CONSTRUCTION FOR THE LEVEE ROAD DEPRESSION UNDER TORNILLO GUADALUPE INTERNATIONAL BRIDGE

THE COUNTY OF EL PASO
TEXAS

STATE OF TEXAS
SIDNEY A. MIELKE
60799
REGISTERED PROFESSIONAL ENGINEER

Sidney A. Mielke
06/18/18

STRUCTURAL ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS

TBPE Firm No. F-199

Revision 1 - June 18, 2018

TECHNICAL SPECIFICATIONS
DIVISION 00
PROCUREMENT AND CONTRACTING REQUIREMENTS

This page intentionally left blank for double sided printing.

00.01.01
PROJECT TITLE

The title of this project is as follows:

CONSTRUCTION FOR THE
LEVEE ROAD DEPRESSION UNDER
TORNILLO GUADALUPE INTERNATIONAL BRIDGE
El Paso County, Texas

--End of Section—

This page intentionally left blank for double sided printing.

00.01.10
TABLE OF CONTENTS

DIVISIONS AND SECTIONS

Division 35-Waterway Construction

Technical Specification Tables

Technical Specification Figures

--End of Section—

00.01.15
LIST OF CONTRACT DRAWINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.3 DRAWING TITLES

A. The Contract Drawings applicable to this Contract are titled:

PLANS FOR THE LEVEE ROAD DEPRESSION UNDER
TORNILLO-GUADALUPE INTERNATIONAL BRIDGE
El Paso County, Texas

1.4 DRAWING INDEX

A. An index of drawings is identified on the drawing title sheet and includes the following:

Table 1 - Index of Drawings

SHEET NO.	SHEET TITLE
S-1	COVER SHEET
S-2	GENERAL NOTES
S-3	OVERALL PLAN & PROFILE
S-4	TYPICAL SECTIONS & DETAILS
S-5	LEVEE ROAD CROSS SECTIONS
S-6	LEVEE ROAD CROSS SECTIONS
S-7	LEVEE ROAD CROSS SECTIONS
S-8	STORM WATER POLLUTION PREVENTION PLAN

SHEET NO.	SHEET TITLE
S-9	TEMP. SEDIMENT CONTROL FENCE & BALED HAY
S-10	TEMP. SEDIMENT CONTROL CONSTRUCTION EXITS
S-11	EPIC
S-12	TEMPORARY BORDER FENCE FOUNDATION DETAILS
S-13	RIPRAP DETAILS
S-14	CONSTRUCTION JOINT & WATERPROOFING DETAILS

1.5 ADDITIONAL OR REVISED DRAWINGS

A. Except as provided in these specifications for drawings to be furnished by Contractor, Contract Drawings will be supplemented by additional or revised general and detail drawings as necessary or desirable as work progresses.

B. Additional or revised general and detail drawings will show dimensions and details necessary for construction purposes more completely than are shown on these Contract Drawings for features of work.

C. Perform work in accordance with additional general and detail drawings or revisions at applicable prices bid in schedule for such work.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section--

00.31.19
EXISTING CONDITION INFORMATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 00.31.32-Geotechnical Data

1.3 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.4 GENERAL

A. Reports on the Existing Condition Information

1. None

B. Geotechnical investigations were performed as noted in Section 00.31.32.

1.5 EXISTING STRUCTURES

LEVEE ROAD
TORNILLO-GUADALUPE INTERNATIONAL BRIDGE
TEMPORARY BORDER FENCE FOUNDATIONS

1.6 EXISTING UTILITIES

None.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

--End of Section--

SPECIFICATION 00.31.21
SURVEY INFORMATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 02.02.00-Existing Conditions & Facilities

1.3 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.4 EXISTING INFORMATION

N/A

1.5 FIELD SURVEY

A. Field survey was performed December 2014, by FXSA, Inc. who developed and provided the following, which were used as the basis of design.

1. Cross sections survey on new international bridge location.

1.6 SURVEY CONTROL

A. The surveyor established horizontal and vertical controls based on Texas State Plane Coordinate System, Central Zone, North American Datum of 1983 (NAD 83) in US Survey Feet, and North American Vertical Datum of 1988 (NAVD 88) in US Survey Feet.

B. The survey was based on existing monument established by NGS. Vertical First Order, Class II. Designated P 1073. Elevation 3583.88 feet.

1.7 EXISTING SURVEY MARKERS

The surveyor surveyed and located existing levee station survey markers.

1.8 RIGHT OF WAY (ROW)

The project is within the USIBWC ROW. Information provided from the USIBWC indicates that the ROW is approximately 100 feet north of the levee centerline and approximately 250 feet south of the levee centerline.

1.9 TOPOGRAPHIC SURVEY

The surveyor performed a cross sections at every 50', 300' east and west from centerline of new bridge and 250' from centerline levee to the edge of the river. The final topographic mappings, including a 3-dimensional surface, were provided in an Auto-CAD file, survey point and a surface TIN file.

1.10 EXISTING UTILITY SURVEY

A. The surveyors surveyed and obtained x & y coordinates and elevations of existing surface features of visible structures and utilities, including, but not limited to, fences, levee, and bent columns.

1. **NOTE:** It is the Contractor's responsibility to verify locations of all existing utilities (shown and not shown) prior to construction.
2. Additionally, attention is called to Sections 02.02.00 for additional requirements and guidelines for existing utility survey.

1.11 GEOTECHNICAL BORINGS SURVEY

NONE WAS PROVIDED

1.12 SURVEY CONTROL MAPS

NONE WAS PROVIDED

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

00.31.24
ENVIRONMENTAL INFORMATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 REFERENCE STANDARDS

A. United States Code (USC)

1. Clean Air Act, 42 USC §7401 et seq.
2. Clean Water Act (CWA), 33 USC §1251 et seq.
3. Fish and Wildlife Act of 1956, 16 USC §742a 742j
4. Migratory Bird Treaty Act (MBTA), 16 USC §§703 - 712
5. National Environmental Policy Act (NEPA), 42 USC §§4321-4347
6. National Historic Preservation Act (NHPA), 16 USC §470 et seq.
7. National Wildlife Refuge System Improvement Act of 1997, 16 USC §668dd
8. Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC §3001 et. seq.
9. Refuge Recreation Act, 16 USC §§460k - 460k-4

1.3 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.4 GENERAL

A. The Project's Environmental Assessment (EA) was prepared for U.S. Department of State in 2001. A Finding of No Significant Impact was issued by the U.S. Department of State on December 15, 2004.

B. These documents list environmentally and culturally sensitive areas that need to be protected from any disturbances of construction activities. The environmentally and culturally sensitive areas that were identified on the document are identified below.

1. Environmentally Sensitive Areas
   a. None.
2. Culturally Sensitive Areas
   a. None.
3. Biological Resources
   a. Work should be scheduled to occur outside of the bird breeding season whenever possible. The breeding and nesting season is from March 1 through August 31. If work continues into the bird breeding season, the areas proposed for disturbance will be surveyed in order to avoid the inadvertent destruction of nests and eggs.
4. Natural Resources
   a. Equipment cannot be parked, staged, or used under large, mature trees. Keeping equipment away from the large, mature trees will prevent incidental damage to the tree and prevent compression of the root ball.

1.5 PRESERVATION OF CULTURAL AND NATURAL RESOURCES AND THE ENVIRONMENT

A. If the Contractor initiates changes to the Contract and the County of El Paso approves the changes, the Contractor is responsible for obtaining clearances and coordinating with the appropriate regulatory agencies.

B. Culturally Sensitive Areas

1. If a site, building, or location of historical, archeological, educational, or scientific interest is discovered within the right of way, cease all work immediately, secure the site from further disturbance and possible vandalism, and notify the County of El Paso. The site, building, or location will be investigated and evaluated by the County of El Paso.

1.6 OTHER CONSIDERATIONS

The Contractor is required to ensure that all Environmental Permits, Issues, and Comments (EPIC), which are included within the Contract Documents are followed and implemented to ensure potential impacts are avoided.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

00.31.26
EXISTING HAZARDOUS MATERIAL INFORMATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.3 GENERAL

Based on the environmental report(s), identified in Section 00.31.24, there are no hazardous material or waste storage, disposal sites, or spill sites, identified within the immediate Project area.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

00.31.32
GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.3 GEOTECHNICAL REPORTS

A. No geotechnical analysis was performed specifically for this project. For this project, the County of El Paso has accepted the general geotechnical report performed by for the bridge performed by Licon Engineering entitled, "*Geotechnical Engineering Study Tornillo/Guadalupe International Bridge, El Paso, TX,*" dated April 9, 2003.

B. No design assumptions were made in the geotechnical information in regards to this project.

C. The data and report are not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured. The County of El Paso neither warrants or guarantees the results of any geotechnical or subsurface investigations as being representative of the site, beyond the actual location of the test specimen(s) nor assumes any responsibility for the manner in which this information may be used or the conclusions reached in utilizing the information contained in the Contract documents. Additional test borings and other exploratory operations may be made by Contractor subsequent to award of the Contract.

D. The Contractor shall consider all geotechnical information including geotechnical reports, bore logs, and site visits as a whole. The Contractor shall consider the limitations of any geotechnical tests performed including the auger size, bore hole spacing and location, consistency of bore hole data, as well as the frequency and results of testing. The County of El Paso will not be responsible for interpretations or conclusions drawn there by the Contractor.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

--End of Section--

00.31.43
PERMIT APPLICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 REFERENCE STANDARDS

A. Texas Commission on Environmental Quality (TCEQ)

1. Texas Pollution Discharge Elimination System (TPDES)
2. TPDES Construction General Permit TXR150000

B. U.S. Army Corps of Engineers (USACE)

1. Section 404 of Clean Water Act, 33 USC §1251 et seq.

1.3 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.4 GENERAL

Prior to the beginning of construction, the Contractor shall be responsible for researching, coordinating, obtaining, and paying all applicable fees for all permits required by Federal, state and local entities, including, but not limited to, a specific or general stormwater permit prepared in accordance with the requirements of Stormwater Pollution Prevention Plan (SWPPP) and Texas Pollution Discharge Elimination System (TPDES) General Permit TXR150000.

1.5 WORK IN WATERS OF THE UNITED STATES

A. The Contractor is required to restore any area of the floodplain within the currently defined Temporary Construction Limits (TCL) disturbed by construction operations to preconstruction conditions including removal of any stockpiles, construction materials,

and debris. Under these conditions, the U.S. Army Corps of Engineers (USACE) has determined that a Section 404 permit will not be required and there is no requirement to comply with any Nationwide Permit for work within the currently defined TCL.

B. The Contractor must adhere to all agreements, mitigation plans, and standard best management practices required by these permits.

C. If Contractor-initiated changes in the construction method result in impacts to waters of the U.S., the Contractor shall have sole responsibility to obtain all required new or revised Section 404 permit and shall adhere to all agreements, mitigation plans, and standard best management practices required by these permits.

1.6 RESPONSIBILITIES

A. The Contractor shall be responsible for providing the proposed location of the project staging areas prior to installation of stormwater pollution prevention (SWPP) measures.

B. Borrow pits and other offsite locations are subject to local regulations. The Contractor is responsible for researching and obtaining all necessary permits for offsite work.

C. The Contractor shall be responsible for obtaining all necessary permits and rights of entry for all work required under this Contract.

1. The construction site is located in Texas, but due to its proximity to the State of New Mexico, the Contractor is reminded that any borrow areas, disposal, or hauling within New Mexico shall be in compliance with the laws of that state.

D. The Contractor will also be required to research the need for any other required permits, based on the information available from the Contract Drawings and Technical Specifications prior to the beginning of construction. For the work under this Contract, the Contractor shall be responsible for coordinating and obtaining all permits required by Federal, state, and local entities, unless otherwise specified within the Contract Provisions and these Technical Specifications.

E. The Contractor shall apply and pay for all required permits. The County of El Paso is not responsible for any existing or newly introduced permits required before, during and/or after construction.

F. The Contractor shall be responsible for and shall give and maintain any and all notices required by applicable regulations, laws, or permitting authorities pertaining to construction of this project.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

00.31.50
OTHER PROJECT INFORMATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.3 GENERAL

Contact information for:

The County of El Paso
El Paso County Public Works Department
Fernando Hernandez, P.E.
800 E Overland Suite 407
El Paso, TX 79901
Tel. (915) 546-2015
Fax (915) 546-8194

--End of Section—

This page intentionally left blank for double sided printing.

00.73.63
SECURITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 01.33.00-Submittal Procedures

1.3 SUBMITTALS

A. Submittals shall be transmitted by the Contractor in accordance with the requirements of Section 01.33.00-Submittal Procedures. The Contractor shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Worker's name, social security number, and copy of Government identification card for vetting.

1.4 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.5 GENERAL

The project site may be exposed to vandalism and theft. The Contractor shall be responsible for providing adequate security of the project site in order to prevent vandalism and theft.

1.6 SECURITY

A. The Contractor is responsible for securing the work site, equipment, and materials from vandalism and theft.

B. The Contractor shall implement a security program that:

1. Protects the work, the existing premises, and the County of El Paso's operations from theft, vandalism and unauthorized entry.
2. Initiates a security program in coordination with the County of El Paso's existing security system at mobilization.
3. Maintains the security program throughout construction duration until Contract Closeout.

C. The Contractor shall implement entry control to the work area that:

1. Restricts entry of non-County persons and vehicles into the work area and existing facilities, unless otherwise compliance confirmed by the County of El Paso.
2. Allows entry only to authorized persons with proper identification.

D. The County of El Paso shall not be responsible for the security of any items within the work area and associated PSLs.

1.7 INSURANCE

A. When not required by the Contract clauses, the Contractor has the right to purchase coverage for property insurance, builder's risk insurance (including perils of wind, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure), and/or flood insurance or to be self-insured for these exposures.

B. The Contractor shall be held liable for all costs associated with losses, deductibles, and self-insurance for coverages not required by the Contract clauses.

1. Loses shall include architects' and engineers' fees that may be necessary to provide drawings and specifications for the repair and/or replacement of damaged property.
2. Loses shall include appropriate supervision and quality control of all work for the repair and/or replacement of damaged property.

C. Any insurance policies purchased for work or property related to this Contract for coverages not required by the Contract clauses shall list the County of El Paso as an additional insured.

1.8 DEPARTMENT OF HOMELAND SECURITY

A. In any event the staff of the U.S. Department of Homeland Security (also known as U.S. Customs and Border Protection (CBP)) alerts and directs any field crews to stop work for any security reasons in the area, the Contractor shall consider this as top priority and fully cooperate with the directions of DHS at all times until the security alert is cleared by the DHS. In addition the Contractor shall contact and coordinate with the County of El Paso for any additional steps to be taken during and after the security alert from the DHS is cleared.

B. Access to the site is controlled by Border Patrol. All site work is anticipated to take place on the south side of the DHS border fence. Gates through the border fence are located at both ends of the project site. Access through the border fence must be coordinated with Border Patrol.

C. The Contractor shall provide a list of all workers' names, their social security number, and a copy of a Government issued identification card to the County of El Paso. This list shall be provided at least three (3) days prior to the workers arriving onsite. Border Patrol and/or the County of El Paso will run background checks on all employees working onsite.

1. The Contractor shall provide updates whenever employees are added or deleted from the work crews.
2. Employees must pass the background checks/vetting to be allowed to work onsite.
   a. Workers with felony convictions, issues with their immigration paperwork, or outstanding warrants are precluded from working onsite.

D. The Contractor shall ensure that all employees working onsite are identifiable with a project identification card, a special hard hat color, a significantly colored piece of clothing, or another method agreeable to Border Patrol.

E. All on-road vehicles shall have the name of the construction company/Contractor clearly displayed on the side of the vehicle.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section—

This page intentionally left blank for double sided printing.

TECHNICAL SPECIFICATIONS
DIVISION 01
GENERAL REQUIREMENTS

This page intentionally left blank for double sided printing.

01.42.00
REFERENCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.3 APPLICATION OF INDUSTRY STANDARDS

A. Applicability of Standards
In the event of a conflict between the referenced standard and these Contract documents, the provisions of the Contract documents shall apply. When a reference standard is specified, comply with the requirements and recommendations stated in the standard, except when they are modified by the Contract documents, or when applicable laws, ordinances, rules, regulations or codes establish stricter standards.

B. Copies of Standards
Copies of applicable standards are not bound with the Contract documents. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from publication source.

1.4 SOURCES FOR STANDARDS AND REFERENCES

A. Referenced industry standards are cited in other Sections of the Contract documents and the following may not include all referenced standards organizations within the Contract documents. This does not relieve the Contractor of the responsibility of performing the work in accordance with all terms of the Technical Specifications and Contract

provisions herein. Contractors may contact the referenced organizations to obtain copies of references and standards.

1. American Association of State Highway and Transportation Officials (AASHTO)
   444 North Capital Street, NW, Suite 249, Washington, DC 20001
   Ph: 202-624-5800; Fax: 202-624-5806; internet: http://www.aashto.org

2. AASHTO Materials Reference Laboratory (AMRL)
   4441 Buckeystown Pike, Suite A, Frederick, MD 21704
   Ph: 240-436-4900; Fax: 240-436-4899; internet: http://www.amrl.net

3. The American Association for Laboratory Accreditation (A2LA)
   5301 Buckeystown Pike, Suite 350, Frederick, MD 21704
   Ph: 301 644 3248; Fax: 301 662 2974; internet: http://www.a2la.org

4. American Concrete Institute (ACI)
   P.O. Box 9094, Farmington Hills, MI 48333
   Ph: 248-848-3700; Fax: 248-848-3801; internet: http://www.aci-int.org

5. American Forest & Paper Association (AF&PA)
   1101 K. Street NW, Ste 700, Washington, DC 20005
   Ph: 202-463-2700; internet: http://www.afandpa.org/

6. American Institute of Steel Construction (AISC)
   One East Wacker Drive, Suite 3100, Chicago, IL 60601-2001
   Ph: 312-670-2400/800-644-2400; Fax: 312-670-5403; internet: http://www.aisc.org

7. American Institute of Timber Construction (AITC)
   Ph: 503-639-0651; Fax: 503-684-8928; internet: http://www.aitc-glulam.org/

8. American Iron and Steel Institute (AISI)
   25 Massachusetts Ave. NW, Ste 800, Washington, DC 20001
   Ph: (202) 452-7100; internet http://www.steel.org/

9. American National Standards Institute (ANSI)
   11 West 42nd Street, New York, NY 10036
   Ph: 212-642-4900; Fax: 212-398-0023; internet: http://www.ansi.org

10. American Petroleum Institute (API)
    1220 L Street NW, Washington, DC 20005-4070
    Ph: 202-682-8000; internet: http://api.org

11. American Society for Nondestructive Testing (ASNT)
    PO Box 28518, 1711 Arlingate Lane, Columbus, OH 43228-0518
    Ph: 800-222-2768; Fax: 614-274-6899; internet: http://asnt.org

12. American Society of Civil Engineers (ASCE)
    1801 Alexander Bell Drive, Reston, Virginia 20191-4400
    Ph: 800-548-2723; Fax: 703-295-6222; internet: http://www.asce.org

13. American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
1791 Tullie Circle NE, Atlanta, GA 30329
Ph: 404-636-8400; Fax: 404-321-5478; internet: https://www.ashrae.org/

14. American Society of Mechanical Engineers (ASME)
345 East 47th Street, New York, NY 10017
Ph: 212-705-7722; Fax: 212-705-7739; internet: http://www.asme.org

15. American Society of Safety Engineers (ASSE)
1800 E Oakton St., Des Plaines, IL 60018
Ph: 847-699-2929; Fax: 847-768-3434; internet: http://www.asse.org

16. American Water Works Association (AWWA)
6666 West Quincy Avenue, Denver, CO 80235
Ph: 303-794-7711; Fax: 303-794-7310; internet: http://www.awwa.org

17. American Welding Society, Inc. (AWS)
550 NW Le Jeune Road, Miami, FL 33126
Ph: 305-443-9353, 800-334-9353; Fax: 305-443-7559; internet: http://www.amweld.org

18. American Wood Council (AWC)
222 Catoctin Circle SW, Ste 201, Leesburg, VA 20175
Ph: 202-463-2766; Fax: 202-463-2791; internet: http://awc.org/

19. APA - The Engineered Wood Association
7011 S. 19th Street, Tacoma, WA 98466
Ph: 253-565-6600; Fax: 253-565-7265; internet: http://www.apawood.org/

20. Arizona Department of Environmental Quality (ADEQ)
1110 W Washington St, Phoenix, AZ 85007
Ph: 602-771-2300; internet: www.azdeq.gov

21. ASTM International (ASTM)
100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
Ph: 610-832-9585; Fax: 610-832-9555; internet: http://www.astm.org

22. California Environmental Protection Agency (CalEPA)
1001 I Street, PO Box 2815, Sacramento, CA 95812
Ph: 916-323-2514; internet: www.calepa.ca.gov

23. Center for Construction Research and Training, The
8484 Georgia Venue, Ste 1000, Silver Spring, MD 20910
Ph: 301-578-8500; Fax: 301-578-8572; internet: http://www.elcosh.org

24. Code of Federal Regulations (CFR)
Superintendent of Documents, P.0. Box 371954, Pittsburg, PA 15250-7954
Ph: 202-512-1800; Fax: 202-512-2250; internet: http://www.gpo.gov/fdsys/

25. Composite Panel Association (CPA)
19465 Deerfield Avenue, Ste 306, Leesburg, VA 20176
Ph: 703-724-1128; Fax: 703-724-1588; internet: http://compositepanel.org/

26. Environmental Protection Agency (EPA)
Public Information Center
401 "M" Street, SW, Washington, DC 20460
Ph: 202-260-7751 / 800-490-9198; Fax: 202-260-6257; internet: http://www.epa.gov

27. Federal Acquisition Regulation (FAR)
Internet: http://www.acquisition.gov

28. Federal Geographic Data Committee
590 National Center, Reston, VA 20192
Ph: 703-648-5752; Fax: 703-648-5755; internet: http://www.fgdc.gov/

29. Federal Highway Administration (FHWA)
Office of Highway Safety (HHS-31).
400 Seventh St., SW, Washington, DC 20590-0001
Ph: 202-366-0411; Fax: 202-366-2249
Order from: Government Printing Office (GPO), Superintendent of Documents
Washington, DC 20402; Ph: 202-783-3238

30. Federal Sections (FS)
DLA Document Services
Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094
Ph: 215-697-6396; internet: http://quicksearch.dla.mil

31. General Services Administration (GSA)
Ph: 202-619-8968; internet: http://www.gsa.gov

32. Illuminating Engineering Society of North America (IESNA)
120 Wall Street, New York, NY
Internet: http://www.ies.org

33. Infrastructure Health & Safety Association
21 Voyager Court South, Etobicoke, Ontario, Canada M9W 5M7
Ph: 800-263-5024; Fax: 905-625-8998; internet: www.ihsa.ca

34. International Accreditation Service
5360 Workman Mill Road, Whittier, CA 90601
Ph: 562-364-8201; Fax: 562-699-8031; internet: http://iasonline.org

35. International Code Council (ICC)
500 New Jersey Ave, NW, 6th Floor, Washington, DC 20001
Ph: 800-786-4452; internet: http://www.iccsafe.org

36. International Dark-Sky Association (IDA)
3223 N 1st Avenue, Tucson, AZ 85719
Ph: 520-293-3198; Fax: 520-293-3192; internet: http://darksky.org/

37. International Safety Equipment Association (ISEA)
1901 North Moore Street, Arlington, VA 22209
Ph: 703-525-1695; Fax: 703-528-2148; internet: http://www.safetyequipment.org

38. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS)
127 Park Street, NE, Vienna, VA 22180-4602
Ph: 703-281-6613; Fax: 703-281-6671; internet: http://www.cssinfo.corn

39. Master Painter's Institute (MPI)
2800 Ingleton Ave., Burnaby BC V5C 6G7 Canada
Ph: 604-298-7578; Fax: 604-298-7571; internet: http://paintinfo.com

40. National Association of Architectural Metal Manufacturers (NAAMM)
800 Roosevelt Road, Bldg. C, Ste 321, Glen Ellyn, IL 60137
Ph: 630-942-6591; Fax: 630-790-3095; internet: http://naamm.org

41. National Electrical Manufacturers Association (NEMA)
1300 N 17th Street, Ste 1752, Rosslyn, VA 22209
Ph: 703-841-3200; Fax: 703-841-5900; internet: http://www.nema.org

42. National Fire Protection Association (NFPA)
1 Batteryrnarch Park, Quincy, MA 02269-9101
Ph: 617-770-3000; Fax: 617-770-0700; internet: http://www.nfpa.org

43. National Institute for Occupational Safety and Health (NIOSH)
395 E Street, SW, Ste 9200, Patriots Plaza Building, Washington, DC 20201
Ph: 800-232-4636; internet: http://www.cdc.gov/niosh

44. National Institute for Standards and Technology (NIST)
100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899
Ph: 301-975-6478; internet: http://www.nist.gov/index.html

45. New Mexico Department of Game and Fish
1 Wildlife Way, Santa Fe, NM 87507
Ph: 505-476-8000; internet: http://www.wildlife.state.nm.us/contact/index.htm

46. New Mexico Department of Transportation (NMDOT)
1120 Cerrillos Road, Santa Fe, NM 87504-1149
Ph: 505-827-5100; Fax: 505-827-5469; internet:
http://www.dot.state.nm.us/content/nmdot/en.html

47. New Mexico Energy, Minerals and Natural Resources Department (EMNRD)
1220 South St. Francis Drive, Santa Fe, NM 87505
Ph: 505-476-3200; Fax: 505-476-3220; internet: http://www.emnrd.state.nm.us

48. New Mexico Environment Department (NMED)
1190 St. Francis Drive, Suite N4050 Santa Fe, New Mexico 87505
Ph: 800-219-6157 or 505-827-2855; internet: http://www.nmenv.state.nm.us

49. New Mexico Historic Preservation Division (NMHPD)
407 Galisteo Street, Suite 236, Santa Fe, NM 87501
Ph: 505-827-6320; internet: http://www.nmhistoricpreservation.org

50. New Mexico Office of the State Enginer (NMOSE)
1680 Hickory Loop, Ste J, Las Cruces, NM 88005
Ph: 575-524-6161; internet: http://www.osa.state.nm.us

51. North American Proficiency Testing Program for Soil, Plant, & Water Analysis Laboratories (NAPT)
5585 Guilford Rd., Madison, WI 53711-5801
Ph: 608-268-4972; Fax: 608-273-2021; internet: http://www.naptprogram.org

52. Occupational Safety & Health Administration (OSHA)
200 Constitution Ave., Washington, DC 20210
Ph: 800-321-6742; internet: http://www.osha.gov

53. Petroleum Equipment Institute (PEI)
PO Box 2380, Tulsa, OK 74101
Ph: 918-494-9696; Fax: 918-491-9895; internet: http://pei.org/

54. Research Council on Structural Connections (RCSC)
internet: http://boltcouncil.org

55. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
4201 Lafayette Center Drive, Chantilly, VA 20151
Ph: 703-803-2980; Fax: 703-803-3732; internet: https://www.smacna.org/

56. Steel Structures Painting Council (SSPC)
40 24th Street, Pittsburg, PA 15222
Ph: 412-281-2331; Fax: 412-281-9992; internet: http://www.sspc.org

57. Telecommunications Industry Association (TIA)
1320 N Courthouse Rd, Ste. 200, Arlington, VA 22201
Ph: 703-907-7700; Fax: 703-907-7727; internet: http://www.tiaonline.org/

58. Texas Commission on Environmental Quality (TCEQ)
PO Box 13087, Austin, TX 78711-3087
Ph: 512-239-1000; internet http://www.tceq.texas.gov

59. Texas Department of Transportation (TxDOT)
125 East 11th Street, Austin, TX 78701-2483
Ph: 512.416.2576; Fax: 512.416.2599; internet: http://www.dot.state.tx.us

60. Texas Historical Commission (THC)
P.O. Box 12276, Austin, TX 78711-2276
Ph: 512-463-6100; internet: http://www.thc.state.tx.us

61. Texas Parks and Wildlife Department (TPWD)
4200 Smith School Road, Austin, TX 78744
Ph: (800) 792-1112; internet: http://tpwd.state.tx.us

62. The NELAC Institute (TNI)
PO Box 2439, Weatherford, TX 76086
Ph: 817-598-1624; Fax: 817-423-6777; internet: http://www.nelac-institute.org

63. UL, LLC
801 Klein Rd, Ste 200, Plano, TX
Ph: 877-854-3577; internet: http://ul.com/
UL Listed products can be searched at no cost at http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm

64. United States Army Corps of Engineers (USACE)
ATTN: Technical Report Distribution Section, Services Branch, TIC
3909 Halls Ferry Road, Vicksburg, MS 39180-6199
Ph: 601-634-2355; Fax: 601-634-2542

65. United States Code (USC)
Government Printing Office (GPO)
732 North Capitol Street, NW, Washington, DC 20401
Ph: 202-512-1800; internet: http://www.gpo.gov/fdsys/

66. US Department Of Commerce Product Standards (PS)
Superintendent of Documents.
P.0. Box 371954, Pittsburg, PA 15250-7954
Ph: 202-512-1800; Fax: 202-512-2250; internet: http://www.access.gpo.gov/su_docs

67. US Fish and Wildlife Service (FWS)
P.O. Box 1306, Albuquerque, NM 87103-1306
Ph: 505-248-6911; internet: http://www.fws.gov/southwest/

68. United States Green Building Council (USGBC)
2101 L. Street NW, Ste. 500, Washington, DC
Ph: 800-795-1747; internet: http://www.usgbc.org/

1.5 ABBREVIATIONS

Wherever the following abbreviations and terms are used in the Technical Specifications, Contract Drawings, or other Contract documents, the intent and meaning will be as follows:

GENERAL TERMS

2D	Two Dimensional
3D	Three Dimensional
AED	Automated External Defibrillator
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan (Safety Plan)
BL	Baseline
BMP	Best Management Practices
BOP	Beginning of Project

C	Celsius
CAD	Computer Aided Design
CD	Compact Disc (may be used interchangeably with DVD)
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CGP	Comprehensive Procurement Guideline
CI	Construction Inspector provided by Construction Management Contractor
CL	Centerline
CLIN	Contract Line Item Number
cm	Centimeter
CM	Construction Management Contractor
CO	The County of El Paso Contracting Officer
COB	Close of Business
COR	The County of El Paso Contracting Officer's Representative
CPG	Comprehensive Procurement Guideline
CPM	Critical Path Method
CPR	Cardiopulmonary Resuscitation
CQC	Contractor's Quality Control
CQCSM	Contractor's Quality Control Systems Manager
CRP	Contractor's Responsible Person
CWA	Clean Water Act
CWHSSA	Contract Work Hours and Safety Standards Act
CY	Cubic Yard
D	Diameter
D&O	Deficiency and Omission
DBA	Davis-Bacon Act
DC	Direct Current
DIA	Diameter
DLC	Direct Labor Costs
dpi	Dots per inch
DTM	Digital Terrain Model
DVD	Digital Video Disc (may be used interchangeably with CD)
EA	Each
EM	Engineering Manual
EO	Executive Order
EOF	USIBWC Engineering Office Files (ROW data)
EOP	End of Project
ESD	The County of El Paso Engineering Services Division
°F	Degrees Fahrenheit
FAD	USIBWC Finance and Accounting Division
FAR	Federal Acquisition Regulations
FDGC	Federal Geographic Committee
FEM	Field Environmental Monitor
FLSA	Fair Labor Standards Act
FS	Federal Sections

FSRIA	Farm Security and Rural Investment Act of 2002
FT	Foot/feet
FY	Fiscal Year (October 1 through September 30)
g	Gram
GIP	Government Inspection Personnel
GPS-RTK	Global Position Satellite-Real Time Kinematic land surveying
IFB	Invitation for Bid
IGE	Independent Government Estimate
in	Inch
JHA	Job Hazard Analysis
kPa	Kilopascals
ksi	Thousand pounds per square inch
LBS	Pounds
LDs	Liquidated Damages
LF	Linear Feet
LiDAR	Light Detection and Ranging
LRFD	Load and Resistance Factor Design
LS	Lump Sum
m	Meter
MAX	Maximum
MBTA	Migratory Bird Treaty Act
MIN	Minimum
MIN	Minute
mm	Millimeter
MOA	Memorandum of Agreement
Mod	Contract modification
MOU	Memorandum of Understanding
MPa	Megapascals
MPEG	Moving Picture Experts Group file format
MSDS	Material Safety Data Sheets (has been replaced with SDS)
MUTCD	Manual on Uniform Traffic Control Devices
N	Newton
NA	Not Applicable
NAD27	North American Datum of 1927
NAD83	North American Datum of 1983
NAGPRA	Native American Graves Protection and Repatriation Act
NAVD	North American Vertical Datum of 1988
NEC	National Electrical Code (also known as NFPA 70)
NGE	Natural Ground Elevation
NGVD	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NMSPCGS	New Mexico State Plane Coordinate System
NPS	Nominal Pipe Size
NTP	Notice to Proceed
NTS	Not to Scale

O&M	Operations and Maintenance
OC	On Center
ODC	Other Direct Costs
OEM	Original Equipment Manufacturer
OZ	Ounce
PE	Pay Estimate
PE	Professional Engineer
PLS	Public Land Surveyor
PLS	Pure Live Seed
PPE	Personal Protective Equipment
PSI	Pounds Per Square Inch
PSL	Project Specific Locations
QA	Quality Assurance
QC	Quality Control
QCSM	Quality Control System Manager
R/W	Right-of-Way
RCRA	Resource Conservation and Recovery Act
RFI	Request for Information
RFP	Request for Proposal
RMAN	Recovered Materials Advisory Notice
ROW	USIBWC Right of Way
RPLS	Registered Professional Land Surveyor
s	Second
SDWA	Safe Drinking Water Act
SDS	Safety Data Sheets (new name of MSDS)
SEC	Second
SF	Square Foot
SF	Standard Form
SFS	Schedule for Submittals
SHPO	State Historical Preservation Officer/Office
SOP	Standard Operating Procedure
SOW	Statement of work or Scope of work
SSHO	Site Safety and Health Officer
STA	Station
SUE	Subsurface Utility Engineering
SY	Square Yards
TAC	Texas Administrative Code
TBD	To be Determined
TCL	Temporary Construction Limits
TCP	Traffic Control Plan
TIN	Triangulated Irregular Networks file format
TOLE	Top of Levee Elevation
TYP	Typical
US	United States
USC	United States Code

USCS	Unified Soil Classification System
WSE	Water Surface Elevation
YD	Yard
YR	Year

AGENCIES & ASSOCIATIONS - Check to see if these are used in the Sections------

A2LA	American Association for Laboratory Accreditation
AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
ABAAS	Architectural Barriers Act Accessibility Standard
ABET	Accreditation Board for Engineering and Technology
ACHP	Advisory Council on Historical Preservation
ADA	Americans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADMI	American Dye Manufacture's Institute
ADOT	Arizona Department of Transportation
AF&PA	American Forest & Paper Association
AISI	American Industrial Standards Institute
AITC	American Institute of Timber Construction
AMRL	AASHTO Materials Reference Laboratory
ANSI	American National Standards Institute
APA	APA - The Engineered Wood Association
API	American Petroleum Institute
APWA	American Public Works Association
AR	US Army Regulation
ARPA	Achaeological Resources Protection Act
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASSE	American Society of Safety Engineers
ASTM	ASTM International
AWC	American Wood Council
AWWA	American Water works Association
AZ	Arizona
CA	California
CalEPA	California Environmental Protection Agency
CalTrans	California Department of Transportation
CBP	Customs and Border Protection
CC	International Code Council
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPA	Composite Panel Association
CPWR	The Center for Construction Research and Training
CSI	Construction Sections Institute
DHS	US Department of Homeland Security

DOE	Department of Energy
DOJ	Department of Justice
DOL	Department of Labor
DOT	Department of Transportation
DPS	Defense Printing Service
EBID	Elephant Butte Irrigation District
EEOC	Equal Employment Opportunity Commission
ELCOSH	Electronic Library of Construction Occupational Safety & Health
EMNRD	New Mexico Energy, Minerals and Natural Resources Department
EPA	US Environmental Protection Agency
EPCWID1	El Paso County Water Improvement District #1
EPWU	El Paso Water Utilities
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FWS	US Fish and Wildlife Service
GPO	Government Printing Office
GSA	Geological Society of America
GSA	US General Services Administration
IARC	International Agency for Research on Cancer
IAS	International Accreditation Service
IBC	International Building Code
IBWC	International Boundary and Water Commission
IDA	International Dark-Sky Association
IECC	International Energy Conservation Code
IESNA	Illuminating Engineering Society of North America
IFG	International Fire Code
IFGC	International Fuel Gas Code
IHSA	Infrastructure Health & Safety Equipment
IMC	International Mechanical Code
IPC	International Plumbing Code
IPSDC	International Private Sewage Disposal Code
ISC	Interagency Security Committee
ISEA	International Safety Equipment Association
MPI	Master Painter's Institute
NAPT	North American Proficiency Testing Program for Soil, Plant, & Water Analysis Laboratories
NCHRP	National Cooperative Highway Research Program
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NEMA	National Electrical Manufacturers Association
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NGS	National Geodetic Survey
NIOSH	National Institute for Occupational Safety and Health
NIST	US National Institute of Standards and Technology

NLRA	National Labor Relations Board
NM HPD	New Mexico Historic Preservation Division
NM OSE	New Mexico Office of the State Engineer
NM SHPO	New Mexico State Historic Preservation Officer
NM	New Mexico
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NPS	US National Park Service
NRCS	National Resource Conservation Service
NSF	National Science Founation
NTSC	National Television System Committee
NWS	National Weather Service
OIG	Office of Inspector General
OSHA	Occupational Safety and Health Association
PCI	Precast/Prestressed Concrete Institute
PEI	Petroleum Equipment Institute
PS	US Department Of Commerce Product Standard
PUB	Public Utilities Board of Brownsville
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
THC	Texas Historical Commission
TIA	Telecommunications Industry Association
TMUCTD	Texas Manual on Uniform Traffic Control Devices
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TRB	Transportation Research Board
TX	Texas
TxDOT	Texas Department of Transportation
UL	Underwriter’s Laboratory
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USERRA	Uniformed Services Employment and Reemployment Rights Act
USGBC	United States Green Building Council
USIBWC	International Boundary and Water Commission, United States Section
WH	Wage and Hour Division, Department of Labor
WHD	Wage and Hour Division, Department of Labor

MATERIALS

ABC	Aggregate Base Course
BWG	Birmingham Wire Gauge
CH	High Plasticity Clay
CL	Low Plasticity Clay
CLSM	Controlled Low Strength Material
DAR	Durability Absorption Ratio
DR	Pipe Dimension Ratio

G	Gradation Coefficient
GC	Clayey Gravel
GP	Poorly Graded Gravel
GW	Well Graded Gravel
HDPE	High Density Polyethylene
IDT	Indirect Tensile for ASTM D6931
LL	Liquid Limit
MH	High Plasticity Silt
ML	Low Plasticity Silt
ND1 or ND2	Non-dispersive Soil from ASTM D4647
PI	Plasticity Index
PL	Plastic Limit
PVC	Polyvinyl Chloride
SC	Clayey Sand
SM	Silty Sand
SP	Poorly Graded Sand or Gravely Sand
SSD	Saturated Surface Dry
SW	Well Graded Sand
UHMW	Ultra High Molecular Weight Polyethylene

CONCRETE

ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
CPMB	Concrete Plant Manufacturers Bureau
CRSI	Concrete Reinforcing Steel Institute
f'c	Compressive Strength of Concrete
GGBFS	Ground Granulated Blast Furnace Slag (Concrete)
NRMCA	National Ready Mixed Concrete Association
PCA	Portland Cement Association
RCB	Reinforced Concrete Box Culvert
RCP	Reinforced Concrete Pipe
UFFA	Ultra Fine Fly Ash (Concrete)

ASPHALT PAVING

AC	Asphalt Cement
AE	Asphalt Emulsion
AE-P	Asphalt Emulsion Prime
AQMP	Aggregate Quality Monitoring Program
A-R	Asphalt-Rubber
C	Cationic Asphalt
COC	Cleveland Open Cup for Flash Points
CRM	Crumb Rubber Modifier Asphalt Polymer
cSt	CentiStokes
EAP&T	Emulsified Asphalt Prime and Tack
HF	High Float Asphalt

HMA	Hot Mix Asphalt
HMAC	Hot Mix Asphalt Concrete
H-suffix	Harder Residue Asphalt
JMF	Job Mix Formula
MC	Medium Curing Asphalt
MS	Medium Setting Asphalt
P	Polymer Modified Asphalt
PCE	Prime, Cure, and Erosion Control
PG	Performance Grade Asphalt
RAP	Recycled/Reclaimed Asphalt Pavement
RC	Rapid Curing Asphalt
RS	Rapid Setting Asphalt
RTFO	Rolling Thin Film Oven
RTFOT	Rolling Thin Film Oven Test
SAC	Surface Aggregate Classification
SBR	Styrene-butadiene Rubber Asphalt Polymer
SBS	Styrene-butadiene-styrene Block Copolymer Asphalt Polymer
SCM	Special Cutback Asphalt Material
SCM	Supplementary Cementing Materials
SS	Slow Setting Asphalt
S-suffix	Stockpile Asphalt Usage
TOC	Tag Open Cup for Flash Point
TR	Tire Rubber Asphalt Polymer
VMA	Voids in Mineral Aggregates

STEEL/METAL

AISC	American Institute of Steel Construction
AISI	American Iron and Steel Insitute
CMP	Corrugated Metal Pipe
HPS	High Performance Steel
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
NAAMM	National Association of Architectural Metal Manufacturers
RCSC	Research Council on Structural Connections
SSPC	Steel Structures Painting Counsel

WELDING

AWS	American Welding Society
BPVC	Boiler and Pressure Vessel Code
ET	Electromagnetic Testing (Welding)
FCAW	Flux Cored Arc Welding (Welding)
GMAW	Gas Metal Arc Welding (Welding)
GTAW	Gas Tungsten Arc Welding (Welding)
MAG	Metal Active Gas Welding, a subset of GTAW (Welding)
MIG	Metal Insert Gas Welding, a subset of GTAW (Welding)
MMA	Manual Metal Arc Welding, also known as SMAW (Welding)

MT	Magnetic Particle Testing (Welding)
NDT	Nondestructive Testing (Welding)
PT	Liquid Penetrant Testing (Welding)
RT	Radiographic Testing (Welding)
SAW	Submerged Arc Welding (Welding)
SMAW	Shielded Metal Arc Welding (Welding)
TIG	Tungsten Insert Gas Welding, more properly known as GTAW
UT	Ultrasonic Testing (Welding)
VT	Visual and Optical Testing (Welding)
WPS	Welding Procedure Sections

ENVIRONMENTAL

BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethybenzene, and Xylene
C:N	Carbon Nitrogen Ratio
CATEX	Categorical Exemption (NEPA)
CE	Categorical Exemption (NEPA)
CGP	Construction General Permit (SWPP)
EA	Environmental Assessment (NEPA)
EIS	Environmental Impact Statement (NEPA)
EPIC	Environmental Permits, Issues, and Comments
ESA	Endangered Species Act
FONSI	Final of No Significant Impact (NEPA)
HHRB	Human Health Risk-Based
IARC	International Agency for Research on Cancer
LEED	Leadership in Energy and Environmental Design
LEL	Lower Explosive Limit
NELAP	National Enviromental Laboratory Accreditation Program
NEPA	National Environmental Policy Act
NOI	Notice of Intent (SWPP)
NOT	Notice of Termination (SWPP)
NPDES	National Pollutant Discharge Elimination System
PCL	Protective Concentration Level
ROD	Record of Decision (NEPA)
SVOC	Semi-Volatile Organic Compounds
SWPP	Stormwater Pollution Prevention
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TNI	The NELAC Institute
TPH	Total Petroleum Hydrocarbons
TRRP	Texas Risk Reduction Program
TSS	Total Suspended Solids

TZ	Tetrazolium Test
VOC	Volatile Organic Compounds

COMMISSIONING

BoD	Basis of Design
CCxP	Contractor's Commissioning Plan
CCxR	Contractor's Commissioning Representative
CxA	Commissioning Authority
FPT	Functional Performance Test
TBC	Total Building Commissioning

1.6 DEFINITION OF TERMS

Definitions of terms used include the following:

Activity	A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the project. Activities included in a construction schedule consume time and resources.
Actual Cost	Contractor’s actual cost to provide labor, material, equipment and project overhead necessary for the work.
Addendum	Change in proposal forms developed between advertising and bid submittal deadline.
Air Temperature	The temperature measured in degrees Fahrenheit (°F) in the shade, not in the direct rays of the sun and away from artificial heat.
Archaeological Resource	Any material remains of human life or activities which are at least one hundred (100) years of age and which are of archaeological interest.
Baseline	A control line offset from the existing facility and/or proposed improvement.
Best Management Practices	Methods or measures used for stormwater pollution control.
Bridge	A structure, including supports, erected over a depression or an obstruction (e.g., water, a highway, or a railway) having a roadway or track for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between faces of abutments, spring lines of arches, or extreme ends of the openings for multiple box culverts.
Brittle	Breaking of geological materials from relatively low stress.

Bug Holes	Bug holes, blowholes, or air voids, are small cavities ranging from nearly invisible to approximately one inch that result from the entrapment of air bubbles in the surface of formed concrete.
Business Day	All days in a month excluding weekends and holidays.
Calendar Day	All days in a month including weekends, holidays, and both work and non-work days.
Canal	A man-made waterway used for conveying irrigation water.
Canal Turnout	A structure used to divert water from a canal to a smaller water distribution system.
Centerline	The line identified as the geometric center of the alignment of the existing facility or proposed improvement.
Clean Fill	Fill material that meets or exceeds the TCEQ Texas Risk Reduction Program (TRRP) rules (30 TAC §350.51(m)), median background concentration levels.
Cold Weather	When the air temperature has fallen to, or is expected to fall below forty degrees Fahrenheit (40°F) during the protection period of concrete which includes placement.
Competent	In geology, competence refers to the degree of resistance of geological materials to erosion and deformation. High resistance to erosion and deformation is a competent material.
Contract	The agreement between the County of El Paso and the Contractor establishing the obligations of the parties for furnishing of materials and performance of the work prescribed in the Contract documents.
Contract Documents	Elements of the Contract including but not limited to the plans, construction drawings, Scope of Work, Technical Specifications, provisions, Contract bonds, modifications and supplemental agreements.
Contract Drawings	The construction drawings identified in Section 00.01.15 and any drawings produced as part of this Contract.
Contract Time	The number of calendar days specified for completion of the work including authorized additional working days.
Contracting Officer	Authorized representative of the County of El Paso with the authority to enter into, administer and/or terminate Contracts and make related determinations and findings.

Contracting Officer's Representative	An individual, designated in writing, by the County of El Paso Contracting Officer authorized to perform specific technical and administrative functions.
Control Point	An established point shown on the Contract Drawings to provide vertical and horizontal references for geometric control for construction.
Cost Loading	The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract sum, unless otherwise approved by the CO or COR.
CPM	Critical Path Method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the project.
Critical Path	The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
Critical Path Method	An activity-oriented scheduling method, where activities and durations are well-defined for the development of the Project.
Cross-Sections	Graphic representations of the original ground and the proposed improvement, at right angles to the baseline or centerline.
Crumbly	A material that is easily broken into small fragments or reduced to powder.
Cultural Resources	Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties; specific items include, but are not limited to, human skeletal remains, archaeological artifacts, records, and material remains related to such properties.
Culvert	Any buried structure providing an opening under the facility for drainage or other purposes.
Definable Feature of work	A task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. It results in a physical product and is identified by different trades or disciplines; it is usually an item or activity on the construction schedule. So, for example, excavation, electrical, concrete, roofing, mechanical, HVAC, etc. are all Definable Features of work.

Detour	A temporary traffic route around a closed portion of a road.
Drawings	Construction Contract Drawings that show the location, character, dimensions and details of the work and are a part of the Contract documents. Plans are the same as drawings.
Easement	A real property right acquired by one party to use land belonging to another party for a specified purpose.
Engineer	A professional engineer or engineering firm registered professional in the State of Texas.
Flexible Base	One or more layers of specified material thickness placed on a subgrade to support a surface course (usually asphalt).
Float	The measure of leeway in starting and completing an activity in a CPM schedule. Float is not for the exclusive use or benefit of either the Government or the Contractor by is jointly owned. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.
Flood	An overflow of water that submerges land which is usually dry. Flooding can be caused by any source of water including, but not limited to, rain, runoff, river flow, dam releases, and structural failures.
Forb(s)	Any herbaceous flowering plant that is not a grass
Friable	Geological material that crumbles very easily in the hand or is reduced to finer particles by small pressure or friction. Friabililty is the ability of a solid substance to be reduced to smaller pieces with little effort.
Geotechnical Engineer	A professional engineer, licensed in the state of Texas with a minimum of five (5) years of experience in the field of geotechnical engineering.
Government	Refers to International Boundary and Water Commission, United States and Mexico, United States Section.
Ground Disturbing Activities	A ground disturbance is any work or activity that results in a disturbance of the earth including, but not limited to: excavating, digging, trenching, plowing, drilling, tunneling, auguring, backfilling, blasting, topsoil stripping, land leveling, placing embankment, quarrying, clearing and grubbing, hauling, burning, tree removal, fencing, discing, and seeding.

Hard	Geological material that is not friable, is unyielding to pressure, and is impenetrable or almost impenetrable.
Haul Road	A temporary road created or modified to handle construction traffic.
Haul Route	The complete route that will be used to haul materials to and from the jobsite. This includes haul roads and existing roads, both on and off the site.
Hazardous Materials	Hazardous materials or waste include but are not limited to explosives, compressed gas, flammable liquids, flammable solids, combustible liquids, oxidizers, poisons, radioactive materials, corrosives, etiologic agents and other material classified as hazardous by 40 CFR 261, or applicable state and federal regulations.
Holidays	Holidays recognized by the Federal Government: New Year's Day, Birthday of Martin Luther King, Jr., Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day. See http://www.opm.gov/policy-data-oversight/snow-dismissal-procedures/federal-holidays/#url=Overview for a complete list for any given year.
Homogeneous	Of uniform structure or composition throughout. Alike in construction.
Honeycomb	Honeycomb is a condition of irregular voids in concrete due to failure of the mortar to effectively fill the spaces between the coarse aggregate particles. Honeycomb is caused by segregation of the concrete during placement.
Hot Weather	One or a combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise causing detrimental results: high ambient temperature, high concrete temperature, low relative humidity and high wind speed.
Independent Assurance Tests	Tests used to evaluate the sampling and testing techniques and equipment used in the acceptance program.
Inspector	The firm or person assigned by the County of El Paso to inspect for compliance with the Contract any or all parts of the work and the materials used.
Levee	A facility constructed of an embankment whose primary purpose is to furnish flood protection from seasonal high

	water and which is therefore subject to water loading for periods of only a few days or weeks a year.
Limits of Construction	An area with established boundaries, identified within the Project's right of way and easements, where the Contractor is permitted to perform the work.
Maintenance Road	A road usually on top of or adjacent to the facility, primarily utilized by the USIBWC and Customs.
Materials	The words "material" or "materials" is used in these specifications to denote items furnished by the Contractor which shall be construed to mean equipment, machinery, product, component, or any other item required to be incorporated in the work
Milestone Date	The date that a specific portion of the work is to be completed, before the completion date for all work under the Contract.
Modification	Any written change in the terms of a Contract.
Notice to Proceed	A written notice to the Contractor to begin the work.
Pavement	That part of a roadway having a constructed all-weather surface. Pavement Structure Combination of surface course, flexible base and subgrade to support the traffic load and distribute it to the roadbed:
Pavement Structure	Combination of surface course, base course, and subgrade to support the traffic load and distribute it to the roadbed: (1) Surface Course - Pavement structure layers designed to accommodate the traffic load. The top layer resists skidding, traffic abrasion, and the disintegrating effects of climate and is sometimes called the wearing course. (2) Base Course - One or more layers of specified material thickness placed on a subgrade to support a surface course. (3) Subgrade - The top surface of a roadbed upon which the base and surface courses (and curbs, if applicable) are constructed.
Pesticide	Any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies.

Plans	Construction Contract Drawings that show the location, character, dimensions and details of the work and are a part of the Contract documents. Plans are the same as drawings.
Project	The facility and its associated appurtenances that are being constructed under this Contract.
Protection Period	The time required to prevent concrete from being affected by exposure to cold weather.
Quality Assurance	Sampling, testing, inspection and other activities conducted by the Government to assure that the Contractor's quality control is being conducted properly.
Quality Control	Sampling, testing and other process control activities conducted by the Contractor to monitor production and placement operations.
Rehabilitate	To restore to original condition, operation, and/or capacity. To make as-new.
Resource Loading	The allocation of manpower and equipment necessary for the completion of an activity as scheduled.
Right-of-Way	A general term denoting land or property owned by the USIBWC for the construction, operation and maintenance of the facility.
Road or Street	General terms denoting a public way for purposes of vehicular travel, primarily for access to residence, business, or other abutting property.
Roadway Gravel	Gravel designed as the surface of a gravel roadway; also known as aggregate surface in this Contract.
Scarification	Scratching the surface of a compacted layer to facilitate bonding with the next layer and avoid potential lamination between compacted layers.
Sluice Gate	A mechanical apparatus that controls the flow of water (through a pipe at the bottom of the levee) from the land side of the levee to the floodway or channel.
Sluice Gate Structure	A concrete manhole that contains the sluice gate apparatus and an opening or openings for the cross-drainage pipe.
Specifications	Requirements issued or made pertaining to the method and manner of performing the work or to quantities and qualities of materials to be furnished under the Contract.
Station	A unit of measurement consisting of 100 horizontal feet.

Subcontract	The agreement between the Contractor and subcontractor establishing the obligations of the parties for furnishing of materials and performance of the work prescribed in the Contract documents.
Subcontractor	An individual, partnership, limited liability company, corporation, or any combination thereof that the Contractor sublets, or proposes to sublet, any portion of a Contract, excluding a material supplier, truck owner-operator, wholly owned subsidiary, or specialty-type businesses such as security companies and rental companies.
Subgrade	The top surface of a roadbed upon which the base and surface courses (and curbs, if applicable) are constructed. Also the bottom of the excavation above which backfill or concrete will be placed.
Subsidiary	Materials, labor, or other elements that because of their nature or quantity have not been identified as a separate bid item and are considered included within the items on which they necessarily depend.
Superintendent	The representative of the Contractor who is available at all times and able to receive instructions from the County of El Paso CO or COR and is able to act for the Contractor.
Surface Course	Pavement structure layers designed to accommodate the traffic load. The top layer resists skidding, traffic abrasion and the disintegrating effects of climate and is sometimes called the wearing course.
Surplus Materials	Any debris or material related to the Contract not incorporated into the work.
Utility	Privately, publicly, or cooperatively owned lines, facilities and systems for producing, transmitting, or distributing communications, power, heat, gas, oil, water, waste, or storm or irrigation water; the utility company.
Verification Tests	Tests used to verify accuracy of QC and QA testing.
Weather Advisory	An announcement that hazardous weather or hydrologic event is occurring, imminent, or likely. Advisories are less serious than warnings. Advisories are for events that cause significant inconvenience and if caution is not exercised, could lead to situations that may threaten life or property.
Weather Warning	An announcement that hazardous weather or hydrologic event is occurring, imminent, or likely. A warning means

	weather conditions pose a threat to life or property. People in the path of the storm need to take protective action.
Weather Watch	An announcement that the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, or timing is still uncertain. Warnings are intended to provide enough lead time so those who need to set plans in motion can do so. A watch means that hazardous weather is possible. People should have a plan of action in case a storm threatens and they should listen for later information and possible warnings.
Work	The furnishing of all labor, materials, equipment and other incidentals necessary for the successful completion of the Contract.
Work Day	Contractor's scheduled days of work, whether work is performed or not.
Work Week	Normal, non-overtime, work week accounts for forty (40) hours in four or five work days.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

01.45.07
QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 00.31.32-Geotechnical Data

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO Materials Reference Laboratory (AMRL)

B. The American Association for Laboratory Accreditation (A2LA)

1. Geotechnical Testing Accreditation Program

C. ASTM International (ASTM)

1. ASTM C1077-13b Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
2. ASTM D3666-13 Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

3. ASTM D3740-12a Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
4. ASTM E329-11c Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
5. ASTM E543-13 Standard Specification for Agencies Performing Nondestructive Testing
6. ASTM E699-09 Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance and Evaluating of Building Components

D. Federal Acquisition Regulation (FAR)

1. FAR 52.211-10, Commencement, Prosecution and Completion of work
2. FAR 52.246-12, Inspection of Construction

E. International Accreditation Service

1. Testing Laboratories Program

F. The NELAC Institute

1. National Environmental Laboratory Accreditation Program (NELAP)

G. United States Army Corps of Engineers (USACE)

1. Materials Testing Center, Laboratory Quality Assurance Inspection

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Quality Control Plan
The Contractor shall furnish for review by El Paso County, not later than seven (7) calendar days after receipt of Notice to Proceed, the Contractor Quality Control Plan (CQC Plan) proposed to implement the requirements of FAR 52.246-12, Inspection of Construction and the Contract.

2. Quality Control Organization
The Contractor shall identify their quality control organization personnel as well as lines of authority and communication.

3. Quality Control System Manager Qualifications

4. Alternate Quality Control System Manager Qualifications

5. Engineering Testing Laboratory Certifications
Prior to use of any laboratory for quality control engineering testing, the Contractor shall submit the name, address, telephone number, laboratory certifications, name(s) of laboratory's full time engineer(s), and the name of the laboratory's responsible officer.

6. Environmental Testing Laboratory Certifications
Prior to use of any laboratory for quality control environmental testing, the Contractor shall submit the name, address, telephone number, laboratory certifications, name(s) of laboratory's full time engineer(s), and the name of the laboratory's responsible officer.

7. Daily Quality Control Reports

1.5 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this specification shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 QUALITY CONTROL PLAN

A. General

1. The Contractor's Quality Control (CQC) Plan shall identify personnel, procedures, control, instructions, test, records and forms to be used. Construction will be permitted to begin only after acceptance by El Paso County of the CQC Plan or acceptance of an interim plan applicable to the particular feature of the work to be started.

2. Work outside of the features of the work included in a compliance confirmed interim plan will not be permitted to begin until compliance confirmation of a full CQC Plan or another interim plan containing the additional features of work to be started

B. Contents of the CQC Plan

1. The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents.

2. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC Plan shall implement the three (3) phase control system for all aspects of the work specified. The CQC System Manager shall report to the project manager or someone higher in the Contractor’s organization. Project Manager in this context shall mean the individual with responsibility for the overall management of the project including quality and construction.

3. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the Contract. A copy of this letter will be furnished to El Paso County.
4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
5. Control, verification, and acceptance of testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency and person responsible for each test. (Laboratory facilities will be compliance confirmed by El Paso County).
6. Procedures for tracking preparatory, initial and follow up control phases and control, verification and acceptance tests including documentation.
7. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
8. Reporting procedures, including proposed reporting formats.
9. List of the Definable Features of work

a. A definable feature of work is a task that is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each Technical Specification will have at least one definable feature of work, there is frequently more than one definable feature under a particular Technical Specification.

10. El Paso County may supplement the CQC testing with independent assurance tests and inspections (Quality Assurance). Acceptance of the work by the CQC System Manager does not mean El Paso County accepts the work.

C. Acceptance of the CQC Plan

1. Acceptance of the Contractor's QC Plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction.
2. El Paso County reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

D. Notification of Changes

1. After compliance confirmation of the CQC Plan, the Contractor shall notify the El Paso County COR in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes are subject to acceptance by El Paso County.

1.7 CONTRACTOR OVERALL RESPONSIBILITY

A. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract clause in FAR 52.246-12, Inspection of Construction. The quality control system shall consist of plans, procedures and organization necessary to produce an end product that complies with the Contract requirements. The system shall cover all construction operations, both onsite and offsite and shall be keyed to the proposed construction sequence.

1.8 QUALITY CONTROL COORDINATION MEETING

A. After the Preconstruction Conference, before start of construction, and prior to acceptance by El Paso County of the CQC Plan, the Contractor shall meet with the El Paso County CO or COR and discuss the Contractor's quality control system.

B. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's management and control with El Paso County's Quality Assurance (QA).

C. Minutes of the meeting shall be prepared by El Paso County and signed by both the Contractor and the COR. The minutes shall become a part of the Contract file.

D. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by the Contractor.

1.9 QUALITY CONTROL ORGANIZATION

A. The Contractor shall identify an individual within their organization, as the CQC System Manager, who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor.

1. The CQC System Manager (CQCSM) shall be onsite at all times whenever Contract work is in progress unless the CQCSM is on a scheduled absence.
2. The CQCSM shall be an employee of the Contractor.
3. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the CQC System Manager's absence.

4. Period of absence for CQCSM shall not exceed three (3) weeks at any one time and not more than thirty (30) workdays during a calendar year.
5. If the CQCSM is absent, the alternate CQCSM shall perform all CQC duties identified.
6. The requirements for the alternate will be the same as for the designated CQC System Manager.

B. CQC Organizational Staffing

1. The Contractor shall provide a CQC staff which shall be at the worksite at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract.
2. Testing laboratories and onsite technicians are considered critical elements in the Contractor's QC Plan.
3. The Contractor shall submit a resume of the CQC staff qualifications to the COR for compliance confirmation.

a. At a minimum, this shall include:
   (1) CQC Systems Manager
   (2) Alternate CQC Systems Manager

C. CQC System Manager

1. The CQC System Manager shall be a graduate of an ABET accredited college of engineering and/or a registered professional engineer in the State of Texas.
2. The CQCSM shall have a minimum of two (2) years of construction experience on similar earthwork projects.

D. Organizational Changes

1. The Contractor shall obtain El Paso County COR's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties and responsibilities of each proposed replacement.
2. El Paso County reserves the right to require the Contractor to make changes in the CQC staff, including removal of personnel, laboratories, or technicians as necessary, to obtain the quality specified.

1.10 QC TESTING

A. Testing Procedures

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure

the services of a compliance confirmed testing laboratory. The Contractor shall perform the following activities and shall record and provide the following data:

1. Verify that testing procedures comply with Contract requirements.
2. Verify that facilities and testing equipment are available and comply with testing standards.
3. Check test instrument calibration data against certified standards.
4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
5. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If compliance confirmed by El Paso County, actual test reports shall be submitted later with the reference to the test number and date taken.

a. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to El Paso County.
b. Failure to submit timely test reports as stated shall result in nonpayment for related work performed and disapproval of the test facility for this Contract.

B. Testing Laboratories

1. The Contractor shall pay for all services of any independent testing laboratories required to perform the specified quality control testing and required to ensure that all Contract requirements are met.
2. El Paso County reserves the right to check the laboratory equipment in the proposed laboratory for compliance with the standards set forth in the Contract Specifications and to check the laboratory technician's testing procedures and techniques.
3. The Contractor shall employ certified independent laboratory to perform sampling and testing or provide an onsite laboratory with testing apparatus and qualified laboratory technicians.

a. Engineering testing laboratories shall be accredited by US Army Corps of Engineers (USACE), AASHTO, International Accreditation Service, or American Association for Laboratory Accreditation (A2LA).
b. Environmental testing laboratories shall be accredited by a National Environmental Laboratory Accreditation Program (NELAP) accreditation body.

4. All laboratories employed to perform testing under this Contract shall be unaffiliated with the Contractor. Additionally, the companies cannot have common ownership or management.
5. No testing laboratory shall be employed that was affiliated with the design of the project. Review the geotechnical data provided in Section 00.31.32.

6. All engineering laboratory tests shall be certified by a professional engineer licensed to practice in the State of Texas.
7. Testing laboratories must be experienced in the type of testing work to be done. All laboratories must meet the requirements of ASTM E699 and ASTM E329.
   a. Laboratories testing concrete and concrete aggregates: Meet requirements of ASTM C1077.
   b. Laboratories testing soil and rock: Meet requirements of ASTM D3740.
   c. Laboratories testing bituminous paving materials: Meet requirements of ASTM D3666.
   d. Laboratories engaged in nondestructive testing: Meet requirements of ASTM E543.
8. Laboratories shall calibrate measuring devices, laboratory equipment, and instruments at established intervals against certified standards in accordance with National Institute of Standards and Technology requirements.
9. All nuclear density testing equipment operators shall have completed a training course approved by the nuclear density testing equipment manufacturer.
10. Upon request, the testing laboratory shall make measuring and testing devices available for use by El Paso County for verification tests.
11. Employment of testing laboratories in no way relieves the Contractor of the obligation to perform work in accordance with the requirements of the Contract.

1.11 COMPLETION OF WORK INSPECTIONS

A. Contractor Inspection

At the completion of all work or any increment thereof established by a completion time stated in the FAR Clause 52.211-10, entitled "Commencement, Prosecution and Completion of work," or stated elsewhere in the Contract documents, the CQC System Manager shall conduct an inspection of the work and develop a "Contractor's Punch List" of items of work which do not conform to the Contract documents. Such a list of deficiencies shall be included in the CQC documentation and shall include the estimated date by which the deficiencies will be corrected.

1. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify El Paso County.
2. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work.

B. Contractor and El Paso County Pre-Final Inspection

The CQC System Manager, Contractor's superintendent, or other primary management person, and the El Paso County will be in attendance at this inspection. The Pre-Final Inspection will be formally scheduled by El Paso County based upon notice from the Contractor. This notice will be given to the Government at least fourteen (14) calendar days prior to the Pre-Final Inspection. The notice must include the Contractor's assurance

that all deficiencies listed in the "Contractor's Punch List" developed during the Contractor Inspection phase have been corrected and all Contract work is complete and acceptable by the date scheduled for the Pre-Final Inspection.

1. Failure of the Contractor to have all Contract work acceptably complete will be cause for El Paso County to cancel the inspection and bill the Contractor for El Paso County's additional inspection costs in accordance with the FAR 52.246-12, "Inspection of Construction."
2. At this inspection El Paso County will develop a "El Paso County's Punch List" of incomplete and/or unacceptable work performed under the Contract and will subsequently furnish this list to the Contractor.
3. Failure of El Paso County to detect and list all incomplete and/or unacceptable work during this inspection will not relieve the Contractor from acceptably performing all work required by the Contract documents.
4. El Paso County, at its option, may accept this inspection as the final acceptance inspection if in its opinion, the completion status of the inspected facilities and other work performed under the Contract, warrant this consideration.

C. Contractor and El Paso County Final Acceptance Inspection
The CQC System Manager, the superintendent or other primary management person, and El Paso County will be in attendance at this inspection. The final acceptance inspection will be formally scheduled by El Paso County based upon notice from the Contractor. This notice will be given to El Paso County at least fourteen (14) calendar days prior to the final acceptance inspection. The notice must include the Contractor's assurance that all items in " El Paso County's Punch List" developed during the Contractor and El Paso County Pre-Final Inspection phase have been corrected.

1. Failure of the Contractor to have all Contract work acceptably complete for this final acceptance inspection will be cause for El Paso County to cancel the inspection and bill the Contractor for El Paso County's additional inspection costs in accordance with FAR Clause 52.246-12, Inspection of Construction.
2. This inspection will be considered another Contractor and El Paso County Pre-Final Inspection and the Contractor must schedule another Contractor and El Paso County Final Acceptance Inspection after all items have been corrected.
3. Otherwise, this inspection will be considered a Contractor and El Paso County Final Acceptance Inspection if all items in "El Paso County's Punch List" and all other work are considered acceptably complete by El Paso County.

1.12 DOCUMENTATION

A. The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall

include the work of subcontractors and suppliers and shall include, as a minimum, the following information:

1. Weather conditions at the worksite.
a. When determining minimum and maximum temperatures at the worksite, thermometers placed onsite shall be used. Use of weather.com or other online weather services is not valid for determining the worksite temperature.
b. Additional thermometers may be required to monitor concrete placements.
2. Contractor/subcontractor and their area of responsibility.
3. Operating plant/equipment with hours worked, idle, or down for repair.
4. Identification of equipment mobilized or demobilized from the worksite.
5. Work performed each day, giving location, description and by whom.
6. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow up). List deficiencies noted along with corrective action.
7. Quantity of materials, as appropriate, received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements. For lump sum priced line items, quantity of materials received is usually not relevant; however, the CQC shall still make notes of items received, acceptability, storage, etc.
8. Offsite surveillance activities, including actions taken.
9. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
10. Instructions given/received and conflicts in Contract Drawings and/or specifications.
11. Contractor's verification statement.

B. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract.

C. The contractor shall use an acceptable daily quality control report form to document this data.

1. A digital copy of the form shall be emailed to the COR daily within twelve (12) hours after the date(s) covered by the report, except that reports need not be emailed on calendar days on which no work is performed.

2. At a minimum, one (1) report shall be prepared and submitted for every seven (7) calendar days of no work and on the last day of a no work period. The first report following a day of no work shall be for that day only.
3. All calendar days shall be accounted for throughout the life of the Contract.
4. The original form (containing an original signature) with copies of all appurtenance records in report form shall be provided to the COR as part of the Contract Close Out. These hard copies shall contain an original signature and if the daily report contains color items, it must be printed in color.

D. The report form shall be signed and dated by the CQC System Manager. The report from the CQCSM shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. All of these items shall also be provided to the COR daily in electronic format. The report form can be provided as a pdf scan of the original or as a pdf document containing a scanned electronic signature. All test reports and other items attached to the daily report shall also be scanned into pdf format.
   1. The minimum scanning resolution shall be 400 dpi for color and grayscale and shall be 600 dpi for black and white.
   2. Color documents shall be scanned in color.
   3. Test reports, inspections, minutes, etc. shall all be submitted in separate electronic files.
   4. The file names for the electronic files shall always start with the Contract day number and shall also contain a brief description as well as the calendar date. For example, 065 DR Contractor Name IBMxxCxxxx 12-13-2014.pdf.

1.13 NOTIFICATION OF NONCOMPLIANCE

A. El Paso County will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

--End of Section—

This page intentionally left blank for double sided printing.

01.57.13
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 32.92.00-Vegetation for Erosion Control

1.3 REFERENCE STANDARDS

A. Environmental Protection Agency (EPA)

1. General Construction Permit 2012
2. National Pollutant Discharge Elimination System (NPDES) Permit Program

B. Code of Federal Regulations (CFR)

1. 36 CFR 800, Protection of Historic Properties

C. Texas Commission on Environmental Quality (TCEQ)

1. Texas Pollution Discharge Elimination System (TPDES)
2. TCEQ Construction General Permit TXR150000

D. United States Code (USC)

1. Archaeological Resources Protection Act (ARPA), 16 USC Chapter 1B
2. Federal Environmental Pesticide Control Act, 7 USC Chapter 6
3. Migratory Bird Treaty Act (MBTA), 16 USC §§703-712
4. National Environmental Policy Act (NEPA), 42 USC §§4321-4347
5. Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC §3001 et. seq.

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Stormwater Pollution Prevention Plan
   a. A compliance confirmed SWPPP for the worksite is required prior to Contractor mobilization.
   b. Copies of NOI, NOT, and any applicable waivers shall be provided to the County of El Paso upon receipt.
2. Pesticide Use Plan, if required.
3. Test Results of Topsoil Salinity Levels
4. Hydrocarbon Storage Tank Permits
   a. Provide the County of El Paso with copies of any permits issued allowing storage tanks in excess of 1,100 gallons.

1.5 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this Section shall be paid based on the lump sum bid price identified in Section B of the contract provisions.

1.6 GENERAL

A. The Contractor shall provide and maintain methods, equipment and temporary construction as necessary to provide controls over environmental conditions in the construction areas, adjacent areas, temporary work areas and all Project Specific Locations (PSL) and shall remove physical evidence of the temporary facilities at the completion of work.

B. The Contractor shall, at their own expense, obtain all required permits for environmental controls unless otherwise specified.

C. Contractors shall be responsible for knowing about applicable environmental laws and regulations.

1.7 FIELD ENVIRONMENTAL MONITOR (NOT USED)

1.8 WATER POLLUTION

A. The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into the Rio Grande or associated watersheds of the project limits.

B. Stockpiling material on the floodplain is prohibited.

1. Stockpiles shall be placed parallel to the levee.
2. Stockpiles shall have appropriate stormwater BMPs placed between the stockpile and the Rio Grande.
3. In case of activation of the Contractor's Flood Protection Plan, stockpiles on the floodplain shall be pushed up against or onto the levee.
4. Brush and other debris cannot be stored on the floodplain. These items must be removed from the riverside of the levee within seventy two (72) hours.

C. The Contractor shall meet all the requirements of their SWPPP during construction activities.

D. The Contractor shall meet all requirements of the National TCEQ Pollutant Discharge Elimination System (NPDES) (TPDES) requirements for discharges associated with construction activities including but not limited to preparation of a stormwater pollution prevention and monitoring plan (SWPPP).

E. The Contractor shall provide contained traps to washout concrete trucks. All material washed out of any concrete truck shall be contained in the trap.

F. The Contractor shall periodically inspect earthwork for any evidence of erosion starting. If such evidence is found, the Contractor shall apply corrective measures, as required, to control erosion.

1.9 AIR POLLUTION

A. The Contractor shall comply with applicable Federal, state, and local laws and regulations and with the requirements of these Contract documents concerning the prevention and control of air pollution and for pollutant emissions from all vehicles and equipment onsite. Should a conflict exist in the requirements for abatement of air pollution, the most stringent requirement shall apply. The Contractor shall utilize such methods and devices available to prevent, control and otherwise minimize atmospheric emissions or discharges of air contaminants including dust.

B. The Contractor shall not operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments reduce such emissions to acceptable levels.

1.10 DUST ABATEMENT

A. The Contractor shall, during the performance of the work required by these Contract documents, or any operations appurtenant thereto and whether within the construction limits of this project or elsewhere, comply with applicable Federal, state, and local laws and regulations regarding the prevention, control and abatement of dust pollution. Should a conflict exist in the requirements for dust abatement, the most stringent requirement shall apply.

B. The Contractor shall be responsible for controlling objectionable dust caused by the operation of vehicles and equipment, clearing, or for any reason whatsoever. The Contractor shall control dust at all times, including Saturdays, Sundays, and holidays, during both working and nonworking hours.

C. The County of El Paso has the authority to stop any construction activity contributing to dust levels which are excessive or are in violation of Federal, state, or local laws. Dust control measures shall be maintained at all times to the satisfaction of the COR, in accordance with the requirements of the County of El Paso.

D. All costs resulting from such work stoppage shall be the responsibility of the Contractor and Contract time extensions will not be provided.

E. The Contractor shall reference dust control requirements in SWPPP under EPA's TCEQ's general construction permit.

1.11 NOISE POLLUTION

A. The Contractor shall minimize noise throughout all phases of the Contract and exercise particular and special efforts to avoid the creation of unnecessary noise impact on adjacent noise sensitive receptors in the placement of non-mobile equipment such as air compressors, generators, pumps, etc. Place mobile and stationary equipment to cause the least disruption of normal adjacent activities.

B. The Contractor shall comply with the applicable Federal, state, and local laws and regulations, regarding the prevention, control and abatement of harmful noise levels. Should a conflict exist in the requirements for noise abatement, the most stringent requirement shall apply.

C. The Contractor's vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA and local agency standards.

D. All equipment associated with the work must be equipped with components to suppress excessive noise and these components must be maintained in their original operating condition considering normal depreciation. Noise attenuation devices installed by the manufacturer such as mufflers, engine covers, insulation, etc. must not be removed nor rendered ineffectual nor be permitted to remain off the equipment while the equipment is in use.

1.12 LIGHT ABATEMENT

The Contractor shall exercise special care to direct all stationary lights to shine downward at an angle less than horizontal. These lights shall also be shielded so as not to be a nuisance to surrounding areas. No lighting shall include a residence or roadway in its direct beam. The Contractor shall immediately correct lighting problems when they occur.

1.13 PESTICIDES

A. Pesticides are also known as herbicides, insecticides, fungicides, rodenticides, piscicides, avicides, surface disinfectants, animal repellants, and insect repellants.

B. Only those pesticides registered with EPA in compliance with the Federal Environmental Pesticide Control Act, or with State or local agencies may be used on the site.

C. Only pesticides noted as safe for use near lakes and aquatic environments shall be used.

D. The Contractor shall provide rodent and pest control as necessary to prevent infestation of construction or storage areas, employing methods, and use materials which will not adversely affect conditions at the site or on adjoining properties.

E. Prior to the use of any pesticide on or within USIBWC's ROW, the Contractor shall submit a pesticides use plan.

1. A pesticide use plan is not required for insect repellant to be applied directly to clothing, or for small quantities of aerosol insecticides, such as fly and spider sprays, to be applied within or directly to offices or shop buildings.

2. Submit the pesticide use plan when any chemicals or applications meet one or more of the following:
   a. Chemicals categorized by the EPA for restricted use.
   b. Chemicals applied to or that can reasonably be expected to contact water.
   c. Chemicals expected to endanger threatened animal or plant species.
   d. Applications involving 2,560 acres or more.

3. For each pesticide:
   a. Identify the entity to be responsible for pesticide application.
   b. Provide the complete label as defined by Federal Insecticide Fungicide Rodenticide Act, as amended, containing the following:
   (1) Brand, common and chemical names.
   (2) Ingredients and net contents.
   (3) Use classification and registered uses.
   (4) Name and address of manufacturer or registrant, EPA registration number and the establishment number.
   (5) Directions for use, including safety information, warnings and precautions.
   c. Safety Data Sheet (SDS).

F. Keep records of pesticide types and amounts purchased, delivered, stored, mixed and actually used, and disposal means of excess. Provide copies of all records to the COR as well as keeping a copy at the jobsite for review.

1.14 EROSION PROTECTION

A. The Contractor shall use industry Best Management Practices (BMP) for erosion control and construction stormwater containment and permits.

B. The Contractor shall plan and execute construction and earthwork by methods to control surface drainage from cuts and fills and from borrow and waste disposal areas, to prevent erosion and sedimentation.

C. The Contractor shall hold the areas of bare soil exposed at any time to a minimum.

D. The Contractor shall provide temporary control measures such as berms, dikes, and drains.

E. Vegetation for Erosion Control-Topsoil Salinity

When using vegetation as a method for temporary erosion control, Contractor shall be responsible for using topsoil with salinity levels that are conductive to plant growth, particularly for establishment of native grasses and forbs.

F. Prior to completion of this Contract, a vegetative cover as noted in Section 32.92.00 shall be established to control erosion.

G. The Contractor shall construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode.

H. The Contractor shall apply water or use other methods subject to the COR's compliance confirmation which will keep dust in the air to a minimum.

I. The Contractor shall revegetate all areas disturbed during construction.

1.15 PAINT AND SOLVENT CONTROL

The Contractor shall comply with all requirements of regulatory agencies in use, storage, application, and disposal of paints and solvents, and containers for paints and solvents. All disposals shall be at a compliance confirmed legal disposal site.

1.16 HYDROCARBONS

A. Fuel, oil, hydraulic fluid, lubricants, and other petrochemicals shall not be stored within the 100 year floodplain. The 100 year floodplain is defined as top of left levee to top of right levee.

B. All stored petrochemicals and hydrocarbons must have a secondary containment system capable of containing twice the volume of the project. Appropriate spill cleanup materials must be available onsite at all times during construction.

1. Storage tanks shall have a capacity of 1,100 gallons or less or shall be properly licensed by the state where the tank is located.

C. The Contractor shall maintain all of their equipment, both onsite and at all PSLs, in good working order to prevent drips and leaks.

1. Leaking equipment shall not be used.
2. Leaking equipment shall be red tagged by the COR. This equipment must be removed from the site until all leaks have been corrected.

D. All equipment shall be cleaned (pressure washed and/or steam cleaned) of external oil, grease, dirt and mud, and all leaks repaired prior to arriving at the project site.

1. All equipment will be inspected by the CQC and the County of El Paso Inspector before unloading at site.
2. Any leaks or accumulations of grease shall be immediately corrected.

3. A written log of inspections and maintenance must be completed and maintained throughout the project period.

E. All equipment (heavy equipment, chainsaws, ATVs, other hand power tools, etc.) shall be fueled outside of stream adjacent riparian areas and wet areas and at least one hundred (100) feet from any surface water. Specific fueling areas may be approved and designated by the COR.

F. Used hydrocarbons shall be disposed of by the Contractor according to local, state, and Federal regulations at legal disposal sites.

G. Any soil contaminated by hydrocarbons shall be removed from the site and disposed of according to the appropriate regulations.

1.17 PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

A. General
Federal legislation provides for the protection, preservation, and collection of scientific, prehistorical, historical and archeological data, including relics and specimens, which might otherwise be lost due to alteration of the terrain as a result of any Federal construction project.

1. Scientific data and specimens include, but are not limited to: fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest, and that provide information about the history of life on earth.

B. If the Contractor intends to conduct operations which will affect other public or private lands, including but not limited to quarry operation, aggregate production, and use of borrow sources or waste areas, they shall provide the County of El Paso a minimum of forty five (45) days notice to evaluate the site or they shall provide a certification, signed by a qualified Cultural Resource Professional, that the Contractor’s performance under a resultant Contract will in no manner adversely impact any historic property (36 CFR 800).

1. A qualified Cultural Resource Professional is someone that meets the Secretary of the Interior's Standard and Guidelines minimum education and experience requirements for archeology or historic architecture. See http://www.nps.gov/history/local-law/arch_stnds_9.htm.

C. The Contractor and any subcontractors shall comply with state historical preservation laws (see State's Historical Preservation Office (SHPO)) when operating on non-Federal and non-Indian lands. Any person who, without permission, injures, destroys, excavates, appropriates, or removes any historical or prehistorical artifact, object of antiquity, or archeological resource on public lands of the United States is subject to arrest and penalty of law.

D. Discovery of Resources

1. Should the Contractor, or any of the Contractor's employees, or parties operating or associated with the Contractor in the performance of this Contract discover evidence of possible cultural, scientific, prehistorical, historical, or archeological resources, the Contractor shall:
   a. Immediately cease work at that location.
   b. Immediately notify the COR orally, giving the location and nature of the findings.
   c. Follow with written confirmation to the COR within two (2) days.
2. In addition to notifying the COR, where the discovery occurs on state, municipal, or private lands, notify the appropriate state officials as prescribed by state law.
3. If a cultural resource is determined by the County of El Paso to be a Native American cultural item, then the Contractor shall cease the activity in the area of the discovery, make a reasonable effort to protect the items discovered, and wait for written approval from the CO before resuming activity. This requirement is prescribed under the Native American Graves Protection and Repatriation Act (NAGPRA).
4. If the discovery occurs on tribal lands, the Contractor shall immediately orally notify the responsible tribal official and the COR and follow with written confirmation within two (2) days to the responsible tribal official and the COR.
5. Exercise care so as not to disturb or damage cultural resources uncovered during construction activities and provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the CO.
6. Do not resume work in the area of discovery until receipt of written notice to proceed from the CO.

E. Discovery of Human Remains or Native American Artifacts

1. Should the Contractor, or any of the Contractor's employees, or parties operating or associated with the Contractor in the performance of this Contract discover evidence of human remains or burials, the Contractor shall:
   a. Immediately cease work at that location and within a one hundred (100) foot radius.
   b. Immediately notify the COR orally, giving the location and nature of the findings.
   c. Follow with written confirmation to the COR within twenty four (24) hours.
2. In addition to all Federal regulations, any human remains or Native American artifacts found on private property or state owned land used as part of this project is subject to all applicable state regulations.
   a. See Texas Health and Safety Code §711-715 http://www.statutes.legis.state.tx.us/Docs/SDocs/HEALTHANDSAFETYCODE.pdf

3. Exercise care so as not to disturb or damage any remains or artifacts uncovered during construction activities and provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the CO.
4. Do not resume work in the area of discovery until receipt of written notice to proceed from the CO.

F. Where appropriate by reason of discovery, the CO may order delays in time of performance or changes in work, or both. When such delays or changes are ordered, an equitable adjustment will be made in the Contract in accordance with applicable clauses of the Contract.

G. Destruction of Archaeological Resources
Any person who excavates, removes, damages, alters, or defaces or attempts to excavate, remove, damage, or otherwise alter, or deface any archaeological resource located on public lands or Indian lands is subject to a maximum of five years in prison and $250,000 fine, as prescribed under Sections 6 and 7 of the Archaeological Resources Protection Act (ARPA). State law may provide other penalties on non-Federal lands.

H. The Contractor shall insert this Section (1.17 Preservation of Historical and Archaeological Data) in all subcontracts which involve performance of work on ground disturbing activities.

1.18 MIGRATORY BIRDS

A. Bird species that are protected under the Migratory Bird Treaty Act (MBTA) may nest in areas containing trees or other suitable habitat within the project limits.
1. When possible, construction activities should be scheduled to occur outside of the migratory bird nesting season (from the March 1 through August 31).
2. However, if construction activities must occur during the nesting season of birds protected under the MBTA, then the areas proposed for disturbances shall be surveyed and flagged for any nesting birds prior to construction to avoid inadvertent destruction of active nests and eggs.
3. If nesting birds are found during this survey, the birds and any related eggs must be relocated or mitigated at the Contractor's expense prior to starting construction.

B. US Fish and Wildlife (FWS) regulations do not allow for the collection or transport (dead or alive) of any migratory birds nor removal of their nests without a permit issued by the FWS Regional Bird Permit Office. If birds or nest removal is required, the Contractor shall call the COR. The COR will coordinate with a USIBWC FEM/biologist so that they identify, coordinate, and acquire a temporary permit to collect the bird(s).
1. The Contractor or the FEM shall notify the COR of any dead birds found on the project site.

1.19 NOXIOUS WEEDS

A. In order to prevent the potential spread of noxious weeds into work areas, Contractor shall be required to use weed-free equipment.

B. Pressure wash all equipment to remove dirt and vegetation before bringing onsite to limit introduction of noxious weeds.

C. All subsequent move-ins of construction equipment shall be treated in the same manner as initial move-in.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

A. Stormwater Pollution Prevention Plan

1. The Contractor shall prepare and obtain the County of El Paso compliance confirmation of a Stormwater Pollution Prevention Plan (SWPPP) for the project site prior to mobilization. The Contractor shall implement their SWPPP in accordance with EPA and General Construction Permit 2012 TCEQ and Construction General Permit TXR150000.
2. The Contractor shall develop and implement an SWPPP for all project-specific locations within and outside of the USIBWC's right of way in accordance with the specific or general stormwater permit requirements.
3. Copies of Notice of Intent (NOI), Waivers, and Notice of Terminations (NOT) shall be provided to the COR.
4. The Contractor shall prevent water pollution from stormwater associated with project site.
5. The plan shall include the BMPs to be used.
6. The SWPPP shall be signed, sealed, and dated by a professional engineer and shall be available and posted on the project site during the duration of construction activities.
7. A general plan covering all work areas is not permitted; each PSL must be addressed separately.
8. It is the Contractor's responsibility to obtain all permits and clearances required by the SWPPP prior to commencement of construction.

B. Other General Responsibilities

1. Phasing

The Contractor shall implement control measures in the area to be disturbed before beginning construction. Disturbances shall be limited to those areas shown on the Contract Drawings. If, in the opinion of the County of El Paso, the Contractor cannot control soil erosion and sedimentation resulting from construction operations, the County of El Paso will limit the disturbed area to that which the Contractor is able to control. The Contractor shall minimize disturbance to vegetation.

2. Maintenance

The Contractor shall immediately correct ineffective control measures, implement additional controls, and/or remove excavated material within the time requirements specified in the applicable stormwater permit.

3. Stabilization

The Contractor shall stabilize disturbed areas where construction activities will be temporarily stopped in accordance with the applicable stormwater permit and establish a uniform vegetative cover.

4. Finished Work

Upon acceptance of vegetative cover, the Contractor shall remove and dispose of all temporary control measures, temporary embankments, bridges, matting, falsework, piling, debris, or other obstructions placed during construction that are not a part of the finished work. Areas where temporary control measures are removed shall be reshaped and seeded.

5. Restricted Activities

a. Disposal areas, stockpiles, or haul roads shall not be located in any wetland, water body, or streambed unless specifically allowed on the Contract Drawings.
b. The Contractor shall not install temporary construction crossings in or across any water body without the prior compliance confirmation of the appropriate resource agency and the County of El Paso.
c. The Contractor shall restrict construction operations in any water body to the necessary areas as shown on the Contract Drawings or applicable permit; use temporary bridges, timber mats, or other structurally sound and non-eroding material for stream crossings; provide protected storage area for paints, chemicals, solvents and fertilizers at a compliance confirmed location; keep paints, chemicals, solvents and fertilizers off bare ground and provide shelter for stored chemicals.
d. No equipment repairs shall occur on or in the floodplain/channel of the Rio Grande.
e. Unless compliance confirmed by the COR, all equipment shall be parked at the Contractor's staging area or at the stockpile site at the end of each work shift.

6. Structure Intakes

All structures shall be protected with silt fence or other appropriate BMP.

7. Installation, Maintenance and Removal Work
   a. The Contractor shall perform work in accordance with the specific or general stormwater permit; install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until earthwork construction and permanent erosion control features are in place or the disturbed area has been adequately stabilized as determined by the County of El Paso.
   b. If a device ceases to function as intended or it has visible damage, the Contractor shall repair or replace the device or portions thereof as necessary.
   c. The Contractor shall remove sediment, debris, and litter. When compliance confirmed, sediments may be disposed of in the right of way in areas where the material will not contribute to further siltation. The Contractor shall dispose of removed material in accordance with Federal, state, and local regulations.
   d. The Contractor retains ownership of stockpiled material and must remove it from the project when new installations or replacements are no longer required.
   e. The Contractor shall remove devices upon compliance confirmation or when directed. Upon removal, finish-grade and dress the area. Stabilize disturbed areas in accordance with the permit and/or as shown on the Contract Drawings or directed.

C. The Contractor shall submit the SWPPP to the COR for review and compliance confirmation.

3.2 CONTROLS

A. In addition to BMPs identified in the Contractor's SWPPP, the Contractor shall provide the following as required:

1. Construction Exits / Entrances
When tracking conditions exist, prevent traffic from crossing or exiting the construction site or moving directly onto a public roadway, alley, sidewalk, parking area, or other right of way areas other than at the location of construction exits. The Contractor will be required to use a street sweeper, blade, water truck, or other equipment if other methods of track out control fail to prevent build up of mud or dust on the roadway.

2. Earthwork for Erosion Control
   a. The Contractor shall perform excavation and backfill operations to minimize erosion and to remove collected sediments from other erosion control devices.
   b. The Contractor shall ensure that:
      (1) Earth dikes, swales, or combinations of both are placed along the low crown of daily lift placement to prevent runoff spillover
      (2) Swales and dikes are placed at other locations to prevent runoff spillover or to divert runoff
      (3) Cuts are constructed with the low end blocked with undisturbed earth to prevent erosion of hillsides

(4) Sediment traps are constructed at drainage structures in conjunction with other erosion control measures.

3. Removal of Sediment and Debris
The Contractor shall remove sediment and debris when accumulation affects the performance of the devices.

4. Drip Pans
The Contractor shall be responsible for providing oil drip pans to be set under any vehicle left parked overnight or being repaired within USIBWC ROW to prevent oil drips from contaminating the soil.

3.3 ENVIRONMENTAL COMMITMENTS

A. The Contractor shall power wash all equipment prior to using onsite.

1. If equipment is demobilized and then returned to the project, it shall be power washed again.

2. Haul trucks are exempt from this requirement unless they are only used onsite.

B. Leaking or dripping equipment is not allowed to be operated on this worksite. The Contractor shall ensure that all equipment is in sound working order.

C. Equipment with oil seeps may require periodical power washing to ensure that oil is not deposited within USIBWC ROW.

D. The Contractor shall perform construction operations incorporating any environmental commitments identified in the project's environmental documents.

E. The Contractor shall include permission for the County of El Paso access in arrangements for private lands used as staging areas, quarries, aggregate sources, borrow sources, etc. The County of El Paso access to the private land shall be to identify cultural resources and conduct appropriate inspections.

--End of Section—

01.78.39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 SUBMITTALS

A. Required submittals in this Section include:

1. The Contractor shall submit to the County of El Paso, within forty five (45) calendar days after completion of construction phase of Contract, a record copy of the Record Drawings for review and compliance confirmation.
   a. Record Drawings shall be submitted to the COR for review and approval.
      (1) If review of the preliminary Record Drawings reveals errors and/or omissions, the drawings will be returned to the Contractor for corrections.
      (2) The Contractor shall make all corrections and return the Record Drawings to the COR within ten (10) calendar days of receipt.
      (3) Full compliance with this Section is a condition precedent to Substantial Completion and the commencement of any warranty periods set forth in the Contract documents.
   b. Full compliance with this Section must be completed prior to submittal of the Contractor's final payment application.

1.3 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.4 GENERAL

A. Record Drawings (as-builts or as-constructed drawings) shall be performed under the supervision of a registered Engineer or Surveyor, licensed to practice in Texas.

B. The terms "drawings," "Contract Drawings," 'drawing files," "working record drawings," and "plans" refer to Contract Drawings which are revised to be used for Record Drawings showing end of project as-built conditions.

C. Record Drawings are an official record of the project at the time of construction completion. The original "as-designed" Contract Drawings are modified to show all additions, deletions, and other changes made during construction. Accurate Record Drawings are very important for project operation and maintenance as well as future modifications.

D. The Contractor shall keep one current and updated record copy of all Technical Specifications, Contract Drawings, addenda, supplementary drawings, shop drawings, modifications, and clarifications at the Contractor's field office. Specifications, Contract Drawings, supplementary drawings, and shop drawings shall be annotated to show all changes made during the construction process. These shall be available to the County of El Paso on a monthly basis to inspect for accuracy and completeness. Failure by the Contractor to maintain a current and satisfactory record copy of the aforementioned documents shall result in retainage of an appropriate amount of the monthly pay estimate, as determined by the County of El Paso.

1.5 RECORD DRAWING REQUIREMENTS

A. Any deviations from plan design elevations, layout, quantities, coordinates, slopes, dimensions, workmanship, material, and method of constructability shall be clearly noted on the Record Drawings OR create new drawings that only show the finished construction project.

1. If new drawings are created, their layout, numbering, etc. shall match that of the design/construction drawings.
2. If new drawings are created, they must meet all of the requirements noted in Paragraph 1.10 below.

B. Cross out words like "equal to" or "similar to" and replace them with the specific information used during the construction process.

C. Where Contract Drawings or Specifications present options, show only the option used in construction on the Record Drawings.

D. Use written explanations to describe changes. Do not simply reference modifications, RFIs, or other related documents.

E. The following information is provided to improve the quality of and to facilitate preparation of the Record Drawings. The most important guideline is that the marked-up changes on the drawings shall be complete and understandable. Someone with no knowledge of the design or construction should be able to review the Record Drawings and clearly know what exists in the field and how project was constructed.

1. Use written explanations on Record Drawings to describe changes from design. Do not rely on graphic means to convey the revision.
2. Legibility of lettering and digit values shall be precise and clear when marking drawings and shall clarify ambiguities concerning the nature and application of change involved.
3. When changes are made, cross out all features, data, and captions that relate to that revision.
4. When changes are required on small-scale drawings and in restricted areas, suggest large-scale inserts be drawn or sketched, with leaders to the location where applicable.
5. Provide a legend to delineate as-built features.
6. Be sure descriptive markings conform to legend symbols shown.
7. Errors in notation on design drawings shall be corrected and shall clearly show as-built condition.

F. Record Drawings shall clearly delineate what features are as-built and which features were on the original construction drawings.

1. Record Drawings shall only be printed in black and white.
2. "As-Designed" items that are not shown on the Record Drawing shall be frozen instead of deleted.

1.6 CONTRACTOR RECORD DRAWING PREPARER

Only personnel proficient in the preparation of engineering drawings and AutoCad (at least three (3) years experience) shall be employed to modify the original Contract Drawings and prepare additional new drawings.

1.7 GOVERNMENT AUTOCAD DRAWINGS

A. The Contractor will be furnished the "as-designed" drawings by the County of El Paso. The drawings are in AutoCad 2015 format.

1. The County of El Paso makes no representation regarding the accuracy or completeness of the electronic files received.
2. The electronic files are not construction documents. Differences may exist between these electronic files and corresponding contractual hard copy/pdf construction documents or the site at the time of construction. In the event that a conflict arises

between the hard copy/pdf drawings provided by the County of El Paso and the electronic files, the hard copy/pdf drawings shall govern. The Contractor is responsible for determining if any conflicts exist.

3. Record Drawing files submitted by the Contractor shall have different filenames than the "as-designed" files.

1.8 CERTIFICATION OF RECORD DRAWINGS

A. Record Drawings shall be signed and sealed by a registered, professional engineer or surveyor.

1. The Record Drawings shall contain a statement that they are not considered a certified document as to the original design, but only as to the record drawing changes.
2. The Record Drawings shall contain a certification similar to: "I certify that the locations, elevations, depths, and comments regarding construction accurately reflect existing field conditions."
3. If the engineer signing the drawings did not personally observe and confirm the record conditions or have it done under their direct supervision, then the engineer must clearly indicate the source of the as-built information (eg, field changes noted are from mark-up drawings supplied by the Contractor).
   a. The engineer may include a caveat on the Record Drawings with a notation as to what they actually confirmed based upon information they obtained through observation, construction inspection, interview, samples, or other useful information acquired during construction of project.

1.9 MINIMUM DRAWING REQUIREMENTS

A. Stamp sheet with "RECORD DRAWING" and include Contractor's name, County of El Paso Contract number, and date.

1. The drawing number, name, and description shall not be changed.
2. If Record Drawings are revised after acceptance/completion, thoroughly note so in a revision block.

B. Record Drawings are required to reflect the same degree of detail as the original Contract Drawings. This includes detailing items and providing elevations in profiles.

C. Provide elevations, alignments and related information for all related earthwork.

D. Provide levee centerline elevation, hinge point elevation, toe elevations, alignment, ramps and related information for all areas of levee construction.

E. Provide final topography in plan and profile sheets.

F. Note surveyed levee hinge points and toes on topography.

G. Show new centerline on topography.

H. Provide elevations of the retaining wall within the construction area or project limits.

I. Provide edge of road base data for the aggregate road surface built as part of this Contract.

J. Provide edge of road base data for the existing levee roadway that construction abutted as part of this Contract.

K. Detail locations, depths, and description of any utilities encountered during construction.

L. Record Drawings shall include, at a minimum, all original Contract Drawings labeled as:

1. "Cover Sheet S-1"
2. "General Notes S-2"
3. "Proposed Plan and Profile Levee Road Alignment “A” S-3"
4. "Levee Road Typical Section & Details S-4"
5. "Levee Road Cross Sections S-5"
6. "Levee Road Cross Sections S-6"
7. "Levee Road Cross Sections S-7"
8. "Storm Water Pollution Prevention Plan S-8"
9. “Temporary Erosion, Sediment and Water Pollution Control Measures S-9”
10. “Temporary Erosion, Sediment and Water Pollution Control Measures S-10”
11. “Environmental Permits, Issues and Commitments S-11”
12. “Temporary Border Fence Foundation Details S-12”
13. “Riprap Details S-13”
14. “Construction Joint and Waterproofing Details S-14”

M. Plan and Profile drawings shall conform to:

1. All items, notes and callouts that start with "proposed" or include "to be paid for under" shall not be shown on the Record Drawings.
2. The levee profile shall:
   a. Include the as constructed top of clay embankment centerline profile.
   b. Include the as constructed top of aggregate surface centerline profile.
   c. Include the elevation for the constructed top of clay embankment centerline.
   d. Include the elevation for the constructed top of flexbase centerline.
   e. Include the elevation of any other features shown on the profile.
   f. Not include the elevation for the prop. TOLE.

g. Not include the elevation for the min. TOLE.
h. Not include the elevation for existing ground at proposed centerline.

3. The levee plan view shall:
   a. Include only as constructed topography.
   b. Not include the silt fence or construction exits.
   c. Only include as constructed centerline.
   d. Include as constructed levee hinge points (usually the edge of levee roadway).
   e. Include as constructed levee toes.

PART 2 - PRODUCTS

2.1 FINAL RECORD DRAWINGS

A. Paper Copies

1. Two (2) complete signed and sealed plan and profile set printed at half scale on 11"x17" paper, (ANSI B).

B. Electronic Copies

1. Five (5) electronic sets of drawings in pdf format containing all signatures and stamps.
   a. Pdf files shall be configured to allow for high quality printing.
   b. Pdfs shall be generated from AutoCad with a minimum of 600 dpi.
   c. Pdfs shall be rotated to drawing/sheet orientation.
   d. Pdfs shall be the true size of the drawings (11"x17" or 22"x34" as appropriate).
   e. Pdf files shall allow extraction of sheets.
2. Five (5) electronic sets of drawing in AutoCad (dwg) 2015 format. This set shall not contain signatures nor official seals/stamps but shall fully contain all necessary items to access the data in AutoCad.
   a. All associated topographic, survey, 2D data, 3D data, and cross referenced files shall be included in this drawing set.
   b. Include all shx line type files, ctb pen setting files, etc. required to replicate the drawings shall be included with the drawing set.
   c. All cross referenced files shall be saved with relative paths.
   d. All data shall exist in model space (AutoCad model tab).
   e. A correctly scaled layout with full border and delineated print area shall be shown in AutoCad's layout tab.
   f. All AutoCad files shall be georeferenced and contain metadata and GIS projection files.
   g. No more than nine (9) Record Drawings shall be included in each AutoCad file.
   h. Drawing items shall be associated to correct layers. Minimum Record Drawing layers shall include: dimensions, text/annotation, contours-major, contours-minor, elevations, survey data/points, break lines, survey border, concrete, irrigation gates, and vehicle gates.

i. Record Drawing layer names shall be descriptive in nature and shall start with "RD."

3. Please note that some versions of AutoCad do not "export" 3D data that is readable to AutoCad 2015. For the Record Drawings to be accepted by the County of El Paso, **ALL** 3D data including points, contours, breaklines, etc. shall be readable with all attached data. In other words, a point shall exist as a 3D point and not as a block or a 2D point.

C. Record Drawings and completed work may be rejected by the County of El Paso until such work is corrected by the Contractor and re-certified on the Record Drawings by said Engineer or Land Surveyor.

1. AutoCad project files without full 3D points and lines will be rejected.

D. Organize paper drawing sets into manageable sizes, bind with durable cover sheets and print titles and identification information on cover.

E. All CD/DVDs shall be labeled with the Contract Name, County of El Paso Contract Number, general contents, and preparing engineer/surveyor name.

PART 3 - EXECUTION

(Not Used)

--End of Section--

This page intentionally left blank for double sided printing.

TECHNICAL SPECIFICATIONS
DIVISION 02
EXISTING CONDITIONS

This page intentionally left blank for double sided printing.

02.02.00
EXISTING CONDITIONS & FACILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 00.31.32-Geotechnical Data

B. Section 01.78.39-Project Record Documents

C. Section 02.21.00-Surveys

D. Section 31.11.00-Preparing Right of Way

1.3 REFERENCE STANDARDS

A. Federal Acquisition Regulation (FAR)

1. FAR 52.249-10, Default (Fixed Price Construction)

B. US Army Corps of Engineers (USACE)

1. Engineer Technical Letter (ETL) No. 1110-2-583, "Guidelines for Landscaping Planting and Vegetation at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures," April 30, 2014

1.4 SUBMITTALS

A. Required submittals in this Section include:

1. Copies of notifications provided by Contractor.
2. Flood Protection Plan.

1.5 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 GENERAL

A. The Contractor shall protect all existing survey markers, piezometers, benchmarks, cross arm stations, base plates, roadways and roadway appurtenances, utilities (underground and above-ground), drainage and irrigation facilities, and trees/vegetation within the right of way or adjacent properties not designated for modification, construction, and/or removal, and shall restore damaged or temporarily relocated utilities, facilities, and trees/vegetation to a condition equal to or better than prior to such damage or temporary relocation, all in accordance with the Contract documents.

B. The Contractor shall plan and conduct operations to ensure the protection of existing features and ongoing and completed construction. Damages occurring during the course of this construction Contract as a result of the Contractor's actions or negligence shall be repaired by the Contractor at no expense to the County of El Paso.

C. Damage shall be restored to a condition equal to or better than prior to such damage or temporary relocation, all in accordance with the Contract documents.

D. Analyses, designs, and details associated with the repairs shall be prepared by a compliance confirmed design firm at no expense to the County of El Paso. The Contractor shall submit the designs for COR review and shall not begin work until the design has been compliance confirmed.

E. In some cases the repair may require an upgrade. If the upgrade is at the request of the County of El Paso, then the Contractor shall be responsible for the expense of the design in its entirety including the upgraded features. However, the County of El Paso will provide an equitable adjustment in cost to cover the expense of the construction associated with the upgrade.

1.7 USIBWC OWNED RIGHT-OF-WAY

A. The Contractor shall begin site work once preconstruction submittals are complete and the Notice to Proceed has been issued.

B. When landowners adjacent to USIBWC's right-of-way have encroached onto USIBWC property with landscaping, fences, or other items, the Contractor shall provide said landowner with a least seven (7) days notice prior to removal of encroachments.

   1. Copies of these notices shall be provided to the COR.

C. If utilities within the right-of-way must be relocated to proceed with construction, the Contractor shall notify the utility owners.

   1. Copies of these notices shall be provided to the COR.

1.8 USIBWC RIGHT-OF-WAY EASEMENT

A. When construction will occur on USIBWC right-of-way where USIBWC does not own the property, but only has an easement for the project, the Contractor shall not do any work that would affect items not owned by USIBWC (e.g., roadways and roadway appurtenances, railroads, utilities including oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line, any landscape features (trees/vegetation), any facility, fences, or any other structure) until authority has been secured by the owner.

B. The Contractor shall give said owner due notice of its intention to begin work and if required by said owner and shall remove, shore, support, or otherwise protect such roadways and roadway appurtenances, railroads, utility; and any other features or items not designated for removal, modification, or construction.

1.9 SURVEY MARKERS

A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers without prior authorization from the COR.

B. All survey markers, brass caps, or monuments discovered during construction, whether noted on the Contract Drawings or not, shall be surveyed to ensure that they can be accurately restored after construction activities have been completed.

C. The Contractor shall be required to restore survey markers noted on the Contract Drawings or visible above ground that are disturbed during construction operations. Restoration of the survey markers shall be in accordance Section 02.21.00.

1.10 ROADWAYS AND APPURTENANCES

A. Signs and Markers
The Contractor shall not destroy, remove, or otherwise disturb any existing roadway signs or markers, unless otherwise specified in the Contract Drawings. The Contractor shall accurately restore or replace any existing roadway signs or markers immediately and as approved by the owner of the roadway.

B. Pavement or Paved Structures
All paved areas cut or damaged during construction shall be replaced with similar materials of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract documents or in the requirements of the owner of the pavement of paved structures. The pavement restoration requirement to match existing sections shall apply to all components of existing sections, including sub-base, base and pavement. Temporary and permanent pavement shall conform to the requirements of the affected pavement. Pavements which are subject to partial removal shall be neatly saw-cut in straight lines.

1. Temporary Resurfacing
Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

2. Permanent Resurfacing
In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw-cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw-cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

C. Sidewalks or Private Roads
Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions. If no such period of time is so fixed, the Contractor shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

1.11 UTILITIES

A. The Contractors shall contact the state's 811 (www.texas811.org) at least forty eight (48) hours in advance of any construction work to allow utility operatory to check and mark locations of existing utilities within the project limits.

B. The Contractor is required to hire a utility locator to survey the project limits to locate any utilities not indicated in the Contract Drawings. The Contractor shall immediately notify the COR of any located utilities not indicated in the Contract Drawings; immediate verbal notification is to be followed-up with written notification to the COR within forty eight (48) hours.

C. All underground utilities and other improvements which may be impaired during construction operations shall be protected by the Contractor, regardless of whether or not the utilities are indicated in the Contract documents. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

1. Special attention is called to the existing structures that are called out in the Contract Drawings.

D. The Contractor shall be responsible for exploratory excavations it deems necessary to determine the exact locations and depths of any utilities, including irrigation facilities, which may interfere with its work.

1. All such exploratory excavations shall be performed as soon as practicable after Notice to Proceed and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor’s progress.
2. When such exploratory excavations show the utility location as indicated in the Contract documents to be in error, the Contractor shall so notify the COR.

E. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

F. It is the Contractor's responsibility to document by either photographs or video ALL areas where pipes, structure, and utilities are located PRIOR to and after excavation.

1. The COR shall be notified in writing of any existing leaks or other visible damage prior to Contractor's work.
2. Any leaks and/or damage not detected prior to the Contractor beginning work around the pipes or utilities will be repaired and/or replaced by the Contractor at no cost to the County of El Paso.
3. If vegetation obscures pipes, structures, or utilities, the Contractor shall carefully remove obscuring vegetation in order to clearly document the pipe/utility and its condition.

G. Utilities to be Moved

1. In case it shall be necessary to move the property of any public utility or franchise holder, the Contractor shall coordinate the move with such utility company or franchise holder.

2. Only upon failure of the utility company or franchise holder to abide by the Contractor's request will the County of El Paso become involved to require the relocation of the utilities.
3. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the County of El Paso a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

H. Utilities to be Removed

1. Where the proper completion of the work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the County of El Paso and the owner of the facility.
2. In all cases of such temporary removal or relocation, restoration to the former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.
3. Abandoned utilities shall be removed within the area of construction.

I. Government's Right of Access

The right is reserved to the County of El Paso and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the work of this Contract.

J. Underground Utilities Indicated

It is the Contractor's sole responsibility to field-verify locations and elevations of all the underground utilities indicate in the Contract Documents and coordinate with the utility owners for access, permit, and/or fee as required by the owners and project, prior to construction.

1. It is NOT the responsibility of the County of El Paso to provide or verify the said information for any of these utilities in the field.
2. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the Contractor, unless otherwise repaired by the owner of the damaged utility.
3. If the owner of the damaged facility performs its own repairs, the Contractor shall reimburse said owner for the costs of repair.

K. Underground Utilities Not Indicated
In the event that the Contractor damages existing utility lines that are not indicated or the locations of which are not made known to the Contractor prior to excavation, a verbal report of such damage shall be made immediately to the County of El Paso Inspector and COR and a written report thereof shall be made promptly thereafter.

1. The Contractor shall immediately notify the utility owner of the damage, except under no circumstances shall the Contractor notify licensed drainage and/or irrigation districts or structure owners.
   a. In the case of drainage and/or irrigation districts or private structure owners, the County of El Paso shall be responsible for contacting the owner.
   b. Any repairs made to drainage and/or irrigation structures without concurrence or direction by the County of El Paso shall be at the Contractors expense and responsibility.
2. All utilities shall be fully documented on the Record Drawings.

L. Costs of Repairs
Costs of repairing utilities, even when damage is not due to failure of the Contractor to exercise reasonable care in locating and identifying utilities, will be the responsibility of the Contractor.

1. Costs include equipment on the project which was actually working on that portion of the work which was interrupted or idled by repair or relocation of such utility facilities and which was necessarily idled during such work.

M. Compliance Confirmation of Repairs
All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.

N. Maintaining in Service

1. Unless indicated otherwise, oil and gasoline pipelines, power and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles and overhead power, and communication wires and cables encountered along the line of the work shall remain continuously in service during all the operations under the Contract.

O. Record Drawings
All found or relocated utilities shall be included in the Record Drawings in accordance with Section 01.78.39.

1.12 TREES, VEGETATION AND OTHER LANDSCAPE FEATURES

A. General

1. The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within the right-of-way and project limits and shall not trim or remove any trees unless such trees are noted on the Contract Drawings to be removed or have been compliance confirmed for removal by the COR.
2. Existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency and/or the County of El Paso.

B. Vegetated areas damaged during construction shall be repaired to match the preconstruction condition to the satisfaction of the land owner and the County of El Paso.

C. Vegetation Removal
The Contractor shall remove all existing vegetation including, but not limited to, trees, and shrubs lying within the Temporary Construction Limits (TCL) indicated on the Contract Drawings. The Contractor shall comply with the requirements of the Engineer Technical Letter (ETL) No. 1110-2-583 in vegetation removal activities.

1.13 NOTIFICATION BY THE CONTRACTOR

A. Prior to any work in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines, all buried electric power, communications, or television cables, all traffic signal and street lighting facilities, all roadway and state highway rights-of-way, or other existing structures, the Contractor shall notify the respective authorities representing the entities, owners, or agencies responsible for such facilities not less than three (3) working days nor more than seven (7) working days prior to excavation so that a representative of said entities, owners, or agencies can be present during such work if they so desire.

B. As part of this Section, the Contractor shall be required to notify adjacent landowners, renters, or other occupants of adjacent property of the construction operations in writing, and copies of these notifications shall be provided to the COR.

C. Copies of these notices shall be provided to the COR.

1.14 PROTECTION FROM ELEMENTS

A. The work area and Project-Specific Locations may be subject to flooding and the Contractor shall be responsible for protecting the work, existing conditions, and adjacent properties from floods and from any flood damage during the course of construction and prior to acceptance of the work by the County of El Paso.

B. Until final written acceptance of the project improvements by the CO, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. Protection of the worksite shall be in accordance with the Contract and Federal Acquisition Regulations (FAR). The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the project including material sites occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work as otherwise specified herein.

C. Flood Caused Suspension of Work

1. In the case of suspension of work from any cause whatsoever, the Contractor shall be responsible for the project and shall take such precautions as shall be necessary to prevent damage to the project, provide for normal drainage and shall erect any necessary temporary structures, signs, or other facilities at no additional cost to the County of El Paso.
2. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and soddings furnished under the Contract and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

D. Damage from the Elements

1. All damage and loss (whether caused by fire, flood, or any other casualty or happening) to work to be constructed or performed pursuant to the Contract (whether or not covered by partial payments made by the County of El Paso) shall be at the risk of the Contractor until final acceptance of the work by the County of El Paso, and no such damage or loss shall relieve the Contractor of, or in any way affect, the obligations to complete and deliver the work in accordance with the Contract requirements, irrespective of any insurance carried by the Contractor.
2. The Contractor shall assume full responsibility and expenses for removing, protecting, and returning to the work site, any and all equipment under their care which might be endangered by said fire, flood, or happening.
3. For any interference or delay in operations which might be caused by such incident(s).
   a. Weather caused delays shall be reviewed under Contract clause Time Extensions for Unusually Severe Weather.
   b. Delays caused by fire, flood, unusually severe weather, or Acts of God shall be reviewed under FAR 52.249-10, Default (Fixed Price Construction).
4. Any re-excavation, replacement of embankment, or other work made necessary by damage from floods, hurricanes, storms, or water of whatever source or quantity

during the course of construction and until final acceptance by the County of El Paso, shall be performed by the Contractor at their expense.

5. Repair Work
   a. Repair of work shall be pursuant to the original Contract requirements.
   b. Such repair work shall consist of restoring the in-place construction to the same state of completion to which such work had advanced prior to the occurrence.
   c. The County of El Paso reserves the right to make changes in the Contract Drawings and Technical Specifications applicable to the portions of the work to be repaired and if such changes increase the cost of repairing the damage over the County of El Paso's estimate of the cost of repair without the changes, the Contractor shall be paid for such increased costs and the increased cost amount shall not be considered in determining the cost of repair.
   d. Nothing in this Section shall be construed to relieve the Contractor of full responsibility for the risk of injury, loss, or damage to materials not yet incorporated in the work and to materials, tools, and equipment used to perform the work, or to relieve the Contractor of responsibility required under other Sections of the Contract documents.
   e. The provisions of this Section shall not be applicable to the repair of damage caused by an occurrence to any portion of the work accepted by the County of El Paso.

E. Flood Protection Plan

The Contractor shall develop and submit a Flood Protection Plan that includes the design for temporary controls for protection from floods.

1. Design elements of the Flood Protection Plan shall be designed by a licensed professional engineer and submitted to the COR for review. The COR shall review the submittal for compliance confirmation, but this shall not relieve the Contractor of the assigned responsibility of protection of the construction site.

2. The Flood Control Plan includes an Emergency Levee Closure Plan that details how the Contractor will close the levee within twenty four (24) hours when necessary. The Contractor must plan to close the levee within a twenty four (24) hour time frame in the event of emergencies. The plan shall describe how the work will be expedited to close the levee, secure the possible breach, and ensure the repair can survive the twenty five (25) year flood stage without collapse, breach, or damage to the remaining parts of the levee. The plan shall also include the method of closure, procedures for closure, and who is responsible for determine when a closure is needed from the Contractor’s management. From the Government’s side only the CO can order a closure.

3. The Flood Control Plan must be adapted to your site and work conditions. However, the basic components of a Flood Control Plan should include these, or similar, aspects.
   a. Stage 1: A flood watch has been issued by the NWS (National Weather Service) or the onsite superintendent enacts this stage. All work continues as normal but weather conditions and river levels are watched carefully.
   b. Stage 2: A flood warning has been issued by the NWS or the onsite superintendent. The Contractor continues to work but begins to limit the length of open excavations (breaches) in the levees.
   c. Stage 3: The Rio Grande begins to overbank. The Contractor should use their discretion about continuing excavation operations. Embankment (backfilling with material that meets Contract Sections) operations usually can continue. The Contractor should have sufficient equipment on hand to close all breaches if required. If spoil or stockpiles exist in the floodplain, the Contractor may want to begin moving them against the levees.
   d. Stage 4: Water begins to flow into the floodplain. The Contractor should begin to close all breaches immediately with material on hand (material does not need to meet Contract Sections). Any spoil or stockpiles located in the floodplain needs to be pushed up against the levee. All stockpile tops and levee crowns need to be flattened to allow the passage of emergency vehicles.
   e. Stage 5: Flood waters are up against the levee. The Contractor has stopped all levee construction work and is maintaining vigilance to protect breaches from developing in the levee.
4. The Contractor is reminded that they are required to use their own judgment to determine when to move to a different flood stage and what work to continue at any given time. Contractors should monitor the Rio Grande flows and current weather conditions. Releases from upstream dams also contribute to the river flows.
5. Once there is a potential for the river to exceed the banks and rise into the floodplain. It is recommended that the Contractor maintain strict surveillance on floodplain conditions in order to decide whether or not to invoke the flood protection plan for their project. The Contractor may always choose to amend any flood protection plan submittal, based on conditions and viable alternatives for working conditions in order to meet the specification requirements to protect the work, existing conditions, and adjacent properties.
6. Throughout all flood stages, the Contractor shall maintain surveillance of the water conditions and keep communications ongoing with the Government Inspector and COR.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

--End of Section—

02.21.00
SURVEYS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 REFERENCE STANDARDS

A. Federal Geographic Data Committee (FDGC)

1. Standards and Specifications for Geodetic Control Networks, Federal Geodetic Control Committee, September, 1984.

1.3 SUBMITTALS

A. Submittals shall be transmitted by the Contractor in accordance with the requirements of Section 01.33.00. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Survey Plan
   a. A complete Survey Plan which shall be submitted twenty one (21) days prior to beginning survey work.

b. Survey Plan shall include how lines and grades will be maintained, checked, and during construction.

2. Surveyor Resumes and Proof of Licensure
   a. Resumes shall be submitted of the registered land surveyors conducting the work twenty one (21) days prior to beginning survey work.
   b. During the course of the work, a resume shall be submitted for each new registered land surveyor working on the project at least twenty one (21) days prior to the beginning of work by such new registered land surveyor.

3. Sample Field Book or Data Layout
   a. A sample of the proposed survey field books or electronic data layout to be maintained by the Contractor's surveyor. The sample shall have sufficient information and detail, including example calculations and notes, to demonstrate that the field books will be organized and maintained in a professional manner.

4. Field Data and Calculations
   a. One copy of actual field data (original field book or electronic data) and calculations entered by the Contractor's Surveyor in the field book shall be submitted within two (2) days of completion of such field data collection, or calculations, except that the COR may request a copy of each day's field notes that are entered in the field books at the conclusion of that day.
   b. The Contractor shall coordinate with the COR for concurrence regarding submittal of electronic copies, prior to submitting in electronic format. Submittal format shall be included in the Contractor's Survey Plan.

5. All Survey Books, Data, and Documents
   a. After completion of construction, the Contractor shall submit all field survey books used by the surveyor to the County of El Paso if not already submitted. These documents will become the property of the County of El Paso.
   b. When survey data is submitted electronically, a stamped cover letter identifying the filenames and survey dates shall be submitted concurrently.

6. Survey verification of provided existing site conditions.

1.4 MEASUREMENT AND PAYMENT

A. The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.5 GENERAL

A. The Contractor shall establish required benchmarks and shall perform construction staking for use in their work.

B. The Contractor shall further:

1. Develop and make all detail surveys and measurements needed for construction including slope stakes, batter boards, piling, and pier layouts and all other working lines, elevations, and cut sheets.
2. Provide all material required for benchmarks, control points, batter boards, grade stakes, structure and pipeline elevation stakes, and other items.
3. Safeguard all points, stakes, grade marks, monuments, and benchmarks made or established on the work. Reestablish same and rectify all work improperly installed because of not maintaining, not protecting, or removing without authorization established points, stakes, marks, and monuments.
4. Provide such facilities as may be necessary for the COR to check line and grade points placed by Contractor.
5. The Contractor shall give notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the work. If the Contractor observes that the Contract are at variance therewith, they shall promptly notify the COR in writing.

1.6 CONTRACTOR'S SURVEYOR

A. The Contractor shall employ and retain as needed at the worksite a surveyor with the experience and capability of performing all surveyor and layout tasks required of the Contractor. The surveyor shall be a land surveyor registered in the State of Texas. All field surveys will be performed under the direct supervision of a registered surveyor in the State of Texas. Tasks included are:

1. Provide all surveying equipment required including transit, level, stakes, and required surveying accessories.
2. Furnish all required lines and grades for construction of all facilities, structures, pipelines, and site improvements.
3. Keep professional, accurate, well organized, and legible notes of all measurements and calculations made while surveying and laying out the work.

B. Unless otherwise allowed by state engineering/surveying rules and statues, all survey drawings shall be signed and sealed by a registered surveyor.

C. Primary control survey monuments damaged or destroyed by the Contractor will be reestablished by the Contractor. If the Contractor fails to reestablish said monuments, the County of El Paso shall do so at the Contractor's expense and will be deduct these costs from amounts due, or become due from the Contractor.

D. From established primary control points, the Contractor shall establish all lines and grades and elevations necessary to control the work and shall be responsible for all measurements that are required for execution of the work to the tolerances prescribed in the Contract.

E. The Contractor shall establish, place, and replace as required, such additional stakes, markers, and other controls as may be necessary for control, intermediate checks and guidance of construction operations.

F. The Contractor shall provide staking and controls for Government inspection unless waived by the COR.

1.7 SURVEY STAKING

A. The Contractor shall follow the following construction surveying guidelines for this project:

B. Utilities and Pipelines

1. Stake out utilities and pipelines including elevations.
2. Checkout prior to and during construction.

C. Cross Sections

1. Original, final, and intermediate as required, for the structure sites and other locations as necessary and as required to confirm construction in accordance with lines, grades, elevations, etc. in the Contract Drawings and to maintain and complete the Record Drawings.
2. At any location where construction stops or starts.
3. The maximum interval for cross section surveys shall be one hundred (100) feet.

1.8 SURVEY CONTROL

A. The North American Datum of 1983 (NAD83) state plane coordinate system shall be used.

B. All vertical data shall be in accordance with the North American Vertical Datum of 1988 (NAVD88).

C. All surveys shall be completed in U.S. feet.

D. Conversions from ground coordinates to grids coordinates shall be provided.

1.9 SURVEY ACCURACY

A. Temporary survey references set by the Contractor for the Contractor's own use shall be established to at least third order class I accuracy (i.e., 1:10,000). Construction staking used as a guide for the actual work shall be set at least third order class II accuracy (i.e., 1:5,000). The basis on which such orders are established shall be sufficient to provide the absolute margin for error specified below.

B. Staking shall be +/-0.10 feet horizontally and +/-0.05 feet vertically.

C. Survey calculations shall include an error analysis sufficient to demonstrate the required accuracy.

1.10 SURVEY RECORDS

A. Maintain a complete, accurate log of all control, and survey work as it progresses.

B. All survey data shall be in accordance with recognized professional surveying standards.

1. All original field notes and computations shall be recorded by the Contractor's surveyor in the Contractor furnished field books and shall be signed by the Contractor's surveyor.
2. The completeness and accuracy of all survey work and the completeness and accuracy of the survey records, including the field books, shall be the responsibility of the Contractor.
3. Failure to organize and maintain survey records in a professional manner to allow reasonable and independent verification of all calculations by the County of El Paso and to allow reasonable identification by the COR of all elevations, dimensions and grades of the work shall be cause for rejection of the survey records, including the field books.
4. Surveyor field notes and field books shall be available for review as part of the Record Drawing Agenda Item to be discussed at each Progress Meeting.

C. Illegible notes or data, or erasures on any page of the field books will also be considered sufficient cause for rejection of part or all of the field book.

D. Corrections by ruling or lining out errors will be satisfactory only if initialed by the surveyor.

E. Quantity Calculations

1. The Contractor's surveyor shall provide station, offset, and elevation data for the surveyed cross sections in an electronic ASCII file, formatted such that each line contains the baseline station, offset distance from the baseline, and elevation of the surveyed point. The fields in the ASCII file may be separated by a comma, tab, or other commonly used separator.
2. Volume calculations shall be performed by the average end area method. Computer programs used for calculating quantities shall be approved by the COR, and the program shall be provided to the County of El Paso so that independent verification of computed quantities can be made. The original plotted sections shall indicate the original ground line and the final lines and grade, as applicable. The elevation and offset shall be shown at each break point or shot on each section

so that these elevations and offsets can be used by the County of El Paso to verify quantity calculations.

F. Copied notes or data will be permitted. Survey notes shall be legible and shall be scanned into pdf format.

1. The minimum scanning resolution shall be 400 dpi for color and grayscale and shall be 600 dpi for black and white.
2. Color documents shall be scanned in color.

1.11 PERMANENT SURVEY MARKERS

A. Any permanent survey markers including brass caps, rebar, metal stakes, pipes, etc. that are disturbed during construction shall be replaced by the Contractor, at the Contractor's expense, prior to final Contract acceptance by the County of El Paso.

B. Replacement shall be performed by a professional licensed surveyor.

C. All monuments shall be set in a such a manner that the accuracy of their relative position is not less than second-order Class II, in accordance with the Sections establish by the U.S. Federal Geodetic Control Committee.

D. A copy of the survey notes documenting the setting of the monument shall be kept by the responsible surveyor and a copy shall be submitted to the COR.

E. Survey markers replacement may be verified by County of El Paso surveyors.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 CONTRACTOR VERIFICATION OF CONTRACT SURVEY DATA

A. During initial site layout and before existing conditions are disturbed the Contractor shall verify, in writing, the basic survey data provided on the Contract Drawings. Verification shall be initiated from the point shown the Contract Drawings or from the Contract Drawing reference point designated by the COR and shall include, as a minimum, benchmark elevations, horizontal control points, and topographic survey sufficient to ensure that the survey data adequately reflects existing conditions.

B. The Contractor shall not proceed with construction until survey verification is provided to the COR.

C. Before any existing benchmark references on the Contract Drawings are disturbed, the Contractor shall establish a new benchmark which has been compliance confirmed by the COR.

3.2 PRECONSTRUCTION SURVEY

A. Prior to any construction operations, the Contractor shall survey the entire project site.

B. This topographic survey shall be of sufficient detail to produce a six (6) inch contour map.

C. The centerline of all linear objects (roads, levees, culverts, etc.) shall be stationed.

D. This survey will be used in conjunction with construction surveys to produce the as-built drawings.

E. This survey is to determine the existing conditions prior to site disturbances.

3.3 AS CONSTRUCTED SURVEYS

A. The Contractor's surveyor shall check construction progress to verify that all work is in compliance with the Contract requirements. The Contractor has a responsibility to perform quality control checks on their construction.

B. The Contractor's surveyor shall perform, plot, and submit cross sections as work progresses.

C. Surveys shall include sections perpendicular to the centerline of the levee at one hundred (100) foot intervals and at as many additional stations as may be necessary to accurately represent each area.

D. The Contractor's surveyor shall conduct a survey of the site:

1. Prior to any construction work under this Contract.
2. Upon discovery of any utilities within the construction area.
3. After excavation for the levee road depression and the retaining wall.
4. After construction of the retaining wall.
5. After completion of impervious backfill placement.
6. After topsoil installation.
7. After placement of roadway gravel.
8. The Contractor's surveyor shall perform additional surveys as necessary for providing Record Drawings.

--End of Section--

TECHNICAL SPECIFICATIONS
DIVISION 03
CONCRETE

This page intentionally left blank for double sided printing.

03.11.00
CONCRETE FORMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 03.30.00-Cast-in-Place Concrete

B. Section 03.39.00-Concrete Curing

1.3 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 347R-14(Errata August 31, 2014) Guide to Formwork for Concrete

B. American National Standards Institute (ANSI)

1. ANSI A10.9-2013 Safety Requirements for Concrete and Masonry Work

C. APA - The Engineered Wood Association (APA)

1. APA PS 1-09 Voluntary Product Standard Structural Plywood

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Plans for Formwork/Falsework
   a. Shop drawings
   b. Provide details of formwork plans including PE stamped designs, if required.
2. Submit manufacturer's product data, including literature describing form materials, accessories, and form releasing agents.

1.5 MEASUREMENT AND PAYMENT

Include cost of furnishing, constructing, and removing forms in applicable prices offered in Contract for concrete items for which forms are required.

1.6 GENERAL

A. The design, engineering, and construction of the formwork are the responsibility of the Contractor. Design formwork in accordance with methodology of ACI 347R for anticipated loads, lateral pressures, and stresses. Forms shall have capability of withstanding the pressures resulting from placement and vibration of concrete.

B. Comply with the tolerances specified in Section 03.30.00.

C. Design the formwork as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others.

D. Monitor the adequacy of formwork design and construction prior to and during concrete placement as part of the Contractor's approved Quality Control Plan.

E. Forms include horizontal and vertical formwork, vertical shoring, and falsework.

1.7 QUALITY CONTROL

A. General
Forms, embedded items, ties, and other accessories shall be inspected by the CQCSM and inspector in sufficient time prior to each concrete placement by the Contractor in order to certify to the COR that the forms are ready to receive concrete.

1. Inspection of forms for concrete shall include a detailed evaluation of leakage control measures, type and application of release agent, and form cleanliness to avoid dirt transfer to the concrete.

B. Abrupt or Gradual Irregularities in Formed Surfaces

1. Allowable tolerances for formed surfaces are shown in Table 5.
2. Offsets and fins resulting from displaced, mismatched, or misplaced forms, sheathing, or lines, or from defects in forming materials are considered abrupt irregularities.
3. Irregularities resulting from warping and similar uniform variations from planeness or true curvature are considered gradual irregularities.
   a. Gradual irregularities shall be checked with a straightedge for plane surfaces or a shaped template for curved or warped surfaces.

Table 5 - Permitted Surface Irregularities

Class of Surface	A	B	C	D
Permitted Irregularity (in)	1/8	1/4	1/2	1

4. Class A surface is used for surfaces prominently exposed to public view where appearance is of upmost importance and to surfaces where accurate alignment and evenness are required to eliminate destructive effects of water.
5. Class B surface is used for coarse textured concrete formed surfaces that are usually intended to receive plaster, stucco, or wainscoting and to surfaces with special appearance requirements not required to have a Class A surface.
6. Class C surface is a general standard for permanently exposed surfaces where other finishes are not specified.
7. Class D surface is the minimum quality requirement for permanently concealed surfaces.
8. Surface and finish are used interchangeably in these specifications in reference to the finished appearance of the concrete. Concrete strength classes are defined in Section 03.30.00.

C. Reporting
The results of each inspection are to be reported in writing and shall include, but not be limited to, the following:

1. Removal of extraneous material from forms.
2. Check of joints for mortar tightness.
3. Type of form material required for the concrete finish.
4. Falsework, shoring, and/or bracing.
5. Alignment, tolerances, and dimensions.
6. Chamfering.
7. Form coating.

1.8 FORM DESIGNS

A. Safety Factor
Design, erect, brace, and maintain formwork, falsework, structural shoring and bracing to safely support all vertical and lateral loads that might be applied until the structure can support such loads. Incorporate the minimum safety factors (as specified in ANSI A10.9, Safety Requirements for Concrete and Masonry Work) in the design and erection of all framework, shoring, falsework and formwork accessories.

1. Design forms for the pressure exerted by a liquid weighing one hundred fifty (150) pounds per cubic feet; take the rate of concrete placement into consideration in determining the depth of the equivalent liquid; include a live load allowance of fifty (50) pounds per square feet of horizontal surface for job-fabricated forms.
2. Do not exceed one hundred twenty five percent (125%) of the allowable stresses for the design of structures.
3. For commercially produced structural units used for forms, do not exceed the manufacturer's maximum allowable working loads for moment and shear or end reaction. Include a live load allowance of thirty-five (35) pounds per square feet of horizontal form surface in determining the maximum allowable working load for commercially produced structural units.

B. Construction Loads
Do not impose any construction loads on the partially completed structures unless such loading has been considered in the design and is shown on the formwork design drawings or specifications.

C. Plans for Formwork

1. The form plans shall show all essential details of the proposed formwork. Include standard dimensions, types of studding, shoring, and sequence of work.

2. PE Approved Formwork Plan
   a. A PE must approve and sign detailed design calculations and working drawings for all formwork or vertical shoring installations when any of the following conditions exist:
      (1) The total height of the forms exceeds eight (8) feet.
      (2) Individual form horizontal span lengths exceed ten (10) feet.
      (3) Provisions are made for vehicular or railroad traffic through the falsework or vertical shoring.
   b. The form plans shall show all essential details of the proposed formwork.
   c. When the formwork plans have been designed and stamped by a professional engineer, County of El Paso compliance confirmation is not required, but the County of El Paso reserves the right to request modifications to the plans.

PART 2 - PRODUCTS

2.1 FORMS

A. General

1. Except where otherwise specified or permitted, the Contractor shall provide forms of either timber or metal. Use only one type of form sheathing or lining material.
2. Construct forms to confine and shape concrete to required lines so that completed work meets specified structural deviations, surface tolerances, and finish requirements.
3. Construct forms with sufficient strength to maintain position and withstand pressure from placing and vibrating concrete.
4. For commercially produced structural units used for forms, do not exceed the manufacturer's maximum allowable working loads for moment and shear or end reaction.
5. Provide forming systems that are practically mortar-tight, rigidly braced, and strong enough to prevent bulging between supports and maintain them to the proper line and grade during concrete placement.
6. When concrete contains type 1 or type 2 plasticizer chemical admixtures, adjust formwork design and concrete placing rate to compensate for hydraulic pressures exerted on forms by concrete with high fluidity.
7. Maintain forms in a manner that prevents warping and shrinkage.
8. Do not allow offsets at form joints to exceed one sixteenth (1/16) inch.

B. Finish

1. All forms exposed to view shall be designed to provide a Class B finish. A Class B finish allows a quarter (¼) inch abrupt or gradual irregularity in the formed surface as measured within a five (5) foot length with a straightedge.

2. Where concrete will be backfilled with earthen materials, a Class D finish form may be used.
3. Forms for Class B finished surfaces shall be plywood panels conforming to APA PS 1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels.

2.2 FORM TIES

A. Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spall concrete upon removal. Provide solid backing for each tie.

B. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than one-fourth (1/4) inch nor more than one (1) inch deep and not more than one (1) inch in diameter.

C. Terminate the embedded portion of metal ties no less than two (2) inches from any concrete surface exposed to water. Removable tie rods shall be not more than one and a half (1-1/2) inches in diameter. Plastic snap ties may be used in locations where the surface will not be exposed to view.

2.3 FORM RELEASING AGENTS

A. Form releasing agents shall be commercial formulations that will not bond with, stain, nor adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

B. If special form liners are to be used, follow the recommendation of the form coating manufacturer. Submit manufacturer's recommendation on method and rate of application of form releasing agents.

Part 3 - EXECUTION

3.1 INSTALLATION

A. Forms shall be constructed true to the structural design and required alignment.

B. Forms shall be mortar tight, properly aligned, and adequately supported to produce concrete surfaces meeting the surface requirements and conforming to construction tolerance specified in Section 03.30.00 Table 11.

C. Continuously monitor the alignment and stability of the forms during all phases to assure the finished product will meet the required surface class specified. Failure of any

supporting surface either due to surface texture, deflection, or form collapse shall be the responsibility of the Contractor as will the replacement or correction of unsatisfactory surfaces.

D. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar.

E. Forms shall not be reused if there is any evidence of defects which would impair the quality of the resulting concrete surface. All surfaces of used forms shall be cleaned of mortar and any other foreign material before reuse.

F. Form ties that are to be completely withdrawn shall be coated with a nonstaining bond breaker.

3.2 CHAMFERING

A. All exposed joints, edges, and external corners shall be chamfered by molding placed in the forms unless the Contract Drawings specifically state that chamfering is to be omitted or as otherwise specified.

B. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete surfaces.

C. Chamfered joints shall be terminated twelve (12) inches outside the limit of the earth or rockfill so that the end of the chamfers will be clearly visible.

3.3 COATING

A. Forms shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions.

B. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.4 FORM TIES AND ANCHORS FOR CONCRETE

A. Embed ties for holding forms.

B. Terminate ties not less than two (2) diameters or twice minimum dimension of tie, whichever is greater, from formed surface of concrete.

C. Install ties so ends or end fasteners can be removed without causing spalling at face of concrete.

D. Provide form anchors as required to ensure that concrete surfaces will meet specified tolerances. Replace form anchors embedded in concrete which are loosened before placement of adjoining concrete with other supports firmly embedded in hardened concrete.

3.5 PRIOR TO PLACEMENT

A. Construct forms to produce a uniform and consistent texture and pattern on face of concrete. Metal patches on forms are not permitted.

B. For forms to be left in place, use only material that is inert, non-biodegradable, and non-absorptive.

C. Construct all forms to permit their removal without marring or damaging the concrete.

D. Complete all preparatory work before requesting permission to place concrete.

E. Inspection
Forms and embedded items shall be inspected in sufficient time prior to each concrete placement in order to certify to the COR that they are ready to receive concrete. The results of each inspection shall be reported in writing prior to concrete placement. Submit field inspection reports for concrete forms and embedded items.

3.6 DURING CONCRETE PLACEMENT

A. Install sufficient plumb and string lines to monitor formwork positions before concrete placements.

B. Monitor plumb and string lines during concrete placement and correct deficiencies in formwork.

C. If the forms show signs of bulging or sagging at any stage of the placement, cease placement and remove the portion of the concrete causing this condition immediately if necessary.

D. Reset the forms and securely brace them against further movement before continuing the placement.

3.7 FORM REMOVAL

A. The minimal time required for concrete to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them.

B. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements.

C. Remove forms within twenty four (24) hours after concrete has hardened sufficiently to prevent damage by form removal. Begin required repair and curing immediately after form removal.

1. Do not remove forms until concrete strength is such that form removal will not result in perceptible cracking, spalling, or breaking of edges or surfaces, or other damage to concrete.

D. Remove forms on upper sloping faces of concrete, such as forms on waterside of warped transitions, as soon as concrete has attained sufficient stiffness to prevent sagging.

E. Loosen wood forms for wall openings as soon as loosening can be accomplished without damage to concrete to prevent excessive stress in concrete from swelling of forms. Construct forms for openings to facilitate loosening.

F. Formwork Supporting Weight of Concrete (Falsework)

1. Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected.

2. As a minimum, forms shall be left in place until control concrete test cylinders indicate evidence the concrete has attained at least one hundred (100) percent of the compressive strength required for the structure in accordance with the quality and location requirements.

G. Remove forms in a manner which prevents damage to concrete.

H. Begin required repair and curing immediately after form removal.

I. Fill and smooth finish voids at joints in form lining or sheathing.

J. Repair damaged concrete in accordance with Section 03.30.00 3.9 .

K. Allow at least one (1) curing day after the concrete has achieved initial set before placing strain on projecting reinforcement to prevent damage to the concrete.

3.8 CURING

All concrete surfaces exposed upon removal of forms shall immediately be cured per Section 03.39.00-Concrete Curing.

--End of Section—

This page intentionally left blank for double sided printing.

03.15.16
CONCRETE JOINTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 224.3R-95(Reapproved 2013; Errata January 26, 2011) Joints in Concrete Construction

1.3 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for joints as specified in this section. All costs in connection therewith shall be included in the Contract prices for the items to which the work is incidental thereto.

1.4 GENERAL

This Section covers the materials, techniques, and workmanship requirements for forming joints in concrete structures.

PART 2 - PRODUCTS (NOT USED)

Part 3 - EXECUTION

3.1 PREPARATION

A. Thoroughly clean joints free of dirt, debris, dust, and laitance.

3.2 CONSTRUCTION JOINTS

A. A construction joint is the joint formed by placing plastic concrete in direct contact with concrete that has attained its initial set. Monolithic placement means that the manner and sequence of concrete placing does not create a construction joint.

B. Type and Location of Construction Joints

1. Make horizontal construction joints only between the wall stem and footing of the type as shown on the Contract Drawings.
2. Vertical construction joints are permissible at not less than 30 feet spacing.
3. Additional joints in other locations are not permitted without compliance confirmation.

C. Bond is required at construction joints regardless of whether reinforcements is continuous across joint.

D. Thoroughly roughen the top surface of a concrete placement terminating at a horizontal construction joint as soon as practical after initial set is attained.

1. Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by ensuring that the surface is roughened to an amplitude of 1/4 inch by either air-water cutting, sandblasting, high-pressure water jet, or other approved method.
2. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel.
3. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well-bonded coarse aggregate is exposed uniformly throughout the lift surface.
4. The edges of the coarse aggregate shall not be undercut.
5. The surface shall be washed clean as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.
6. Air-Water Cutting
   Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints.
   a. The air pressure used in the jet shall be ninety (90) to one hundred and ten (110) psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure.
   b. When compliance confirmed by the COR, a surface retarder may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective.
   c. Retarders shall not contain acid, shall be water based, and shall be classified as nonhazardous.

d. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

7. High-Pressure Water Jet
   A stream of water under a pressure of not less than three thousand (3,000) psi may be used for construction joint preparation.
   a. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin of mortar is removed and there is no undercutting of coarse-aggregate particles.
   b. If the water jet is incapable of uniformly exposing coarse aggregate, the surface shall be prepared by sandblasting.

8. Wet Sandblasting
   This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

9. Waste Disposal
   The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to compliance confirmation.

E. Thoroughly clean the hardened concrete surface of all loose material, laitance, dirt, and foreign matter, and saturate it with water. Remove all free water and moisten the surface before concrete or bonding grout is placed against it.

--End of Section—

This page intentionally left blank for double sided printing.

03.21.11
EPOXY REINFORCING STEEL

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. None

1.3 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI SP-66(2004) ACI Detailing Manual
2. ACI 350-06 (Errata as of April 29, 2015) Code Requirements for Environmental Engineering Concrete Structures

B. ASTM International (ASTM)

1. ASTM A615-14 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
2. ASTM A706-14 Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Shop Drawings
The Contractor shall submit shop drawings prior to rebar fabrication for compliance confirmation.

2. Record Shop Drawings
During construction, the Contractor shall keep detailed records of any changes made to the reinforcement placement. If any changes were made to fabricated rebar, resubmit a corrected shop drawing showing the actual reinforcement used.

3. Mill Certificates
Provide mill certificates of all sizes and grades of reinforcement that will be used on this project. Also provide County of Origin certificates for the steel used to produce the rebar.

1.5 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 GENERAL

In general, the Contractor shall furnish and place reinforcing steel of the sizes and details shown on the Contract Drawings.

1.7 QUALITY CONTROL

A. Materials Tests
Manufacturer certifications stating that the rebar meets the required tensile strength are to be provided. These certifications shall be provided as product submittals.

B. General
The Contractor shall establish and maintain quality control for proper installation of all work covered in this section to assure compliance with Contract specifications and

maintain records of the quality control for all construction operations including but not limited to the following:

1. Minimum concrete cover of reinforcement steel.
2. Number, size, and location of placement.
3. Maintain adequate splicing lengths where required.
4. Tests, inspections, and verifications

1.8 SPECIAL STORAGE, HANDLING, AND SHIPPING OF EPOXY-COATED REINFORCING

A. Bars shall be handled and stored in a manner to prevent damage to bars or coating.

B. All systems for handling epoxy-coated bars shall have padded contact areas. The bars or bundles shall not be dropped or dragged. Coated bars shall be stored on padded wooden or steel cribbing. Sufficient spacers and padding shall be used to prevent damage to the bars and coating.

C. Bars shall be shipped using sufficient dunnage to adequately protect the bars and their external coating. Chains or steel bands shall not be used without sufficient padding to prevent damage to the coating.

D. Bars shall be loaded for shipping in accordance with ASTM A775 and in compliance with all transport regulations.

PART 2 - PRODUCTS

2.1 REINFORCING STEEL

A. Compliance Confirmed Mills

1. Before furnishing steel, producing mills of reinforcing steel must be compliance confirmed in accordance with this Section.
2. Reinforcing steel obtained from unapproved sources will not be accepted.
3. Verify any Buy American Acts that are in this Contract.

B. Deformed Bar Reinforcement.
Reinforcing steel bars shall conform to ASTM A615, Grade 60 for bar sizes 3 through 11.

C. Epoxy Coating
Provide epoxy coated bars in accordance with ASTM A775.

D. Wire Reinforcement
Reinforcement must conform to ASTM A615, Grade 60.

E. Weldable Reinforcing Steel
Reinforcing steel to be welded must comply with ASTM A706 or have a carbon equivalent (C.E.) of at most 0.55%. A report of chemical analysis showing the percentages of elements necessary to establish C.E. is required (to be submitted to the COR) for reinforcing steel that does not meet ASTM A706 to be structurally welded. Calculate C.E. using the following formula:

$$C.E. = \%C + \frac{\%Mn}{6} + \frac{\%Cu}{40} + \frac{\%Ni}{20} + \frac{\%Cr}{10} - \frac{\%Mo}{50} - \frac{\%V}{10}$$

F. Any reinforcing steel that does not meet the requirements of this Section shall not be used in the project.

2.2 WIRE TIES

Wire ties shall be 16 gage or heavier steel wire, epoxy-coated or plastic-coated.

2.3 SUPPORTS

Bar supports shall comply with the requirements of ACI SP-66. Bar chairs, supports or clips must be of steel, fully coated with epoxy or plastic.

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

The rebar supplier/manufacturer shall provide certifications that the rebar supplied meet all Contract requirements. These certifications shall be submitted as product data submittals.

Part 3 - **EXECUTION**

3.1 REINFORCEMENT

A. Reinforcement steel and accessories shall be fabricated and placed as specified and shown and approved shop drawings. Fabrication and placement details of steel and accessories not specified or shown shall be in accordance with ACI SP-66 and ACI 350.

B. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.

C. Wire tie ends shall face away from the forms.

D. Submit detail drawings showing reinforcing steel placement, schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

3.2 BENDING

A. The Contractor shall cold-bend the reinforcement accurately to the shapes and dimensions shown on the Contract Drawings.

1. Fabricate in a shop. Field bending is not allowed unless compliance confirmed by the COR. Field-fabrication of straight bars is allowed.
2. Replace improperly fabricated, damaged, or broken bars at no additional expense to the County of El Paso. Repair damaged or broken bars embedded in a previous concrete placement using a method compliance confirmed by the County of El Paso.
3. Unless otherwise shown on the Contract Drawings, the inside diameter of bar bends, in terms of the nominal bar diameter (d), must comply with ACI 350-06 Section 7.2.

3.3 PLACEMENT

A. Unless otherwise shown on the Contract Drawings, dimensions shown for reinforcement are to the centers of the bars.

1. The Contractor shall place reinforcement as near as possible to the position shown on the Contract Drawings.
2. In the plane of the steel parallel to the nearest surface of concrete, bars must not vary from plan placement by more than one-twelfth (1/12) of the spacing between bars.
3. In the plane of the steel perpendicular to the nearest surface of concrete, bars must not vary from plan placement by more than one-quarter (¼) inch.
4. The cover of concrete to the nearest surface of steel must be at least one (1) inch unless otherwise shown on the Contract Drawings.
5. Maintain concrete cover over reinforcement to within one quarter (¼) inch for covers of two and half (2 ½) inches or less and within half (½) an inch if cover is greater than two and half (2 ½) inches.

B. The Contractor shall place reinforcement as near as possible to the position shown on the Contract Drawings.

C. Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete before placement.

D. Reinforcement shall be placed in accordance with ACI 350 at locations shown plus or minus one bar diameter.

E. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or Contraction joints.

F. Concrete coverage shall be as indicated or as required by ACI 350.

G. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

H. Any changes to the placement of rebar from what is shown on the Contract Drawings shall be noted on the Record Drawings.

I. The Contractor shall locate the reinforcement accurately in the forms and hold it firmly in place before and during concrete placement by means of bar supports that are adequate in strength and number to prevent displacement and to keep the steel at the proper distance from the forms.

1. Support bars by standard bar supports with plastic tips, compliance confirmed plastic bar supports, or precast mortar or concrete blocks when supports are in contact with removable or stay-in-place forms.
2. Bar supports in contact with soil or subgrade must be compliance confirmed.
3. For bar supports with plastic tips, the plastic protection must be at least 3/32 inch thick and extend upward on the wire to a point at least one-half (½) inch above the formwork.

J. All accessories such as tie wires, bar chairs, supports, or clips used with epoxy-coated reinforcement must be of steel, fully coated with epoxy or plastic. Plastic supports compliance confirmed by the County of El Paso may also be used with epoxy-coated reinforcement.

K. The Contractor shall place individual bar supports in rows at four (4) foot maximum spacing in each direction; place continuous type bar supports at four (4) foot maximum spacing; use continuous bar supports with permanent metal deck forms.

L. If reinforcement is not adequately supported or tied to resist settlement, reinforcement is floating upward, truss bars are overturning, or movement is detected in any direction during concrete placement, stop placement until corrective measures are taken.

M. Allow at least one (1) curing day after the concrete has achieved initial set before placing strain on projecting reinforcement to prevent damage to the concrete.

3.4 TOLERANCES

A. Fabrication tolerances for bars are shown in Figure 2.

B. Spacing
Bars shall be spaced as indicated on the Contract Drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers of bars may not vary from the indicated position by more than one (1) bar diameter or more than one (1) inch, whichever is smaller.

C. Concrete Cover

1. Unless different cover depths are shown on the Contract Drawings, all rebar shall be installed using the clear cover indicated below.
   a. Bar #5 or less cover equals 1.5 inches
   b. Bars greater than #5 cover equals 2.0 inches
   c. Concrete placed against ground or rock cover equals 3.0 inches.
   d. If diameter of bar exceeds cover indicated, cover shall equal diameter of bar.
2. The dimensions indicated are from the outside of the bar to the surface of the concrete.
3. The allowable variation for minimum cover shall be as shown in Table 10.

Table 10 - Minimum Concrete Cover Variation

MINIMUM COVER (inch)	VARIATION (inch)
6	plus 1/2
4	plus 3/8
3	plus 3/8
2	plus 1/4
1-1/2	plus 1/4
1	plus 1/8
3/4	plus 1/8

3.5 STORAGE

A. The Contractor shall store steel reinforcement above the ground on platforms, skids, or other supports and protect it from damage and deterioration.

B. Ensure that reinforcement is free from dirt, paint, grease, oil and other foreign materials when it is placed in the work

C. Use reinforcement free from defects such as cracks and delaminations.

D. Rust, surface seams, surface irregularities, or mill scale will not be cause for rejection if the minimum cross-sectional area of a hand wire-brushed specimen meets the requirements for the size of steel specified.

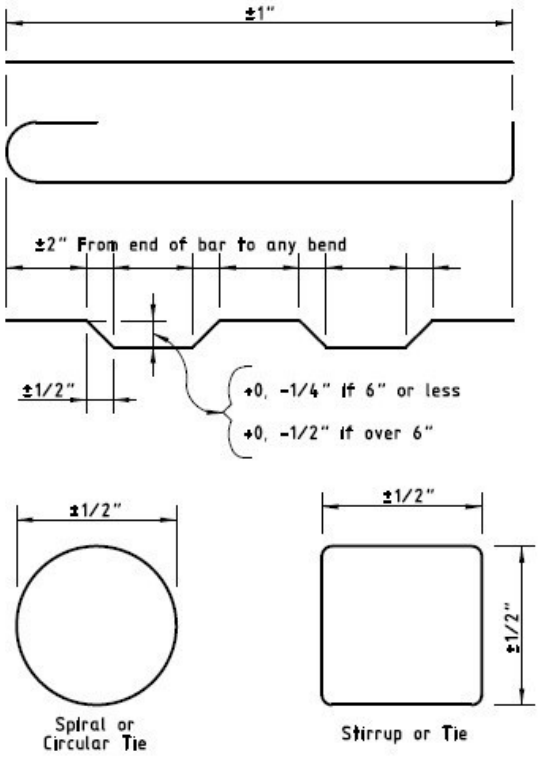

Figure 2-Fabrication Tolerances for Bars

3.6 SPLICES

A. The Contractor shall lap-splice, weld-splice, or mechanically splice bars as shown on the Contract Drawings. Splices in steel bars shall be made only as required. Bars may be spliced at alternate or additional locations at no additional cost to the County of El Paso subject to COR compliance confirmation.

B. All splices shall meet ACI SP-66.

C. Lap Splices
Lap splices shall be used only for bars smaller than #11. Bar laps may be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete, but shall not be spaced farther apart than one fifth the required length of lap nor six (6) inches. Lengths of laps for bars shall conform to the requirements of ACI 350, except when otherwise shown on the Contract Drawings.

D. Butt-Splices

1. Do not flame-cut reinforcement. Saw or shear-cut only when approved.

2. Do not weld or mechanically couple coated reinforcing steel except where specifically shown on the Contract Drawings or as directed by the COR.
   a. Remove the epoxy coating at least six (6) in. beyond the weld limits before welding and two (2) in. beyond the limits of the coupler before assembly. After welding or coupling, clean the steel of oil, grease, moisture, dirt, welding contamination, and rust to a near white finish.
   b. Check the existing epoxy for damage. Remove any damaged or loose epoxy back to sound epoxy coating.
   c. After cleaning, coat the splice area with epoxy repair material to a thickness of seven (7) to seventeen (17) mils after curing. Apply a second application of repair material to the bar and coupler interface to ensure complete sealing of the joint.
   d. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 350. Bars larger than #11 shall be spliced with mechanical connectors or butt-welded in accordance with ACI 350. The splice shall be submitted to the COR for compliance confirmation.

--End of Section—

This page intentionally left blank for double sided printing.

03.30.00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 03.11.00-Concrete Forming

B. Section 03.39.00-Concrete Curing

1.3 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 117-10 (Errata September 23, 2011) Specification for Tolerances for Concrete Construction and Materials
2. ACI 211.1-91 (2009; Errata July 19, 2012) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
3. ACI 304R-00 (2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
4. ACI 305R-10 Guide to Hot Weather Concreting
5. ACI 306R-10 (Errata April 25, 2011) Guide to Cold Weather Concreting
6. ACI 350-06 (Errata April 29, 2015) Code Requirements for Environmental Engineering Concrete Structures

B. American National Standards Institute (ANSI)

1. ANSI A10.9-2013 Safety Requirements for Concrete and Masonry Work

C. ASTM International (ASTM)

1. ASTM C31-12 Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. ASTM C33-13 Standard Specification for Concrete Aggregates
3. ASTM C39-15a Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
4. ASTM C40-11 Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
5. ASTM C42-13 Standard Test Method for Obtaining and Testing Drilled Cored and Sawed Beams of Concrete
6. ASTM C88-13 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
7. ASTM C94-15 Standard Specification for Ready-Mixed Concrete
8. ASTM C109-13 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using two (2) inch or [50-mm] Cube Specimens)
9. ASTM C117-13 Standard Test Method for Materials Finer than 75 µM (No.200) sieve in Mineral Aggregates by Washing
10. ASTM C131-14 Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

11. ASTM C142-10 Standard Test Method for Clay Lumps and Friable Particles in Aggregates
12. ASTM C143-12 Standard Test Method for Slump of Hydraulic-Cement Concrete
13. ASTM C150-12 Standard Specification for Portland Cement
14. ASTM C172-14a Standard Practice for Sampling Freshly Mixed Concrete
15. ASTM C191-13 Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle
16. ASTM C231-14 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
17. ASTM C260-10a Standard Specification for Air-Entraining Admixtures for Concrete
18. ASTM C494-13 Standard Specification for Chemical Admixtures for Concrete
19. ASTM C595-14 Standard Specification for Blended Hydraulic Cement
20. ASTM C597-09 Standard Test Method for Pulse Velocity Through Concrete
21. ASTM C618-12a Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
22. ASTM C803-03(2010) Standard Test Method for Penetration Resistance of Hardened Concrete
23. ASTM C805-13a Standard Test Method for Rebound Number of Hardened Concrete
24. ASTM C989-14 Standard Specification for Slag Cement for Use in Concrete and Mortars
25. ASTM C1017-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
26. ASTM C1059-13 Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete
27. ASTM C1064-12 Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
28. ASTM C1602-12 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
29. ASTM D512-12 Standard Test Method for Chloride Ion in Water
30. ASTM D516-11 Standard Test Method for Sulfate Ion in Water
31. ASTM D1073-11 Standard Specification for Fine Aggregate for Bituminous Paving Mixtures

32. ASTM D2419-14 Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
33. ASTM D4191-15 Standard Test Method for Sodium in Water by Atomic Absorption Spectrophotometry
34. ASTM D4192-15 Standard Test Method for Potassium in Water by Atomic Absorption Spectrophotometry
35. ASTM E1721-01(2015) Standard Test Method for Determination of Acid-Insoluble Residue in Biomass

D. Bureau of Reclamation (USBR)

1. USBR Guide to Concrete Repair, 1997

E. Code of Federal Regulations (CFR)

1. 36 CFR 800, Protection of Historic Properties

F. Federal Acqusition Regulation (FAR)

1. FAR 52.236-21 Specifications and Drawings for Construction

G. National Ready Mixed Concrete Association (NRMCA)

1. Concrete Plant Standards of the Concrete Plant Manufacturers Bureau, 15th revision, March 20, 2007
2. NRMCA's Plant Certification Program

H. Portland Cement Association (PCA)

1. DCCM: Design and Control of Concrete Mixtures (15th Edition)

I. United States Army Corps of Engineers (USACE)

1. USACE Safety and Health Requirements Manual, EM 385-1-1, November 30, 2014

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. The Contractor shall submit copies of the ready mix batch plant certifications.
2. Concrete Mix Design(s)
   a. The mix design shall include test results of cylinders produced from this mix.
   b. The mix design shall include gradation results for all aggregates to be used.

c. Aggregate data shall include sulfate content and susceptibility of aggregate to cause sulfate attack of concrete.

3. Prior to beginning concrete site work, the Contractor shall submit to the COR a plan of concrete construction methods.
   a. Procedures to be used in the field.
   b. Sequence of work.
   c. Hot or cold weather placing materials and methods, if applicable.

4. Prior to using any concrete materials or materials associated with concrete placement on the site, the Contractor shall submit to the COR all required product information. All proposed products to be used shall meet or exceed the minimum requirements for the products and their proper use within the project.
   a. Materials to be used.
   b. Manufacturer product data.
   c. Manufacturer recommendations for proper use of the product.
   d. Certification of the products to ensure it meets or exceeds the specification requirements.

5. Testing Laboratory
   a. No work requiring testing will be permitted until the facilities have been compliance confirmed by the COR.
   b. If this information has already been submitted for other quality control work, it does not need to be resubmitted.

6. Concrete Testing Technician

Prior to performing concrete tests onsite, the Contractor shall submit to the COR a certification that the operator is either ACI certified or qualified by a recognized equivalent written and performance testing program for all of the tests to be performed.

7. Batch/Delivery Tickets

A legible copy of all batch/delivery tickets shall be furnished to the COR. Attach all tickets with that day's quality control report.

8. Test Results

Test results shall be furnished to the COR within twenty four (24) hours of making the test.

   a. Inspections and test results shall be certified by a Texas registered Professional Civil Engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the Texas registered Professional Civil Engineer and that the results are representative of the materials or conditions being certified by the tests.

9. Preservation of Historical and Archaeological Data
When the Contractor proposes to use a source/quarry for rock or gravel, the source must first be approved by the COR to ensure compliance with Section 106 of NHPA (36 CFR 800).
   a. Submit a map showing the location of proposed sites to the COR at least forty five (45) days in advance of use.
   b. Take no action to use or alter the proposed location until written approval for site use is received from the COR.
   c. If the quarry or borrow site already provides materials for USIBWC, USACE, or other governmental agency, the Contractor may provide a copy of the environmental approvals from said agencies.
   d. Include permission for County of El Paso access to any gravel sources.

10. Environmental Compliance
Submit documentation showing that all applicable laws, rules, and regulations are being followed for project-specific locations.

1.5 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 GENERAL

A. In general, the Contractor shall furnish hydraulic cement concrete for concrete construction.

B. The Contractor shall furnish all materials, equipment and incidentals, and construct concrete structures as shown on the Contract Drawings.

C. Unless otherwise noted in these specifications or on the Contract Drawings, construct all concrete to a Class B surface.

1.7 CLASSES OF CONCRETE

A. Classes of concrete are designated by numerical symbol indicating the minimum twenty eight (28) day compressive strength, in pounds per square inch as determined by ASTM C39, and the maximum permissible size of coarse aggregate.

B. Each class of concrete may consist of one or more mixes determined by the maximum size of aggregate, cement factor, and types of admixtures or special aggregates used.

C. Each mix within a Class shall be considered a specific type, requiring acceptance of the mix design.

D. The various classes of concrete are listed in Table 16 in this Section.

1.8 STRUCTURAL DEVIATIONS AND SURFACE TOLERANCES

A. Structural deviations are defined as allowable variations from specified lines, grades, and dimensions.

1. Horizontal deviation is a departure from an established point, line, or surface measured normal (perpendicular) to a vertical line through the point of interest.
2. Vertical deviation is a departure from an established point, line, or surface measured normal (perpendicular) to a horizontal line through the point of interest.

B. Surface tolerances are defined as maximum allowable deviation from a specified dimension, location, or quantity.

C. Specified structural deviations and surface tolerances are consistent with modern construction practice and governed by effect that permissible variations may have upon a structure. COR reserves the right to diminish specified structural deviations and surface tolerances where such variations impair structural action, operational function, or architectural appearance of a structure or portion of structure.

D. Construct concrete within stated variations even though more than one may be specified.

1. Specified variation for one element of a structure will not apply when it will permit another element of same structure to exceed its allowable variation.
2. Where variations are not specified or shown on Contract Drawings for a particular structure, variations shall be those specified for similar work. As an exception to clause at FAR 52.236-21, Specifications and Drawings for Construction, specific tolerances shown on Contract Drawings in connection with any dimension shall govern.

E. Deviations and Tolerances

1. Check variations from specified lines, grades, and dimensions in hardened concrete to determine that structures are within tolerances specified in Table 11.
2. Variation is distance between actual position of structure or any element of structure and specified position in plan for structure or particular element.
   a. Plus or minus variations, shown as (±), indicate a permitted actual position up or down and in or out from specified position in plan.
   b. Variations not designated as (+) or (-) indicate maximum deviation permitted between designated successive points on completed element of construction.
3. Specified position in plan is defined as lines, grades, and dimensions described in these specifications or shown on Contract Drawings.
4. Tolerances and deviations are not cumulative. The most restrictive controls.
5. Deviations and tolerances not identified in Table 11 shall be as stated in ACI 117.

Table 11 - Deviations and Tolerances from Specified Lines, Grades, and Dimensions

Item or Description	Tolerance
1. Footings	
a. Variation in length and width dimensions from specified	- ½ inch +2 inches
b. Horizontal misplacement or eccentricity	2% of footing width in direction of misplacement, but not more than 2 inches
c. Deviation from elevation	± ½ inch
d. Reduction in thickness	5% of specified thickness

PART 2 - PRODUCTS

2.1 CONCRETE

A. For each type of structure or unit, provide the class of concrete shown on the Contract Drawings or in pertinent governing Specification Sections.

2.2 CEMENTITIOUS MATERIALS

A. The Contractor shall provide sampling and testing results for compliance confirmation before use of cementitious materials.

B. Portland Cement

1. The Contractor shall furnish cement conforming to ASTM C150:
    a. Portland Cement, Type I/II
2. The Contractor shall provide a cement mill test report for all sources of cement.

C. Pozzolan, other than Silica Fume
Pozzolan shall conform to ASTM C618, Class C or F

D. Ground Granulated Blast-Furnace Slag
Ground Granulated Blast-Furnace Slag (GGBF) shall conform to ASTM C989, Grade 100 or Grade 120.

E. Blended Hydraulic Cement

1. Portland blast-furnace slag cement shall conform to ASTM C595, Type IS
2. Portland-pozzolan cement shall conform to ASTM C595, Type IP (20 to 40)
3. Blended hydraulic cement shall conform to the mortar expansion limits in Table 2 of ASTM C595.
    a. Admixture additions shall not be included in the blended cement.

F. If cementitious materials or pozzolan are obtained from more than one source, the mix design shall estimate the amount obtained from each source.

2.3 CHEMICAL ADMIXTURES

A. The Contractor may include accepted concrete admixtures and cementitious materials in the mix to improve the water-cement ratio or water-cementitious ratio or workability of the concrete, providing the strengths specified and other desirable characteristics of the concrete can be achieved and maintained. Admixtures require COR's compliance confirmation before they may be used, and shall be included in the design mix. Admixtures shall be added at the batch plant, except as otherwise noted herein.

B. Air Entraining Admixtures
Air entraining admixtures shall conform to ASTM C260 and shall consistently cause the concrete to have air content in the specified ranges under field conditions.

C. Accelerating Admixtures
Accelerators shall conform to ASTM C494 Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

D. Water Reducing or Retarding Admixtures

1. Water reducing or retarding admixtures shall conform to ASTM C494 Type A, B, or D, except that the six (6) month and one (1) year compressive strength tests are waived.
2. High range water reducing admixtures shall conform to ASTM C494 Type F or G, except that the six (6) month and one (1) year compressive strength tests are waived.
3. This admixture may only be used when compliance confirmed by the COR.

E. Other Chemical Admixtures
Other chemical admixtures for use in producing flowing concrete shall comply with ASTM C1017 Type 1 or 2.

F. Prohibited Admixtures
Admixtures containing chlorides or sulfides are not acceptable. Admixtures must be certified that they do not contain calcium chloride.

G. The Contractor to submit admixture certifications and product data sheets to the COR for compliance confirmation.

2.4 WATER

A. The Contractor shall furnish mixing and curing water that meets ASTM C1602 and is free from oils, acids, organic matter, or other deleterious substances.

B. Water from potable municipal supplies do not require proof of compliance.

C. When using water from other sources, the Contractor shall provide test reports showing compliance with Table 12 before use.

D. Water that is a blend of concrete wash water and other acceptable water sources, certified by the concrete producer as complying with the requirements of both Table 12 and Table 13, may be used as mix water. The Contractor shall test the blended water weekly for four (4) weeks for compliance with both Table 12 and Table 13 or provide previous test results. The Contractor shall then test every month for compliance and provide water test results upon receipt.

Table 12 - Acceptance Criteria for Questionable Water Supplies

Property	Test Method[1]	Limits
Compressive strength, min % control at 7 days	ASTM C109	90
Time of set, deviation from control, Min.	ASTM C191	from 60 early to 90 later

[1] *Base comparisons on fixed proportions and the same volume of test water compared to the control mix using city water or distilled water.*

Table 13 - Chemical Limits for Mix Water

Contaminant	Test Method	Maximum Concentration (ppm)
Chloride (Cl)	ASTM D512	1,000
Sulfate (SO_4)	ASTM D516	1,000
Alkalies ($Na_2O + 0.658K_2O$)	ASTM D4191 & ASTM D4192	600
Total solids	ASTM C1602	50,000

E. The Contractor shall not use mix water that has an adverse effect on the air-entraining agent, on any other chemical admixture, on strength, or time of set of the concrete.

F. When using white hydraulic cement, use mixing and curing water free of iron and other impurities that may cause staining or discoloration.

2.5 AGGREGATE

A. The Contractor shall supply aggregates that meet the definitions in ASTM C33 for coarse and fine aggregates. Do not combine compliance confirmed material with unapproved material.

1. The Contractor shall limit the use of recycled crushed hydraulic cement concrete as a coarse or fine aggregate to Class A and B concrete.
2. When white hydraulic cement is specified, use light-colored aggregates.

3. Coarse Aggregate
   a. The Contractor shall provide coarse aggregate consisting of durable particles of gravel, recycled crushed hydraulic cement concrete, crushed stone, or combinations thereof that are free from frozen material and from injurious amounts of salt, alkali, vegetable matter, or other objectionable material, either free or as an adherent coating; provide coarse aggregate of uniform quality throughout; provide coarse aggregate that has:
      (1) At most one quarter of one percent (0.25%) by weight of clay lumps,
      (2) At most one percent (1.0%) by weight of shale, and
      (3) At most five percent (5.0%) by weight of laminated and friable particles.
   b. Unless otherwise specified, provide aggregate conforming to the gradation requirements shown in Table 14 when tested in accordance with ASTM C33.
   c. Choose the appropriate ASTM C33 gradation based upon the class of concrete used (Table 16) as well as the required spacing and clearance of rebar within the forms. Whenever possible, the largest size aggregate shall be used.

Table 14 - Coarse Aggregate Gradation Chart

Aggregate Grade No.[1]	Nominal Size	Percent Passing on Each Sieve								
		2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
1	2"	100	80-100	50-85		20-40			0-5	
2 (467)	1-1/2"		100	95-100		35-70		10-30	0-5	
3	1-1/2"		100	95-100		60-90	25-60		0-5	
4 (57)	1"			100	95-100		25-60		0-10	0-5
5 (67)	3/4"				100	90-100		20-55	0-10	0-5
6 (7)	1/2"					100	90-100	40-70	0-15	0-5
7	3/8"						100	70-95	0-25	
8	3/8"						100	95-100	20-65	0-10

[1] *Corresponding ASTM C33 gradation shown in parentheses.*

   d. Using ASTM C131 (LA Abrasion), wear must not be more than forty percent (40%) for the coarse aggregate to be used.
   e. Unless otherwise shown on the Contract Drawings, provide coarse aggregate with a 5-cycle magnesium sulfate soundness of not more than eighteen percent (18%) when tested in accordance with ASTM C88. Crushed recycled hydraulic cement concrete is not subject to the 5-cycle soundness test.
   f. The loss by decantation as tested in accordance with ASTM C88, plus the allowable weight of clay lumps, must not exceed one percent (1.0%) or the value shown on the Contract Drawings, whichever is smaller. In the case of aggregates made primarily from crushing stone, if the material finer than the No. 200 sieve is established to be the dust of fracture and essentially free from clay or shale as established by ASTM C142, the limit may be increased to one and a half percent (1.5%). When crushed limestone coarse aggregate is used in concrete pavements, the decant may exceed one percent (1.0%) but not more

than three percent (3.0%) if the material finer than the No. 200 sieve is determined to be at least sixty-seven percent (67%) calcium carbonate in accordance with ASTM C142. Unless otherwise specified, provide aggregate conforming to the gradation requirements shown in when tested in accordance with ASTM C33.

4. Fine Aggregate
   a. The Contractor shall provide fine aggregate consisting of clean, hard, durable particles of natural or manufactured sand or a combination thereof with or without mineral filler; provide fine aggregate free from frozen material and from injurious amounts of salt, alkali, vegetable matter, or other objectionable material and containing no more than one-half percent (0.5%) clay lumps by weight in accordance with ASTM C142.
   b. Provide fine aggregate that does not show a color darker than standard when subjected to the color test for organic impurities in accordance with ASTM C40.
   c. Unless otherwise shown on the Contract Drawings use fine aggregate with an acid insoluble residue of at least sixty percent (60%) by weight when tested in accordance with ASTM E1721 in all concrete subject to direct traffic; and unless otherwise shown on the Contract Drawings, when necessary, blend the fine aggregate to meet the acid insoluble residue requirement.
      (1) When blending, the Contractor shall use the following equation:
      Acid Insoluble (%) {(A1)(P1)+(A2)(P2)}/100 where:
      A1 = acid insoluble (%) of aggregate 1
      A2 = acid insoluble (%) of aggregate 2
      P1 = percent by weight of A1 of the fine aggregate blend
      P2 = percent by weight of A2 of the fine aggregate blend
   d. The Contractor shall provide fine aggregate or combinations of aggregates, including mineral filler, conforming to the gradation requirements shown in Table 15 when tested in accordance with ASTM C33 unless otherwise specified.

Table 15 - Fine Aggregate Gradation Chart

Sieve Size	Percent Passing
3/8 inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-65
No. 50	10-35[1]
No. 100	0-10
No. 200	0-3[2]

[1] 6-35 percent passing when sand equivalent value is greater than 85.
[2] 0-6 percent passing for manufactured sand.

e. Unless otherwise shown on the Contract Drawings, the Contractor shall provide fine aggregate with a sand equivalent of at least eighty (80) in accordance with ASTM D2419.
f. For all classes of concrete, provide fine aggregate with a fineness modulus between 2.30 and 3.10 as determined by ASTM D1073.
g. Limit recycled crushed concrete fine aggregate to a maximum of twenty percent (20%) of the fine aggregate

B. Mineral Filler

1. The Contractor shall provide mineral filler consisting of stone dust, clean crushed sand, or other compliance confirmed inert material with one hundred percent (100%) passing the No. 30 sieve and sixty five to one hundred percent (65% to 100%) passing the No. 200 sieve when tested in accordance with ASTM C33.
2. ASTM C117 shall be used for material passing the No. 200 sieve if the mineral filler is found to be detrimental to the concrete mix.

2.6 MORTAR

A. Use mortar consisting of 1 part cement, 2 parts, by volume, of sand passing a No. 16 screen, and enough water so that mortar has consistency of thick cream.

B. Blend standard cement with white cement as necessary to obtain a color which will match surrounding concrete surface.

2.7 GROUT

A. For concrete repairs and patching, use only pre-packaged, non-shrink grout.

B. Said grout shall meet the minimum strength requirements of the concrete class being patched (Table 16) and is not required to meet the requirements in Table 7.

C. Material identified as epoxy grout shall meet the requirements of Paragraph 2.2 Section 03.15.00.

2.8 LATEX BONDING COMPOUND

Latex bonding compound shall conform to ASTM C1059. Latex bonding compound shall be used for bonding fresh concrete to hardened concrete.

2.9 CLASSIFICATION AND MIX DESIGN

A. The Contractor shall furnish mix designs using ACI 211.1, PCA's Design and Control of Concrete Mixtures, or other compliance confirmed procedures. For the classes of concrete required produce the design strengths noted in **Table 16** to the COR for

compliance confirmation before being used on the project. If no concrete strength/class if specified on the Contract Drawings, use Class S.

B. Do not exceed the maximum water-to-cementitious-material ratio. A higher-strength class of concrete with equal or lower water-to-cementitious-material ratio may be substituted for the specified class of concrete.

Table 16 - Concrete Classes

Class of Concrete	Design Strength, Min. 28-day f'c (psi)	Maximum W/C Ratio[1]	Coarse Aggregate Grades[2,3]	General Usage[4]
A	3,000	0.60	2-5	Inlets, curb, gutter, curb & gutter, conc. retards, sidewalks, driveways, backup walls, anchors, conc. ditch, conc. collars
B	2,500	0.60	2-7	Riprap, small signs, fence footings, anchors, and Class A bedding
C[5]	3,600	0.45	1-6	Precast box culverts except top slab of direct traffic culverts, Precast pipes, gatewells, cutoff walls, concrete traffic barrier (cast-in-place), headwalls
S[5]	4,000	0.45	2-5	Top slab of reinforced box culvert

[1] Maximum water-cement or water-cementitious ratio by weight.
[2] Unless otherwise permitted, do not use Grade 1 coarse aggregate except in massive foundations with 4-in. minimum clear spacing between reinforcing steel bars. Do not use Grade 1 aggregate in drilled shafts.
[3] Unless otherwise compliance confirmed, use Grade 8 aggregate in extruded curbs.
[4] For information only.
[5] Structural concrete classes.

C. To account for production variability and ensure minimum compressive strength requirements are met, over-design the mix in accordance with Table 17 or Table 18. When a concrete product facility has at least fifteen (15) tests for the specified mix, use Table 17. When a concrete production facility does not have field strength test records for at least 15 tests, the required average compressive strength shall be shown in Table 18.

Table 17 - Overdesign to Meet Compressive Strength Requirements (1)

No. of Tests	Standard Deviation, psi				
	300	400	500	600	700
15	470	620	850	1,120	1,390
20	430	580	760	1,010	1,260
30 or more	400	530	670	900	1,130

[1] When designing the mix, add the tabulated amounts to the minimum design strength in Table 16.

Table 18 - Overdesign to Meet Compressive Strength Requirements (2)

Specified f'c psi	Required Average f'cr psi
Less than 3,000	f'c + 1,000
3,000 to 5,000	f'c + 1,200
Over 5,000	f'c + 1,400

D. Cementitious Materials

1. Unless otherwise specified or compliance confirmed, limit cementitious material content to no more than seven hundred (700) pounds per cubic yard. When supplementary cementing materials are used, "cement" is defined as "cement plus supplementary cementing material."
2. Use Type III cement only in precast concrete or when specified or permitted.
3. For monolithic placements, use cement of the same type and from the same source.
4. Do not use Class C fly ash in sulfate-resistant concrete.
5. Do not use supplementary cementing materials when white hydraulic cement is specified.

E. Air Entrainment

1. The Contractor shall air-entrain all concrete, except for Class B when used for small signs or anchors, in accordance with Table 19 unless otherwise shown on the Contract Drawings.
2. Use moderate exposure values unless otherwise specified.
3. If the air content is more than one and a half (1 ½) percentage points below or three (3) percentage points above the required air, the load of concrete will be rejected.
4. If the air content is more than one and a half (1 ½) but less than three (3) percentage points above the required air, the concrete may be accepted based on strength tests.

Table 19 - Air Entrainment

Nominal Maximum Aggregate Size, inch	% Air[1]	
	Moderate Exposure	Severe Exposure
3/8 (Grades 7 & 8)	6	7-1/2
1/2 (Grade 6)	5-1/2	7
3/4 (Grade 5)	5	6
1 (Grade 4)	4-1/2	6
1-1/2 (Grades 2 & 3)	4-1/2	5-1/2
2 (Grade 1)	4	5

[1] *For specified concrete strengths above 5,000 psi a reduction of 1 percentage point is permitted.*

Table 20 - Slump Requirements

Concrete Designation	Recommended Design and Placement Slump (in)	Maximum Acceptable Placement Slump (in)
Thin walled Section (9 inch or less)	4	5-1/2
Approach slabs, concrete overlays, caps, columns, piers, wall Sections (over 9 inch)	3	5
Bridge slabs	4	5-1/2
Prestressed concrete members[1]	4	6-1/2
Concrete traffic barrier, concrete bridge railing	4	6-1/2
Dense concrete overlay	3/4	2
Latex-modified conc. for bridge deck overlays	3	7-1/2
Concrete placed underwater	6	8-1/2
Concrete pavement (slip-formed)	1-1/2	3
Concrete pavement (formed)	4	6-1/2
Riprap, curb, gutter, slip-formed and extruded concrete	As compliance confirmed	As compliance confirmed

[1] *If a high-range water reducer (HRWR) is used, maximum acceptable placement slump will be 9 inch.*

F. Slump

1. Unless otherwise specified, the mix shall provide concrete slump in accordance with Table 20 using the lowest slump possible that can be placed and finished efficiently without segregation or honeycombing.
2. Concrete that exceeds the maximum acceptable placement slump at time of delivery will be rejected.
3. When compliance confirmed, the slump of a given concrete mix may be increased above the values shown in Table 20 using chemical admixtures, provided that the admixture-treated concrete has the same or lower water-cement or water-cementitious-material ratio and does not exhibit segregation or excessive bleeding. The Contractor shall request compliance confirmation for the mix design sufficiently in advance for proper evaluation by the County of El Paso.

2.10 EQUIPMENT

A. Batch Plant
Batch plant shall conform to the requirements of National Ready Mixed Concrete Association (NRMCA) Plant Certification Program (http://www.nrmca.org/Research_Engineering/Plant_Certification/Main.htm) and Concrete Plant Standards (CPMB 100) of the Concrete Plant Manufacturers Bureau (http://www.cpmb.org/cpmb%20standards/CPMB%20100-07%20reduced.pdf).

1. Copies of the plant certification shall be provided to the COR.

B. Transporting and Placing Equipment
The Contractor shall use appropriate transporting and placing equipment such as buckets, chutes, buggies, belt conveyors, pumps, or other equipment as necessary. Do not transport or convey concrete through equipment made of aluminum; use carts with pneumatic tires for carting or wheeling concrete over newly placed slabs; use tremies to control the fall of concrete or for underwater placement; use tremies that are watertight and of large enough diameter to allow the placement of the concrete but less than fourteen (14) inches in diameter. Use pumps with lines at least five (5) inches inside diameter where Grade 2 or smaller coarse aggregate is used, and at least eight (8) inches inside diameter for Grade 1 coarse aggregate.

1. The Contractor shall ensure that concrete is transported and placed per ACI 304R.

C. Vibrators
The Contractor shall use immersion-type vibrators for consolidation of concrete. Provide at least one (1) standby vibrator for emergency use.

D. Temperature Recording Equipment
For concrete operations or as otherwise specified, the Contractor shall use compliance confirmed devices that are accurate to within plus or minus two degrees Fahrenheit (±2°F) within the range of thirty two to two hundred twelve degrees Fahrenheit (32°F ~ 212°F) to monitor the temperature of the concrete.

1. When determining temperature of site for concrete placements, only thermometers placed onsite shall be used. Use of weather.com or other online weather services is not valid for determining the worksite temperature.

E. Artificial Heating Equipment
The Contractor shall use artificial heating equipment as necessary for maintaining the concrete temperatures as specified in ACI 306R.

F. Spraying Equipment
The Contractor shall use mechanically powered pressure sprayers, either air or airless, with appropriate atomizing nozzles for the application of membrane curing. If compliance confirmed, the Contractor shall use hand-pressurized spray equipment equipped with two (2) or three (3) fan-spray nozzles; ensure that the spray from each nozzle overlaps the spray from adjacent nozzles by approximately fifty percent (50%).

G. Concrete Testing Equipment
The Contractor, or their quality control laboratory, shall provide all required concrete testing equipment.

PART 3 - EXECUTION

3.1 GENERAL

A. Before starting work, the Contractor shall obtain compliance confirmation for proposed construction methods. Compliance confirmation of construction methods and equipment does not relieve the Contractor's responsibility for safety or correctness of methods, adequacy of equipment, nor completion of work in full accordance with the Contract.

B. Safety

1. The Contractor shall follow ANSI A10.9 and EM 385-1-1 for all concrete work on this project.

3.2 SCHEDULE RESTRICTIONS

A. Unless otherwise shown on the Contract Drawings, the Contractor shall construct and open completed structures to traffic with the following limitations:

1. Setting Forms
   a. Attain at least two thousand, five hundred (2,500) pounds per square inch compressive strength before erecting forms on concrete footings supported by piling or drilled shafts, or on individual drilled shafts. Erect forms on spread footings and culvert footings after the footing concrete has aged at least two (2) curing days as defined in Section 03.39.00. Place concrete only after the forms and reinforcing steel have been inspected by the County of El Paso.
   b. Support tie beam or cap forms by falsework on previously placed tie beams only if the tie beam concrete has attained a compressive strength of two thousand, five hundred (2,500) pounds per square inch and the member is properly supported to eliminate stresses not provided for in the design. Maintain curing as required until completion of the curing period.
   c. Place falsework on the substructure only if the design strength of the substructure concrete has been attained.

2. Removal of Forms and Falsework
   See Section 03.11.00 3.7 F.

3. Placement of Superstructure Members
   Do not place superstructure members before the substructure concrete has attained a compressive strength of three thousand (3,000) pounds per square inch.

4. Storage of Materials on the Structure
   Obtain compliance confirmation to store materials on completed portions of a structure once the design strength has been attained. Maintain proper curing if materials will be stored on structures before completion of curing.

5. Placement of Equipment and Machinery
Do not place erection equipment or machinery on the structure until the concrete has attained the design strength.

6. Carting of Concrete
Once the concrete has attained a compressive strength of three thousand (3,000) pounds per square inch, it may be carted or wheeled over completed slabs. Maintain curing during these operations.

7. Backfilling
Fill shall not be placed on or against concrete less than seven (7) days after concrete placement or when the concrete is less than seventy-five percent (75%) of the design strength.

3.3 PREPARATION FOR PLACING

A. Embedded Items
Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within two (2) feet of the surface of the concrete.

B. Concrete on Aggregate and Soil Foundations

1. Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted.

2. Concrete to be placed on compacted crushed aggregate base material shall also be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the crushed aggregate base foundation shall have been satisfactorily compacted.

3.4 PLACING REINFORCEMENT

The Contractor shall place reinforcement as provided in Section 03.21.11. Do not weld reinforcing steel supports to reinforcing steel except where shown on the Contract Drawings.

3.5 PLACING CONCRETE

A. Concrete shall be placed per ACI 304R.

B. County of El Paso Notice and Inspection

1. The Contractor shall give the County of El Paso a minimum twenty four (24) hour advance notice before placing concrete to permit the inspection of forms, reinforcing steel placement, and other preparations.
2. Items noted during this inspection shall be corrected prior to concrete placement.

C. Mixing and Batching

1. The Contractor shall mix and deliver concrete by commercially available ready mix batch plants except for extremely small non-structural placements which may be mixed by hand using prepackage concrete mixes.
2. When the concrete contains silica fume, adjust mixing times and batching operations as necessary to ensure the material is completely and uniformly dispersed in the mix. The dispersion of the silica fume within the mix will be verified by using cylinders made from trial batches. If uniform dispersion is not achieved, make necessary changes to the batching operations until uniform and complete dispersion of the silica fume is achieved.
3. Hand-Mixed Concrete

When permitted, for small placements of less than two (2) cubic yards, the Contractor shall mix up to a 2-sack batch of concrete by hand methods or in a small motor-driven mixer. For such placements, proportion the mix by volume or weight.

D. Weather Conditions During Placement

1. Do not place concrete when impending weather conditions would impair the quality of the finished work. If conditions of wind, humidity, and temperature are such that concrete cannot be placed without the potential for shrinkage cracking, place concrete in early morning or at night or adjust the placement schedule for more favorable weather.
2. Consult the evaporation rate recommendations in ACI 305R for shrinkage cracking potential.
3. When mixing, placing, and finishing concrete in non-daylight hours, adequately illuminate the entire placement site as compliance confirmed.
4. If changes in weather conditions require protective measures after work starts, furnish adequate shelter to protect the concrete against damage from rainfall or from freezing temperatures as outlined herein.
5. Continue operations during rainfall only if compliance confirmed.

E. Concrete Temperature

The Contractor shall place concrete according to the following temperature limits for the classes of concrete defined in Table 16.

1. Place Class C concrete only when the temperature of the concrete at time of placement is between fifty (50°F) and ninety-five degrees Fahrenheit (95°F).
2. Place Class S concrete only when its temperature at time of placement is between fifty (50°F) and eighty-five degrees Fahrenheit (85°F).
3. Place Class A and B concrete only when the temperature of the concrete at the time of placement is greater than fifty degrees Fahrenheit (50°F).

F. Transporting Time

1. The Contractor shall place concrete delivered in agitating trucks within sixty (60) minutes after batching.
2. The Contractor may revise the concrete mix design as necessary for longer travel times, hot weather, or other conditions that contribute to quick setting of the concrete.
3. The Contractor shall submit for compliance confirmation a plan to demonstrate that these time limitations can be extended while ensuring the concrete can be properly placed, consolidated, and finished without the use of additional water.

G. Workability of Concrete

1. The Contractor shall place concrete with a slump as specified in Table 20.
2. Concrete that exceeds the maximum slump will be rejected.
3. Water may be added to the concrete before discharging any concrete from the truck to adjust for low slump provided that the maximum mix design water-cement ratio is not exceeded. After introduction of any additional water or chemical admixtures, mix concrete in accordance with:
   a. When this water is added, do not exceed the mix design water-cementitious-material ratio. Note amount of water added on delivery ticket.
   b. Turn the drum or blades at least thirty (30) additional revolutions at mixing speed (high speed) to ensure thorough and uniform mixing of the concrete.
   c. Concrete shall be discharged before the drum has revolved a total of three hundred (300) revolutions after the introduction of the mixing water to the cement and the aggregates.
4. Do not add water or chemical admixtures after any concrete has been discharged. This includes adding water to aid in the finishing of the surface.
5. Maintain concrete delivery and placement rates sufficient to prevent cold joints.
6. Do not use concrete which has become so stiff that concrete cannot be properly placed.

H. Transporting Concrete

1. Use a method and equipment capable of maintaining the rate of placement shown on the Contract Drawings or required to ensure that all concrete is placed prior to setting up. Transport concrete by buckets, chutes, buggies, belt conveyors, pumps, or other methods.
2. Protect concrete transported by conveyors from sun and wind to prevent loss of slump and workability. Shade or wrap with wet burlap pipes through which concrete is pumped as necessary to prevent loss of slump and workability.
3. Arrange and use chutes, troughs, conveyors, or pipes so that the concrete ingredients will not be separated. When necessary to prevent segregation, terminate such equipment in vertical downspouts. Extend open troughs and chutes, if necessary, down inside the forms or through holes left in the forms. Do not allow the concrete to segregate during placement.
4. Keep all transporting equipment clean and free from hardened concrete coatings.

I. Preparation of Surfaces

1. Thoroughly wet all forms on which concrete is to be placed before placing concrete on them. Remove any remaining puddles of excess water before placing concrete. Provide surfaces that are in a moist, saturated surface-dry condition when concrete is placed on them. Ensure that the subgrade or foundation is moist before placing concrete placed on grade. Lightly sprinkle the subgrade if dry.
2. Pick up all trash, including pieces of tie wire, within the forms prior to placement.

J. Handling and Placing

1. Do not place concrete against surfaces of absorbent materials that are dry. Do not place concrete against surfaces that have free water.
2. Minimize segregation of the concrete and displacement of the reinforcement when handling and placing concrete.
3. The final product shall be a uniform, dense, compact mass.
4. Do not allow concrete to free-fall more than five (5) feet except in the case of drilled shafts.
5. Fill each part of the forms by depositing concrete as near its final position as possible. Do not deposit large quantities at one (1) point and then work the concrete along the forms.
6. Deposit concrete in the forms in layers of suitable depth but not more than twenty four (24) inches deep unless compliance confirmed. Thoroughly vibrate each layer and adjacent portions into the previously placed concrete prior to beginning the next layer.

7. Use a compliance confirmed retarding agent to control stress cracks in placements where differential settlement and setting time may induce cracking.
8. No additional water or any other fluid shall be placed on the concrete to aid in finishing the surface.
9. Document all concrete placements.

K. Consolidation

1. Carefully consolidate concrete and flush mortar to the form surfaces with immersion type vibrators. Do not use vibrators that operate by attachment to forms or reinforcement except where compliance confirmed on steel forms.
2. Vibrate the concrete immediately after deposit.
3. Systematically space points of vibration to ensure complete consolidation and thorough working of the concrete around the reinforcement, embedded fixtures, and into the corners and angles of the forms.
4. Insert the vibrator vertically where possible except for slabs where it may be inserted in a sloping or horizontal position.
5. Vibrate the entire depth of each lift, allowing the vibrator to penetrate several inches into the preceding lift.
6. Do not use the vibrator to move the concrete to other locations in the forms.
7. Do not drag the vibrator through the concrete.
8. Thoroughly consolidate concrete along construction joints by operating the vibrator along and close to but not against the joint surface.
9. Continue the vibration until the concrete surrounding reinforcements and fixtures is completely consolidated. Do not cause the concrete paste and aggregate to separate from over vibration.
10. Hand-spade or rod the concrete if necessary to ensure flushing of mortar to the surface of all forms.

L. Placing Concrete in Cold Weather

1. Protect concrete placed under weather conditions where weather may adversely affect results. Use ACI 306R, Guide to Cold Weather Concreting, as a reference for work in cold weather. Following ACI 306R for placement of concrete in cold weather will not relieve the Contractor of responsibility for producing concrete equal in quality to that placed under normal conditions. Substandard concrete shall be removed and replaced it at Contractor's expense.
2. Do not place concrete in contact with any material coated with frost or having a temperature of thirty two degrees Fahrenheit (32°F) or lower.

3. Do not place concrete when the ambient temperature in the shade is below forty degrees Fahrenheit (40°F) and falling unless compliance confirmed.
4. Concrete may be placed when the ambient temperature in the shade is thirty-five degrees Fahrenheit (35°F) and rising or above forty degrees Fahrenheit (40°F).
5. Provide and install recording thermometers, maturity meters, or other suitable temperature measuring devices to verify that all concrete is effectively protected.
6. Use additional covering, insulated forms, or other means and, if necessary, supplement the covering with artificial heating. Avoid applying heat directly to concrete surfaces. Cure as specified in Section 03.39.00 during this period until all requirements for curing have been satisfied. When impending weather conditions indicate the possible need for temperature protection, have on hand all necessary heating and covering material, ready for use, before permission is granted to begin placement.

M. Placing Concrete in Hot Weather

1. Hot weather results from one or a combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise causing detrimental results:
   a. High ambient temperature
   b. High concrete temperature
   c. Low relative humidity
   d. High wind speed.
2. When the air temperature is above eighty five degrees Fahrenheit (85°F), concrete placement and mixing shall be based upon ACI 305R, Guide to Hot Weather Concreting. The Concrete may use a retarding agent, ice, or other compliance confirmed method to control the concrete temperature and minimize the weather effects.

N. Allow at least one (1) curing day after the concrete has achieved initial set before placing strain on projecting reinforcement to prevent damage to the concrete.

3.6 QUALITY CONTROL TESTING

A. The Contractor shall implement a quality control program to oversee concrete compressive strength. At a minimum, this program shall test concrete compressive strength in accordance with ASTM C31 and ASTM C39 for six (6) inch by twelve (12) inch cylinders.

B. Sampling Fresh Concrete
The Contractor shall provide all material to be tested. Concrete samples shall be taken as required by ASTM C172. Fresh concrete will be sampled for testing at the discharge end if using belt conveyors or pumps. When it is impractical to sample at the discharge end, a

sample will be taken at the time of discharge from the delivery equipment and correlation testing will be performed and documented to ensure specification requirements are met at the discharge end.

C. Testing of Fresh Concrete

1. Air Content: ASTM C231 using Type B meter
2. Temperature: ASTM C1064
3. Slump: ASTM C143
4. Making and Curing Strength Specimens: ASTM C31 and ASTM C39

D. Testing of Hardened Concrete

1. Compressive Strength: ASTM C109

E. Certification of Testing Personnel

Personnel performing testing must be either ACI certified or qualified by a recognized equivalent written and performance testing program for the tests being performed. Personnel performing these tests are subject to County of El Paso compliance confirmation.

F. Adequacy and Acceptance of Concrete

1. Test 7-day and 28-day specimens. Acceptance will be based on the design strength given in Table 16, Table 17, and Table 18 using ASTM C94.
   a. The average of three consecutive compressive strength tests must be equal to or greater than the design strength.
   b. No single cylinder has a compressive strength of less than the specified compressive strength at twenty eight (28) days minus five hundred (500) psi.
2. For any concrete that fails to meet the required strengths as outlined below, investigate the quality of the materials, the concrete production operations and other possible problem areas to determine the cause.
3. Take necessary actions to correct the problem including redesign of the concrete mix. The County of El Paso may suspend all concrete operations if the Contractor is unable to identify, document, and correct the cause of the low strengths in a timely manner.
4. Resume concrete operations only after obtaining compliance confirmation for any proposed corrective actions.
5. The County of El Paso reserves the right to sample and test the fresh or hardened concrete for acceptance.
6. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests shall be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

a. Investigation of Low-Strength Test Results
When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than five hundred (500) psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C597, ASTM C803, or ASTM C805 may be permitted by the COR to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored.

b. Testing of Cores
When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the COR to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least eight five percent (85%) of the specified strength requirement and if no single core is less than seventy five percent (75%) of the specified strength requirement.

c. Load Tests
If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the COR in accordance with the requirements of ACI 350. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the COR. All investigations, testing, load tests, and correction of deficiencies will be performed and compliance confirmed by the COR at the expense of the Contractor, except that if all concrete is in compliance with the Contract Drawings and specifications, the cost of investigations, testing, and load tests will be at the expense of the County of El Paso.

G. Test Sample Handling
Unless otherwise shown on the Contract Drawings, the Contractor shall remove forms and deliver test specimens to curing facilities, in accordance with pertinent test procedures. The Contractor shall clean and prepare forms for reuse.

H. Testing Frequency

1. A minimum of at least one (1) set of test cylinders shall be taken once every eight (8) hour shift, once per structure, or for every other concrete truck load (up to 20 cy) placed each day, whichever requires more samples.
   a. Each set of test cylinders shall include a minimum of four (4) cylinders. Two (2) cylinders shall be tested at seven (7) days and two (2) cylinders shall be tested at twenty eight (28) days.
   b. If the Contractor wishes to test cylinders at three (3) days, fourteen (14) days, twenty one (21) days, or other time frames, additional cylinders must be taken.

All additional testing shall be at no additional expense to the County of El Paso.

c. Concrete cannot be loaded until tests indicate that the concrete is considered structurally adequate.

(1) Concrete is structurally adequate when structurally adequate when average compressive strength of three cylinders is equal to at least the design strength and no single cylinder has a compressive strength of less than the specified compressive strength at twenty eight (28) days minus five hundred (500) psi.

2. Perform air, slump, and temperature tests whenever cylinders are taken or whenever there is a question about the quality of the concrete.

I. Cure these specimens under the same conditions as the portion of the structure involved for all stages of construction. Ensure safe handling, curing and storage of all test specimens.

J. Coring will not be allowed for in-situ strength determination for schedule restrictions.

K. The County of El Paso may require additional time for strength gain to account for field curing conditions such as cold weather.

L. Provide the County of El Paso the opportunity to witness all testing operations.

M. Test Reporting

1. Test results will be made immediately available to the COR.
2. Tests and test results shall be thoroughly documented in the Contractor's daily QC report.
   a. Ensure that the concrete testing technician's daily field report of all tests and samples taken is included with the Contractor's daily QC report.
3. The Contractor shall provide a certified hard-copy of each test report to the COR within twenty four (24) hours of each test result or as requested by the COR.
4. Summarize test results for each concrete placement.

3.7 PROTECTION

A. Protect concrete from damage until final acceptance by the County of El Paso.

B. Do not load, remove forms or shoring, or backfill against concrete until concrete has gained strength to safely support its weight and imposed loads.

C. Protect fresh concrete against erosion from rain, hail, sleet, or snow; contamination from foreign materials; and damage from foot traffic until the concrete has hardened.

D. Protect concrete from heavy foot traffic and other construction activities by covering with plywood or other suitable material. Remove and dispose of temporary covering when no longer required.

3.8 DEFECTIVE WORK

The Contractor shall repair defective work as soon as possible. Remove and replace, at the expense of the Contractor, any defect that cannot be repaired to the satisfaction of the COR.

3.9 CONCRETE REPAIR

A. All concrete repair shall be performed per the requirements of Bureau of Reclamation's (USBR) Guide to Concrete Repair including USBR's M-47 Standard Specifications for the Repair of Concrete.

B. Surface Classes are defined in Section 03.35.00.

C. The Contractor shall repair and finish all concrete work as follows:

1. Minimum repairs for each concrete surface finish are detailed in Section 03.35.00 Paragraph 3.2 .
2. Chip away all loose or broken material to sound concrete where porous, spalled, or honeycombed areas are visible after form removal.
3. Repair spalls by saw-cutting and chipping at least one half (½) inch deep, perpendicular to the surface to eliminate feather edges. Repair shallow cavities using a cement mortar or epoxy mortar as compliance confirmed. Repair large areas using concrete as compliance confirmed.
4. Clean and fill holes, spalls, and honeycombs with non-shrink grout as compliance confirmed.
   a. Fill only the holes.
   b. Do not blend the patch with the surrounding concrete.
   c. Chip out exposed parts of metals chairs to a depth of one half (½) inch and repair the surface.
5. Remove all fins, runs, drips, or mortar from surfaces that will be exposed.
6. Smooth all form marks and chamfer edges by grinding or dry-rubbing.
7. Ensure that all repairs are dense, well bonded, and properly cured.
8. Finish exposed large repairs to blend with the surrounding concrete where a higher class of finish is not specified.
9. Use latex bonding agent on existing hardened concrete unless mortar manufacturer details that it is not required.

D. Repair concrete which will be exposed to view in a manner which will result in a concrete surface with uniform appearance.

1. When grinding surfaces exposed to view, limit depth of grinding such that no aggregate particles are exposed more than 1/16 inch in cross section at finished surface.

2. When grinding has caused or will cause exposure of aggregate particles greater than 1/16 inch in cross section at finished surface, repair concrete by excavating (saw cutting) and replacing concrete.

E. All repairs shall be completed within forty eight (48) hours after form removal.

F. Protect repairs from premature drying. Fully cure all repairs.

--End of Section—

This page intentionally left blank for double sided printing.

03.35.00
CONCRETE FINISHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 03.30.00-Cast-in-Place Concrete

1.3 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 305R-10 Guide to Hot Weather Concreting

1.4 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.5 GENERAL

The Contractor shall finish all concrete on this project per this Section.

1.6 REQUIRED CONCRETE FINISHES

A. Concrete shall be finished as noted below unless other finishes are called out in the Contract Drawings.

1. Visible concrete surfaces of all cast-in-place concrete shall be a Class A finish.
2. Permanently buried surfaces will be finished to a Class D surface.

1.7 FINISH CLASS DEFINITIONS

A. Class A unformed surface shall have a troweled finish. Trowel to a dense uniform surface free from blemishes and trowel marks. Class A formed surfaces shall be repaired to the standards in Paragraph 3.2 and left with a sack rub finish.

B. Class D unformed surface shall have a screeded finish. Level and screed to produce even unformed surface. Class D formed surfaces shall be repaired to the standards in Paragraph 3.2 and shall retain a form finish.

C. Surface and finish are used interchangeably in these specifications.

1.8 FINISHING DEFINITIONS

A. Form Finish
Concrete surface retains the imprint of the associated formwork material.

B. Screed Finish

1. Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible.
2. No water, cement, or mortar shall be added to the surface during the finishing operation.

C. Trowel Finish

1. Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks.
2. A trowel finish shall be applied to sides visible to the public, and to top surfaces of headwalls.
3. No water, cement, or mortar shall be added to the surface during the finishing operation.

D. Sack Rub Finish

1. After required patching and correction of imperfections has been completed, the surface of the concrete is thoroughly wetted and sack rubbed with mortar while surface is still damp.
2. Use mortar consisting of 1 part cement, 2 parts, by volume, of sand passing a No. 16 screen, and enough water so that mortar has consistency of thick cream. Blend standard cement with white cement as necessary to obtain a color which will match surrounding concrete surface.
3. The mortar is rubbed with clean burlap or a sponge rubber float to fill pits, bug holes, and other defects.
4. While mortar in pits is still plastic, rub surface with a dry mix of above proportions and material to remove excess plastic material and place enough dry material in the pits to stiffen and solidify mortar so that filling will be flush with surface. Remove material remaining on surface except material within pits.
5. The finished surface is even and smooth with no excess mortar left on the concrete surface.

PART 2 - PRODUCTS

2.1 MORTAR AND GROUT

A. Use products meeting Section 03.30.00.

PART 3 - EXECUTION

3.1 FINISHING

A. The ambient temperature of spaces adjacent to surfaces being finished shall be not less than forty degrees Fahrenheit (40°F).

B. In hot weather when the rate of evaporation of surface moisture, as determined by ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour, provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

C. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

D. No water shall be added to the concrete surface during any finishing operation.

3.2 SURFACE REPAIRS

A. Section 03.30.00 Paragraph 3.9 details concrete repair procedures.

B. Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired.

C. Class A Surface

1. Patch voids larger than 3/8 inch wide or ½ inch deep.
2. Remove projections larger than 1/8 inch.
3. Patch tie holes.
4. Sack Rub

D. Class D Surface

1. Patch voids larger than one (1) inch wide or ½ inch deep.
2. Remove projections larger than one (1) inch.
3. Patch tie holes.

E. Defective and unsound concrete areas larger than described above shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be coated with an epoxy grout. The void shall be filled with replacement concrete in accordance with Paragraph 3.9 Section 03.30.00.

F. Surface Repair
After removal of forms, all ridges, lips, and bulges on surfaces shall be removed. All repairs shall be completed within forty eight (48) hours after form removal.

--End of Section--

03.39.00
CONCRETE CURING

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. None.

1.3 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 308R-01 (2008) Guide to Curing Concrete

B. ASTM International (ASTM)

1. ASTM C171-07 Standard Specification for Sheet Materials for Curing Concrete
2. ASTM C309-11 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
3. ASTM C1602-12 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Prior to using any curing materials, the Contractor shall submit to the COR all required product information.
   a. Materials to be used.
   b. Manufacturer product data.
   c. Manufacturer recommendations for proper use of the product.
   d. Certification of the products to ensure it meets or exceeds the Section requirements.

1.5 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 GENERAL

All concrete placed as part of this project shall be cured per this Section and ACI 308R.

PART 2 - PRODUCTS

2.1 CURING MATERIALS

A. Impervious-Sheet Curing Materials
Impervious-sheet curing materials shall conform to ASTM C171, type optional, except polyethylene film shall not be used.

B. Membrane-Forming Curing Compound
The membrane-forming curing compound shall conform to ASTM C309, Type 1-D or 2.

2.2 WATER

Provide water for curing that is fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water may be used if it meets the requirements of ASTM C1602.

2.3 SPRAYING EQUIPMENT

1. The Contractor shall use mechanically powered pressure sprayers, either air or airless, with appropriate atomizing nozzles for the application of membrane curing. If compliance confirmed, the Contractor shall use hand-pressurized spray equipment equipped with fan-spray nozzles.

2. Ensure that the spray from each nozzle is operating at peak efficiency.
3. If nozzles become clogged, clean immediately.

PART 3 - EXECUTION

3.1 CURING CONCRETE

A. The Contractor shall obtain compliance confirmation of the proposed curing methods, equipment and materials before placing concrete. The County of El Paso may require the same curing methods for like portions of a single structure.

B. Inadequate curing shall delay all concrete placement on the job until remedial action is taken.

3.2 DURATION

A. The minimum length of the curing period shall be determined by the type of cementitious material as specified in Table 21.

B. Concrete shall be cured by an approved method.

1. A curing day is a calendar day when the temperature, taken in the shade away from artificial heat, is above fifty degrees Fahrenheit (50°F) for at least nineteen (19) hours or, on colder days if the temperature of all surfaces of the concrete is maintained above fifty degrees Fahrenheit (50°F), for the entire twenty four (24) hours.

Table 21 - Duration of Curing

Type of Cementitious Material	Length of Curing, minimum
Type III Portland cement	3 days
Portland cement when accelerator is used to achieve high early strength, except when pozzolan or GGBF slag is used	3 days
Type I Portland cement	7 days
Type IS or Type IP cement	7 days
Type II Portland cement (including Type I/II)	14 days
Portland cement blended with 25 percent or less pozzolan or GGBF slag	14 days
Portland cement blended with more than 25 percent pozzolan or GGBF slag	21 days

C. Immediately after placement, concrete shall be protected from premature drying, extremes in temperature, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement.

D. Concrete shall be protected from the damaging effects of rain for twelve (12) hours and from flowing water for fourteen (14) days (seven (7) days with Type III cement).

E. No fire or excessive heat, including welding, shall be permitted near or in direct contact with concrete or concrete embedment at any time.

3.3 MOIST CURING

A. Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period.

B. Vertical surfaces shall be cured using soaker hoses, fog sprayers, or sprinklers.

C. Burlap may be used to assist moist curing provided that the wall and burlap are kept continuously saturated, including nights and weekends, and the burlap is kept in contact with the concrete being cured.

D. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required to meet specifications.

E. Saltwater and brine water shall not be used.

F. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface.

G. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of two (2) inches of continuously saturated sand, or by covering with saturated non-staining burlap or cotton mats. Horizontal construction joints may be allowed to dry for twelve (12) hours immediately prior to the placing of the following lift.

3.4 MEMBRANE-FORMING CURING COMPOUND

A. Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface to which a grout cleaned finish is to be applied, a cementitious paint finish is to be applied, any surface other concrete is to be bonded, on any surface containing protruding steel reinforcement, on an abrasive aggregate finish, or any surface maintained at curing temperature by use of free steam.

B. Membrane-Forming curing compound shall conform to ASTM C309, Type 1-D or 2.

C. A pigmented-type curing compound may be used and is preferred over nonpigmented compounds.

D. Concrete cured with nonpigmented curing compound must be shaded from the sun for the first three (3) days when the ambient temperature is ninety degrees Fahrenheit (90°F) or higher.

E. Application

1. The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface.
2. The curing compound shall be applied to unformed surfaces per manufacturer's instructions.
   a. Apply to concrete surface to provide a water-retaining film. Reapply as necessary to maintain a continuous, water-retaining film on surface for the curing period.
   b. Thoroughly mix compound and spray apply in one coat to provide a continuous, uniform film over surface.
   c. If an additional coat are required, the second coat shall be applied perpendicular to the first coat
   d. Do not exceed coverage rate of one hundred fifty (150) square feet per gallon. Decrease coverage rate on rough surfaces as necessary to obtain required continuous film.
   e. Ensure ample coverage on edges, corners and rough surfaces.
3. Spray equipment and equipment performance will be subject to approval by COR. Repair or replace equipment when directed by COR.
4. Use personnel qualified in using specified spray technique, as determined by COR, to perform application.
5. Concrete surfaces that have been subjected to rainfall within three (3) hours after curing compound has been applied shall be resprayed by the method and at the coverage specified.
6. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

3.5 EVAPORATION RETARDANT

A. Horizontal surfaces may be cured using sheet material. Sheet curing shall not be used on vertical or near-vertical surfaces.

B. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper or polyethylene-coated burlap having the burlap thoroughly water-saturated before placing.

C. Covering shall be laid with light-colored side up. Covering shall be lapped not less than twelve (12) inches and securely weighted down or shall be lapped not less than four (4) inches and taped to form a continuous cover with completely closed joints.

D. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by to withstand wind and prevent circulation of air inside curing film.

E. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.6 COLD WEATHER CURING AND PROTECTION

A. Maintain concrete at a temperature of fifty degrees Fahrenheit (50°F) or greater for seventy two (72) hours, minimum, after placement. Vent heater and prevent concrete from drying where artificial heat is employed.

B. Maintain concrete above forty degrees Fahrenheit (40°F) for the first seven (7) days after placing.

C. Discontinue protection against cold weather such that the drop in temperature of the concrete will be gradual and will not exceed five degrees Fahrenheit (5°F) per hour and forty degrees Fahrenheit (40°F) in twenty four (24) hours for thin sections and five degrees Fahrenheit (5°F) per hour and twenty (20) degrees Fahrenheit (20°F) in twenty four (24) hours for massive sections greater than thirty six (36) inches.

D. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than twenty five degrees Fahrenheit (25°F) as determined by observation of ambient and concrete temperatures indicated by suitable temperature measuring devices furnished by the County of El Paso as required and installed adjacent to the concrete surface and two (2) inches inside the surface of the concrete.

E. The installation of the thermometers shall be made by the Contractor at such locations as required or as may be directed.

1. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The County of El Paso has the right to examine all test and inspection records.

3.7 CURING QUALITY CONTROL

A. Moist-Curing Inspections
At least once each shift, and once per day on non-work days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

B. Moist-Curing Corrective Action
When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

C. Membrane-Curing Inspection
No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, they shall estimate the quantity of compound used by measurement of the container, the area of concrete surface covered and compute the rate of coverage in square feet per gallon. They shall note whether or not coverage is uniform.

D. Membrane-Curing Corrective Action
When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again. The Contractor shall inspect coated concrete a minimum of twice a day to ensure that coating compound has not been worn off by construction activities. If wear marks are present, recoat concrete.

E. Sheet-Curing Inspection
At least once each shift and once per day on non-work days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

F. Sheet-Curing Corrective Action
When a daily inspection report lists any tears, holes, laps, or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

G. Cold-Weather Protection and Sealed Insulation Curing
At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

H. Cold-Weather Protection Corrective Action
When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended one (1) day.

I. Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week.

--End of Section—

TECHNICAL SPECIFICATIONS
DIVISION 31
EARTHWORK

This page intentionally left blank for double sided printing.

31.11.00
PREPARING RIGHT OF WAY

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 35.41.00-Construction of Levee

1.3 REFERENCE STANDARDS

A. US Army Corps of Engineers (USACE)

1. Engineer Technical Letter (ETL) No. 1110-2-583, "*Guidelines for Landscaping Planting and Vegetation at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*," dated April 30, 2014

1.4 MEASUREMENT AND PAYMENT

A. Measurement

1. This Bid Item will be measured based on the lump sum basis, and no separate construction activity will be measured in the field for the purpose of payment for the individual construction activity.

2. Measurement of cost components considered under this Section shall be based on the percentage complete, regardless of the width of the right-of-way, per the Contract Drawings.

B. Payment

1. This Bid Item will be paid based on the lump sum bid price identified in Section B of the Contract Provisions.
2. The cost components considered for the Bid Item price under this Section is "Preparing Right of Way." This price is full compensation for pruning of designated trees and shrubs; excavation, removal, storage, and/or disposal, hauling fees/charges for structures, vegetation, and obstructions; backfilling and compaction of holes; and equipment, labor, tools, and incidentals.

1.5 GENERAL

In general, the Contractor shall prepare the right of way, temporary construction limits, and designated easements for construction operations by removing and disposing of all obstructions even when removal of such obstructions is not specifically shown on the Contract Drawings.

PART 2 - PRODUCT

(Not Applicable to this Section)

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall limit all construction activities to the Temporary Construction Limits (TCL) shown on the Contract Drawings.

B. It shall be the Contractor's responsibility to identify and acquire any easements beyond the USIBWC right-of-way necessary for construction, prior to commencement of construction, at no cost to the County of El Paso.

3.2 PROTECT FEATURES.

A. The Contractor shall protect designated features on the right of way.

B. Do not park equipment, service equipment, store materials, or disturb the root area under the branches of trees designated for preservation.

C. When shown on the Contract Drawings, prune trees and shrubs. Treat cuts on trees with a compliance confirmed tree wound dressing within twenty (20) minutes of making a pruning cut or otherwise causing damage to the tree.

D. Testing, removal, and disposal of hazardous materials within the right of way will be in accordance with Contract provisions.

3.3 CLEAR RIGHT OF WAY.

A. The Contractor shall clear areas within the construction limits of all obstructions, except those features and/or vegetation that are shown on the Contract Drawings to be preserved or protected in place.

B. Obstructions include but are not limited to structures, concrete, brick, lumber, plaster, equipment, fences, trees, brush and other items as compliance confirmed by the COR.

C. Pipes and Drainage Structures
The Contractor shall inform the COR of all pipes and drainage structures not shown on the Contract Drawings which are encountered during grubbing. Such pipes and drainage structures shall not be removed or disturbed until so directed by the COR. Deleterious material excavated in the process of removing pipes and drainage structures shall be removed from the project site at no additional cost.

D. Remove miscellaneous stone, scrap iron and debris, whether above or below ground.

E. Removal of live utility facilities is not included in this Section.

F. Remove all existing vegetation including, but not limited to trees, brushes, and shrubs prior to the commencement of grading.

G. The Contractor shall remove and dispose of all existing vegetation together including stumps, roots, and matted roots and other organic materials to a depth of two (2) feet below the depth of the required excavation or existing ground elevations, whichever is lower. Depression made by vegetation removal shall be backfilled in accordance with Section 35.41.00.

3.4 CLEAR OBSTRUCTIONS

A. In areas to be excavated, remove obstructions to two (2) feet below the excavation level. In all other areas, remove obstructions to two (2) foot below natural ground.

B. When allowed by the Contract Drawings, cut trees and stumps off to ground level.

C. Plug the remaining ends of abandoned underground structures with concrete to form a tight closure.

D. Backfill, compact, and restore areas where obstructions have been removed. Use compliance confirmed material for backfilling.

3.5 VEGETATION REMOVAL (INSIDE FOOTPRINTS OF LEVEE IMPROVEMENT)

A. The Contractor shall completely remove all existing vegetation including, but not limited to, trees, shrubs, and sod lying within the footprints of the levee improvements, shown on the Contract Drawings, unless directed otherwise by the COR.

B. The vegetation removal shall include complete removal of stumps, root bulbs, and root system. The removal of the vegetation shall be performed by excavating the trunk (or stem), stump, rootball, and all roots and backfilling of the voided stump area to the original grades in compliance with the compacting method, procedure and minimum compaction required in Section 35.41.00-Construction of Levee. The Contractor shall refer to the Contract Drawings for approximate locations of existing trees to be removed and footprints of levee improvements and channel excavation.

C. The Contractor shall comply with the requirements of the Engineer Technical Letter (ETL) No. 1110-2-583, "*Guidelines for Landscaping Planting and Vegetation at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*," (dated April 10, 2009) in vegetation removal activities.

3.6 VEGETATION REMOVAL (OUTSIDE OF FOOTPRINTS OF LEVEE IMPROVEMENT)

A. The Contractor shall remove all existing vegetation including stem, trunk, stump, rootball, and all roots greater than a half (0.5) inch in diameter, located within fifteen (15) feet distances from both landside and riverside toes of levees as long as they are located within the TCLs and USIBWC Right of Way, unless directed otherwise by the COR.

B. All existing trees located inside of the TCLs but outside the fifteen (15) feet distances from both landside and riverside toes of levees and not designated for removal shall not be removed, unless directed otherwise by the COR. All remaining vegetation within the TCLs shall be mowed to less than twelve (12) inches high.

C. If identified to be removed, the removal of the vegetation shall be performed by excavating the trunk (or stem), stomp, rootball, and all roots and backfilling of the voided stump area to the original grades in compliance with the compacting method, procedure and minimum compaction required in Section 35.41.00. The Contractor shall refer to the Contract Drawings for approximate locations of existing trees to be removed. The Contractor must provide a submittal for compliance confirmation by the COR for those trees that will be removed before the work is performed.

D. The Contractor shall comply with the requirements of the USACE's ETL, identified in Paragraph 3.5 C. herein.

3.7 VEGETATION IN AREAS RECEIVING FILL MATERIAL (GRUBBING)

A. In areas receiving fill, the Contractor shall remove and dispose of all existing vegetation together including stumps, roots, and matted roots, and other organic materials. Depression made by vegetation removal shall be backfilled in accordance with Section 35.41.00.

B. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of fill, the Contractor will be required to clear and grub the area again prior to embankment construction. No payment will be made for this additional clearing and grubbing.

3.8 EXISTING STRUCTURES TO BE REMOVED.

A. The Contractor shall remove and dispose of the existing structures, identified on the Contract Drawings or by the COR in the field.

B. Backfilling
The Contractor shall backfill and restore any voided area or holes created by removal activities to the original grade per details shown on the Contract Drawings.

C. The Contractor shall accept ownership and dispose of removed materials and debris at locations off the right of way. The Contractor is responsible for hauling to locations off of the right of way and for payment of any applicable fees or charges associated with disposal of removed materials and debris.

--End of Section—

This page intentionally left blank for double sided printing.

31.14.00
REMOVE / STOCKPILE EXISTING MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 35.41.00-Construction of Levee

1.3 REFERENCE STANDARDS

A. ASTM International (ASTM)

1. ASTM D5268-13 Standard Specification for Topsoil Used for Landscaping Purposes.

1.4 MEASUREMENT AND PAYMENT

The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.5 GENERAL

This Section includes requirements for the removal and disposal or removal and stockpile for re-use of existing materials excavated within the limits of the project, and includes the following:

A. As indicated on the Contract Drawings or as directed by the COR, the Contractor shall either (1) remove and dispose of or (2) remove and, at the Contractor's option, stockpile for re-use all material excavated within the limits of the Project. All materials reused on the project shall meet the Contract Specifications.

B. The material to be removed and which may be stockpiled for re-use includes topsoil, providing that it meets all the requirements for Topsoil presented in Section 35.41.00. All other materials are to be disposed of by the Contractor.

C. The existing aggregate surface shall not be reused as nor incorporated into new aggregate surface material.

D. All removals and/or stockpiling shall be completed to the satisfaction of the COR, in order to construct, shape, and rough-in materials to the required lines, grades, and typical sections as shown on the Contract Drawings.

E. The Contractor will NOT be allowed to stockpile on the riverside of the levee or in the floodplain. It is the Contractor's responsibility to comply with any federal and local regulations and requirements with regards to working in the area within the levees of the Rio Grande.

F. The Contractor will be required to remove concrete foundations remaining from the construction of a temporary border fence used during the new international bridge construction. The temporary border fence foundations to be removed are approximately located along bent 11 of the new bridge as shown in Figure 1.5.F-1. The foundations to be removed consist of 18 inch diameter, 4-feet deep drilled piers at 8 feet spacing with 6 inch wide by 3 feet deep concrete walls in between them as shown in Figure 1.5.F-2. Temporary border fence foundations shall be completely removed. Any temporary border fence foundation removal below the exposed subgrade elevation shall be replaced with compacted Fill (Impervious Materials) per Section 35.41.00.

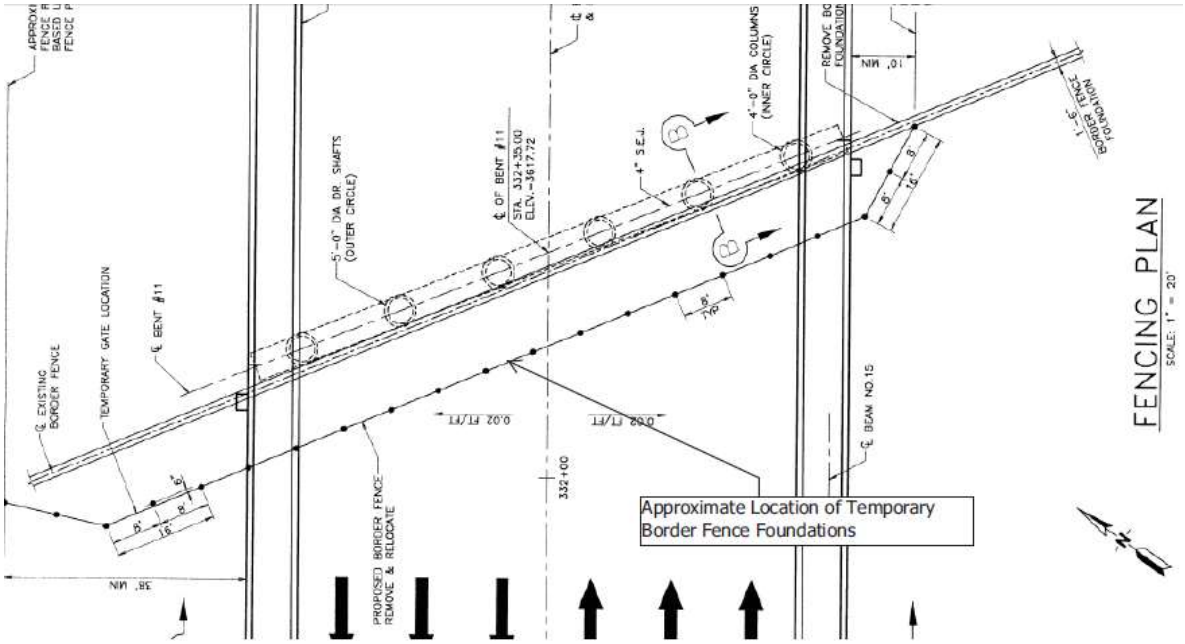

Figure 3 Approximate Location of Temporary Border Fence Foundations.

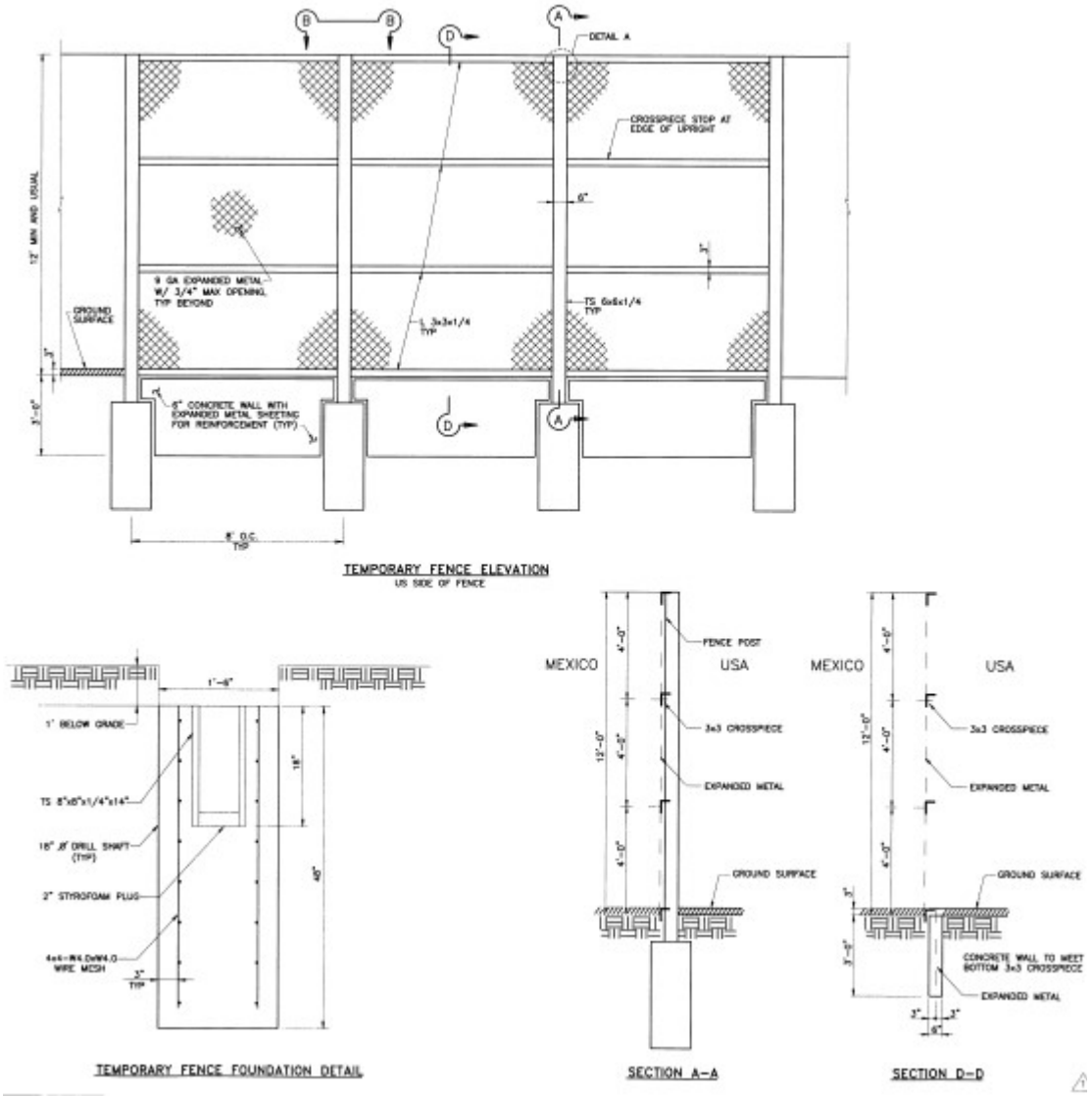

Figure 4 Temporary Border Fence Foundation Details.

PART 2 - PRODUCT

(Not Used)

PART 3 - EXECUTION

3.1 EXISTING GRAVEL (AGGREGATE SURFACE)

A. Scarify
Loosen and break existing gravel/caliche and/or aggregate surface material.

B. Salvaging
Remove the existing gravel and/or caliche material and dispose of it per the requirements specified herein. The Contractor shall NOT re-use the excavated existing aggregate surface as or incorporate it into new aggregate surface at any time. Perform removal operations without interfering with proper drainage, or the general requirements of the work. Remove scarified material using a method compliance confirmed by the County of El Paso.

C. Disposal
Dispose of gravel/caliche and/or existing aggregate surface material at a location compliance confirmed by the County of El Paso. The Contractor shall comply with the local, state, and Federal requirements for disposal activities and location.

3.2 EXISTING TOPSOIL

A. Scarify
Before scarifying, clean the existing topsoil of objectionable materials by compliance confirmed methods. Scarify the area to remove existing topsoil to a depth of six (6) inches.

B. Salvaging
Remove the existing topsoil material and stockpile. Perform salvage operations without interfering with proper drainage, or the general requirements of the work. Remove scarified material using a method compliance confirmed by the County of El Paso. Keep material free of contamination.

C. Stockpiling and/or Disposal
If topsoil meets the requirements of ASTM D5268, store salvaged topsoil at a location compliance confirmed by the County of El Paso. Prepare stockpile sites by removing and disposing of trash, wood, brush, stumps, vegetation, and other objectionable materials. Deliver salvaged material and stockpile for re-use. If topsoil does not meet ASTM D5268, then the Contractor shall dispose of unsuitable topsoil material per Section 01.74.19.

3.3 EXISTING TEMPORARY BORDER FENCE FOUNDATION

A. Disposal
Dispose of temporary border fence concrete foundation material at a location compliance confirmed by the County of El Paso. The Contractor shall comply with the local, state, and Federal requirements for disposal activities and location.

--End of Section—

31.23.00
EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 03.30.00-Cast-in-Place Concrete

B. Section 35.41.00-Construction of Levee

1.3 REFERENCE STANDARDS

A. Federal Highway Administration

1. Manual on Uniform Traffic Control Devices, 2009 with Revisions 1 and 2 May 2012

1.4 SUBMITTALS

A. Submittals shall be transmitted by the Contractor in accordance with the requirements of Section 01.33.00. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Excavation Plan
   The Contractor shall submit an Excavation Plan to the COR that must be compliance confirmed prior to commencing excavation activities. The plan shall include the

following: access and egress, securing of site, method for working around and protecting existing structures and utilities, equipment required, and other requirements as found in 29 CFR 1926.651.

2. Utility Location Plan
   The Contractor shall submit a utility location plan. Utility location plan shall detail the depth and size of located utilities, as well as their location relative to landmarks. Once utility location plan is completed, it shall be submitted as an addendum to the Excavation Plan.

3. Disposal or Remediation Plan
   The Contractor shall submit a plan detailing how the excavated material will be disposed or remediated in a manner that complies with soil that exceeds TCEQ residential PCL's for arsenic, lead, and cadmium and meets state and Federal requirements.
   a. The Contractor shall not commence excavation activities prior to compliance confirmation of this plan by the County of El Paso.

4. Testing Laboratory
   Compliance confirmation of engineering testing facilities shall be based on compliance with Section 01.45.07 1.10 B. and no work requiring testing will be permitted until the facilities have been inspected and compliance confirmed by the COR.
   a. If this information has already been submitted for other quality control work, it does not need to be resubmitted.

5. Testing Laboratory
   Compliance confirmation of environmental analysis facilities shall be based on compliance with Section 01.45.07 1.10 B. and no work requiring testing will be permitted until the facilities have been inspected and compliance confirmed by the COR.
   a. If this information has already been submitted for other quality control work, it does not need to be resubmitted.

6. Reports-Survey Records
   Submit a copy of the records of each compliance survey the next work day following the survey.

7. Test Results
   Test results shall be furnished to the COR within twenty four (24) hours of making the test.

8. Environmental Compliance
   Submit documentation showing that all applicable law, rules and regulations are being followed for contaminated soil disposal.

9. Disposal Records
   a. Submit all Bills of Lading (shipping papers) and weigh tickets showing hauling of contaminated soil.

b. Submit receipts of acceptance of material by landfill.

1.5 MEASUREMENT AND PAYMENT

A. Measurement
Structural excavation quantities shown are for information purposes only. Structural excavation for pipe headwalls, inlets, manholes, culvert or storm drain extensions, bridge abutments, retaining walls, and side road and private entrance pipe culverts will not be measured. No allowance will be made for variance from plans quantity incurred by an alternate bid. Excavation diagrams on the Contract Drawings take precedence over the provisions of this Section.

B. Payment
The work performed by the Contractor under this Section shall not be paid for directly, but shall be included in the various Bid Items under this Contract.

1.6 GENERAL

In general, the Contractor shall excavate and backfill for placement and construction of structures.

PART 2 - PRODUCTS

2.1 MATERIALS

The Contractor shall use materials that meet the requirements of the Section 35.41.00.

PART 3 - EXECUTION

3.1 GENERAL EXCAVATION

A. The Contractor shall excavate to the lines and grades shown on the Contract Drawings. The Contractor shall provide slopes, benching, sheeting, bracing, pumping, and bailing as necessary to maintain the stability and safety of excavations up to five (5) feet. Excavation protection for excavations deeper than five (5) feet will require trench protection and/or safety shoring.

B. The Contractor shall use satisfactory excavated material as compacted or backfill as required by the Contract Drawings. The Contractor shall dispose of material not incorporated into the final project off the right-of-way in accordance with Federal, state, and local regulations.

C. All material used as fill shall meet the requirements of Section 35.41.00 regardless of origin.

D. Obstructions
The Contractor shall remove obstructions to the proposed construction, including trees and other vegetation, debris, and structures. If abandoned storm drains, sewers, or other drainage systems are encountered, remove as required to clear the new structure, and plug in a compliance confirmed manner. After removing obstructions, restore the bottom of the excavation to grade by backfilling in accordance with this Section and Section 35.41.00. Dispose of surplus materials in accordance with Section 01.74.19.

E. Utilities

1. The Contractor shall conduct work with minimum disturbance of existing utilities, and coordinate work in or near utilities with the utility owners. Inform utility owners sufficiently before work begins to allow them time to identify, locate, reroute, or make other adjustments to utility lines.

2. Avoid cutting or damaging underground utility lines that are to remain in place. If damage occurs, promptly notify the utility company. Also, the Contractor shall repair the damaged utilities to the original conditions to no expense to the County of El Paso. If an active sanitary sewer line is damaged during excavation, provide temporary flumes across the excavation while open, and restore the lines when backfilling has progressed to the original bedding lines of the cut sewer.

3.2 EXCAVATION

A. Retaining Wall
Excavation for the retaining wall will be concurrent with the excavation for lowering of the levee road. As such, excavation requirements for the retaining wall shall concur with the levee construction excavation requirements of Section 35.41.00 3.3 Excavation Operations.

3.3 BACKFILL

A. As soon as practical, the Contractor shall backfill excavations after placement of the permanent structure. All backfill shall be compliance confirmed.

1. Backfill shall meet Section 35.41.00.

B. Fill Placement Against Retaining Wall

1. Crawler-type tractors, vibratory equipment and other similar compaction equipment shall not be used within four (4) feet of the new retaining wall. Compaction within four (4) feet of the new retaining wall shall be accomplished by the use of mechanical hand tampers, vibrating plates, or other compliance confirmed methods and equipment.

2. The Contractor shall ensure that compaction operations do not damage any existing utility, structure, or pipe. Any damage caused by the Contractor's operation shall be repaired at no additional cost to the County of El Paso.

C. Fill Placement Adjacent to Concrete
Concrete shall meet requirements of Section 03.30.00 3.2 prior to backfilling against it.

--End of Section--

This page intentionally left blank for double sided printing.

TECHNICAL SPECIFICATIONS
DIVISION 32
EXTERIOR IMPROVEMENTS

This page intentionally left blank for double sided printing.

32.15.00
AGGREGATE ROAD SURFACING

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 35.41.00-Construction of Levee

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO T180-10-UL Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
2. AASHTO T224-10-UL Standard Method of Test for Correction for Coarse Particles in the Soil Compaction Test

B. ASTM International (ASTM)

1. ASTM C117-13 Standard Test Method for Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
2. ASTM C127-12 Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
3. ASTM C128-12 Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Fine Aggregate
4. ASTM C131-14 Standard Test Method for Resistance to Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
5. ASTM C136-06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
6. ASTM D8-13b Standard Terminology Relating to Materials for Roads and Pavements
7. ASTM D422-63(2007)e2 Standard Test Method for Particle-Size Analysis of Soils
8. ASTM D1556-07 Density and Unit Weight of Soil in Place by the Sand-Cone Method
9. ASTM D1557-12 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
10. ASTM D4318-10e1 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
11. ASTM D6938-10 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
12. ASTM E11-13 Wire Cloth and Sieves for Testing Purposes

C. Code of Federal Regulations (CFR)

1. 36 CFR 800, Protection of Historic Properties

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Testing Laboratory
   a. No work requiring testing will be permitted until the facilities have been inspected and compliance confirmed by the COR.
   b. If this information has already been submitted for other quality control work, it does not need to be resubmitted.

2. Gravel/Aggregate Materials

At least ten (10) calendar days prior to placement of any aggregate surface, the Contractor shall submit to the COR the results of all required testing necessary to classify the gravel and necessary for determining if placement is in compliance with the requirements herein.

3. Nuclear Density Testing Equipment Operator

Nuclear density testing equipment shall be used in accordance with ASTM D6938. In addition, the following conditions shall apply:

a. Prior to using the nuclear density testing equipment on the site, the Contractor shall submit to the COR a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer.
b. The nuclear density testing equipment shall be capable of extending a probe a minimum of twelve (12) inches down into a hole.
c. If this information has already been submitted for other quality control work, it does not need to be resubmitted.

4. Reports-Survey Records

Submit a copy of the records of each compliance survey the next work day following the survey.

5. Test Results

Test results shall be furnished to the COR within twenty four (24) hours of making the test.

a. Test results shall be certified by a Texas registered Professional Civil Engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the Texas registered Professional Civil Engineer and that the results are representative of the materials or conditions being certified by the tests.

6. Preservation of Historical and Archaeological Data

a. When the Contractor proposes to use a source/quarry for rock or gravel, the source must first be approved by the COR to ensure compliance with Section 106 of NHPA (36 CFR 800).
b. Submit a map showing the location of proposed sites to the COR at least forty five (45) days in advance of use.
c. Take no action to use or alter the proposed location until written approval for site use is received from the COR.
d. If the quarry or borrow site already provides materials for USACE, or other governmental agency, the Contractor may provide a copy of the environmental approvals from said agencies.
e. Include permission for County of El Paso access to any gravel sources.

7. Environmental Compliance

Submit documentation showing that all applicable laws, rules, and regulations are being followed for project-specific locations.

1.5 MEASUREMENT AND PAYMENT

A. Measurement

1. This Bid Item will be measured based on the in place square yards measured in the field for the purpose of payment for the individual construction activity.
2. Measurement of cost component considered under this Section will be based the square yard complete in place in final position.

B. Payment

1. This Bid Item will be paid for based on the unit bid price identified in Section B of the Contract Provisions.
2. The cost components considered for the Bid Item price under this Section shall include the followings:
   a. The work performed and materials furnished under this Section will be "Roadway Surface," specified at the location in the Contract Drawings, including top of levees and maintenance ramps. No additional payment will be made for thickness or width exceeding that shown on the Typical Sections or provided on the Contract Drawings for square yard in the final position. Sprinkling, rolling, and correction of soft spots will not be paid for directly but will be subsidiary to the cost component under this Section unless otherwise shown on the Contract Drawings. This price is full compensation for furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, spreading, blading, mixing, shaping, placing, compacting, reworking, finishing, correcting locations where thickness is deficient, curing, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

1.6 GENERAL

A. The Contractor shall construct six (6) inch layer of Aggregate Base Course (ABC), a roadway surfacing, along the top of levee embankments and maintenance access ramps as shown on the Contract Drawings.

B. Degree of Compaction
Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have thirty percent (30%) or less by weight of their particles retained on the ¾ inch sieve, the degree of compaction for material having more than thirty percent (30%) by weight of their particles retained on the ¾ inch sieve are expressed as a percentage of the laboratory maximum dry density in accordance with AASHTO T180 Method D and corrected with AASHTO T224.

1.7 WORK PLAN

A. 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. Provide adequate equipment having the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.8 WEATHER RESTRICTIONS

A. Perform construction when the atmospheric temperature is above thirty five degrees Fahrenheit (35°F). When the temperature falls below thirty five degrees Fahrenheit (35°F), protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Contractor shall furnish uncontaminated materials of uniform quality that meet the requirements of the Contract Drawings and Technical Specifications and shall notify the County of El Paso of the proposed material sources and of changes to material sources.

B. No slag material shall be permitted at any time.

C. County of El Paso may sample and test project materials at any time before compaction throughout the duration of the project to assure Technical Specification compliance.

D. The Contractor shall use ASTM D8 material definitions and shall incorporate the following requirement for materials as applicable.

2.2 AGGREGATE

A. Furnish aggregate of the type and grade shown on the Contract Drawings and conforming to these specifications. Each source must meet Table 25 requirements for liquid limit, and plasticity index. Do not use additives such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements of Table 25, unless shown on the Contract Drawings.

B. Material Types

1. Do not use fillers or binders unless compliance confirmed.
2. Gravel shall be free of organic matter and other objectionable materials or coatings.

3. The portion retained on the No. 4 sieve is known as coarse aggregate; that portion passing the No. 4 sieve is known as fine aggregate.

C. Aggregate Road Surfacing
Materials shall be composed of caliche (argillaceous limestone, calcareous or calcareous clay particles) with or without stone conglomerate gravel, sand, or granular materials. Furnished material shall be 'CRUSHED' gravel and meet all the requirements of Table 25 herein.

Table 25 - Aggregate Surfacing Gradation Requirements

Property	Test Method	Aggregate Surfacing
Master Gradation Sieve Size	ASTM D422	% Passing by Weight
1-½ in.		0–10
3/8 in.		50-85
No. 4		35-65
No. 40		15-30
Liquid Limit, max.	ASTM D4318	40
Plasticity Index, max.	ASTM D4318	12
Plasticity Index, min.		4
Specific Gravity, min.	ASTM C127/C128	2.40
LA Abrasion, max. loss	ASTM C131	20%

2.3 WATER

A. Furnish water free of industrial wastes and other objectionable matter. Each of sulfate and chloride contents shall not exceed 3,000 ppm.

2.4 IN-SITU MATERIAL

A. The quality of in-situ material at this project location is of very low quality. The Contractor shall either import material or generate a crushing operation within the vicinity and Right-of-Way of the project to provide the material meeting the requirements specified in this Section.

B. No in-situ material shall be reused on this project.

2.5 EQUIPMENT

A. The Contractor shall provide proof rollers.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. The Contractor shall construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content; provide a smooth surface that conforms to the typical sections, lines, and grades shown on the Contract Drawings.

B. Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area.

C. Provide line and grade stakes as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

A. Clearing, stripping, excavating, and crushing are the responsibility of the Contractor. Operate the aggregate sources to produce the quantity and quality of materials meeting the specified requirements in the specified time limit.

B. Aggregate sources on non-USIBWC lands shall be operated in agreement with local laws or authorities.

C. Unless authorized by law and by written authorization of the landowner, any Contractor (or subcontractor) operated aggregate source shall be returned to its pre-construction condition upon completion of work.

3.3 STOCKPILING MATERIAL

A. Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Materials obtained from different sources shall be stockpiled separately.

3.4 PREPARATION OF UNDERLYING COURSE

A. Prior to constructing the aggregate surface the subgrade shall be cleaned of all foreign substances and shall contain no frozen material.

B. Any existing gravel along top of existing levee and surface of maintenance ramps shall be removed and disposed of.

C. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances of Section 35.41.00.

1. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein

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.

2. The top of the levee shall be sloped to drain per the Contract Drawings.
3. The top of the levee shall not have windrows of clay along the edges.

D. Proof Rolling
All areas to receive aggregate surface shall be proof rolled prior to placement. Ruts and low areas shall be repaired by scarifying and recompacting. Any additional material required to fill low areas must meet the requirements of Section 35.41.00.

3.5 INSTALLATION

A. Mixing the Materials
Mix the coarse and fine aggregates in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. Make adjustments in mixing procedures or in equipment, as directed, to obtain true grades, to minimize segregation or degradation, to obtain the required water content and to insure a satisfactory aggregate surface meeting all requirements of this Section.

B. Placing
Place the material on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader.

1. When a compacted layer six (6) inches or less in thickness is required, place the material in a single layer. When a compacted layer in excess of six (6) inches is required, place the material in layers of equal thickness.
2. No individual layer shall be thicker than six (6) inches or thinner than three (3) inches when compacted.
3. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance.
4. Where the aggregate surface is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed.
5. Such adjustments in placing procedures or equipment shall be made as may be directed by the COR to obtain true grades, to minimize segregation and degradation, to adjust the water content and to insure an acceptable aggregate surface.

C. Grade Control
The finished and completed aggregate surface shall conform to the lines, grades, and typical sections shown. Underlying material(s) shall be excavated and prepared at

sufficient depth for the required aggregate surface thickness so that the finished aggregate surface and the subsequent surface course will meet the designated grades.

D. Edges of Aggregate Road Surfacing
The aggregate surface shall be placed so that the completed section will be a minimum of two (2) feet wider, on all sides, than the next layer that will be placed above it. Additionally, place approved fill material along the outer edges of the aggregate surface in sufficient quantities to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple layer course, allowing in each operation at least a two (2) foot width of this material to be rolled and compacted simultaneously with rolling and compacting of each layer of aggregate surface.

E. Compaction
Compact each layer of the aggregate surface, as specified, with approved compaction equipment.

1. Maintain water content during the compaction procedure to within plus or minus two percent (2%) of the optimum water content determined from laboratory tests as specified in Paragraph 3.8 .
2. Rework, re-compact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted. Continue work until Technical Specification requirements are met.
3. In all places not accessible to the rollers, the mixture shall be compacted with hand operated power tampers.
4. Continue compaction until each layer has a degree of compaction that is at least ninety five percent (95%) of laboratory maximum density through the full depth of the layer. 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 aggregate surface.
5. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed by the COR, to meet the requirements of this Section.

F. Thickness
Construct the compacted thickness of the aggregate surface as indicated.

1. The total compacted thickness of the aggregate surface shall be not be less than six (6) inches.
   a. Where the measured thickness is more than half (½) inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading and recompacting as directed.
   b. Areas less than half (½) inch deficient, shall be corrected per direction of COR.
   c. The Contractor may, at their discretion, place the aggregate surface thicker than six (6) inches at no additional cost to the County of El Paso. Where the

measured thickness is thicker than required, the course shall be considered as conforming to the specified thickness requirements.

G. Finishing
The surface of the top layer of aggregate surface shall be finished after final compaction and proof rolling by cutting any overbuild to grade and rolling with a steel-wheeled roller.

1. Thin layers of material shall not be added to the top layer of aggregate surface to meet grade.
2. If the elevation of the top layer of aggregate surface is half (½) inch or more below grade, then the top layer should be scarified to a depth of at least three (3) inches and new material shall be blended in and compacted and proof rolled to bring to grade.
3. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable aggregate surface.
4. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to County of El Paso acceptance of the project, the unsatisfactory portion shall be scarified, reworked, and recompacted or it shall be replaced as directed.

3.6 MAINTENANCE

A. Maintain the aggregate surface in a satisfactory condition until final acceptance by the County of El Paso. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any area of aggregate surface that is damaged shall be reworked or replaced as necessary to comply with this Section.

3.7 DISPOSAL OF UNSATISFACTORY MATERIALS

A. Any unsuitable materials that must be removed shall be disposed of outside the limits of USIBWC-controlled land. No additional payments will be made for materials that must be replaced.

3.8 QUALITY CONTROL

A. All test reports, both unofficial and official, shall be provided to the COR along with the Contractor's daily QC report.

B. Sampling
Take samples for laboratory testing in conformance with ASTM D75. When deemed necessary, the sampling will be observed by the County of El Paso.

C. Tests

Perform the following tests in conformance with the applicable standards listed.

1. Sieve Analysis

Make sieve analysis in conformance with ASTM C117 and ASTM C136. Sieves shall conform to ASTM E11. Particle-size analysis of the soils shall also be completed in conformance with ASTM D422. Hydrometer is not required.

2. Specific Gravity

Determine the specific gravity of the aggregates using ASTM C127 or C128 as appropriate.

3. Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318. Atterberg Limits Test shall be performed in accordance with ASTM D4318 wet preparation, mechanically disaggregated, four-point method.

4. Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with ASTM D1557 and if greater than thirty percent (30%) retained on ¾ inch sieve then by AASHTO T180 corrected with AASHTO T224.

5. Field Density Tests

a. Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density.

b. Since ASTM D1557 applies only to soils that have thirty percent (30%) or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than thirty percent (30%) by weight of their particles retained on the 3/4 inch sieve are expressed as a percentage of the laboratory maximum dry density in accordance with AASHTO T180 and corrected with AASHTO T224.

c. Measure field density in accordance with ASTM D1556 or ASTM D6938.

d. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in paragraph Calibration of the ASTM publication.

e. Tests performed in accordance with ASTM D6938 result in a wet unit weight of soil and ASTM D6938 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 D6938.

f. 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 of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed.

6. Wear Test (LA Abrasion)

Perform wear tests on aggregate surface material in conformance with ASTM C131.

D. Testing Frequency

1. Initial Tests

Perform one of each of the following tests, on the proposed material prior to commencing construction, to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

a. Gradation and sieve analysis.
b. Liquid limit and plasticity index.
c. Moisture-density relationship.
d. Wear.
e. Specific gravity.

2. In Place Tests

Perform each of the following tests on samples taken from the placed and compacted aggregate surface. Samples shall be taken and tested at the rates indicated. Perform sampling and testing of recycled concrete aggregate at twice the specified frequency until the material uniformity is established.

a. Perform moisture and density tests on every lift of material placed and at a frequency of one set of tests for every five hundred linear feet (500 lf), or portion thereof, of completed area.
b. Perform gradation and sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every fifteen hundred linear feet (1,500 lf), or portion thereof, of material placed.
c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
d. Measure the total thickness of the aggregate surface at intervals, in such a manner as to ensure one measurement for each five hundred (500) square yards of aggregate surface. Measurements shall be made in three (3) inch diameter test holes penetrating the aggregate surface.

E. Confirmation of Material

1. Select the source of the material prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results.
2. Final compliance confirmation of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted course(s).

--End of Section--

32.92.00
VEGETATION FOR EROSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 01.57.13-Temporary Environmental Controls

B. Section 35.41.00-Construction of Levee

1.3 REFERENCE STANDARDS

A. ASTM International (ASTM)

1. ASTM D5268-13 Standard Specification for Topsoil Used for Landscaping Purposes
2. ASTM D5851-95(2011) Standard Guide for Planning and Implementing a Water Monitoring Program

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Seeding Plan
   a. The Contractor shall submit a Seeding Plan for review and compliance confirmation by COR. The seed mix, site preparation, maintenance, and watering shall be developed per these specifications and the site conditions.
   b. The Contractor shall revise the Seeding Plan as appropriate for site conditions and vegetation management.

2. Vegetation Establishment Plan
   a. The Contractor shall submit a Vegetation Establishment Plan for compliance confirmation. The plan shall include recommendations for fertilizer and/or soil amendment application based upon soil testing results for each completed area to be seeded.
   b. The Contractor shall provide copies of the topsoil analyses data sheets. Topsoil analyses shall include soil pH, phosphorus, potassium, calcium, magnesium, sodium, sulfur, copper, zinc, chloride, total dissolved salts, conductivity, and sodium absorption ratio.
   c. In addition to the soil amendment and fertilization plan, this plan shall describe procedures for fertilizing, mulching, and site maintenance until vegetation is established.

3. Vegetation Maintenance Plan
   The Contractor shall include instructions indicating procedures during one typical year including variations of maintenance for climatic conditions throughout the year. The Maintenance Plan shall provide instructions and procedures for watering, promotion of growth, including pruning and mowing, integrated pest management and any site specific conditions that require specialized maintenance.

4. During Seeding Activities
   Daily seeding and watering areas shall be noted on the Contractor's daily QC report.

5. Seed Bag Labels
   The Contractor will be required to collect seed labels and keep accurate records of seed sources, types and mixes. All labels and records shall be submitted at the completion of seeding for County of El Paso records.

6. Pesticide Use Plan
   Prior to any use of an herbicide, the Contractor shall submit a Pesticide Use Plan per Specification 01.57.13 1.13.

7. Testing Laboratory
   Compliance confirmation of testing facilities shall be based on North American Proficiency Testing Program for Soil, Plant, & Water Analysis Laboratories (NAPT)

certification. No work requiring testing will be permitted until the facilities have been inspected and compliance confirmed by the COR.

8. Topsoil
At least ten (10) calendar days prior to placement of any material, the Contractor shall submit to the COR the results of all required testing necessary to classify the material and necessary for determining if placement is in compliance with the requirements herein.

9. Test Results
   a. Test results shall be furnished to the COR within twenty four (24) hours of making the test.
   b. Inspections and test results shall be certified by a NAPT certified laboratory and that the results are representative of the materials or conditions being certified by the tests.

10. Preservation of Historical and Archaeological Data
   a. When the Contractor proposes to use a source or borrow pit for topsoil, the source must first be compliance confirmed by the COR to ensure compliance with Section 106 of NHPA (36 CFR 800).
   b. Submit a map showing the location of proposed sites to the COR at least forty five (45) days in advance of use.
   c. Take no action to use or alter the proposed location until written approval for site use is received from the COR.
   d. If the quarry or borrow site already provides materials for USIBWC, USACE, or other governmental agency, the Contractor may provide a copy of the environmental approvals from said agencies.
   e. Include permission for County of El Paso access to any borrow sources.

11. Environmental Compliance
Submit documentation showing that all applicable laws, rules, and regulations are being followed for project-specific locations.

1.5 MEASUREMENT AND PAYMENT

A. Measurement

1. This Bid Item will be measured based on the lump sum basis, and no separate construction activity will be measured in the field for the purpose of payment for this individual construction activity.

2. Measurement of cost components considered under this Section is based percentage complete of final revegetation per these Specifications and the Contract Drawings.

3. No separate measurement will be made for placement of material required for repairs or reseeding.

B. Payment

1. This Bid Item will be paid for based on the lump sum bid price identified in Section B of the Contract Provisions.
2. Payment for seeding, fertilizing, mulching, watering, and mowing will be included in the Contract Lump Sum bid price. Price and payment shall constitute full compensation for furnishing all plant, labor, products, including soil testing, seeding plan, and watering to prepare the soil and apply the seed and mulch at the applicable rates as specified herein. Price shall also include maintenance mowing as required herein.
3. After seeding is completed, the Contractor may request partial payment only. Material certifications, invoices, and test reports must be provided to authorize the initial fifty percent (50%) payment when seeding is completed. One hundred percent (100%) payment will only be paid when vegetation is established per this Section.

1.6 GENERAL

A. All areas disturbed by construction activities shall be revegetated.

B. The Contractor shall establish adapted plants by seeding. This practice serves to prevent excessive soil and water loss and improve water quality, to provide or improve forage, browse, or cover for wildlife, and to restore historic plant communities.

PART 2 - PRODUCTS

2.1 SEED

A. Origin of Seed

1. The first preference for seed selection will be adapted certified named varieties, followed by adapted non-certified named varieties, then followed by common local ecotypes (local native harvest).
2. The success of range seeding is strongly influenced by the adaptation of the seed source to local climatic conditions. Released cultivars with known performance and adaptations should be used. Also, seed originating on sandy soils generally should not be used to seed heavy soils or vice-versa. Certified seed of released cultivars is always recommended over uncertified or native harvested material. Seed certification is the only guarantee as to variety and quality.

B. Native Sources

1. The origin of native harvest seed shall not exceed the following distance guidelines from the area of intended use: three hundred (300) miles to the north, two hundred (200) miles to the south, two hundred (200) miles to the east, and one hundred (100) miles to the west.

2. Named varieties are exempt from mileage requirements, so long as they are seeded within their range of adaptability.

C. Seed Quality and Definitions

1. Interpretation of Current Analysis Report
   a. Grass seed germination deteriorates rapidly with age. For this reason, seed analysis shall be no more than one (1) year old.
   b. Cooperators who harvest seed for their own use must have an analysis completed. Regardless of who grows or sells the seed, a copy of the current analysis must be provided. The analysis will show purity, germination, harvest location, and weed content. Noxious or weed seed content in excess of that permitted by state seed law will not be allowed for use.

2. Pure Live Seed (PLS) Determination
   Compute by adding percentage of germination and firm seed. Multiply this sum by purity. Divide the product by 100 for percent PLS.
   [(% Germ.+ % Firm Seed) Purity] / 100= % PLS
   (Firm, hard or dormant are congruent terms)

D. Seed Varieties and Seeding Rates
All seed rates shown are based upon drilled seed. Broadcast seeding will need at least double the seed rate.

Table 26 - Plant Varieties and Seeding Rates

Plant Name and Variety	NRCS Recommended Seeding Rate
Alkali muhly (Westwater Germplasm)	0.6 PLS per acre
Alkali sacaton (Salado)	0.5 PLS per acre
Blue grama (Hatchita or Lovington)	1.2 PLS per acre
Cane bluestem (Grant)	1.7 PLS per acre
Green sprangletop (Marfia)	1.6 PLS per acre
Indian ricegrass	4.0 PLS per acre
Inland saltgrass	2.0 PLS per acre
Black grama (Nogal)	0.7 PLS per acre
Plains bristlegrass	3.0 PLS per acre
Sand dropseed	0.2 PLS per acre
Sideoats grama	4.6 PLS per acre

1. Filler Grasses
   For broadcast or drilled seedings, up to one (1) pound per acre of green sprangletop may be added to a full rate (100%) of a basic mixture of native grasses to provide quick cover. Use of filler grass should be considered when reseeding following mechanical brush control or other operations with complete soil disturbance.

2. Using PLS to Determine Actual Seeding Rate
   Once the PLS for a seed has been determined, it is used to calculate the actual seeding rate. If the recommended rate for a seed is 10 pounds per acre and the PLS is 89%,

11.2 pounds per acre of the supplied seed will actually have to be applied to achieve the rate of 10 pounds PLS per acre.
Calculate this by: (Recommended Seeding Rate) / PLS = Actual Seeding Rate

E. Seeding Mixtures
The Contractor shall develop a seed mix that is adaptable to the work site. At least five (5) of the native seeds listed in Table 26 shall be used in the seed mix. The Contractor's seed mix shall be comprised of native grasses whose adaptations to soil, salinity, moisture, and location indicate that they will be successful in growing at the worksite. To determine the seeding rate for individual species used in a mixture, multiple the percent of each species in the mixture times the full actual seeding rate for that species.

2.2 WATERING

A. For seed germination, the top four (4) inches of the soil surface must remain moist to be successful. If rainfall does not provide the required moisture for germination, the Contractor shall apply water in such a manner and rate to ensure germination. The Contractor shall ensure that applied water does not erode soil or vegetation.

B. The Contractor shall ensure that water used for any irrigation does not contain high levels of salts or other chemicals/pollutants that may impede germination.

C. Water applied during establishment and irrigation from a water source other than municipal water supply shall be analyzed by a certified water analysis laboratory. The water source shall be tested every thirty (30) days or until operations cease use of the water source for irrigation purposes.

D. The water source shall have a total dissolved solids (TDS) concentration of no greater than 1,000 mg/L. In addition to the agronomic tests to determine irrigation water suitability, the Contractor shall not apply water as irrigation that may contain any substance toxic to plants or that limits plant growth (e.g., oil, acid, alkali, salt, etc.).

E. The Contractor shall provide copies of the findings for all proposed water sources, other than municipal water sources, earmarked for vegetation establishment and irrigation. Water analyses shall include pH, alkalinity, calcium, chloride, iron, magnesium, manganese, potassium, sodium, sulfur, total dissolved salts, conductivity, and sodium absorption ratio.

F. The Contractor must provide submittal for compliance confirmation of the water to be used for vegetative watering shall be procured from a metered commercial source. Water from the Rio Grande shall not be used by the Contractor at any time.

2.3 TOPSOIL

A. Topsoil shall be tested per Section 35.41.00 3.10 H.

B. Topsoil testing shall indicate that the soil used can support the seed mix used by the Contractor. The Contractor shall also use the topsoil tests to aid in determining fertilizer usage, mulching, and watering schedules.

2.4 PLANTING DATES

A. The Contractor is responsible for seeding and site vegetation and therefore shall determine the when to plant. NRCS provides the following guidance for planting in this region.

B. Dates of seeding usually correspond to the high probability (sixty percent [60%] or more) of receiving effective precipitation (.6 to 1.0 inch during any three week period) for seedling establishment.

C. Cool season species may be seeded anytime during the dormant period (generally from November to March). When the seeding is done early in this period it allows for more winter moisture to accumulate in the soil. Treatment of seed with a fungicide to prevent seed deterioration is recommended. Disturbances like discing, harrowing, and seeding tend to dry out the soil surface.

D. The preferred time for warm season species is three to six (3-6) weeks after the last killing frost in the spring, although they may be seeded any time during the growing season except the last forty five (45) days prior to the average killing frost date. In the desert areas it is desirable to delay seeding until July after the monsoon storm weather pattern have developed.

PART 3 - EXECUTION

3.1 SEEDBED PREPARATION

A. Areas disturbed during construction will be seeded using any method noted in this Contract that will place the seed in the newly disturbed soil before rain crusts the soil surface. The seedbed shall be firm, free of weed competition and shall not have a restrictive layer such as a plowpan, hardpan, or caliche.

B. All areas to be seeded shall be cultivated to a depth of four (4) inches before seeding, except where temporary vegetation was established prior to permanent seeding and drilling will be used to seed. Temporary vegetation, if used, shall be mowed to a height of six (6) to ten (10) inches in height prior to seeding with permanent seed. Weeds are not counted in any vegetation establishment calculations.

C. At a minimum, topsoil is required in all areas notes on the typical sections in the Contract Drawings including on the levee side slopes and on permeable fill. Topsoil may be required in other areas disturbed by construction to establish vegetation.

1. Topsoil shall not be placed within the excavated river channel.

3.2 SEEDING OPERATION

A. Drilling

1. Whenever possible native grasses should be seeded with a grass drill equipped with double disk openers having depth bands followed by cultipacker, press wheels or drag chains. (Press wheels or cultipacking are preferred). Seed is usually planted 1/4 to 3/4 inches deep. The distance between rows should not exceed twelve (12) inches.
2. Any type of drill is preferable to broadcast seeding. An inert seed dilutant such as rice hulls or cracks grain may be used to facilitate drilling and regulation of seeding rates.

B. Broadcasting

1. Broadcasting may be used where the seed can be firmly anchored into the soil. Seedbed modification by cultipacking or other means will be needed to accomplish this. Cultipacking before and after seed placement is preferred. Broadcasting, without covering or packing, requires no less than two (2) times the amount of seed used for drilling.
2. Hand broadcasting is acceptable where equipment cannot be operated because of terrain and an adequate stand of grasses can be expected on the seeded area.

C. Seeding Depth

Optimum depth of seeding is roughly proportional to seed size. Generally smaller sized seeds like blue grama are planted shallow and larger seeds like tall fescue can be planted deeper. Optimal seeding depth is also dependent on soil surface textures. The following is a general guideline.

1. One-fourth to one-half inch deep on fine-to-medium textured soils.
2. One-half to three-fourth inch deep on sandy loams or loamy sand soils.

3.3 MULCHING

Mulch should be used on all areas except those previously planted with temporary vegetation. Prior to mulching, the soil surface shall be prepared in order to achieve the desired purpose.

A. Mulching Materials

1. The selection of mulching materials will depend primarily on site conditions and the material's availability. Mulch materials shall consist of natural and/or artificial materials that are environmentally safe such as plant residue, wood bark or chips, rice hulls, or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period.

2. The mulch material shall be evenly applied and, if necessary, anchored to the soil. Tackifiers, emulsions, pinning, netting, crimping, or other acceptable methods of anchoring will be used if needed to hold the mulch in place for specified periods. As a minimum, manufactured mulches shall be applied according to the manufacturer's specifications.
3. Mulching operations shall comply with federal, state and/or local laws and regulations during the installation, operation, and maintenance of this practice.
4. Mulch material shall be relatively free of disease, pesticides, chemicals, noxious weed seeds, and other pests and pathogens.
5. Use the Soil Conditioning Index to assess soil quality impacts and to determine the type and rate of the mulching material.

B. Operation and Maintenance

1. Mulched areas will be periodically inspected and mulch shall be reinstalled or repaired as needed to accomplish the intended purpose. Evaluate the effectiveness of the mulch (application, amount of cover provided, durability, etc.) and adjust the management or type of mulch to better meet the intended purpose(s).
2. Removal or incorporation of mulch materials shall be consistent with the intended purpose and site conditions.
3. Operation of equipment near and on the site shall not compromise the intended purpose of the mulch.
4. Prevent or repair any fire damage to the mulch material.
5. Properly collect and dispose of artificial mulch material after intended use.
6. Monitor and control undesirable weeds in mulched areas.

3.4 FERTILIZER

A. Fertilizer normally will not be recommended when reseeding native rangeland because it will encourage excessive weed growth. However, it may be necessary to fertilize on coarse textured or severely eroded soils that may not have residual or inherent fertility of sufficient levels to support emerging grasses during establishment. In these cases, fertilize following the emergence of the seeded grasses to limit weeds from using the fertilizer. A soils test should be taken prior to fertilization. The soil test should note "for establishment" instead of listing a yield goal that would be for production purposes.

B. It is the Contractor's responsibility to ensure that the topsoil used has appropriate amounts of nitrogen, phosphorous, and potassium to encourage native grass growth. The Contractor shall also ensure that the topsoil used matches the seed mixture in terms of salinity.

3.5 MANAGEMENT DURING ESTABLISHMENT

A. Immediately after seeding has been installed, the Contractor shall begin to provide vegetation maintenance to include, but not limited to, mowing, edging, over-seeding, aeration, fertilizing, watering, weeding, and pruning for all newly seeded materials, unless indicated otherwise and at all areas inside or outside the limits of the construction that are disturbed by the Contractor's operations.

B. Weed Control

The Contractor shall control the growth of weeds on the jobsite. Generally, when three (3) weeds per square foot or a fifty percent (50%) canopy are observed, weed control should begin. During establishment, excessive amounts of competitive weedy plants may be controlled by the following methods:

1. Herbicides

Chemicals used must be federally and locally registered and must be applied in accordance with authorized registered uses, directions on label and other federal or state policies and requirements. Seeded species shall have three (3) to five (5) leaves per plant before herbicides are applied.

a. Any herbicides used must be safe for use in aquatic environments.
b. Records of herbicide usage including type, strength, dates of application, application rate and area applied shall be submitted.
c. Submit a Pesticide Use Plan per Section 01.57.13.

2. Mowing

Weeds shall be mowed when they reach a height of six (6) to eight (8) inches. Mowing should be above the height of seeded plants. The cover crop should also be maintained. Mowing shall not be done when daily maximum air temperature exceeds ninety five degrees Fahrenheit (95º) and the humidity falls below thirty percent (30%) to prevent dehydration of the seedlings. Generally, mowing should not be done after July 15.

C. Policing

The Contractor shall police all vegetated areas. Policing shall include removal of leaves, branches and limbs regardless of length or diameter, dead vegetation, paper, trash, garbage, rocks, or other debris. Collected debris shall be promptly removed and disposed of at a compliance confirmed disposal site.

D. Water Restriction

The Contractor shall abide by state, local, or other water conservation regulations in force during the vegetation establishment period. Additionally, no water from Rio Grande shall be used for vegetation maintenance activities.

E. Promotion of Growth

The seeded areas shall be maintained in a manner that promotes proper health, growth, and natural color. Turf shall have a neat uniform manicured appearance, free of bare

areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow, remove excess clippings, eradicate weeds, water, over-seed, aerate, and perform other operations necessary to promote growth, as compliance confirmed by COR. Remove noxious weeds from the seeded areas by mechanical means.

F. Mowing
The turf shall be mowed at a uniform finished height of twelve (12) inches, measured from the soil. Mowing of turf shall be performed in a manner that prevents scalping, rutting, bruising, uneven, and rough cutting. Prior to mowing, all rubbish, debris, trash, leaves, rocks, paper, and limbs or branches on a turf area shall be picked up and disposed.

G. Slope Erosion Control Maintenance
The Contractor shall provide slope erosion control maintenance to prevent undermining of all slopes in newly seeded areas. Maintenance tasks include immediate repairs to weak spots where seeding will be installed, in order to intercept and direct water flow to prevent development of large gullies and slope erosion. Eroded seeded areas shall be backfilled with amended topsoil and replanted with the same plant species.

3.6 VEGETATION MAINTENANCE PERIOD

A. The Contractor shall maintain the vegetated areas including all fertilizing, watering, mulches, and weed control for the full revegetion period stated in the Contract or until at least a seventy percent (70%) vegetative coverage is established, whichever is greater.

B. Immediately after seeding has been installed in the seeding areas per the Contract Drawings, the Contractor shall begin to provide vegetation maintenance to include, but not limited to, mowing, edging, over-seeding, aeration, fertilizing, watering, weeding, and pruning for all newly seeded materials, unless indicated otherwise, and at all areas inside or outside the limits of the construction that are disturbed by the Contractor's operations.

C. Replanting
The Contractor shall replant in accordance with Paragraph 3.2 herein and within specified planting dates, the areas which do not have a satisfactory stand of vegetation cover.

D. When work is found to not meet design intent and Technical Specification requirements, maintenance period will be extended at no additional cost to the County of El Paso, until work has been completed, inspected and compliance confirmed by COR.

E. Substantial completion and acceptance of the construction portion of the Contract by the County of El Paso can occur prior to the end of the vegetation maintenance period. Final Contract completion will not occur until vegetation cover has been established.

3.7 CRITERIA FOR DETERMINING STAND ESTABLISHMENT

A. The quality of vegetation established will be determined by counting the number of plants per square foot that are well distributed throughout field. Weeds are not counted in any vegetation establishment calculations. Failure of the Contractor to ensure vegetation growth will require reseeding at the Contractor's expense.

   1. To determine the plants per square foot, transects shall be located in representative areas of the field. One hundred readings, three (3) to five (5) steps apart with one-foot square quadrats are recommended for recording the plant counts. Count the total number of plants occurring within the quadrats and divide by 100 to get the number of plants per square foot. More than one transect may be needed on large fields or where stand establishment is not uniform. Delineate those areas of the planted area that do not meet establishment criteria
      a. 0 to 0.05 Plants per Square Foot = Failure. Reseeding required.
      b. 0.05 to 0.1 Plants per Square Foot = Probable Failure. Reseeding required at a reduced seeding rate (75% of original rate).
      c. 0.1 to 0.5 Plants per Square Foot = Questionable. COR and Contractor will decide whether or not to reapply. Factors to consider are vigor of existing plants, potential to spread, extent of competition, length of Contract, weather considerations and adequacy of erosion control.
      d. Over 0.5 Plants per Square Foot = Satisfactory.
   2. Areas larger than five hundred (500) square feet that are bare of vegetation will require spot reseeding by the Contractor.

B. Weeds include all plants not included on the seed list in Table 26.

--End of Section—

TECHNICAL SPECIFICATIONS
DIVISION 35
WATERWAY CONSTRUCTION

This page intentionally left blank for double sided printing.

35.41.00
CONSTRUCTION OF LEVEE

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.2 RELATED REQUIREMENTS

A. Section 01.57.13-Temporary Environmental Controls

B. Section 32.15.00-Aggregate Road Surfacing

C. Section 31.11.00-Preparing Right of Way

D. Section 31.14.00-Remove / Stockpile Existing Materials

1.3 REFERENCE STANDARDS

A. ASTM International (ASTM)

1. ASTM D422-63(2007)e2 Standard Test Method for Particle-Size Analysis of Soils
2. ASTM D448-12 Standard Classification for Sizes of Aggregate for Road and Bridge Construction
3. ASTM D698-12 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
4. ASTM D2166-13 Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
5. ASTM D2216-10 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
6. ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
7. ASTM D4221-11 Standard Test Method for Dispersive Characteristics of Clay Soil by Double Hydrometer
8. ASTM D4318-10e1 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
9. ASTM D4647-13 Standard Test Methods for Identification and Classification of Dispersive Clay Soils by the Pinhole Test
10. ASTM D5268-13 Standard Specification for Topsoil Used for Landscaping Purposes.
11. ASTM D6572-13e1 Standard Test Methods for Determining Dispersive Characteristics of Clayey Soils by the Crumb Test
12. ASTM D6938-10 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.4 SUBMITTALS

A. The Contractor Quality Control (CQC) System Manager shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

B. Required submittals in this Section include:

1. Plan of Operations
2. Testing Laboratory
   No work requiring testing will be permitted until the facilities have been compliance confirmed by the COR. If this information has already been submitted for other quality control work, it does not need to be resubmitted.
3. Compacted and Backfill Materials
   At least ten (10) calendar days prior to placement of any material, the Contractor shall submit to the COR the results of all required testing necessary to classify the material and necessary for determining if placement is in compliance with the requirements herein.
4. Moisture Adjustment Plan
   The Contractor shall outline the steps that will be taken to ensure that embankment material is placed at the appropriate moisture. Detail testing, methods of wetting, mixing methods, and drying methods.
5. Blending Plan
   When blended material will be used as fill, a blending plan which outlines all steps, materials, equipment, labor, etc. that the Contractor will use to assure material is blended into one homogeneous mixture shall be submitted.
6. Nuclear Density Testing Equipment Operator
   Nuclear density testing equipment shall be used in accordance with ASTM D6938. In addition, the following conditions shall apply:
   a. Prior to using the nuclear density testing equipment on the site, the Contractor shall submit to the COR a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer.
   b. The nuclear density testing equipment shall be capable of extending a probe a minimum of twelve (12) inches down into a hole.
7. Reports - Survey Records
   Submit a copy of the records of each compliance survey the next work day following the survey.
8. Test Results
   Test results shall be furnished to the COR within twenty-four (24) hours of completing the test, and in accordance with Paragraph 3.10 B. herein.
   a. Test results shall be certified by a Texas registered Professional Civil Engineer. These certifications shall state that the tests and observations were

performed by or under the direct supervision of the professional engineer and that the results are representative of the materials or conditions being certified by the tests.

9. Preservation of Historical and Archaeological Data
   When the Contractor proposes to use a source or borrow pit, the source must first be approved by the COR to ensure compliance with Section 106 of NHPA (36 CFR 800).
   a. Submit a map showing the location of proposed sites to the COR at least forty-five (45) days in advance of use.
   b. Take no action to use or alter the proposed location until written approval for site use is received from the COR.
   c. If the quarry or borrow site already provides materials for USIBWC, USACE, or other governmental agency, the Contractor may provide a copy of the environmental approvals from said agencies.
   d. Include permission for County of El Paso access to any borrow sources.
10. Environmental Compliance
    Submit documentation showing that all applicable laws, rules, and regulations are being followed for project-specific locations.

1.5 MEASUREMENT AND PAYMENT

A. Measurement
Measurement of cost components considered under this Section and based on the Contract Drawings shall include the following:

1. Excavation (Levee)
   The volume of Excavation (Levee) is computed between the original ground surface and the excavation limits within the limits of levee embankment foundation, including benching, as shown on the Contract Drawings. The measurements will occur at one hundred (100) feet intervals along the levee alignment. The work for this cost component shall be measured by cubic yard.
2. Fill (Impervious Materials)
   The volume of compacted fill is computed between the excavation limits and the design grade within the limits of levee embankment foundation, including backfill of benching sections, as shown on the Contract Drawings. The measurements will occur at one hundred (100) feet intervals along the levee alignment. Shrinkage or swelling factors are not considered in determining the calculated quantities shown in the Contract Drawings. The work for this cost component shall be measured by cubic yard.
3. Topsoil
   The volume of topsoil is computed as the upper six (6) inches within the areas defined as "Topsoil" in the Typical Sections of the Contract Drawings. The

measurements will occur at one hundred (100) feet intervals along the levee alignment. The work for this cost component shall be measured by cubic yard.

4. The work for the items under this Section will be measured by the cubic yard complete in place using the average end area method.
   a. The volume is computed between the original ground surface or the new surface as constructed meeting the lines, grades, and slopes of the Contract Drawings.
   b. The measurements will occur at one hundred (100) feet intervals along the levee alignment.
   c. Shrinkage or swelling factors are not considered in determining the calculated quantities shown in the Contract Drawings.
   d. Over excavation and over building of embankment performed beyond specified or directed paylines and backfill and compaction of backfill for such over excavation will not be measured.
   e. Where excavation is performed in backfill, no measurement will be made for the resulting excavation, backfill, and compacting backfill.
   f. Overbuilding beyond lines and grades indicated on Contract Drawings is for the Contractor's benefit and shall not be included in measurement.

B. Payment

These Bid Items will be paid for based on the unit bid price identified in Section B of the Contract Provisions. The cost components considered for the Bid Item price under this Section shall include the following:

1. Excavation (Levee)
   The work performed and the materials furnished for excavation of material within the limits of levee embankment as shown on the Contract Drawings and disposal offsite. The Contractor, at no additional expense to County of El Paso, may elect to stockpile excavated material for re-use in the project provided the material meets all requirements of the Technical Specifications.

2. Fill (Impervious Material)
   The work performed and materials furnished for constructing impervious fill using clay material to establish design grade for the levee embankment as shown on the Contract Drawings.

3. Topsoil
   The work performed and materials furnished to construct a topsoil layer as shown on the Contract Drawings.

4. These prices are full compensation for furnishing, hauling, and placement, disposal of waste materials, equipment, labor, tools, and incidentals. Additionally, shaping existing material, loosening, mixing, pulverizing, compacting, finishing, curing, curing materials, blading, shaping and maintaining shape, replacing mixture, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water and sprinkling, rolling (including proof rolling), and corrections of soft spots, will not be paid for directly but will be subsidiary to the various bid items, unless otherwise shown on the Contract Drawings.

a. Includes cost of labor and materials for shoring, sheeting, bracing, timbering, safety sloping, and other temporary construction; of removing such temporary construction where required; stockpiling excavated material for backfill unless covered under another line item; and disposal of unused or wasted excavated materials.
b. Over excavation performed beyond specified or directed paylines and backfill and compaction of backfill for such over excavation shall be at the expense of the Contractor.
c. Where excavation is performed in backfill, no payment will be made for the resulting excavation, backfill, and compacting backfill.
d. Includes the cost of work associated with the excavation or procuring, processing, and hauling of necessary material.
e. No payment will be made for removal and reconstruction of defective and nonconforming backfill or backfill compacted to an insufficient density.
f. Include costs associated with furnishing water to moisten material for compaction.
g. Overbuilding beyond lines and grades indicated on Contract Drawings is for the Contractor's benefit and shall not be included in payment.

1.6 GENERAL

A. The work covered by this Section consists of furnishing all submittals, labor, equipment, plant, materials, and all efforts necessary to perform levee construction including, but not limited to, compacted fill and backfill placement, benching, excavation, and over-excavation, construction of maintenance ramps, and any general earthwork as defined for this project.

B. In regard to earthwork, this Section shall govern if there is disagreement with or between Technical Specifications and Contract Drawings.

1.7 PLAN OF OPERATIONS

A. Fifteen (15) calendar days prior to commencement of placing compacted fill, the Contractor shall submit for compliance confirmation a Plan of Operations for accomplishing all fill and excavation operations as well as for the location of haul roads.

B. Compliance confirmation of the detailed Plan of Operations shall be obtained from the COR prior to starting the work.

1.8 ACCESS ROADS AND MAINTENANCE RAMPS

A. General
In general and as a minimum, the Contractor shall be required to maintain the access, haul roads, routing, and staging areas to prevent dust, rutting, interference with normal traffic flow, litter, and general damage or deterioration.

B. Permanent Roads Used as Haul Roads
Permanent roads used as haul roads shall be maintained throughout the duration of use and shall be restored to the pre-construction condition or the intended construction condition.

1.9 MAPPING AND FIELD SURVEYS

A. Topographic mapping is as indicated on the Contract Drawings. Field surveys shall be completed as necessary and shall use the vertical and horizontal control identified within the Contract Drawings.

B. Layout of Work
The Contractor shall lay out the work as indicated within the Contract Drawings.

C. Verification Survey
The Contractor shall complete surveys to verify work to the lines, grades, and requirements specified.

1.10 SOURCES OF FILL MATERIAL

A. Reuse of Excavated Material

1. The excavated or over-excavated material that meets the requirements for the topsoil specified in this Section and is approved by the COR may be salvaged and reused at the intended locations.
2. Excavated existing Flex Base material may not be reused as new Flex Base material at any time.
3. The County of El Paso makes no assurances or guarantees that any of the existing material onsite will be suitable for reuse.
4. Unsuitable material becomes the property of the Contractor and must be removed from the project site.

1.11 SUBSURFACE INFORMATION

A. Use of Subsurface Information
The geotechnical engineering report dated April 9, 2003 for the new international bridge is used as a reference for this project. Drill, sample, and test results are an indication of the subsurface condition at the location of the boring and tests. Variations in subsurface condition may exist between boring and test locations. Soil moisture contents and groundwater levels are indication of that information at the time of the measurement, sample extraction, and/or testing. Soil moisture content and groundwater level may vary with time in response to seasonal precipitation and river stage variations. As a result, moisture contents and groundwater levels at the time of construction may differ from the data shown on the geotechnical report.

1.12 SAMPLES FURNISHED TO THE USIBWC

A. Upon request from the COR and within four (4) hours of the COR request, the Contractor shall furnish samples from material sources, placed fill, ongoing construction, and/or completed construction. The specifics of sample acquisition to include method, conditions, quantity, container, and other requirements will be specified by the COR. Contractor shall perform this service at no cost to the County of El Paso.

1.13 DRAINAGE AND DEWATERING

A. The Contractor shall address in their general Plan of Operations the methods of drainage control. The Contractor shall maintain natural drainage patterns and/or designed drainage patterns. Temporary work, such as haul roads, shall be designed and constructed so as not to induce adverse flooding or backwater from general runoff and pipe, ditch, or stream. The Contractor shall complete necessary efforts to divert runoff and pipe, ditch, or stream discharge away from excavations, fill areas, and general construction. The Contractor shall monitor and make adjustments as necessary.

1.14 PROTECTION OF EXISTING FEATURES AND ONGOING OR COMPLETED CONSTRUCTION

A. The Contractor shall plan and conduct operations to ensure the protection of existing features and ongoing and completed construction.

B. Ongoing and Completed Construction
The Contractor shall complete the necessary efforts to protect ongoing and completed construction. Earth fills and exposed cuts shall be protected from construction activity and general erosion. Damages occurring shall be repaired by the Contractor at no expense to the County of El Paso. The Contractor shall be responsible for protecting against erosion and repair thereof until the cover has been placed and in the instance of vegetative cover, until the vegetation has established.

C. Public Roads, Accesses, and Appurtenances
The Contractor shall plan and complete the necessary efforts to protect public roads, accesses, and appurtenances from damages associated with this construction project. Contractor's activities shall not deter public use of the roads, accesses, and appurtenances.

D. Environmental and Cultural
The Contractor is referred to and shall comply with the requirements of environmental protection, outlined in Section 01.57.13.

E. Blasting and Explosives' Storage
Blasting shall not be allowed for this construction project. Explosives shall not be stored on site for any reason or for any length of time.

F. Impacts Outside Construction Right-of-Way/Easements.

1. Contractor's work directly or indirectly impacting property not included within the project's construction right-of-way limits, shall be coordinated with the COR, and proof of Contractor acquired right-of-way or easements of the impacted real estate or facility shall be provided to the COR thirty (30) days prior to impacting the real estate or facility.
2. The Contractor shall coordinate with the COR to obtain more information on working outside the USIBWC right-of-of-way areas. It is the Contractor's responsibility to protect in place any existing features that were not identified to be altered or modified on the Contract Drawings and restore any disturbed areas to the original conditions at no cost to the County of El Paso.

1.15 WEATHER RESTRICTION

A. Perform construction when the atmospheric temperature is above thirty five degrees Fahrenheit (35°F). When the temperature falls below thirty five degrees Fahrenheit (35°F), protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by rainfall, freezing, or other weather conditions to meet specified requirements.

PART 2 - PRODUCTS

2.1 FILL (IMPERVIOUS MATERIALS)

A. Soils used for areas identified as 'Fill (Impervious Materials)' in the Contract Drawings shall meet the following requirements:

1. The clay soils shall be clean and free of trash, organics, hazardous compounds, asbestos, or other deleterious materials.
2. The clay soils shall be rated as Grade 1 (non-dispersive) when tested in accordance with ASTM D6572 (Crumb Test).
3. The clay soils shall be rated as ND1 or ND2 as evaluated using ASTM D4647 (Pin Hole Test).
4. The clay soils shall have a percent dispersive less than thirty (30) evaluated using ASTM D4221 (Double Hydrometer).
5. The materials shall consist of low to moderate plasticity clay soils and be classified as CL in accordance with the Unified Soil Classification System (USCS). Soils classified as ML, MH, SC, SM, SP, or gravels shall not be permitted.
6. The clay shall have a Plasticity Index in the range of fifteen (15) to thirty (30) with a maximum Liquid Limit of forty five (45).

7. Gradation shall consist of dry material with a minimum of sixty percent (60%) passing a US Standard No. 200 sieve and of one hundred percent (100%) of the dry material passing the one (1) inch sieve.
8. The material shall contain less than thirty five percent (35%) sand content by weight.
9. Large clay clods shall be pulverized and reduced to less than one half (½) inch in diameter.
10. Rock, gravel and other oversized material (greater than one (1) inch in diameter) shall not be permitted.
11. **Clay used as the impervious layer shall not be blended with any other material if it meets the requirements of 35.41.00 2.1.A.(1) through (10) in situ at the borrow pit.**
12. The intent is to build a hard, solid, competent, impervious levee. The impervious fill used in levee construction shall be homogenous throughout any levee section in its physical characteristics (hard, solid, competent, and impervious).
13. The final product shall be a hard, competent, solid soil mass. Contractor must be aware of the fact that there are some clayey materials that even though they fulfill the specifications as a clay layer, do not hold together after twenty four (24) to thirty six (36) hours of drying time. The Contractor shall be responsible for running any necessary tests to make sure that these materials are not used as levee embankment fill material.
    a. If the levee material becomes soft and/or friable after drying, it shall be removed and replaced with material that produces a hard, competent, solid soil mass.
14. Use Clean Fill as defined by the USIBWC: Fill material that meets or exceeds the TCEQ Texas Risk Reduction Program (TRRP) rules (30 TAC §350.21(m)), median background concentration levels.

2.2 TOPSOIL MATERIAL

A. In general, topsoil material shall be material organic in nature and capable of sustaining the specified vegetative growth. The Contractor may elect to stockpile and reuse existing onsite topsoil material, stripped in preparation of the fill, excavation, or general construction, if the topsoil material meets the requirements of ASTM D5268.

1. Unsuitable stripped material becomes the property of the Contractor and shall be removed from the site. Stripped material is addressed within Section 31.14.00.
2. Topsoil from offsite sources, proposed by the Contractor and compliance confirmed by the COR, shall be supplemented as necessary when there is insufficient acceptable onsite sources.

3. Topsoil material shall be free from clay lumps, weeds, litter, brush, matted roots, toxic substances, or any material harmful to plant growth or which would hinder grading, planting, operation, or maintenance operations.
4. Topsoil material shall comply with ASTM D5268, except that the pH range of 5 to 7 is not required. If pH testing is performed, pH shall match that normal to the natural soil in the area.
5. Topsoil material shall not contain more than five percent (5%) by weight of stones or other such objects larger than one (1) inch in any dimension.
6. Topsoil salinities must be at a level that are conductive to plant growth, including the establishment of native grasses and forbs as used in the seeding mix. The Contractor is responsible for performing any tests necessary to determine if the topsoil material is appropriate for plant growth.

2.3 SALVAGED MATERIAL

A. The Contractor is allowed to reuse, as topsoil only, the salvaged material excavated from the existing levee embankment (with the exception of re-using excavated existing Flex Base as new Flex Base material) if it meets the material requirements for topsoil specified herein and is approved by the COR. The reused material can be blended with other material in which case the final product must meet or exceed all material requirements from this Section and the Contract Drawings.
    1. Reused material may not be blended for Fill (Impervious Material).

B. If the Contractor chooses to blend material to meet the topsoil material requirements herein, the Contractor shall submit a blending plan which outlines all steps, materials, equipment, labor, etc. that the Contractor will use to assure material is blended into one homogeneous mixture.

C. If issues with the blending, placement, or compaction of material arises, the County of El Paso shall discontinue allowing blending of materials.

D. The Contractor is required to obtain their own soils testing laboratory and provide results of the material stockpile for COR final compliance confirmation.

E. All stockpiling, blending, testing, and any other related labor, equipment, materials, storage areas are the sole responsibilities and the cost of the Contractor.

2.4 UNSUITABLE MATERIAL

A. Unsuitable materials or unsatisfactory materials are subgrade materials made up of woody debris, garbage, organics, or any item not defined as stone or soil.

B. Existing, in-situ subgrade material that does not meet these specifications for fill is considered unsuitable material.

2.5 EQUIPMENT

A. Earthwork construction equipment intended for the tasks identified hereinafter shall comply with the requirements specified.

B. Towed Tamping Rollers
The design and operation of the tamping roller shall be subject to the compliance confirmation of the COR who shall have the right at any time during the prosecution of the work to direct such repairs to the tamping feet, minor alterations in the roller and variations in the weight as may be found necessary to secure optimum compaction of the earth fill materials. The Contractor may be required to add ballast to the roller to the maximum capacity specified by the manufacturer of the roller. The use of the rubber-tired tractor shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller.

C. Vibratory Rollers
Vibratory rollers shall be used for compacting pervious materials in random fill, drainage fill, or aggregate surfacing.

D. Self-Propelled Tamping Rollers
Self-propelled tamping rollers may be used in lieu of towed tamping rollers provided the foot pressure on the tamping feet of the self-propelled roller are approximately the same as the foot pressure on the towed roller. The COR has the authority to limit or eliminate the use of self-propelled rollers if they are found to cause shearing or laminations of the compacted fill.

E. Hand Operated Power Tampers
In areas where large equipment is not allowed or it is impracticable to use a roller, compaction shall be performed by the use of compliance confirmed hand operated power tampers. Hand operated power tampers shall be used for compaction of impervious materials and shall be capable of compacting material in a confined area. The character and efficiency of this equipment shall be subject to the compliance confirmation of the COR.

F. Hand Operated Vibratory Plate
In areas where large equipment is not allowed or it is impracticable to use a vibratory roller, compaction shall be performed by the use of a compliance confirmed hand operated vibratory plate. The character and efficiency of this equipment shall be subject to the compliance confirmation of the COR.

G. Wetting Equipment
Wetting equipment shall consist of tank trucks, pressure distributors or other equipment designed to apply water uniformly and in controlled quantities and rates to variable surface widths. Wetting equipment compliance confirmation shall be based on demonstration of satisfactory performance. Wetting equipment types and operations shall

not compact or excessively wet the material to receive the moisture and shall not result in standing water within the material to be wetted or areas adjacent the staging.

H. Materials' Manipulation Equipment
Scarifiers, discs, pulverizers, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in manipulating materials in preparation of use in construction. Equipment shall be subject to compliance confirmation by the COR and shall be based on demonstration of satisfactory performance. Equipment used for blending materials shall be capable of penetrating the full thickness or capable of processing the full thickness of the material. Satisfactory performance shall be based on consistent complete and thorough processing of the material or materials.

1. If incomplete mixing of the material occurs, the COR can require the Contractor to use different equipment up to and including a pulverizer.

I. Other Earthwork Equipment
Other Equipment not mentioned such as equipment for earthwork extraction and handling shall be subject to COR compliance confirmation, and compliance confirmation shall be based on continued satisfactory performance. When conditions change, equipment changes may be required.

1. The Contractor shall be made aware of conditions specific to a floodplain with a fluctuating river adjacent to the work, the Contractor shall consider operational (or trafficability) problems such as, but not limited to, pumping of water and materials to the surface by moving equipment as well as bogging of equipment in soft, wet ground.
2. Selection and proposal of equipment in the Plan of Operations shall account for ground conditions associated with floodplains near a fluctuating river.

J. Provide machinery, tools, and equipment necessary for proper execution of the work. Provide proof rollers when required.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION

A. All work shall be in compliance with the requirements of the construction documents including compliance confirmed submittals.

B. Diversion, Dewatering, and Runoff Control
Where diversion, dewatering and/or runoff control is necessary, the Contractor shall submit a ‘Construction Sequencing Plans’ for COR review.

1. Diversion, surface and groundwater control shall be accomplished as necessary in coordination with the required excavation and fill placement.

2. Runoff control shall also include control of discharges from pipes either currently discharging or discharging as a result of being severed.
3. Surface water and/or groundwater control may necessitate the use of temporary diversion ditches or berms, cofferdams, and/or pumping from wells, well points, and/or sumps.

C. Moisture Content Adjustment

1. General

   The Contractor shall develop a plan for adjusting moisture contents of the available fill material to achieve the proper placement and compaction. Moisture content for Fill (Impervious Material) may require air drying or additives for moisture content reduction or sprinkling and mixing to increase the moisture content. Contractor may propose alternative methods to adjust moisture contents. The submittal shall include in detail the planned procedures. Adjustment of moisture content shall not be an added expense to the County of El Paso.

2. Air Dry

   The Contractor may reduce the moisture content by staging operations to allow spreading of material and disking the soil to expose it to air and sun. The submittal shall address such tasks as efforts to acquire the wet material from the borrow area, borrow sequencing, location of spreading, procedure to avoid crusting of the spread soil or exposed borrow, plan to avoid introduction of moisture from rainfall, continuous aeration, seasonal complications, and transfer of material to the fill zone. The submittal shall also address in detail staging, equipment, and anticipated results.

3. Admixtures

   The Contractor may reduce the moisture content by mixing additives within the wet soil. The submittal shall address in detail as a minimum the procedure, equipment, mixture, and case studies where used before (under similar circumstances). Applicable requirements considered within the air dry option shall also be included within this submittal. The use of lime or other drying agents, compliance confirmed by the COR, may be proposed by the Contractor. The submittal shall also include moisture-density curves developed for the material types and admixture percentage. The moisture-density curve for the fill with the admixture (drying agent) shall be used to establish the maximum dry density and optimum moisture content for the fill type with the drying agent incorporated. Adjustments in the drying agent will constitute a different fill material type and will be subjected to the required testing. Any drying agents incorporated into the embankment material must be environmentally safe for placement into an aquatic environment.

3.2 SHORING, SHEETING, AND BRACING

A. Where excavation or fill support is necessary to support earth, protect adjacent features, or maintain worker safety, the support system shall be designed in accordance with Standard design criteria and submitted for COR compliance confirmation.

B. Design shall be completed by a Texas registered professional engineer with experience in this kind of work. Shoring, sheeting and bracing shall not be used in lieu of the required excavation slopes where there is sufficient space for cut back slopes.

C. The design and submittal shall also address removal of the excavation or fill support. All shoring, sheeting and bracing shall be removed as fill and backfill operations progress and the void filled by a COR compliance confirmed method.

3.3 EXCAVATION OPERATIONS

A. Excavation shall consist of removal to the lines and grades shown on the Contract Drawings, including benching, and the handling to include stockpiling, loading, hauling, disposal, and/or placement as required. Excavations shall be maintained free of debris of any sort or deposited material. Excavations shall be protected from surface runoff. Excavation drainage and dewatering shall be coordinated as required by these construction documents to include compliance confirmed submittals. Excavation shall not be initiated until utilities have been cleared.

B. Clearing, grubbing, and stripping shall conform to Section 31.11.00 Preparing Right of Way.

C. Excavation for Structures
Excavations for structures shall conform to the dimensions and elevations indicated for each structure, except as specified hereinafter. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Satisfactory material removed below the depths indicated without specific direction of the COR shall be replaced at no additional cost to the County of El Paso and filled in accordance with the requirements herein. Over excavation below required invert elevations or bottoms of footings shall be backfilled with satisfactory material compacted to the density of the surrounding undisturbed material at no additional cost to the County of El Paso. No footings shall be constructed on unsatisfactory material as determined by the COR through compliance confirmation method. Excessively wet and/or soft material in sub-grades resulting from water ponding in footing excavations shall be removed and replaced with satisfactory material compacted to the density of the surrounding undisturbed material.

D. Excavation for Keys and Benches

1. If the Contractor excavates beyond the proposed excavation line shown on the Contract Drawings, then the Contractor shall excavate into the existing levee to

create a series of keys and benches as shown in the Contract Drawings with the bench placed within the slope rather than constructed at the toe of the slope.

2. The keys and benches reduce the risk of formation of a preferential failure surface at the old/new fill interface.

3. Typical bench consists of an eight (8) foot long horizontal and two (2) or three (3) feet high vertical section depending upon the applicable Typical Section in the Contract Drawings.

E. Over-Excavations

1. Over-Excavations OUTSIDE the Limits of the Levee
   Over-excavation outside the limits of the foundation of the levee (or structure within the levee alignment) shall be backfilled to grade with similar materials or a COR compliance confirmed alternate material and compacted to a density of at least that of the surrounding undisturbed material or if an alternate material is compliance confirmed, to the density required for that material type.

2. Over-Excavations WITHIN the Limits of the Levee
   a. Over-excavation within the limits of the foundation of the levee (or structure within the levee alignment) shall be performed as shown in the Contract Drawings. The over-excavation of the existing levee shall be at least twelve (12) inches from the existing grade and may need to be extended or deepened, as necessary, to remove unsuitable soil, if encountered. The over-excavation in the levee embankment shall include a series of benches with a typical bench consisting of minimum eight (8) foot long horizontal and maximum three (3) feet high vertical sections as shown on the Contract Drawings. Exposed subgrade soil after over-excavation is completed may need to be dried prior to receiving backfill material. Over-excavated area shall be backfilled to grade with Fill (Impervious Material) in accordance with the compaction requirements herein.
   b. Over-excavation shall include a one (1) to three (3) feet deep key with a minimum width of six (6) feet along the riverside toe of the new levee.

3. Over-excavation not agreed to in writing by the County of El Paso shall be for the Contactor's convenience and shall not be included in measurement and payment for excavation or for backfill.

F. Stockpiles

1. Stockpiled material shall be placed such that any part of the stockpile is no closer to the excavation than a distance equal to the depth of the excavation.

2. Stockpiled material placed the minimum distance from the excavation shall not be higher than the adjacent excavation depth and shall maintain the slope of the excavation. Stockpiles material shall be no taller than 1.25 the height of the levee at that location.

3. Stockpiles shall be left with safe side slopes. Vertical side slopes are not allowed.
4. Stockpiling shall be performed in accordance with the requirements of Section 31.14.00.
5. Stockpiles shall be protected from contamination of differing materials, natural occurrences, and general construction activities.

3.4 FILL (IMPERVIOUS MATERIAL) OPERATIONS

A. In general, fill operations shall conform to the requirements in these construction documents and compliance confirmed submittals. Specified testing shall be required to verify the specified ranges or limits are met and to verify adequacy of the procedure. It is the Contractor's sole responsibility to achieve the compaction requirements defined herein. If the specified ranges and limits and/or procedure are not met, then the Contractor shall adjust the operations for compliance and the fill shall be reworked at no additional cost to the County of El Paso.

B. Limits of Fill Operations
Fill shall be placed to the lines and grades and within the appropriate fill zone as indicated within the Contract Drawings and as described herein. Only compliance confirmed materials as defined herein shall be placed in the appropriate fill zones. Topsoil shall be placed within the fill lines indicated on the Contract Drawings per the requirements herein. Unsatisfactory materials shall be the responsibility of the Contractor for disposition. The Contractor shall place fill in such a manner as to prevent mixing of material types especially at the fill zones' interfaces.

C. Surface Preparation for Fill Placement
Clearing, grubbing, stripping, and/or general excavation shall be completed as required prior to any fill operations, in accordance with Section 31.11.00 Preparing Right of Way. Fill shall not be placed until the area to receive the fill has been inspected and compliance confirmed by the COR or County of El Paso Inspector.

D. Minimum Density and Moisture Content
Surfaces subjected to Fill (Impervious Material) include prepared in-situ subgrade and surfaces of the previously placed lift. Surfaces subjected to fill shall be moisture-conditioned by scarifying to a minimum depth of three (3) inches and re-compacted to the minimum requirements of this Specification Section.

1. Compact each layer of Fill (Impervious Material) to at least ninety-eight percent (98%) to not more than one-hundred-two percent (102%) of the maximum dry density as determined from ASTM D698 and as shown on the Contract Drawings.
2. The moisture content of the Fill (Impervious Material) should be maintained within the range of optimum moisture content to two (2) percentage points above the optimum moisture content while fill operations occur.

3. Fill shall be placed in layers and compacted in accordance with the provisions for the specific material type required herein.
4. Where necessary the moisture content shall be adjusted for the scarified soil or the fill to be placed.
5. Surfaces shall be graded to drain.

E. Removal of Unsuitable Materials
Unsuitable materials or soil that has been subjected to conditions such as saturating rain or freeze conditions, shall be removed prior to placement of fill.

F. Benching
When fill is to be placed against the existing levee embankment, the Contractor shall create a series of benches into the banks, conforming to the methods described in Paragraph 3.3 E.

G. Placement of Fill
In general, placement of fill shall be in accordance with the requirements of the Technical Specifications and to the lines and grades shown on the Contract Drawings.
Fill shall be placed in horizontal layers only. The Contractor shall note zone callouts in the Contract Drawings for specific material types.

H. Fill Placement

1. The levee embankment is to be raised in eight (8) inch loose, six (6) inch compacted, lifts. The fill material placed within the levee embankment slopes shall be compacted as required to meet the requirements of Paragraph 3.4 D. If the minimum compaction is not achieved, the lifts shall be reworked. If compaction testing fails again, placement shall be discontinued until the COR makes a determination.
2. To ensure proper compaction of the final lift, the compacted fill for the levee embankment is to be overbuilt a minimum of two (2) feet past the final slopes and grades and then trimmed to the finished grade. The overbuilding shall occur in five hundred (500) feet sections measured along the centerline of the levee. The overbuild will not be placed within four (4) feet of any structure.
3. To ensure a competent finished top lift, the Contractor shall ensure that the completed top lift is at least three (3) inches thick after compaction. If the final cut reduces the thickness of the top lift to less than three (3) inches, the Contractor shall scarify the top lift to a depth of at least six (6) inches and then re-compact the section.
4. If the dumped impervious material requires breaking up, then the Contractor shall propose a procedure, which shall be compliance confirmed subject to satisfactory demonstration of effectiveness.

I. The Contractor shall be required to perform whatever work is required to achieve the required densities for the Fill (Impervious Material). This work shall include complete removal of unacceptable fill areas, and replacement and recompaction until acceptable fill is provided. Material removed which does not conform to the requirements for fill and excess excavated materials shall be hauled away from the project site by the Contractor and disposed of in compliance with ordinances, codes, laws, and regulations at no additional cost to the County of El Paso.

J. Proof Rolling

1. Once a site is cleared, grubbed, stripped, and/or excavated, the site shall be proof rolled to locate loose, saturated, or soft zones.
2. Loose and soft zones shall be removed and disposed.
3. Surveys for excavation volume shall be conducted prior to proof rolling.

K. Placement practices throughout each fill zone of the levee shall be such that the fill will be free from lenses, pockets, streaks, and layers of material differing in texture, gradation, or classification from surrounding material of the same material type. If within the same material type lenses, pockets, streaks, or layers are encountered, the Contractor shall spread and mix the materials by a COR compliance confirmed method in order to form a homogeneous blend of the materials.

L. The finished levee embankment shall be homogenous in material and compaction characteristics. No evidence of placement layers/lifts shall be visible in the final product. Each lift of fill shall be thoroughly bounded to the prior lift/subgrade. In no instance shall any two lifts be able to be easily separated.

M. The finished levee embankment shall be a hard, competent, solid soil mass. The dried clay shall not be brittle, crumbly, or friable.

N. The levee typical sections shall be maintained throughout the work zone. No deviations in cross section shall be greater than three (3) inches longitudinally unless shown on the Contract Drawings. The sides of the levee shall not have a wavy appearance.

3.5 TOPSOIL FILL OPERATIONS

A. Where vegetative cover is scheduled, topsoil shall be placed within the limits of the lines and grades of the Contract Drawings but not to exceed the specified topsoil thickness of six (6) inches.

B. Topsoil shall only be placed where vegetative cover is scheduled. Topsoil shall be compacted by one (1) pass over each eight (8) inch loose lift thickness. Topsoil shall not be placed in more than an eight (8) inch loose lift thickness.

C. Moisture Content of Topsoil Material
The moisture content for the topsoil material to be placed shall be such that compaction effort is kept to a minimum yet sufficient to hold the soil together and support vegetative cover.

3.6 FILL TOLERANCES

A. Fill areas shall be constructed to the grades, lines, and cross sections shown on the Contract Drawings and as directed herein. Allowance of tolerance is for Contractor's constructability purposes only and there will be no additional compensation by the County of El Paso for Contractor's utilization of grade tolerance.

1. The vertical tolerance for the final grade of Fill (Impervious Material) shall be 0.1 foot below and zero above design grade.
2. The vertical tolerance for the final grade for other surfaces (top of Flex Base) shall be zero above or 0.1 foot below design grade.

3.7 MOISTURE CONTROL

A. Materials being placed as fill shall be within the moisture content limits for the respective material type. Materials that are not within the specified moisture content limits either before or after compaction shall be reworked and the moisture content adjusted to obtain moisture content within the specified range.

B. The project site is in a semi-arid to desert environment, and hot, dry conditions are expected in late spring through early fall and low humidity conditions are expected during the majority of the year. The soils must be maintained in a moist condition at all times and properly compacted in a timely, workmanlike manner.

C. Surfaces to receive fill shall be monitored for moisture content. Whenever the surface to receive fill is either too dry or too wet, the moisture content of the surface shall be appropriately adjusted prior to placing the next fill lift.

D. Once the fill has been placed to required lines and grades and has passed all required soils and density tests, the Contractor shall allow the material to dry out.

3.8 MATERIALS TESTING

A. In general, the requirements specified herein are the minimum requirements. Additional testing shall be required when there is question on the material or fill placed or change of conditions occurring that may impact the material or placed fill. The Contractor shall

perform quality control testing and shall use a certified laboratory. The County of El Paso will not provide quality control testing.

1. The County of El Paso reserves the right to sample and test any material used on this Contract for quality assurance. County of El Paso inspections are for the sole benefit of the County of El Paso.

B. Test Reporting Frequency
Test results will be made immediately available to the COR upon request. The Contractor shall provide a certified hard copy of each test report to the COR within twenty four (24) hours of each test result or as requested by the COR. The original test report and an electronic copy of the original report are required. The electronic copy shall be a scan of the signed original or include a scanned electronic signature. Unsigned copies will not be accepted.

C. Minimum soil classification tests apply whether the material is from a borrow pit or from excavations onsite.

D. Fill (Impervious Material)

1. ASTM D2487, grain size analyses, in accordance with ASTM D422 shall be performed during placement at a minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material, or at least once every day fill is placed, whichever produces the greater number of tests.
   a. When performing ASTM D422, sieves sized two (2) inch, one (1) inch, 3/8 inch, 4, 10, 20, 40, 60, 140 and 200 shall be used at a minimum.
   b. ASTM D422 includes hydrometer testing of material below the 200 sieve.
2. Fill soils shall be tested in accordance with ASTM D6572 (Crumb Test) at minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material.
3. Fill soils shall be tested in accordance with in accordance with ASTM D4647 (Pin Hole Test) at minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material.
4. Fill soils shall be tested in accordance with in accordance with ASTM D4221 (Double Hydrometer) at minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material.
5. Fill soils shall be tested in accordance with in accordance with ASTM D4318 (Atterberg Limits) at minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material.
6. Sand content in accordance with ASTM D1140 at minimum rate of one (1) test per two hundred fifty (250) cubic yards of compacted fill material.
7. Any materials that do not meet the minimum test criteria shall be removed and replaced with suitable soils.

8. Prior to placing any Fill (Impervious Material), a (5) five-point (minimum) compaction test (ASTM D698) shall be performed on the representative samples of the material to be used as fill.
    a. Additional tests shall be required each time a new material is encountered or every two hundred fifty (250) cubic yards of compacted fill material, whichever provides for the greatest number of tests.
    b. The moisture-density curves shall be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) to be used with field density tests.
9. Additional tests shall be required if noticeable changes in any material is observed.

E. In-Situ Subgrade Soils

1. Soil classification tests (ASTM D2487) shall be performed on foundation materials as required to determine the properties of the in situ soils.
2. Moisture-Density Relationship
   Subgrade materials shall be tested in accordance with ASTM D698 at minimum rate of one (1) test for each type of material exposed in the subgrade or one (1) test for every seven thousand five hundred square feet (7,500 ft^2) of exposed subgrade, whichever produces the greater number of tests.
3. Density Requirements
    a. The subgrade under the new Fill (Impervious Material), and under all concrete placements shall be compacted to at least ninety-eight percent (98%) to not more than one-hundred-two percent (102%) of the maximum dry density as determined from ASTM D698.
    b. The subgrade under the new Flex Base shall be maintained to at least ninety-eight percent (98%) to not more than one-hundred-two percent (102%) of the maximum dry density as determined from ASTM D698.
    c. The subgrade under topsoil shall be compacted to a minimum of ninety percent (90%) of maximum dry density per ASTM D698.
4. Moisture Content
    a. The subgrade under the new Fill (Impervious Material) shall be scarified and recompacted while between optimum and two (2) percentage points above optimum.
    b. The subgrade under new Flex Base shall be scarified and recompacted while between optimum and two (2) percentage points above optimum.
    c. The subgrade under topsoil shall be scarified and recompacted while within two (2) percentage points plus/minus of the optimum moisture content.

F. Topsoil

1. ASTM D5268 shall be performed during placement at a minimum rate of one (1) test per one hundred fifty (150) cubic yards of topsoil.
   a. Each soil sample shall be a composite sample from no less than six (6) random areas within the sample area to a depth of four (4) inches.
   b. Collected soil shall be mixed within a clean, non-metallic container.
   c. All organic matter from existing vegetation shall be removed from the soil sample prior to submission to the testing laboratory.
2. Additional tests shall be required if noticeable changes in material is observed.
3. These testing requirements apply to all topsoil whether brought in from offsite or if onsite material is reused.

G. Moisture Content Tests

1. One moisture content test in accordance with ASTM D6938 shall be performed whenever an in place density test is performed.
2. Fills not meeting the required specifications for moisture content shall be retested after corrective measures have been applied.
3. When conditions exist throughout the placement process such as drying winds or sun or wetting from precipitation, additional testing shall be completed throughout the placement process to ensure proper moisture content. The COR shall determine the frequency of additional testing.
4. Whenever a change of material occurs, a laboratory moisture content (ASTM D2216) shall be obtained to verify the nuclear gauge reading. Additional ASTM D2216 tests shall be performed once every ten (10) nuclear density (ASTM D6938) tests performed to verify the nuclear gauge reading.
5. The Contractor and/or QC Laboratory shall correlate the moisture tests taken by ASTM D2216 and ASTM D6938 to ensure that testing procedures are within industry guidelines.

H. In-Place Density Tests

1. In-place density shall be determined in accordance with ASTM D698 and ASTM D6938.
2. Fill in-place density tests shall be performed at least two (2) tests per day or one (1) test every two hundred fifty (250) cubic yards placed, whichever provides for the greatest number of tests. Additionally, the Contractor shall perform in place density tests for the fill material when requested by COR.
3. Placed fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed.
4. Subgrade

a. Immediately prior to placement of Fill (Impervious) or Flex Base, subgrade materials shall be tested in accordance with in accordance with ASTM D6938 at minimum rate of one (1) test per seven thousand five hundred square feet (7,500 ft^2) of exposed subgrade or once per workday, whichever provides for the greatest number of tests.

b. Prior to installation of concrete, subgrade materials shall be tested in accordance with ASTM D6938 at minimum rate of one (1) test per one hundred square feet (100 ft^2) of exposed subgrade or once per workday, whichever provides for the greatest number of tests.

5. During ASTM D6938 nuclear density tests, the probe shall extend through both the newly added lift and the scarified prior lift (e.g., 6" lift plus 3" scarification equals probe of 9", minimum). Tests into scarified and compacted subgrade shall be taken at a twelve inch (12") depth.

6. Each submittal including density test data shall include a copy of the testing laboratory's summary of all densities performed for a given workday as well as all tests and samples taken.

I. The Contractor shall perform additional tests at the request of the COR.

3.9 CONTRACTOR QUALITY CONTROL

A. Contractor quality control in support of the earthwork shall include all efforts to ensure compliance with these construction documents to include support of County of El Paso efforts as part of quality assurance. The Contractor shall immediately report to the COR in writing all conditions identified in the field as a change. The Contractor efforts in support of Contractor earthwork quality control shall include but not be limited to the items indicated hereinafter.

B. Excavation
The Contractor shall complete all efforts to ensure compliance with the construction documents in support of excavation requirements for required excavation and excavation in support of non-pay items such as borrow areas. Contractor efforts shall include but not be limited to the following:

1. Maintain records and complete as-built drawings and submit to the COR as required.

2. Complete all surveys to ensure excavations to all specified lines and grades within specified tolerances.

3. Complete utility location prior to excavations and documenting the utilities as required.

4. Use only compliance confirmed equipment for work and modify as necessary and as compliance confirmed by the COR.

5. Complete segregation of materials to include testing, stockpile, placement, removal offsite, and providing for protection of segregated materials.
6. Complete operations to ensure protection of levee embankment and stockpile from runoff and discharges.
7. Complete operations to ensure stability of levee embankment and stockpiled material.

C. Fill

1. The Contractor shall complete all efforts to ensure compliance with the construction documents in support of fill operations' requirements for levee embankment, structure backfill, and topsoil. Contractor efforts shall include but not be limited to the following:
   a. Maintain records, test results, and complete as-built drawings and submit to the COR as required.
   b. Use only compliance confirmed equipment for work and modify as necessary and as compliance confirmed by the COR.
   c. Complete all surveys to include survey control, grade stakes, and survey sections to ensure proper project layout and that fill limits are met to include fill zones and overall fill.
   d. Complete all proper surface preparation to receive fill.
2. Complete all testing of materials and fill placed to ensure compliance with the construction requirements. Properly place and compact appropriate materials and protect partially and completed fill operations.
3. The Contractor shall perform whatever work is required to achieve the required densities for the compacted fill. This work shall include complete removal of unacceptable fill areas, and replacement and recompaction until acceptable fill is provided. Material removed which does not conform to the requirements for fill and excess excavated materials shall be hauled away from the project site by the Contractor and disposed of in compliance with ordinances, codes, laws, and regulations at no additional cost to the County of El Paso.

D. Miscellaneous

Contractor shall perform all work in accordance with the construction documents and compliance confirmed submittals. All necessary surveys shall be completed as well as maintaining all records and complete as-built drawings.

E. Testing and Reporting

The Contractor shall complete all testing in accordance with the requirements of these construction documents and shall continue to do so until testing results meet all requirements of the project sections and are compliance confirmed by the COR at no

additional cost to the County of El Paso. Testing specified shall be considered the minimum requirement.

1. When there is question of the material or the fill placed or conditions occurring in the field that may impact the material or fill placed properties, the COR may require additional testing and the Contractor shall complete the additional testing at no additional cost to the County of El Paso.
2. As part of quality assurance, the County of El Paso may perform testing. The Contractor shall provide the samples for County of El Paso testing and when the testing is to be performed in the field, the Contractor shall provide the testing equipment at no additional cost to the County of El Paso.
3. The Contractor shall furnish records, test results, and related documentation to the COR in accordance with the requirements of these construction documents.

F. All test reports and other collected data shall be provided to the COR daily with the Contractor's Daily QC Report.

3.10 EQUIPMENT TRAFFIC ON FOUNDATION AND FILL ZONES

A. Equipment traffic shall be routed to distribute the compaction effort as much as practicable. Ruts formed in the surface to receive fill material shall be filled before that material is compacted.

B. Surfaces made smooth prior to receiving fill shall be scarified.

C. Surfaces rutted or damaged after compaction shall be re-scarified and re-compacted within allowable moisture levels.

3.11 COMPLETED AND PARTIALLY PLACED FILL

A. Fill placed, completely or partially, shall be shaped to drain from the fill and graded to drain away from the fill.

B. The Contractor shall protect the fill from erosion until the vegetative cover is established. Erosion occurring during the interim shall be the Contractor's responsibility to repair at no additional cost to the County of El Paso.

C. Should a slide occur in any part of the embankment during its construction or after its completion, but prior to its expiration of the warranty period, the Contractor shall repair the levee embankment with a compliance confirmed method at no additional expense to the County of El Paso.

3.12 EMBANKMENT SURFACE EROSION REPAIR OPERATIONS

A. In general, embankment surface repair operations shall conform to the requirements herein these construction documents and compliance confirmed submittals. The operations shall take place in the areas where drainage rills were observed along the landside slope of the levee embankment.

   1. The methodology shall primarily be a procedural specification with specific material properties maintained within a specified range or limit.

   2. Specified testing shall be required to verify the specified ranges or limits are met and to verify adequacy of the procedure. If the specified ranges and limits are met and the procedure testing doesn't deliver the defined compaction results, then an adjustment in the procedure may be specified and an equitable adjustment made in the price to the Contractor or in lieu of this, the COR may adjust the compaction values. If the specified ranges and limits and/or procedure are not met, then the Contractor shall adjust the operations for compliance and the operations reworked at no additional cost to the County of El Paso.

B. The Contractor shall bench into the existing slope as shown in the Contract Drawings. Each bench shall contain multiple lifts (at maximum depths designated in the Contract Drawings) that butt-up against the vertical face of the bench and shall be re-compacted with each lift until the minimum compacted dry density is achieved.

--End of Section--