NEIGHBORS IN NEED OF SERVICES, INC.
(NINOS)
HEAD START / EARLY HEAD START PROGRAM

"Creating a brighter future for our children and la familia"

RFB Packet for

OTIS KLAR HEADSTART
SITE IMPROVEMENTS

at

1305 E. Hidalgo Ave.
Raymondville, Texas 78580

FY 2024/2025
24-RFB-026

Neighbors In Need of Services, Inc. Head Start/Early Head Start
Invitation to Participate

RFB Number #: 24-RFB-026

RFB Title: Otis Klar Headstart Site Improvements

Project Address: 1305 E. Hidalgo Ave., Raymondville, Texas 78580

Date Due: Monday, December 2, 2024 Due No Later Than: 4:00 p.m.

PROJECT DESCRIPTION

NINOS Inc. is requesting qualifications from qualified BIDDERS to perform a range of construction services as related to the construction plans set forth for the Otis Klar Headstart located at 1305 E. Hidalgo Ave., Raymondville, Texas 78580. Such work includes demolition, site grading, excavation and parking lot rehabilitation.

Copies of the Request for Bid Package are available at the office of Tracy Torres, Director of Finance, located at 22887 State Highway 345 Rio Hondo, TX 78583, or NINOS Inc. website: www.ninosinc.org

All prospective bidders are encouraged to visit the project site.

CLOSING SUBMISSION DATE & PUBLIC OPENING

Bid Proposals for the above will be received by NINOS, Inc. ATTN: Tracy Torres, Director of Finance, at the Administration Building, 22887 State Highway 345 Rio Hondo, TX 78583 no later than 4:00 pm on Monday, December 2, 2024.
Please provide one (1) original and two (2) copies of the proposal.

RFBs will be opened at 9:00 am on December 3, 2024, at the Administration Building, 22887 State Highway 345, Rio Hondo, TX 78583. Responses will be evaluated in the following weeks. Successful respondents may be invited to present to the Board of Directors for final selection.

NINOS, INC. reserves the right to reject any or all qualifications, waive any formalities in proposals received, and accept the proposal most advantageous to NINOS, Inc.

NON-DISCRIMINATION & EQUAL OPPORTUNITY

No person shall on the grounds of race, color, religion, sex, national origin, age, handicap, political affiliation or belief be excluded from participation in, be denied the benefits of, be subjected to discrimination under, or be denied employment in the administration of or in connection with any program or activity funded in whole or in part with funds made available under this contract.

PURPOSE

NINOS, Inc. requests bids from licensed professionals and qualified contractors to

provide construction services for the site drainage improvements and pavement reconstruction at Otis Klar Headstart located at 1305 Hidalgo Ave., Raymondville, Texas, 78580.

Technical questions or requests for clarification shall be directed to the Engineer of Record by writing to the email addresses below. All responses to questions or requests for clarification will be provided via return email only to the proposer asking the question(s). Responses to inquiries which directly affect an interpretation nor change this RFB will be issued in writing by Addendum. Addendum(s) will be posted online at NINOS Inc, website: www.ninosinc.org.

Perez Consulting Engineers
Attn: Jorge D. Perez, P.E.
808 Dallas Ave.
McAllen, Texas 78501
956.631.4482
jdp@perezce.com
ah@perezce.com

GENERAL INFORMATION

NINOS, Inc. anticipates contracting with the selected candidate after the award for construction for the time specified in Attachment A – Bid Proposal Form.

NINOS, Inc. makes no guarantee that an award will be made as a result of this RFB and reserves the right to accept or reject any or all proposals, waive any formalities or minor technical inconsistencies or delete any item/requirements from this RFB or resulting contract when deemed to be in NINOS, Inc best interest.

Proposals are to be valid for NINOS, Inc. acceptance for a minimum of 90 days from the submittal deadline to allow time for evaluation, selection and any unforeseen delays. Proposals, if accepted, shall remain valid for the life of the Contract.

SCOPE OF SERVICES

NINOS, Inc. specifically requests the following services:

- Drainage Improvements and Pavement Reconstruction
  - Demolition of flatwork
  - Disposal of flatwork
  - Excavation and Grading of building perimeter
  - Pavement Repair at West Drive
  - Concrete Thresholds at entryways
  - Drainage crossings at Pedestrian Walkway
  - Stormwater retention pond
  - Reconstruction of front parking lot (Add Alternate)

QUALIFICATION REQUIREMENTS

To demonstrate bidder's qualifications to perform the work, the bidder shall include with the bid package the following items:

A. Bidder must include with the bid package a statement of qualification containing but not limited to the bidder's line of business and services provided. Bidder is welcome to include a company brochure.

B. Bidder must include with the bid package a list of five (5) relevant projects and comparable in complexity to this project which the bidder successfully completed within the past 5 years and which had a dollar value equal to or larger than the value bid for this project. Bidder must include the project name, owner's name, and owner's representative contact information.

C. The bidder must include with the bid package the name and contact information for the bidder's project representative, including but not limited to the representative's resume.

D. The bidder shall include with the bid package a list of all subcontractors proposed to be employed for this project and the service they will provide. Owner will reserve the right to review the list of subcontractors, evaluate accordingly and will reserve the right to reject the bid and all formalities shall the owner determine the bid is not in the owners' best interest of NINOS, Inc.

E. The bidder shall include with the bid package proof of certificate of insurance.

F. The bidder must submit a bid bond or certified check equal to 5% of the total price proposal amount. If a certified check is submitted in lieu of a bid bond, it will be made payable to NINOS, Inc.

G. The successful bidder will be required to furnish a one (1) year warranty from substantial completion date assuring the completed work is free from all defects due to faulty materials or workmanship.

COMPENSATION

The owner will retain an amount equivalent to 5% of the total amount for each corresponding request for payment submitted by Contractor. The engineer will review each payment application, and the owner will release each payment after recommendation for approval is issued by the engineer. The final retainage will be released by the owner after satisfactory completion of the contract items are obtained.

EVALUATION CRITERIA FOR SELECTION

The Agency reserves the right to accept or reject any and all qualifications, waive technicalities, be the sole judge, and accept qualifications that are in the best interest of NINOS, Inc.

NINOS, Inc. staff may select finalists for presentations and interviews, negotiate contractual agreements, and recommend the selected finalist to the Agency's Board of Directors. The Board has the final authority to accept or reject the contract.

The Bidder selected for an award will be the Respondent whose proposal, as presented in the response to this RFB, is the most advantageous to NINOS, Inc.

The criteria for evaluation of proposal and selection of the successful bidder for this award will be based on the factors listed below:

Evaluation of each proposal will be based on the following criteria:

	Factor	Point
a.	Price Proposal	0 – 75
b.	Bidders	0 – 10
c.	Bidders Time for project completion	0 – 10
d.	Ability to provide proof of Insurance Bid Bonds	0 – 5
	Maximum Points	100

NEIGHBORS IN NEED OF SERVICES, INC.
(NINOS)
HEAD START / EARLY HEAD START PROGRAM
INSTRUCTIONS

The undersigned Bidder, having carefully read all instructions and requirements, examined the plans and specifications and having visited the Project Site, do hereby submit the following bid for the Otis Klar Site Improvements Project.

All Addendums – if issued - should be reviewed and downloaded by entering NINOS, Inc. website at www.ninosinc.org. Bidder must acknowledge receipt of Addenda(s) in the space provided below:

Please return the RFB in a sealed envelope. The envelope should show the RFB Number and description and be marked "SEALED RFB."

RETURN RFB TO:

Delivered to the administration office: By Delivery Services
Attn: Tracy Torres, Director of Finance
22887 State Hwy 345
Rio Hondo, TX 78583

Mailed to: By USPS
Attn: Tracy Torres, Director of Finance
PO BOX 189
Rio Hondo, TX 78583

You must sign below in ink; failure to sign will disqualify the RFB offer. All prices must be typewritten or written in ink and totaled on Attachment A – Bid Proposal Form.

Company Name: _____

Company Address: _____

City, State, Zip Code: _____

Telephone: _____ Fax No: _____ E-mail: _____

Print Name: _____

Signature: _____

Date: _____

(Your signature attests to the accuracy of the responses you provided in response to the RFB.)

BASE BID – SITE DRAINAGE IMPROVEMENTS
ESTIMATED QUANTITIES

Item No.	Estimated Quantity	Unit	Item Description	Unit Price	Total
1	1	LS	**Site Preparation**, Clearing, tree removal, removal of all organic materials for the lump sum price of	$ _____	$ _____
2	1	LS	**Demolition of Existing Sidewalks** (Flatwork, including debris removal and disposal for the lump sum price of	$ _____	$ _____
3	1,350	CY	**Building Perimeter Drainage Swale Excavation and Grading**, Swale and Detention Pond; including debris removal and disposal, seeding all complete per Cubic Yard for	$ _____	$ _____
4	42	LF	**2-8" PVC SDR 26 Culvert service drive crossing**, reinforced concrete riprap, sidewalk and and Pavement Repair at West Drive including Slope End Treatments, per lineal foot for	$ _____	$ _____
5	300	SF	**New Reinforced Concrete thresholds at exterior doors** and walkways, all ADA complaint per square foot for	$ _____	$ _____
6	2	EA	**Pedestrian Sidewalk Drainage Swale Crossings** of the width shown on the plans, per each for	$ _____	$ _____
7	10	EA	**Concrete Roof Gutter Drainage Downspout Splash Guards** into drainage perimeter drainage swales at directed locations located at the perimeter of building per each for	$_____	$_____

8	6	EA	**Adjustment of water and sanitary sewer service yard service lines** encountered and requiring adjustment while performing drainage swale excavation, all required service line diameters, including all necessary fittings, materials and excavation, complete in place per each for	$_____	$_____
9	1	LS	**Preparation of a Storm Water Pollution Prevention Plan** (SWPPP) as required for the construction site, prepared and maintained by the Contractor, all for the lump sump price of	$_____	$_____
TOTAL BASE BID: SITE DRAINAGE IMPROVEMENTS				$ _____	

ADD ALTERNATE BID – PARKING LOT REHABILITATION IMPROVEMENTS ESTIMATED QUANTIES

Item No.	Estimated Quantity	Unit	Item Description	Unit Price	Total
1	1,000	SY	**Reconstruct Front Parking Lot** including removal and disposal of existing pavement, regrading and re-compaction of existing base, make-up flexible base as required, 1-1/2 inch compacted asphaltic material pavement surface, striping and all markings and new handicap signage and poles, removal of existing handicap poles, 16 new wheel stops, all complete in place as per the plans and specifications per square yard for	$ _____	$ _____

2	1	LS	**Traffic Control Plan** for work along Hidalgo Street (SH 186) and prepared by a qualified Professional Engineer, for the lump sum price of	$ _____	$ _____
3	1	LS	**Erosion Control Plan** as maintained by the Contractor and prepared by a qualified Professional Engineer, for the limp sum price of	$ _____	$ _____
TOTAL ADD ALTERNATE BID: PARKING LOT REHABILITATION IMPROVEMENTS				$ _____	

GRAND TOTAL: BASE BID + ADD ALTERNATE BID	**$ _____**

THE CONTRACTOR AGREES TO PERFORM AND COMPLETE THE PROJECT WITHIN 60 CONSECUTIVE CALENDAR DAYS.

THE CONTRACTOR ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA:

Addenda No.:	**Date Received:**

SECTION C-200 - INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. ***Issuing Office*** - Perez Consulting Engineers, 808 Dallas Ave., McAllen, Texas, 78501; the office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

B. ***Owner*** – NINOS, Inc and entity to whom the Bidder will submit the bid for the specified work in these contract documents, and with whom the successful bidder will enter into an agreement to perform the services and work hereby specified by these contract documents.

C. ***Bidder*** - Sole proprietorship, partnership, corporation, joint-venture, and or limited liability company who submits a Bid directly to Owner.

D. ***Contractor*** - Successful Bidder to whom the Owner awards the project and who enters into an agreement with the Owner to perform the services and work hereby specified by these contract documents.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents are available online at NINOS, Inc. Website: www.ninosinc.org.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate bidder's qualifications to perform the work, the bidder shall include with the bid package the following items:

A. Bidder must include with the bid package a statement of qualification containing but not limited to the bidder’s line of business and services provided. Bidder is welcome to include a company brochure.

B. Bidder must include with the bid package a list of five (5) relevant projects and comparable in complexity to this project which the bidder successfully completed within the past 5 years and which had a dollar value equal to or larger than the value bid for this project. Bidder must include the project name, owner's name, and owner's representative contact information.

C. Bidder must include with the bid package the name and contact information for the bidder's project representative, including but not limited to the representative's resume.

D. Bidder shall include with the bid package a list of all subcontractors proposed to be employed for this project and the service they will provide. Owner will reserve the right to review the list of subcontractors, evaluate accordingly and will reserve the right to reject the bid and all formalities shall owner determine the bid is not in owners best interest all in accordance with Article 12 Instructions to Bidders below.

E. The bidder shall include with the bid package proof of certificate of insurance. Insurance requirements are outlined in Article SC 5.04 Supplemental Conditions.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 Upon request, the Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of his Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility location activity.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by

these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

E. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

F. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

G. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

H. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environment Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions:

I. obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and

procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

J. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or date are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - SITE AND OTHER AREAS

5.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 - INTERPRETATIONS AND ADDENDA

6.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 7 - BID SECURITY

7.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5** percent of Bidders' maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

7.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven says after the Effective Date of the Agreement or 60 days after the Bid opening, whereupon Bid security by such Bidders will be returned.

7.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 8 - CONTRACT TIMES

8.01 The number of days within which, or the dates by which, [Milestones are to be achieved and] the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 9 - LIQUIDATED DAMAGES

9.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 10 - SUBSTITUTE AND "OR-EQUAL" ITEMS

10.01 The Contract, if awarded, will be on the basis of equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 11 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 Owner reserves the right to review and evaluate the award of a bid based on subcontracted services considered by the Bidder in preparation of the Bid price. For this

purpose the Owner requests that all interested Bidders include with the Bid package a list of all subcontractors, individuals, or entities considered for support, and or services that the Bidder is unable to perform and which the Bidder will rely on to complete the project. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, individual, or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute. Bidder's price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the decision on whether to award or move to the second most qualified bidder.

11.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

11.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 - PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from the Engineer.

12.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each [, Bid item, , and unit price item] listed therein, or the words “No Bid,” “No Change,” or “Not Applicable” entered.

12.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

12.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

12.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

12.06 A Bid by an individual shall show the Bidder's name and official address.

12.07 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

12.08 All names shall be typed or printed in ink below the signatures.

12.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

12.10 The address and telephone number for communications regarding the Bid shall be shown.

ARTICLE 13 - BASIS OF BID; COMPARISON OF BIDS

13.01 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item listed in the Bid schedule.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price.

C. Discrepancies between the multiplication of item units and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the correct figures.

13.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents

13.03 If the Time of Completion is not specified by the Owner, bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Section C-520 - Form of Agreement Article 4.

ARTICLE 14 - SUBMITTAL OF BID

14.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, the unbound copy of the Bid Form is to be completed and submitted with the following data:

All items listed in Article 3 Instructions to Bidders above.

14.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with "**BID ENCLOSED**", the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the required documents in Article 3 above. The Bid shall be submitted to:

Tracy Torres, Director of Finance
NINOS, Inc.
22887 State Highway 345
Rio Hondo, Texas 78583

ARTICLE 15 - MODIFICATION AND WITHDRAWAL OF BID

15.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

15.02 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the owner will reserve the right to accept or reject a rebid from that bidder if it deems necessary.

ARTICLE 16 - OPENING OF BIDS

16.01 Bids will be opened at the time and place and method indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid and Contract Documents, but Owner may, at his sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 – EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

18.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

18.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in Article 12 above and SC 6.06.

18.05 In evaluating the bid the Engineer will review each bid form and prepare a bid tabulation. All errors will be corrected in favor of the unit price bid.

18.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

18.07 If the Contract is to be awarded, Owner will award the Contract to the most qualified responsible Bidder whose Bid is in the best interests of the Project.

ARTICLE 19 - CONTRACT SECURITY AND INSURANCE

19.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the successful bidder delivers the executed agreement to Owner, it shall be accompanied by such bonds. In accordance with C-700 General Conditions Article 5.04B1 successful bidder must submit Certificate of Insurance with additional insureds as follows:

Owner: NINOS, Inc.
22887 State Highway 345
PO Box 189
Rio Hondo, Texas 78583

Engineer: Perez Consulting Engineers
808 Dallas Ave.
McAllen, Texas 78501

ARTICLE 20 - SIGNING OF AGREEMENT

20.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

20.02 Successful bidder will be required to furnish a one (1) year warranty from substantial completion date assuring the completed work is free from all defects due to faulty materials or workmanship all as specified in Section C-520 Form of Agreement Article 4.04.

ARTICLE 21 - SALES AND USE TAXES

21.01 Owner is exempt from Texas state sales and use taxes on materials, labor, and equipment. Said taxes shall not be included in the Bid. Refer to Paragraph SC-6.10 of the Supplementary Conditions for additional information.

ARTICLE 22 - RETAINAGE

22.01 The owner will retain an amount equivalent to 5% of the total amount for each corresponding request for payment submitted by Contractor. The engineer will review each payment application, and the owner will release each payment after recommendation for approval is issued by the engineer. The final retainage will be released by owner after satisfactory completion of the contract items are obtained.

ARTICLE 23 - CONTRACTS TO BE ASSIGNED

23.01 Owner as “buyer” will execute a contract with Contractor as “seller” for the procurement of goods and special services for the Park Avenue Street Improvements for the Base Bid, Alternate Bid or both Base Bid and Alternate Bid.

END OF SECTION

SECTION C-520 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is by and between NINOS, Inc., 22887 State Highway 345, PO Box 189, Rio Hondo, Texas 78583 (Owner) and _____ (Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Drainage Improvements and Pavement Reconstruction at the Otis Klar Headstart.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents is generally described as follows:

BASE BID: Site Drainage Improvements

ADD ALTERNATE: Parking Lot Rehabilitation Improvements

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by Perez Consulting Engineers, 808 Dallas Avenue, McAllen, TX. 78501.

(Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be completed within **60** days after the date of the NOTICE TO PROCEED and as provided in the General Conditions.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $150.00 for each day that expires after the time specified in Paragraph 4.02 above, for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $150.00 for each day that expires after the time specified in Paragraph 4.02 above, for completion and readiness for final payment until the Work is completed and ready for final payment.

4.04 General Guaranty

A. Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall guarantee materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Final Acceptance of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including repairs of any damage to other parts of the system or other work resulting from such defects.

The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other

work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01 -A below:

A. For all Unit Price Work, an amount equal to the sum of the established unit price bid for each separately identified item of Unit Price Work times the **final field measured quantity** of that item.

As explained in the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and clarifications are to be made by Engineer for actual work done and field measured, all in accordance with the General Conditions.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25 day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments for Periodic Progress Estimates shall be estimated by the actual work done on the ground for the period.

1. Prior to the Completion of the Project, Periodic Progress Estimates will be made by the Contractor for an amount equal to the actual work done on the ground and for the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with the General Conditions:

   a. 90 percent of Work completed (with the balance being a 10% retainage).

b. Materials on hand will not be paid for.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with the General Conditions, Owner shall pay the Retainage (remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07).

~~ARTICLE 7 - INTEREST~~ (ARTICLE 7 IS NOT APPLICABLE, THEREFORE STRIKE OUT OF SECTION 520.)

~~7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the of . permit per annum.~~

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and technical specifications in the Contract Documents.

E. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

F. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. Form of Agreement
2. Performance Bond
3. Payment Bond
4. Certificate of Insurance
5. General Conditions
6. Supplementary Conditions
7. Special Project Conditions
8. Measurement and Basis of Payment
9. Technical Specifications
10. Drawings consisting of **5** sheets with each sheet bearing the following general title: **Otis Klar Headstart Site Improvements** and which are attached and made part of these documents.
11. Addenda
12. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid Proposal Form
    b. Any other documentation as required

.

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    a. Notice to Proceed
    b. Change Order(s).
    c. Field Orders and Directives

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in Duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
[CORPORATE SEAL]	[CORPORATE SEAL]
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
	License No.: _____ (Where applicable)
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)	Agent for service or process: _____
	_____
	(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

SECTION 00 0110 - TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

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2.05 DIVISION 32 -- EXTERIOR IMPROVEMENTS

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E. 32 1723.13 – Painted Pavement Markings
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A. 33 0513 – Storm Sewer Appurtenances
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SECTION 00 7400
SPECIAL PROJECT CONDITIONS FOR CIVIL-SITE WORK

In all cases where these special project conditions conflict with the technical specifications, plans, general conditions of the agreement, special conditions of the agreements, contract conditions, or any other document contained or attached or made a part herein, these special project conditions shall govern. It is the intention that all work is done in strict accordance with the plans and specifications. Any deviations from these plans due to any reason shall be submitted in writing to the Engineer and approved in writing by the Civil Engineer before such modification. The contractor shall not make any modifications without written approval by the Civil Engineer.

It is the intent to solicit proposals for Site Drainage Improvements as a Base Bid, and Parking Lot Rehabilitation Improvements as an Alternate Add Bid.

Base Bid - Site Drainage Improvements:
The Otis Klar Headstart intends to perform the work included in the Plans and Specifications to mitigate stormwater intrusion into the existing buildings by providing swales and stormwater detention/retention facilities.

Alternate Add Bid – Parking Lot Rehabilitation Improvements:
The Otis Klar Headstart Facility intends to perform the work included in the Plans and Specifications to re-construct and resurface the existing parking lot located in front of the building including striping and regrading.

1.1 The Contractor shall do all necessary excavation, filling, fine grading, trenching, demolition, grading, seeding, backfilling, dewatering, tree removal, etc., to complete the project. Such costs shall be subsidiary to the various items of the proposal and shall not be paid directly. Soil material deemed salvageable shall become property of the owner and such material shall be stockpiled on the site at the Owner's designated location. All material removed and not deemed salvageable such as broken concrete, etc., shall become the property of the Contractor and he shall be responsible for removing it from the site and disposed of in an approved disposal site at no extra expense to the Owner. It will be necessary to grade as shown within the entire "Project Limits" shown on the Plans and limited only to the Owner's property. Any material used for fill must be free of trash, large boulders, organic or other material or debris, and in accordance with specifications. All fill material shall be placed, spread shaped and compacted to 98% standard proctor density and shall have a maximum P.I. (Plasticity Index) of 12. Any material unsuitable for fill shall be rejected and shall become the property of the contractor and disposed of at the expense of the Contractor.

1.2 All trees, plants, grass and shrubs, outside the limits of construction, shall be protected at all times. Any damages done by the Contractor of areas in and adjacent to the construction limits shall be restored to their original conditions after necessary grading is completed.

1.3 The Contractor shall furnish the Owner the names, addresses and telephone numbers of all personnel responsible for the work in case of emergencies.

1.4. Damages done to existing utilities, power poles, fences, signs, driveways, culverts, pavement, drainage systems, sprinkler systems, hose bibs, irrigation liens, etc., shall be repaired by the Contractor at no cost to the Owner, and such costs shall be subsidiary to the various unit items in the proposal.

1.5 The Contractor shall be limited only to the existing project limits. Any damage done to property outside these designated work areas will be corrected to its original or better condition by the contractor at no extra cost to the owner. It is important that the Contractor be aware of the work limits (limited only to the property boundaries) so that no damage can be caused to those areas outside these limits.

1.6 Construction work performed by others within the areas of the project-designated areas will not relieve the Contractor from insuring his work and work performance. The Contractor shall be responsible for coordinating all work in order to avoid any conflicts.

1.7 The Contractor shall be responsible for construction staking by a qualified Professional. Horizontal and vertical control will be provided by the Owner before construction. The contractor is responsible for protecting survey control and benchmark provided by the Owner. Any additional survey control required from the Owner will be paid for by the Contractor.

1.8 The plans do not show all locations of existing water, sanitary sewer, telephone, fiber optic, sprinkler, irrigation, and gas lines. The Contractor is responsible to call appropriate public or private utility company to locate all lines before construction operations begin. The Contractor shall exercise extreme care in working in the vicinity of these lines.

1.9 The Contractor is expected to conduct his work in such a manner as to minimize any soil erosion or sediment runoff away from the construction site. Earth cuts and fills shall have smooth, flat side slopes, as generally indicated on the plans, to preclude erosion of the soil. Such operations should be timed consistent with the actual need to do the work and only to leave raw, unprotected surfaces for a minimum of time.

1.10 The Contractor shall be responsible for correcting any erosion that occurs at his cost without claim for extra compensation.

1.11 The Contractor shall prepare, administer and implement a storm water pollution prevention plan (SWP3) as per Texas Commission on Environmental Quality (TCEQ) rules and regulations for areas that disturb more than 1 acre. All application fees for the SWP3 shall be paid for by the Contractor. A copy of the TPDES General Permit TXR15000 is included with the Civil Specifications as well as Erosion Control Devices shown in the plans as a guideline. Contractor shall refer to and comply with all other applicable discharge permits as per TCEQ rules and regulations.

1.12 It is the intent of this project to comply with the latest TAS Texas Accessibility Standards. The Contractor is responsible to set all the site work, such as sidewalks, ramps and handicap parking areas according to the latest TAS Standards. The Contractor shall notify the Engineer when forms for all flat work are set in order to determine if TAS Standards have been complied with prior to pouring the walks or other TAS sensitive areas. Failure to do so shall be reason to reject the work and any reconstruction of affected areas shall be paid for by the contractor.

1.13 If specified, all reinforced concrete pipe shall be C-76 of the class specified in the plans with rubber gasket joints unless otherwise specified on the plans.

1.14 The proposed permanent pavement markings shall be applied in all areas designated on the plans. Prior to placing pavement markings, prepare pavement surface of sufficient area for the pavement markings shown on the plans. Remove all contamination and loose material. Avoid damaging the pavement surface. Approved pavement surface preparation methods are sweeping, air blasting, flail milling, and blast cleaning unless otherwise specified on the plans. Reflectorized pavement markings shall be installed in accordance to the 2004 Texas Department of Transportation (TxDOT) Standards Specifications Item 666, Type I. Permanent pavement markings shall be placed no later than two weeks after final surfacing.

1.15 The Contractor shall be aware that the Owner expects the new pavement surfaces to be of the best quality and rideability. The Owner will implement standard methods of pavement testing as required. The cost for any re-testing shall be paid by the Contractor and deducted from his final payment. The Contractor shall repair any such portion or portions of the project not meeting specifications and acceptance.

1.16 The Contractor shall have full responsibility for obtaining and paying for all necessary permits required for construction of this project, including City and TxDOT. The Contractor is obligated to have a copy of the permits at the job site at all times. All permit special conditions must be followed, whether they are issued by state or city permits.

END OF SECTION

SECTION 015713
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.
B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
C. Restoration of areas eroded due to insufficient preventive measures.
D. Performance bond.
E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

A. Section 31 1000 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
B. Section 31 2200 - Grading: Temporary and permanent grade changes for erosion control.
C. Section 32 1123 - Aggregate Base Courses: Temporary and permanent roadways.
D. Section 03 3000 - Cast-in-Place Concrete: Concrete for temporary and permanent erosion control structures indicated on drawings.

1.03 REFERENCE STANDARDS

A. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).
B. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP), whether the project is required by law to comply or not.
B. Also comply with Texas Commission on Environmental Quality (TCEQ) rules and regulations.
C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
    1. Owner will obtain permits and pay for securities required by authority having jurisdiction.
    2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
E. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.
F. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
G. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
    1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

H. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

J. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

K. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

L. Open Water: Prevent standing water that could become stagnant.

M. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

PART 2 EXECUTION

2.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

2.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

2.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
c. Along the toe of cut slopes and fill slopes.
d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.

2. Space sediment barriers with the following maximum slope length upslope from barrier:
a. Slope of Less Than 2 Percent: 100 feet.
b. Slope Between 2 and 5 Percent: 75 feet.
c. Slope Between 5 and 10 Percent: 50 feet.
d. Slope Between 10 and 20 Percent: 25 feet.
e. Slope Over 20 Percent: 15 feet.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.
F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
G. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
H. Temporary Seeding: Use where temporary vegetated cover is required.

2.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:
1. Excavate minimum of 6 inches.
2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
3. Place and compact at least 6 inches of 1.5 to 3.5 inch diameter stone.

B. Silt Fences:
1. Store and handle fabric in accordance with ASTM D4873.
2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
3. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
4. Install with top of fabric at nominal height and embedment as specified.
5. Embed bottom of fabric in a trench on the upslope side of fence, with 2 inches of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.
6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
7. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Temporary Seeding:
1. When hydraulic seeder is used, seedbed preparation is not required.
2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
5. Incorporate fertilizer into soil before seeding.
6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

2.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
B. Repair deficiencies immediately.
C. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
D. Clean out temporary sediment control structures weekly and relocate soil on site.
E. Place sediment in appropriate locations on site; do not remove from site.

2.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
B. Clean out temporary sediment control structures that are to remain as permanent measures.
C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 01 5713

SECTION 01 5723
TEMPORARY STORM WATER PREVENTION CONTROL

BMP - BEST MANAGEMENT PRACTICES
CSN -CONSTRUCTION SITE NOTICE- (NOI- CSN FOR LARGE SITES; CSN FOR SMALL SITES).
NOI & NOT - NOTICE OF INTENT AND NOTICE OF TERMINATION FOR TPDES PERMITS.
SWPPP - STORM WATER POLLUTION PREVENTION PLAN
TCEQ - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
TPDES - TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM
LARGE CONSTRUCTION ACTIVITIES - CONSTRUCTION ACTIVITIES INCLUDING CLEARING, GRADING AND EXCAVATING THAT RESULT IN LAND DISTURBANCE OF EQUAL TO OR GREATER THAN FIVE (5) ACRES.
SMALL CONSTRUCTION ACTIVITIES - CONSTRUCTION ACTIVITIES INCLUDING CLEARING, GRADING AND EXCAVATING THAT RESULT IN LAND DISTURBANCE OF EQUAL TO OR GREATER THAN ONE (1) ACRE AND LESS THAN FIVE (5) ACRES OF LAND.

8.01 RELATED DOCUMENTS AND APPLICABLE WORK

A. The TCEQ TPDES General Permit No. TXR150000, March 5, 2008 and the project SWPPP. This specification requires compliance with all provisions of the TCEQ with regards to the TPDES permit. The TCEQ requirements currently pertain to large construction activities of five (5) acres or more and small construction activities which disturb one (1) to less than five (5) acres.
   1. Information to Respondents, Agreement, and Special Conditions shall be carefully read for provisions pertaining to this work. In the event of conflict, the better quality or greater quantity shall prevail.
   2. The work described in this section is applicable to any and all sections of the Contract Documents. Any and all work that would disturb the existing site conditions or present the potential for site run-off shall adhere fully to this specification section.
   3. Unless specifically notified to the contrary by the Owner, in writing, all aspects of this specification shall apply to this project.

B. CONTRACTOR RESPONSIBILITIES
   1. This project requires implementation of storm water “Best Management Practices” (BMP) for control devices and monitoring by the Contractor to comply with all provisions of the Storm Water Pollution Prevention Plan (SWPPP) developed for the project by the licensed civil engineer. The Contractor must fulfill all Texas Pollutant Discharge Elimination System (TPDES) regulatory requirements, including the filing of a NOI and NOT or signing and posting of the Construction Site Notice (CSN).
   2. The Contractor shall provide signatures of a corporate Officer for the NOI, NOI-CSN, CSN and NOT and any other forms or applications as required by the TPDES General Permit TXR150000. The Contractor shall also provide delegated authorization to sign reports per 30 TAC 305.128. Individuals conducting site inspections shall be qualified to the satisfaction of the Owner.
   3. When the Contractor receives the approved SWPPP from the Owner, the Contractor signs the NOI and/or CSN (see Sample form in Part 4 of this section) and forwards it to the Owner. Two separate $325 application fees (one for the Owner and one for the Contractor) must accompany the NOI. The Owner signs his NOI and sends both NOI’s and application fees to TCEQ. The Contractor shall insert a copy of the signed NOI or CSN into the SWPPP booklet to be kept at the

jobsite. The $325 application fees are not required for Small Construction Sites or CSN sites.

4. The SWPPP booklet kept at the jobsite shall also contain the following:
   a. 1.3.4.1 A letter delegating signature authority to the field personnel for both the
      1) Contractor and the Owner.
         (a) 1.3.4.2 A copy of TPDES permit when received.
         (b) 1.3.4.3 A copy of the Construction Site Notice (Large or Small).
         (c) 1.3.4.4 A copy of the Shared SWPPP Acceptance Certification form.
   b. The Contractor shall review SWPPP and verify existing conditions at the site before determining scope of implementation of site controls. Site survey and site plan drawings shall be used for additional reference. The Contractor shall notify the Owner, in advance, of this site review to allow for Owner participation.
   c. The Contractor shall construct a Project SWPPP sign and place it at the main entrance to the project site. This sign shall include the NOI and TPDES permit along with the TCEQ TPDES Large Construction Site Notice (NOI-CSN); or the Construction Site Notice (CSN) for small construction projects. The sign shall be constructed as detailed in the sample SWPPP sign drawing included in Part 4 of this Section.
   d. Contractor shall contact Construction Inspector (CI) for review of initial site controls in place prior to commencing site-disturbing activities, to ensure that any unusual circumstances or unforeseen site conditions with regard to erosion and
      1) sedimentation have been addressed. The Contractor shall complete the SWPPP Project Start-up form (see Sample in Part 4 of this Section)) and review it with the Owner before commencing soil disturbing activities. Both parties shall sign this form when the requirements listed in the SWPPP Project Start-up form have been met.
   e. The Contractor shall provide all material, labor, equipment and services required to implement, maintain and monitor all erosion and sedimentation controls in compliance with the Storm Water Pollution Prevention Plan (SWPPP). All controls implemented by the Contractor shall comply with the Texas Pollutant Discharge Elimination System (TPDES) regulations as issued by the Texas Commission on Environmental Quality (TCEQ) on March 5, 2008. These controls shall remain in operation until project completion and reestablishment of the site or longer as directed by the RCM. The work shall include, but not be limited to the following:
      1) 1.3.8.1 All earthwork as required to implement swales, dikes, basins and other excavations for temporary routing of utilities, to protect against erosion or sediment-laden (“polluted”) storm water runoff.
      2) 1.3.8.2 All structural controls as shown or specified, including silt fences, sediment traps, stabilized construction entrance, subsurface drains, pipe slope drains, inlet/outlet protection, reinforced soil retention, gabions, rock berms, etc
      3) 1.3.8.3 All non-structural controls as shown or specified, including temporary or permanent vegetation, mulching, geotextiles, sod stabilization, preservation of vegetative buffer strips, preservation/protection of existing trees and other mature vegetation.

4) 1.3.8.4 All modifications and revisions to SWPPP necessary to meet changing site conditions and to address new sources of storm water discharges, as the work progresses.
5) 1.3.8.5 All maintenance and repair of structural and non-structural controls in place shall continue until final stabilization is achieved or as directed by the RCM.
6) 1.3.8.6 Weekly site inspections, as required by the SWPPP, of pollutant sources, including hazardous sources, structural and non-structural controls, and all monitoring of SWPPP revisions and maintenance of inspection records.
7) 1.3.8.7 Removal of all structural and non-structural controls as necessary upon completion, and only after final stabilization is achieved.
8) 1.3.8.8 Filing of Notice of Termination (NOT) with the RCM within 30 days of final stabilization being achieved and is approved by the Owner, or of another Operator assuming control of the unstabilized portions of the site.
9) 1.3.8.9 Refer to the SWPPP for additional requirements to ensure compliance with
(a) TPDES regulations.

5. QUALITY ASSURANCE
   a. In order to minimize the discharge of pollutants to storm water, the Contractor shall implement all permanent and temporary site controls according to Texas Pollutant Discharge Elimination System (TPDES) Guidelines, as set forth by the Texas Commission on Environmental Quality.
   b. Implementation of site controls shall be performed by a qualified contractor experienced in the proper installation of such devices in accordance with manufacturers' specifications, and in keeping with recognized Best Management Practices (BMP's), and in keeping with TPDES regulations. Qualification of installing Contractor shall be reviewed with the Owner prior to entering into a contract with them for services.
   c. The Contractor shall inspect all BMP's at regular intervals as specified in the Storm Water Pollution Prevention Plan for this project. Use standard Owner Inspection forms (see form at the end of this Section) for each inspection. Record all deficiencies of site controls, and take immediate action to correct any deficiencies recorded. Keep records of inspections current and on file, available for review by EPA, TCEQ, MS4 operator and Owner.
6. SUBMITTALS
   a. Submittals of products used in structural and non-structural controls shall be made through established procedures for review and approved by the Owner prior to installation on the site. The Contractor shall make available physical samples and product literature on any material used in structural or non-structural controls during the course of the project prior to its implementation in the field.

PART 2 - PRODUCTS

MATERIALS

10.01 SPECIFIC SITE CONTROL DEVICES ARE IDENTIFIED IN THE SWPPP. WHERE SUCH DEVICES ARE INDICATED, THEIR MATERIAL COMPOSITION SHALL COMPLY WITH THIS SECTION.

A. Materials to be used in structural and non-structural site controls shall include, but not be limited to the following:

1. 2.1.1.1 Silt Fences: implemented to filter, and remove sediment from storm water shall be composed of the following materials:
   a. Geotextile fabric - a non-woven, polypropylene, polyethylene, or polyamide fabric with non- raveling edges. It shall be non- biodegradable, inert to most soil chemicals, ultraviolet resistant, unaffected by moisture and other weather conditions, and permeable to
      1) water while retaining sediment. Fabric shall be 36 inches wide, with a minimum weight of 4.5 oz/yd.
         (a) Posts - steel fence posts shall be made of hot rolled steel, galvanized or painted, a minimum of 4 feet long, with a Y-bar or TEE cross-section of sufficient strength to withstand forces implied.
            (1) Wire Backing - a galvanized, 2"x4", welded wire fencing, 12 gauge minimum.

            Width shall be sufficient to support geotextile fabric 24 inches above adjacent grades. Chain link fences located along the same lines as silt fences, may be use to support geotextile fabric. In this circumstance, the geotextile fabric shall be firmly attached to fence.
         (b) 2.1.1.2 Triangular filter dikes: for use on surfaces or in locations where standard silt fence cannot be implemented, shall be composed of the following:
            (1) Geotextile fabric - a non-woven, polypropylene, polyethylene, or polyamide fabric with non raveling edges, in a minimum width of 60 inches.
            (2) Dike Structure - 6 gauge, 6x6 welded wire mesh, 60 inches wide, folded into a triangular form. Each side shall be 18 inches with an overlap of 6 inches.
            (3) Ties - metal shoat rings or standard wire/cable ties for attachment of wire mesh to itself, and for attachment of geotextile fabric to wire mesh.
         (c) 2.1.1.3 Stabilized construction exit: A steel grid that allows the safe passage of vehicles while agitating the tires to loosen and remove the soil build up. The grid or structures shall conform to the following:
            (1) It shall consist of pipes or tubes spaced such that there is a minimum clear distance between the pipes or tubes of 4 ½". It shall be elevated above the ground surface a minimum of 8" to allow water, debris and soil to drain.
            (2) Minimum diameter of pipe or tube shall be 3".
            (3) It shall be designed to support any and all vehicles entering and leaving the construction site.
            (4) It shall be firmly placed in the ground at the exit.
            (5) It shall be of sufficient length so that the agitation will remove the soil from the tires or a minimum of 8'-0".
            (6) At the "street side" approach of the grid there shall be an impervious surface or it shall consist of 3" to 5" diameter angular crushed stone/rock approximately 5'-0" in length, minimum, and 8" deep, minimum. On the "job site" side of the grid, there shall be 3" to 5" diameter angular crushed stone/rock 15"-0" in length, minimum, 8" deep, minimum. The steel grid will be between the "street side" approach and the job site crushed

stone/rock. All crushed stone/rock shall have filter fabric beneath the stone/rock. See diagram on Exhibit F.

(7) Steel grid area shall be used as the tire wash area. When tire wash is in use (rainy or muddy days) the area shall be manned and the tires shall be washed using a high pressure hose/nozzle.

(8) The area beneath the grid shall be sloped such that debris, soil and water shall be diverted back on to the construction site or to a sediment basin. No water, soil or debris shall leave the construction site. The resulting discharge shall be disposed of properly.

(d) 2.1.1.4 Rock Berms: shall be composed of the following materials:

(e) Rock - clean open graded rock, with a maximum diameter of 3 inches. b. Wire Mesh Support - a galvanized, woven wire sheathing having a maximum opening size of 1 (one) inch, and a minimum wire diameter

(1) of 20 gauge.

(2) Ties - metal shoat rings or standard wire/cable ties.

(f) 2.1.1.5 Concrete Truck Washout (self installed): shall be used for containment of fluids from concrete truck washout wastes.

(1) Gravel bags, concrete blocks or open graded rock b. 10 mil plastic sheeting

(g) 2.1.1.6 Temporary Storage Tanks: shall be used for temporary storage of fuels on the construction project site

(1) 2 inches of sand on the bottom of the containment area b. 6 mil plastic sheeting

(2) 2 inches of sand on top of the plastic sheeting

(h) 2.1.1.7 Erosion Control Matting: shall be used on steep slopes, in drainage swales, and in high traffic pedestrian areas of barren soil. It shall include one or more of the following:

(1) Jute Mat - a plain fabric made of jute yarn, woven in a loose and simple manner, with a minimum unit weight of 2.7 pounds per square yard. Width shall be as required for the dimensions of the area to be covered.

(2) Wood Fiber Mat - a mat composed of wood fibers, which are encased in nylon, cotton or other type of netting.

(3) Synthetic Webbing Mat - a mat manufactured from polyvinyl chloride or polypropylene monofilament, which are bonded together into a three-dimensional web to facilitate erosion control and/or re- vegetation.

(i) 2.1.1.8 Organic mulches: shall be used for covering bare soil, retaining moisture under existing vegetation being preserved, and for absorbing the energy of compaction caused by foot or vehicular traffic. Mulch shall be one or more of the following:

(1) Straw - from broken straw bales that are free of weed and grass seed where the grass from the seed is not desired vegetation for the area to be protected.

(2) Wood Chips - from chipped limbs of cleared trees on site, or delivered in chipped form, in bulk quantities of pine, cedar or cypress. Wood chips of all species shall be partially decomposed

to alleviate nitrogen depletion of the soil in areas where existing vegetation is to be preserved and protected.

(3) Shredded Mulches - from pine, cypress or cedar, mechanically shredded, and capable of forming an interlocking mat following placement, and after sufficient wetting and drying has taken place naturally.

(j) 2.1.1.9 Any other materials indicated in SWPPP.

PART 3 - EXECUTION

GENERAL

12.01 THE CONTRACTOR SHALL PROVIDE A COMPLETE INSTALLATION OF ALL SITE CONTROL DEVICES AND MEASURES (BMPS). INDICATED IN THE SWPPP BOOKLET, INCLUDING THE SITE EROSION AND SEDIMENTATION CONTROL DRAWING AND AS SPECIFIED HEREIN. THESE BMPS MUST BE CONFIRMED AS FULLY OPERATIONAL WITH THE OWNER BEFORE ANY WORK THAT DISTURBS THE SITE CAN BEGIN.

12.02 THE CONTRACTOR SHALL PROVIDE INSPECTION AND MONITORING OF CONTROLS IN PLACE AND SHALL PERFORM ALL REVISIONS AND UPDATING OF SWPPP BOOKLET. AN ACCURATE, CHRONOLOGICAL RECORD OF ALL CONTRACTOR INSPECTIONS REVISIONS AND ADDITIONAL CONTROLS SHALL BE KEPT ON FILE AT THE PROJECT SITE, FOR REVIEW, WITH A COPY OF THE SWPPP BOOKLET.

12.03 THE CONTRACTOR SHALL SUBMIT THEIR NOTICE OF TERMINATION (NOT) TO THE OWNER AFTER ALL DISTURBED AREAS ARE RE-ESTABLISHED (STABILIZED) WITH VEGETATIVE COVER FOLLOWING COMPLETION OF CONSTRUCTION. FOLLOWING ACCEPTANCE OF STABILIZED AREAS, ALL SITE CONTROLS THAT ARE NO LONGER NECESSARY SHALL BE REMOVED.

A. CONTROL DEVICES

B. Execution of specific site control devices is described in the following paragraphs. Refer to the SWPPP for applicable devices, extent and location.

1. SILT FENCE

a. 3.2.1.1 Silt fences shall consist of non-woven geotextile fabric, attached to wire fabric backing to support the geotextile. The wire fabric should be galvanized 2" x

1) 4" welded wire, 12-gauge minimum. Attach non-woven geotextile fabric to fence with shoat or standard cable/wire ties, leaving a "toe" of fabric at the

2) bottom of the fence of not less than 6 (six) inches. Steel posts as specified shall be driven to a depth of 1 (one) foot minimum, and spaced not more than

3) 6 (six) feet on center. Tilt posts slightly, in an "uphill" direction for additional strength. Attach fencing to posts with standard cable/wire ties. Dig a 6 (six) inch deep by 6 (six) inch wide trench on the disturbed side of the fence, bury geotextile fabric in trench, backfill and tamp. Abutting ends of geotextile fabric shall be overlapped a minimum of 12 (twelve) inches.

(a) 3.2.1.2 Maintain silt fence daily as necessary to repair breaches in geotextile fabric.

(1) Maintain steel posts as specified in tilted condition. When siltation has occurred, it shall be removed when it has reached a depth of 6 (six) inches. Silt that has been removed shall be disposed of off site.

(b) 3.2.1.3 Remove silt fence when the disturbed areas protected by silt fence have been completely stabilized as specified. Minimize site disturbance while removing silt fence and posts.

b. CURB INLET PROTECTION
   1) 3.2.2.1 Cover curb storm inlet with non-woven geotextile fabric covered wire fabric.
      (a) Wire fabric to be 2"X4" - W1.4XW1.4. Extend fabric 2(two) feet beyond inlet opening at each end and 12" (twelve) in front of opening in the gutter. Remove strip of filter fabric apx. 2 1/2" (two and one half) high for the length of the protection to act as overflow. Extend fabric over the top of opening to allow placement of gravel bags. Anchor fabric with 20 lb. gravel bags placed 3 (three) feet on center.
      (b) 3.2.2.2 Maintain inlet protection daily as necessary to repair breaches in geotextile fabric. When siltation has occurred, it shall be removed when it has reached a depth of 2 (two) inches. Silt that has been removed shall be disposed of off site.
c. STABILIZED CONSTRUCTION EXIT
   1) 3.2.3.1 A steel grid that allows the safe passage of vehicles while agitating the tires to loosen and remove the soil build up. The grid or structures shall conform to the following:
      (a) It shall consist of pipes or tubes spaced such that there is a minimum clear distance between the pipes or tubes of 4 ½". It shall be elevated above the ground surface a minimum of 8" to allow water, debris and soil to drain.
      (b) Minimum diameter of pipe or tube shall be 3".
      (c) It shall be designed to support any and all vehicles entering and leaving the construction site.
      (d) It shall be firmly placed in the ground at the exit.
      (e) It shall be of sufficient length so that the agitation will remove the soil from the tires or a minimum of 8'-0".
      (f) At the "street side" approach of the grid there shall be an impervious surface or it shall consist of 3" to 5" diameter angular crushed stone/rock approximately 5'-0" in length, minimum, and 8" deep, minimum. On the "job site" side of the grid, there shall be 3" to 5" diameter angular crushed stone/rock 15"-0" in length, minimum, 8" deep, minimum. The steel grid will be between the "street side" approach and the job site crushed stone/rock. All crushed stone/rock shall have filter fabric beneath the stone/rock. See diagram on Exhibit F.
      (g) Steel grid area shall be used as the tire wash area. When tire wash is in use (rainy or muddy days) the area shall be manned and the tires shall be washed using a high pressure hose/nozzle.
      (h) The area beneath the grid shall be sloped such that debris, soil and water shall be diverted back on to the construction site or to a sediment basin. No water, soil or debris shall leave the construction site. The resulting discharge shall be disposed of properly.
d. ROCK BERM
   1) 3.2.4.1 Rock berm shall consist of rip-rap type rock, secured within a wire sheathing as specified, and installed at the toe of slopes, or at the perimeter of developing or disturbed areas. Height of berm shall be a

minimum of 18 (eighteen) inches from top of berm to uphill toe of berm. Top width shall be a minimum of 24 (twenty four) inches, with side slopes of 2:1 or flatter. Uphill toe of berm shall be buried a minimum of 4 (four) inches into existing grade. Rock berm shall have a minimum flow-through rate of 60 (sixty) gallons per minute, per square foot of berm face.

2) 3.2.4.2 Maintain rock berm in a condition that allows the sediment to be removed, when the depth of sediment has reached 1/3 (one third) the height of the berm.

Berm shall be reshaped as needed, and silt buildup removed, to maintain specified flow through berm.

3) 3.2.4.3 Rock berm shall be removed when the disturbed areas served have been stabilized as specified.

e. CONCRETE TRUCK WASHOUT (SELF INSTALLED)

1) 3.2.5.1 Concrete Truck Washout (self installed) shall be constructed so that it will be able to accommodate the maximum number of anticipated concrete trucks that will be cleaned on any given day at any given time using 7 gallons of water being used for washout per truck or 50 gallons of water being used to wash out pump trucks.

The area utilized to contain the wash water and concrete solids cleaned from the trucks will be a minimum of 10 feet in width. The containment area will be covered with 10 mil plastic sheeting without any holes or tears and the seams shall be sealed according to manufacturer's recommendations. The gravel bags, concrete blocks or open graded rocks shall line the outside perimeter and shall be double wrapped

(a) with the 10 mil plastic sheeting to prevent any potential for runoff from the containment area.

(b) 3.2.5.2 The concrete truck washout containment area shall be maintained in a condition that will not allow concrete build up within the containment area to exceed 50% of the storage capacity.

(c) 3.2.5.3 The concrete truck washout area will be removed when it is no longer necessary to wash out concrete trucks on the site.

f. TEMPORARY STORAGE TANKS

1) 3.2.6.1 Must be located in a bermed containment area. The berm must be a minimum 3 feet in all directions, and the height of the berm must contain the maximum contents of the largest tank plus 8 inches (approximately 110% of the tank capacity). The containment area is constructed by beginning with a

(a) 2 inch sand pad, and then covered with 6 mil plastic or rubber sheeting. The sheeting is then covered with another 2 inch layer of sand. The plastic sheeting is secured to the outer berm.

(b) 3.2.6.2 Storage tanks are to be placed no closer than 50 feet from a building or property line.

(c) 3.2.6.3 If using tanks with a gravity feed type set up, the containment must be of sufficient size to be able to contain the tank if it should fall over

(d) 3.2.6.4 There must be a fusible link at the valve that will shut off the flow to the hose in the event of a fire

(e) 3.2.6.5 There must be sufficient cover for the tank and the containment area to prevent potential stormwater runoff

(f) 3.2.6.6 The area within the containment area is to be kept free and clear of spills, if a spill occurs then the sand is to be removed and replace with a fresh layer of sand.

(g) 3.2.6.7 The storage tank containment area is to be removed from the site once it has been determined that it will no longer be used on the construction site.

g. DIVERSION DIKE

1) 3.2.7.1 Diversion dikes shall be formed and shaped using compacted fill, and shall not intercept runoff from more than 10 (ten) acres. Dike shall have a minimum top width of 24 (twenty four) inches, and a minimum height of 18 (eighteen) inches. Soil shall have side slopes of 3:1 or flatter, and shall be placed in 8 (eight) inch lifts. Compact soil to 95% standard proctor density. Where protected slopes exceed 2 (two) percent, the uphill side of diversion dike shall be stabilized with crushed stone or erosion control matting - to a

(a) distance of not less than 7 (seven) feet from toe of dike. The channel, which is formed by the diversion dike, must have positive drainage for its entire length to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure.

Storm water shall not be allowed to overflow the top of diversion dike at any point other than the stabilized outlet.

(b) 3.2.7.2 Maintain diversion dike in a condition that allows the storm water runoff to be diverted away from exposed slopes. Repair any failures at top of dike and remove sediment as necessary behind dike to allow positive drainage to a stabilized outlet.

(c) 3.2.7.3 Remove diversion dike when the expose slopes being protected are stabilized with vegetation or other permanent cover.

h. INTERCEPTOR SWALE

1) 3.2.8.1 Interceptor swale shall be implemented to prevent on or off-site storm water from entering a disturbed area, or prevent sediment-laden runoff from leaving the site or disturbed area. Interceptor swale shall be excavated as required by the SWPPP drawing/s, with side slopes of 3:1 or flatter. This shall include all labor and equipment associated with the installation and maintenance of the swale as shown on the construction documents. Constructed swale may be v-shaped or trapezoidal with a flat bottom, depending on the volume of water being channeled. Sediment laden runoff from swale shall be directed to a stabilized outlet or sediment-trapping device. Flow line of swale shall have a continuous fall for its entire length and shall not be allowed to overflow at any other point/s along its length.

2) 3.2.8.2 Maintain interceptor swale in a condition that allows the storm water runoff to be channeled away from disturbed areas. Remove sediment in swale as necessary to maintain positive drainage to a stabilized outlet.

3) 3.2.8.3 Fill in or remove swale after the disturbed area/s being protected is completely stabilized as specified.

i. EROSION CONTROL MATTING

1) 3.2.9.1 Remove all rocks, debris, dirt clods, roots, and any other obstructions, which would prevent the matting from lying in direct contact with the soil. 6 inch by 6 inch anchor trenches shall be dug along the entire

perimeter of the installation. Bury matting in trenches, backfill and compact. Fasten matting to the soil using 10 gauge wire staples, 6 inches in length and 1 inch wide. Use a minimum of one staple per 4 square feet of matting, and at 12 inches on center along all edges. Install parallel to flow of water and overlap joining strips a minimum of 12 inches.

2) 3.2.9.2 Maintain erosion control matting by repairing any bare spots. Missing or loosened matting shall be promptly replaced or re-anchored.
3) 3.2.9.3 Remove matting where protection is no longer required. In areas where permanent vegetation is established along with matting, matting can be left in place permanently.

j. 3.2.10 MULCHES
1) 3.2.10.1 Apply specified mulches in areas identified on the SWPPP, to a depth of 3 inches or as otherwise specified on the SWPPP drawing/s.

k. 3.2.11 BPM Details
l. 3.2.11.1 Refer to Exhibit's for the following BMP details:
1) 3.2.11.1.1 Exhibit "A" Area Inlet Detail
2) 3.2.11.1.2 Exhibit "B" Curb Inlet Detail
3) 3.2.11.1.3 Exhibit "C" Rock Berm Detail
4) 3.2.11.1.4 Exhibit "D" Silt Fence Detail
5) 3.2.11.1.5 Exhibit "E" Triangular Dike Detail
6) 3.2.11.1.6 Exhibit "F" Stabilized Construction Exit
7) 3.2.11.1.7 Exhibit "G" Concrete Truck Washout

C. INSPECTIONS AND RECORD KEEPING
1. Contractor shall inspect all BMP's on 7-day intervals. Coordinate inspections with CI, who is also required by TPDES to regularly inspect the site. Use standard Owner Inspection forms (see form in Part 4 of this Section) for each inspection. Record all deficiencies of site controls, and take appropriate action to correct any deficiencies recorded. Exception is rock berms located in a streambed. Any rock berm located in a streambed shall be inspected on a daily basis. Keep records of inspections current and on file, available for review by EPA, TCEQ, MS4 operator Representative and/or Owner's Representative/s.
2. Contractor shall keep records of all Contractor inspections on file with SWPPP booklet at project site, and make available for review by Owner's Representative/s or EPA, TCEQ or MS4 operator officials requesting review of SWPPP inspection records. One copy of each inspection report shall be delivered to the CI and the RCM's office.
3. Contractor shall keep records of all major grading and stabilization activities on file with the SWPPP booklet at the project site and make available for review by owner's representative(s), EPA, TCEQ, or MS4 operator officials requesting review of the SWPPP.
4. Contractor shall submit copies of all inspection records and the Major Grading and Stabilization Log and the Major Grading and Stabilization Log along with SWPPP booklet to the RCM at project completion.

D. MAINTENANCE
1. All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If through inspections the permittee determines that BMP's are not operating effectively, maintenance must be performed before the next anticipated storm event

or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed or otherwise rendered ineffective must be replaced or corrected immediately upon discovery.

E. PART 4 - SAMPLE FORMS
   1. The following forms or sketches are to be used by the Contractor in the execution of the work in this Section, in compliance with TPDES requirements and the SWPPP.
   2. Coordinate with the City of Pharr for any required SWPPP permit forms.
   3. Major Grading and Stabilization Log
   4. SWPPP Posting Sign for Main Construction Entrance for large construction site 5 acres or greater
   5. SWPPP Posting Sign for Main Construction Entrance for small construction site 1 to less than 5 acres
   6. Contact the Owner's representative for useable copies of these forms to be used in the execution of work in this section.
   7. TCEQ TPDES Notice of Intent (TCEQ NOI)
   8. TCEQ TPDES Construction Site Notice (CSN)
   9. TCEQ TPDES Notice of Termination (TCEQ NOT)
   10. TCEQ TPDES Large Construction Site Notice (NOI-CSN)
   11. Shared SWPPP Acceptance Certification form

END OF SECTION 01 5723

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.
B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
D. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
I. Return: To give back reusable items or unused products to vendors for credit.
J. Reuse: To reuse a construction waste material in some manner on the project site.
K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Product Requirements for substitution submission procedures.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See additional requirements for project meetings, reports, submittal procedures, and project documentation.
B. See additional requirements related to trash/waste collection and removal facilities and services.
C. See waste prevention requirements related to delivery, storage, and handling.
D. See trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
D. Meetings: Discuss trash/waste management goals and issues at project meetings.
    1. Pre-bid meeting.
    2. Pre-construction meeting.
    3. Regular job-site meetings.
E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
    1. Provide containers as required.
    2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
    3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 02 1000
SITE PREPARATION

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to prepare the site for construction, including the removal of trees and brush, and disposal of construction debris.

B. Remove existing buildings or structures as indicated or as specified herein, including foundations, concrete steps and sidewalks, septic tanks, fences, retaining walls, or other features either above or below ground level.

1.02 JOB CONDITIONS

A. Protect trees and landscaping not designated to be removed from damage. Contractor and Engineer shall visit the site and mark trees that are to remain. In the event that these trees are in close proximity to the construction, wrap trunks with 2 x 4 lumber and take precautions to prevent damage to limbs and root systems.

B. Except where further excavation extends beyond the cavities resulting from work performed under this section, fill holes with appropriate backfill material and tamp to the density of the surrounding undisturbed soil. Finish the site by blading or other methods to smooth the area, remove ditches, mounds, or other natural or man made irregular features. Blend grades together in a smooth uniform manner.

C. Felled trees, brush, lumber, concrete, and other debris shall become the property of the Contractor and shall be promptly removed from the site. No burning will be permitted on site.

2.00 PRODUCTS [Not Used]

3.00 EXECUTION

3.01 TREES AND BRUSH

A. Remove trees and brush of all sizes and description within the limits of construction. Cut trees approximately 12" above ground line and grub out and remove the remaining stumps and roots. Remove root systems larger than 2" diameter to a point 12" below the lowest foundation line.

B. Scrape the entire site within the limits of construction, including structures, building, streets, parking lots or other pavements clear of brush, under-growth, or other vegetation.

3.02 REMOVAL OF STRUCTURES

Remove any concrete or masonry structures within the limits of the construction, or as otherwise indicated, including concrete slabs, foundations, brick or other masonry work, concrete steps, sidewalks, pavements, curbs and gutters, or other components.

3.03 UNDERGROUND STRUCTURES

A. Remove underground structures such as abandoned manholes, vaults, septic tanks and distribution field piping, inlets, buried trash, or debris.

B. Take precautions during excavation procedures to guard against damage to active underground piping. In the event that inactive or abandoned pipelines are uncovered, determine that the lines are inactive, then remove buried piping within the limits of construction, or 4'-0" beyond the limits of buildings or other structures, or as needed to clear excavations. Plug both ends of such abandoned piping with concrete plugs.

C. Remove underground obstructions to a minimum depth as follows:

1. Parking Lots and Drives - 2 ft below natural grade or 12" below sub-base, whichever is greater.
2. Under buildings or structures - 2 ft below the lowest footing.
3. All other areas - 1 ft below natural or finish grade, whichever is greater.

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.
B. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01 5723 Temporary Storm Water Pollution Controls
B. Section 01 5713 - Temporary Erosion and Sediment Control.
C. Section Execution and Closeout Requirements: Project conditions; protection of benchmarks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
E. Section 31 1000 - Site Clearing: Vegetation and existing debris removal.
F. Section 31 2200 - Grading: Topsoil removal.
G. Section 31 2200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
H. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
I. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
    1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
    2. Include a summary of safety procedures.
B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
    1. Minimum of 5 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 2323 - Fill.

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
    1. Obtain required permits.
    2. Comply with applicable requirements of NFPA 241.
    3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.

4. Provide, erect, and maintain temporary barriers and security devices.
5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
7. Do not close or obstruct roadways or sidewalks without permit.
8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.
D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
E. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.
F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
H. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.
I. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with the requirements of Section 01 7419 - Waste Management.
   2. Dismantle existing construction and separate materials.
   3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.02 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.03 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 7419 - Waste Management.
C. Leave site in clean condition, ready for subsequent work.
D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.

B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

D. ACI 347R - Guide to Formwork for Concrete; 2014.

E. PS 1 - Structural Plywood; 2009.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with Highways standards of the State of Texas.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

F. Comply with Highways standards of the State of Texas.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

C. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.05 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.06 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION 03 1000

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories.
B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
C. ACI SP-66 - ACI Detailing Manual; 2004.
D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
E. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement; 2006 (Reapproved 2011).
F. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
G. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
I. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement; 2006 (Reapproved 2011).
J. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
K. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.
L. CRSI (DA4) - Manual of Standard Practice; 2009.
M. CRSI (P1) - Placing Reinforcing Bars; 2011.

1.04 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
B. Reinforcing Steel Mat: ASTM A704/A704M, using ASTM A615/A615M, Grade 40 (40,000 psi) steel bars or rods, unfinished.
C. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.
D. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
    1. WWR Style: As indicated on drawings.
E. Reinforcement Accessories:
    1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
B. Welding of reinforcement is not permitted.

END OF SECTION 03 2000

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.
B. Floors and slabs on grade.
C. Concrete reinforcement.
D. Joint devices associated with concrete work.
E. Miscellaneous concrete elements, including equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
F. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
B. Section 03 2000 - Concrete Reinforcing.
C. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

A. TxDOT Item 420, Concrete Structures, Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2004 edition.
B. TxDOT Item 421, Hydraulic Cement Concrete, Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2004 edition.
C. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
D. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
E. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
F. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
G. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
H. ACI 305R - Hot Weather Concreting; 2010.
I. ACI 306R - Cold Weather Concreting; 2010.
J. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
K. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
L. ACI 347R - Guide to Formwork for Concrete; 2014.
M. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
N. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
O. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
P. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
Q. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
R. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
S. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
T. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.
U. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.
W. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.
X. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2014.
Y. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2010a (Reapproved 2015).
Z. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2014.
AA. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
AB. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).

1.04 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Mix Design: Submit proposed concrete mix design.
C. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with Item 420 TxDOT 2004 Standard Specifications.
B. Perform work in accordance with Item 421 TxDOT 2004 Standard Specifications.
C. Perform work of this section in accordance with ACI 301 and ACI 318.
    1. Maintain one copy of each document on site.
D. Follow recommendations of ACI 305R when concreting during hot weather.
E. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.
B. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
C. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
    1. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 2000.
B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
C. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
    1. WWR Style: As indicated on drawings.
D. Reinforcement Accessories:
    1. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

A. Provide concrete materials in accordance with Item 421 TxDOT 2004 Standard Specifications.
B. Cement: ASTM C150/C150M, Type I - Normal Portland type.

C. Fine and Coarse Aggregates: ASTM C 33.
D. Fly Ash: ASTM C618, Class C or F.
E. Calcined Pozzolan: ASTM C618, Class N.
F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
G. Water: Clean and not detrimental to concrete.
H. Fiber Reinforcement: ASTM C1116/C1116M.

2.04 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.
   2. Material: ASTM D1752 sponge rubber (Type I).
   3. Material: Closed-cell, non-absorbent, compressible polyethylene or polymer foam in sheet form.
   4. Manufacturers:
      a. W.R. Meadows, Inc; Fiber Expansion Joint Filler with Snap-Cap: www.wrmeadows.com.
      b. W.R. Meadows, Inc; Deck-O-Foam Joint Filler with pre-scored top strip: www.wrmeadows.com.
C. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.

2.05 CONCRETE MIX DESIGN

A. Mix design in accordance with Item 421 TxDOT 2004 Standard Specifications.
B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.
C. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 pounds per square inch.

2.06 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Comply with requirements of Item 420 TxDOT 2004 Standard Specifications.
B. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.
B. Place concrete for floor slabs in accordance with ACI 302.1R.
C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.03 SLAB JOINTING

A. Locate joints as indicated on the drawings.
B. Anchor joint fillers and devices to prevent movement during concrete placement.
C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
E. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.
F. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.04 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 feet.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
   3. Under Carpeting: 1/4 inch in 10 feet.
B. Correct the slab surface if tolerances are less than specified.
C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.05 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.
B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
C. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Final Curing: Begin after initial curing but before surface is dry.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.
C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
D. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.08 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
B. Repair or replacement of defective concrete will be determined by the Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

3.09 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION 03 3000

SECTION 03 3300
REINFORCING STEEL

PART 1 - GENERAL

1.01 This work shall consist of the furnishing and placing of reinforcing steel, deformed and smooth, of the size and quantity indicated and in accordance with these specifications.

PART 2 - PRODUCTS

2.01 BARS

A. Bar reinforcement shall be deformed and shall conform to ASTM A 615, A 616, Grades 40, 60 or 75 and shall be open-hearth, basic oxygen or electric furnace new billet steel, unless otherwise indicated. Large diameter new billet steel (Nos. 14 and 18), Grade 75, will be permitted for straight bars only.

B. Where bending of bar sizes No. 14 or No. 18 of Grades 40 or 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM specification. The required bend shall be 90 degrees at a minimum temperature of 60 F around a pin having a diameter of 10 times the nominal diameter of the bar and shall be free of cracking.

C. Spiral reinforcement shall be either smooth or deformed bars or wire of the minimum diameter indicated. Bars for spiral reinforcement shall comply with ASTM A 675, A 615 or A 617. Wire shall comply with ASTM A 82. The minimum yield strength for spiral reinforcement shall be 40,000 psi.

D. In cases where the provisions of this item are in conflict with the provisions of the ASTM Designation to which reference is made, the provisions of this item shall govern.

E. Report of chemical analysis showing the percentages of carbon, manganese, phosphorus and sulfur will be required for all reinforcing steel when it is to be welded, except for drill shafts. No tack welding will be allowed. All welding shall conform to the requirements of AWS D-1-72.

F. The nominal size and area and the theoretical weight (lbs) of reinforcing steel bars covered by these specifications are as follows:

BAR SIZE NUMBER	NOMINAL DIAMETER INCHES	NOMINAL AREA SQUARE INCHES	WEIGHT PER LINEAR FOOT
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.65
18	2.257	4.00	13.60

G. Smooth bars, larger than No. 4, may be steel conforming to the above or may be furnished in any steel that meets the physical requirements of ASTM A36.

H. Smooth, round bars shall be designated by size number through No. 4. Smooth bars above No. 4 shall be designated by diameter in inches.

2.03 WELDED WIRE FABRIC

A. Wire for fabric reinforcement shall be cold-drawn from rods hot-rolled from open-hearth, basic oxygen or electric furnace billet. Wire shall conform to the requirements of the standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement, ASTM A82 or A 496. Wire fabric, when used as reinforcement, shall conform to ASTM A 185 or A 497.

B. When wire is ordered by size numbers, the following relations between size number, diameter in inches and area shall apply unless otherwise indicated:

SIZE W NUMBER	NOMINAL DIAMETER (INCH)	NOMINAL AREA SQUARE INCHES
31	0.628	0.310
30	0.618	0.300
28	0.597	0.280
26	0.575	0.260
24	0.553	0.240
22	0.529	0.220
20	0.505	0.200
18	0.479	0.180
16	0.451	0.160
14	0.391	0.140
12	0.391	0.120
10	0.357	0.100
8	0.319	0.080
7	0.299	0.070
6	0.276	0.060
5.5	0.265	0.055
5	0.252	0.050
4.5	0.239	0.045
4	0.226	0.040
3.5	0.211	0.035
3	0.195	0.030
2.5	0.178	0.025
2	0.160	0.020
1.5	0.138	0.015
1.2	0.124	0.012
1	0.113	0.010
0.5	0.080	0.005

C. When deformed wire is required, the size number shall be preceded by D and for smooth wire the prefix W shall be shown.

2.04 CHAIRS AND SUPPORTS

A. Chairs and Supports shall be steel, precast mortar or concrete block cast in molds meeting the approval of the ENGINEER of sufficient strength to position the reinforcement as indicated when supporting the dead load of the reinforcement, the weight of the workers placing concrete and the weight of the concrete bearing on the steel.

B. Chairs shall be plastic coated when indicated.

C. Chair types and uses shall be as follows:

Structural or Architectural Elements (columns, beams, walls, slabs) subjected to feet. sand blasting, water blasting or grinding.	Galvanized steel or steel chairs with plastic coated exposed to weather, not
Structural or Architectural Elements exposed to weather and subject to sand blasting, water blasting or grinding.	Stainless steel chairs.
Structural or Architectural Elements exposed to weather or corrosive conditions.	Uncoated steel chairs.

Slabs and grade beams cast on grade. Steel chairs with a base with 9 inch^2 minimum area or sufficient area to prevent the chair from sinking into fill or subgrade. Precast mortar or concrete blocks meeting the requirements of this item may be used.

2.05 BENDING

A. The reinforcement shall be bent cold, true to the shapes indicated. Bending shall preferably be done in the shop.

B. Irregularities in bending shall be cause for rejection.

C. Unless otherwise indicated, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as follows:

1. Bends of 90 degrees and greater in stirrups, ties and other secondary bars that enclose another bar in the bend:

Bar Number	Grade 40	Grade 50
3, 4, 5	3d	4d
6, 7, 8	4d	5d

2. All bends in main bars and in secondary bars not covered above:

Bar Number	Grade 40	Grade 60	Grade 75
3 - 8	6d	6d	--
9, 10	8d	8d	--
11	8d	8d	8d
14, 18	10d	10d	--

2.06 STORAGE

A. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust.

B. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations.

C. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross sectional area and tensile

properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel indicated.

2.07 SPLICES

A. No splicing of bars, except when indicated or specified herein, will be permitted without written approval of the ENGINEER.

B. No substitution of bars will be allowed without the approval of the ENGINEER. Any splicing of substituted bars shall conform to Table 03330-1.

C. Splices not indicted will be permitted in slabs no more than 15 inches in thickness, columns, walls and parapets, but not included for measurement, subject to the following:

1. Splices will not be permitted in bars 30 feet or less in plan length.
2. For bars exceeding 30 feet in plan length, the distance center to center of splices shall not be less than 30 feet minus 1 splice length, with no more than 1 individual bar length less than 10 feet.
3. Splices not indicated, but permitted hereby, shall conform to Table 03330-1. The specified concrete cover shall be maintained at such splices and the bars placed in contact and securely tied together.

Table 03330-1
Minimum Lap Requirements

Bar Number		Grade 40		Grade 60	
No.	3	1 foot	0 inches	1 foot	4 inches
No.	4	1 foot	2 inches	1 foot	10 inches
No.	5	1 foot	5 inches	2 feet	3 inches
No.	6	1 foot	9 inches	3 feet	0 inches
No.	7	2 feet	4 inches	4 feet	0 inches
No.	8	3 feet	0 inches	5 feet	3 inches
No.	9	3 feet	10 inches	6 feet	8 inches
No.	10	4 feet	10 inches	8 feet	5 inches
No.	11	5 feet	11 inches	10 feet	5 inches

D. Spiral steel shall be lapped a minimum of 1 turn. Bar No. 14 and No. 18 may not be lapped.

E. Welding of reinforcing bars may be used only where indicated or as permitted herein. all welding operations, processes, equipment, materials, workmanship and inspection shall conform to the requirements indicated. All splices shall be of such dimension and character as to develop the full strength of the bar being spliced.

F. End preparation for butt welding reinforcing bars shall be done in the field, except Bar No. 6 and larger shall be done in the shop. Delivered bars shall be of sufficient length to permit this practice.

G. For box culvert extensions with less than 1 foot of fill, the existing longitudinal bars shall have a lap with the new bars as shown in Table 03330-1.

H. For box extensions with more than 1 foot of fill, a minimum lap of 6 inches will be required.

I. Unless otherwise indicated, dowel bars transferring tensile stress shall have a minimum embedment equal to the minimum lap requirements shown in Table 03330-1.

J. Shear transfer dowels shall have a minimum embedment of 12 inches.

PART 3 - EXECUTION

3.01 PLACING

A. Reinforcement shall be placed as near as possible in the position indicated. Unless otherwise indicated, dimensions shown for reinforcement are to the center of the bars.

B. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch.

C. Cover of concrete to the nearest surface of steel shall be as follows:

Item	Minimum Cover Inches
1. Concrete cast against and permanently exposed to earth.	3
2. Concrete exposed to earth or weather:	
Bar No. 6 through 18 bars	2
Bar No. 5, W31 or D31 wire and smaller	1 1/2
3. Concrete not exposed to weather or in contact with ground:	
(slabs, walls, joists)	
Bar No. 14 and 18	1 1/2
Bar No. 11 and smaller	1
(Beams, columns)	
Primary reinforcement, ties, stirrups, spirals	1 1/2
(Shells, folded plate members)	
Bar No. 6 and larger	1
Bar No. 5, W31 or D31 wire, and smaller	1

D. Vertical stirrups shall always pass around the main tension members and be attached securely thereto. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers or approved precast mortar or concrete blocks. For approval of plastic spacers on a project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.

E. All reinforcing steel shall be tied at all intersections, except that where spacing is less than 1 foot in each direction, alternate intersections only need be tied. For reinforcing steel cages for other structural members, the steel shall be tied at enough intersections to provide a rigid cage of steel. Mats of wire fabric shall overlap each other 1 full space as a minimum to maintain a uniform strength and shall be tied at the ends and edges.

F. Where prefabricated deformed wire mats are specified or if the CONTRACTOR requests, welded wire fabric may be substituted for a comparable area of steel reinforcing bar plan, subject to the approval of the ENGINEER.

G. A suitable tie wire shall be provided in each block, to be used for anchoring to the steel. Except in unusual cases and when specifically authorized by the ENGINEER, the size of the surface to be placed adjacent to the forms shall not exceed 2 1/2 inches square or the equivalent thereof in cases where circular or rectangular areas are provided. Blocks shall be cast accurately the thickness required and the surface to be placed adjacent to the forms shall be a true plan, free of surface imperfections.

H. Reinforcement shall be supported and tied in such a manner that sufficiently rigid cage of steel is provided. If the cage is not adequately supported to resist settlement or floating upward of the steel, overturning of truss bars or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken. Sufficient measurements shall be made during concrete placement to insure compliance with the above.

I. No concrete shall be deposited until the ENGINEER has reviewed the placement of the reinforcing steel and all mortar, mud, dirt, etc., shall be cleaned from the reinforcement, forms, workers' boots and tools.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. The measurement of quantities of reinforcement furnished and placed will be based on the calculated weight of the steel actually placed as indicated, with no allowance made for added bar lengths for splices requested by the CONTRACTOR nor for extra steel used when bars larger than those indicated or with a higher grade of steel are substituted with the permission of the ENGINEER.

B. Tie wires and supporting devices will not be included in the calculated weights.

C. The calculated weight of bar reinforcement will be determined using the theoretical bar weight set forth in this item.

D. Measurement required by a change in design will be computed as described above for the actual steel required to complete the work.

4.02 PAYMENT

A. Reinforcing steel shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

B. Compensation, whether by contract pay item or incidental work, will be for furnishing, bending, fabricating, welding and placing reinforcement, for all clips, blocks, metal spacers, ties, chairs, wire or other materials used for fastening reinforcement in place and for all tools, labor, equipment and incidentals necessary to complete the work.

END OF SECTION 03 3000

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.
B. Removal of existing debris.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 2200 - Grading

PART 3 EXECUTION

3.01 SITE CLEARING

A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by site improvements, paving, playing fields, lawns, and planting beds.
B. Do not begin clearing until vegetation to be relocated has been removed.
C. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
    1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
    2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 36 inches.
    3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
    4. Fill holes left by removal of stumps and roots, using suitable fill material, compacted to 95 percent standard procotor density, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to UHS.

3.04 DEBRIS

A. Remove debris, junk, and trash from site.
B. Leave site in clean condition, ready for subsequent work.
C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 31 1000

SECTION 31 1101
CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. Cleaning and grubbing on project site of trees, stumps, brush, roots, vegetation, logs rubbish and other objectionable matter within limits described in specifications or as shown on plans.
B. Cleaning and grubbing shall be in advance of grading operation except that in cuts over 3 feet in depth, grubbing may be done simultaneously with excavation, provided objectionable matter is removed as specified.
C. Disposal of all debris resulting from clearing and grubbing work.
D. PROTECTION OF ADJACENT WORK:
E. Protect all areas outside indicated construction areas.
F. Protect existing improvements, adjacent property, utilities and other facilities, and trees and plants not to be removed from injury or damage.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 CLEARING:

A. Clear all areas covered by dikes, roads, structures and embankments within project limits unless otherwise shown in plans.
B. Remove all saplings, brush, down-timber and debris unless shown or directed otherwise.
C. Use tree wound paint to treat scars, gashes or limbs stubs on trees not removed.
D. GRUBBING:
E. Trees, stumps, root systems, rocks and other obstructions shall be removed to the depths shown when they fall within the construction templates for the following items:
   1. Footings — 18-inches below bottom of footing (or as specified on Structural Plans, whichever is greater).
   2. Sidewalks (or other types of walks — 12-riches below bottom of walk.
   3. Roadways or Streets — 18-inches below bottom of sub-grade
   4. Parking Areas — 18-inches below bottom of sub-grade
   5. Grassed Areas — 18-inches below topsoil
   6. Fills — 24-inches below bottom of fill
F. Blasting not permitted.
G. REMOVAL OF DEBRIS AND CLEANUP
H. Dispose of all waste materials not burned by removal from site. Disposal of all materials deemed unsalvageable by the CONTRACTOR shall be disposed at a State of Texas Permitted Disposal Site.
I. Materials cleared and grubbed shall be the property of the Contractor and shall be his responsibility for disposal.
J. CLEARING AND GRUBBING:
K. When not listed as separate contract pay item, Clearing and Grubbing shall be considered as incidental work, and the cost thereof shall be included in such contract pay items as are provided in the proposal contract.
L. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor equipment, tools and in incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION 31 1101

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal and storage of topsoil.
B. Rough grading the site for site structures, building pads, and site work to the limits as shown in the plans.
C. Finish grading for planting.

1.02 RELATED REQUIREMENTS

A. Section 31 1000 - Site Clearing.
B. Section 31 2316.10 - Excavation.
C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
D. Section 31 2316.26 - Rock Removal.
E. Section 31 2323 - Fill: Filling and compaction.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of Texas, Highway Department standards.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Stake and flag locations of known utilities.
C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
D. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
E. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
F. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
B. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
C. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
D. When excavating through roots, perform work by hand and cut roots with sharp axe.
E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.04 FINISH GRADING

A. Before Finish Grading:
    1. Verify building and trench backfilling have been inspected.
    2. Verify subgrade has been contoured and compacted.
B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 4 inches.
D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
E. Place topsoil in areas where seeding are indicated.
F. Place topsoil in areas indicated.
G. Place topsoil to thickness as scheduled.
H. Place topsoil to the following compacted thicknesses:
   1. Areas to be Seeded with Grass: 6 inches.
   2. Areas to be Sodded: 4 inches.
   3. Shrub Beds: 18 inches.
   4. Flower Beds: 12 inches.
   5. Planter Boxes: To within 3 inches of box rim.
I. Place topsoil during dry weather.
J. Remove roots, weeds, rocks, and foreign material while spreading.
K. Near plants spread topsoil manually to prevent damage.
L. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
M. Lightly compact placed topsoil.

3.05 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.06 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Engineer as to remedy.
C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size as directed by Engineer.

3.07 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.08 CLEANING

A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.
B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION 31 2200

SECTION 31 2316.10
EXCAVATION – CIVIL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 01 5723 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.
B. Section 31 2200 - Grading: Soil removal from surface of site.
C. Section 31 2200 - Grading: Grading.
D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
E. Section 31 2316.26 - Rock Removal: Removal of rock during excavating.
F. Section 31 2323 - Fill: Fill materials, filling, and compacting.

1.03 PRICE AND PAYMENT PROCEDURES

1.04 SUBSIDIARY TO PROJECT COST

A. See Unit Prices, for general requirements applicable to unit prices for excavation.

1.05 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 3 EXECUTION

2.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.
B. See Section 31 2200 for additional requirements.
C. Locate, identify, and protect utilities that remain and protect from damage.
D. Notify utility company to remove and relocate utilities.
E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
F. Protect plants, lawns, rock outcroppings, and other features to remain.

2.02 EXCAVATING

A. Excavate to accommodate new structures and construction operations.
B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.
D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
E. Do not interfere with 45 degree bearing splay of foundations.
F. Cut utility trenches wide enough to allow inspection of installed utilities.
G. Hand trim excavations. Remove loose matter.
H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.
I. Grade top perimeter of excavation to prevent surface water from draining into excavation.
J. Remove excavated material that is unsuitable for re-use from site.
K. Remove excess excavated material from site.

2.03 FIELD QUALITY CONTROL

A. See Quality Requirements, for general requirements for field inspection and testing.
B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

2.04 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION 31 2316.10

SECTION 31 2316.13
TRENCH EXCAVATION, BACKFILL AND COMPACTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. Excavation, shoring, dewatering, pipe bleeding, trench backfill, compaction, grading and cleanup of all pipeline trenching for the project.

B. All work must be done in accordance with these specifications and OFPC requirements.

1.02 JOB CONDITIONS

A. Site Acceptance

1. Accept site in condition existing during Contract time frame.
2. Ground water/surface water found during construction are conditions of the contract and responsibility of Contractor.

B. Adverse Weather

1. Place no backfill that is excessively wet or frozen.
2. Place no backfill in excessively wet or frozen trenches.

PART 2 - PRODUCT

2.01 PIPE BEDDING AND BACKFILL

A. The type of bedding shall be stated on the Plans or in the Special Conditions of the contract document. Determination of source of materials for bedding and backfill to meet the stated conditions shall be responsibility of Contractor, but use of such materials shall be subject to approval of Engineer.

B. Excavated Material Backfill

1. Excavated material may be used in the trench backfill, provided that all hard rock and stones having any dimensions greater than 6" and frozen earth debris and roots larger than 2" are removed for the initial backfill. Excavated backfill material must be approved by Engineer for bedding material.

C. Select Backfill

1. Select Backfill shall be gravel, fine rock cuttings, sand, sandy loam or loam free from excessive clay. Rock cuttings shall have no dimensions greater than 2 inches. Select backfill must be approved by Engineer.

D. Sand Backfill

1. Sand backfill shall be clean, hard, durable, uncoated grains, free from lumps and organic material. All materials must pass a No. 8 Sieve.

E. Granular Backfill

1. Granular backfill shall be free flowing, such as sand or hydraulically grade stone fines, or mixed sand and gravel, or sandy loam. The material shall be free from lumps, stones over 2 inches in diameter, clay and organic matter.

F. Controlled Density Fill

1. Use high slump mixture of portland cement, fly ash and fine aggregate formulated, licensed and marketed as K-Krete or equal. Provide mixture with minimum 28-day compressive strength of 70psi with no measurable shrinkage or surface settlement.

2.02 CRADLING ROCK

A. Use crushed rock or stone with 70-100% passing 1> inch sieve and no more than 50% passing 1 inch sieve.

2.03 SHEETING, SHORING AND BRACING

A. Use sound timber or structural steel.

B. Use shapes and sizes as required.

PART 3 - EXECUTION

3.01 GENERAL

A. Dewatering

1. Execute work "dry". No pipe or conduits shall be laid or concrete poured on excessively wet soil.
2. Prevent surface water from flowing into excavation.
3. Provide equipment for handling water encountered as required. Obtain approval of proposed method of dewatering.
4. No Sanitary sewer shall be used for disposal of trench water.

B. Protection of Existing Utilities:

1. Notify all utilities of location and schedule of work.
2. Locations and elevations of utilities shown on plans are to be considered approximate only. Notify utility and Engineer of conflicts between existing and proposed facilities.
3. Repair, relay or replace existing utilities damaged, destroyed or disrupted during work. Unless specified otherwise, replacement will be at the Contractors expense.

C. Sheeting, Shoring and Bracing

1. Provide as necessary, to hold walls of excavation, prevent damage to adjacent structures, and to protect workmen and property.
2. Leave Sheeting and shoring in place where removal might cause damage to work or otherwise indicated on drawings.
3. When movable trench shield is used below spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

D. Changes in Grade

1. Grades may be adjusted 1.5 feet (plus or minus) from plan grades to suit unforeseen construction conflicts or conditions with approval of Engineer.
2. No additional compensation will be made for such changes.

3.02 EXCAVATION AND TRENCHING

A. General

1. Method of excavation at Contractor's option.
2. Excavate by hand under tree roots 3 inches and large, and under and around structures and utilities.
3. Stockpile and replace topsoil to a minimum of 8-inches for surface restoration in grassed or agricultural areas.

B. Trench Characteristics

1. Depth
   a. As indicated for pipe installation to lines and grades required with proper allowance for thickness of pipe and type of bedding specified or indicated.
2. Width

a. Keep width of trench as narrow as possible and yet provide adequate room for backfilling and jointing.
b. Maximum width as follows:

Pipe Size Inches		Maximum Trench Width
4		2-feet 0-inches
6		2-feet 0-inches
8		2-feet 4-inches
10		2-feet 4-inches
12		2-feet 6-inches
15		2-feet 9-inches
18		3-feet 0-inches
Over 18		Pipe O.D. + 12-inches

3. Trench walls must be vertical below top of pipe and may be vertical or sloped above pipe to conform to excavating codes.
4. Provide bell holes for each pipe joint where pipe bears on undisturbed earth.
5. Trench bottom shall be free of large stones and other foreign material.

3.03 SOFT, SPONGY OR UNSTABLE MATERIALS

A. Stop work and notify Engineer.
B. Perform remedial work as directed.
C. If material is judged unsuitable and removal is authorized, remove and replace with trench stabilizing material as directed by Engineer.

3.04 ROCK EXCAVATION

A. Excavate any rock to maintain minimum 6-inch clearance around pipe.
B. Dispose of rock material not suitable for backfill as directed by Engineer.
C. Use of explosives not permitted without prior written authorization from owner and Engineer.
D. Provide Special Hazard Insurance covering liability for blasting operations.

3.05 BEDDING

A. Place after bottom of trench has been excavated to proper depth and grade.
B. Place, compact and shape bedding material to conform to barrel of pipe to insure continuous firm bedding for fill length of pipe.
C. Provide bedding as described in following table un less indicated otherwise on Plans or in Special Conditions.

	Pipe Material		Minimum Bedding Class
1.	Vitrified Clay Pipe		Class C*
2.	Non-reinforced Concrete Pipe		Class C*
3.	Reinforced Concrete Pipe		Class D*
4.	Ductile Iron Pipe		Class D*

5.	Steel Cylinder		Class C*
6.	Flexible or Composite Pipe (PVC)		Class 1 **

*Refers to standard detail, "Pipe Envelope Requirements", Drawing D-01.
**Refers to standard detail, "Flexible Pipe Bedding Requirements" Drawing D-02.

3.06 TRENCH BACKFILL

A. Use excavated material backfill (2.01B) unless otherwise specified.
B. Use Sand Backfill for all trenches within 5 feet of buildings and beneath walks, parking areas, paved streets or existing exposed utilities.
C. Initial Backfill
   1. Place after pipe has been bedded and checked for alignment, grade and internal obstructions.
   2. Carry out in an orderly fashion after authorization to cover pipe has been given.
   3. Allow no more than 300 feet of trench to be open at one time.
   4. Do not backfill until concrete or mortar has sufficiently cured.
   5. Record location of connections and appurtenances before backfilling.
   6. Place by hand and hand tamp to not less than 12-inches above top of pipe, in approximately 4-inch layers.
   7. Backfill simultaneously on both sides of pipe to prevent displacement.
   8. Place cushion of 4-feet above pipe envelope before using heavy compacting equipment.
D. Subsequent Backfill
   1. Place backfill into trench at an angle so that impact on installed pipe is minimized.
   2. Compaction of all backfill material shall be performed in an manner that shall not crack, crush, and/or cause the installed pipe to be moved from the established grade and/or alignment.
   3. Area under or within 5-feet of pavement; and under or within 2-feet of utilities, buildings, or walks shall be mechanically compacted to the top of the sub-grade in 6-inch lifts to a minimum of 95 % Standard Proctor Density.
   4. Areas not subject to vehicular traffic shall be backfilled in layers not more than 10-inches in depth.
   5. Compaction method at discretion of Contractor with following exceptions:
      a. If in Owner's opinion compaction method presents potential damage to pipe, it will not be allowed.
      b. Compaction of any backfill material by flooding or jetting will require prior written authorization of Engineer.
   6. Mound excavated materials no greater than 6-inches in open areas only.
   7. Fill upper portion of trench with topsoil as specified hereinbefore.
E. Controlled Density Fill
   1. Use where shown on plans.
   2. Provide suitable forms to limit volume of control density fill material.
   3. Prevent flow of material into existing drain lines.
   4. Protect exposed utility lines during placement.

5. Place material in accordance with suppliers' written recommendations unless directed otherwise by Engineer.

3.07 EXCESS MATERIAL

A. Waste excess excavated material where directed by Engineer.

3.08 TESTING

A. Unless specified elsewhere, testing will be responsibility of Owner.
B. Standard Proctor Density
   1. ASTM D698.
   2. One (1) required for each type of material encountered.
C. In Place Density
   1. ASTM D1556 (Sand Cone)
   2. ASTM D2167 (Balloon)
   3. ASTM D3017 (Nuclear)
D. One (1) test per each 400 cubic yards of backfill placed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 TRENCH EXCAVATION

A. Trench excavation shall be considered incidental to pipeline installation.
B. Payment shall be made at the contract unit price per cubic yard only if a bid item is established in the contract.

4.02 BACKFILL

A. Payment for backfill shall be made at the contract unit price per cubic yard only if a separate bid item is established in the contract.
B. No allowance for waste shall be made.
C. If Engineer orders an initial backfill material other than that specified in contract, it shall be paid for as an extra in price per cubic yard as compacted in place, EXCEPT if a higher class embedment is ordered by Engineer because the Contractor has over-excavated the trench width.
D. If the Contractor over-excavates the trench width and the Engineer orders the next higher class of embedment to be used, the embedment for as if the original specified embedment was used.
E. If the Engineer orders the excavated material to be removed and disposed of and replaced with another material and a separate bid item is not established as a bid item, the material shall be paid as an extra.
F. If the Contractor fails to compact the backfill to the density requirements, the Engineer may order the material removed and replaced at no cost to the Owner.
G. The disposal of rejected material shall be at no cost to the Owner.

END OF SECTION 31 2316.13

SECTION 31 2316.14
TRENCH PROTECTION SYSTEM

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. This work shall consist of shoring, bracing, bank stabilization, bank sloping, providing trench boxes or trench shields or other equivalent means to protect employees from the effects of moving ground or cave-ins for all trenches 5-feet or more in depth.
B. All work shall be done in conformance with OSHA Safety and Health Standards (29 CFR 1926/1010 Chapter XVII Subpart P-Excavations, Trenching and Shoring.).
C. DEFINITIONS APPLICABLE TO THIS SPECIFICATION
D. "Accepted engineering requirements (or practices)" - Those requirements or practices which are compatible with standards required a Registered Professional Engineer, or other duly licensed or recognized authority.
E. "Angle of repose" - The greatest angle above the horizontal plane at which a material will lie without sliding.
F. "Bank" - A mass of soil rising above a digging level.
G. "Belled excavation" - A part of shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross section above.
H. "Braces (trench)" - The horizontal members of the shoring system whose ends bear against the uprights or stringers.
I. "Excavation" - Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.
J. "Faces" - See paragraph (k) of this section.
K. "Hard compact soil" - All earth materials not classified as running or unstable.
L. "Kickouts" - Accidental release or failure of a shore or brace.
M. "Sheet pile" - A pile, or sheeting, that may form one of the continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.
N. "Sides", "Walls", or "Faces" - The vertical or inclined earth surfaces formed as a result of excavation work.
O. "Slope" - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.
P. "Stringers" (wales) - The horizontal members of a shoring system whose sides bear against the uprights or earth.
Q. "Trench" - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 ft.
R. "Trench shield" - A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.
S. "Unstable soil" - Earth material, other than running, that because of its nature of the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.
T. "Uprights" - the vertical members of a shoring system.
U. "Wales" - See paragraph M of this section.
V. "Walls" - See paragraph K of this section.

PART 2 - PRODUCTS
2.01 NO INFORMATION FOR THIS SECTION
PART 3 - EXECUTION
3.01 GENERAL PROTECTION REQUIREMENTS

A. Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.
B. If planks are used for raised walkways, runways, or sidewalks they shall be laid parallel to the length of the walk and fastened together against displacement.
C. Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.
D. Raised walkways, runways, and sidewalks shall be provided with plank steps on string stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.
E. All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet and other parts of the body as set forth in OSHA Standards.
F. Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made or reflectorized with high visibility material.
G. Employees subjected to hazardous dusts, gases, fumes, mists, or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in OSHA Standards.
H. No person shall be permitted under loads handled by power shovels, derricks, or hoists. To avoid any spillage, employees shall be required to stand away from any vehicle being loaded.
I. Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard employees.
J. SPECIFIC EXCAVATION REQUIREMENTS
K. Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., sewer, telephone, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.
L. Trees, boulders, and other surface encumbrances, located so as to create a hazard employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed o made safe before excavating is begun.
M. The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground or some other equivalent means.
N. Excavations shall be inspected by a competent person after ever rainstorm or other hazard-increasing occurrence, and the protection against slides and cave-ins shall be increased if necessary.
O. The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: Depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures,

equipment, overlying materials, or stored material; and vibration from equipment, blasting, traffic, or other sources.

P. Supporting systems, i.e., piling, cribbing, shoring, etc., shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

Q. All slops shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting.

R. The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders, and areas were erosion deep frost action and slide planes appear.

S. Clearances:
   1. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2-feet or more from the edge of the excavation.
   2. As an alternative to the clearance prescribed in subparagraph 1, the Contractor may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

T. Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

U. Support systems shall be planned and designed by a qualified person when excavation is in excess of 20-feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.

V. Materials used for sheeting, sheet piling, cribbing, bracing, shoring and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.

W. Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to previously backfilled excavation for a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.

X. Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall in underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.

Y. If the stability of adjoining building or walls is endangered by excavations, shoring, bracing or underpinning shall be provided as necessary to insure their safety. Such shoring, bracing or underpinning shall be inspected daily or more often, as conditions warrant, by a competent person the protection effectively maintained.

Z. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.

AA. If it is necessary to place or operate power shovels, derricks, trucks, excavation, the side of the excavation shall be sheet-piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

AB. Blasting and the use of explosives are not allowed unless authorized in other portions of the specifications.
AC. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed. if possible, the grade should be away from the excavation.
AD. Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be backfilled.
AE. If possible, dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil, or other means.
AF. In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in OSHA Standards shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc. shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.
AG. Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.
AH. Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.
AI. All ladders used on excavation operations shall be in accordance with requirements of OSHA Standards.
AJ. SPECIFIC TRENCHING REQUIREMENTS
AK. Banks more than 5-feet shall be shored, laid back to a stable slope or some other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Trenches less that 5-feet in depth shall also be effectively protected when examination of the ground indicates hazardous ground movement may be expected.
AL. Sides of trenches in unstable or soft material, 5-feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them.
AM. Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5-feet in depth and 8-feet or more in length. In lieu of shoring, the sides of the trench above the 5-foot level many be sloped to preclude collapse, but shall not be steeper than a 1-foot rise to each 1/2-foot horizontal. When the outside diameter of a pipe is greater than 6-feet, a bench of 4-foot minimum shall be provided at the toe of the sloped portion.
AN. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to be effective to the bottom of the excavation.
AO. Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.
AP. Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth.

Such temporary protection shall be provided for the full depth of that part of each pier and securely fastened to shoulder harness, shall be worn by each employee entering the shafts. This lifeline shall be individually manned and separate from any line used to remove materials excavated from the bell footing.

AQ. Minimum requirements for trench timbering shall be in accordance with Table 19000-1. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stresses in excess of values given by the following formula:
1. S + 1300 - 20L
   a. Maximum L = 50
   b. Ratio D
2. Where:
3. Length, unsupported, inches
4. Least side of the timber in inches
5. Allowable stress in pounds per square inch of cross-section.

AR. When employees are required to be in trenches 4-feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25-feet of lateral travel.

AS. Bracing or shoring of trenches shall be carried along with the excavation.

AT. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kickouts.

AU. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench. The Contractor shall provide a statement certified by a Registered Professional Engineer of the adequacy of trench boxes or shields.

AV. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

AW. CONSTRUCTION REQUIREMENTS

AX. The Contractor unless provided for in the plans otherwise shall provide the minimum shoring shown in Table 19000-1 for the soil class noted in the plans.

AY. Should the soil conditions differ form those specified or should ground water be encountered int eh excavation the contractor shall notify the Engineer immediately. The Contractor shall refrain from operating in that portion of the trench where changed conditions are noted until such time as an inspection of conditions takes place and the contractor is notified of measures necessary for continued operation.

AZ. The Contractor shall prepare and submit a plan of operation. This plan of operation shall identify material, equipment, methods and installation and shall be inspected by a Registered Professional Engineer. The Contractor's Engineer shall certify the adequacy of the trench protection system and its adherence of OSHA Standards.

BA. PART 4- MEASUREMENT AND PAYMENT

BB. MEASUREMENT

BC. Providing shoring in trenches or other alternate means in accordance with this specification shall be measured by the linear foot of trench of specified sizes or sizes of pipe in ranges of depth to the invert elevation of the pipe or structure. Additional depth for foundations, etc. shall be considered incidental to the price bid for the protection.

BD. The Contractor shall provide shoring systems for construction of structures 5-feet or greater in depth. There will be no direct payment for these systems but it shall be considered incidental to the price bid for the structure.

BE. PAYMENT

BF. Trench protection shall be full compensation for providing acceptable shoring or other alternate means, installing, inspecting, certifying and maintaining the shoring and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work.

BG. SEE ATTACHED TABLE

END OF SECTION 31 2316.14

SECTION 31 2316.15
TRENCHING – CIVIL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Document Obtain from Owner's Representative Project Administrator: Geotechnical report; bore hole locations and findings of subsurface materials.
B. All excavation is unclassified.
C. Trench dewatering: Contractor is responsible for dewatering and trench stabilization with geotextile or other approved methods to allow for proper bedding and sidewall Trench conditions for proper pipe installation. No separate payment shall be made to the contractor for such work, but shall be subsidiary to the total project cost.
D. Section 31 2200 - Grading: Site grading.
E. Section 31 2316.10 - Excavation: Building and foundation excavating.
F. Section 31 2316.26 - Rock Removal: Removal of rock during excavating.
G. Section 31 2323 - Fill: Backfilling at building and foundations.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Unit Prices, for general requirements applicable to unit prices for earthwork.
B. Subsidiary to the Utility Work related to the Project.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.
B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated in landscaping plans whichever is greater.

1.05 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010
B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2007.
C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2009.
E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.
F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2010.
G. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
H. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.
I. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010

1.06 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Materials Sources: Submit name of imported materials source.
C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

1.07 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.
B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill - Fill Type as specified in plan details.: Conforming to State of Texas Highway Department standard.

2.02 SOURCE QUALITY CONTROL

A. See Quality Requirements, for general requirements for testing and analysis of soil material.
B. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.
B. See Section 31 2200 for additional requirements.
C. Locate, identify, and protect utilities that remain and protect from damage.
D. Notify utility company to remove and relocate utilities.
E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
F. Protect plants, lawns, rock outcroppings, and other features to remain.

3.03 TRENCHING

A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
C. Do not interfere with 45 degree bearing splay of foundations.
D. Cut trenches wide enough to allow inspection of installed utilities.
E. Hand trim excavations. Remove loose matter.
F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
G. Remove excavated material that is unsuitable for re-use from site.
H. Remove excess excavated material from site.

3.04 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.
D. Apply the granular bedding material as specified for pressure pipe or gravity pipe as specified and shown on the plan details.

3.05 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.
C. Employ a placement method that does not disturb or damage other work.
D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
E. Maintain optimum moisture content of fill materials to attain required compaction density.
F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
H. Correct areas that are over-excavated.
    1. Thrust bearing surfaces: Fill with concrete.
    2. Other areas: Use general fill, flush to required elevation, compacted to minimum 98 percent of maximum dry density.
I. Compaction Density Unless Otherwise Specified or Indicated:
    1. Under paving, slabs-on-grade, and similar construction: 98 percent of maximum dry density.
    2. At subgrade: 98 percent of maximum dry density.
    3. At other locations: 98 percent of maximum dry density.
J. Reshape and re-compact fills subjected to vehicular traffic.
K. Water jetting is not permissible.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.
B. Utility Piping and Conduits :
    1. Bedding: Use Fill Type as specified in bedding detail.
    2. Cover with Fill Type as specified in bedding detail.
    3. Fill up to subgrade elevation.
    4. Compact in maximum 6 inch lifts to 95 percent of maximum dry density.
C. At Storm Sewer Inlets:
    1. Use Fill Type select.
    2. Fill 8 inches deep.
    3. Fill up to subgrade elevation.
    4. Maximum compacted depth of each lift: 6 inches.
    5. Compact to 95 percent of maximum dry density.

3.07 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations (subgrade elevations).

3.08 FIELD QUALITY CONTROL

A. See Quality Requirements, for general requirements for field inspection and testing.
B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.
C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
E. Frequency of Tests: as determined by Owner.
F. All re-tests shall be paid for by the Contractor.

3.09 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION 31 2316.15

SECTION 31 2323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for paving, site structures, and site inside project limits as required to acquire final grade elevation.
B. Backfilling and compacting for utilities outside the building to utility main connections.
C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Document Geotechnical engineering report. A copy can be obtained with owner's representative project administrator.: Geotechnical report; bore hole locations and findings of subsurface materials including approved fill materials.
B. Section 31 2200 - Grading: Site grading.
C. Section 31 2316.10 - Excavation: Removal and handling of soil to be re-used.
D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 PRICE AND PAYMENT PROCEDURES

A. Shall be Subsidiary to the Project Cost.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated in drawings.
B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.05 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.
B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.
C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.
D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.
F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.
G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.
H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.
J. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

1.06 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.
C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
E. Compaction Density Test Reports.

1.07 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.
B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site and clean of organic material or other debris deemed unsuitable, or material hauled in to the site having a maximum PI of 16. When material is hauled in for fill, the material classification must be of the same type as existing to provide a uniform hogeneous subgrade foundation.
   On-Site Clay Fill: If on-site clay fill is utilized as backfill, material shall be placed as recommended on geotechnical engineering study produced by Geotechnical Engineer.
   Select Fill: As recommended on geotechnical engineering study.

2.02 SOURCE QUALITY CONTROL

A. See Quality Requirements, for general requirements for testing and analysis of soil material.
B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
C. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
D. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.
B. Identify required lines, levels, contours, and datum locations.
C. See Section 31 2200 for additional requirements.

3.02 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.
B. Fill up to subgrade elevations unless otherwise indicated.
C. Employ a placement method that does not disturb or damage other work.
D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
E. Maintain optimum moisture content of fill materials to attain required compaction density.
F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
H. Slope grade away from building minimum 2 inches in 10 ft areas near pedestrian access routes, all other areas grade away from the building at 6 inches in 10 feet or as shown in the plans . Make gradual grade changes. Blend slope into level areas.
I. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density ASTM D648.

J. Compaction Density Unless Otherwise Specified or Indicated:
K. Reshape and re-compact fills subjected to vehicular traffic.
L. Refer to geotechnical engineering study AMA13-014-00 produced by Raba Kistner Consultants Inc. for additional information.

3.03 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated in geotechnical report.

3.04 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.05 FIELD QUALITY CONTROL

A. See Quality Requirements, for general requirements for field inspection and testing.
B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
D. Frequency of Tests: as determined by the Owner.

3.06 CLEANING

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
B. Leave unused materials in a neat, compact stockpile.
C. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
D. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION 31 2323

Section 31 2324
TxDOT Item 210 - Rolling

204.1. Description. Compact embankment, subgrade, base, surface treatments, broken concrete pavement, or asphalt pavement using rollers. Break up asphalt mats, pit run material, or base materials.

204.2. Equipment. The Contractor may use any type of roller to meet the production rates and quality requirements of the Contract unless otherwise shown on the plans or directed. When specific types of equipment are required, use equipment that meets the requirements of this Article. The Engineer may allow the use of rollers that operate in one direction only when turning does not affect the quality of work or encroach on traffic.

Table 1
Roller Requirements[1]

Roller Type	Materials to be Compacted	Load (tons)	Contact Pressure	Roller Speed (mph)
Steel wheel	Embankment, subgrade, base, asphalt concrete	≥ 10	≥ 325 lb. per linear inch of wheel width	2–3
Tamping	Embankment, subgrade, base	–	125–550 psi per tamping foot	2–3
Heavy tamping	Embankment, subgrade, base	–	≤ 550 psi per tamping foot	2–3
Vibratory	Embankment, subgrade, base, asphalt concrete	Type A < 6 Type B > 6 Type C as shown on plans	Per equipment specification and as approved	As approved
Light pneumatic	Embankment, subgrade, base, surface treatment	4.5–9.0	≥ 45 psi	2–6
	Asphalt Concrete			4–12
Medium pneumatic	Same as light pneumatic	12–25	≥ 80 psi, as directed	Same as light pneumatic
Heavy pneumatic	Embankment, subgrade, base, previously broken concrete pavement, other pavements	≥ 25	≤ 150 psi	2–6
Grid	Embankment, base, breaking up existing asphalt mats or base	5–13	–	2–3

1. Unless otherwise specified in the Contract.

A. Static Steel Wheel Rollers. Furnish single, double, or triple steel wheel, self-propelled power rollers weighing at least 10 tons capable of operating in a forward and backward motion. Ensure all wheels are flat. When static steel wheel rollers are required, vibratory rollers in the static mode may be used.

For single steel wheel rollers, pneumatic rear wheels are allowed for embankment, subgrade, and base. For triple steel wheel rollers, provide rear wheels with a minimum diameter of 48 in., a minimum width of 20 in., and a minimum compression of 325 lb. per inch of wheel width.

B. Tamping Rollers. Furnish self-propelled rollers with at least 1 self-cleaning metal tamping drum capable of operating in a forward or backward motion with a minimum effective rolling width of 5 ft. For rollers with more than 1 drum, mount drums in a frame so that each drum moves independently of the other. Operate rollers in static or vibratory mode.

1. **Tamping Roller (Minimum Requirement).** For all tamping rollers except for heavy tamping rollers, provide tamping feet that exert a static load of 125 to 550 psi and project at least 3 in. from the surface of the drum.
2. **Heavy Tamping Roller.** Provide tamping rollers that have:
   - 2 metal tamping drums, rolls, or shells, each with a 60-in. minimum diameter and a 5-ft. minimum width, or
   - 1 rear and 2 forward drums, each with a 60-in. minimum diameter. Arrange drums so that the rear drum compacts the space between the 2 forward drums and the minimum overall rolling width is 10 ft.

   Equip drums with tamping feet that:
   - project at least 7 in. from the drum surface,
   - have an area of 7 to 21 sq. in.,
   - are self-cleaning,
   - exert a static load of at least 550 psi, and
   - are spaced at 1 tamping foot per 0.65 to 0.70 sq. ft. of drum area.

C. Vibratory Rollers. Furnish self-propelled rollers with at least 1 drum equipped to vibrate. Select and maintain amplitude and frequency settings per manufacturer's specifications to deliver maximum compaction without material displacement or shoving, as approved. Furnish the equipment manufacturer's specifications concerning settings and controls for amplitude and frequency. Operate rollers at speeds that will produce at least 10 blows per foot unless otherwise shown on the plans or approved. Pneumatic rear wheels are allowed for embankment, subgrade, and base. Equip each vibrating drum with:

- separate frequency and amplitude controls,
- controls to manually start and stop vibration, and
- a mechanism to continuously clean the face of the drum.

For asphalt-stabilized base and asphalt concrete pavement, furnish a roller that also has the ability to:

- automatically reverse the direction of the rotating eccentric weight,
- stop vibration before the motion of the roller stops, and
- thoroughly moisten the drum with water or approved asphalt release agent.

1. **Drum (Type A).** Furnish a roller with a static weight less than 6 tons and a vibratory drum.
2. **Drum (Type B).** Furnish a roller with a minimum static weight of 6 tons and a vibratory drum.
3. **Drum (Type C).** Furnish a roller as shown on plans.

D. Pneumatic Tire Rollers. Pneumatic tire rollers consist of rubber tire wheels on axles mounted in a frame with either a loading platform or body suitable for ballast loading. Arrange the rear tires to cover the gaps between adjacent tires of the forward group. Furnish rollers capable of forward and backward motion. Compact asphalt pavements and surface treatments with a roller equipped with smooth-tread tires. Compact without damaging the surface. When necessary, moisten the wheels with water or an approved asphalt release agent.

Select and maintain the operating load and tire air pressure within the range of the manufacturer's charts or tabulations to attain maximum compaction throughout the lift, as approved. Furnish the manufacturer's chart or tabulations showing the contact areas and contact pressures for the full range of tire inflation pressures and for the full range of loadings for the particular tires furnished. Maintain individual tire inflation pressures within 5 psi of each other. Provide uniform compression under all tires.

1. **Light Pneumatic Tire.** Furnish a unit:
   - with at least 9 pneumatic tires,
   - with an effective rolling width of approximately 5 ft.,
   - capable of providing a total uniform load of 4.5 to 9 tons, and
   - with tires capable of maintaining a minimum ground contact pressure of 45 psi.
2. **Medium Pneumatic Tire.** Furnish a unit:
   - with at least 7 pneumatic tires,
   - with an effective rolling width of approximately 7 ft.,
   - capable of providing a total uniform load of 12 to 25 tons, and
   - with tires capable of maintaining a minimum ground contact pressure of 80 psi or 90 psi as directed.
3. **Heavy Pneumatic Tire.** Furnish a unit:
   - with at least 4 pneumatic-tired wheels mounted on axles carrying at most 2 wheels,
   - with wheels arranged to carry approximately equal loads on uneven surfaces,
   - with a width between 8 and 10 ft. that can turn 180° in the crown width,
   - capable of providing a total uniform load of at least 25 tons,
   - with tires capable of maintaining a maximum ground contact pressure of 150 psi, and
   - with liquid-filled tires inflated to such a level that liquid will flow from the valve stem when the stem is in the uppermost position.

E. Grid Rollers. Furnish rollers that have 2 cylindrical cages with a minimum diameter of 66 in. and a minimum width of 32 in. Mount cages in a rigid frame with weight boxes. Use a cage surface of cast or welded steel fabric grid with bars 1-1/2 in. wide, spaced on 5-in. centers in each direction, that undulate approximately 1 in. between the high and low points.

Furnish rollers capable of providing a total load of 5 to 13 tons and capable of being operated in a forward or backward motion.

F. Alternate Equipment. Instead of the specified equipment, the Contractor may, as approved, operate other compaction equipment that produces equivalent results. Discontinue the use of the alternate equipment and furnish the specified equipment if the desired results are not achieved.

204.3. Construction. Perform this work in accordance with the applicable Items using equipment and roller speeds specified in Table 1. Use only rubber-tired equipment to push or pull compaction equipment on base courses. Use equipment that does not damage material being rolled.

204.4. Measurement and Payment. The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be subsidiary to pertinent Items.

END OF SECTION 31 2324

SECTION 31 2325
TXDOT ITEM 216 - PROOF ROLLING

216.1. Description

Proof-roll earthwork, base, or both to locate unstable areas.

216.2. Equipment.

A. Specified Equipment. Furnish rollers that when loaded weigh at least 25 tons. The maximum acceptable load is 50 tons. Provide rollers that meet the requirements of Section 210.2.D, “Pneumatic Tire Rollers.”

B. Alternative Equipment. Instead of the specified equipment, the Contractor may, as approved, operate other compaction equipment that produces equivalent results in the same period of time. Discontinue the use of the alternative equipment and furnish the specified equipment if the desired results are not achieved.

216.3. Construction.

Perform proof rolling as directed. Adjust the load and tire inflation pressures within the range of the manufacturer’s charts or tabulations, as directed. Make at least 2 coverages with the proof roller. Offset each trip of the roller by at most 1 tire width. Operate rollers at a speed between 2 and 6 miles per hour, as directed. If an unstable or non-uniform area is found, correct the area in accordance with the applicable Item.

216.4. Measurement

Rolling will be measured by the hour operated on surfaces being tested.

216.5. Payment

The work performed and equipment furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Proof Rolling.” This price is full compensation for furnishing and operating equipment and for labor, materials, tools, and incidentals.

END OF SECTION 31 2325

SECTION 31 3214
TXDOT ITEM 247 - FLEXIBLE BASE

247.1. Description. Construct a foundation course composed of flexible base.

247.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. Use Tex-100-E material definitions.

A. Aggregate. Furnish aggregate of the type and grade shown on the plans and conforming to the requirements of Table 1. Each source must meet Table 1 requirements for liquid limit, plasticity index, and wet ball mill for the grade specified. Do not use additives such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements of Table 1, unless shown on the plans.

Table 1
Material Requirements

Property	Test Method	Grade 1	Grade 2	Grade 3	Grade 4
Master gradation sieve size (% retained)	Tex-110-E				As shown on the plans
2-1/2 in.		–	0	0	
1-3/4 in.		0	0–10	0–10	
7/8 in.		10–35	–	–	
3/8 in.		30–50	–	–	
No. 4		45–65	45–75	45–75	
No. 40		70–85	60–85	50–85	
Liquid limit, % max.[1]	Tex-104-E	35	40	40	As shown on the plans
Plasticity index, max.[1]	Tex-106-E	10	12	12	As shown on the plans
Plasticity index, min.[1]		As shown on the plans			
Wet ball mill, % max.[2]	Tex-116-E	40	45	–	As shown on the plans
Wet ball mill, % max. increase passing the No. 40 sieve		20	20	–	
Classification[3]	Tex-117-E	1.0	1.1–2.3	–	As shown on the plans
Min. compressive strength[3], psi					As shown on the plans
lateral pressure 0 psi		45	35	–	
lateral pressure 15 psi		175	175	–	

1. Determine plastic index in accordance with Tex-107-E (linear shrinkage) when liquid limit is unattainable as defined in Tex-104-E.
2. When a soundness value is required by the plans, test material in accordance with Tex-411-A.
3. Meet both the classification and the minimum compressive strength, unless otherwise shown on the plans.

1. **Material Tolerances.** The Engineer may accept material if no more than 1 of the 5 most recent gradation tests has an individual sieve outside the specified limits of the gradation.

When target grading is required by the plans, no single failing test may exceed the master grading by more than 5 percentage points on sieves No. 4 and larger or 3 percentage points on sieves smaller than No. 4.

The Engineer may accept material if no more than 1 of the 5 most recent plasticity index tests is outside the specified limit. No single failing test may exceed the allowable limit by more than 2 points.

2. **Material Types.** Do not use fillers or binders unless approved. Furnish the type specified on the plans in accordance with the following.
   a. **Type A.** Crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use gravel or multiple sources.
   b. **Type B.** Crushed or uncrushed gravel. Blending of 2 or more sources is allowed.
   c. **Type C.** Crushed gravel with a minimum of 60% of the particles retained on a No. 4 sieve with 2 or more crushed faces as determined by Tex-460-A, Part I. Blending of 2 or more sources is allowed.
   d. **Type D.** Type A material or crushed concrete. Crushed concrete containing gravel will be considered Type D material. Crushed concrete must meet the requirements in Section 247.2.A.3.b, “Recycled Material (Including Crushed Concrete) Requirements,” and be managed in a way to provide for uniform quality. The Engineer may require separate dedicated stockpiles in order to verify compliance.
   e. **Type E.** As shown on the plans.

3. **Recycled Material.** Recycled asphalt pavement (RAP) and other recycled materials may be used when shown on the plans. Request approval to blend 2 or more sources of recycled materials.
   a. **Limits on Percentage.** When RAP is allowed, do not exceed 20% RAP by weight unless otherwise shown on the plans. The percentage limitations for other recycled materials will be as shown on the plans.
   b. **Recycled Material (Including Crushed Concrete) Requirements.**
      (1) **Contractor Furnished Recycled Materials.** When the Contractor furnishes the recycled materials, including crushed concrete, the final product will be subject to the requirements of Table 1 for the grade specified. Certify compliance with DMS-11000, “Evaluating and Using Nonhazardous Recyclable Materials Guidelines,” for Contractor furnished recycled materials. In addition, recycled materials must be free from reinforcing steel and other objectionable material and have at most 1.5% deleterious material when tested in accordance with Tex-413-A. For RAP, do not exceed a maximum percent loss from decantation of 5.0% when tested in accordance with Tex-406-A. Test RAP without removing the asphalt.
      (2) **Department Furnished Required Recycled Materials.** When the Department furnishes and requires the use of recycled materials, unless otherwise shown on the plans:
         - Department required recycled material will not be subject to the requirements in Table 1,
         - Contractor furnished materials are subject to the requirements in Table 1 and this Item,
         - the final product, blended, will be subject to the requirements in Table 1, and
         - for final product, unblended (100% Department furnished required recycled material), the liquid limit, plasticity index, wet ball mill, classification, and compressive strength is waived.

Crush Department-furnished RAP so that 100% passes the 2 in. sieve. The Contractor is responsible for uniformly blending to meet the percentage required.

(3) Department Furnished and Allowed Recycled Materials. When the Department furnishes and allows the use of recycled materials or allows the Contractor to furnish recycled materials, the final blended product is subject to the requirements of Table 1 and the plans.

c. Recycled Material Sources. Department-owned recycled material is available to the Contractor only when shown on the plans. Return unused Department-owned recycled materials to the Department stockpile location designated by the Engineer unless otherwise shown on the plans.

The use of Contractor-owned recycled materials is allowed when shown on the plans. Contractor-owned surplus recycled materials remain the property of the Contractor. Remove Contractor-owned recycled materials from the project and dispose of them in accordance with federal, state, and local regulations before project acceptance. Do not intermingle Contractor-owned recycled material with Department-owned recycled material unless approved by the Engineer.

B. Water. Furnish water free of industrial wastes and other objectionable matter.

C. Material Sources. When non-commercial sources are used, expose the vertical faces of all strata of material proposed for use. Secure and process the material by successive vertical cuts extending through all exposed strata, when directed.

247.3. Equipment. Provide machinery, tools, and equipment necessary for proper execution of the work. Provide rollers in accordance with Item 210, “Rolling.” Provide proof rollers in accordance with Item 216, “Proof Rolling,” when required.

247.4. Construction. 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 plans or as directed.

Stockpile base material temporarily at an approved location before delivery to the roadway. Build stockpiles in layers no greater than 2 ft. thick. Stockpiles must have a total height between 10 and 16 ft. unless otherwise shown on the plans. After construction and acceptance of the stockpile, loading from the stockpile for delivery is allowed. Load by making successive vertical cuts through the entire depth of the stockpile.

Do not add or remove material from temporary stockpiles that require sampling and testing before delivery unless otherwise approved. Charges for additional sampling and testing required as a result of adding or removing material will be deducted from the Contractor’s estimates.

Haul approved flexible base in clean trucks. Deliver the required quantity to each 100-ft. station or designated stockpile site as shown on the plans. Prepare stockpile sites as directed. When delivery is to the 100-ft. station, manipulate in accordance with the applicable Items.

A. Preparation of Subgrade or Existing Base. Remove or scarify existing asphalt concrete pavement in accordance with Item 105, “Removing Stabilized Base and Asphalt Pavement,” when shown on the plans or as directed. Shape the subgrade or existing base to conform to the typical sections shown on the plans or as directed.

When new base is required to be mixed with existing base, deliver, place, and spread the new flexible base in the required amount per station. Manipulate and thoroughly mix the new base with existing material to provide a uniform mixture to the specified depth before shaping.

When shown on the plans or directed, proof roll the roadbed in accordance with Item 216, “Proof Rolling,” before pulverizing or scarifying. Correct soft spots as directed.

B. Placing. Spread and shape flexible base into a uniform layer with an approved spreader the same day as delivered unless otherwise approved. Construct layers to the thickness shown on the plans. Maintain the shape of the course. Control dust by sprinkling, as directed. Correct or replace segregated areas as directed, at no additional expense to the Department.

Place successive base courses and finish courses using the same construction methods required for the first course.

C. Compaction. Compact using density control unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. When necessary, sprinkle the material in accordance with Item 204, "Sprinkling."

Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the roller unit. On superelevated curves, begin rolling at the low side and progress toward the high side. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed.

Rework, recompact, 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 specification requirements are met. Perform the work at no additional expense to the Department.

1. **Ordinary Compaction.** Roll with approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing approved material as required, reshaping, and recompacting.
2. **Density Control.** Compact to at least 100% of the maximum density determined by Tex-113-E unless otherwise shown on the plans. Determine the moisture content of the material at the beginning and during compaction in accordance with Tex-103-E.

   The Engineer will determine roadway density of completed sections in accordance with Tex-115-E. The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

D. Finishing. After completing compaction, clip, skin, or tight-blade the surface with a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove loosened material and dispose of it at an approved location. Seal the clipped surface immediately by rolling with a pneumatic tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades as shown on the plans or as directed.

In areas where surfacing is to be placed, correct grade deviations greater than 1/4 in. in 16 ft. measured longitudinally or greater than 1/4 in. over the entire width of the cross-section. Correct by loosening, adding, or removing material. Reshape and recompact in accordance with Section 247.4.C, "Compaction."

E. Curing. Cure the finished section until the moisture content is at least 2 percentage points below optimum or as directed before applying the next successive course or prime coat.

247.5. Measurement. Flexible base will be measured as follows:

- **Flexible Base (Complete In Place).** The ton, square yard, or any cubic yard method.
- **Flexible Base (Roadway Delivery).** The ton or cubic yard in vehicle.
- **Flexible Base (Stockpile Delivery).** The ton, cubic yard in vehicle, or cubic yard in stockpile.

Measurement by the cubic yard in final position and square yard is a plans quantity measurement. The quantity to be paid for is the quantity shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

Measurement is further defined for payment as follows.

A. Cubic Yard in Vehicle. By the cubic yard in vehicles of uniform capacity at the point of delivery.

B. Cubic Yard in Stockpile. By the cubic yard in the final stockpile position by the method of average end areas.

C. Cubic Yard in Final Position. By the cubic yard in the completed and accepted final position. The volume of base course is computed in place by the method of average end areas between the original subgrade or existing base surfaces and the lines, grades, and slopes of the accepted base course as shown on the plans.

D. Square Yard. By the square yard of surface area in the completed and accepted final position. The surface area of the base course is based on the width of flexible base as shown on the plans.

E. Ton. By the ton of dry weight in vehicles as delivered. The dry weight is determined by deducting the weight of the moisture in the material at the time of weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with Tex-103-E from samples taken at the time of weighing.

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

247.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the types of work shown below. No additional payment will be made for thickness or width exceeding that shown on the typical section or provided on the plans for cubic yard in the final position or square yard measurement.

Sprinkling and rolling, except proof rolling, will not be paid for directly but will be subsidiary to this Item unless otherwise shown on the plans. When proof rolling is shown on the plans or directed, it will be paid for in accordance with Item 216, "Proof Rolling."

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade will be at the Contractor's expense. Where subgrade is not constructed under this project, correction of soft spots in the subgrade will be paid in accordance with pertinent Items or Article 4.2, "Changes in the Work."

A. Flexible Base (Complete In Place). Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. For square yard measurement, a depth will be specified. 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.

B. Flexible Base (Roadway Delivery). Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" will be specified. The unit price bid will not include processing at the roadway. 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, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

C. Flexible Base (Stockpile Delivery). Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" or "In Stockpile" will be specified. The unit price bid will not include processing at the roadway. This price is full compensation for furnishing and disposing of materials, preparing the stockpile area, temporary or permanent stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials to the stockpile, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

END OF SECTION 31 3214

SECTION 31 3220
TXDOT ITEM 260 - LIME TREATMENT (ROAD MIX)

260.1. Description. Mix and compact lime, water, and subgrade or base (with or without asphaltic concrete pavement) in the roadway.

260.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. Obtain verification from the Engineer that the specification requirements are met before using the sources. The Engineer may sample and test project materials at any time before compaction. Use Tex-100-E for material definitions.

A. Lime. Furnish lime that meets the requirements of DMS-6350 “Lime and Lime Slurry,” and DMS-6330, “Lime Sources Prequalification of Hydrated Lime and Quicklime.” Use hydrated lime, commercial lime slurry, or quicklime, as shown on the plans. When furnishing quicklime, provide it in bulk.

B. Flexible Base. Furnish base material that meets the requirements of Item 247, “Flexible Base,” for the type and grade shown on the plans, before the addition of lime.

C. Water. Furnish water free of industrial wastes and other objectionable material.

D. Asphalt. When asphalt or emulsion is permitted for curing purposes, furnish materials that meet the requirements of Item 300, “Asphalts, Oils, and Emulsions,” as shown on the plans or as directed.

E. Mix Design. The Engineer will determine the target lime content and optimum moisture content in accordance with Tex-121-E or prior experience with the project materials. The Contractor may propose a mix design developed in accordance with Tex-121-E. The Engineer will use Tex-121-E to verify the Contractor’s proposed mix design before acceptance. Reimburse the Department for subsequent mix designs or partial designs necessitated by changes in the material or requests by the Contractor. When treating existing materials, limit the amount of asphalt concrete pavement to no more than 50% of the mix unless otherwise shown on the plans or directed.

260.3. Equipment. Provide machinery, tools, and equipment necessary for proper execution of the work. Provide rollers in accordance with Item 210, “Rolling.” Provide proof rollers in accordance with Item 216, “Proof Rolling,” when required.

A. Storage Facility. Store quicklime and dry hydrated lime in closed, weatherproof containers.

B. Slurry Equipment. Use slurry tanks equipped with agitation devices to slurry hydrated lime or quicklime on the project or other approved location. The Engineer may approve other slurrying methods.

Provide a pump for agitating the slurry when the distributor truck is not equipped with an agitator. Equip the distributor truck with a sampling device in accordance with Tex-600-J, Part I, when using commercial lime slurry.

C. Pulverization Equipment. Provide pulverization equipment that:

- cuts and pulverizes material uniformly to the proper depth with cutters that plane to a uniform surface over the entire width of the cut,
- provides a visible indication of the depth of cut at all times, and
- uniformly mixes the materials.

260.4. Construction. 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 plans or as directed.

A. Preparation of Subgrade or Existing Base for Treatment. Before treating, remove existing asphalt concrete pavement in accordance with Item 105, “Removing Stabilized Base and Asphalt Pavement,” when shown on the plans or as directed. Shape existing material in accordance with applicable bid items to conform to typical sections shown on the plans and as directed.

When shown on the plans or directed, proof roll the roadbed in accordance with Item 216, “Proof Rolling,” before pulverizing or scarifying existing material. Correct soft spots as directed.

When new base material is required to be mixed with existing base, deliver, place, and spread the new material in the required amount per station. Manipulate and thoroughly mix new base with existing material to provide a uniform mixture to the specified depth before shaping.

B. Pulverization. Pulverize or scarify existing material after shaping so that 100% passes a 2-1/2-in. sieve. If the material cannot be uniformly processed to the required depth in a single pass, excavate and windrow the material to expose a secondary grade to achieve processing to plan depth.

C. Application of Lime. Uniformly apply lime using dry or slurry placement as shown on the plans or as directed. Add lime at the percentage determined in Section 260.2.E, “Mix Design.” Apply lime only on an area where mixing can be completed during the same working day.

Start lime application only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend application when the Engineer determines that weather conditions are unsuitable.

Minimize dust and scattering of lime by wind. Do not apply lime when wind conditions, in the opinion of the Engineer, cause blowing lime to become dangerous to traffic or objectionable to adjacent property owners. When pebble grade quicklime is placed dry, mix the material and lime thoroughly at the time of lime application. *Use of quicklime can be dangerous. Inform users of the recommended precautions for handling and storage.*

1. **Dry Placement.** Before applying lime, bring the prepared roadway to approximately optimum moisture content. When necessary, sprinkle in accordance with Item 204, “Sprinkling.” Distribute the required quantity of hydrated lime or pebble grade quicklime with approved equipment. Only hydrated lime may be distributed by bag. Do not use a motor grader to spread hydrated lime.
2. **Slurry Placement.** Provide slurry free of objectionable materials, at or above the approved minimum dry solids content, and with a uniform consistency that will allow ease of handling and uniform application. Deliver commercial lime slurry to the jobsite or prepare lime slurry at the jobsite or other approved location by using hydrated lime or quicklime, as specified.

   Distribute slurry uniformly by making successive passes over a measured section of roadway until the specified lime content is reached. Uniformly spread the residue from quicklime slurry over the length of the roadway being processed, unless otherwise directed.

D. Mixing. Begin mixing within 6 hours of application of lime. Hydrated lime exposed to the open air for 6 hours or more between application and mixing, or that experiences excessive loss due to washing or blowing, will not be accepted for payment.

Thoroughly mix the material and lime using approved equipment. Allow the mixture to mellow for 1 to 4 days, as directed. When pebble grade quicklime is used, allow the mixture to mellow for 2 to 4 days, as directed. Sprinkle the treated materials during the mixing and mellowing operation, as directed, to achieve adequate hydration and proper moisture content. After mellowing, resume mixing until a homogeneous, friable mixture is obtained.

After mixing, the Engineer will sample the mixture at roadway moisture and test in accordance with Tex-101-E, Part III, to determine compliance with the gradation requirements in Table 1.

Table 1
Gradation Requirements (Minimum % Passing)

Sieve Size	Base	Subgrade
1-3/4 in.	100	100
3/4 in.	85	85
No. 4	–	60

E. Compaction. Compact the mixture using density control, unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. When necessary, sprinkle the treated material in accordance with Item 204, “Sprinkling.” Determine the moisture content of the mixture at the beginning and during compaction in accordance with Tex-103-E.

Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half the width of the roller unit. On superelevated curves, begin rolling at the low side and progress toward the high side. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 MPH, as directed.

Rework, recompact, 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 specification requirements are met. Rework in accordance with Section 260.4.F, “Reworking a Section.” Perform the work at no additional expense to the Department.

1. **Ordinary Compaction.** Roll with approved compaction equipment, as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and recompacting.
2. **Density Control.** The Engineer will determine roadway density of completed sections in accordance with Tex-115-E. The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.
    a. **Subgrade.** Compact to at least 95% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans.
    b. **Base.** Compact the bottom course to at least 95% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans. Compact subsequent courses treated under this Item to at least 98% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans.

F. Reworking a Section. When a section is reworked within 72 hours after completion of compaction, rework the section to provide the required density. When a section is reworked more than 72 hr. after completion of compaction, add additional lime at 25% of the percentage determined in Section 260.2.E, “Mix Design.” Reworking includes loosening, adding material or removing unacceptable material if necessary, mixing as directed, compacting, and finishing. When density control is specified, determine a new maximum density of the reworked material in accordance with Tex-121-E, and compact to at least 95% of this density.

G. Finishing. Immediately after completing compaction of the final course, clip, skin, or tight-blade the surface of the lime-treated material with a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove loosened material and dispose of at an approved location. Roll the clipped surface immediately with a pneumatic tire roller until a smooth surface is attained. Add small amounts of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades shown on the plans or as directed.

Finish grade of constructed subgrade in accordance with Section 132.3.F.1, "Grade Tolerances." Finish grade of constructed base in accordance with Section 247.4.D, "Finishing."

H. Curing. Cure for the minimum number of days shown in Table 2 by sprinkling in accordance with Item 204, "Sprinkling," or by applying an asphalt material at a rate of 0.05 to 0.20 gal. per square yard as directed. Maintain moisture during curing. Upon completion of curing, maintain the moisture content in accordance with Article 132.3.E, "Maintenance of Moisture and Reworking" for subgrade and Article 247.4.E, "Curing" for bases prior to placing subsequent courses. Do not allow equipment on the finished course during curing except as required for sprinkling, unless otherwise approved. Apply seals or additional courses within 14 calendar days of final compaction.

Table 2
Minimum Curing Requirements Before Placing Subsequent Courses[1]

Untreated Material	Curing (Days)
PI $\leq$ 35	2
PI > 35	5

1. Subject to the approval of the Engineer. Proof rolling may be required as an indicator of adequate curing.

260.5. Measurement.

A. Lime. When lime is furnished in trucks, the weight of lime will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

When lime is furnished in bags, indicate the manufacturer's certified weight. Bags varying more than 5% from that weight may be rejected. The average weight of bags in any shipment, as determined by weighing 10 bags taken at random, must be at least the manufacturer's certified weight.

1. **Hydrated Lime.**
   a. **Dry.** Lime will be measured by the ton (dry weight).
   b. **Slurry.** Lime slurry will be measured by the ton (dry weight) of the hydrated lime used to prepare the slurry at the job site.
2. **Commercial Lime Slurry.** Lime slurry will be measured by the ton (dry weight) as calculated from the minimum percent dry solids content of the slurry, multiplied by the weight of the slurry in tons delivered.
3. **Quicklime.**
   a. **Dry.** Lime will be measured by the ton (dry weight) of the quicklime.

b. Slurry. Lime slurry will be measured by the ton (dry weight) of the quicklime used to prepare the slurry multiplied by a conversion factor of 1.28 to give the quantity of equivalent hydrated lime, which will be the basis of payment.

B. Lime Treatment. Lime treatment will be measured by the square yard of surface area. The dimensions for determining the surface area are established by the widths shown on the plans and the lengths measured at placement.

260.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid in accordance with Section 260.6.A, "Lime," or Section 260.6.B, "Lime Treatment."

Furnishing and delivering new base will be paid for in accordance with Section 247.6.B, "Flexible Base (Roadway Delivery)." Mixing, spreading, blading, shaping, compacting, and finishing new or existing base material will be paid for in accordance with Section 260.6.B, "Lime Treatment." Removal and disposal of existing asphalt concrete pavement will be paid for in accordance with pertinent Items or Article 4.2, "Changes in the Work."

Sprinkling and rolling, except proof rolling, will not be paid for directly but will be subsidiary to this Item, unless otherwise shown on the plans. When proof rolling is shown on the plans or directed by the Engineer, it will be paid for in accordance with Item 216, "Proof Rolling."

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade or existing base will be at the Contractor's expense. Where subgrade is not constructed under this Contract, correction of soft spots in the subgrade or existing base will be paid for in accordance with pertinent Items or Article 4.2, "Changes in the Work."

Asphalt used solely for curing will not be paid for directly, but will be subsidiary to this Item. Asphalt placed for curing and priming will be paid for under Item 310, "Prime Coat."

A. Lime. Lime will be paid for at the unit price bid for "Lime" of one of the following types:

- Hydrated Lime (Dry),
- Hydrated Lime (Slurry),
- Commercial Lime Slurry,
- Quicklime (Dry), or
- Quicklime (Slurry).

This price is full compensation for materials, delivery, equipment, labor, tools, and incidentals.

Lime used for reworking a section in accordance with Section 260.4.F, "Reworking a Section," will not be paid for directly but will be subsidiary to this Item.

B. Lime Treatment. Lime treatment will be paid for at the unit price bid for "Lime Treatment (Existing Material)," "Lime Treatment (New Base)," or "Lime Treatment (Mixing Existing Material and New Base)," for the depth specified. No payment will be made for thickness or width exceeding that shown on the plans. This price is full compensation for shaping existing material, loosening, mixing, pulverizing, providing lime, spreading, applying lime, compacting, finishing, curing, curing materials, blading, shaping and maintaining, replacing, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water, equipment, labor, tools, and incidentals.

END OF SECTION 31 3220

SECTION 31 3700
RIPRAP

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Riprap .

1.02 RELATED REQUIREMENTS

A. Section 31 2323 - Fill: Aggregate requirements.

1.03 PRICE AND PAYMENT PROCEDURES

A.

B. See Unit Prices, for additional unit price requirements.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with 2004 TxDOT Standard Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riprap: Provide in accordance with Item 432 of 2004 TxDOT Standard Specifications.

B. Aggregate: Granular fill as specified in Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not place riprap bags over frozen or spongy subgrade surfaces.

3.02 PLACEMENT

A. Place geotextile fabric over substrate, lap edges and ends.

B. Place riprap at culvert pipe ends, embankment slopes, and as indicated.

END OF SECTION 31 3700

SECTION 32 1124
TXDOT ITEM 251 - REWORKING BASE COURSES

251.1. Description. Refinish existing base material or rework existing base material with or without asphaltic concrete pavement. Incorporate new base material when shown on plans.

251.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer will verify that the specification requirements are met before the sources can be used. The Engineer may sample and test project materials at any time before compaction. Use Tex-100-E for material definitions.

A. **Flexible Base.** Furnish new base material that meets the requirements of Item 247, "Flexible Base," for the type and grade shown on the plans.

B. **Water.** Furnish water free of industrial wastes and other objectionable matter.

251.3. Equipment. Provide machinery, tools, and equipment necessary for proper execution of the work.

A. **Compaction Equipment.** Provide rollers in accordance with Item 210, "Rolling." Provide rollers in accordance with Item 216, "Proof Rolling," when required.

B. **Pulverization Equipment.** Provide pulverization equipment that:

- cuts and pulverizes material uniformly to the proper depth with cutters that plane to a uniform surface over the entire width of the cut,
- provides a visible indication of the depth of cut at all times, and
- uniformly mixes the materials.

251.4. Construction. Perform work to the width and depth shown on the typical sections for the type of work shown on the plans. Construct and shape exposed subgrade to conform to typical sections as shown on the plans or as directed. Proof roll in accordance with Item 216, "Proof Rolling," when shown on the plans. Correct soft spots as directed.

Before scarifying, clean the existing base of objectionable materials by blading, brooming, or other approved methods, unless otherwise shown on the plans. Perform this work in accordance with applicable Items.

A. **Types of Work:**

1. **Type A.** Scarifying only.
2. **Type B.** Scarifying, salvaging, and replacing.
3. **Type C.** Scarifying, salvaging, and stockpiling.
4. **Type D.** Scarifying and reshaping.
5. **Type E.** Refinishing.

B. **Performance of Work.**

1. **Scarifying.** Loosen and break existing base material, with or without existing asphaltic concrete pavement. Remove asphalt concrete pavement, surface treatment, plant-mix seal, and micro-surfacing when shown on the plans and in accordance with applicable items. Prevent contamination of asphalt material during and after removal. When the existing pavement consists of only a surface treatment, do not remove before scarifying.

Scarify existing material for its full width and depth, unless otherwise shown on the plans. Do not disturb the underlying subgrade. Break material into particles of not more than 2-1/2 in., unless otherwise shown on the plans.

2. **Salvaging.** Remove the existing base material and stockpile. Windrow if allowed. Perform salvage operations without interfering with traffic, proper drainage, or the general requirements of the work. Remove scarified material using a method approved by the Engineer. Keep material free of contamination.
3. **Replacing.** Before replacing salvaged material, prepare subgrade as shown on the plans or as directed. Proof roll in accordance with Item 216, “Proof Rolling,” when shown on the plans. Correct soft spots as directed.

   Return and rework salvaged base material, with or without additional new base material, on the prepared roadbed. Deposit salvaged material on the prepared subgrade and sprinkle, blade, and shape the base to conform to the typical sections shown on the plans or as directed. When shown on the plans, place new base material and uniformly mix with salvaged material. Correct, or remove and replace, segregated material with satisfactory material, as directed.
4. **Stockpiling.** Store salvaged base material at a location shown on the plans or as directed. Prepare stockpile sites by removing and disposing of trash, wood, brush, stumps, vegetation, and other objectionable materials as directed. Deliver salvaged material and construct stockpiles as directed.
5. **Reshaping.** Rework scarified base material with or without additional new base material. Mix and shape scarified base to conform to the typical sections shown on the plans. When shown on the plans, furnish new base material, and uniformly mix with scarified material before shaping. Do not disturb the underlying subgrade. Correct, or remove and replace, segregated material with satisfactory material as directed.
6. **Refinishing.** Blade existing base surface to remove irregularities. Cure before placing the pavement on the refinished base, as shown on the plans or as directed.

C. **Compaction.** Compact using ordinary compaction or density control as shown on the plans. Bring each layer to the moisture content directed. When necessary, sprinkle the material in accordance with Item 204, “Sprinkling.”

Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half the width of the roller unit. On super elevated curves, begin rolling at the low side and progress toward the high side. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 MPH, as directed.

Rework, recompact, 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 specification requirements are met. Perform the work at no additional expense to the Department.

1. **Ordinary Compaction.** Roll with approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing approved material as required, reshaping, and recompacting.

2. **Density Control.** Determine the moisture content in the mixture at the beginning of and during compaction in accordance with Tex-103-E. Compact to at least 98% of the maximum density determined by Tex-113-E, unless otherwise shown on the plans.

   The Engineer will determine roadway density of completed sections in accordance with Tex-115-E. The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

D. **Finishing.** Immediately after completing compaction, clip, skin, or tight-blade the surface with a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove and dispose of loosened material at an approved location. Seal the clipped surface immediately by rolling with a pneumatic tire roller until a smooth surface is attained. Add small amounts of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades shown on the plans or as directed.

In areas where surfacing is to be placed, correct grade deviations in excess of 1/4 in. in 16 ft. measured longitudinally for the entire width of the cross-section. Correct by loosening, adding, or removing material. Reshape and recompact in accordance with Section 251.4.C, “Compaction.”

E. **Curing.** Cure the finished section until the moisture content is at least 2 percentage points below optimum or as directed before applying the next successive course or prime coat.

251.5. Measurement. This Item will be measured by the station, square yard, cubic yard, or ton.

Square yard and cubic yard in original position measurement will be established by the widths and depths shown in the plans and the lengths measured in the field.

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, “Weighing and Measuring Equipment.”

Measurement is further defined for payment as follows.

A. **Station.** By the 100-ft. station measured along the centerline of each roadbed.

B. **Square Yard.** By the square yard of existing base or pavement in its original position. When square yard measurement is used, limits of measurement will be as shown on the plans.

C. **Cubic Yard in Vehicle.** By the cubic yard of salvaged material in vehicles as delivered at the stockpile.

D. **Cubic Yard in Stockpile.** By the cubic yard of salvaged material in the final stockpile position by the method of average end areas.

E. **Cubic Yard in Original Position.** By the cubic yard in its original position measured by the method of average end areas.

F. **Ton.** By the ton of dry weight in the trucks as delivered at the stockpile. The dry weight is determined by deducting the weight of the moisture in the material at the time of weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with Tex-103-E from samples taken at the time of truck weighing.

251.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Reworking Base Material” for the type, scarified depth, and compaction method shown on the plans. For cubic yard measurements, the measurement location (vehicle, stockpile, or original position) will be specified. No additional payment will be made for thickness or width exceeding that shown on the typical sections or provided on the plans for station, square yard, and cubic yard in the original position measurement. This price is full compensation for furnishing and disposing of materials, blading, brooming, scarifying, salvaging, replacing, stockpiling, reshaping, refinishing, compacting, finishing, curing, and equipment, labor, tools, and incidentals.

Furnishing and delivering new base will be paid for in accordance with Section 247.6.B, “Flexible Base (Roadway Delivery).” Mixing, spreading, blading, shaping, compacting, and finishing new or existing base material will not be paid for directly, but will be subsidiary to this Item.

Sprinkling and rolling, except proof rolling, will not be paid for directly but will be subsidiary to this Item, unless otherwise shown on the plans. When proof rolling is shown on the plans or directed by the Engineer, it will be paid for in accordance with Item 216, “Proof Rolling.”

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade or existing base will be at the Contractor’s expense. Where subgrade is not constructed under this Contract, correction of soft spots in the subgrade or existing base will be in accordance with pertinent Items or Article 4.2, “Changes in the Work.”

Removal of existing asphalt concrete pavement will be paid for in accordance with pertinent Items or Article 4.2, “Changes in the Work.”

Additional restrictions for measurement and payment are as follows:

- **Type A.** Work will be restricted to station and square yard measurement.
- **Type B.** Work will be restricted to station, square yard, and cubic yard in the original position measurement.
- **Type C.** Work will not be restricted to any measurement.
- **Type D.** Work will be restricted to station, square yard, and cubic yard in the original position measurement.
- **Type E.** Work will be restricted to station and square yard measurement.

END OF SECTION 32 11424

SECTION 32 1216
ASPHALT PAVING

PART 1 GENERAL

Asphalt paving shall be provided in accordance with the **compacted** thickness specified for the use category indicated and in accordance with this Specification and as further shown in the Typical Detail Section of the Site-Civil Plans.

1.01 SECTION INCLUDES
A. Aggregate base course.
B. Single course bituminous concrete paving.
C. Surface sealer.

1.02 RELATED REQUIREMENTS
A. Section 31 2200 - Grading: Preparation of site for paving and base.
B. Section 31 2323 - Fill: Compacted subgrade for paving.
C. Section 32 1123 - Aggregate Base Courses: Aggregate base course.
D. Section 33 0513 - Manholes and Structures: Manholes, including frames; gutter drainage grilles, covers, and frames for placement by this section.
E. Section 32 1723.13 – Painted Pavement Markings.

1.03 PRICE AND PAYMENT PROCEDURES
A. Subsidiary to Project Cost
B. Asphalt Pavement Mix (Binder Course): By the ton. Includes preparing base, tack coating surfaces, placing, compacting and rolling, testing. Includes mix design, supplying to site, testing.
C. Asphalt Pavement Mix (Wearing Course): By the ton. Includes preparing base, tack coating surfaces, placing, compacting and rolling, testing. Includes mix design, supplying to site, testing.
D. Seal Coat: By the square yard. Includes preparing surfaces and applying.

1.04 REFERENCE STANDARDS

1.05 TXDOT ITEM 300 ASPHALTS, OILS AND EMULSIONS (STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES; 2014 EDITION)

1.06 TXDOT ITEM 301 ASPHALT ANTI-STRIPPING AGENTS (STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES; 2014 EDITION)

1.07 TXDOT ITEM 310 ANTI-STRIPPING AGENTS (STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES; 2014 EDITION)

1.08 TXDOT ITEM 340 DENSE-GRADED HOT-MIX ASPHALT (STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES; 2014 EDITION)

1.09 TXDOT ITEM 300 ASPHALTS, OILS AND EMULSIONS (STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES; 2014 EDITION)
A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; 1997.
B. AI MS-19 - A Basic Asphalt Emulsion Manual; Fourth Edition.
C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.10 QUALITY ASSURANCE

A. Perform Work in accordance with 2014 TxDOT Standard Specifications.
B. Mixing Plant: Conform to 2014 TxDOT Standard Specifications.
C. Obtain materials from same source throughout.

1.11 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D 946.
B. Hot Mix Surface Course with Lime Stone Aggregate and Fillers , TxDoT Type D, Item 340 compacted to a minimum of 92% SPD.
C. Aggregate for Base Course: In accordance with 2014 TxDOT Standard Specifications Type B Grade 3, item 247 compacted to a minimum of 98% SPD, ASTM D-698 with 1.5% lime by weight.
D. Stabilized Subgrade: General Fill material compacted to 95% SPD and stabilized with 3% lime by weight to the thickness specified on the plans.
E. Aggregate for Binder Course: 2014 TxDOT Standard Specifications.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Base Course: 3.0 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.
B. Binder Course: 4.5 to 6 percent of asphalt cement by weight in mixture in accordance with AI ____.
C. Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2.
D. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
B. Verify gradients and elevations of base are correct.

3.02 BASE COURSE

A. Place and compact base course.
B. See Section 32 1123.

3.03 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer's instructions.
B. Apply primer on aggregate base or subbase at uniform rate of 1/3 gal/sq yd.
C. Apply primer to contact surfaces of curbs, gutters, and valley gutters.
D. Use clean sand to blot excess primer.

3.04 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.
B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.
C. Apply tack coat to contact surfaces of curbs, gutters and valley gutters.
D. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.05 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with State of Texas Highways standards.
B. Place asphalt within 24 hours of applying primer or tack coat.

C. Place to 1 1/2" inch compacted thickness.
D. Install gutter drainage grilles and frames in correct position and elevation.
E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.06 SEAL COAT

A. Apply seal coat to surface course and asphalt curbs in accordance with AI MS-19.

3.07 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.
C. Variation from True Elevation: Within 1/2 inch.

3.08 FIELD QUALITY CONTROL

A. See Quality Requirements, for general requirements for quality control.
B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.09 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 5 days or until surface temperature is less than 140 degrees F.

END OF SECTION 32 1216

SECTION 32 1216.5
TXDOT ITEM 340 DENSE-GRADED HOT-MIX ASPHALT (METHOD)

340.1. Description. Construct a pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant.

340.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the requirements of this Item are met and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify compliance.

A. Aggregate. Furnish aggregates from sources that conform to the requirements shown in Table 1, and as specified in this Section, unless otherwise shown on the plans. Provide aggregate stockpiles that meet the definition in this Section for either coarse aggregate or fine aggregate. When reclaimed asphalt pavement (RAP) is allowed by plan note, provide RAP stockpiles in accordance with this Section. Aggregate from RAP is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply mechanically crushed gravel or stone aggregates that meet the definitions in Tex-100-E. The Engineer will designate the plant or the quarry as the sampling location. Samples must be from materials produced for the project. The Engineer will establish the surface aggregate classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro- Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II. Do not add material to an approved stockpile from sources that do not meet the aggregate quality requirements of the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) unless otherwise approved.

1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Provide aggregates from sources listed in the BRSQC. Provide aggregate from nonlisted sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for nonlisted sources.

   Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes, unless otherwise shown on the plans. The SAC for sources on the Department's AQMP is listed in the BRSQC.

   Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. When blending, do not use Class C or D aggregates. For blending purposes, coarse aggregate from RAP will be considered as Class B aggregate.
2. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2-in. sieve.

   RAP from either Contractor- or Department-owned sources, including RAP generated during the project, is permitted only when shown on the plans. Department-owned RAP, if allowed for use, will be available at the location shown on the plans. When RAP is

used, determine asphalt content and gradation for mixture design purposes. Perform other tests on RAP when shown on the plans.

When RAP is allowed by plan note, use no more than 30% RAP in Type A or B mixtures unless otherwise shown on the plans. For all other mixtures, use no more than 20% RAP unless otherwise shown on the plans.

Do not use RAP contaminated with dirt or other objectionable materials. Do not use the RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with the laboratory method given in Tex-406-A, Part I. Determine the plasticity index using Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

3. **Fine Aggregate.** Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with

Tex-408-A to verify the material is free from organic impurities. At most 15% of the total aggregate may be field sand or other uncrushed fine aggregate. With the exception of field sand,

use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1,

unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

Table 1
Aggregate Quality Requirements

Property	**Test Method**	**Requirement**
Coarse Aggregate		
SAC	AQMP	As shown on plans
Deleterious material, %, max	Tex-217-F, Part I	1.5
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 1
Los Angeles abrasion, %, max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	30[2]
Coarse aggregate angularity, 2 crushed faces, %, min	Tex 460-A, Part I	85[3]
Flat and elongated particles @ 5:1, %, max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, max	Tex-107-E	3

Combined Aggregate[4]		
Sand equivalent, %, min	Tex-203-F	45

1. Not used for acceptance purposes. Used by the Engineer as an indicator of the need for further investigation.
2. Unless otherwise shown on the plans.
3. Unless otherwise shown on the plans. Only applies to crushed gravel.
4. Aggregates, without mineral filler, RAP, or additives, combined as used in the job-mix formula (JMF).
5.

Table 2
Gradation Requirements for Fine Aggregate

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70–100
#200	0–30

B. Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, cement, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Do not use more than 2% hydrated lime or cement, unless otherwise shown on the plans. The plans may require or disallow specific mineral fillers. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size		% Passing by Weight or Volume
#8		100
#200		55–100

C. Baghouse Fines. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

D. Asphalt Binder. Furnish the type and grade of performance-graded (PG) asphalt binder specified on the plans in accordance with Section 300.2.J, “Performance-Graded Binders.”

E. Tack Coat. Unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, “Asphalts, Oils, and Emulsions.”

Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use. If required, verify that emulsified asphalt proposed for use meets the

minimum residual asphalt percentage specified in Item 300, “Asphalts, Oils, and Emulsions.”
The Engineer will obtain at least 1 sample of the tack coat binder per project and test it to verify compliance with Item 300. The Engineer will obtain the sample from the asphalt distributor immediately before use.

F. Additives. When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing or improve the quality of the mixture may be allowed when approved.
If lime or a liquid antistripping agent is used, add in accordance with Item 301, “Asphalt Antistripping Agents.” Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime back into the drum.

340.3. Equipment. Provide required or necessary equipment in accordance with Item 320, “Equipment for
Asphalt Concrete Pavement.”

340.4. Construction. Design, produce, store, transport, place, and compact the specified paving mixture in accordance with the requirements of this Item. Unless otherwise shown on the plans, provide the mix design. The Department will perform quality assurance (QA) testing. Provide quality control (QC) testing
as needed to meet the requirements of this Item.

A. Mixture Design.

1. Design Requirements. Use a Level II specialist certified by a Department-approved hot-mix asphalt certification program to develop the mixture design. Have the Level II specialist sign the design documents. Unless otherwise shown on the plans, use the typical weight design example given in Tex-204-F, Part I, to design a mixture meeting the requirements listed in Tables 1 through
6. Use an approved laboratory to perform the Hamburg Wheel test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Construction Division maintains a list of approved laboratories. Furnish the Engineer with representative samples of all materials used in the mixture design. The Engineer will verify the mixture design. If the design cannot be verified by the Engineer, furnish another mixture design.
The Contractor may submit a new mixture design at anytime during the project. The Engineer will approve all mixture designs before the Contractor can begin production.
Provide the Engineer with a mixture design report using Department-provided software. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level II person or persons who performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 4
Master Gradation Bands (% Passing by Weight or Volume) and Volumetric Properties

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
1-1/2"	98.0–100.0	–	–	–	–
1"	78.0–94.0	98.0–100.0	–	–	–

3/4"	64.0–85.0	84.0–98.0	95.0–100.0	–	–
1/2"	50.0–70.0	–	–	98.0–100.0	–
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	80.0–86.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA[1], % Minimum					
–	12.0	13.0	14.0	15.0	16.0
Plant-Produced VMA, % Minimum					
–	11.0	12.0	13.0	14.0	15.0

1. Voids in Mineral Aggregates.

Table 5
Laboratory Mixture Design Properties

Property	**Test Method**	**Requirement**
Target laboratory-molded density, %	Tex-207-F	96.0[1]
Tensile strength (dry), psi (molded to 93% ±1% density)	Tex-226-F	85–200[2]
Boil test[3]	Tex-530-C	–

1. Unless otherwise shown on the plans.
2. May exceed 200 psi when approved and may be waived when approved.
3. Used to establish baseline for comparison to production results. May be waived when approved.

Table 6
Hamburg Wheel Test Requirements[1]

High-Temperature Binder Grade	**Minimum # of Passes[2] @ 0.5" Rut Depth, Tested @ 122°F**
PG 64 or lower	10,000
PG 70	15,000
PG 76 or higher	20,000

1. Tested in accordance with Tex-242-F.
2. May be decreased or waived when shown on the plans.

B. Job-Mix Formula Approval. The job-mix formula (JMF) is the combined aggregate gradation and target asphalt percentage used to establish target values for mixture production. JMF is the original laboratory mixture design used to produce the trial batch. The Engineer and the Contractor will verify JMF based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the
trial batch to verify JMF. If the JMF is not verified by the Engineer from the trial batch, adjust the JMF
or redesign the mix and produce as many trial batches as necessary to verify the JMF.
Provide the Engineer with split samples of the mixtures and blank samples used to determine the ignition oven correction factors. The Engineer will determine the aggregate and asphalt correction factors from the ignition oven using Tex-236-F.
The Engineer will use a Texas gyratory compactor calibrated in accordance with Tex-914-F in molding production samples.
The Engineer will perform Tex-530-C and retain the tested sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

C. JMF Field Adjustments. Produce a mixture of uniform composition closely conforming to the approved JMF.
If, during initial days of production, the Contractor or Engineer determines that adjustments to the JMF are necessary to achieve the specified requirements, or to more nearly match the aggregate production, the Engineer may allow adjustment of the JMF within the tolerances of Table 7 without a laboratory redesign of the mixture.
The Engineer will adjust the asphalt content to maintain desirable laboratory density near the optimum value while achieving other mix requirements.

Table 7
Operational Tolerances

Description	Test Method	Allowable Difference from JMF Target
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±5.0[1]
Individual % retained for sieves smaller than #8 and larger than #200		±3.0[1]
% passing the #200 sieve		±2.0[1]
Asphalt content, %	Tex-236-F	±0.3[1]
Laboratory-molded density, %	Tex-207-F	±1.0
VMA, %, min		Note 2

1. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the percent passing the #200 sieve will be considered out of tolerance when outside the master grading limits.
2. Test and verify that Table 4 requirements are met.

D. Production Operations. Perform a new trial batch when the plant or plant location is changed. The Engineer may suspend production for noncompliance with this Item. Take

corrective action and obtain approval to proceed after any production suspension for noncompliance.

1. Operational Tolerances. During production, do not exceed the operational tolerances in Table 7.

Stop production if testing indicates tolerances are exceeded on:

- 3 consecutive tests on any individual sieve,
- 4 consecutive tests on any of the sieves, or
- 2 consecutive tests on asphalt content.

Begin production only when test results or other information indicate, to the satisfaction of the Engineer, that the next mixture produced will be within Table 7 tolerances.

2. Storage and Heating of Materials. Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions" or outside the manufacturer's recommended values. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures in accordance with Item 320, "Equipment for Asphalt Concrete Pavement." Unless otherwise approved, do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.

3. Mixing and Discharge of Materials. Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F. The Department will not pay for or allow placement of any mixture produced at more than 350°F. Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant.

E. Hauling Operations. Before use, clean all truck beds to ensure mixture is not contaminated. When a release agent is necessary to coat truck beds, use a release agent on the approved list maintained by the Construction Division.

F. Placement Operations. Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly. Place mixture within the compacted lift thickness shown in Table 8, unless otherwise shown on the plans or allowed.

Table 8
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness	
	Minimum (in.)	Maximum (in.)
A	3.00	6.00
B	2.50	5.00
C	2.00	4.00
D	1.50	3.00
F	1.25	2.50

1. **Weather Conditions.** Place mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Measure the roadway surface temperature with a handheld infrared thermometer. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.
2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.04
and 0.10 gal. of residual asphalt per square yard of surface area. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Prevent splattering of tack coat when placed
adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller when directed. The Engineer may use Tex-243-F to verify that the tack coat has adequate adhesive
properties. The Engineer may suspend paving operations until there is adequate adhesion.

G. Lay-Down Operations.

1. **Minimum Mixture Placement Temperatures.** Use Table 9 for suggested minimum mixture placement temperatures.
2. **Windrow Operations.** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

Table 9
Suggested Minimum Mixture Placement Temperature

High-Temperature Binder Grade	**Minimum Placement Temperature (Before Entering Paver)**
PG 64 or lower	260°F
PG 70	270°F
PG 76	280°F
PG 82 or higher	290°F

H. Compaction. Use air void control unless ordinary compaction control is specified on the plans. Avoid displacement of the mixture. If displacement occurs, correct to the satisfaction of the Engineer. Ensure pavement is fully compacted before allowing rollers to stand on the pavement. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off the mixture. Unless otherwise directed, operate vibratory rollers in static mode when not compacting, when changing directions, or when the plan depth of the pavement mat is less than 1-1/2 in.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with the rollers.

The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

1. **Air Void Control.** Compact dense-graded hot-mix asphalt to contain from 5% to 9% in-place air voids. Do not increase the asphalt content of the mixture to reduce pavement air voids.

   a. Rollers. Furnish the type, size, and number or rollers required for compaction, as approved.

   Use a pneumatic-tire roller to seal the surface, unless otherwise shown on the plans. Use additional rollers as required to remove any roller marks.

   b. Air Void Determination. Unless otherwise shown on the plans, obtain 2 roadway specimens at each location selected by the Engineer for in-place air void determination. The Engineer will measure air voids in accordance with Tex-207-F and Tex-227-F. Before drying to a constant weight, cores may be predried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will use the average air void content of the 2 cores to calculate the in-place air voids at the selected location.

   c. Air Voids Out of Range. If the in-place air void content in the compacted mixture is below

   5% or greater than 9%, change the production and placement operations to bring the in-place air void content within requirements. The Engineer may suspend production until the in-place air void content is brought to the required level, and may require a test section as described in
   Section 340.4.H.1.d, “Test Section.”

   d. Test Section. Construct a test section of 1 lane-width and at most 0.2 mi. in length to demonstrate that compaction to between 5% and 9% in-place air voids can be obtained. Continue this procedure until a test section with 5% to 9% in-place air voids can be produced. The Engineer will allow only 2 test sections per day. When a test section producing satisfactory in-place air void content is placed, resume full production.

2. **Ordinary Compaction Control.** Furnish the type, size, and number or rollers required for compaction, as approved. Furnish at least 1 medium pneumatic-tire roller (minimum 12-ton weight). Use the control strip method given in Tex-207-F, Part IV, to establish rolling patterns that achieve maximum compaction. Follow the selected rolling pattern unless changes that affect compaction occur in the mixture or placement conditions. When such changes occur, establish a new rolling pattern. Compact the pavement to meet the requirements of the plans and specifications.

   When rolling with the 3-wheel, tandem or vibratory rollers, start by first rolling the joint with the adjacent pavement and then continue by rolling longitudinally at the sides. Proceed toward the center of the pavement, overlapping on successive trips by at least 1 ft., unless otherwise directed. Make alternate trips of the roller slightly different in length. On superelevated curves, begin rolling at the low side and progress toward the high side unless otherwise directed.

I. Irregularities. Immediately take corrective action if surface irregularities, including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, color, texture, roller

marks, tears, gouges, streaks, or uncoated aggregate particles, are detected. The Engineer may suspend production or placement operations until the problem is corrected.
At the expense of the Contractor and to the satisfaction of the Engineer, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities identified above.

J. Ride Quality. Use Surface Test Type A to evaluate ride quality in accordance with Item 585, "Ride
Quality for Pavement Surfaces," unless otherwise shown on the plans.

340.5. Measurement. Hot mix will be measured by the ton of composite hot mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

340.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Dense-Graded Hot-Mix Asphalt (Method)" of the type, surface aggregate classification, and binder specified. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools,
and incidentals.
Trial batches will not be paid for unless they are incorporated into pavement work approved by the
Department.
Pay adjustment for ride quality, when required, will be determined in accordance with Item 585, "Ride
Quality for Pavement Surfaces."

END OF SECTION 32 1216.5

Section 32 1216.55
TxDOT Item 341 - DENSE-GRADED HOT-MIX ASPHALT (QC/QA)

341.1. Description. Construct a pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant.

341.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the specification requirements are met and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify specification compliance.

A. Aggregate. Furnish aggregates from sources that conform to the requirements shown in Table 1, and as specified in this Section, unless otherwise shown on the plans. Provide aggregate stockpiles that meet the definition in this Section for either a coarse aggregate or fine aggregate. When reclaimed asphalt pavement (RAP) is allowed by plan note, provide RAP stockpiles in accordance with this Section. Aggregate from RAP is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply mechanically crushed gravel or stone aggregates that meet the definitions in Tex-100-E. The Engineer will designate the plant or the quarry as the sampling location. Samples must be from materials produced for the project. The Engineer will establish the surface aggregate classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II. Do not add material to an approved stockpile from sources that do not meet the aggregate quality requirements of the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) unless otherwise approved.

1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Provide aggregates from sources listed in the BRSQC. Provide aggregate from nonlisted sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for nonlisted sources.

   Provide coarse aggregate with at least the minimum SAC as shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes, unless otherwise shown on the plans. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the BRSQC.
   Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. When blending, do not use Class C or D aggregates. For blending purposes, coarse aggregate from RAP will be considered as Class B aggregate.

2. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2-in. sieve.

RAP from either Contractor- or Department-owned sources, including RAP generated during the project, is permitted only when shown on the plans. Department-owned RAP, if allowed for use, will be available at the location shown on the plans. When RAP is used, determine asphalt content and gradation for mixture design purposes. Perform other tests on RAP when shown on the plans.

When RAP is allowed by plan note, use no more than 30% RAP in Type A or B mixtures unless otherwise shown on the plans. For all other mixtures, use no more than 20% RAP unless otherwise shown on the plans.

Do not use RAP contaminated with dirt or other objectionable materials. Do not use the RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with the laboratory method given in Tex-406-A, Part I. Determine the plasticity index using Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

3. **Fine Aggregate.** Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. At most 15% of the total aggregate may be field sand or other uncrushed fine aggregate. With the exception of field sand, use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1, unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	AQMP	As shown on plans
Deleterious material, %, max	Tex-217-F, Part I	1.5
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 1
Los Angeles abrasion, %, max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	30
Coarse aggregate angularity, 2 crushed faces, %, Min	Tex 460-A, Part I	85[2]
Flat and elongated particles @ 5:1, %, max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3

Property	Test Method	Requirement
Combined Aggregate[3]		
Sand equivalent, %, Min	Tex-203-F	45

1. Not used for acceptance purposes. Used by the Engineer as an indicator of the need for further investigation.
2. Only applies to crushed gravel.
3. Aggregates, without mineral filler, RAP, or additives, combined as used in the job-mix formula (JMF).

Table 2
Gradation Requirements for Fine Aggregate

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70–100
#200	0–30

B. Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, cement, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Do not use more than 2% hydrated lime or cement, unless otherwise shown on the plans. The plans may require or disallow specific mineral fillers. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55–100

C. Baghouse Fines. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

D. Asphalt Binder. Furnish the type and grade of performance-graded (PG) asphalt binder specified on the plans in accordance with Section 300.2.J, “Performance-Graded Binders.”

E. Tack Coat. Unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, “Asphalts, Oils, and Emulsions.” Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

The Engineer will obtain at least 1 sample of the tack coat binder per project and test it to verify compliance with Item 300. The Engineer will obtain the sample from the asphalt distributor immediately before use.

F. Additives. When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing or improve the quality of the mixture may be allowed when approved.

If lime or a liquid antistripping agent is used, add in accordance with Item 301, “Asphalt Antistripping Agents.” Do not add lime directly into the mixing drum of any plant where lime is

removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime back into the drum.

341.3. Equipment. Provide required or necessary equipment in accordance with Item 320, “Equipment for Asphalt Concrete Pavement.”

341.4. Construction. Produce, haul, place, and compact the specified paving mixture. Schedule and participate in a prepaving meeting with the Engineer as required in the Quality Control Plan (QCP).

A. Certification. Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 4. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design that is developed and signed by a Level II certified specialist. Provide a Level IA certified specialist at the plant during production operations. Provide a Level IB certified specialist to conduct placement tests.

Table 4
Test Methods, Test Responsibility, and Minimum Certification Levels

1. Aggregate Testing	**Test Method**	**Contractor**	**Engineer**	**Level**
Sampling	Tex-400-A	✓	✓	IA
Dry sieve	Tex-200-F, Part I	✓	✓	IA
Washed sieve	Tex-200-F, Part II	✓	✓	IA
Deleterious material	Tex-217-F, Part I	✓	✓	II
Decantation	Tex-217-F, Part II	✓	✓	II
Los Angeles abrasion	Tex-410-A		✓	
Magnesium sulfate soundness	Tex-411-A		✓	
Micro-Deval abrasion	Tex-461-A		✓	
Coarse aggregate angularity	Tex-460-A	✓	✓	II
Flat and elongated particles	Tex-280-F	✓	✓	II
Linear shrinkage	Tex-107-E	✓	✓	II
Sand equivalent	Tex-203-F	✓	✓	II
Organic impurities	Tex-408-A	✓	✓	II
2. Mix Design & Verification	**Test Method**	**Contractor**	**Engineer**	**Level**
Design and JMF changes	Tex-204-F	✓	✓	II
Mixing	Tex-205-F	✓	✓	II
Molding (TGC)	Tex-206-F	✓	✓	IA
Laboratory-molded density	Tex-207-F	✓	✓	IA
VMA (calculation only)	Tex-207-F	✓	✓	II
Rice gravity	Tex-227-F	✓	✓	IA
Ignition oven calibration[1]	Tex-236-F	✓	✓	II
Indirect tensile strength	Tex-226-F	✓	✓	II
Hamburg wheel test	Tex-242-F	✓	✓	II
Boil test	Tex-530-C	✓	✓	IA
3. Production Testing	**Test Method**	**Contractor**	**Engineer**	**Level**
Random sampling	Tex-225-F		✓	IA
Mixture sampling	Tex-222-F	✓	✓	IA
Molding (TGC)	Tex-206-F	✓	✓	IA
Laboratory-molded density	Tex-207-F	✓	✓	IA
VMA (calculation only)	Tex-207-F	✓	✓	IA
Rice gravity	Tex-227-F	✓	✓	IA
Gradation & asphalt content[1]	Tex-236-F	✓	✓	IA
Control charts	Tex-233-F	✓	✓	IA
Moisture content	Tex-212-F	✓	✓	IA
Hamburg Wheel test	Tex-242-F	✓	✓	II
Micro-Deval abrasion	Tex-461-A		✓	
Boil test	Tex-530-C	✓	✓	IA
Aging ratio	Tex-211-F		✓	
4. Placement Testing	Test Method	Contractor	Engineer	Level
Random Sampling	Tex-225-F		✓	IA
In-Place air voids	Tex-207-F	✓	✓	IA
Establish rolling pattern	Tex-207-F	✓		IB
Control charts	Tex-233-F	✓	✓	IA
Ride quality measurement	Tex-1001-S	✓	✓	IB
Segregation (density profile)	Tex-207-F, Part V	✓	✓	IB
Longitudinal joint density	Tex-207-F, Part VII	✓	✓	IB
Thermal profile	Tex-244-F	✓	✓	IB
Tack coat adhesion	Tex-243-F		✓	IB

1. Refer to Section 341.4.1.2.c for exceptions to using an ignition oven.

B. Reporting. Use Department-provided software to record and calculate all test data. The Engineer and the Contractor shall provide any available test results to the other party when requested. The maximum allowable time for the Contractor and Engineer to exchange test data is as given in Table 5 unless otherwise approved. The Engineer and the Contractor shall immediately report to the other party any test result that requires production to be suspended, a payment penalty, or fails to meet the specification requirements. Use the approved communication method (e.g., email, diskette, hard copy) to submit test results to the Engineer.

Table 5
Reporting Schedule

Description	Reported By	Reported To	To Be Reported Within
Production Quality Control			
Gradation[1] Asphalt content[1] Laboratory-molded density[2] Moisture content[3] Boil test[3]	Contractor	Engineer	1 working day of completion of the sublot
Production Quality Assurance			
Gradation[3] Asphalt content[3] Laboratory-molded density[1] Hamburg wheel test[2] Boil test[3] Binder tests[2]	Engineer	Contractor	1 working day of completion of the sublot
Placement Quality Control			
In-Place air voids[2] Segregation[1] Longitudinal joint density[1] Thermal profile[1]	Contractor	Engineer	1 hr. of performing the test for segregation, longitudinal joint density, and thermal profile
Placement Quality Assurance			
In-Place air voids[1] Segregation[2] Longitudinal joint density[2] Thermal profile[2] Aging ratio[2]	Engineer	Contractor	1 working day of receipt of the trimmed cores for in-place air voids[4]
Pay Adjustment Summary	Engineer	Contractor	2 working days of performing all required tests and receiving Contractor test data

1. These tests are required on every sublot.
2. Optional test. To be reported as soon as results become available.
3. To be performed at the frequency shown in Table 12.
4. Additional time is allowed if cores cannot be dried to constant weight within 1 day.

The Engineer will use the Department-provided software to calculate all pay adjustment factors for the lot. Sublot samples may be discarded after the Engineer and Contractor sign off on the pay adjustment summary documentation for the lot.
Use the procedures described in Tex-233-F to plot the results of all quality control (QC) and quality assurance (QA) testing. Update the control charts as soon as test results for each

sublot become available. Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

C. QCP. Develop and follow the QCP in detail. Obtain approval from the Engineer for changes to the QCP made during the project. The Engineer may suspend operations if the Contractor fails to comply with the QCP.

Submit a written QCP to the Engineer before the mandatory prepaving meeting. Receive the Engineer's approval of the QCP before beginning production. Include the following items in the QCP.

1. **Project Personnel.** For project personnel, include:
   - a list of individuals responsible for QC with authority to take corrective action and
   - contact information for each individual listed.
2. **Material Delivery and Storage.** For material delivery and storage, include:
   - the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
   - aggregate stockpiling procedures to avoid contamination and segregation;
   - frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and
   - procedure for monitoring the quality and variability of asphalt binder.
3. **Production.** For production, include:
   - loader operation procedures to avoid contamination in cold bins,
   - procedures for calibrating and controlling cold feeds,
   - procedures to eliminate debris or oversized material,
   - procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, lime, liquid antistrip),
   - procedures for reporting job control test results, and
   - procedures to avoid segregation and drain-down in the silo.
4. **Loading and Transporting.** For loading and transporting, include:
   - type and application method for release agents and
   - truck loading procedures to avoid segregation.
5. **Placement and Compaction.** For placement and compaction, include:
   - proposed agenda for mandatory prepaving meeting including date and location;
   - type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
   - procedures for the transfer of mixture into the paver while avoiding segregation and preventing material spillage;
   - process to balance production, delivery, paving, and compaction to achieve continuous placement operations;
   - paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
   - procedures to construct quality longitudinal and transverse joints.

D. Mixture Design.

1. **Design Requirements.** Unless otherwise shown on the plans, use the typical weight design example given in Tex-204-F, Part I, to design a mixture meeting the requirements listed in Tables 1, 2, 3, 6, 7, and 8. Use an approved laboratory to perform the Hamburg Wheel test and provide results with the mixture design or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Construction Division maintains a list of approved laboratories. The Engineer will be allowed 10 working

days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Contractor may submit a new mixture design at anytime during the project. The Engineer will approve all mixture designs before the Contractor can begin production. When shown on the plans, the Engineer will provide the mixture design.

Provide the Engineer with a mixture design report using Department-provided software. Include the following in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level II person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 6
Master Gradation Bands (% Passing by Weight or Volume) and Volumetric Properties

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
1-1/2"	98.0–100.0	–	–	–	–
1"	78.0–94.0	98.0–100.0	–	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	–	–
1/2"	50.0–70.0	–	–	98.0–100.0	–
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	80.0–86.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA[1], % Minimum					
–	12.0	13.0	14.0	15.0	16.0
Plant-Produced VMA, % Minimum					
–	11.0	12.0	13.0	14.0	15.0

1. Voids in mineral aggregates.

Table 7
Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, %	Tex-207-F	96.0[1]
Tensile strength (dry), psi (molded to 93% ±1% density)	Tex-226-F	85–200[2]
Boil test[3]	Tex-530-C	–

1. Unless otherwise shown on the plans.
2. May exceed 200 psi when approved and may be waived when approved.
3. Used to establish baseline for comparison to production results. May be waived when approved.

Table 8
Hamburg Wheel Test Requirements[1]

High-Temperature Binder Grade	Minimum # of Passes[2] @ 0.5" Rut Depth, Tested @ 122°F
PG 64 or lower	10,000
PG 70	15,000
PG 76 or higher	20,000

1. Tested in accordance with Tex-242-F.
2. May be decreased or waived when shown on the plans.

2. **Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation and target asphalt percentage used to establish target values for hot mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. The Engineer and the Contractor will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1.

   a. **Contractor's Responsibilities.**

      (1) **Providing Texas Gyratory Compactor.** If molding production samples, use a Texas Gyratory Compactor (TGC) calibrated in accordance with Tex-914-F. When allowed, the Contractor may use the Department's TGC.
      (2) **Gyratory Compactor Correlation Factors.** Use Tex-206-F, Part II, to perform a gyratory compactor correlation when the Engineer uses a different TGC. Apply the correlation factor to all subsequent production test results.
      (3) **Submitting JMF1.** Furnish the Engineer a mix design report (JMF1) and request approval to produce the trial batch. If opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, provide the Engineer with approximately 10,000 g of the design mixture and request that the Department perform the Hamburg Wheel test.
      (4) **Supplying Aggregates.** Provide the Engineer with approximately 40 lb. of each aggregate stockpile unless otherwise directed.
      (5) **Supplying Asphalt.** Provide the Engineer at least 1 gal. of the asphalt material and sufficient quantities of any additives proposed for use.
      (6) **Ignition Oven Correction Factors.** Determine the aggregate and asphalt correction factors from the ignition oven using Tex-236-F. Provide the Engineer with split samples of the mixtures and blank samples used to determine the correction factors.

(7) Boil Test. Perform the test and retain the tested sample from Tex-530-C. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

(8) Trial Batch Approval. Upon receiving conditional approval of JMF1 from the Engineer, provide a plant-produced trial batch for verification testing of JMF1 and development of JMF2.

(9) Trial Batch Production Equipment. To produce the trial batch, use only equipment and materials proposed for use on the project.

(10) Trial Batch Quantity. Produce enough quantity of the trial batch to ensure that the mixture is representative of JMF1.

(11) Number of Trial Batches. Produce trial batches as necessary to obtain a mixture that meets the requirements in Table 9.

(12) Trial Batch Sampling. Obtain a representative sample of the trial batch and split it into 3 equal portions in accordance with Tex-222-F. Label these portions as “Contractor,” “Engineer,” and “Referee.” Deliver samples to the appropriate laboratory as directed.

(13) Trial Batch Testing. Test the trial batch to ensure the mixture produced using the proposed JMF1 meets the verification testing requirements for gradation, asphalt content, laboratory-molded density, and voids in mineral aggregates (VMA) listed in Table 9 and is in compliance with the Hamburg Wheel test requirement in Table 8. Use an approved laboratory to perform the Hamburg Wheel test on the trial batch mixture or request that the Department perform the Hamburg Wheel test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.

(14) Development of JMF2. After the Engineer grants full approval of JMF1 based on results from the trial batch, evaluate the trial batch test results, determine the optimum mixture proportions, and submit as JMF2.

(15) Mixture Production. After receiving approval for JMF2 and receiving a passing result from the Department’s or an approved laboratory’s Hamburg Wheel test on the trial batch, use JMF2 to produce Lot 1 as described in Section 341.4.I.3.a(1), “Lot 1 Placement.” As an option, once JMF2 is approved, proceed to Lot 1 production at the Contractor’s risk without receiving the results from the Department’s Hamburg Wheel test on the trial batch.

If electing to proceed without Hamburg Wheel test results from the trial batch, notify the Engineer. Note that the Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor’s expense.

(16) Development of JMF3. Evaluate the test results from Lot 1, determine the optimum mixture proportions, and submit as JMF3 for use in Lot 2.

(17) JMF Adjustments. If necessary, adjust the JMF before beginning a new lot. The adjusted JMF must:

- be provided to the Engineer in writing before the start of a new lot,
- be numbered in sequence to the previous JMF,
- meet the master gradation limits shown in Table 6, and
- be within the operational tolerances of JMF2 listed in Table 9.

(18) Requesting Referee Testing. If needed, use referee testing in accordance with Section 341.4.I.1, “Referee Testing,” to resolve testing differences with the Engineer.

Table 9
Operational Tolerances

Description	Test Method	Allowable Difference from Current JMF Target	Allowable Difference between Contractor and Engineer[1]
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±5.0[2]	±5.0
Individual % retained for sieves smaller than #8 and larger than #200		±3.0[2]	±3.0
% passing the #200 sieve		±2.0[2]	±1.6
Asphalt content, %	Tex-236-F	±0.3[3]	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0
In-Place air voids, %		N/A	±1.0
Laboratory-molded bulk specific gravity		N/A	±0.020
VMA, %, min		Note 4	N/A
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	±0.020

1. Contractor may request referee testing only when values exceed these tolerances.
2. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
3. Tolerance between JMF1 and JMF2 may exceed ±0.3%.
4. Test and verify that Table 6 requirements are met.

b. Engineer's Responsibilities.

(1) Gyratory Compactor. The Engineer will use a Department TGC, calibrated according to Tex-914-F, to mold samples for trial batch and production testing. The Engineer will make the Department TGC and the Department field laboratory available to the Contractor for molding verification samples, if requested by the Contractor.

(2) Conditional Approval of JMF1. Within 2 working days of receiving the mixture design report (JMF1) and all required materials and Contractor-provided Hamburg Wheel test results, the Engineer will review the Contractor's mix design report and verify conformance with all aggregates, asphalt, additives, and mixture specifications. The Engineer may perform tests to verify the aggregates meet the requirements listed in Table 1. The Engineer will grant the Contractor conditional approval of JMF1 if the information provided on the paper copy of JMF1 indicates the Contractor's mixture design meets the specifications. When the Contractor does not provide Hamburg Wheel test results with laboratory mixture design, a total of 10 working days is allowed for conditional approval of JMF1. Full approval of JMF1 will be based on the Engineer's test results on mixture from the trial batch.

(3) Hamburg Wheel Testing of JMF1. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the laboratory mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 8.

(4) Authorizing Trial Batch. After conditionally approving JMF1, which will include either Contractor- or Department-supplied Hamburg Wheel test results, the Engineer will authorize the Contractor to produce a trial batch.

(5) Ignition Oven Correction Factors. The Engineer will use the split samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven in accordance with Tex-236-F.

(6) Testing the Trial Batch. Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the gradation, asphalt content, laboratory-molded density, and VMA meet the requirements listed in Table 9. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the trial batch mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 8.

The Engineer will have the option to perform the following tests on the trial batch:

- Tex-226-F to verify that the indirect tensile strength meets the requirement shown in Table 7;
- Tex-461-A to determine the need for additional magnesium sulfate soundness testing; and
- Tex-530-C to retain and use for comparison purposes during production.

(7) Full Approval of JMF1. The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for gradation, asphalt content, laboratory-molded density, and VMA confirm that the trial batch meets the requirements in Table 9.

The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet the requirements in Table 9.

(8) Approval of JMF2. The Engineer will approve JMF2 within 1 working day if it meets the master grading limits shown in Table 6 and is within the operational tolerances of JMF1 listed in Table 9.

(9) Approval of Lot 1 Production. The Engineer will authorize the Contractor to proceed with Lot 1 production as soon as a passing result is achieved from the Department's or a Department-approved laboratory's Hamburg Wheel test on the trial batch. As an option, the Contractor may at their own risk, proceed with Lot 1 production without the results from the Hamburg Wheel test on the trial batch.

If the Department's or Department-approved laboratory's sample from the trial batch fails the Hamburg Wheel test, the Engineer will suspend production until further Hamburg Wheel tests meet the specified values. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test be removed and replaced at the Contractor's expense.

(10) Approval of JMF3. The Engineer will approve JMF3 within 1 working day if it meets the master grading limits shown in Table 6 and is within the operational tolerances of JMF2 listed in Table 9.

E. Production Operations. Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance with this Item.

1. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures in accordance with Item 320, "Equipment for Asphalt Concrete Pavement." Unless otherwise approved, do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.
2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F. The

Department will not pay for or allow placement of any mixture produced at more than 350°F.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. If requested, determine the moisture content by oven-drying in accordance with Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

F. Hauling Operations. Before use, clean all truck beds to ensure mixture is not contaminated. When a release agent is necessary to coat truck beds, use a release agent on the approved list maintained by the Construction Division.

G. Placement Operations. Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly. Place mixture within the compacted lift thickness shown in Table 10 unless otherwise shown on the plans or allowed.

Table 10
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

1. **Weather Conditions.** Place mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Measure the roadway surface temperature with a handheld infrared thermometer. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.
2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller when directed. The Engineer may use Tex-243-F to verify that the tack coat has adequate adhesive properties. The Engineer may suspend paving operations until there is adequate adhesion.
3. **Lay-Down Operations.** Use the guidelines in Table 11 to establish the temperature of mixture delivered to the paver. Record the information on Department QC/QA forms and submit the forms to the Engineer.
   a. **Thermal Profile.** For each sublot, obtain a thermal profile using Tex-244-F. The Engineer may reduce the testing frequency based on a satisfactory test history. The Engineer may also obtain as many thermal profiles as deemed necessary. If the temperature differential is greater than 25°F, the area will be deemed as having thermal segregation. Evaluate areas with thermal segregation by performing a density

profile in accordance with Section 341.4.I.3.c(2), “Segregation (Density Profile).” Take corrective action to eliminate areas that have thermal segregation. Unless otherwise directed, suspend operations if the maximum temperature differential exceeds 50°F. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Item.

b. Windrow Operations. When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

Table 11
Suggested Minimum Mixture Placement Temperature

High Temperature Binder Grade	Minimum Placement Temperature (Before Entering Paver)
PG 64 or lower	260°F
PG 70	270°F
PG 76	280°F
PG 82 or higher	290°F

H. Compaction. Uniformly compact the pavement to the density requirements of this Item. Use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern. Do not use pneumatic-tire rollers if excessive pickup of fines by roller tires occurs. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment.

Where specific air void requirements are waived, furnish and operate compaction equipment as approved. Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

I. Acceptance Plan. Pay adjustments for the material will be in accordance with Article 341.6, “Payment.”

Sample and test the hot mix on a lot and sublot basis. If the production pay factor given in Section 341.6.A, “Production Pay Adjustment Factors,” for 3 consecutive lots or the placement pay factor given in 341.6.B, “Placement Pay Adjustment Factors,” for 3 consecutive lots is below 1.000, suspend production until test results or other information indicate to the satisfaction of the Engineer that the next material produced or placed will result in pay factors of at least 1.000.

1. **Referee Testing.** The Construction Division is the referee laboratory. The Contractor may request referee testing if a “remove and replace” condition is determined based on the Engineer’s test results, or if the differences between Contractor and Engineer test results exceed the maximum allowable difference shown in Table 9 and the differences cannot be resolved. Make the request within 5 working days after receiving test results and cores from the Engineer. Referee tests will be performed only on the sublot in question and only for the particular test in question. Allow 10 working days from the time the samples are received at the referee laboratory for test results to be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than 3 referee tests per project are required and the Engineer’s test results are closer than the Contractor’s test results to the referee test results.

The Construction Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample. The in-place air voids will be determined based on the bulk specific gravity of the cores, as determined by the referee laboratory, and the Engineer's average maximum theoretical specific gravity for the lot. With the exception of remove and replace conditions, referee test results are final and will establish pay adjustment factors for the sublot in question. Sublots subject to be removed and replaced will be further evaluated in accordance with Article 341.6, "Payment."

2. Production Acceptance.

a. Production Lot. A production lot consists of 4 equal sublots. Lot 1 will be 1,000 tons. The Engineer will select subsequent lot sizes based on the anticipated daily production. The lot size will be between 1,000 and 4,000 tons. The Engineer may change the lot size before the Contractor begins any lot.

(1) Small-Quantity Production. When the anticipated daily production is less than 500 tons or the total production for the project is less than 5,000 tons, the Engineer may waive all quality control and quality assurance (QC/QA) sampling and testing requirements. If the Engineer waives QC/QA sampling and testing, both production and placement pay factors will be 1.000. However, the Engineer will retain the right to perform random acceptance tests for production and placement and may reject objectionable materials and workmanship.

When the Engineer waives all QC/QA sampling and testing requirements:

- produce, haul, place and compact the mixture as directed by the Engineer;
- control mixture production to yield a laboratory-molded density of 96.0% ±1.0% as tested by the Engineer; and
- compact the mixture to yield in-place air voids that are greater than or equal to 2.7% and less than or equal to 9.9% as tested by the Engineer.

(2) Incomplete Production Lots. If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot. Adjust the payment for the incomplete lot in accordance with Section 341.6.A, "Production Pay Adjustment Factors."

b. Production Sampling.

(1) Mixture Sampling. At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with Tex-225-F.

Obtain hot mix samples from trucks at the plant in accordance with Tex-222-F. For each sublot, take 1 sample at the location randomly selected. For each lot, the Engineer will randomly select and test a "blind" sample from at least 1 sublot. The location of the Engineer's "blind" sample will not be disclosed to the Contractor. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.

The sampler will split each sample into 3 equal portions in accordance with Tex-200-F, and label these portions as "Contractor," "Engineer," and "Referee." Deliver the samples to the appropriate party's laboratory. Deliver referee samples to the Engineer. Discard unused samples after accepting pay adjustment factors for that lot.

(2) Asphalt Binder Sampling. Obtain a 1-qt. sample of the asphalt binder for each sublot of mixture produced. Obtain the sample at approximately the same time the mixture random sample is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill. Take the sample in accordance with

the pipeline sampling procedure given in Tex-500-C, Part II. Label the can with the corresponding lot and sublot numbers, and deliver the sample to the Engineer.

The Engineer may also obtain independent samples. If the Engineer chooses to obtain an independent asphalt binder sample, the Engineer will split a sample of the asphalt binder with the Contractor. The Engineer will test at least 1 asphalt binder sample per project to verify compliance with Item 300, “Asphalts, Oils, and Emulsions.”

c. Production Testing. The Contractor and Engineer must perform production tests in accordance with Table 12. The Contractor has the option to verify the Engineer’s test results on split samples provided by the Engineer. Determine compliance with operational tolerances listed in Table 9 for all sublots.

If the aggregate mineralogy is such that Tex-236-F does not yield reliable results, the Engineer may allow alternate methods for determining the asphalt content and aggregate gradation. Unless otherwise allowed, the Engineer will require the Contractor to provide evidence that results from Tex-236-F are not reliable before permitting an alternate method. If an alternate test method is allowed, use the applicable test procedure as directed.

Table 12
Production and Placement Testing Frequency

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Individual % retained for #8 sieve and larger Individual % retained for sieves smaller than #8 and larger than #200	Tex-200-F or Tex-236-F	1 per sublot	1 per 12 sublots
% passing the #200 sieve			
Asphalt content	Tex-236-F	1 per sublot	1 per lot
Laboratory-molded density VMA In-Place air voids Laboratory-molded bulk specific gravity	Tex-207-F	N/A	1 per sublot
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	1 per sublot
Hamburg Wheel test	Tex-242-F	N/A	1 per project
Boil test[1]	Tex-530-C	1 per lot	1 per project
Moisture content	Tex-212-F, Part II	When directed	1 per project
Asphalt binder sampling and testing[1]	Tex-500-C	1 per sublot (sample only)	1 per project
Thermal profile	Tex-244-F	1 per sublot	1 per project
Segregation (density profile)	Tex-207-F, Part V	1 per sublot	1 per project
Longitudinal joint density	Tex-207-F, Part VII	1 per sublot	1 per project

1. The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.

d. Operational Tolerances. Control the production process within the operational tolerances listed in Table 9. When production is suspended, the Engineer will allow

production to resume when test results or other information indicates the next mixture produced will be within the operational tolerances.

(1) **Gradation.** Unless otherwise directed, suspend production when either the Contractor's or the Engineer's test results for gradation exceed the operational tolerances for 3 consecutive sublots on the same sieve or 4 consecutive sublots on any sieve. The consecutive sublots may be from more than 1 lot.

(2) **Asphalt Content.** No production or placement bonus will be paid for any lot that has 2 or more sublots within a lot that are out of operational tolerance for asphalt content based on either the Contractor's or the Engineer's test results. Suspend production and shipment of mixture if the asphalt content deviates from the current JMF by more than 0.5% for any sublot.

(3) **Hamburg Wheel Test.** The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. When the production or core samples fail the Hamburg Wheel test criteria in Table 8, suspend production until further Hamburg Wheel tests meet the specified values. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

If the Department's or approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by retesting the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

e. **Individual Loads of Hot Mix.** The Engineer can reject individual truckloads of hot mix. When a load of hot mix is rejected for reasons other than temperature, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 9, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load and the Engineer may require removal.

3. **Placement Acceptance.**

a. **Placement Lot.** A placement lot consists of 4 placement sublots. A placement sublot consists of the area placed during a production sublot.

(1) **Lot 1 Placement.** Placement bonuses for Lot 1 will be in accordance with Section 341.6.B, "Placement Pay Adjustment Factors." However, no placement penalty will be assessed for any sublot placed in Lot 1 when the in-place air voids are greater than or equal to 2.7% and less than or equal to 9.9%. Remove and replace any sublot with in-place air voids less than 2.7% or greater than 9.9%.

(2) **Incomplete Placement Lots.** An incomplete placement lot consists of the area placed as described in Section 341.4.I.2.a(2), "Incomplete Production Lot," excluding miscellaneous areas as defined in Section 344.4.I.3.a(4), "Miscellaneous Areas." Placement sampling is required if the random sample plan for production resulted in a sample being obtained from an incomplete production sublot.

(3) **Shoulders and Ramps.** Shoulders and ramps are subject to in-place air void determination and pay adjustments unless otherwise shown on the plans.

(4) Miscellaneous Areas. Miscellaneous areas include areas that are not generally subject to primary traffic such as driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous areas also include level-ups and thin overlays if the layer thickness designated on the plans is less than the compacted lift thickness shown in Table 10. Miscellaneous areas are not eligible for random placement sampling locations, and will receive a 1.000 placement pay factor. Compact areas that are not subject to in-place air void determination in accordance with Section 341.4.H, “Compaction.”

b. Placement Sampling. At the beginning of the project, the Engineer will select random numbers for all placement sublots. The Engineer will provide the Contractor with the placement random numbers immediately after the sublot is completed. Mark the roadway location at the completion of each sublot and record the station number. Determine 1 random sample location for each placement sublot in accordance with Tex-225-F. If the randomly generated sample location is within 2 ft. of a joint or pavement edge, adjust the location by no more than necessary to achieve a 2-ft. clearance.

Shoulders and ramps are always eligible for selection as a random sample location. However, if a random sample location falls on a shoulder or ramp that is designated on the plans as not subject to in-place air void testing, cores will not be taken for the sublot and a 1.000 pay factor will be assigned to that sublot.

Unless otherwise determined, the Engineer will witness the coring operation and measurement of the core thickness. Unless otherwise approved, obtain the cores within 1 working day of the time the placement sublot is completed. Obtain two 6-in.-diameter cores side-by-side from within 1 ft. of the random location provided for the placement sublot. Mark the cores for identification. Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. If an adequate bond does not exist between the current and underlying layer, take corrective action to insure that an adequate bond will be achieved during subsequent placement operations. For Type D and Type F mixtures, 4-in.-diameter cores are allowed.

Immediately after obtaining the cores, dry the core holes and tack the sides and bottom. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

If the core heights exceed the minimum untrimmed values listed in Table 10, trim and deliver the cores to the Engineer within 1 working day following placement operations unless otherwise approved.

If the core height before trimming is less than the minimum untrimmed value shown in Table 10, decide whether to include the pair of cores in the air void determination for that sublot. If the cores are to be included in air void determination, trim the cores before delivering to the Engineer. If the cores will not be included in air void determination, deliver untrimmed cores to the Engineer. The placement pay factor for the sublot will be 1.000 if cores will not be included in air void determination.

c. Placement Testing. Perform placement tests in accordance with Table 12. After the Engineer returns the cores, the Contractor has the option to test the cores to verify the Engineer’s test results for in-place air voids. Re-dry the cores to constant weight before testing. The allowable differences between the Contractor’s and Engineer’s test results are listed in Table 9.

(1) In-Place Air Voids. The Engineer will measure in-place air voids in accordance with Tex-207-F and Tex-227-F. Before drying to a constant weight, cores may be predried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will average the values obtained for all sublots in the production lot to determine the theoretical maximum specific gravity. The Engineer will use the

average air void content of the 2 cores to calculate a placement pay adjustment factor.

The Engineer will use paraffin coating or vacuum methods to seal the core if required by Tex-207-F. The Engineer will use the test results from the unsealed core to determine the placement pay adjustment factor if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

(2) Segregation (Density Profile). Test for segregation using density profiles in accordance with Tex-207-F, Part V. Provide the Engineer with the results of the density profiles as they are completed. Areas defined in Section 341.4.I.3.a(4), "Miscellaneous Areas," are not subject to density profile testing.

Unless otherwise approved, perform a density profile every time the screed stops, on areas that are identified by either the Contractor or the Engineer as having thermal segregation, and on any visibly segregated areas. If the screed does not stop, and there are no visibly segregated areas or areas that are identified as having thermal segregation, perform a minimum of 1 profile per sublot. Reduce the test frequency to a minimum of 1 profile per lot if 4 consecutive profiles are within established tolerances. Continue testing at a minimum frequency of 1 per lot unless a profile fails, at which point resume testing at a minimum frequency of 1 per sublot. The Engineer may further reduce the testing frequency based on a consistent pattern of satisfactory results.

The density profile is considered failing if it exceeds the tolerances in Table 13. No production or placement bonus will be paid for any sublot that contains a failing density profile. The Engineer may make as many independent density profile verifications as deemed necessary. The Engineer's density profile results will be used when available.

Investigate density profile failures and take corrective actions during production and placement to eliminate the segregation. Suspend production if 2 consecutive density profiles fail, unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

Table 13
Segregation (Density Profile) Acceptance Criteria

Mixture Type	Maximum Allowable Density Range (Highest to Lowest)	Maximum Allowable Density Range (Average to Lowest)
Type A & Type B	8.0 pcf	5.0 pcf
Type C, Type D & Type F	6.0 pcf	3.0 pcf

(3) Longitudinal Joint Density.

(a) Informational Tests. While establishing the rolling pattern, perform joint density evaluations and verify that the joint density is no more than 3.0 pcf below the density taken at or near the center of the mat. Adjust the rolling pattern if needed to achieve the desired joint density. Perform additional joint density evaluations at least once per sublot unless otherwise directed.

(b) Record Tests. For each sublot, perform a joint density evaluation at each pavement edge that is or will become a longitudinal joint. Determine the joint

density in accordance with Tex-207-F, Part VII. Record the joint density information and submit results, on Department forms, to the Engineer. The evaluation is considered failing if the joint density is more than 3.0 pcf below the density taken at the core random sample location and the correlated joint density is less than 90.0%. The Engineer may make independent joint density verifications at the random sample locations. The Engineer's joint density test results will be used when available.

Investigate joint density failures and take corrective actions during production and placement to improve the joint density. Suspend production if 2 consecutive evaluations fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

(4) Recovered Asphalt Dynamic Shear Rheometer (DSR). The Engineer may take production samples or cores from suspect areas of the project to determine recovered asphalt properties. Asphalt binders with an aging ratio greater than 3.5 do not meet the requirements for recovered asphalt properties and may be deemed defective when tested and evaluated by the Construction Division. The aging ratio is the DSR value of the extracted binder divided by the DSR value of the original unaged binder (including RAP binder). DSR values are obtained according to AASHTO T 315 at the specified high temperature PG of the asphalt. The binder from RAP will be included proportionally as part of the original unaged binder. The Engineer may require removal and replacement of the defective material at the Contractor's expense. The asphalt binder will be recovered for testing from production samples or cores using Tex-211-F.

(5) Irregularities. Immediately take corrective action if surface irregularities, including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, color, texture, roller marks, tears, gouges, streaks, or uncoated aggregate particles, are detected. The Engineer may allow placement to continue for at most 1 day of production while taking appropriate action. If the problem still exists after that day, suspend paving until the problem is corrected to the satisfaction of the Engineer.

At the expense of the Contractor and to the satisfaction of the Engineer, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities identified above.

4. Ride Quality. Unless otherwise shown on the plans, measure ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces."

341.5. Measurement. Hot mix will be measured by the ton of composite hot mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

341.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under Article 341.5, "Measurement," will be paid for at the unit price bid for "Dense-Graded Hot-Mix Asphalt (QC/QA)" of the type, surface aggregate classification, and binder specified. Pay adjustments for bonuses and penalties will be applied as determined in this Item. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals.

Trial batches will not be paid for unless they are included in pavement work approved by the Department.

Pay adjustment for ride quality will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

A. Production Pay Adjustment Factors. The production pay adjustment factor is based on the laboratory-molded density using the Engineer's test results. A pay adjustment factor will be determined from Table 14 for each sublot using the deviation from the target laboratory-molded density defined in Table 7. The production pay adjustment factor for completed lots will be the average of the pay adjustment factors for the 4 sublots sampled within that lot.

Table 14
Production Pay Adjustment Factors
for Laboratory-Molded Density

Absolute Deviation from Target Laboratory-Molded Density	Production Pay Adjustment Factor
0.0	1.050
0.1	1.050
0.2	1.050
0.3	1.044
0.4	1.038
0.5	1.031
0.6	1.025
0.7	1.019
0.8	1.013
0.9	1.006
1.0	1.000
1.1	0.965
1.2	0.930
1.3	0.895
1.4	0.860
1.5	0.825
1.6	0.790
1.7	0.755
1.8	0.720
> 1.8	Remove and replace

1. **Incomplete Production Lots.** Production pay adjustments for incomplete lots, described under Section 341.4.I.2.a(2), "Incomplete Production Lots," will be calculated using the average production pay factors from all sublots sampled. A production pay factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples.
2. **Production Sublots Subject to Removal and Replacement.** If after referee testing, the laboratory-molded density for any sublot results in a "remove and replace" condition as listed in Table 14, the Engineer may require removal and replacement, or may allow the sublot to be left in place without payment. Replacement material meeting the requirements of this Item will be paid for in accordance with this Article.

B. Placement Pay Adjustment Factors. The placement pay adjustment factor is based on in-place air voids using the Engineer's test results. A pay adjustment factor will be determined from Table 15 for each sublot that requires in-place air void measurement. A placement pay adjustment factor of 1.000 will be assigned to the entire sublot when the random sample location falls in an area on a ramp or shoulder not subject to in-place air void testing. A placement pay adjustment factor of 1.000 will be assigned to quantities placed in miscellaneous areas as described in Section 341.4.I.3.a(4), "Miscellaneous Areas." The placement pay adjustment factor for completed lots will be the average of the placement pay adjustment factors for the 4 sublots within that lot.

1. **Incomplete Placement Lots.** Pay adjustments for incomplete placement lots described under Section 341.4.I.3.a(2), “Incomplete Placement Lots,” will be calculated using the average of the placement pay factors from all sublots sampled and sublots where the random location falls in an area on a ramp or shoulder not eligible for testing. A placement pay adjustment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples.
2. **Placement Sublots Subject to Removal and Replacement.** If after referee testing the placement pay adjustment factor for any sublot results in a “remove and replace” condition as listed in Table 15, the Engineer will choose the location of 2 cores to be taken within 3 ft. of the original failing core location. The Contractor will obtain the cores in the presence of the Engineer. The Engineer will submit the cores to the Materials and Pavements Section of the Construction Division where they will be tested for bulk specific gravity within 10 working days of receipt. The average bulk specific gravity of the cores will be divided by the Engineer’s average maximum theoretical specific gravity for that lot to determine the new pay adjustment factor of the sublot in question. If the new pay adjustment factor is 0.700 or greater, then the new pay adjustment factor will apply to that sublot. If the new pay adjustment factor is less than 0.700, no payment will be made for the sublot. Remove and replace the failing sublot. Replacement material meeting the requirements of this Item will be paid for in accordance with this Article.

C. Total Adjustment Pay Calculation. Total adjustment pay (TAP) will be based on the applicable pay adjustment factors for production and placement for each lot.

$TAP = (A+B)/2$

where:

A = Bid price × production lot quantity × average pay adjustment factor for the production lot

B = Bid price × placement lot quantity × average pay adjustment factor for the placement lot + (bid price × miscellaneous quantities × 1.000)

Table 15
Placement Pay Adjustment Factors for In-Place Air Voids

In-Place Air Voids	Placement Pay Adjustment Factor	In-Place Air Voids	Placement Pay Adjustment Factor
< 2.7	Remove and Replace	6.4	1.042
2.7	0.705	6.5	1.040
2.8	0.720	6.6	1.038
2.9	0.735	6.7	1.036
3.0	0.750	6.8	1.034
3.1	0.765	6.9	1.032
3.2	0.780	7.0	1.030
3.3	0.795	7.1	1.028
3.4	0.810	7.2	1.026
3.5	0.825	7.3	1.024
3.6	0.840	7.4	1.022
3.7	0.855	7.5	1.020
3.8	0.870	7.6	1.018
3.9	0.885	7.7	1.016
4.0	0.900	7.8	1.014
4.1	0.915	7.9	1.012
4.2	0.930	8.0	1.010
4.3	0.945	8.1	1.008
4.4	0.960	8.2	1.006
4.5	0.975	8.3	1.004
4.6	0.990	8.4	1.002
4.7	1.005	8.5	1.000
4.8	1.020	8.6	0.998
4.9	1.035	8.7	0.996
5.0	1.050	8.8	0.994
5.1	1.050	8.9	0.992
5.2	1.050	9.0	0.990
5.3	1.050	9.1	0.960
5.4	1.050	9.2	0.930
5.5	1.050	9.3	0.900
5.6	1.050	9.4	0.870
5.7	1.050	9.5	0.840
5.8	1.050	9.6	0.810
5.9	1.050	9.7	0.780
6.0	1.050	9.8	0.750
6.1	1.048	9.9	0.720
6.2	1.046	> 9.9	Remove and Replace
6.3	1.044		

END OF SECTION 32 1216.55

32 1723.13 - PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.
B. Roadway lane markings and crosswalk markings.
C. "No Parking" curb painting.

1.02 RELATED REQUIREMENTS

A. Section 32 1216.10 - Asphalt Paving.
B. Section 32 1313 - Concrete Paving.

1.03 PRICE AND PAYMENT PROCEDURES

1.04 SUBSIDIARY TO PROJECT COST

1.05 REFERENCE STANDARDS

A. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective; Rev. D, 2007.
B. FS TT-P-1952 - Paint, Traffic Black, and Airfield Marking, Waterborne; Rev. E, 2007.
C. Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges; 2004 Edition, Item 666 Reflectorized Pavement Markings

1.06 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Certificates: Submit for each batch of paint and glass beads stating compliance with specified requirements.
D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Product Requirements, for additional provisions.
   2. Extra Paint: 2 containers, 1 gallon size, of each type and color.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.
C. Store products in manufacturer's unopened packaging until ready for installation.
D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. TxDOT Item 666, Type I "Hot Applied Thermoplastic"
   1. Roadway Markings: As per Drawing Details.
   2. Parking Lots: White.
   3. Handicapped Symbols: Blue.
B. Paint For Obliterating Existing Markings: FS TT-P-1952; black for bituminous pavements, gray for portland cement pavements.

C. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.

END OF SECTION 32 1723.13

SECTION 32 1723.14 - ITEM 678 (TXDOT) - PAVEMENT SURFACE PREPARATION FOR MARKINGS

678.1. DESCRIPTION. PREPARE PAVEMENT SURFACE AREAS BEFORE PLACEMENT OF PAVEMENT MARKINGS AND RAISED PAVEMENT MARKERS. ITEM 677, “ELIMINATING EXISTING PAVEMENT MARKINGS OR MARKERS,” GOVERNS COMPLETE REMOVAL OF EXISTING MARKINGS.

1.01 678.2. MATERIALS. USE A COMMERCIAL ABRASIVE-BLASTING MEDIUM CAPABLE OF PRODUCING THE SPECIFIED SURFACE CLEANLINESS. USE POTABLE WATER, WHEN WATER IS REQUIRED.

1.02 678.3. EQUIPMENT. FURNISH AND MAINTAIN EQUIPMENT IN GOOD WORKING CONDITION. USE MOISTURE AND OIL TRAPS IN AIR COMPRESSION EQUIPMENT TO REMOVE ALL CONTAMINANTS FROM THE BLASTING AIR AND PREVENT THE DEPOSITION OF MOISTURE, OIL, OR OTHER CONTAMINANTS ON THE ROADWAY SURFACE.

1.03 678.4. CONSTRUCTION. PREPARE PAVEMENT SURFACE OF SUFFICIENT AREA FOR THE PAVEMENT MARKINGS OR RAISED PAVEMENT MARKERS SHOWN ON THE PLANS. REMOVE ALL CONTAMINATION AND LOOSE MATERIAL. AVOID DAMAGING THE PAVEMENT SURFACE. WHEN EXISTING PAVEMENT MARKINGS ARE PRESENT, REMOVE LOOSE AND FLAKING MATERIAL. APPROVED PAVEMENT SURFACE PREPARATION METHODS ARE SWEEPING, AIR BLASTING, FLAIL MILLING, AND BLAST CLEANING UNLESS OTHERWISE SPECIFIED ON THE PLANS.

1.04 FOR CONCRETE PAVEMENT SURFACES, IN ADDITION TO THE ABOVE, AIR BLAST AFTER THE REMOVAL OF CONTAMINATION OR EXISTING MATERIAL AND JUST PRIOR TO PLACING THE STRIPE. PERFORM THE AIR BLASTING WITH A COMPRESSOR THAT IS CAPABLE OF GENERATING COMPRESSED AIR AT A MINIMUM OF 150 CFM AND 100 PSI USING 5/16-IN. OR LARGER HOSING FOR THE AIR BLAST.

1.05 CONTAMINANTS UP TO 0.5 SQ. IN. MAY REMAIN IF THEY ARE NOT REMOVED BY THE FOLLOWING TEST, PERFORMED JUST BEFORE APPLICATION OF MARKINGS:

A. Step 1. Air-blast the surface to be tested, to simulate blasting during application of markings.
B. Step 2. Firmly press a 10-in.-long, 2-in.-wide strip of monofilament tape onto the surface, leaving approximately 2 in. free.
C. Step 3. Grasp the free end and remove the tape with a sharp pull.
D. 678.5. Measurement. This Item will be measured by the foot for each width specified; by each word, shape, or symbol; or by any other unit except lump sum.

1.06 THIS IS A PLANS QUANTITY MEASUREMENT ITEM. THE QUANTITY TO BE PAID IS THE QUANTITY SHOWN IN THE PROPOSAL, UNLESS MODIFIED BY ARTICLE 9.2, “PLANS QUANTITY MEASUREMENT.” ADDITIONAL MEASUREMENTS OR CALCULATIONS WILL BE MADE IF ADJUSTMENTS OF QUANTITIES ARE REQUIRED.

A. 678.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Pavement Surface Preparation for Markings” of the type and width as applicable. This price is full compensation for the cleaning method used, and equipment, materials, tools, labor, and incidentals.

END OF SECTION

SECTION 33 0513
STORM SEWER APPURTENANCES

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and installing appurtenances except manholes, for storm sewers in accordance with details on the plans and as specified herein as directed by the ENGINEER.

B. The various types of structures and appurtenances as inlets, headwalls, energy dissipaters, etc. are designated on the plans by letters or by numbers indicating the particular design of each. Each type shall be constructed in accordance with the details indicated and to the depth required by the profiled and scheduled given.

PART 2 - PRODUCTS

2.01 GENERAL

A. The construction plans will specify the size and material for the pipe between the storm sewer main and the storm water collection structure.

B. The various types of storm inlets and their relation to curb and gutter, or valley gutter are shown on the Standard Detail Drawings. Construction plans will identify the type to be constructed.

C. Grating size, material, and configuration shall conform to the Standard Detail Drawings.

2.02 MATERIALS

A. Concrete
   1. Concrete for cast in place miscellaneous structures shall be Class A concrete when used with precast sewer construction and Class C concrete when used with monolithic pipe sewer construction.
   2. Concrete for precast structures shall be 4000 psi and comply with the applicable requirements of ASTM 478.

B. Mortar:
   1. Mortar shall be composed of 1 part Portland Cement and 2 parts clean, sharp mortar and sand suitably graded for the purpose by conforming in other respects to the provisions of Section 03 3000 for fine aggregate.
   2. Hydrated lime or lime putty may be added to the mix, but in no case shall it exceed 10 percent by weight of total dry mix.

C. Reinforcement:
   1. Reinforcing Steel shall conform to Section 03 3300.

D. Frames, Grates, Rings and Covers:

E. Miscellaneous Items:
   1. Cast iron for supports, steps and inlet units shall conform to the shape and dimensions indicated. The casting shall be clean and perfect, free from sand or blow holes or other defects. Cast iron shall meet the requirements of ASTM A 48, Class 30. Steel for temporary covers when used with Stage Construction shall be adequate for the loads imposed.

PART 3 - EXECUTION

3.01 INSTALLATION OF DRAINAGE FACILITIES:

A. Excavation and backfilling for the storm inlet shall be accompanied in accordance with Section 31 2316.10.

B. Trenching, backfilling, and compaction for the connection pipe between the storm sewer main and the storm inlet shall conform to the specifications contained in Section 31 2316.15.

C. All pipe and structures shall be installed per location and elevation, as shown on the construction plans. If during the course of installation, an underground obstruction (i.e., existing utility line) the work shall stop and the ENGINEER shall be immediately notified so that the problem can be resolved.
D. Removal of curb and gutter, and sidewalk for installation of a storm inlet shall be made at a scored or full depth joint.
E. Existing pavement removal and replacement shall conform to details indicated on the plans.
F. No width greater than ½ inch will be permitted between the inlet grate and the roadside portion of the inlet frame.
G. The construction of inlets shall be done as soon as is practicable after sewer lines into the inlet are complete. All sewers shall be cut nearly at the inside face of the walls of the inlet and pointed up with mortar.
H. The inverts passing out or through an inlet shall be shaped and grout across the floor of the inlet as indicated. This shaping may be accomplished by adding shaping mortar or concrete after the base in cast or by placing the required additional material with the base.
I. All miscellaneous structures shall be completed in accordance with the details indicated. Backfilling to original ground elevation shall be in accordance with the provisions of the appropriate items and as directed by the ENGINEER.
J. PART 4 - MEASUREMENT AND PAYMENT

3.02 MEASUREMENT

A. Pavement removal and replacement will be measured by the square yard.
B. Trenching, backfilling and compaction will not be measured or paid, but will be considered incidental to other items.
C. Frame, grates, rings and covers will not be measured or paid, but will be considered incidental to other items.
D. Connecting pipe shall be measured by the linear foot along centerline of pipe from the main side wall of the inlet to the centerline of the main.
E. Storm sewer inlets shall be measured per each for the type and size specified.
F. All miscellaneous structures satisfactorily completed in accordance with the plan and specifications will be measured as complete units per each.

END OF SECTION

SECTION 33 4111
SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.
B. Connection of drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.
B. Section 31 2316.10 - Excavation: Excavating of trenches.
C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
D. Section 31 2323 - Fill: Bedding and backfilling.
E. Section 33 0513 - Manholes and Structures.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

A. TxDOT Item 464, Reinforced Concrete Pipe , Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2014 edition.
B. TxDOT Item 465, Junction Boxes, Manholes, and Inlets, Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2014 edition.
C. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
D. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2012).
E. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2015.
F. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.
G. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.
H. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2014.
I. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

1.05 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.
B. Product Data: Provide data indicating pipe, pipe accessories, and Fittings.
C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
D. Product Data: Provide data indicating pipe and pipe accessories.
E. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
F. Field Quality Control Submittals: Document results of field quality control testing.
G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
H. Project Record Documents:
    1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
    2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).
B. Concrete Pipe Joint Devices: ASTM C443 (ASTM C443M) rubber compression gasket joint.
C. Concrete Pipe: Reinforced, ASTM C76 (ASTM C76M), Class IIII and Class IV .A; mesh reinforcement; inside nominal diameter of see plan inches, bell and spigot end joints.
D. Reinforced Concrete Pipe Joint Device: ASTM C443 (ASTM C443M) rubber compression gasket joint.
E. Corrugated Dual Wall Pipe: ASTM F2881, Polypropylene (PP) material; inside nominal diameter of 12 to 30 inches, reinforced bell with polymer composite band and dual gaskets.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.
B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Storm Sewer Service " in large letters.
C. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
    1. Configuration: Angular.
    2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
    3. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.

2.03 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. As shown on the plans

2.04 BEDDING AND COVER MATERIALS

A. Bedding material and cover for flexible pipe as specified by manufacturer of product.
B. Cover: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 2316.13 for additional requirements.
B. Hand trim excavation for accurate placement of pipe to elevations indicated.
C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. RCP connections to inlet structures shall be watertight; opening in storm sewer structure shall be pre-manufacture or neatly saw cut to a diameter that is a 1/4 - 1/2 inch larger than the outer diameter of the RCP. Secured with a concrete collar and sealed with high strength mortar. Hammering or breaking of the structure will not be allowed, structures that are hammered and expose structural cracks will be replaced by the contractor at no additional cost to the owner.
B. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.
C. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
    1. Plastic Pipe: Also comply with ASTM D2321.

D. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
E. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.
F. Make connections through walls through sleeved openings, where provided.
G. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 2316.13.

3.03 INSTALLATION - CATCH BASINS, TRENCH DRAINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.
B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.
C. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.
D. Establish elevations and pipe inverts for inlets and outlets as indicated.
E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.
F. Prefabricated trench drains:
    1. Excavate; prepare substrate and supports according to the manufacturer's printed installation instructions.
    2. Install prefabricated trench drain system according to the manufacturer's printed installation instructions.
    3. Expansion, Construction, and Control Joints: Do not locate trench drain system on an expansion, construction or control joint in concrete or pavement. Where concrete or pavement joints running transverse to direction of flow cross the trench drain system, locate concrete or pavement joints and trench drain system joints so that both coincide.
    4. Concrete Trench Support: 3000 pounds per square inch compressive strength, minimum.
        a. Provide support on all sides of trench in minimum thickness recommended by trench drain system manufacturer.
        b. Screed and finish top edge of concrete flush with top surface of trench drain system.
        c. Do not use secondary edge finishing tools.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Quality Requirements.
B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to OWNER.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

NOVEMBER 2024

SHEET INDEX

OTIS KLAR HEADSTART

SITE IMPROVEMENTS

24-RFB-026

NOVEMBER 2024

JORGE D. PEREZ
34594
LICENSED PROFESSIONAL ENGINEER
11-22-24

PCE Parco Consulting Express
Texas Registered Engineering Firm F-2158
808 Dallas Ave, McAllen, Texas 78501
(956) 631-4482 Fax (956) 682-1545

WILLACY COUNTY
OTIS KLAR HEADSTART

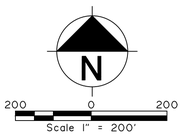
RAYMONDVILLE, TEXAS
COVER SHEET

PCE JOB NO. NIN23116
FILE
DATE 11-22-2024
DESIGNED JDP
DRAWN JH
REVISED
CHECKED

NO.	REVISION	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET C100



GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR TO DEMOLISH AND REMOVE (AT HIS EXPENSE) ANY EXISTING HINDRANCES INCLUDING, BUT NOT LIMITED TO: STRUCTURES, UTILITIES, TREES, SHRUBS AND/OR CONCRETE WORK NECESSARY TO COMPLETE PROPOSED WORK AS INDICATED IN THE PLANS OR THE SPECIAL PROJECT CONDITIONS. ALL MATERIAL DEMOLISHED AND NOT SEEMED SALVAGABLE SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED AT HIS OWN EXPENSE.
2. BACKFILL FOR DRAINAGE INLETS, IRRIGATION PIPE SLEEVES, ELECTRICAL CONDUIT, AND UTILITY TRENCHES WITHIN THE SUBGRADE SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
3. ALL CONCRETE SHALL BE TYPE "A" (2004 TxDOT SPECS) AND HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I. @ 28 DAYS UNLESS NOTED OTHERWISE IN PLAN DETAILS.
4. PLASTIC BAR CHAIRS OR SMALL PRECAST CONCRETE BLOCKS APPROVED BY THE ENGINEER SHALL BE USED AS SUPPORTS FOR REINFORCEMENT.
5. LONGITUDINAL REINFORCING BARS SHALL BE LAPPED AT A MINIMUM OF 18 INCHES.
6. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE PROVIDED UNDER THIS CONTRACT.
7. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A TRAFFIC CONTROL PLAN PREPARED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS AND PROVIDED UNDER THIS CONTRACT.
8. LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE INITIATING CONSTRUCTION OPERATIONS.
9. ANY DAMAGES DONE TO EXISTING PAVEMENT STRUCTURE, EXISTING SIDEWALKS, IRRIGATION SYSTEM, UTILITIES, OR OTHER STRUCTURES SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
10. CONTRACTOR TO SUBMIT JOINT SEALER MATERIAL TO ENGINEER FOR APPROVAL.
11. ALL RCP TO BE ASTM C 76 RUBBER GASKET JOINT OF THE STRENGTH CLASS SPECIFIED.
12. ALL SIGNS SHALL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", LATEST EDITION.
13. POST MOUNTED SIGNS SHALL BE PLACED APPROXIMATELY 1 FOOT (OR GREATER) BEHIND THE CURB TO PREVENT DAMAGE FROM VEHICLE OVERHANG.
14. CONTRACTOR SHALL SUBMIT JOINT LAYOUT PLAN FOR ANY CONCRETE PAVEMENT FOR APPROVAL BY ENGINEER.
15. ALL HANDICAP RAMPS SHALL A HAVE REPLACEABLE TRUNCATED DOME DETECTABLE WARNING SYSTEM; RED BRICK, BY ADA SOLUTIONS OR METADOME OR APPROVED EQUAL.
16. THERE SHALL BE A MINIMUM INTERRUPTION OF TRAFFIC AND ACCESS TO ADJACENT STREETS ALONG THE PROJECT SITE. IF DRIVEWAYS OR ROADS ARE TO BE CLOSED; CITY OF LYFORD POLICE AND FIRE DEPARTMENTS SHALL BE CONTACTED 48 HOURS BEFORE SUCH CLOSING.
17. VERTICAL AND HORIZONTAL CONTROL HAVE BEEN PROVIDED TO THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO DO ALL HIS CONSTRUCTION AND LAYOUT FIELD STAKING. ALL LAYOUT RELATIVE TO PROPERTY LINES SHALL BE DONE BY A REGISTERED PROFESSIONAL LAND SURVEYOR, LICENSED TO PRACTICE IN THE STATE OF TEXAS.
18. UNLESS OTHERWISE SPECIFIED BY THE ENGINEER, ALL OBSTRUCTIONS, OBJECTIONABLE MATERIAL AND CONCRETE SHALL BE DISPOSED PROPERLY BY HAULING IT OFF THE PROJECT AT THE CONTRACTOR EXPENSE.
19. ALL HAULING OF EXCAVATED OR REMOVED MATERIAL WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS SUBSIDIARY TO THE PROJECT COST.
20. FURNISH HYDRAULIC CEMENT CONCRETE FOR CONCRETE PAVEMENTS, CONCRETE OTHER CONCRETE CONSTRUCTION IN ACCORDANCE WITH ITEM 421 TxDOT (2004) STANDARD SPECIFICATIONS.
21. LIMIT AIR ENTRAINMENT TO LESS THAN 2% IN ALL CONCRETE MIXES.
22. CONSTRUCT CONCRETE STRUCTURES IN ACCORDANCE TO ITEM 420 TxDOT (2004) STANDARD SPECIFICATIONS.
23. PROVIDE MEMBRANE CURING COMPOUND ON ALL CONCRETE WORK SPECIFIED IN THE PLANS. CONTRACTOR TO SUBMIT MEMBRANE CURING COMPOUND FOR ENGINEERS APPROVAL.
24. THE CONTRACTOR SHALL IMPLEMENT A STORM SEWER WATER POLLUTION PREVENTION PLAN (SW3P.) AND SHALL BE IN ACCORDANCE TO TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS. ALL APPLICATIONS FEES IT ANY SHALL BE PAID FOR BY THE CONTRACTOR. A COPY OF THE TPDES GENERAL PERMIT TXR150000 IS INCLUDED WITH THE SPECIFICATIONS.
25. CONTRACTOR SHALL COORDINATE STAGING AREA AND HAUL ROUTES WITH THE OWNER.
26. CONTRACTOR TO COORDINATE ANY RELOCATION OF ELECTRICAL, LIGHTING, GAS, AND ANY OTHER SERVICES CONFLICTING WITH THE PROPOSED IMPROVEMENTS AND ANY ADJUSTMENTS SHALL BE SCHEDULED WITH THE CORRESPONDING UTILITY OWNERS.
27. ALL NEW CURB AND GUTTER SHALL BE 24" IN ACCORDANCE WITH THE TYPICAL DETAILS CONTAINED IN THE PLANS.
28. CONTRACTION/EXPANSION JOINTS FOR NEW CURB AND GUTTER SHALL BE PLACED ON 10' SPACING AND SHALL BE 1/4" WIDE AND 1" DEEP. JOINTS SHALL BE "TOOLED" OR SAW-CUT.
29. CONSTRUCTION JOINTS FOR CURB AND GUTTER SHALL BE PLACED AS REQUIRED OR AT A MAXIMUM OF 50' SPACING AND AT POINTS OF CURVATURE (P.C.) AND POINTS OF TANGENCY (P.T.), POINTS OF VERTICAL GRADE CHANGES, NEXT TO CONCRETE VALLEY GUTTERS, NEXT TO SIDEWALKS OR DRIVEWAYS, FILLET SECTIONS OR NEXT TO A STORM INLET. JOINTS SHALL BE 3/4" WIDE AND SHALL BE FILLED WITH 3/4" ASPHALTIC PRE-FORMED JOINT MATERIAL MEETING, ASTM D994 AND AASHTO M-33 AND PLACED WITHIN 1/2" FROM THE FINISHED SURFACE. THE REMAINDER OF THE VOID SHALL BE FILLED WITH A SILICONE-TYPE JOINT SEALANT. PROVIDE 3/4" (#6) SMOOTH REBAR DOWELS AT 12" O/C - 24" LONG AT EACH CONSTRUCTION JOINT. EXPOSED DOWEL SHALL BE LUBRICATED WITH GRAPHITE-BASE LUBRICANT.
30. ALL EXPOSED CURB SURFACES SHALL BE RUBBED TROWEL FINISHED AND SPRAYED WITH A CURING COMPOUND.
31. SALVAGEABLE BROKEN CONCRETE PAVEMENT RUBBLE, ASPHALT PAVEMENT, CALICHE BASE, AND EARTHEN SPOIL SHALL BE HAULED TO AND STOCKPILED AT
32. THE CONTRACTOR SHALL CONTACT "DIG TESS" AT 1-800-344-8377 PRIOR TO ANY CONSTRUCTION ACTIVITY TO LOCATE ANY EXISTING UTILITY LINE.

Texas 811
Know what's below.
Call before you dig.

STATE OF TEXAS
JORGE D. PEREZ
34594
LICENSED
PROFESSIONAL ENGINEER
11-22-24

PCE
Perez Consulting Engineers
Texas Registered Engineering Firm F-2158
808 Dallas Ave. McAllen, Texas 78501
(956) 631-4482 Fax (956) 682-1545

WILLACY COUNTY

OTIS KLAR HEADSTART

RAYMONDVILLE, TEXAS

GENERAL NOTES & LOCATION MAP

PCE JOB NO.	NIN23116
FILE	
DATE	11-22-2024
DESIGNED	JDP
DRAWN	JH
REVISED	
CHECKED	

NO.	REVISION	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
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SHEET CIOI

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J:\NIN23116-Otis Klar Headstart\DESIGN\DWGS\01 NIN23116 GN.dwg Lyt: CIOI GENERAL NOTES & LOCATION MAP

IO 0 IO

Scale 1" = 10'

LEGEND

- = BENCHMARK
- = CULVERT
- = MANHOLE
- = LIGHT POLE
- = POWER POLE
- = GUY WIRE
- = IRRIGATION STAND PIPE
- = SIGN
- = PVC TOP
- = WATER METER
- E = ELECTRIC METER
- = GAS VALVE
- = WATER VALVE
- = FIRE HYDRANT
- = SEPTIC TANK
- A.C. = A.C. UNIT
- X = CHAINLINK FENCE
- OH = OVERHEAD POWERLINE
- G = GAS LINE
- = DEMOLITION AREA

DEMOLITION KEYED NOTES:

(A) EXISTING CONCRETE SIDEWALK TO BE REMOVED

(B) EXISTING CONCRETE STOOP TO BE REMOVED

(C) EXISTING WOOD BUILDING TO BE REMOVED

(D) EXISTING ASPHALT PAVEMENT SECTION TO BE REMOVED

STATE OF TEXAS
JORGE D. PEREZ
34594
LICENSED
PROFESSIONAL ENGINEER
11-22-24

PCE
Perez Consulting Engineers
Texas Registered Engineering Firm F-2158
806 Dallas Ave. McAllen, Texas 78501
(956) 631-4482 Fax (956) 682-1545

WILLACY COUNTY

OTIS KLAR HEADSTART

RAYMONDVILLE, TEXAS

DEMOLITION PLAN

PCE JOB NO.	NIN23II6
FILE	
DATE	II-22-2024
DESIGNED	JDP
DRAWN	JH
REVISED	
CHECKED	

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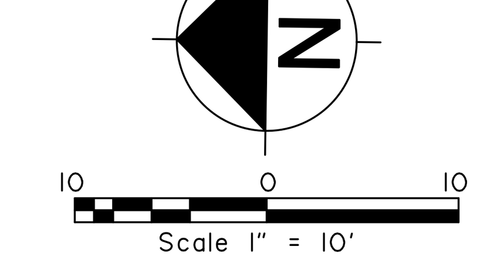
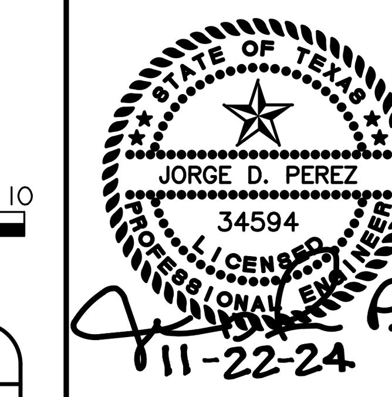
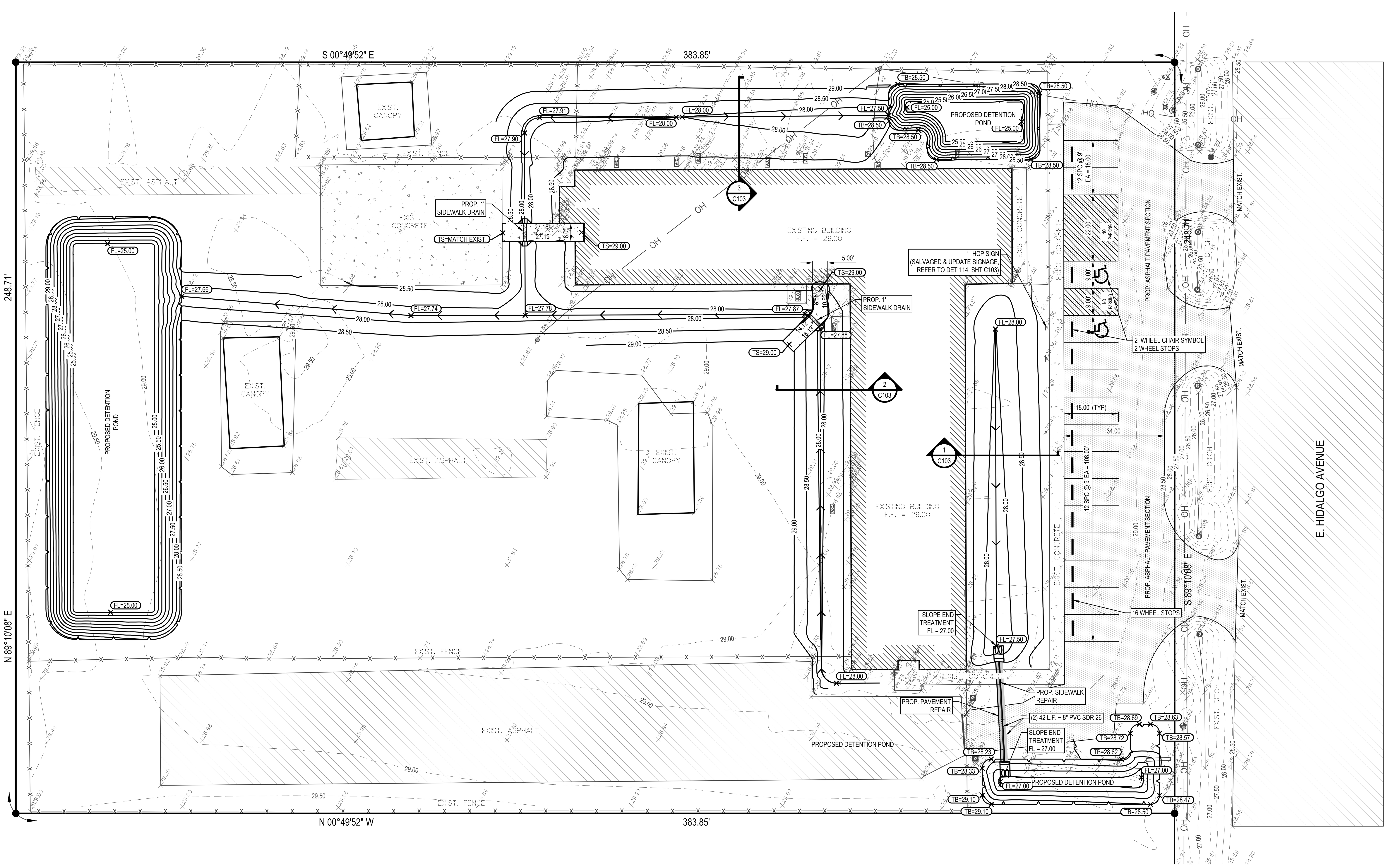
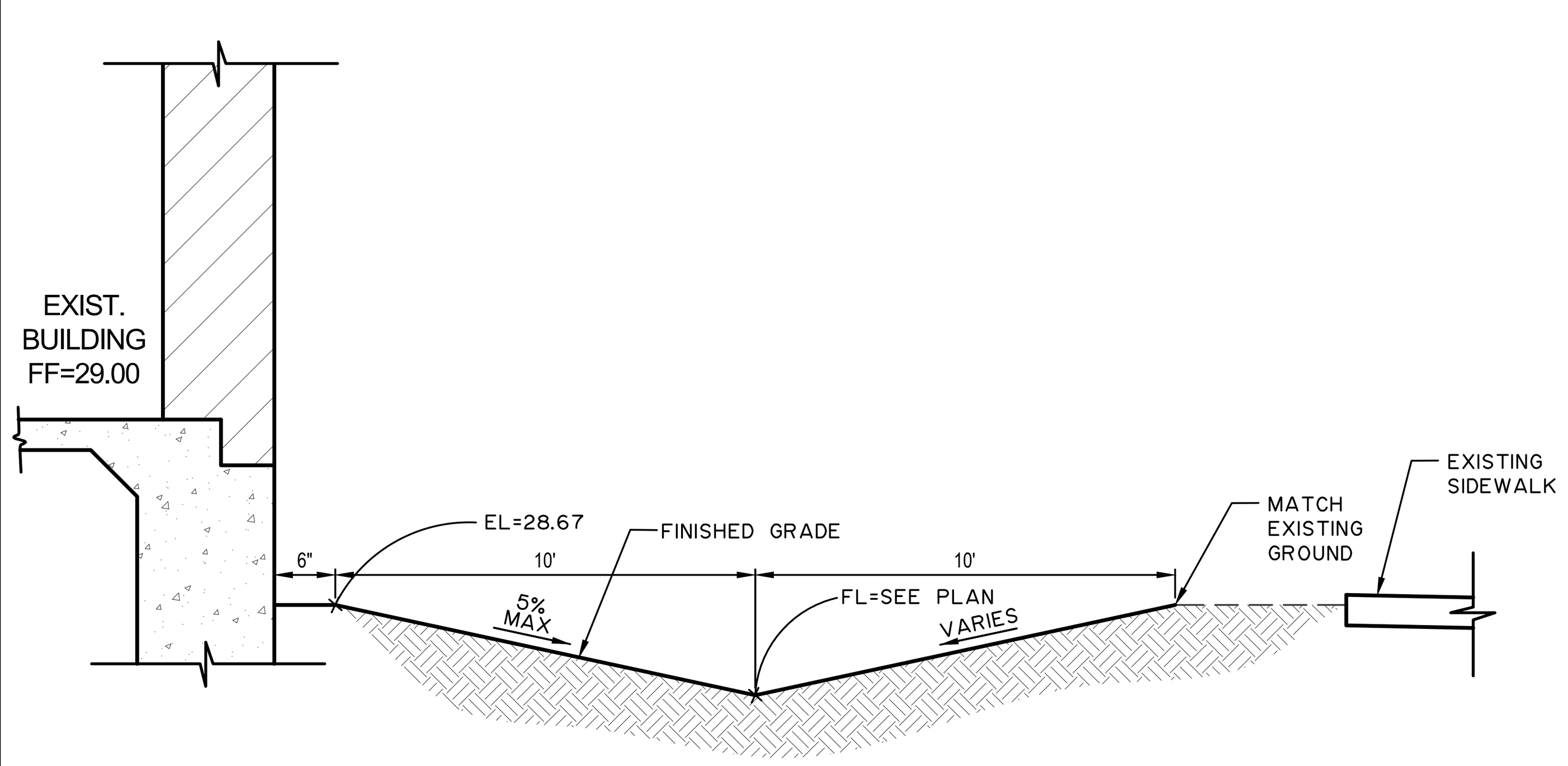




LEGEND

	= BENCHMARK
	= CULVERT
	= MANHOLE
	= LIGHT POLE
	= POWER POLE
	= GUY WIRE
	= IRRIGATION STAND PIPE
	= SIGN
	= PVC TOP
	= WATER METER
	= ELECTRIC METER
	= GAS VALVE
	= WATER VALVE
	= FIRE HYDRANT
	= SEPTIC TANK
A.C.	= A.C. UNIT
—— X ——	= CHAINLINK FENCE
—— OH ——	= OVERHEAD POWERLINE
—— G ——	= GAS LINE





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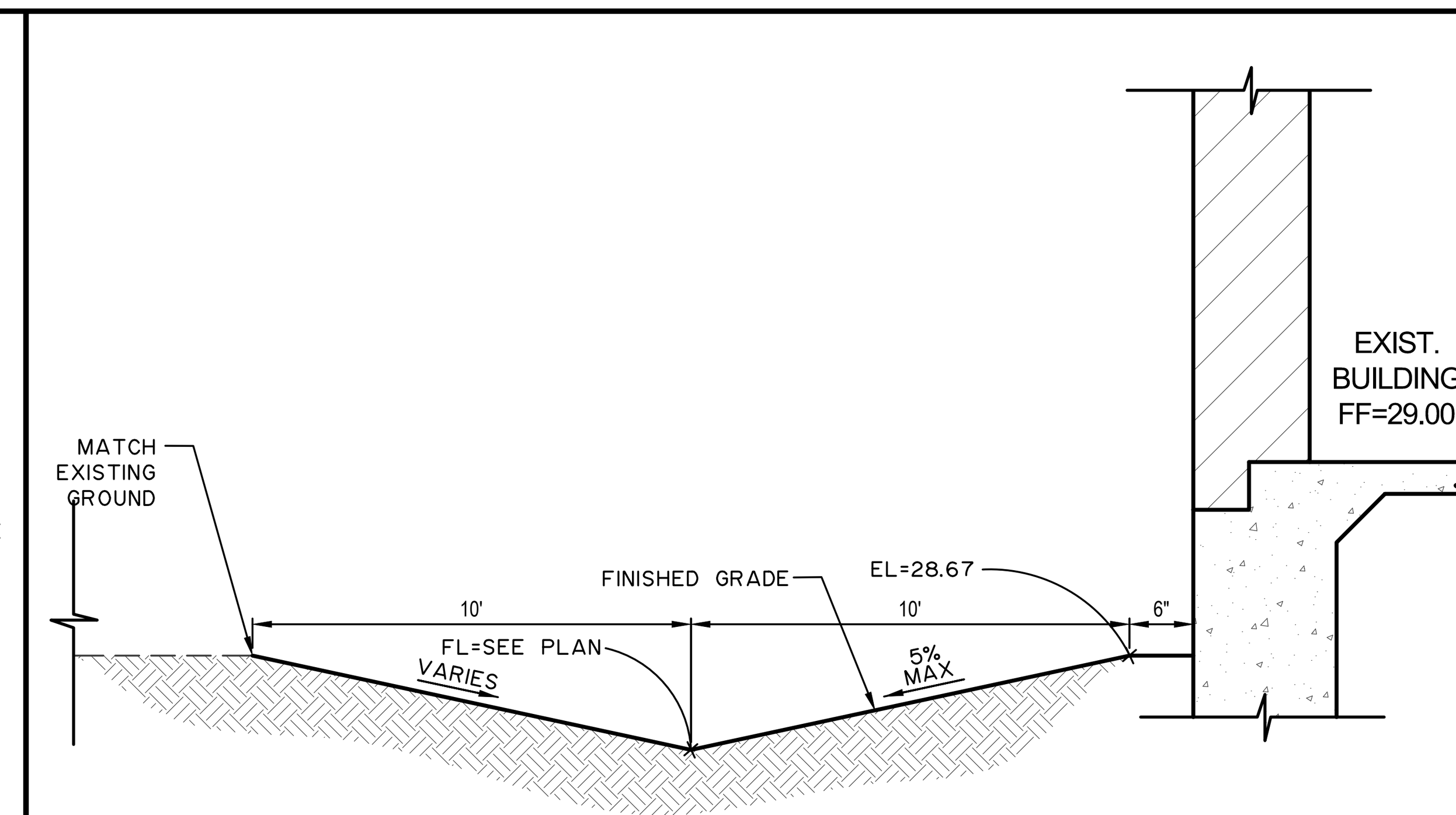

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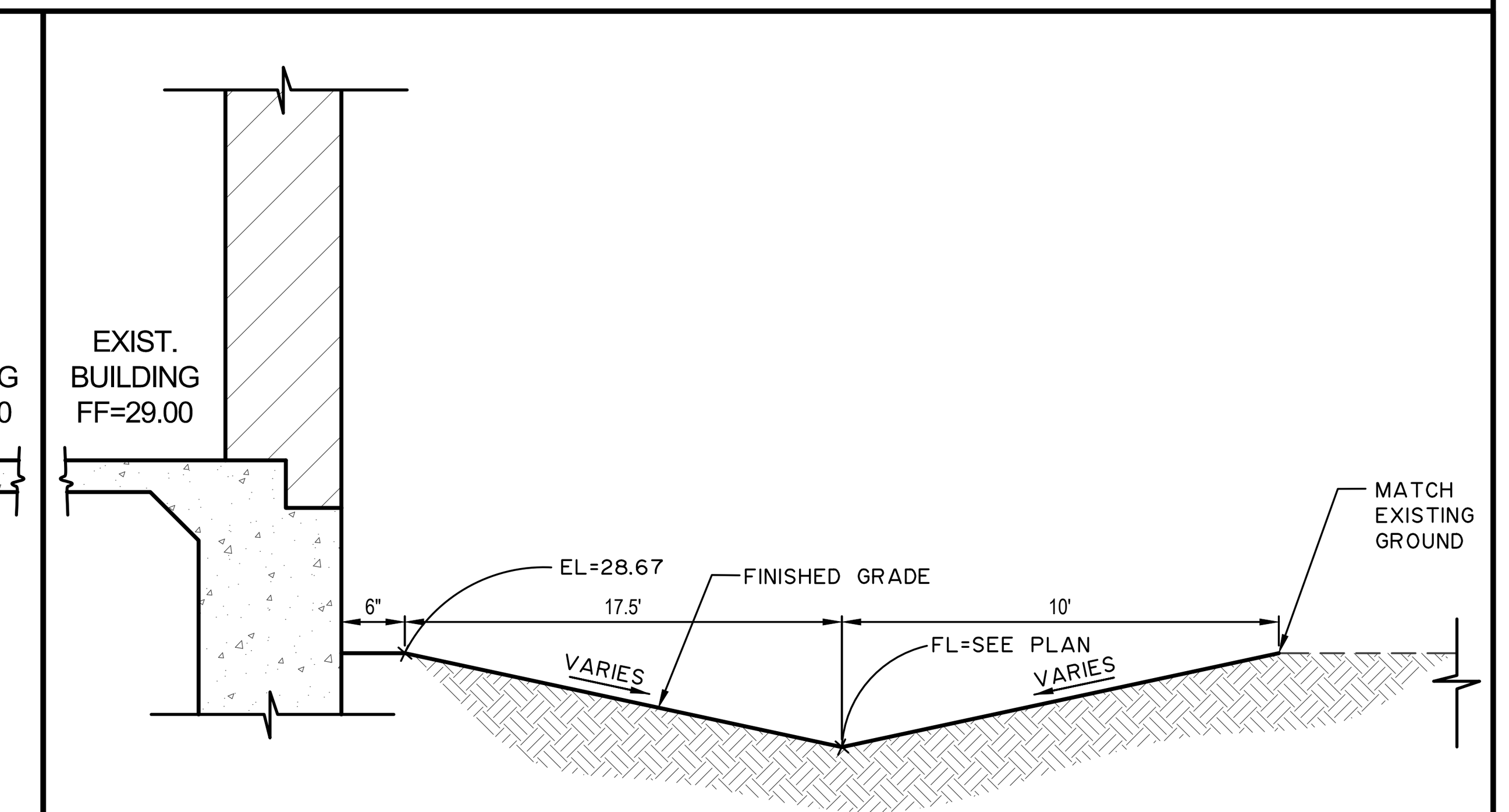

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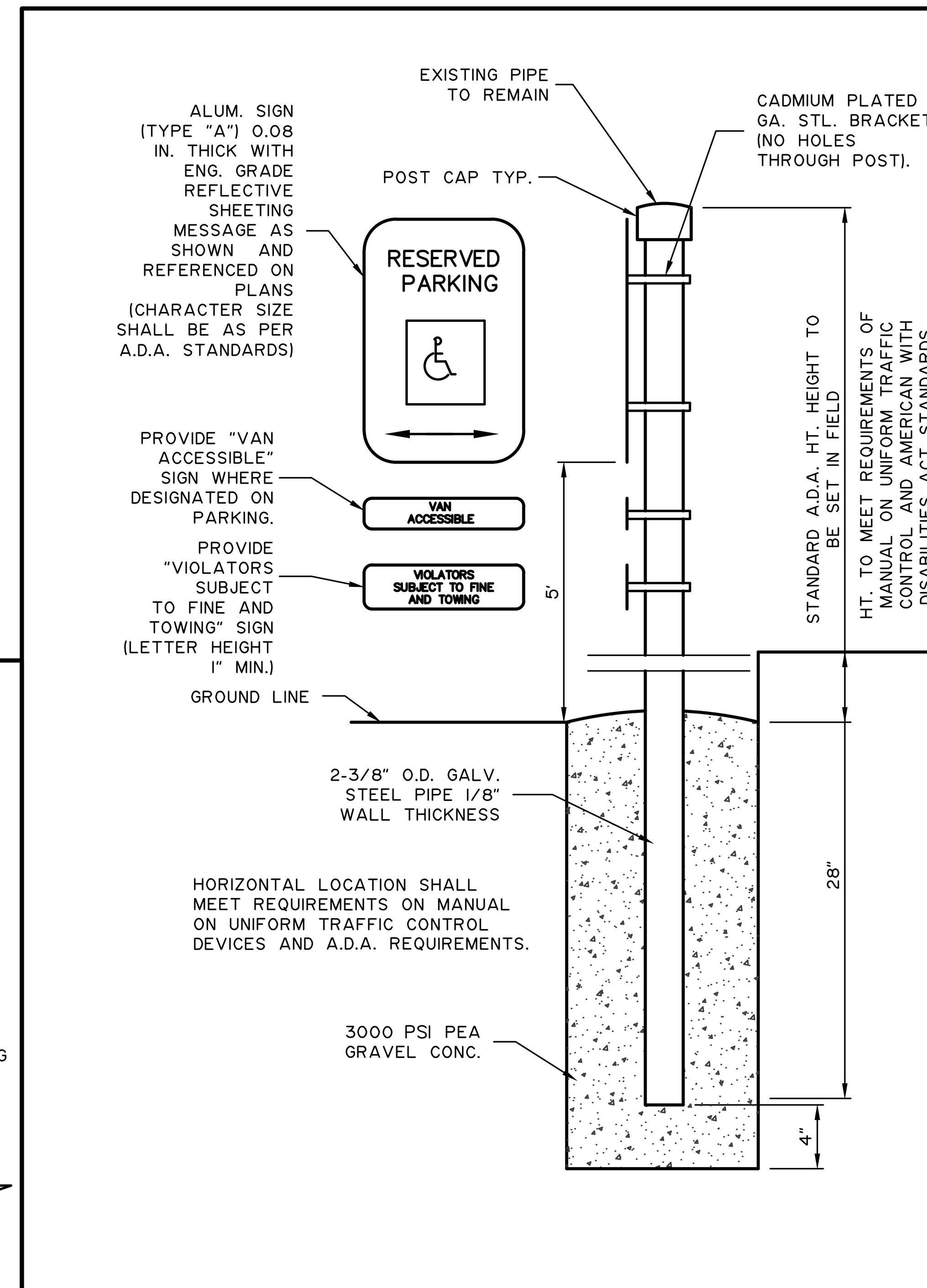

4 HANDICAP SIGN DETAIL
NOT TO SCALE

PCE
Perez Consulting Engineers
Texas Registered Engineering Firm F-2158
808 Dallas Ave. McAllen, Texas 78501
(956) 631-4482 fax (956) 682-1545

WILLACY COUNTY
OTIS KLAR HEADSTART
RAYMONDVILLE, TEXAS
SITE PLAN - GRADING & DRAINAGE

PCE JOB NO.	NIN23116
FILE	
DATE	11-22-2024
DESIGNED	JDP
DRAWN	JH
REVISED	
CHECKED	

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VERIFY SCALE
Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

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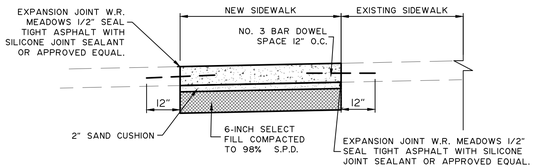
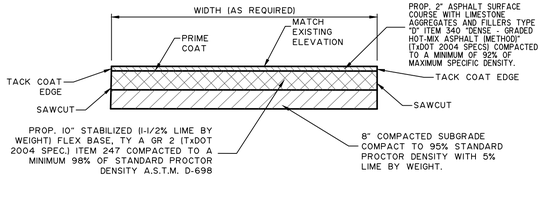
Lyt: C103 SITE PLAN - GRADING & DRAINAGE



1 SIDEWALK REPAIR DETAIL
NOT TO SCALE



2 PAVEMENT REPAIR DETAIL
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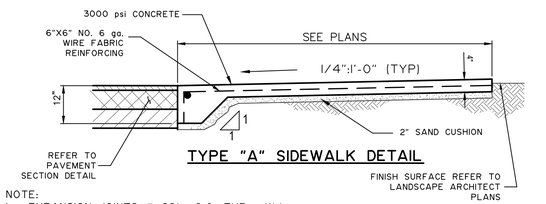
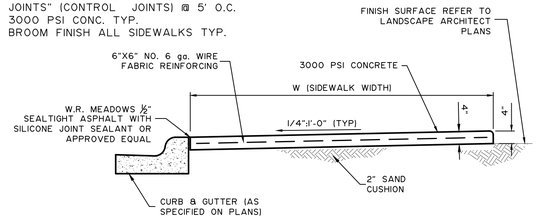
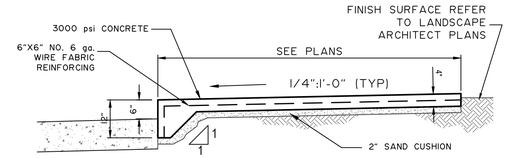


TYPE "A" SIDEWALK DETAIL

NOTE:
1. EXPANSION JOINTS @ 20' O.C. TYP. W/ ASPHALTIC MATERIAL (1/2") I/4" "DUMMY JOINTS" (CONTROL JOINTS) @ 5' O.C.
2. 3000 PSI CONC. TYP.
3. BROOM FINISH ALL SIDEWALKS TYP.

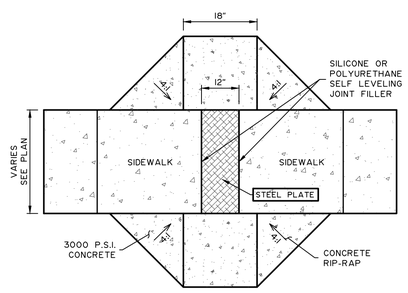


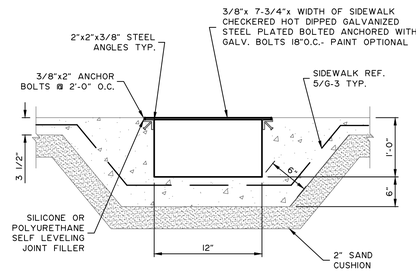
TYPE "B" SIDEWALK DETAIL



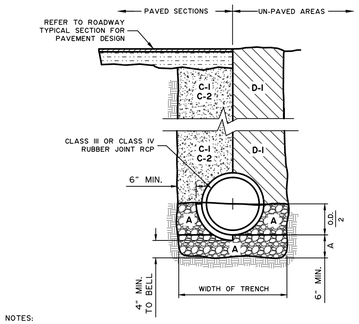
TYPE "C" SIDEWALK DETAIL

3 SIDEWALK DETAILS
NOT TO SCALE





4 1' SIDEWALK DRAIN
NOT TO SCALE



GENERAL NOTES:

1. BACKFILL THE EXCAVATION AFTER PAVEMENT OF THE PERMANENT STRUCTURE. USE BACKFILL FREE FROM STONES LARGE ENOUGH TO INTERFERE WITH COMPACTION; LARGE OR FROZEN JUMPS THAT WILL NOT BRAKE DOWN READILY UNDER COMPACTING; A WOOD OR OTHER EXTRANEOUS MATERIAL OBTAIN BACKFILL MATERIAL FROM EXCAVATION OR FROM OTHER SOURCES. CONTRACTOR SHALL REFER TO SECTION 02221 OF SPECIFICATIONS. BEFORE CONSTRUCTION.

2. WIDTH OF TRENCH

INSIDE DIAMETER OF PIPE (INCHES)	WIDTH OF TRENCH AT TOP OF PIPE (INCHES)
12 - 33	O.D. + 16
36 - 78	O.D. + 24
80 AND LARGER	O.D. + 30

3. PROVIDE PRECAST REINFORCED CONCRETE PIPE THAT CONFORMS TO THE DESIGN SHOWN ON THE PLANS AND TO ASTM C76

4. BACKFILL SHALL BE CLEAR OF ORGANIC MATERIALS, CONSTRUCTION DEBRIS OR TRASH. IT SHALL MEET THE FOLLOWING STANDARDS.

A - ANGULAR CRUSHED STONE OR ROCK OR CRUSHED GRAVEL. 100% PASSING 1 1/2" SIEVE, LESS THAN 10% PASSING NO. 4 SIEVE AND LESS THAN 5% PASSING NO. 200 SIEVE.

C-1 SELECT BACKFILL OR COHESIONLESS MATERIAL / SAND

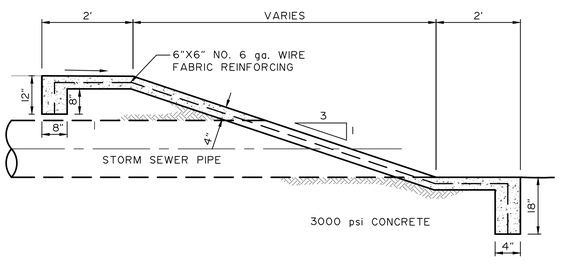
SELECT BACKFILL - EXCAVATED MATERIAL BACKFILL OR CLEAN LOCAL MATERIAL CONSISTENT WITH THE SURROUNDING EARTH MATERIAL MAY BE USED (REFER TO SECTION 02221 OF SPECIFICATIONS) . PLACE BACKFILL IN UNIFORM LAYERS AT MOST 10 IN. DEEP (LOOSE MEASUREMENT) COMPACT EACH LAYER TO 95% STD PROCTOR DENSITY (ASTM D-698 & ASTM 4253) BRING EACH LAYER OF BACKFILL MATERIAL TO THE MOISTURE CONTENT NEEDED TO OBTAIN THE REQUIRED DENSITY. COMPACT EACH LIFT MECHANICALLY (ROLLERS MAY BE USED IF FEASIBLE).

COHESIONLESS MATERIAL / SAND - USE WELL GRADED OR POORLY GRADED SANDS WITH MORE THAN 50% PASSING No. 4 SIEVE BUT LESS THAN 12% PASSING No. 200 SIEVE AND HAVE A PLASTICITY INDEX LESS THAN 4. PLACE SAND IN UNIFORM LAYERS AT MOST 10 IN. DEEP. COMPACT MATERIAL USING VIBRATORY EQUIPMENT OR MECHANICAL EQUIPMENT. WATER POUNDING / WATER JETTING WILL BE ALLOWED ONLY IF APPROVED IN WRITING BY THE CITY OR ENGINEER. (ASTM D-1557 OR TX 113-E)

C-2 SAND CEMENT STABILIZED BACKFILL WITH 7% PORTLAND CEMENT, AS PER ITEM 400 SECTION 400.3.C OF THE 2000 TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

D-1 SELECT BACKFILL - PLACE BACK FILL IN UNIFORM LAYERS AT MOST 12 IN. DEEP. COMPACT EACH LAYER TO 90% STD PROCTOR DENSITY. COMPACT EACH LIFT MECHANICALLY (ROLLERS MAY BE USED IF FEASIBLE).

5 TYPICAL REINFORCED R.C.P. STORM SEWER TRENCH DETAIL
NOT TO SCALE



6 CONCRETE SLOPED-END TREATMENT DETAIL
NOT TO SCALE

GENERAL NOTES:

(A) THE PERCENT OF DENSITY AS DETERMINED BY COMPACTION RATIO (TEX-113-E) FOR THE NEW FLEXIBLE BASE SHALL BE A MINIMUM OF 98%

(B) THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT CERTAIN EXISTING AND/OR PROPOSED STRUCTURES MAY BE WITHIN THE LIMITS OF THE FLEXIBLE BASE AND TREATED SUBGRADE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION OPERATIONS WITHOUT DAMAGE TO THESE STRUCTURES.

(C) MOISTURE CONTENT ON FLEX BASE MATERIAL SHALL BE TESTED IN ACCORDANCE WITH (A.S.T.M. 1557).

(D) TREAT NEWLY CONSTRUCTED FLEX BASE SURFACE WITH MC-30 ASPHALT MATERIAL AT A RATE OF 0.22 GAL/SY AS PER TXDOT ITEM 300 BEFORE PLACEMENT OF H.M.A.C. SURFACE.

(E) THE CONTRACTOR SHALL EXERCISE DILIGENCE IN THE APPLICATION OF ASPHALT BY THE USE OF FLAGGING AND ROLLING PROCEDURES TO KEEP FROM SPRAYING OR SPLATTERING THE TRAVELING PUBLIC WITH ASPHALTIC MATERIAL.

(F) H.M.A.C. SHALL BE 1/2" HOT MIX ASPHALTIC CONCRETE, PG. 76-22 S. TYPE "D" SURFACE COURSE WITH LIMESTONE AGGREGATE AND FILLERS.

(G) TACK COAT LAYER SHALL BE APPLIED BETWEEN H.M.A.C. LIFTS BETWEEN CONCRETE STRUCTURES AND ASPHALT AND SHALL BE SUBSIDIARY TO ASPHALT SURFACE COURSE ITEM.

(H) TACK COAT BINDERS INCLUDE CSS-1H, SS-1H, AND PG 64-22.

(I) AT THE EXPENSE OF THE CONTRACTOR AND TO THE SATISFACTION OF THE ENGINEER, REMOVE AND REPLACE ANY HOT MIX ASPHALTIC CONCRETE SURFACE COURSE THAT DOES NOT BOND OR THAT HAS IRREGULARITIES SUCH AS SEGREGATION, RUTTING, RAVELING, FLUSHING, FATSPOTS, MAT SLIPPAGE, COLOR, TEXTURE, ROLLER MARKS, TEARING, GOUGES, STREAKS, UNCOATED AGGREGATED PARTICLES OR SURFACE THAT DO NOT MEET TYPE A SURFACE RIDE QUALITY IN ACCORDANCE TO ITEM 585 OF TECHNICAL SPECIFICATIONS.

(J) ANY DAMAGES DONE TO EXISTING CONCRETE SIDEWALK, CONCRETE CURB & GUTTER, VALLEY GUTTER AND DRIVEWAYS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.

(K) PARKING LOT TO MAINTAIN EXISTING GRADING PATTERNS.

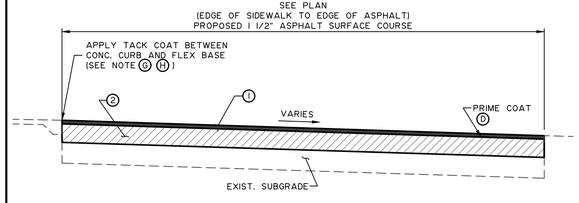
KEYED NOTES

(1) PROPOSED 1/2" HOT MIX ASPHALTIC CONCRETE SURFACE COURSE WITH LIMESTONE AGGREGATES AND FILLERS TYPE "D ITEM 340 (2004 TxDOT STANDARD SPECIFICATIONS) COMPACTION TO WITHIN AN AIR VOID RANGE OF 5% TO 9% FROM MAXIMUM THEORETICAL GRAVITY PER TxDOT TEX-227.

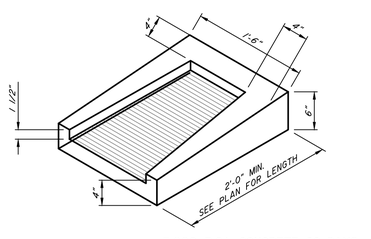
(2) SCARIFY AND RESHAPE 6-INCHES OF EXISTING PAVEMENT WITH RECLAIMED ASPHALT CONCRETE SURFACE PAVEMENT ITEM 216 TYPE D (2004 TxDOT STANDARD SPECIFICATIONS) AND STABILIZE WITH 3% LIME BY WEIGHT. REWORK EXISTING BASE AS PER TXDOT ITEM 216 TO A FINAL DEPTH OF 6-INCHES. ALL COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY-DETERMINED BY MODIFIED MOISTURE-DENSITY RELATIONSHIP (A.S.T.M. 1557) WITHIN 2% OF OPTIMUM MOISTURE. ADD 2% LIME BY WEIGHT AS PER TXDOT ITEM 260. MAKE-UP FLEXIBLE BASE SHALL CONFORM TO TXDOT ITEM 247, TYPE E, GRADE 3.

ABBREVIATIONS

F	= FACE OF CURB
EOA	= EDGE OF ASPHALT
F-F	= FACE TO FACE OF CURB
PGL	= PROFILE GRADE LINE
B-B	= BACK TO BACK OF CURB

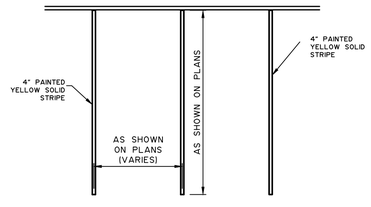


7 PARKING LOT PAVEMENT SECTION
NOT TO SCALE

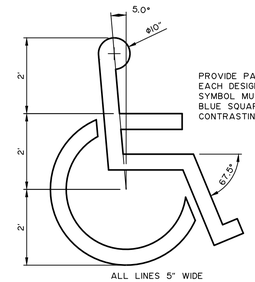


3,000 P.S.I. CONCRETE 28 DAYS

8 TYPICAL SPLASH BLOCK DETAIL
NOT TO SCALE

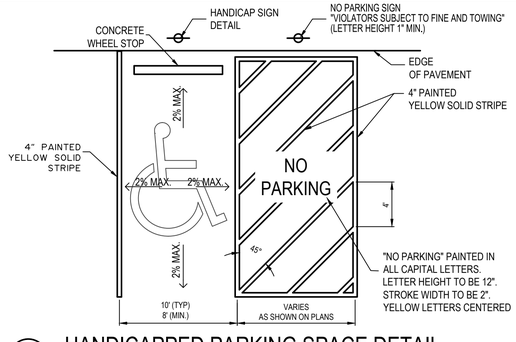


9 PARKING SPACE & STRIPING DETAIL
NOT TO SCALE



ALL LINES 5" WIDE

10 WHEEL CHAIR SYMBOL DETAIL
NOT TO SCALE



11 HANDICAPPED PARKING SPACE DETAIL
NOT TO SCALE

JORGE D. PEREZ
34594
LICENSED
PROFESSIONAL ENGINEER
11-22-24

PCE Parsons Consulting Engineers
Texas Registered Engineering Firm F-2158
808 Dallas Ave. McAllen, Texas 78501
(956) 631-4482 Fax (956) 682-1545

WILLACY COUNTY
OTIS KLAR
RAYMONDVILLE, TEXAS
TYPICAL DETAILS

PCE JOB NO.	DESIGNED	DRAWN	CHECKED
NIN23116	JDP	JH	
FILE	DATE 11-22-2024	REVISED	

NO.	REVISION	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET C104