximum density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224. To maintain the same percentage of coarse material, the "remove and replace" procedure as described in the NOTE 8 in Paragraph 7.2 of AASHTO T 180 shall be used.

1.2.5 Topsoil

Material suitable for topsoils obtained from excavations is defined as 4 inches of turf.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Earthwork; G.

Procedure and location for disposal of unused satisfactory material.
Blasting plan when blasting is permitted. Proposed source of borrow

material.

Notification of encountering rock in the project. Advance notice on the opening of excavation or borrow areas. Advance notice on shoulder construction for rigid pavements.

SD-06 Test Reports

Testing; G.

Within 24 hours of conclusion of physical tests, 3 copies of test results, including calibration curves and results of calibration tests.

SD-07 Certificates

Testing; G.

Qualifications of the commercial testing laboratory or Contractor's testing facilities.

1.4 SUBSURFACE DATA

Subsurface soil boring logs are appended to the SPECIAL CONTRACT REQUIREMENTS. The subsoil investigation report and samples of materials taken from subsurface investigations may be examined at the site. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.5 CLASSIFICATION OF EXCAVATION

Excavation specified shall be done on a classified basis, in accordance with the following designations and classifications:

1.5.1 Rock Excavation

Rock excavation shall include blasting, excavating, grading, and disposing of material classified as rock and shall include the satisfactory removal and disposal of boulders 1/2 cubic yard or more in volume; solid rock; rock material that is in ledges, bedded deposits, and unstratified masses, which cannot be removed without systematic drilling and blasting; and firmly cemented conglomerate deposits possessing the characteristics of solid rock impossible to remove without systematic drilling and blasting. The removal of any concrete or masonry structures, except pavements, exceeding 1/2 cubic yard in volume that may be encountered in the work shall be included in this classification. If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as rock excavation, such material shall be uncovered and the Contracting Officer notified by the Contractor. The Contractor shall not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation and has taken cross sections as required. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.

1.5.2 Common Excavation

Common excavation shall include the satisfactory removal and disposal of all materials not classified as rock excavation.

1.6 UTILIZATION OF EXCAVATED MATERIALS

Unsatisfactory materials removed from excavations shall be disposed of in designated waste disposal or spoil areas. Satisfactory material removed from excavations shall be used, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. No satisfactory excavated material shall be wasted without specific written authorization. Satisfactory material authorized to be wasted shall be disposed of in designated areas approved for surplus material storage or designated waste areas as directed. Newly designated waste areas on Government-controlled land shall be cleared and grubbed before disposal of waste material thereon. Coarse rock from excavations shall be stockpiled and used for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. No excavated material shall be disposed of to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Where indicated or directed, topsoil shall be stripped to a depth of 4 inches. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance operations. Any surplus of topsoil from excavations and grading shall be removed from the site.

3.2 GENERAL EXCAVATION

The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Grading shall be in conformity with the typical sections shown and the tolerances specified in paragraph FINISHING. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of in areas approved for surplus material storage or designated waste areas. Unsatisfactory excavated material shall be disposed of in designated waste or spoil areas.

During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be excavated from the borrow areas indicated or from other approved areas selected by the Contractor as

specified.

3.2.1 Ditches, Gutters, and Channel Changes

Excavation of ditches, gutters, and channel changes shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown. Ditches and gutters shall not be excavated below grades shown. Excessive open ditch or gutter excavation shall be backfilled with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Material excavated shall be disposed of as shown or as directed, except that in no case shall material be deposited less than 4 feet from the edge of a ditch. The Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Excavations shall be made to the lines, grades, and elevations shown, or as directed. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock or other hard foundation material shall be cleaned of loose debris and cut to a firm, level, stepped, or serrated surface. Loose disintegrated rock and thin strata shall be removed. When concrete or masonry is to be placed in an excavated area, the bottom of the excavation shall not be disturbed. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.3 SELECTION OF BORROW MATERIAL

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from the borrow areas directed by the Government. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. Necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon shall be considered related operations to the borrow excavation.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Except as otherwise permitted, borrow pits and other excavation areas shall be excavated providing adequate drainage. Overburden and other spoil material shall be transported to designated spoil areas or otherwise disposed of as directed. Borrow pits shall be neatly trimmed and drained after the excavation is completed. The Contractor shall ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 GRADING AREAS

Where indicated, work will be divided into grading areas within which satisfactory excavated material shall be placed in embankments, fills, and

required backfills. The Contractor shall not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing.

3.6 BACKFILL

Backfill adjacent to any and all types of structures shall be placed and compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials to prevent wedging action or eccentric loading upon or against the structure. Ground surface on which backfill is to be placed shall be prepared as specified in paragraph PREPARATION OF GROUND SURFACE FOR EMBANKMENTS. Compaction requirements for backfill materials shall also conform to the applicable portions of paragraphs PREPARATION OF GROUND SURFACE FOR EMBANKMENTS, EMBANKMENTS, and SUBGRADE PREPARATION, and Section 02630 STORM-DRAINAGE SYSTEM; and Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.7 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS

3.7.1 General Requirements

Ground surface on which fill is to be placed shall be stripped of live, dead, or decayed vegetation, rubbish, debris, and other unsatisfactory material; plowed, disked, pulverized; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. The prepared ground surface shall be scarified and moistened or aerated as required just prior to placement of embankment materials to assure adequate bond between embankment material and the prepared ground surface.

3.7.2 Frozen Material

Embankment shall not be placed on a foundation which contains frozen material, or which has been subjected to freeze-thaw action. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment) and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to, nights, holidays, weekends, winter shutdowns, or earthwork operations, shall be removed to a depth that is acceptable to the Contracting Officer and replaced with new material. Alternatively, the material will be thawed, dried, reworked, and recompacted to the specified criteria before additional material is placed. The Contracting Officer will determine when placement of fill shall cease due to cold weather. The Contracting Officer may elect to use average daily air temperatures, and/or physical observation of the soils for his determination. Embankment material shall not contain frozen clumps of soil, snow, or ice.

3.8 EMBANKMENTS

3.8.1 Earth Embankments

Earth embankments shall be constructed from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. The material shall be placed in successive horizontal layers of loose material not more than 6 inches in depth. Each layer shall be spread uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, each layer shall be plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements shall be identical with those requirements specified in paragraph SUBGRADE PREPARATION. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any moistening or aerating required to obtain specified compaction. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Rock encountered in the cut section shall be excavated to a depth of 6 inches below finished grade for the subgrade. Low areas resulting from removal of unsatisfactory material or excavation of rock shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified. After rolling, the surface of the subgrade for roadways shall not show deviations greater than 0.5 inch when tested with a 4 foot straightedge applied both parallel and at right angles to the centerline of the area. The elevation of the finish subgrade shall not vary more than 0.05 foot from the established grade and cross section.

3.9.2 Compaction

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas and railroads, each layer of the embankment shall be compacted to at least 90 percent of laboratory maximum density.

3.9.2.1 Subgrade for Pavements

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Subgrade for pavements shall be compacted to at least **98** percentage laboratory maximum density (**Standard Proctor**) for the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, the top 6 inches of subgrade shall be scarified, windrowed, thoroughly blended, reshaped, and compacted. ***0001**

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3.9.2.2 Subgrade for Shoulders

Subgrade for shoulders shall be compacted to at least **98** percentage laboratory maximum density (**Standard Proctor**) for the full depth of the

shoulder.

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3.10 SHOULDER CONSTRUCTION

Shoulders shall be constructed of satisfactory excavated or borrow material or as otherwise shown or specified. Shoulders shall be constructed as soon as possible after adjacent paving is complete. The entire shoulder area shall be compacted to at least the percentage of maximum density as specified in paragraph SUBGRADE PREPARATION above, for specific ranges of depth below the surface of the shoulder. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Shoulder construction shall be done in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. The completed shoulders shall be true to alignment and grade and shaped to drain in conformity with the cross section shown.

3.11 FINISHING

The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. The degree of finish for graded areas shall be within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades shall be specified in paragraph SUBGRADE PREPARATION. Gutters and ditches shall be finished in a manner that will result in effective drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials.

3.12 PLACING TOPSOIL

On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2 inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly to a thickness of 4 inches and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry. Material required for topsoil in excess of that produced by excavation within the grading limits shall be obtained from offsite areas.

3.13 TESTING

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. Field in-place density shall be determined in accordance with ASTM D 1556. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements. Tests on recompacted areas shall be performed to determine conformance with specification requirements. Inspections and test results shall be certified by a registered professional civil engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.13.1 Fill and Backfill Material Gradation

One test per 500 cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ASTM C 136.

3.13.2 In-Place Densities

- a. One test per 1000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.
- b. One test per 1000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.
- c. One test per 1000 linear feet, or fraction thereof, of each lift of embankment or backfill for roads.
- d. One test per 1000 linear feet, or fraction thereof, of each lift of embankment or backfill for railroads.

3.13.3 Check Tests on In-Place Densities

If ASTM D 2922 is used, in-place densities shall be checked by ASTM D 1556 as follows:

- a. One check test per lift for each 500 square feet, or fraction thereof, of each lift of fill or backfill compacted by other than hand-operated machines.
- b. One check test per lift for each 500 square feet, of fill or backfill areas compacted by hand-operated machines.
- c. One check test per lift for each 500 linear feet, or fraction thereof, of embankment or backfill for roads.
- d. One check test per lift for each 500 linear feet, or fraction thereof, of embankment or backfill for railroads.

3.13.4 Moisture Contents

In the stockpile, excavation, or borrow areas, a minimum of two tests per day per type of material or source of material being placed during stable weather conditions shall be performed. During unstable weather, tests shall be made as dictated by local conditions and approved by the Contracting Officer.

3.13.5 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.13.6 Tolerance Tests for Subgrades

Continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION shall be made during construction of the subgrades.

3.14 SUBGRADE AND EMBANKMENT PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operation and shall be protected and maintained by the Contractor in a satisfactory condition until ballast, subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade will not be permitted. No subbase, base course, ballast, or pavement shall be laid until the subgrade has been checked and approved, and in no case shall subbase, base, surfacing, pavement, or ballast be placed on a muddy, spongy, or frozen subgrade.

-- End of Section --

SECTION 02721

SUBBASE COURSES

03/97

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 180 (1997) Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457-mm (18-in) Drop

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29/C 29M (1997) Bulk Density ("Unit Weight") and Voids in Aggregates

ASTM C 117 (1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C 131 (1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C 136 (1996) Sieve Analysis of Fine and Coarse Aggregates

ASTM D 75 (1987; R 1997) Sampling Aggregates

ASTM D 422 (1963; R 1998) Particle-Size Analysis of Soils

ASTM D 1556 (1990; R 1996el) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557 (1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))

ASTM D 2167 (1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method

ASTM D 2487 (1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D 2922 (1996el) Density of Soil and

Soil-Aggregate in Place by Nuclear Methods
(Shallow Depth)

ASTM D 3017 (1988; R 1996e1) Water Content of Soil and
Rock in Place by Nuclear Methods (Shallow
Depth)

ASTM D 4318 (1998) Liquid Limit, Plastic Limit, and
Plasticity Index of Soils

ASTM E 11 (1995) Wire-Cloth Sieves for Testing
Purposes

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment; G

List of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets; G

Copies of waybills and delivery tickets during the progress of the work. Certified waybills and delivery tickets for all aggregates actually used.

SD-06 Test Reports

Sampling and Testing; G

Copies of initial and in-place test results.

1.3 DEGREE OF COMPACTION

Degree of compaction is 100 percent of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved testing laboratory in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Tests shall be performed at the specified frequency. No work requiring testing will be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting

Officer.

1.4.2 Tests

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM D 422. Sieves shall conform to ASTM E 11.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture shall be determined in accordance with ASTM D 1557.

1.4.2.4 Density Tests

Density shall be field measured in accordance with [ASTM D 1556. The base plate, as shown in the drawing shall be used.] [ASTM D 2167.] [ASTM D 2922. The calibration curves shall be checked and adjusted, if necessary, using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D 2922 result in a wet unit weight of soil and, when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made by the prepared containers of material method, as described in paragraph Calibration, in ASTM D 2922, on each different type of material to be tested at the beginning of a job and at intervals as directed.]

1.4.2.5 Wear Test

Wear tests shall be made on subbase course material in conformance with ASTM C 131.

1.4.2.6 Weight of Slag

Weight per cubic foot of slag shall be determined in accordance with ASTM C 29/C 29M on the subbase course material.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements prior to installation.

- a. Sieve Analysis
- b. Liquid limit and plasticity index moisture-density relationship
- c. Wear
- d. Weight per cubic foot of Slag

1.4.3.2 In-Place Tests

One of each of the following tests shall be performed on samples taken from the placed and compacted subbase course. Samples shall be taken for each 500 square yards of each layer of material placed in each area.

- a. Sieve Analysis
- b. Field Density
- c. Moisture liquid limit and plasticity index

1.4.4 Approval of Material

The source of the material shall be selected 30 days prior to the time the material will be required in the work. Approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and compacted subbase course.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.6 EQUIPMENT

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Subbase Course

Aggregates shall consist of crushed stone or slag, gravel, shell, sand, or other sound, durable, approved materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Material retained on the No. 4 sieve shall have a percentage of wear not to exceed 50 percent after 500 revolutions when tested as specified in ASTM C 131. Aggregate shall be reasonably uniform in density and quality. Slag shall be an air-cooled, blast-furnace product having a dry weight of not less than 65 pcf. Aggregates shall have a maximum size of 3 3/4 inch and shall be within the limits specified as follows:

Maximum Allowable Percentage by Weight
Passing Square-Mesh Sieve

| <u>Sieve Designation</u> | <u>No. 1</u> | <u>No. 2</u> | <u>No. 3</u> | <u>No. 4</u> |
|--------------------------|--------------|--------------|--------------|--------------|
| No. 10 | 50 | 80 | -- | 85 |
| No. 200 | 15 | 15 | 15 | 15 |

The portion of any blended component and of the completed course passing

the No. 40 sieve shall be either nonplastic or shall have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 OPERATION OF AGGREGATE SOURCES

All clearing, stripping and excavating work involved in the opening or operation of aggregate sources shall be performed by the Contractor. Aggregate sources shall be opened to working depth in a manner that produces excavation faces that are as nearly vertical as practicable for the materials being excavated. Materials excavated from aggregate sources shall be obtained in successive cuts extending through all exposed strata. All pockets or strata of unsuitable materials overlying or occurring in the deposit shall be wasted as directed. The methods of operating aggregate sources and the processing and blending of the material may be changed or modified by the Contracting Officer, when necessary, in order to obtain material conforming to specified requirements. Upon completion of work, aggregate sources on Government reservations shall be conditioned to drain readily, and shall be left in a satisfactory condition. Aggregate sources on private lands shall be conditioned in agreement with local laws and authorities.

3.2 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.3 PREPARATION OF UNDERLYING MATERIAL

Prior to constructing the subbase course, the underlying course or subgrade shall be cleaned of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. Ruts, or soft yielding spots, in the underlying courses, subgrade areas having inadequate compaction, and deviations of the surface from the specified requirements, shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the subbase course is placed.

3.4 GRADE CONTROL

The finished and completed subbase course shall conform to the lines, grades, and cross sections shown. The lines, grades, and cross sections shown shall be maintained by means of line and grade stakes placed by the Contractor at the work site.

3.5 MIXING AND PLACING MATERIALS

The materials shall be mixed and placed to obtain uniformity of the subbase material at the water content specified. The Contractor shall make such adjustments in mixing or placing procedures or in equipment as may be

directed to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to insure a satisfactory subbase course.

3.6 LAYER THICKNESS

The compacted thickness of the completed course shall be as indicated. When a compacted layer of 6 inches is specified, the material may be placed in a single layer; when a compacted thickness of more than 6 inches is required, no layer shall exceed 6 inches nor be less than 3 inches when compacted.

3.7 COMPACTION

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Each layer of the subbase course shall be compacted as specified with approved compaction equipment. Water content shall be maintained during the compaction procedure to within plus or minus 3 percent of optimum water content, as determined from laboratory tests, as specified in paragraph SAMPLING AND TESTING. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer is compacted through the full depth to at least 100 percent of laboratory maximum density (**Standard Proctor**). The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory subbase course. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification. 0001

3.8 EDGES

Approved material shall be placed along the edges of the subbase course in such quantity as will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least a 1 foot width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the subbase course, as directed.

3.9 SMOOTHNESS TEST

The surface of each layer shall not show deviations in excess of 3/8 inch when tested with a 12 foot straightedge applied parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding this amount shall be corrected by removing material, replacing with new material, or reworking existing material and compacting, as directed.

3.10 THICKNESS CONTROL

The completed thickness of the subbase course shall be in accordance with the thickness and grade indicated on the drawings. The thickness of each course shall be measured at intervals providing at least one measurement for each 500 square yards or part thereof of subbase course. The thickness measurement shall be made by test holes, at least 3 inches in diameter through the course. The completed subbase course shall not be more than 1/2 inch deficient in thickness nor more than 1/2 inch above or below the established grade. Where any of these tolerances are exceeded, the Contractor shall correct such areas by scarifying, adding new material of proper gradation or removing material, and compacting, as directed. Where the measured thickness is 1/2 inch or more thicker than shown, the course

will be considered as conforming with the specified thickness requirements plus 1/2 inch. The average job thickness shall be the average of the job measurements as specified above but within 1/4 inch of the thickness shown.

3.11 MAINTENANCE

The subbase course shall be maintained in a satisfactory condition until accepted.

-- End of Section --

SECTION 02741

HOT-MIX ASPHALT (HMA) FOR ROADS

09/99

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

| | |
|-------------|--|
| AASHTO MP 1 | (1998) Provisional Specification for Performance Graded Asphalt Binder |
| AASHTO MP 2 | (1998; Interim 1999) Superpave Volumetric Mix Design |
| AASHTO TP53 | (1998; Interim 1999) Determining Asphalt Content of Hot Mix Asphalt by the Ignition Method |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|-----------------|---|
| ASTM C 29/C 29M | (1997) Bulk Density ("Unit Weight") and Voids in Aggregates |
| ASTM C 88 | (1999a) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate |
| ASTM C 117 | (1995) Materials Finer than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing |
| ASTM C 131 | (1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| ASTM C 136 | (1996a) Sieve Analysis of Fine and Coarse Aggregates |
| ASTM C 566 | (1997) Evaporable Total Moisture Content of Aggregate by Drying |
| ASTM C 1252 | (1998) Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading) |
| ASTM D 140 | (1998) Sampling Bituminous Materials |
| ASTM D 242 | (1995) Mineral Filler for Bituminous Paving Mixtures |

Ft. Knox ACP

ASTM D 995 (1995b) Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

ASTM D 1461 (1985)) Moisture or Volatile Distillates in Bituminous Paving Mixtures

ASTM D 1559 (1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

ASTM D 2172 (1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

ASTM D 2419 (1995) Sand Equivalent Value of Soils and Fine Aggregate

ASTM D 2489 (1984; R 1994e1) Degree of Particle Coating of Bituminous-Aggregate Mixtures

ASTM D 2726 (1996e1) Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixture

ASTM D 2950 (1997) Density of Bituminous Concrete in Place by Nuclear Method

ASTM D 3665 (1999) Random Sampling of Construction Materials

ASTM D 3666 (1998) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials

ASTM D 4125 (1994e1)Asphalt Content of Bituminous Mixtures by the Nuclear Method

ASTM D 4791 (1999) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

ASTM D 4867/D 4867M (1996) Effect of Moisture on Asphalt Concrete Paving Mixtures

ASTM D 5444 (1998) Mechanical Size Analysis of Extracted Aggregate

ASTM D 6307 (1998) Asphalt Content of Hot Mix Asphalt by Ignition Method

ASPHALT INSTITUTE (AI)

AI MS-02 (1997) Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types

AI MS-22 (1998; 2nd Edition) Construction of Hot-Mix Asphalt Pavements

1.2 DESCRIPTION OF WORK

The work shall consist of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. HMA designed and constructed in accordance with this section shall conform to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Mix Design; G,

Proposed JMF

Contractor Quality Control; G,

Quality control plan

Material Acceptance and Percent Payment; G,

Acceptance test results and pay calculations

SD-04 Samples

Asphalt Cement Binder; G.

(5 gallon) sample for mix design verification.

Aggregates; G.

Sufficient materials to produce 200 lb of blended mixture for mix design verification.

SD-06 Test Reports

Aggregates; G.

QC Monitoring; G.

Aggregate and QC test results.

SD-07 Certificates

Asphalt Cement Binder; G.

Copies of certified test data.

Testing Laboratory; G.

Certification of compliance.

Plant Scale Calibration Certification

1.4 ASPHALT MIXING PLANT

Plants used for the preparation of hot-mix asphalt shall conform to the requirements of ASTM D 995 with the following changes:

- a. Truck Scales. The asphalt mixture shall be weighed on approved certified scales at the Contractor's expense. Scales shall be inspected and sealed at least annually by an approved calibration laboratory.
- b. Testing Facilities. The Contractor shall provide laboratory facilities at the plant for the use of the Government's acceptance testing and the Contractor's quality control testing.
- c. Inspection of Plant. The Contracting Officer shall have access at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. The Contractor shall provide assistance as requested, for the Government to procure any desired samples.
- d. Storage Bins. Use of storage bins for temporary storage of hot-mix asphalt will be permitted as follows:
 - 1) The asphalt mixture may be stored in non-insulated storage bins for a period of time not exceeding 3 hours.
 - 2) The asphalt mixture may be stored in insulated storage bins for a period of time not exceeding 8 hours. The mix drawn from bins shall meet the same requirements as mix loaded directly into trucks.

1.5 HAULING EQUIPMENT

Trucks used for hauling hot-mix asphalt shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Petroleum based products shall not be used as a release agent. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers (tarps) shall be securely fastened.

1.6 ASPHALT PAVERS

Asphalt pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of hot-mix asphalt which will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface.

1.6.1 Receiving Hopper

The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed

without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

1.6.2 Automatic Grade Controls

If an automatic grade control device is used, the paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor-directed mechanisms or devices which will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent. A transverse slope controller shall not be used to control grade. The controls shall be capable of working in conjunction with any of the following attachments:

- a. Ski-type device of not less than 30 feet in length.
- b. Taut stringline set to grade.
- c. Short ski or shoe for joint matching.
- d. Laser control.

1.7 ROLLERS

Rollers shall be in good condition and shall be operated at slow speeds to avoid displacement of the asphalt mixture. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. Equipment which causes excessive crushing of the aggregate shall not be used.

1.8 WEATHER LIMITATIONS

The hot-mix asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

| <u>Mat Thickness, inches</u> | <u>Degrees F</u> |
|------------------------------|------------------|
| 3 or greater | 40 |
| Less than 3 | 45 |

PART 2 PRODUCTS

2.1 AGGREGATES

Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand and mineral filler, as required. The portion of material retained on the No. 4 sieve is coarse aggregate. The portion of material passing the No. 4 sieve and retained on the No. 200 sieve is fine aggregate. The portion passing the No. 200 sieve is defined as mineral

filler. All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

2.1.1 Coarse Aggregate

Coarse aggregate shall consist of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. All individual coarse aggregate sources shall meet the following requirements:

- a. The percentage of loss shall not be greater than 40 percent after 500 revolutions when tested in accordance with ASTM C 131.
- b. The percentage of loss shall not be greater than 18 percent after five cycles when tested in accordance with ASTM C 88 using magnesium sulfate.
- c. At least 75 percent by weight of coarse aggregate shall have at least two or more fractured faces when tested. Fractured faces shall be produced by crushing.
- d. The particle shape shall be essentially cubical and the aggregate shall not contain more than 20% percent, by weight, of flat and elongated particles (3:1 ratio of maximum to minimum) when tested in accordance with ASTM D 4791.
- e. Slag shall be air-cooled, blast furnace slag, and shall have a compacted weight of not less than 75 lb/cu ft when tested in accordance with ASTM C 29/C 29M.

2.1.2 Fine Aggregate

- a. Fine aggregate shall consist of clean, sound, tough, durable particles. The aggregate particles shall be free from coatings of clay, silt, or any objectionable material and shall contain no clay balls. All individual fine aggregate sources shall have a sand equivalent value not less than 45 when tested in accordance with ASTM D 2419.
- b. The fine aggregate portion of the blended aggregate shall have an uncompacted void content not less than 43.0 percent when tested in accordance with ASTM C 1252 Method A.

2.1.3 Mineral Filler

Mineral filler shall be nonplastic material meeting the requirements of ASTM D 242.

2.1.4 Aggregate Gradation

The combined aggregate gradation shall conform to gradations specified in Table 2, when tested in accordance with ASTM C 136 and ASTM C 117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table 2. Aggregate Gradations

| Sieve Size, inch | Gradation 1 | Gradation 2 | Gradation 3 |
|------------------|----------------------------|----------------------------|----------------------------|
| | Percent Passing by Mass | Percent Passing by Mass | Percent Passing by Mass |
| 1 | 100 | --- | --- |
| 3/4 | 76-96 | 100 | --- |
| 1/2 | 68-88 | 76-96 | 100 |
| 3/8 | 60-82 | 69-89 | 76-96 |
| No. 4 | 45-67 | 53-73 | 58-78 |
| No. 8 | 32-54 | 38-60 | 40-60 |
| No. 16 | 22-44 | 26-48 | 28-48 |
| No. 30 | 15-35 | 18-38 | 18-38 |
| No. 50 | 9-25 | 11-27 | 11-27 |
| No. 100 | 6-18 | 6-18 | 6-18 |
| No. 200 | 3-6 | 3-6 | 3-6 |

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder shall conform to AASHTO MP 1 Performance Grade (PG). Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder. The Contracting Officer may sample and test the binder at the mix plant at any time before or during mix production. Samples for this verification testing shall be obtained by the Contractor in accordance with ASTM D 140 and in the presence of the Contracting Officer. These samples shall be furnished to the Contracting Officer for the verification testing, which shall be at no cost to the Contractor. Samples of the asphalt cement specified shall be submitted for approval not less than 14 days before start of the test section.

2.3 MIX DESIGN

The Contractor shall develop the mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures contained in AI MS-02 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. Sufficient materials to produce 200 pound of blended mixture shall be provided to the Contracting Officer for verification of mix design at least 14 days prior to construction of test section.

At the option of the contractor a currently used DOT superpave hot mix may be used in lieu of developing a new hot mix design study as described herein. The superpave volumetric mix shall be designed in accordance with AASHTO MP 2.

2.3.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of the test section and shall include as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade, penetration grade, or performance grade.
- e. Number of blows of hammer per side of molded specimen.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-02.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with 2 or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Percent flat or elongated particles (in coarse aggregate).
- p. Tensile Strength Ratio(TSR).
- q. Antistrip agent (if required) and amount.
- r. List of all modifiers and amount.
- s. Percentage and properties (asphalt content, binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) in accordance with paragraph RECYCLED HOT-MIX ASPHALT, if RAP is used.

Table 3. Marshall Design Criteria

| <u>Test Property</u> | <u>50 Blow Mix</u> |
|---------------------------|--------------------|
| Stability, pounds minimum | *1000 |
| Flow, 0.01 inch | 8-18 |

Table 3. Marshall Design Criteria

| <u>Test Property</u> | <u>50 Blow Mix</u> |
|---|--------------------|
| Air voids, percent | 3-5 |
| Percent Voids in mineral aggregate VMA, (minimum) | |
| Gradation 1 | 13.0 |
| Gradation 2 | 14.0 |
| Gradation 3 | 15.0 |
| TSR, minimum percent | 75 |

* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

** Calculate VMA in accordance with AI MS-02, based on ASTM D 2726 bulk specific gravity for the aggregate.

2.3.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory jmf design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the Laboratory JMF within the limits specified below to optimize mix volumetric properties with the approval of the Contracting Officer. Adjustments to the Laboratory JMF shall be applied to the field (plant) established JMF and limited to those values as shown. Adjustments shall be targeted to produce or nearly produce 4 percent voids total mix (VTM).

TABLE 4. Field (Plant) Established JMF Tolerances

| <u>Sieves</u> | <u>Adjustments (plus or minus), percent</u> |
|----------------|---|
| No. 4 | 3 |
| No. 8 | 3 |
| No. 200 | 1 |
| Binder Content | 0.40 |

If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table 2; while not desirable, this is acceptable.

2.4 RECYCLED HOT MIX ASPHALT

Recycled HMA shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt cement. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 2 inches. The recycled HMA mix shall be designed using procedures contained in AI MS-02 and AI MS-22. The job mix shall meet the requirements of paragraph MIX DESIGN. The amount of RAP shall not exceed

30 percent.

2.4.1 RAP Aggregates and Asphalt Cement

The blend of aggregates used in the recycled mix shall meet the requirements of paragraph AGGREGATES. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D 2172 using the appropriate dust correction procedure.

2.4.2 RAP Mix

The blend of new asphalt cement and the RAP asphalt binder shall meet the viscosity requirements in paragraph ASPHALT CEMENT BINDER. The virgin asphalt cement shall not be more than two standard asphalt material grades different than that specified in paragraph ASPHALT CEMENT BINDER.

PART 3 EXECUTION

3.1 PREPARATION OF ASPHALT BINDER MATERIAL

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 325 degrees F when added to the aggregates. Modified asphalts shall be no more than 350 degrees F when added to the aggregates.

3.2 PREPARATION OF MINERAL AGGREGATE

The aggregate for the mixture shall be heated and dried prior to mixing. No damage shall occur to the aggregates due to the maximum temperature and rate of heating used. The temperature of the aggregate and mineral filler shall not exceed 350 degrees F when the asphalt cement is added. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.3 PREPARATION OF HOT-MIX ASPHALT MIXTURE

The aggregates and the asphalt cement shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but no less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D 2489, for each individual plant and for each type of aggregate used.

The wet mixing time will be set to at least achieve 95 percent of coated particles. The moisture content of all hot-mix asphalt upon discharge from the plant shall not exceed 0.5 percent by total weight of mixture as measured by ASTM D 1461.

3.4 PREPARATION OF THE UNDERLYING SURFACE

Immediately before placing the hot mix asphalt, the underlying course shall be cleaned of dust and debris. A prime coat or tack coat shall be applied in accordance with the contract specifications.

3.5 TEST SECTION

Prior to full production, the Contractor shall place a test section for each JMF used. The contractor shall construct a test section 250 - 500 feet long and two paver passes wide placed for two lanes, with a longitudinal cold joint. The test section shall be of the same depth as the course which it represents. The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment and personnel used in construction of the test section shall be the same equipment to be used on the remainder of the course represented by the test section. The test section shall be placed as part of the project pavement as approved by the Contracting Officer.

3.5.1 Sampling and Testing for Test Section

One random sample shall be taken at the plant, triplicate specimens compacted, and tested for stability, flow, and laboratory air voids. A portion of the same sample shall be tested for aggregate gradation and asphalt content. Four randomly selected cores shall be taken from the finished pavement mat, and four from the longitudinal joint, and tested for density. Random sampling shall be in accordance with procedures contained in ASTM D 3665. The test results shall be within the tolerances shown in Table 5 for work to continue. If all test results meet the specified requirements, the test section shall remain as part of the project pavement. If test results exceed the tolerances shown, the test section shall be removed and replaced at no cost to the Government and another test section shall be constructed. The test section shall be paid for with the first lot of paving

Table 5. Test Section Requirements for Material and Mixture Properties

| <u>Property</u> | <u>Specification Limit</u> |
|---|----------------------------|
| Aggregate Gradation-Percent Passing (Individual Test Result) | |
| No. 4 and larger | JMF plus or minus 8 |
| No. 8, No. 16, No. 30, and No. 50 | JMF plus or minus 6 |
| No. 100 and No. 200 | JMF plus or minus 2.0 |
| Asphalt Content, Percent (Individual Test Result) | JMF plus or minus 0.5 |
| Laboratory Air Voids, Percent (Average of 3 specimens) | JMF plus or minus 1.0 |
| VMA, Percent (Average of 3 specimens) | 13 minimum |
| Stability, pounds (Average of 3 specimens) | 1000 minimum |
| Flow, 0.01 inches (Average of 3 specimens) | 8 - 16 |
| Mat Density, Percent of Marshall (Average of 4 Random Cores) | 97.0 - 100.5 |
| Joint Density, Percent of Marshall (Average of 4 Random Cores) | 95.5 - 100.5 |

3.5.2 Additional Test Sections

If the initial test section should prove to be unacceptable, the necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made. A second test section shall then be placed. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. Full production shall not begin until an acceptable section has been constructed and accepted.

3.6 TESTING LABORATORY

The laboratory used to develop the JMF shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

3.7 TRANSPORTING AND PLACING

3.7.1 Transporting

The hot-mix asphalt shall be transported from the mixing plant to the site in clean, tight vehicles. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 140 degrees F. To deliver mix to the paver, the Contractor shall use a material transfer vehicle which shall be operated to produce continuous forward motion of the paver.

3.7.2 Placing

The mix shall be placed and compacted at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, the mixture shall be placed to the full width by an asphalt paver; it shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The mixture shall be placed in consecutive adjacent strips having a minimum width of 10 feet. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 foot; however, the joint in the surface course shall be at the centerline of the pavement. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On isolated areas

where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools.

3.8 COMPACTION OF MIXTURE

After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible without causing displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened but excessive water will not be permitted. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hand tampers. Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective shall be removed full depth, replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching will not be allowed.

3.9 JOINTS

The formation of joints shall be made ensuring a continuous bond between the courses and to obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.9.1 Transverse Joints

The roller shall not pass over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing material at the joint. The cutback material shall be removed from the project. In both methods, all contact surfaces shall be given a light tack coat of asphalt material before placing any fresh mixture against the joint.

3.9.2 Longitudinal Joints

Longitudinal joints which are irregular, damaged, uncompacted, cold (less than 175 degrees F at the time of placing adjacent lanes), or otherwise defective, shall be cut back a minimum of 2 inches from the edge with a cutting wheel to expose a clean, sound vertical surface for the full depth of the course. All cutback material shall be removed from the project. All contact surfaces shall be given a light tack coat of asphalt material prior to placing any fresh mixture against the joint. The Contractor will be allowed to use an alternate method if it can be demonstrated that density, smoothness, and texture can be met.

3.10 CONTRACTOR QUALITY CONTROL

3.10.1 General Quality Control Requirements

The Contractor shall develop an approved Quality Control Plan. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved. The plan shall address all elements which affect the quality of the pavement including, but not limited to:

- a. Mix Design
- b. Aggregate Grading
- c. Quality of Materials
- d. Stockpile Management
- e. Proportioning
- f. Mixing and Transportation
- g. Mixture Volumetrics
- h. Moisture Content of Mixtures
- i. Placing and Finishing
- j. Joints
- k. Compaction
- l. Surface Smoothness

3.10.2 Testing Laboratory

The Contractor shall provide a fully equipped asphalt laboratory located at the plant or job site. The laboratory shall meet the requirements as required in ASTM D 3666. The effective working area of the laboratory shall be a minimum of 150 square feet with a ceiling height of not less than 7.5 feet. Lighting shall be adequate to illuminate all working areas. It shall be equipped with heating and air conditioning units to maintain a temperature of 75 degrees F plus or minus 5 degrees F. Laboratory facilities shall be kept clean and all equipment shall be maintained in proper working condition. The Contracting Officer shall be permitted unrestricted access to inspect the Contractor's laboratory facility, to witness quality control activities, and to perform any check testing desired. The Contracting Officer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to adversely affect test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are corrected.

3.10.3 Quality Control Testing

The Contractor shall perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. The testing program shall include, but shall not be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, moisture in the asphalt mixture, laboratory air voids, stability, flow, in-place density, grade and smoothness. A Quality Control Testing

Plan shall be developed as part of the Quality Control Program.

3.10.3.1 Asphalt Content

A minimum of two tests to determine asphalt content will be performed per lot (a lot is defined in paragraph MATERIAL ACCEPTANCE AND PERCENT PAYMENT) by one of the following methods: the extraction method in accordance with ASTM D 2172, Method A or B, the ignition method in accordance with the AASHTO TP53 or ASTM D 6307, or the nuclear method in accordance with ASTM D 4125, provided the nuclear gauge is calibrated for the specific mix being used. For the extraction method, the weight of ash, as described in ASTM D 2172, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture.

3.10.3.2 Gradation

Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. When asphalt content is determined by the nuclear method, aggregate gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix plants. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

3.10.3.3 Temperatures

Temperatures shall be checked at least four times per lot, at necessary locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site.

3.10.3.4 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C 566.

3.10.3.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per lot in accordance with ASTM D 1461 or an approved alternate procedure.

3.10.3.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least four times per lot and compacted into specimens, using 50 blows per side with the Marshall hammer as described in ASTM D 1559. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

3.10.3.7 In-Place Density

The Contractor shall conduct any necessary testing to ensure the specified density is achieved. A nuclear gauge may be used to monitor pavement density in accordance with ASTM D 2950.

3.10.3.8 Grade and Smoothness

The Contractor shall conduct the necessary checks to ensure the grade and smoothness requirements are met in accordance with paragraph MATERIAL ACCEPTANCE AND PERCENT PAYMENT.

3.10.3.9 Additional Testing

Any additional testing, which the Contractor deems necessary to control the process, may be performed at the Contractor's option.

3.10.3.10 QC Monitoring

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed. The Contracting Officer reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing.

3.10.4 Sampling

When directed by the Contracting Officer, the Contractor shall sample and test any material which appears inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

3.10.5 Control Charts

For process control, the Contractor shall establish and maintain linear control charts on both individual samples and the running average of last four samples for the parameters listed in Table 6, as a minimum. These control charts shall be posted as directed by the Contracting Officer and shall be kept current at all times. The control charts shall identify the project number, the test parameter being plotted, the individual sample numbers, the Action and Suspension Limits listed in Table 6 applicable to the test parameter being plotted, and the Contractor's test results. Target values from the JMF shall also be shown on the control charts as indicators of central tendency for the cumulative percent passing, asphalt content, and laboratory air voids parameters. When the test results exceed either applicable Action Limit, the Contractor shall take immediate steps to bring the process back in control. When the test results exceed either applicable Suspension Limit, the Contractor shall halt production until the problem is solved. The Contractor shall use the control charts as part of the process control system for identifying trends so that potential problems can be corrected before they occur. Decisions concerning mix modifications shall be made based on analysis of the results provided in the control charts. The Quality Control Plan shall indicate the appropriate action which shall be taken to bring the process into control when certain parameters exceed their Action Limits.

Table 6. Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts

| Parameter to be Plotted | Running Average of Individual Samples | | Last Four Samples | |
|--|--|---------------------|-------------------|---------------------|
| | Action Limit | Suspension Limit | Action Limit | Suspension Limit |
| No. 4 sieve, Cumulative % Passing, deviation from JMF target; plus or minus values | 6 | 8 | 4 | 5 |
| No. 30 sieve, Cumulative % Passing, deviation from JMF target; plus or minus values | 4 | 6 | 3 | 4 |
| No. 200 sieve, Cumulative % Passing, deviation from JMF target; plus or minus values | 1.4 | 2.0 | 1.1 | 1.5 |
| Stability, pounds (minimum) | | | | |
| 75 Blow JMF | 1800 | 1700 | 1900 | 1800 |
| 50 Blow JMF | 1000 | 900 | 1100 | 1000 |
| Flow, 0.01 inches | | | | |
| 75 Blow | 8 min. 16 max. | 7 min. 17 max. | 9 min. 15 max. | 8 min. 16 max. |
| 50 Blow | 8 min. 18 max. | 7 min. 19 max. | 9 min. 17 max. | 8 min. 18 max. |
| Asphalt content, % deviation from JMF target; plus or minus value | 0.4 | 0.5 | 0.2 | 0.3 |
| Laboratory Air Voids, % deviation from JMF target value | No specific action and suspension limits set since this parameter is used to determine percent payment | | | |
| In-place Mat Density, % of Marshall density | No specific action and suspension limits set since this parameter is used to determine percent payment | | | |
| In-place Joint Density, % of Marshall density | No specific action and suspension limits set since this parameter is used to determine percent payment | | | |

3.11 MATERIAL ACCEPTANCE AND PASS/FAIL SYSTEM

Testing for acceptability of work will be performed by an independent laboratory hired by the Contractor. Test results and payment calculations shall be forwarded daily to the Contracting Officer. Acceptance of the plant produced mix and in-place requirements will be on a lot to lot basis. A standard lot for all requirements will be equal to 2000 tons 4 hours of production. Grade and surface smoothness determinations will be made on the lot as a whole.

3.11.1 Percent Payment

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When a lot of material fails to meet the specification requirements for 100 percent pay as outlined in the following paragraphs, **then the average lot pay factor shall be determined.** The lot pay factor is determined by taking the lowest computed pay factor based on either in-place density, grade, and smoothness (each discussed below). At the completion of the **asphalt paving**, an average of all lot pay factors will be calculated. If this average lot pay factor exceeds 95.0 percent, then **all lots pass, and the Bid Price shall be paid.** If the average lot pay factor is less than 95.0 percent, then each **failing** lot will be **rejected, and the Contractor shall remove and replace the failing lot at no additional cost to the Government.** *0001

3.11.2 Sublot Sampling

One random mixture sample for determining laboratory air voids, theoretical maximum density, and for any additional testing the Contracting Officer desires, will be taken from a loaded truck delivering mixture to each subplot, or other appropriate location for each subplot. All samples will be selected randomly, using commonly recognized methods of assuring randomness conforming to ASTM D 3665 and employing tables of random numbers or computer programs. Laboratory air voids will be determined from three laboratory compacted specimens of each subplot sample in accordance with ASTM D 1559. The specimens will be compacted within 2 hours of the time the mixture was loaded into trucks at the asphalt plant. Samples will not be reheated prior to compaction and insulated containers will be used as necessary to maintain the temperature.

3.11.3 Additional Sampling and Testing

The Contracting Officer reserves the right to direct additional samples and tests for any area which appears to deviate from the specification requirements. The cost of any additional testing will be paid for by the Government. Testing in these areas will be in addition to the lot testing, and the requirements for these areas will be the same as those for a lot.

3.11.4 In-place Density

3.11.4.1 General Density Requirements

For determining in-place density, one random core will be taken by the Government from the mat (interior of the lane) of each subplot, and one random core will be taken from the joint (immediately over joint) of each subplot. Each random core will be full thickness of the layer being placed. After air drying to a constant weight, cores obtained from the mat and from the joints will be used for in-place density determination.

3.11.4.2 Mat and Joint Densities

The average in-place mat and joint densities are expressed as a percentage of the average Marshall density for the lot. The Marshall density for each lot will be determined as the average Marshall density of the four random samples (3 specimens compacted per sample). The average in-place mat density and joint density for a lot are determined and compared with Table 8 to calculate a single pay factor per lot based on in-place density, as described below. First, a pay factor for both mat density and joint density are determined from Table 8. The area associated with the joint is then determined and will be considered to be 10 feet wide times the length of completed longitudinal construction joint in the lot. This area will

not exceed the total lot size. The length of joint to be considered will be that length where a new lane has been placed against an adjacent lane of hot-mix asphalt pavement, either an adjacent freshly paved lane or one paved at any time previously. The area associated with the joint is expressed as a percentage of the total lot area. A weighted pay factor for the joint is determined based on this percentage (see example below). The pay factor for mat density and the weighted pay factor for joint density is compared and the lowest selected. This selected pay factor is the pay factor based on density for the lot. When the Marshall density on both sides of a longitudinal joint is different, the average of these two densities will be used as the Marshall density needed to calculate the percent joint density. All density results for a lot will be completed and reported within 24 hours after the construction of that lot.

Table 8. Pay Factor Based on In-place Density

| Average Mat Density (4 Cores) | Pay Factor, % | Average Joint Density (4 Cores) |
|----------------------------------|---------------|------------------------------------|
| 97.9 or 100 | 100.0 | 96.4 or above |
| 97.8 or 100.1 | 99.9 | 96.3 |
| 97.7 | 99.8 | 96.2 |
| 97.6 or 100.2 | 99.6 | 96.1 |
| 97.5 | 99.4 | 96.0 |
| 97.4 or 100.3 | 99.1 | 95.9 |
| 97.3 | 98.7 | 95.8 |
| 97.2 or 100.4 | 98.3 | 95.7 |
| 97.1 | 97.8 | 95.6 |
| 97.0 or 100.5 | 97.3 | 95.5 |
| 96.9 | 96.3 | 95.4 |

3.11.4.3 Pay Factor Based on In-place Density

An example of the computation of a pay factor (in I-P units only) based on in-place density, is as follows: Assume the following test results for field density made on the lot: (1) Average mat density = 97.2 percent (of lab density). (2) Average joint density = 95.5 percent (of lab density). (3) Total area of lot = 30,000 square feet. (4) Length of completed longitudinal construction joint = 2000 feet.

- a. Step 1: Determine pay factor based on mat density and on joint density, using Table 8:

Mat density of 97.2 percent = 98.3 pay factor.

Joint density of 95.5 percent = 97.3 pay factor.

- b. Step 2: Determine ratio of joint area (length of longitudinal joint x 10 ft) to mat area (total paved area in the lot): Multiply the length of completed longitudinal construction joint by the specified 10 ft. width and divide by the mat area (total paved area in the lot).

(2000 ft. x 10 ft.)/30000 sq.ft. = 0.6667 ratio of joint area to mat area (ratio).

- c. Step 3: Weighted pay factor (wpf) for joint is determined as indicated below:

$$\text{wpf} = \text{joint pay factor} + (100 - \text{joint pay factor}) (1 - \text{ratio})$$

$$\text{wpf} = 97.3 + (100 - 97.3) (1 - 0.6667) = 98.2\%$$

d. Step 4: Compare weighted pay factor for joint density to pay factor for mat density and select the smaller:

Pay factor for mat density: 98.3%. Weighted pay factor for joint density: 98.2%

Select the smaller of the two values as pay factor based on density: 98.2%

3.11.5 Grade

The final wearing surface of pavement shall conform to the elevations and cross sections shown and shall vary not more than 0.05 foot from the plan grade established and approved at site of work. Finished surfaces at juncture with other pavements shall coincide with finished surfaces of abutting pavements. Deviation from the plan elevation will not be permitted in areas of pavements where closer conformance with planned elevation is required for the proper functioning of drainage and other appurtenant structures involved. The final wearing surface of the pavement will be tested for conformance with specified plan grade requirements. The grade will be determined by running lines of levels at intervals of 25 feet, or less, longitudinally and transversely, to determine the elevation of the completed pavement surface. Within 5 working days, after the completion of a particular lot incorporating the final wearing surface, the Contracting Officer will inform the Contractor in writing, of the results of the grade-conformance tests. When more than 5 percent of all measurements made within a lot are outside the 0.05 foot tolerance, the pay factor based on grade for that lot will be 95 percent. In areas where the grade exceeds the tolerance by more than 50 percent, the Contractor shall remove the surface lift full depth; the Contractor shall then replace the lift with hot-mix asphalt to meet specification requirements, at no additional cost to the Government. Diamond grinding may be used to remove high spots to meet grade requirements. Skin patching for correcting low areas or planing or milling for correcting high areas will not be permitted.

3.11.6 Surface Smoothness

The Contractor shall use both of the following methods to test and evaluate surface smoothness of the pavement. All testing shall be performed in the presence of the Contracting Officer. Detailed notes of the results of the testing shall be kept and a copy furnished to the Government immediately after each day's testing. The profilograph method shall be used for all longitudinal and transverse testing, except where the runs would be less than 200 feet in length and the ends where the straightedge shall be used. Where drawings show required deviations from a plane surface (crowns, drainage inlets, etc.), the surface shall be finished to meet the approval of the Contracting Officer.

3.11.6.1 Smoothness Requirements

a. Straightedge Testing: The finished surfaces of the pavements shall have no abrupt change of 1/4 inch or more, and all pavements shall be within the tolerances specified in Table 9 when checked with an approved 12 foot straightedge.

Table 9. Straightedge Surface Smoothness--Pavements

| <u>Pavement Category</u> | <u>Direction of Testing</u> | <u>Tolerance, inches</u> |
|--------------------------|-----------------------------|--------------------------|
| All paved areas | Longitudinal | 1/4 |
| | Transverse | 1/4 |

b. Profilograph Testing: The finished surfaces of the pavements shall have no abrupt change of 1/8 inch or more, and all pavement shall have a Profile Index not greater than specified in Table 10 when tested with an approved California-type profilograph. If the extent of the pavement in either direction is less than 200 feet, that direction shall be tested by the straightedge method and shall meet requirements specified above.

Table 10. Profilograph Surface Smoothness--Pavements

| <u>Pavement Category</u> | <u>Direction of Testing</u> | <u>Maximum Specified Profile Index (inch/mile)</u> |
|--------------------------|-----------------------------|--|
| All Paved Areas | Longitudinal | 9 |

3.11.6.2 Testing Method

After the final rolling, but not later than 24 hours after placement, the surface of the pavement in each entire lot shall be tested by the Contractor in such a manner as to reveal all surface irregularities exceeding the tolerances specified above. Separate testing of individual sublots is not required. If any pavement areas are ground, these areas shall be retested immediately after grinding. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines. The transverse lines shall be 25 feet or less apart, as directed. The longitudinal lines shall be at the centerline of each paving lane for lines less than 20 feet and at the third points for lanes 20 feet or greater. Other areas having obvious deviations shall also be tested. Longitudinal testing lines shall be continuous across all joints.

- a. Straightedge Testing. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points.
- b. Profilograph Testing. Profilograph testing shall be performed using approved equipment and procedures described by the Army Corps of Engineers. in CDT Test 526. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must-grind" bumps and the Profile Index for the pavement. The "blanking band" shall be 0.2 inches wide and the "bump template" shall span 1 inch with an offset of 0.4 inch. The profilograph shall be operated by an approved, factory-trained operator on the alignments specified above. A copy of the reduced tapes shall be furnished the Government at the end of each day's testing.

3.11.6.3 Payment Adjustment for Smoothness

a. Straightedge Testing. Location and deviation from straightedge for all measurements shall be recorded. When between 5.0 and 10.0 percent of all measurements made within a lot exceed the tolerance specified in paragraph Smoothness Requirements above, after any reduction of high spots or removal and replacement, the computed pay factor for that lot based on surface smoothness, will be 95 percent. Carrier thru 10% tolerance. The lot shall be removed and replaced at no additional cost to the Government. Regardless of the above, any small individual area with surface deviation which exceeds the tolerance given above by more than 50 percent, shall be corrected by diamond grinding to meet the specification requirements above or shall be removed and replaced at no additional cost to the Government.

b. Profilograph Testing. Location and data from all profilograph measurements shall be recorded. When the Profile Index of a lot exceeds the tolerance specified in paragraph Smoothness Requirements above by 1.0 inch/mile, but less than 2.0 inches/mile, after any reduction of high spots or removal and replacement, the computed pay factor for that lot based on surface smoothness will be 95 percent. When tolerance exceeds 2.0 inches the lot shall be removed and replaced at no additional cost to the Government. Regardless of the above, any small individual area with surface deviation which exceeds the tolerance given above by more than 5.0 inches/mile or more, shall be corrected by grinding to meet the specification requirements above or shall be removed and replaced at no additional cost to the Government.

c. Bumps ("Must Grind" Areas). Any bumps ("must grind" areas) shown on the profilograph trace which exceed 0.4 inch in height shall be reduced by diamond grinding until they do not exceed 0.3 inch when retested. Such grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. The following will not be permitted: (1) skin patching for correcting low areas, (2) planing or milling for correcting high areas. At the Contractor's option, pavement areas, including ground areas, may be rechecked with the profilograph in order to record a lower Profile Index.

-- End of Section --

SECTION 07320

CLAY TILE ROOFING
07/02

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|-------------|---|
| ASTM B 370 | (1998) Copper Sheet and Strip for Building Construction |
| ASTM C 1167 | (1996) Clay Roof Tiles |
| ASTM C 1184 | (2000ae1) Structural Silicone Sealants |
| ASTM D 146 | (1997) Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing |
| ASTM D 226 | (1997a) Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing |
| ASTM D 412 | (1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension |
| ASTM D 2822 | (1991; R 1997e1) Asphalt Roof Cement |

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

| | |
|-----------------|--|
| NRCA R&W Manual | (2001, 5th Ed) NRCA Roofing and Waterproofing Manual (2 Vol) |
|-----------------|--|

SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

| | |
|---------------------|--|
| SMACNA Arch. Manual | (1993; Errata; Addenda Oct 1997; 4th Printing 1999) Architectural Sheet Metal Manual |
|---------------------|--|

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Snow Retention System; G-RE

Clay Tile Roofing Systems; G-RE

Drawings showing installation and appearance details, flashing details, and fastening details.

SD-03 Product Data

Snow Retention System; G-RE

Underlayment Membrane; G-RE

Manufacturer's catalog data and installation instructions.

Qualifications

Documentation showing qualifications of personnel proposed to perform the roofing work, and a listing identifying prior installations completed by the Contractor.

SD-04 Samples

Mortar;

Representative samples of final color range of fully cured mortar.

Sealants;

8 ounces of each type.

Underlayment Membrane;

1 by 1 foot section of each type.

Fasteners;

Representative samples of each fastener with identifying tags.

Snow Retention System;

One sample of each type proposed.

SD-07 Certificates

Materials;

Certificates of compliance attesting that the materials meet specification requirements.

1.3 QUALIFICATIONS

The Contractor shall provide qualified workers, trained and experienced in installing clay tile roofing systems of this configuration, and shall submit documentation of 5 consecutive years of work of this type. The Contractor shall be familiar with and shall perform work in accordance with NRCA R&W Manual. A list of installations shall be provided which identifies when, where, and for whom the installations were made.

1.4 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered in manufacturer's unopened bundles and containers with the manufacturer's brand and name marked clearly thereon. Roll goods shall be stored on end in an upright position. Contractor shall pick up the Government-furnished clay tile pieces at the Government storage area, transport the tile pieces using its own forces carefully so as to prevent breakage and store the tile pieces at the construction site.

1.5 PROJECT/SITE CONDITIONS

1.5.1 Material Storage

Materials shall not be stored on roof decks in such a manner as to overstress and/or damage the deck and supporting structure. Placing of loads at midspans of framing shall be avoided. Superimposed loads shall be well distributed.

1.5.2 Temporary Protection Materials

Materials shall be provided and maintained on the site at all times for temporary roofing, flashing, and other protection when delays and/or changed weather conditions do not permit completion of each unit of work prior to the end of each working day. Materials which have been used for temporary roofing, flashing and other protection shall be removed and discarded.

1.6 WARRANTY

1.6.1 Contractor's Warranty

The Contractor shall warrant for 5 years that the tile roofing system, as installed, is free from defects in workmanship. When repairs due to defective workmanship are required during the Contractor's warranty period, the Contractor shall make such repair within 72 hours of notification. When repairs are not performed within the specified time, emergency repairs performed by others will not void the warranty.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Existing Clay Tile

The Government will furnish intact and serviceable salvaged flat bar clay tiles. Nominal dimensions of the flat bar clay tile is 6-1/4 inches wide, 14-1/4 inches long, 1/2 inch thick.

2.1.1.1 Existing Clay Tile Fittings

The Government will furnish intact and serviceable salvaged clay tile fittings of the following type: ridge tile.

2.1.2 Underlayment Membrane

An underlayment membrane shall be furnished on surfaces to be covered with tile. Membrane shall consist of high strength composite self-adhering membrane.

2.1.2.1 Elastomeric Membrane Underlayment

Elastomeric membrane shall be a cold applied composite self-adhering membrane, minimum 0.004 inch thick, high strength polyethylene film with slip resistant embossing, coated on one side with a thick layer of adhesive-consistency rubberized asphalt, interwound with a disposable silicone coated release sheet. The tensile strength and elongation values shall be not less than 250 psi when tested in accordance with ASTM D 412 and pliability shall be unaffected when tested in accordance with ASTM D 146.

2.1.2.2 Elastomeric Membrane Accessories

Two component urethane, mastic and primer shall be as approved by the membrane manufacturer. Flashing, expansion joint covers, temporary UV protection and corner fillets shall be as recommended by the membrane manufacturer.

2.1.3 Fasteners

2.1.3.1 Nails

Nails shall be 11 gauge stainless steel ring shank nails with 5/16 inch head. Nails shall be of sufficient length to adequately penetrate the roof sheathing.

2.1.3.2 Miscellaneous Fasteners

Miscellaneous fasteners may include but are not limited to: tile attachment brackets, tile nails, twisted wire (tile-tie), deck anchor systems, and flashing cleats. Fasteners shall be made of stainless steel.

2.1.4 Flashing

Flashing shall be in accordance with the requirements as specified in Section 07600 SHEET METALWORK, GENERAL.

2.1.5 Plastic Cement

Plastic cement for ridges and other conditions shall be non-running, heavy body plastic cement composed of ingredients complying with ASTM D 2822.

2.1.6 Sealant

Sealant, when used in lieu of plastic cement, shall be silicone in accordance with ASTM C 1184.

2.1.7 Mortar

Mortar shall consist of 1 part portland cement to 3 parts damp plaster sand, and shall be colored to the nearest possible match with the color of the tile.

2.1.8 Plywood Substrate Panels

Plywood substrate panels shall conform to the requirements contained in Section 06100, ROUGH CARPENTRY.

2.1.9 Snow Retention System

Snow retention system shall consist of a 16 ounce copper hood and gusset and a 32 ounce copper hook. Install in rows as described on the Architectural Drawings. Spacing shall be as recommended by manufacturer.

Basis of Design Product:

No. 21 gusseted snow guard
Alpine snow guards
A Division of Vermont Slate and Copper Services, Inc.
P.O. Box 430
Stowe, VT 05672
(888) 766-4273

Manufacturers and materials specified are not intended to limit selection of equal projects from other manufacturers.

2.1.10 Wood Nailers

Wood nailers shall conform to the requirements contained in Section 06100, ROUGH CARPENTRY.

PART 3 EXECUTION

3.1 PROTECTION OF ROOF SURFACES

Equipment (such as padded ridge ladders) and techniques shall be used which prevent damage to roof as a result of foot or material traffic. Contractor shall be responsible for controlling breakage of new or existing tile beyond what is indicated. The progression of work shall be laid out and presented to the Contracting Officer to prevent other trades from working on or above completed roofing. Personnel who are working on the roof shall have proper shoes which will not further damage tiles and shoe soles shall be made of a material which will aid in preventing falls.

3.2 PREPARATION OF SURFACES

Roof deck surfaces shall be smooth, clean, firm, dry, and free from loose boards, large cracks, and projecting ends that might damage the roofing. Foreign particles shall be cleaned from all interlocking areas to ensure proper seating and to prevent water damming. Prior to installation of tile, vents and other projections through roofs shall be properly flashed and secured in position, and projecting fasteners shall be driven firmly home.

3.3 ELASTOMERIC MEMBRANE UNDERLAYMENT

3.3.1 Surface Preparation

Dust, dirt, loose fasteners or other protrusions shall be driven home or removed.

3.3.2 Temperature

Membrane shall be applied only in fair weather when air and surface temperatures are above 40 degrees F.

3.3.3 Membrane Application

Membrane shall be applied according to manufacturer's instructions.

Membrane shall be adhered directly to roof deck. Membrane shall be cut into 10 to 15 foot lengths and shall be re-rolled. The release paper shall be peeled back 1 to 2 feet and the membrane shall be aligned on the lower edge of the roof and the first 1 to 2 feet shall be placed. The release paper under the membrane shall be pulled and peeled from the membrane. The membrane shall be pressed in place. Lower edges shall be rolled firmly with a wallpaper or hand roller. Ends and edges shall be overlapped a minimum of 6 inches. Membrane shall not be folded onto an exposed face of the roof edge.

3.3.4 Valley and Ridge Application

The membrane shall be cut into 4 to 6 footlengths. The release paper shall be peeled and the sheet centered over the ridge, draped and pressed in place working from the center of the ridge outward in each direction. Sheets shall overlap a minimum of 6 inches.

3.3.5 Protection

Elastomeric membrane underlayment shall not be left permanently exposed to sunlight. Membrane shall be covered with exposed roofing materials as soon as possible. Membrane damaged due to exposure to sunlight shall be patched prior to the application of final roof covering.

3.4 METAL FLASHING

Metal flashing shall be provided at intersections of vertical or projecting surfaces through the roof or against which the roof abuts, such as walls, pipes, parapets, dormers, and sides of equipment curbs. Flashing installation shall be in accordance with Section 07600 FLASHING AND SHEET METAL.

3.5 CLAY ROOFING TILE (GENERAL)

3.5.1 High or Low Slope Pitches

Tiles shall be applied over indicated underlayment on solid decking as indicated and in accordance with NRCA R&W Manual.

3.5.2 Roof Decks and Fasteners

Tile shall be fastened to roof deck materials as follows:

| DECK | FASTENER |
|---------|---|
| Plywood | Slater's ring shank nail. Point shall just penetrate through underside of deck. |

Note: All fastening and flashing metals shall be of compatible material in order to avoid galvanic action.

3.5.3 Chalk Lines

Horizontal and vertical guide lines shall be chalked on the membrane to assure proper appearance. The chalk lines shall be spaced by measuring the provided tiles for average length and width exposures. An exposure length of 1/4 inch beyond the average shall not be exceeded.

3.6 FLAT SHINGLE TILE APPLICATION

3.6.1 Wood Strips

Wood nailers, nominal 2 inch wide and of proper height, shall be applied on ridges to carry ridge.

3.6.2 Tile Application

- a. Tiles shall be laid to straight lines parallel to ground level.
- b. Each tile shall be fastened with (2) two nails.
- c. Nails on tiles overlapping sheet metalwork shall not puncture the sheet metal. Tiles overlapping sheet metal shall be fastened with copper wire and plastic cement.
- d. Ridges shall be cemented and fastened with 2-1/2 inch stainless steel nails in laps and where they rest on roof tiles.
- e. Voids at ends of ridges shall be filled with mortar colored to nearest match of tile color.
- f. Tile in contact with cement mortar shall be immersed in water for at least 2 minutes before laying.
- g. When short course tiles are not otherwise specified for rafters which do not accommodate full courses, they shall be cut and drilled on job by roofer unless a plus or minus 1 inch adjustment of regular tile overhang at eave is sufficient.

3.7 CLEANING

Remove mortar, plastic cement and sealant spatter from exposed surfaces of tiles. Upon completion of work, remove all refuse by the work of this Section.

-- End of Section --

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SECTION 08411

SECURITY ALUMINUM WINDOWS AND DOORS

04/01

PART 1 GENERAL

1.1 REFERENCES

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 501.1 Standard Test Method for Metal Curtain Walls for Water Penetration Using Dynamic Pressure

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36 Standard Specification for Carbon Structural Steel

ASTM A 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 570 Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled

ASTM A 611 Standard Specification for Structural Steel (SS), Sheet, Carbon, Cold-Rolled

ASTM D 659 Method of Evaluating Degree of Chalking of Exterior

ASTM D 2244 Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

ASTM E 330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E 331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

1.2 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.3 SUMMARY

This section includes the following types of aluminum entrance and storefront work:

Exterior entrance doors, sidelights & transoms
Exterior Windows
Security Glass (Bullet & Blast Resistant)
Builders hardware for aluminum doors

1.4 SYSTEM PERFORMANCE REQUIREMENTS

1.4.1 General

***0001**

Provide bullet resistant aluminum window and door storefront assemblies that comply with performance characteristics specified, as demonstrated by testing the manufacturer's corresponding stock assemblies according to test methods indicated. ***0001**

1.4.2 Thermal Movement

***0001**

Design the bullet resistant aluminum entrance and storefront framing systems to provide for expansion and contraction of the component materials. Security bullet resistant glazed entrance doors shall function normally over the specified temperature range. ***0001**

The system shall be capable of withstanding a metal surface temperature range of 180 degrees F (100 degrees C) without buckling, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, stress on glass or other detrimental effects.

1.4.3 Design Requirements

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Provide bullet resistant aluminum entrance and storefront systems that comply with structural performance, air infiltration, and water penetration requirements when tested in accordance with AAMA 501 performance criteria. ***0001**

1.4.4 Wind Loads

Provide aluminum entrance and storefront assemblies capable of withstanding wind pressures of 20-psf inward and 20 psf outward acting normal to the plane of the wall.

1.4.5 Structural Performance

Conduct tests for structural performance in accordance with ASTM E 331 and AAMA 501.1. At the conclusion of the tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware or actuating mechanism. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.

1.4.6 Deflection Normal to the Plane of the Wall

Deflections shall not exceed 1/175 or 3/4 inch, whichever is less when subjected to structural performance by static pressure (ASTM E 330) for a positive and negative design wind load of 20 psf. The system shall not show any damage or failure when further subject to positive and negative loads of 30 psf to demonstrate a safety factor of 1.5 times design load.

1.4.7 Assembly Design

a. Provide gutters and weep system to collect and drain to the exterior water leakage and condensation. Glazing details shall permit glass replacement after initial construction, shall permit use reuse of original gaskets, shall permit replacement glass of the same nominal size as original glass, and shall not require cutting of framing members or removal of interior finishes. Vision glass in conventional frames shall be replaceable from the interior.

b. Interior window sill trim shall not deflect more than 0.125 inch (3.2 mm) when subjected to a concentrated force of 25 pounds (111 N) at any point. Residual deflection after removal of force shall not exceed 0.062 inch (1.6 mm).

c. Snap engaged components shall not disengage when subjected to a concentrated force of 10 pounds (44.5 N) at any point or during uniform pressure structural tests at pressures less than or equal to 1.5 times design pressures. Snap engaged components shall be secured against migration. Snap engaged components shall not serve any primary structural function, such as retention of glass or panels. Snap engaged plastic components are not permitted, except as nonstructural thermal improvement for interior trim. Joints in continuous snap covers and other continuous trim shall have splice sleeves of the same material and finish as the cover or trim.

d. Provide completely prefabricated, assembled and shop glazed unitized components to the field for shortest possible field erection time.

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1.4.8 Bullet Resistance Design

Aluminum framing shall meet the requirements of U.L. 752 for bullet resistance and shall be UL Listed as evidence of compliance.

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* Level 1 9 mm Automatic (3 shots/4" triangle)

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1.5 SUBMITTALS

Submit the following in accordance with Section 01330 "SUBMITTAL PROCEDURES".

SD-02 Shop Drawings

Doors; G-RE
 Windows; G-RE
 Glass; G-RE
 Accessories; G-RE
 Hardware Schedule; G-RE

Show elevations, construction details, metal gages, hardware provisions, method of glazing and installation details.

Schedule of Doors; G-RE
 Schedule of Windows; G-RE
 Schedule of Frames; G-RE

Submit door, window and frame locations.

SD-03 Product Data

- Doors; G-RE
- Windows; G-RE
- Frames; G-RE
- Glass; G-RE
- Accessories; G-RE
- Hardware Items; G-RE

Submit manufacturer's descriptive literature for doors, windows, frames, glass, and accessories. Include data and details on door construction, window construction, and internal reinforcement.

SD-06 Test Reports

- Doors; G-RE
- Windows; G-RE

1.6 HARDWARE SCHEDULE

Prepare and submit Hardware Schedule in the following form:

| Hard- ware Item | Quan- tity | Size | Reference | Mfr. | Key Con- trol Symbols | BHMA Finish Designa- tion |
|-----------------------|---------------|------|---------------------------------|-------------------------------|--------------------------------|------------------------------------|
| | | | Publi- cation Type No. | Name and Catalog No. | | |

1.7 TEST REPORTS

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Provide certified test reports from a qualified independent testing laboratory showing that bullet resistant aluminum entrance and storefront systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated. All materials used in performance of this project must comply with the requirements of UL 752 and be UL Listed Ballistic Level 1.

1.8 QUALITY ASSURANCE

1.8.1 Fabricator Qualifications

Provide bullet resistant aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and that have a record of successful in-service performance. The fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.

1.8.2 Single Source Responsibility

Obtain aluminum entrance and storefront systems from one source and from a

single manufacturer.

1.9 DELIVERY, STORAGE AND HANDLING

- a. Deliver bullet resistant aluminum entrance and storefront components in the manufacturer's original protective packaging.
- b. Store bullet resistant aluminum components in a clean, dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin, or polyethylene sheeting in a manner to permit circulation of air.
- c. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.10 PROJECT CONDITIONS

1.10.1 Field Measurements

- a. Check openings by accurate field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.
- b. Where necessary, proceed with fabrication without field measurements and coordinate fabrication tolerances to ensure proper fit.

1.11 WARRANTY

1.11.1 Warranty

Submit a written warranty, executed by the manufacturer, agreeing to repair or replace units that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:

- a. Structural failures including excessive deflection, excessive leakage or air infiltration.
- b. Faulty operation.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

1.11.2 Warranty Period

- a. One (1) year after the date of Substantial Completion.
- b. The warranty shall not deprive the Owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Available Manufacturers

Subject to compliance with requirements, manufacturers offering bullet resistant entrance and storefront systems that may be incorporated in the

work include, but are not limited to, the following:

- a. Norshield Security Products, Montgomery, AL 334/ 281-8440
- b. Insulgard Corporation, Hyattsville, MD
- c. Overly Manufacturing Company, Greenburg, PA
- d. Alu-Fab Corporation, Reed City, MI

2.2 MATERIALS

2.2.1 Aluminum Members

- a. All aluminum extrusions shall be extruded from 6063-T6 alloy or equal with aluminum tensile strength (minimum 35.0 ksi ultimate, 32.0 ksi yield).
- b. Carbon Steel reinforcement of aluminum framing members shall comply with ASTM A 36 for structural shapes, plates and bars, ASTM A 611 for cold rolled sheet and strip, or ASTM A 570 for hot rolled sheet and strip.

2.2.2 Security Glass

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- b. Bullet resistant glass shall be provided and factory installed by the system fabricator. The security glass unit shall be an insulated, low E, glass clad polycarbonate consisting of a 1/4" heat strengthened outer layer - 1/2" insulating space - 1 1/4" glass clad polycarbonate. Low E coating shall be applied to the #2 surface of the outboard ply and shall be similar in color and performance to Viracon VE1-40.

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- c. The security glass shall be warranted for 5 years against delamination, insulating seal failure, hazing or fogging of the air space and shall be UL listed for UL Level 1 bullet resistance where indicated.

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- d. Exterior glass components shall be insulated for weather ability. Security glass units of an air gap design will not be acceptable for use in an exterior application.

2.2.3 Setting Blocks

Setting blocks shall be dense extruded silicone or EPDM with a hardness of 85 +/- 5 durometer Shore A, a minimum length of 4 inches, and a minimum width corresponding to the glass thickness. Setting blocks shall be equidistant from the glass centerline. Location of setting blocks at glass quarter points is acceptable. The distance from the vertical glass edge to the nearest edge of the setting block shall not be less than six inches or 0.125 times glass width, whichever is greater.

2.2.4 Side Blocks

- a. Provide two side blocks minimum at both jambs at approximately the quarter points of the glass edge. Blocks shall be a 55 +/- 5 durometer Shore A dense silicone or EPDM. Install block with 0.125 inch (3.2 mm) clearance between block and bearing surface. Positively secure blocks in position. Side blocks may be omitted where glass is secured with structural silicone.

- b. Interior and exterior glazing gaskets shall be solid extruded

santoprene or EPDM.

2.2.5 Anchors in Concrete

Anchors embedded in concrete shall be prime painted or hot dip galvanized rolled steel, or hot dip galvanized cold formed steel, with integral projections or welded deformed bars or headed studs. Provide expansion bolts in concrete. Self drilling, self threading screws are not acceptable. Screws in plugs and power actuated fasteners are not acceptable.

2.2.6 Fasteners

- a. Fastener requirements listed below are applicable to screws, bolts, nuts, washers, rivets, and pins.
- b. Fasteners outboard of or within a glazing pocket, gutter, finished cavity or other potentially wet location (after completion of construction) shall be stainless steel type 302 or 304. Fasteners inboard of potentially wet locations shall be stainless steel type 302 or 304, cadmium plated carbon steel or zinc plated carbon steel.
- c. Provide lock washer or other locking device at all bolted connections.
- d. Powder actuated fasteners are not acceptable.
- e. Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with nonmagnetic stainless steel to receive screw threads.
- f. Do not use exposed fasteners except for application of hardware. For application of hardware, use Phillips flat head machine screws that match the finish of member or hardware being fastened.

2.2.7 Shims

- a. At connections subject to movement, separate all pairs of moving surfaces with friction reducing pads. Pads shall have minimum 0.125 inch thickness and shall be positively retained in position (open ended slots are not acceptable).
- b. Plastic shims are acceptable at static connections for which the shims transfer only compressive forces. Wood shims are not acceptable.

2.2.8 Sealants

- a. Acceptable products for nonstructural seals to substrates other than stone are: General Electric Sillpruf; Dow Corning 790 and 795; Tremco Spectrem 1 and 2. Acceptable products for nonstructural seals to stone are: General Electric Sillpruf; Dow Corning 790 and 795.
- b. Data sheets and samples may be submitted for consideration of other sealants, which are subject to approval. Oil base sealants are not acceptable.

2.2.9 Brackets and Reinforcements

Provide high strength nonmagnetic stainless steel brackets or hot-dip galvanized steel complying with ASTM A 123.

2.2.10 Concrete and Masonry Inserts

All internal fasteners shall be 300 Series stainless steel. Framing to building structure shall be grade 5, cadmium or nickel plated.

2.3 HARDWARE

a. Refer to Division 8 Section "Finish Hardware" for requirements for hardware items other than indicated to be provided by the bullet resistant aluminum entrance manufacturer.

b. Provide heavy duty hardware units as indicated, scheduled, or required for operation of each door as specified. Doors shall include the following hardware items in US26D/US28 finish:

- 1) Hager/Roton Heavy Duty Continuous Hinge HD-226
- 2) LCN 4041 Heavy Duty Closer x Parallel Arm
- 3) Adams Rite MS1850 Deadbolt with Cylinder both sides
- 4) Manufacturer's standard offset tubular pulls (no push bar required)
- 5) Manufacturer's standard weather-stripping

2.4 COMPONENTS

2.4.1 Security Storefront Framing System

Provide security storefront and entrance framing systems fabricated from extruded aluminum members of 2" x 5-1/2" minimum profile indicated. Include subframes and other reinforcing members of the type indicated. Shop fabricate and preassemble frame components.

2.4.2 Mullion Configurations

Provide pockets at the inside glazing face to receive specified glazing gaskets. Mullions and horizontals shall be preassembled into preglazed units. Make provisions to drain moisture accumulation to the exterior.

2.4.3 Exterior Door Frames

Provide security entrance door frame assemblies, as indicated, with welded or mechanical joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads.

2.4.4 Glazing

Provide hook-in extruded interior aluminum glazing stops, with exterior flanges anchored nonremovable.

2.4.5 Design

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Provide doors of design indicated and fully compatible with security storefront and entrance framing systems and manufactured to receive bullet resistant glazing specified. Door frames as well as glazing shall meet U.L. 752 Level 1 bullet resistance specified herein.

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2.4.6 Lights

Provide bullet resistant glazing openings as indicated, with specified moldings and stops. Provide nonremovable stops on the exterior.

2.5 FABRICATION

2.5.1 General

Fabricate security aluminum entrance and storefront components to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes and profile requirements are indicated on the drawings. Variable dimensions are indicated with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

2.5.2 Prefabrication

a. Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the project site. Disassemble components only as necessary for shipment and installation. Typical fixed modules shall be completely prefabricated, shop assembled and shop glazed.

b. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes. Preassemble framing into prefabricated units and shop glaze insofar as practicable.

c. Preglaze door and frame units to greatest extent possible. Typical fixed modules shall be shop glazed.

2.5.3 Welding

Comply with AWS recommendations. Grind exposed welds smooth to remove weld spatter and welding oxides. Restore mechanical finish. Welding behind finished surfaces shall be performed in such a manner as to minimize distortion and discoloration on the finished surface.

2.5.4 Dissimilar Metals

Separate dissimilar metals with bituminous paint, or a suitable sealant, or a nonabsorptive plastic or elastomeric tape, or a gasket between the surfaces. Do not use coatings containing lead.

2.5.5 Fasteners

Conceal fasteners wherever possible. Exposed fasteners shall not be allowed at typical frame conditions.

2.5.6 Weatherstripping

For exterior doors, provide compression weatherstripping against fixed stops. At other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold. All interior door and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.

2.6 PAINTED ALUMINUM FINISH

- a. Painted aluminum finish shall be factory oven cured two coat (minimum) finish based on Kynar 500 fluoropolymer resin as manufactured by Atochem North America, Inc. Comply with AAMA 605.2-90.
- b. The formulation shall have at least 70% Kynar 500 resin in the residual solids.
- c. Color shall match approved samples. Samples shall show extremes of color range.
- d. Fixed touchup of painted aluminum is permitted only with written permission from the Contracting Officer. Unless touchup is authorized, replace damaged material with new material.

2.6.1 Warranty

Color changes shall not exceed 5E NBS units as defined by ASTM D 2244 for the specified special warranty period. Chalking shall not exceed a number 8 rating for colors and a number 6 rating for whites as defined by ASTM D 659 for the specified special warranty period. Paint film shall not crack or peel during the specified special warranty period.

PART 3 EXECUTION

3.1 EXAMINATION

Examine substrates and supports, with the installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of aluminum entrances and storefronts. Correct unsatisfactory conditions before proceeding with the installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- a. Comply with manufacturer's instructions and recommendations for installation.
- b. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Install components in proper alignment and relation to established lines and grades indicated. Provide proper support and anchor securely in place.

3.2.1 Construction Tolerances

Install security aluminum entrance and storefront to comply with the following tolerances.

3.2.2 Variation from Plane

Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.

3.2.3 Offset from Alignment

The maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.

3.2.4 Diagonal Measurements

The maximum difference in diagonal measurements shall not exceed 1/8 inch.

3.2.5 Offset at Corners

- a. The maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.
- b. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- c. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.
- d. Paint dissimilar metals where drainage from them passes over aluminum.
- e. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.
- f. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant. Drill and tap frames and doors and apply surface mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
- g. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction.

3.3 ADJUSTING

Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.

3.4 CLEANING

- a. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.
- b. Clean glass surfaces after installation. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.5 PROTECTION

Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

-- End of Section --

SECTION 16520

EXTERIOR LIGHTING

02/03

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- IEEE C2 (2002) National Electrical Safety Code
(ANSI/IEEE)
- IEEE C136.10 (1996) Roadway Lighting Equipment -
Locking-Type Photocontrol Devices and
Mating Receptacle Physical and Electrical
Interchangeability and Testing

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- NEMA C78.1375 (1996) Electric Lamps - 400-Watt, M59
Single-Ended Metal-Halide Lamps
- NEMA C78.1377 (1996) Electric Lamps - 175-Watt, M57
Single-Ended Metal-Halide Lamps
- NEMA C78.1378 (1996) Electric Lamps - 250-Watt, M58
Single-Ended Metal-Halide Lamps
- NEMA C82.4 (2002) Ballasts for
High-Intensity-Discharge and Low-Pressure
Sodium Lamps (Multiple-Supply Type)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 (2002) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

- UL 773 (1995; R 2002, Bul. 2001, 2002) Plug-In,
Locking Type Photocontrols for Use with
Area Lighting
- UL 773A (1995; R 1999) Nonindustrial Photoelectric
Switches for Lighting Control
- UL 1029 (1994; R 2001) High-Intensity-Discharge
Lamp Ballasts
- UL 1598 (2000; Bul. 2001 and 2002) Luminaires

1.2 RELATED REQUIREMENTS

Section 16050, "Basic Electrical Materials and Methods," applies to this section, with the additions and modifications specified herein.

1.3 DEFINITIONS

1.3.1 Average Life

Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

1.3.2 Groundline Section

That portion between one foot above and 2 feet below the groundline.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Luminaire drawings; G, RE

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SD-03 Product Data

Luminaires; G, RE

Lamps; G, RE

Ballasts; G, RE

Photocell switch; G, RE

SD-06 Test Reports

Test Data for luminaires; G, RE

Operating test

Submit operating test results as stated in paragraph entitled "Field Quality Control."

1.5 QUALITY ASSURANCE

1.5.1 Drawing Requirements

1.5.1.1 Luminaire Drawings

Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and computerized candlepower distribution data shall accompany shop drawings.

PART 2 PRODUCTS

2.1 PRODUCT COORDINATION

Products and materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 16415, "ELECTRICAL WORK, INTERIOR."

2.2 LUMINAIRES

UL 1598. Provide luminaires as indicated. Provide luminaires complete with lamps of number, type, and wattage indicated. Details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs, light distribution and brightness characteristics, and of equal finish and quality will be acceptable as approved.

2.2.1 Lamps

2.2.1.1 Metal-Halide Lamps

Provide luminaires with tempered glass lens.

- a. 175 watt conforming to NEMA C78.1377.
- b. 250 watt conforming to NEMA C78.1378.
- c. 400 watt conforming to NEMA C78.1375.

2.2.2 Ballasts for High-Intensity-Discharge (HID) Luminaires

UL 1029 and NEMA C82.4, and shall be constant wattage autotransformer (CWA) or regulator, high power-factor type. Provide single-lamp ballasts which shall have a minimum starting temperature of minus 30 degrees C. Ballasts shall be:

- a. Designed to operate on voltage system to which they are connected.
- b. Constructed so that open circuit operation will not reduce the average life.

HID ballasts shall have a solid-state igniter/starter with an average life in the pulsing mode of 10,000 hours at the intended ambient temperature. Igniter case temperature shall not exceed 90 degrees C.

2.3 PHOTOCCELL SWITCH

UL 773 or UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell rated 120 volts ac, 60 Hz with single pole double-throw (spdt) contacts for mechanically held contactors rated 1000 watts designed to fail to the ON position. Switch shall turn on at or below 3 footcandles and off at 4 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition. Provide switch:

- a. In a high-impact-resistant, noncorroding and nonconductive molded plastic housing with a threaded pipe fitting and conforming to IEEE

C136.10 and rated 1800 VA, minimum.

PART 3 EXECUTION

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3.1 GROUNDING

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Ground noncurrent-carrying parts of equipment including luminaires, mounting arms, and metallic enclosures as specified in Section 16375, "ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND." Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

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3.2 FIELD QUALITY CONTROL

Upon completion of installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

-- End of Section --