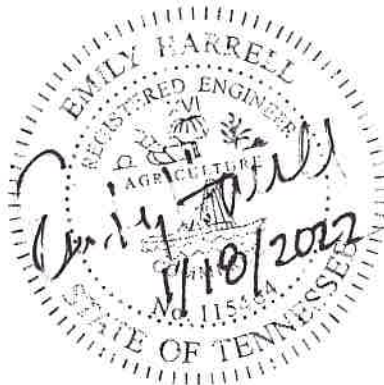


CONTRACT DOCUMENTS
FOR
FY2022 STREET PAVING



City of Lakeland
January 2022

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STANDARD
INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS.

1.1 Terms used in these Instructions to Bidders have the meanings assigned to them in the Standard General Conditions, as modified by the Supplementary Conditions unless otherwise stated herein.

1.2 Certain additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

A. Bidder: One who submits a bid directly to the City.

B. Successful Bidder and/or Contractor: This term means the qualified, responsible, and responsive Bidder, as determined by the City, who has submitted the lowest bid, and to whom the City has awarded the Contract.

C. Bid Documents: Prior to award of the contract, all documents in the Bid Package are considered "Bid Documents." This includes the Advertisement for Bid, Instructions to Bidders, Bid Forms, Bond Forms, Sample Agreement, Standard General Conditions, Supplementary Conditions, Technical Specifications, drawings, etc. Bid Documents also include any addenda issued prior to the opening of the bids.

D. Contract Documents: Following the award of the contract, contract documents shall include those documents listed above in "C." -- with the exception of the Advertisement for Bid, Bid Bond and the Instructions to Bidders; the executed performance and payment bonds; change orders; and, all written agreements and/or written documents executed between the City and Contractor.

2. COPIES OF BIDDING DOCUMENTS.

2.1 Complete sets of Bidding Documents, which include the Advertisement for Bids, these Instructions to Bidders, Bid Form, Bid Bond, Contract Documents, and Addenda, may be obtained from the City of Lakeland, Engineering Office, 10001, U.S. Highway 70, Lakeland, Tennessee 38002.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; the City assumes no responsibility to Bidders for errors or misinterpretations, including those resulting from the use of incomplete sets of Bidding Documents.

2.3 The City, and/or its agent, in making copies of Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS.

3.1 Pre-qualification Requirements: Attendance at the Pre-Bid Conference may be considered by the City in determining a Bidder's qualifications. Consult Section 5 below.

3.2 Post Bid Qualifications: To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five (5) days of Owner's request written evidence demonstrating Bidder's responsibility, including, but not limited to, matters such as financial data and previous experience. Each Bid will be considered a warrant of Bidder's qualification to do business in this state. Proof of such qualifications may be required upon five (5) days notice.

3.3 Bidding Preferences: Pursuant to T.S. 12-4-802 whenever the lowest responsible and responsive bidder on a public construction project in this state is a resident of another state which is contiguous to Tennessee and which allows a preference to a resident contractor of that state, a like reciprocal preference is allowed to the lowest responsible and responsive bidder on such project who is either a resident of this state or is a resident of another state which does not allow for a preference to a resident contractor of that state.

3.4 Responsible and Responsive Bidders: Pursuant to TS 12-4-801, a responsible bidder means a person who has the capacity in all respects to perform fully the contract requirements, and the integrity and reliability which will assure good faith performance and; and Responsive Bidder means a person who has submitted a bid which confirms in all material respects to all document, whether attached or incorporate by reference, utilized for soliciting bids.

4. PRE-BID CONFERENCE.

A Pre-bid Conference will be held at the time and place stated in the "Advertisement for Bid." Attendance at the Pre-bid Conference is not mandatory.

The purpose of the Conference is to review project requirements and provide bidders an opportunity to visit the project site to make their own determination of existing conditions.

Minutes will be taken of the Pre-bid Conference, and thereafter consulted as a bidding document.

5. EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

5.1 Before submitting a Bid, each Bidder must do at least the following:

- A. Examine the Bidding Documents thoroughly;
- B. Visit the site to become familiar with local conditions that may in any manner affect cost progress, or performance of the Work;

- C. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the work; and
- D. Study and carefully correlate Bidder's observations with the Bidding Documents.

5.2 Reference is made to the Supplementary Conditions, for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress, or performance of the work which has/have been relied upon by Engineer in preparing the Drawings and Specifications. The City will provide copies of such reports for review to any Bidder requesting them (if applicable). These reports are not guaranteed as to accuracy or completeness. Before submitting a Bid each Bidder will, at its own expense, make such additional investigations and tests as the Bidder may deem necessary to determine the time, price, and other terms and conditions of the Contract Documents.

5.3 On request the City will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid. The City may require any Bidder desiring access to execute an appropriate release form.

5.4 The lands upon which the work is to be performed, right-of-way for access thereto and other lands designated for use by Contractor in performing the work are identified in the Supplementary Conditions, Special Provisions, and/or Drawings.

5.5 The submission of a Bid will constitute an incontrovertible representation by the Bidder that: Bidder has read and understands the Bidding Documents and the Bid is made in accordance therewith; Bidder has visited the site and become familiar with the local conditions under which the work is to be performed; Bidder assumes responsibility for estimating properly the difficulties and costs of successfully performing the work; Bidder has complied with every requirement of these instructions; and that the Bidding Documents are sufficient in scope and detail to indicate and convey an understanding of all terms and conditions for performance of the Work.

6. AVAILABILITY OF LANDS.

6.1 Access to private property required by Contractor for staging areas, temporary facilities or other uses in addition to those identified in the Bidding or Contract Documents shall be obtained and paid for by Contractor. Such costs are to be considered incidental to the Contract and merged with Bid Items described and are to be provided without additional compensation to Contractor.

7. INTERPRETATIONS.

All questions about the meaning or intent of the Bidding Documents shall be submitted to Engineer in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten (10) days

prior to the date for opening the Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral interpretations, clarifications, or comments are not binding upon the City, and do not serve to amend, modify, or in any way change the basic Bidding Documents, and shall be relied upon by Bidder at his own risk.

8. BID GUARANTY.

8.1 A Bid Guaranty in the form of a properly executed Bid Bond payable to the City in the amount of not less than 5% of the total base bid amount must accompany each bid. Pursuant to T.S. 12-4-201, in lieu of a Bid Bond, the following securities or cash may be substituted at the percentage rate required for such bond: United States treasury bond or general obligation bond or certificates of deposit irrevocably pledged from a state or national bank having its principle office in Tennessee or a state or federal saving and loan association having its principal office in Tennessee, or any state or national banks or state or federal savings and loans associations that has its principal office located outside of Tennessee and that maintains a branch in this state, or a letter of credit or cash. The successful Bidder will be required to execute an Agreement with the City, in the form supplied in the bidding documents, within thirty (30) days after Notice of Award is issued. The Notice of Award shall serve as notice that the Agreement is ready for execution. The Bid Guaranty shall be forfeited as liquidated damages if the Bidder fails to execute the Agreement within thirty (30) days after such Notice is issued, or fails to provide proper Bond or other form of Guaranty, as approved. The Bid Guaranty, if a Bid Bond, shall be executed by a surety or guarantee company authorized to do business in Tennessee. The Attorney-in-Fact who executes the Bond on behalf of the surety shall affix a certified and current copy of its Power of Attorney from the surety. No other type of Bid Guaranty will be accepted. The City may proceed against a Bid Guaranty unless either: a) the Agreement has been executed by Contractor and Performance, and Labor and Material Payment Bonds have been furnished, as required; or, b) the specified time has elapsed so that Bids may be withdrawn; or, c) the Bid has been rejected. .

8.2 The Bid Guaranty of the Successful Bidder will not be released unless and until such Bidder has executed the Agreement and furnished the required contract Bond(s). If the successful Bidder fails to execute and deliver the Agreement and furnish the required Contract Bonds within thirty (30) days of the Notice of Award, or fails to proceed with the performance of the Contract, the City may annul the Notice of Award and the Bid Guaranty of that Bidder will be forfeited as liquidated damages, it being agreed that exact damages are difficult or impossible to calculate, and the Bid Guaranty amount is the best estimate.

9. CONTRACT TIME.

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) is set forth in the Bid Form and will be included in the Agreement.

10. LIQUIDATED DAMAGES.

Provisions for liquidated damages are to be set forth in the Agreement.

11. MATERIAL AND EQUIPMENT.

11.1 The materials, products, and equipment described in the Bidding Documents establish a standard or required function, dimension, appearance, and quality to be met by any proposed substitution.

11.2 Materials containing asbestos will not be accepted.

11.3 No substitution will be considered unless written request for approval has been submitted by the Bidder on an appropriate form, and has been received by the Engineer or the City's designated agent at least TEN (10) DAYS prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment, or work that incorporation of the substitute would require, shall be included. The burden of proof of the merit and adequacy of a proposed substitute is upon the Bidder. The decision of approval or disapproval of a proposed substitution by the Engineer or the City's designated agent will be final.

If any proposed substitution is approved, such approval will be described in an addendum. Bidders shall not rely upon approvals made in any other manner.

11.4 When generic parameters for performance and/or appearance are specified, those materials which comply with specifics as delineated do not require a written request for approval. They must be capable of withstanding specification comparison, however, at the time of product data and shop drawing submittal.

12.5 Pursuant to T.S. 12-4-121, "Preference is hereby given to materials, supplies, equipment, machinery, and provisions produced, manufactured, supplied or grown in Tennessee, quality being equal to articles offered by the competitors outside of the State."

12. SUBCONTRACTORS, ETC.

12.1 If required by the City, the identity of certain Subcontractors and other persons and organizations shall be submitted to the City in advance of the Notice of Award. The apparent Successful Bidder, and any other Bidder so requested by the City, will within seven (7) days after the day of the Bid opening, submit to the City a list of names and addresses of all Subcontractors and other persons and organizations whom Bidder proposes will furnish material and/or equipment for the Work. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each Subcontractor, person, and organization if requested by the City. If the City or Engineer after due investigation has reasonable objection to any proposed Subcontractor, or other person, or organization, the City may, before giving the Notice of Award, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution and the Agreement is not awarded to such Bidder for that reason, the Bidder's

refusal will not constitute grounds for forfeiting the Bid Guaranty. Any Subcontractor, other person, or organization so listed and to whom the City or Engineer does not make written objections prior to giving of the Notice of Award will be deemed acceptable to the Owner and Engineer.

13. BID FORM

13.1 The Bid Form is included with the Bidding Documents. Bidders shall bid all schedules and alternates (if any) as set forth in the Bid Form.

13.2 Bid Forms must be completed in ink or by typewriter. Corrections must be initialed by the Bidder. The Bid price of each item on the form must be stated in words and numerals; in case of a conflict, words will take precedence.

13.3 Bids by corporations or limited liability companies must be executed in the business entity's name by the president or a vice-president (or other officer or member accompanied by evidence of authority to sign), and the signature attested to by an authorized officer or member. The business entity's address and state of incorporation shall be shown below the signature.

13.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature. The official address of the partnership must be shown below the signature.

13.5 All names must be typed or printed below the signature.

13.6 The bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form). Failure to acknowledge receipt of Addenda shall not constitute an adjustment of the Contract Price provided on the Bid Form.

13.7 The address to which communications regarding the Bid are to be directed must be shown.

13.8 All items which are not specifically referred to in the Bid Form but are included in the plans or specifications are to be considered incidental to the performance of the major work described and shall be constructed as indicated on the plans or called for in the specifications without additional remuneration.

14. SUBMISSION OF BIDS.

14.1 Bids shall be submitted not later than the time and at the place indicated in the Advertisement for Bids and shall be included in an opaque sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by the Bid Guaranty and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof. All bidding information shall be included in the sealed envelope.

14.2 Contractors' Licenses, Bids Contractors and electrical, plumbing, and HVAC subcontractors who do jobs costing \$25,000 or more must be licensed by the state (T.C.A. § 62-6-102, T.C.A. § 62-6-111). Officials issuing a permit or work order to an unlicensed contractor are guilty of a Class A misdemeanor (T.C.A. § 62-6-120). The name, license number, license expiration date, and classification of contractors applying to bid on jobs must appear on the bid envelope when the bid is more than \$25,000. If the bid is less than \$25,000, only the name of the contractor must appear on the outside of the envelope. Upon opening the envelope, if the bid exceeds \$25,000, the bid is automatically disqualified (T.C.A. § 62-6-119(b)). The name of a prime contractor who does electrical, plumbing, heating, ventilation, and air conditioning must appear on the outside of the envelope. Failure of a bidder to comply voids the bid, and it may not be opened. It is a Class A misdemeanor for any person to disregard the above requirements. Municipalities may not impose additional licensing requirements on state-licensed contractors (T.C.A. § 62-6-111(i)(2)(c)). T.C.A. § 62-6-137, however, allows municipalities to require a permit bond for contractors to ensure that the contractor complies with applicable laws and ordinances. Approving the permit bond program requires a two-thirds vote of the governing body.

15. MODIFICATION AND WITHDRAWAL OF BIDS.

15.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the same manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

15.2 If, within twenty-four (24) hours after Bids are opened, any bidder files a duly signed written notice with the City and promptly thereafter demonstrates to the satisfaction of the City that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw its Bid and the Bid Guaranty will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work.

16. OPENING OF BIDS.

Bids will be opened publicly and read aloud. An abstract of the bid schedule will be made available after the opening of Bids.

17. BIDS TO REMAIN EFFECTIVE.

All Bids not modified or withdrawn as provided in Section 16, shall remain effective for thirty (30) days after the day of the Bid opening, but the Owner may, in its sole discretion, release any Bid and return the Bid Guaranty prior to that date.

18. AWARD OF CONTRACT.

18.1 The City reserves the right to reject any and all Bids; to waive any and all irregularities or informalities; to negotiate specific contract terms not inconsistent with the

Advertisement for Bids, with the Successful Bidder; and to disregard all nonconforming, nonresponsive, unbalanced, or conditional Bids. Discrepancies between words and numerals will be resolved in favor of words. Discrepancies between the indicated sum of any column of numerals and the correct sum thereof will be resolved in favor of the correct sum.

18.2 A Bidder shall bid all schedules and alternates (if any) as set forth in the Bid Form. The City reserves the right in awarding the Agreement to consider the competency, responsibility, and suitability of the Bidder, as well as the amounts of the various bids. The Work, therefore, may not necessarily be awarded to the low bidder.

18.3 In evaluating Bids, the Owner reserves the right to limit the scope of the project to the monies available for the project.

18.4 The Owner may consider, among other things, the qualifications and experience of Subcontractors and other persons and organizations who are proposed to furnish material or equipment for the Work; operating costs; maintenance considerations; performance data; and guarantees of materials and equipment.

18.5 The Owner may conduct such investigations as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualification, and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations proposed to do the Work in accordance with the Bidding Documents.

18.6 If the Agreement is to be awarded, it will be to the lowest Bidder who is determined qualified and responsible in the sole discretion and best interest of the City. The low bid shall be determined based upon an evaluation of the Total Base Bid. The City reserves the right to accept or reject alternates in any order or combination; and to accept or reject any schedule or all schedules.

If the low bid is to be awarded in any other manner, applicable laws must be consulted and the above paragraphs must be modified.

18.7 If the Agreement is to be awarded, the Owner will give the Successful Bidder a Notice of Award within thirty (30) Days after the day of the Bid opening.

19. PERFORMANCE AND PAYMENT BONDS AND INSURANCE CERTIFICATES.

The General and Supplementary Conditions set forth the City's requirements as to Performance and Payment Bonds and Insurance Certificate(s). When the Successful Bidder delivers the executed Agreement to the Owner, it shall be accompanied by the required Bonds and Insurance Certificate(s).

19.1 Pursuant to T.S. 12-4-201, no contract shall be let for any public work in this state, by any city, county or state authority, until the contractor shall have first executed a good and solvent bond to the effect that the contractor will pay for all the labors and materials used by the contractor, or any immediate or remote subcontractor under the contractor, in such contract, in lawful money of

the United States. The bond to be so given shall be for twenty-five (25%) of the contract price on all contracts in excess of one hundred thousand dollars (\$100,000). Where advertisement is made, the condition of the bond shall be stated in advertisement; provided that T.S. 12-4-201 shall not apply to contracts of one hundred thousand dollars (\$100,000) or less.

20. SIGNING OF AGREEMENT.

When the City gives a Notice of Award to the Successful Bidder, it will be accompanied by one (1) unsigned counterpart of the Agreement and the Performance and Payment Bonds. Within thirty (30) days thereafter, Contractor shall comply with the conditions precedent in the Notice of Award. Within ten (10) days thereafter, the City will deliver one (1) fully signed counterpart to Contractor. The City will deliver one signed copy of the Agreement within the project manual.

Notes:

Revised 10.11.09 paragraph 14.1 and 14.2

EXHIBIT "A"
STANDARD
BID FORM

PROJECT IDENTIFICATION: City of Lakeland, Tennessee
Project Description: FY22 Street Paving Project

THIS BID SUBMITTED TO: City of Lakeland, Tennessee
10001 U.S. Highway 70
Lakeland, Tennessee 38002

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the City in the form included in the Bidding Documents and to complete all Work as specified or indicated in the Bidding Documents for the Contract Price by November 16, 2022, and completed and ready for final payment not later than November 30, 2022, in accordance with the Bidding Documents.
2. Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation those dealing with the disposition of Bid Guaranty. This Bid will remain effective for thirty (30) days after the day of Bid opening. Bidder will sign the Agreement and submit the Bonds and other documents required by the Bidding Documents within thirty (30) days after the date of the City's Notice of Award.
3. Notice that preferences will be granted pursuant to Tennessee Statutes is hereby acknowledged.
4. In submitting this Bid, Bidder represents, as more fully set forth in the Bidding Documents, that:
 - A. Bidder has examined copies of all the Bidding Documents and of the following addenda (receipt of all which is hereby acknowledged):

Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
 - B. Bidder has examined the site and locality where the work is to be performed, the federal, state, and local Laws and Regulations, and the conditions affecting cost, progress, or performance of the work and has made such independent investigations as Bidder deems necessary;

- C. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, corporation, or other business entity. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid. Bidder has not solicited or induced any person, firm, or a corporation to refrain from bidding. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or against the City.
 - D. Each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to Tennessee Statute 12-12-106
5. Bidder is bidding all schedules, alternates, if any, and will complete the Work for unit price(s) stated on the attached bid schedule based on materials actually furnished and installed and services actually provided. The Bid is summarized below on the basis of estimated quantities:

TOTAL BASE BID, IN NUMERALS: \$ _____

TOTAL BASE BID, IN WORDS: _____
 _____ DOLLARS.

- 7. Bidder agrees that the work for the City will be as provided above.
- 8. Bidder accepts the provisions of the Bidding Documents as to liquidated damages in the event of failure to complete the work on time, unless otherwise stated as provided below. Bidder agrees that such liquidated damages are not a penalty and that the amount provided is as close an estimate as possible to actual damages. Any exceptions or objections to this provision are stated in writing and attached hereto by Bidder.
- 9. The following documents are attached to and made a condition of this Bid:
 - A. Required Bid Guaranty in the form of a Bid Bond. (Unless otherwise provided by the City.)
 - B. Itemized Bid Schedule.
- 10. Communications concerning this Bid shall be addressed to:

Address of Bidder: _____

11. The terms used in this Bid are defined in and have the meanings assigned to them in the General Conditions, except as provided in the Supplementary Conditions and Bidding Documents.

Submitted on _____, 2022.

Bidder is bidding as a _____ (Insert Resident or Non-Resident)

IF BIDDER IS:

AN INDIVIDUAL

By: _____ (seal)
(Individual's Name)

doing business as: _____

Business Address: _____

Phone Number: _____

A PARTNERSHIP

By: _____ (seal)
(Firm's Name)

(General Partner)

Business Address: _____

Phone Number: _____

A CORPORATION OR LIMITED LIABILITY COMPANY

By: _____ (seal)
(Corporation's or Limited Liability Company's Name)

(State of Incorporation or Organization)

By: _____ (seal)

(Title)

(Seal)

Attest: _____

Business Address: _____

Phone Number: _____

A JOINT VENTURE

By: _____ (seal)
(Name)

(Address)

By: _____ (seal)
(Name)

(Address)

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

**BID SCHEDULE
FY2022 STREET PAVING**

BID DATE: _____

COMPANY NAME: _____

ADDRESS: _____

Contractor shall furnish and install items as shown on the Drawings or called for in the Specifications. All costs not included in the schedule that are necessary to provide a complete, functional project as depicted in the Drawings and Specifications are to be considered incidental and merged with costs of other related bid items.

LS = Lump Sum R&R = Remove and Replace LF = Linear Feet F&I = Furnish and Install
SY = Square Yard CY = Cubic Yard EA = Each Ton = Ton LB = Pounds

Schedule A

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Cold Planing of Asphalt Pavement	SY	72,130		
2	F&I Select Backfill (Sand)	CY	4,584		
3	F&I Granular Base (LA610)	CY	2,292		
4	F&I Geotextile	SY	6,877		
5	F&I Tack Coat	TON	30		
6	F&I Asphalt Patch	CY	1,250		
7	F&I Asphaltic Concrete Pavement (411-E)	TON	7945		
8	Full Depth Reclamation	SY	2,685		
9	F&I Temporary Traffic Control	LS	1		
10	F&I Asphalt Binder (307-C)	TON	558		
11	R&R 6-30 Concrete Curb & Gutter	LF	9,059		
12	60 mil Thermoplastic Pavement Marking (4" Solid White Line)	LF	14,782		
13	60 mil Thermoplastic Pavement Marking (4" Double Yellow Line)	LF	7,394		
14	60 mil Thermoplastic 24" White Stop Bar	LF	70		
15	Material/ Density Testing	LF	1	\$2,000	\$2,000
16	Mobilization	EA	1		
17	F&I Speed Table - Concrete (24' x 24')	EA	5		
18	F&I Raised Crosswalks - Asphalt (24' x 24')	EA	1		
				Total Bid Schedule A	

Total Base Bid : _____

_____ Dollars (\$ _____).

STANDARD FORM OF
AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is made between the City of Lakeland, hereinafter referred to as the "Owner," and _____ hereinafter referred to as the "Contractor."

WHEREAS, the City of Lakeland is desirous of paving ; and,

WHEREAS _____ is able and willing to provide those services to the City of Lakeland, Tennessee.

NOW, THEREFORE, it is hereby agreed as follows:

ARTICLE 1. WORK.

Contractor shall perform all the work required by the Contract documents for FY22 STREET PAVING PROJECT , Lakeland, Tennessee.

ARTICLE 2. ENGINEER.

The Project has been designed by the City of Lakeland Engineering Office, 10001 U.S. Highway 70, Lakeland, Tennessee, who is hereinafter referred to as the "Engineer" and 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 completion of the Work in accordance with the Contract documents.

ARTICLE 3. CONTRACT TIME.

- 3.1 The Work will be substantially completed by November 16, 2022 and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions by November 30, 2022.
- 3.2 Liquidated Damages. Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not substantially completed by the time specified in Paragraph 3.1 above, plus any extension thereof allowed in accordance with Article 15 of the General Conditions. They 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 substantially 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 one Hundred Dollars (\$100.00) for each day that expires after the time specified in Paragraph 3.1 for substantial completion. After Substantial Completion, if the Contractor shall neglect, refuse, or fail to complete the remaining work within the time specified in paragraph 3.1 for completion and readiness for final payment or any proper

extension thereof granted by Owner, Contractor shall pay Owner One Hundred Dollars (\$100.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment. It is further agreed that such liquidated damages are not a penalty but represent the parties' best estimate of actual damages.

ARTICLE 4. CONTRACT PRICE.

In Consideration of the performance of the work in accordance with the Contract documents for this Unit Price Contract, Owner shall pay Contractor in current funds a not-to-exceed total contract price of _____, subject to additions and deductions by Change Order approved by the Owner. The contract fee shall be based on materials actually furnished and installed and services actually provided based on the unit prices contained in the Bid Form and Itemized Bid Schedule, included as Exhibit "A" (pages BF-1 -- BS-1) and by this reference made a part of this Agreement.

ARTICLE 5. PAYMENT PROCEDURES.

Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed through the Engineer as provided in the General Conditions.

- 5.1 Progress Payments. Owner shall make progress payments on the basis of Contractor's Applications for Payment as recommended by Engineer, on or about the 25th day of each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the Schedule of Values provided for in Paragraph 15 of the General Conditions, subject to the cutoff and submittal dates provided in the General Provisions.
 - 5.1.1 During the course of the Contract progress payments will be made in an amount equal to 95% of the Work completed, less in each case the aggregate of payments previously made.
 - 5.1.2 In the event the Contractor makes only one application for payment upon substantially completing the Work, progress payment will be made in an amount equal to 95% of the Work completed. Owner shall withhold five percent (5%) of the work completed as retainage, said retainage to be paid in accordance with the provisions of Paragraph 5.2, Final Payment.
- 5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Engineer shall recommend payment and present Contractor's Final Application for Payment to the City in accordance with Tennessee Statutes 54-5-122. Before final acceptance of the project as having been finally completed, the contractor shall furnish evidence of payment in full for materials and labor to the City in accordance with Tennessee 54-5-122. When this is done, full settlement may be made with the contractor, but not until thirty (30) day's notice is some newspaper published in the county where the work is done, if there is a newspaper there, and if not, in a newspaper in an adjoining county that

settlement is about to be made and notifying all claimants to file notice of their claims with the officials and the period for filing shall not be less than thirty (30) days after the last published notice. In the event claims are filed, the officials shall withhold a sufficient sum to pay the claims in the same way and manner as is provided for claimants making claims against contractors dealing with the Department of Transportation in accordance with Statutes 54-5-123, and claimants may bring suits against contractors in the way and manner provided in 54-5-124, as suits are brought against contractors dealing with the department. Where claims are allowed by the Courts, Statutes 54-5-125 and 54-5-127 shall be applicable.

ARTICLE 6. WITHHELD FUNDS.

Pursuant to Tennessee Statutes Section 66-11-104 et seq., withheld percentages for Contracts exceeding \$500,000.00 will be retained in an account in the name of the Contractor (except when specifically waived in writing by Contractor) which has been assigned to the Owner until the Contract is completely, satisfactorily, and finally accepted by the Owner. Unless a depository is designated by the Contractor in a written attachment hereto, the Contractor's signature hereon shall act as authority for the Owner to designate a retainage depository on behalf of the Contractor, for the purposes specified in Tennessee Statutes Section 66-11-104. The Contractor's signature hereon shall act as an assignment of the depository account to the Owner, as provided by Tennessee Statutes Section 66-11-104 et seq., whether the depository is designated by the Contractor or by the Owner.

ARTICLE 7. CONTRACTOR'S REPRESENTATIONS.

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

- 7.1 Contractor has familiarized himself with the nature and extent of the Contract documents, Work, locality, and with all local conditions and federal, state, and local Laws and Regulations that in any manner may affect cost, progress, or performance of the Work.
- 7.2 Contractor has studied carefully all reports of investigations and test of subsurface and latent physical conditions at the site or otherwise affecting cost, progress, or performance of the Work which were relied upon by Engineer in the preparation of the Drawings and Specifications and which have been identified in the Supplementary Conditions.
- 7.3 Contractor has made or caused to be made examinations, investigations, and test and studies as he deems necessary for the performance of the Work at the Contract price, within the Contract Time, and in accordance with the other terms and conditions of the Contract documents; and no additional examinations, investigations, tests, reports, or similar data are or will be required by Contractor for such purposes.
- 7.4 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports, and data with the terms and conditions of the Contract documents.

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

ARTICLE 8. CONTRACT DOCUMENTS.

The Contract documents which comprise the entire agreement between Owner and Contractor are attached to this Agreement, made a part hereof and consist of the following:

- 8.1 This Agreement (Pages SFA-1 to SFA-5, inclusive).
- 8.2 Joint Account Agreement or Letter of Forfeiture waiving same (if applicable)
- 8.3 Exhibit "A" - Bid Form and Bid Schedule.
- 8.4 Affidavit of Drug Free Work Program
- 8.5 Addenda
- 8.6 Performance & Payment Bonds
- 8.7 Certificates of Insurance, of Workers' Compensation Coverage, and of Unemployment Insurance Coverage.
- 8.8 2013 Standard General Conditions of the Construction Contract (Pages i to 62, inclusive).
- 8.8 Standard Supplementary Conditions (Pages SSC-1 to SSC-16, inclusive).
- 8.9 General Requirements
- 8.10 Special Provisions (Section 01810)
- 8.11 Technical Specifications
- 8.12 Notice of Award.
- 8.13 Notice to Proceed.
- 8.14 Minutes of the Pre-Bid Conference, if any.
- 8.15 Shop Drawings and other Submittals furnished by Contractor during performance of the Work and accepted by the Owner.

8.16 Any modifications, amendments, and supplements, including Change Orders, issued pursuant to Article 11 of the General Conditions, on or after the effective date of this Agreement.

8.17 Notice of Substantial Completion.

ARTICLE 9. MISCELLANEOUS PROVISIONS.

9.1 The CONTRACTOR hereby agrees, warrants, and assures compliance with the provisions of Title VI and VII of the Civil Rights Act of 1964 and all other federal statutory laws which provide in whole or in part that no person shall be excluded from participation or be denied benefits of or be otherwise subjected to discrimination in the performance of this Contract or in the employment practices of the CONTRACTOR on the grounds of handicap and/or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee State Constitutional or statutory law. The CONTRACTOR shall upon request show proof of such non-discrimination and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

Terms used in this Agreement, which are defined in the General Conditions, shall have the meanings designated in those conditions.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in one (1) original copy on the day and year first above written.

APPROVED AS TO FORM:

(PROJECT: _____)

DATED this _____ day of _____, 2022

ATTEST:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

OWNER:
CITY OF LAKELAND, TENNESSEE

ATTEST:

A Municipal Corporation

By: _____

Debra Murrell

Title: City Recorder

By: _____

Shane Horn

Title: City Manager

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____ County government to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the *Tennessee Code Annotated*.
3. The Company is in compliance with T.C.A. § 50-9-113.

Further affiant saith not.

Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20_____.

Notary Public

My commission expires: _____

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

City of Lakeland
 10001 Highway 70, Lakeland, TN 38002

CONSTRUCTION CONTRACT

Effective Date of the Agreement: _____

Amount: _____

Description *(name and location):* FY22 Street Paving Project

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

 Contractor's Name and Corporate Seal *(seal)*

 Surety's Name and Corporate Seal *(seal)*

By: _____
 Signature

By: _____
 Signature *(attach power of attorney)*

 Print Name

 Print Name

 Title

 Title

Attest: _____
 Signature

Attest: _____
 Signature

 Title

 Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where appl

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and

resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

City of Lakeland
10001 Highway 70, Lakeland, TN 38002

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*): **FY22 Street Paving**

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2 Claimants who do not have a direct contract with Contractor:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
6. Reserved.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related

subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms “labor, materials or equipment” that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*)

Surety Agency or Broker:

Owner’s Representative (*Engineer or other*):

SECTION 01010

SUMMARY OF WORK

A. Project Identification:

FY2022 Street Paving

B. Project Summary:

This project consists of mill and overlay in five (5) subdivisions, Cobb Road, Lakeland City Hall's parking lot and driveways, six traffic calming measures in The Grove as well as a Full Depth Reclamation of Pavement on Sakaskatoon Drive as depicted on the enclosed maps.

All base failures repairs and curb and gutter replacement shall be conducted prior to new asphalt being placed.

- Temporary traffic control measures shall be used during all phases of construction. All attempts shall be made to keep at least one lane of roadway open. In the event of a road closure, the Owner shall be notified within 48 hours of the impending work. A traffic control plan for each location shall be submitted to the City Engineer for approval prior to construction.
- The contractor is responsible for all utility locates in the area of work and for those that may be affected by the construction. Coordination with utility company may be required.
- All construction material shall be removed and properly disposed of in accordance with State and local regulations within the time limits of the project. Removal and hauling away of all construction debris including unsuitable soils shall be the responsibility of the Contractor.
- All pavement markings shall meet the current Manual on Uniform Traffic Control Devices (MUTCD) and Tennessee Department of Transportation (TDOT) Specification for pavement markings. All new pavement markings shall match existing pavement markings.
- Material/Density testing will be performed at the request of the Owner. Testing will be paid by invoice.

SECTION 01010

SUMMARY OF WORK

A. Project Identification:

FY2022 Street Paving

B. Project Summary:

This project consists of mill and overlay in five (5) subdivisions, Cobb Road, Lakeland City Hall's parking lot and driveways, six traffic calming measures in The Grove as well as a Full Depth Reclamation of Pavement on Sakaskatoon Drive as depicted on the enclosed maps.

All base failures repairs and curb and gutter replacement shall be conducted prior to new asphalt being placed.

- Temporary traffic control measures shall be used during all phases of construction. All attempts shall be made to keep at least one lane of roadway open. In the event of a road closure, the Owner shall be notified within 48 hours of the impending work. A traffic control plan for each location shall be submitted to the City Engineer for approval prior to construction.
- The contractor is responsible for all utility locates in the area of work and for those that may be affected by the construction. Coordination with utility company may be required.
- All construction material shall be removed and properly disposed of in accordance with State and local regulations within the time limits of the project. Removal and hauling away of all construction debris including unsuitable soils shall be the responsibility of the Contractor.
- All pavement markings shall meet the current Manual on Uniform Traffic Control Devices (MUTCD) and Tennessee Department of Transportation (TDOT) Specification for pavement markings. All new pavement markings shall be thermoplastic pavement markings.
- Material/Density testing will be performed at the request of the Owner. Testing will be paid by invoice.

Mill and Overlay:

Canada Woods, Creekside Manor, Lakeland Heights, Stonebridge, Veranda Woods, City Hall Parking Lot, and Cobb Road

- All designated streets shall be milled and one and a half inches (1.5”) overlay placed. Asphalt overlay shall be Mix No.1 TDOT 411.E surface course hot mix asphalt. A tack coat shall be applied to the milled surface prior to placement of the asphalt.
- Locations of street repairs will be marked by the City of Lakeland.
- In areas marked for repair, the existing asphalt pavement shall be removed within the marked area. Edges shall be trimmed to a straight vertical line and tacked. All loose or disturbed pavement and base material shall be removed and disposed of.
- Where soft soils are encountered, the area shall be over excavated a maximum of three (3) feet and backfilled with sand. If the soils are still unsatisfactory, a nonwoven geotextile shall be installed in the bottom of the excavation prior to backfilling.
- Asphalt base repair shall be two inches (2”) Mix No.1 TDOT 411.E surface course hot mix asphalt placed on eight inches (8”) of a granular base (LA610). Street repairs shall have a total of three inches (3”) of asphalt. Asphalt shall be installed according to City of Lakeland and TDOT Specifications.

Full Depth Reclamation of Pavement:

Saskatoon Drive

- Contractor shall reclaim 12” deep and soil cement existing material with 10% cement by volume.
- Base asphalt shall be 2” compacted 307-C, in place, and shall meet all current City of Lakeland specifications. Surface asphalt shall be one and a half inches (1.5”) of Mix No. 1 TDOT 411.E. A tack coat shall be applied to the milled surface prior to placement of asphalt.
- Final reclaimed roadbed should be clipped to a 2.0% crown.

Lakeland Public Works Building Driveway

- Base asphalt shall be 3” compacted 307-C, in place, and shall meet all current City of Lakeland specifications. Surface asphalt shall be two and a half inches (2.5”) of Mix No. 1 TDOT 411.E. A tack coat shall be applied to the milled surface prior to placement of asphalt.
- Loops must be installed prior to placement of asphalt.

The Grove Traffic Calming Measures

- Install five speed tables and one raised crosswalk according to Lakeland specifications. All speed tables and crosswalk shall be Mix No. 1 TDOT 411 E. surface course hot mix asphalt.

C. Particular project requirements.

1. Apply for, obtain, and pay for permits when required to perform the work.
2. Field-verify dimensions indicated on drawings (when applicable) before fabricating or ordering materials. Do not scale drawings.
3. Notify Owner of existing conditions differing from those indicated on the drawings. Verify the existence and location of underground utilities along the route of proposed work. Omission from, or inclusion of, locations on the drawings, is not to be considered as the nonexistence of, or the definite location of, existing underground utilities. Do not remove or alter existing utilities without prior written approval.
6. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the project shall be included.
7. The Provisions are written in the imperative mode. Except where specifically intended otherwise, the subject of all imperative statements is the Contractor. For example, "furnish..." means "Contractor shall furnish..."

END OF SECTION

SECTION 01100

GENERAL CONSTRUCTION REQUIREMENTS

PART 1 - Description.

To establish uniform requirements for construction of water distribution facilities, sanitary sewerage collection facilities, storm sewer collection systems, streets, and associated appurtenances which will enable the construction to be performed in accordance with Local, State, and Federal laws.

1.01 Definitions.

A. For the purposes of these specifications, the words and phrases set out in the following articles shall have the meanings as follows:

1. "City" means the governing body of the city of Lakeland, TN.
2. "Contractor" means the individual, partnership, firm, or corporation contracting with the developer or the City which will be performing the work, or which will be performing the construction activities.
3. "Developer" means partnership, firm, or corporation developing property where construction will be performed.
4. "Engineer" means the consultant or City Engineer.
5. "Owner" means the individual, partnership, firm or corporation being the owner of record of property where construction will be performed.
6. "Underground facility" means any item of personal or public property buried or placed below ground for use in connection with the storage or conveyance of electronic, water, sewage, telephonic or telegraphic communications, cable television, electric energy, oil, gas, hazardous liquids, or other substances and including, but not limited to pipes, sewers, water, storm water, conduits, cables, valves, lines, wires, manholes, and attachments.

B. The following abbreviations shall have the designated meanings:

1. "APWA" means the American Public Works Association.
2. "ASTM" means the American Society for Testing and Materials.
3. "AWWA" means the American Water Works Association.

4. "AASHTO" means the American Association of State Highway & Transportation Officials.
- C. Reference to a specific specification, i.e., AWWA C900, means the latest Edition of that specification.

PART 3 Execution

3.01 Scheduling and Construction Progress.

- A. Prior to the start of any work, the Contractor shall submit in writing to the Engineer for review, a progress schedule that shall be followed as closely as possible. Progress scheduling using critical path method is approved and encouraged. Once work has started on a street, it must be pursued continuously until all work on that street is finished.
1. The Contractor shall schedule a preconstruction conference prior to the start of work. Persons attending shall include representatives of the Contractor, subcontractors, owner, developer, Engineer, and affected utilities.
- B. Each successive phase of work will follow the preceding phase as closely as possible so that the time any one street is under construction is kept to a minimum.
- C. In the event that the work is not being accomplished expeditiously or in accordance with the time period set forth in the progress schedule, or if the work on an excavation has ceased or is abandoned without due cause, the Engineer may give written notice to the Contractor and/or the surety company for the project.

3.02 Notification of Landowners, Residents, and Businesses

- A. At least one (1) week prior to beginning construction operations Contractor shall notify in writing, all those directly affected by the Work, including the Fire, Ambulance, Police Departments, and the Engineer's Office. The notification shall include the following as a minimum:
1. Name, address, telephone number, and contact person for Developer, Developer's Contractor, Owner, and Engineer.
 2. A brief description of the proposed Work.
 3. Name and telephone number of Contractor's person to contact in emergency.
 4. A map showing the Work area, the traffic control plan, and the planned access to be provided to the affected properties. The map should also show the property or business owners' access during construction, and access in case of an emergency for fire, ambulance, police, or other emergency service agency vehicles.

5. A schedule for start up and completion of the Work. Schedules shall be updated as needed as the work progresses.
6. Contractor shall notify property owner and occupant 24 hours in advance of any disruption of service or access.

3.03 Available Maintenance Personnel

The Contractor shall have personnel available to maintain the Work as required, 24 hours per day every day. Accordingly, the Contractor shall furnish the City, the Owner, the Engineer, and the Shelby County Sheriff's Office with the names, addresses, and telephone numbers of local employees or representatives who will be available to maintain the Contractor's work during non-working periods, evenings, nights, weekends, and holidays.

3.04 Utility Locates

- A. It is the responsibility of the Contractor to obtain locates for buried facilities within the project area prior to the start of work as necessary and as required by law. The Contractor is responsible for any damage to buried utilities or damage or injury to persons or property resulting from Contractor's work in the vicinity of the utilities.
- B. It is the responsibility of the Contractor to provide advance notice to all utility notification centers serving that area. The Contractor shall request the notification center to provide the nature, location, and elevation of the utility at each location and at whatever interval is necessary for the work. If the utility company cannot or will not provide the information, the Contractor shall obtain the information by whatever means are necessary. For each location that the utility is exposed, the Contractor shall locate the utility by tying it both horizontally and vertically by coordinates, to the datum established by the City.
- C. At all utility crossings the Contractor shall locate the utility at a minimum of one point directly over the proposed line or appurtenance. When existing utilities that parallel the proposed line or appurtenance are exposed by excavation, the Contractor shall locate the utility by tying it both horizontally and vertically to the datum and include the information on the record drawings. At a minimum, the utility shall be tied horizontally and vertically at 300-foot (90 m) intervals.
- D. If during the field location of the utilities, additional unforeseen utilities are discovered, the Contractor shall immediately notify the Engineer and proceed in accordance with approval of the Engineer. The utility must be located by the Contractor as specified above and include the information on the record drawings.
- E. The Contractor must protect all existing utilities and improvements, public or private, located on the right-of-way, and other work areas, during the entire period of his work. Special care must be taken in backfilling and compacting under and around

such improvements. Any breakage or damage to underground facilities caused by trenching, backfilling, resurfacing, or any other activity associated with the work shall be the responsibility of the Contractor.

- F. Whenever utility mains or services are crossed, the utility owner shall be notified and the crossing shall be constructed in accordance with the utility owner's requirements.
- G. Before the Contractor begins his grading operations, he shall confer with the owners of any underground or overhead utilities which may be in or in close proximity to the grading areas, and shall arrange for the necessary disconnection of these utilities in accordance with the regulations of the utility companies concerned. The Contractor shall take such measures as the Engineer may direct in protecting these utilities properly throughout the period his grading operations are in progress. The party or parties owning or operating overhead or underground utilities shall perform the actual work of moving, repairing, reconditioning, or revising the utilities, except as otherwise specified in this Section. Whenever and wherever such operations are undertaken by the owners of utilities, the Contractor shall cooperate to the extent that ample protection of their work will be provided so that the entire work as contemplated may be expedited to the best interests of all concerned, as judged by the Engineer.
- H. Protect and safeguard existing service lines and utilities structures, the locations of which have been made known to the Contractor by the owners of the utilities or by others, prior to excavation or construction of fills or embankments, from damage during grading operations. Any damage to such lines or structures shall be repaired at the Contractor's expense. The above provisions are applicable to all service lines or utilities structures, all or any portion of which protrude above the original ground or street surfaces, or lie beneath such surfaces in any grading area or any other area upon which the Contractor has encroached.

3.05 Protection of Existing Buildings and Structures

For collapse of adjacent buildings, sidewalks, structures, and underground or above ground utilities, the Contractor shall repair damage done to the owner's property or any other property, on or off the premises, by reason of his operations. The Contractor shall adequately brace walls during backfilling and compacting operations.

3.06 Construction Stakes – Alignment and Grades

- A. All work shall be constructed in accordance with lines and grades shown on the drawings and as designated by the Engineer. These lines and grades may be modified by the Engineer as provided in the General Conditions.
- B. The Contractor shall provide experienced personnel, materials, and equipment necessary to complete all survey, layout, and measurement work. The Contractor shall keep the Engineer informed a reasonable time in advance, of the times and places he wishes to do work so that initial control points may be designated.

3.07 Restoration of Street Surface, Street Signs, Curbs, Driveways, Sidewalks, Irrigation and Landscaping

- A. Wherever existing improvements are removed, damaged or otherwise disturbed by Contractor's activities, Contractor shall replace or repair the improvements to conditions equal to or better than the condition prior to the start of work. Any crushed rock, sod, or natural vegetation disturbed by the Contractor shall be replaced, rebuilt or restored to conditions equal to or better than the condition prior to the start of work.

3.08 Temporary Utilities, Public Access and Safety

- A. Contractor shall provide temporary water and sewer service to properties when permanent facilities will be out of service for eight (8) hours or longer, or when other circumstances make it necessary. Where service cannot be interrupted, such as sewer mains, Contractor shall provide plant and equipment to pump around the sections which are out of service.
- B. Where the Engineer deems necessary, the Contractor shall provide access wherever possible to public and private property to prevent serious inconvenience to pedestrian and vehicular traffic. This shall not be construed to require the Contractor to provide such access at the times and locations where it will interfere with his construction progress. The Contractor shall furnish, place, and maintain sufficient flags, flares, barricades, signs, etc., along the location of his work in accordance with the Federal Highway Administration, "Manual on Uniform Traffic Control Devices." Flag persons shall be utilized if necessary to maintain safe traffic flow.

3.09 Erosion and Sediment Control

- A. Erosion and sediment control shall be performed in accordance with rules and regulations adopted by the City of Lakeland and the Tennessee Department of Environment and Conservation.

3.10 City Permits

- A. All necessary permits shall be obtained prior to the beginning of any construction project. Those permits may include: City of Lakeland/TDEC Permit to Construct, Street Cut Permits, Traffic Control Permits, Bonds, and Erosion and Sediment Control Permit, as well as any other appropriate permits required for the project by the City.

3.11 Punchlist and Final Closeout

- A. Initial City Punchlist

1. The Contractor, Owner, Engineer, and City personnel will conduct an initial walkthrough and develop a list of deficiencies that will be presented to the Contractor by the Engineer.
2. The Contractor, Owner, and Engineer will conduct a walkthrough identifying items to be corrected. A final punch list will be developed by the Contractor and Engineer. The punch list will contain dates for completion of the various identified items.
3. All items on the list will be completed to the satisfaction of the City prior to acceptance of the project and start of the one-year warranty period.

3.12 Submittals

The Contractor shall submit for approval by the Engineer a minimum of five (5) copies of data required by specific sections of this specification.

3.13 Workmanship and Cleanup

- A. All debris and rubbish caused by the operations of the Contractor shall be removed, and the areas occupied during his operations shall be left in a neat and presentable condition satisfactory to the Engineer. Construction cleanup and all backfill operations shall immediately follow installation of underground facilities. Cleanup shall be completed to allow local traffic on the street and access to driveways, parking lots, etc. During construction, all existing gutters, storm drains, runoff channels, etc. shall be kept clean of dirt, rubble, or debris which would impede the flow of storm sewer.
- B. Excess, unsuitable, and waste materials from the project (including that from trench excavation, pavement removal, curbwalk removal, and grading operations), shall be suitably disposed of, offsite, by Contractor.
- C. Excess material resulting from parkway and shoulder finishing and other final operations shall not be permitted to accumulate on the pavement surface and shall be removed concurrently with the finishing operations. Care shall be taken to prevent the entrance of this material into drainage structures or other waterways during the construction period. It shall be the responsibility of the Contractor to properly dispose of all excess material.

3.14 Design Mixes, Testing and Quality Assurance

- A. The testing requirements and cost responsibilities of design mixes, testing requirements, and quality assurance testing are listed in each specific section of these specifications.
- B. Unless specified by the contract documents, or addressed specifically within these

Standard Specifications, the Owner will be responsible for moisture/density/compaction testing only. If the initial moisture/density/compaction test fails to meet the minimum standards as established by these specifications, the Contractor shall pay for any and all additional tests until a moisture/density/compaction test meeting the minimum standards is obtained.

END OF SECTION

SECTION 01200

PROJECT COORDINATION

PART 1 – Description

1.01 SUMMARY

- A. Contractor shall schedule a preconstruction conference (if required) to be held within twenty (20) days of the Notice of Award. Contractor's assigned supervisory personnel and subcontractors shall attend this conference. Contractor shall provide a work schedule at or prior to this meeting for review by all parties. A corrected schedule shall be provided within seven (7) days following the meetings.
- B. Conduct all construction activities between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, except in cases of emergencies. No work will be allowed on Saturdays without the Owner's permission, and no work, except for emergencies, will be allowed on Sundays or City of Lakeland Holidays. All pavement subgrade excavation shall be observed by the Owner Representative. The Owner's Representative shall determine the depth of the subgrade excavation prior to backfill.
- C. Contractor shall obtain water for use during construction at his expense. If Contractor elects to obtain water from the public water utility, he will make all the arrangements, comply with their regulations, and pay all fees and charges.

1.02 COORDINATION WITH PUBLIC AND PRIVATE AGENCIES

- A. If utility companies elect to repair or replace their lines in the project area, their crews will be permitted access to the area to accomplish their work.
- B. Contractor is responsible for locating and protecting existing underground improvements. Contact all utility companies for location of their facilities. To contact all utility companies call the local underground number at least 48 hours prior to excavation for field locates.
- C. Contractor shall have personnel available to maintain his work as required 24 hours per day every day. Contractor is responsible for housekeeping, dust and erosion control, and shall provide all equipment and personnel necessary to meet the requirements of this responsibility. Contractor shall provide Engineer with the name(s) and telephone number(s) of the person(s) designated to be available for after-hours contact. If this person cannot be contacted, Owner may use its equipment to correct problems. In this case, Contractor shall pay all costs incurred by Owner.
- D. Do not utilize private property for any purpose without written permission from the property owner.

1.03 COORDINATION WITH OWNER AND ENGINEER

- A. Construct all work in accordance with the lines and grades shown on the Drawings, and as designated by Engineer (when applicable). Engineer may modify these lines and grades as provided in the General Conditions. Where the Contract Documents specify survey work to be provided by Engineer, give Engineer a minimum of 24 hours notice.
- B. Owner shall employ and pay for the services for an independent testing agency to perform tests as required by the Contract Documents. Notify Engineer a minimum of 24 hours in advance to request testing. Contractor shall be responsible for cost of re-tests required if the results of the original tests do not meet the minimum requirements.
- C. Coordinate on-site staging areas, access and temporary facilities with Owner.
- D. For additional information, contact Emily Harrell, PE, Lakeland City Engineer at 867-5418.

1.04 COORDINATION OF CONSTRUCTION

- A. Contractor is responsible for coordinating work of all trades by preparation of schedules and progress reports, coordination of drawings and other work as necessary.
- B. Schedule work to produce orderly, continuous progress and avoid delays due to lack of materials, subcontractor schedule, lack of available manpower, etc.
- F. Contractor is responsible for ensuring that installed and/or completed work is complete and satisfactory prior to enclosing or covering. Call for required inspections in a timely manner and do not cover work that requires inspection.

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - Description

1.01 Summary

- A. Comply with Submittal format requirements as specified in the Contract Documents.
- B. Provide, in a timely manner, the number of copies and types of submittals listed in individual sections of the Contract Documents. If not specified elsewhere, provide the following as a minimum:
 - 1. Mix designs and certifications of compliance for Portland Cement Concrete, Cement Treated Base, Aggregate Base Course, Asphaltic paving material, and any other material or product used as part of this project as required in the Standard Specifications.
 - 2. Closeout submittals.
- C. Provide required resubmittals in the appropriate quantities if original submittals are not approved.
- D. Samples and shop drawings shall be prepared specifically for this project. Shop drawings shall include dimensions and details, including adjacent construction and related work. Note any special coordination required. Note any deviations from requirements of the Contract Documents. Submittal data shall be properly labeled indicating specific service for which material or equipment is to be used, section and article number of specifications, project name, Contractor, etc. Data of a general nature will not be accepted.
- E. Failure of Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time.

END OF SECTION

SECTION 01505

TEMPORARY FACILITIES

PART 1 - Description

1.01 Summary

A. Provide temporary services and utilities, including utility costs:

1. Potable and non-potable water.
2. Lighting and power.
3. Toilet facilities.
4. Materials storage.
5. Heating.

B. Provide construction facilities, including utility costs;

1. Construction equipment.
2. Dewatering and pumping.

C. Provide security and protection requirements:

1. Fire extinguishers.
2. Site enclosure fence, barricades, warning signs, and lights.
3. Snow and ice removal, if applicable.

D. Provide personnel support facilities:

1. Sanitary facilities.
2. Drinking water.
3. Cleaning and trash removal.
4. First aid and Emergency Medical Services.
5. Trash removal.

END OF SECTION

SECTION 01551

TEMPORARY TRAFFIC CONTROLS

PART 1. Description

To establish uniform requirements for detours, signs and barricades, and traffic control plans associated with construction activities performed on or affecting City of Lakeland streets. The work in this article shall consist of furnishing, erecting, maintaining, relocating, and removing temporary traffic control devices at the locations specified on the drawings and as directed by the Engineer. All traffic control devices shall conform to the provision for construction signing as set forth in the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) latest edition.

PART 2 MATERIALS

2.01 Traffic Control Products

A. Sign Panels

1. Sign panels will be constructed of 3/4" plywood conforming to plywood sign panels and barricades of the standard specification for road and bridge construction; or 6061-T6 or 5052-H38 aluminum alloy sheeting conforming to ASTM B209.
2. Wood sign panels will be backed with metal backing angles; except that backing is not required for those sign panels 48" x 60" or smaller.
3. Aluminum sign panels will be 0.125" thick and backed with metal backing angles; except that those sign panels 48" x 60" or smaller may be:
 - i. 0.080" thick and backed with metal backing angles or 2 x 4 lumber; or,
 - ii. Unbacked, 0.125" thick.
4. Special signs which are unique to the project, i.e., signs not shown on the plans or included in part VI of the MUTCD, and signs shown on the plans which contain a message that is unique to the project, will be furnished by the contractor, as specified on the plans, and erected by the Contractor. Posts and hardware for fixed special sign installations, and all equipment for portable special sign installations will be furnished by the contractor. Post lengths will be specified by the Engineer. Upon removal, the special sign panels, posts, hardware, and portable installation equipment will remain the property of the Contractor.

- i. Special signs will be erected on fixed mountings unless portable mountings are authorized by the Engineer.
- B. Barrels will be plastic conforming to the MUTCD, with 6” wide reflective stripes.
- C. Temporary markings
 1. Temporary reflective pavement markings will be paint, preformed tape, or raised pavement markers, and will be suitable for use on either Portland cement concrete or asphalt pavements. Minimum acceptable standards are as follows:
 - i. Paint used for temporary markings will be commercially manufactured highway striping paint. The paint will be applied without dilution.
 - ii. All painted stripes will be 4” wide, and will be reflectorized by dropping or spraying glass beads onto the wet paint.
 - iii. The reflective beads will conform to AASHTO Specification M247, Type 1.
 2. Temporary reflective pavement striping tape will be 4” wide, pressure-sensitive tape manufactured for use as pavement striping.
 - i. Striping tape applied to finished pavement surfaces which will be returned to normal traffic use will be a removable type.
 - ii. Striping tape applied to temporary pavement surfaces which will be obliterated may be a non-removable type.
 - iii. Striping tape applied to the surface of intermediate lifts of asphalt pavement may be non-removable type, and may be let in place. If a removable type is used, it will be removed before placing the next lift.
 3. Temporary retro-reflective raised pavement markers manufactured by Astro Optics of Schaumburg, Illinois, Model No. TPM, or Stimsonite Products of Niles, Illinois, Model No. 66, or an approved equal will be acceptable.
 4. Temporary retro-reflective motorist guidance markers manufactured by Davidson Plastic Company of Ken, Washington, Model NO. TRPM, or TOM, or an approved equal will be acceptable.

PART 3 EXECUTION

3.01 Traffic Control Plans

- A. A complete traffic control plan shall be submitted to the Engineer and the Lakeland City Engineering office at least one week prior to the start of construction.
1. Traffic will be permitted to use the street at all times, unless a detour is specifically permitted on the drawings or by the Engineer. Access to all abutting residences and properties shall be maintained to the maximum extent possible.
 2. The Contractor shall construct and maintain temporary crossings, complete with flagmen, whenever necessary to expedite the work or to maintain traffic. The Contractor shall furnish not less than two flagmen at each location where loading or depositing of material requires the turning of the trucks on any highway or street and where the operation of construction equipment endangers traffic. Temporary crossings shall be of ample size to safely carry the load which comes upon them.
 - i. The Contractor shall maintain the streets in a passable condition. The work shall be conducted so as to create a minimum of inconvenience to traffic.
 - ii. Excavations which traverse a street shall be limited to one-half the width of the street at any one time, unless an emergency situation exists which requires that the entire width of the street be excavated. City Engineer's office approval is required prior to excavation traversing an entire street.
 3. The Contractor shall furnish sufficient signs and barricades to facilitate the directing of traffic. Unless directed otherwise by the Engineer, all signs and barricades shall conform to:
 - i. Within the "Manual on Uniform Traffic Control Devices (MUTCD), " latest edition.
 4. The Contractor shall have a sufficient number of barricades and signs on hand prior to the start of the construction
 - i. Each detour sign shall be reflectorized and shall be illuminated with two battery-powered blinkers with six-inch (6") amber lenses.
 - ii. All barricades shall have blinker lights on each end.
 - iii. It shall be the Contractor's responsibility to make necessary checks and inspections of all lights and barricades every day, including Sundays and holidays.
 5. Temporary suspension of work does not relieve the Contractor of the responsibility outlined in the above requirements.

3.02 Permits

- A. The Contractor shall obtain all necessary permits from the City Engineer's office for any closure of any street or portion thereof, as provided in the Lakeland Municipal Code. Along with the permit application, the Contractor shall provide a sketch showing traffic routing and traffic control devices to be used. The construction traffic control sketch shall be approved by the City Engineer's office before the permit is issued.

3.03 Street Closure

- A. The City Engineer may permit the closing of streets to all traffic for a period of time prescribed by the office if, in the City Engineer's Opinion, it is necessary.

END OF SECTION

SECTION 01650

MEASUREMENT AND PAYMENT PROCEDURES

PART 1 – Description.

All work completed under this Contract will be measured by the Engineering according to the bid items and to the construction drawings. Units of measurement and dimensions will be shown in these specifications.

1.01 Payment

A. Progress payments will be processed in accordance with the following schedule.

<u>Cut-Off Date</u>	<u>Date of Submittal</u>
March 4, 2022	March 11, 2022
April 1, 2022	April 8, 2022
May 6, 2022	May 13, 2022
June 18, 2022	June 25, 2022
July 18, 2022	July 25, 2022
August 19, 2022	August 26, 2022
September 16, 2022	September 23, 2022
October 21, 2022	October 28, 2022
November 16, 2022	November 30, 2022

Submit pay requests to the City by the dates of submittal listed above.

- B. Owner will make progress payments as defined in Article 5 of the Agreement, on the forms provided by the Engineer.
- C. If the Contractor elects to enter into a joint account agreement, two (2) pay requests and vouchers must be submitted. One pay request and voucher for the appropriate progress payment amount, the other for the retained amount.

1.02 Measurement of Quantities

Quantities shown on the bid schedule are estimated and are to be considered approximate. Actual constructed quantities will vary. The Contractor will be compensated only for those items and materials actually installed and approved as part of the project. No additional pay will be granted for items or materials not installed.

- A. Payment will be made for the work completed and stored materials less retained amounts in accordance with provisions of the contract documents.

- B. Payment amounts will be based on the scheduled values and mutually agreed upon percentage of completion for each item.

1.03 Bid Item Descriptions

The cost of all material and labor required to complete this project as specified and shown on the drawings, but not specifically included as a pay item, shall be included in the bid price of its related bid item. No extra pay shall be granted for items that are reasonably foreseen as necessary for the proper installation of an item.

PART 2 Execution

2.01 Measurement and Payment of Bid Items

A. Cold Planing of Asphalt Pavement

1. Measurement of this item shall be by the number of square yards (SY) of asphalt planed and removed. Measurement shall be made on the surface of the existing asphalt cut and removed. This item shall include equipment, materials and labor to perform cold planing and cutting disposal. Payment shall be made by the contract unit price per Square Yard (SY).

B. Furnish and Install Select Backfill (Sand)

1. Measurement of this item shall be by the number of cubic yards (CY) of select backfill furnished and installed in place and approved. Quantities shall be verified and paid by haul ticket. This item includes excavation, disposal of existing material, furnishing and installing granular backfill, and compaction. Payment shall be by the contract unit price per Cubic Yards (CY) in place.

C. Furnish and Install Granular Base (LA610)

1. Measurement of this item shall be by the number of cubic yards (CY) of granular base furnished and installed in place and approved. Quantities shall be verified and paid by haul ticket. This item includes excavation, removal and disposal of existing base, furnishing and installing granular base, and compaction. Payment shall be by the contract unit price per Cubic Yards (CY) in place.

D. Furnish and Install Nonwoven Geotextile

1. Measurement of this item shall be paid by square yard (SY) of nonwoven geotextile furnished and installed in place and approved. This item shall include furnishing and placement of geotextile in excavated areas. Payment shall be made by the contract unit price per Square Yard (SY) in place

E. Furnish and Install Tack Coat

1. Measurement of this item shall be by the number of tons (Tons) of tack coat furnished and installed in place and approved. Quantities shall be verified and paid by haul ticket. This item shall include furnishing and placement of tack coat at a rate of 0.10 gal/SY. Payment shall be made by the contract unit price per Ton (Ton) in place.

F. Furnish and Install Asphalt Patch

1. Measurement of this item shall be by the cubic yard (CY) of asphalt furnished, installed in place and approved. Measurement shall be made from the lines formed by the junction of new asphalt and old asphalt. Quantities shall be verified and paid by haul ticket. This item shall include furnishing and placement of new hot mix asphalt and compaction. Asphalt patch shall have a compacted thickness of no less than two inches (2") of hot mix asphalt pavement. Payment shall be by the contract unit price per Cubic Yard (CY) in place.

G. Furnish and Install Asphaltic Concrete Pavement (411-E)

1. Measurement of this item shall be by the tons (Ton) of hot-mix asphaltic concrete furnished and installed in place and approved. Measurements shall be made from the lines formed by the junction of new asphalt and old asphalt. Quantities shall be verified and paid by haul ticket. This item shall include furnishing and placement of new hot mix asphalt and compaction. New asphalt overlay shall have a compacted thickness of no less than two inches (2") of mill and overlay of asphalt pavement after compaction. Payment shall be by the contract unit price per Ton (Ton) in place.

H. Furnish and Install Full Depth Reclamation

1. Measurement of this item shall be by the square yard (SY) of asphalt pavement reclaimed. Measurement shall be made on the surface of the existing pavement reclaimed and furnished. This item shall include equipment, materials and labor to perform full depth reclamation of asphalt pavement. Payment shall be made by the contract unit price per Square Yard (SY).

I. Furnish and Install Temporary Traffic Control

1. Measurement of this item shall be paid by lump sum (LS) for temporary traffic control furnished and installed. Payment shall be consistent with the percentage of work completed at the time of the request for payment. The lump sum payment shall cover all of the Contractor's activities in meeting traffic control requirements for the project. Flagging, replacement of traffic control devices damaged or destroyed from any cause whatsoever, furnishing and installing cones, wands, portable flashers, any barricades and channelizing devices will be incidental to Traffic Control and no separate payment will be made for any item or activity necessary to comply with this specification. Payment shall be made by the contract unit price per Lump Sum (LS) of work completed.

J. Furnish and Install Asphalt Binder (307-C)

1. Measurement of this item shall be by the tons (Ton) of asphalt binder furnished and installed in place and approved. Measurements shall be made from the lines formed by the junction of new asphalt and old asphalt. Quantities shall be verified and paid by haul ticket. This item shall include furnishing and placement of new hot mix asphalt and compaction. New asphalt binder shall have a compacted thickness of no less than one and half inches (1.5") on asphalt pavement after compaction. Payment shall be by the contract unit price per Ton (Ton) in place.

K. Remove and Replace 6-30 Concrete Curb and Gutter

1. Measurement of this item shall be paid by lineal foot (LF) of 6-30 concrete curb and gutter constructed in place and approved. Measurement shall be made on the surface of the new curb and gutter from the lines formed by the junction of the new concrete and old concrete. This item shall include excavation, forming, concrete, and all other materials needed to perform work. Payment shall be made by the contract unit price per Lineal Foot (LF) in place and approved.

L. Furnish and Install 60 mil Thermoplastic 4" Solid White Line

1. Measurement of this item shall be paid by the linear feet (LF) of 60 mil thermoplastic 4" solid white line pavement marking furnished and installed. Measurements shall be made on the surface of the new pavement marking to the end. The item shall include thermoplastic material, glass beads, equipment, and any other material needed to perform the work.

M. Furnish and Install 60 mil Thermoplastic 4" Double Yellow Line

1. Measurement of this item shall be paid by the linear feet (LF) of 60 mil thermoplastic 4" double yellow line furnished and installed. Measurements shall be made on the surface of the new pavement marking to the end. The item shall include thermoplastic material, glass beads, equipment, and any other material needed to perform the work.

N. Furnish and Install 60 mil Thermoplastic 24" White Stop Bar

1. Measurement of this item shall be paid by the linear feet (LF) of 24" white stop bar thermoplastic marking furnished and installed. Measurements shall be made on the surface of the new pavement marking to the end. The item shall include thermoplastic material, glass beads, equipment, and any other material needed to perform the work.

O.

P. Material/Density Testing

1. Measurement of this item shall be paid by lump sum (LS) for density testing. Contractor performing testing shall be approved by the Owner prior to performing work. Payment shall be made by invoice from Geotechnical Engineer of actual testing performed. This item includes but is not limited to density testing. Payment shall be made by the contract unit price per Lump Sum (LS) of work completed.

Q. Furnish and Install Concrete Speed Table

1. Measurement of this item shall be paid by each (EA)ADA compliant concrete speed table furnished and installed in place and approved . This item shall include concrete, rebar, and all other materials needed to complete the work. Payment shall be made by the contract unit price per each (EA) speed table.

R. Furnish and Install Raised Asphalt Crosswalk

1. Measurement of this item shall be paid by each (EA) ADA compliant raised crosswalk furnished and installed in place and approved . This item shall include asphalt and all other materials needed to complete the work. Payment shall be made by the contract unit price per each (EA) speed table.

END OF SECTION

SECTION 01750

CONTRACT CLOSEOUT

PART I Description

1.01 Summary

- A. Provide prerequisites to substantial completion.
 - 1. Punch list.
 - 2. Supporting documentation.
 - 3. Warranties.
 - 4. Certifications.

- B. Provide prerequisites to final acceptance.
 - 1. Final payment request with supporting affidavits.
 - 2. Completed punch list.
 - 3. Submit record documents: One set of drawings and project manual with all changes noted in red and Project Manual changes flagged with page tabs.
 - 4. Final clean-up.
 - 5. Removal of temporary facilities.

END OF SECTION

SECTION 01810

SPECIAL PROVISIONS

PART 1 Description

1.01 SUMMARY

- A. These "Special Provisions" supplement, clarify, or modify provisions of Specifications as they apply to this project.
- B. Requirements of Special Provisions, General and Supplemental Conditions apply to work performed under all sections of this project.
- C. Work of this contract shall include all work required to construct the entire Project as shown on the drawings and defined by the Specifications and other contract documents, unless specific exceptions are stated therein.
- D. DISCREPANCY BETWEEN SPECIAL PROVISIONS, SPECIFICATIONS, AND PLANS. In the event of discrepancy between Special Provisions and other sections of the Specifications, the Special Provisions will take precedence over the Specifications, the General Conditions, and the Supplemental Conditions. The Specifications will take precedence over the Plans.

1.02 LABOR PRACTICES

A. EIGHT-HOUR WORK DAY

The Contractor's attention is directed to, Limitation on work hours; overtime; exceptions. a) No person shall require laborers, workmen, or mechanics to work more than eight hours in any one calendar day or forty hours in any one week upon any public works of the state, or any of its political subdivisions, except as hereafter authorized. An employee may agree to work more than eight hours per day or more than forty hours in any week provided the employee shall be paid at the rate of one and one-half times the regularly established hourly rate for all work in excess of forty hours in any one week.

1.03 BACKFILL OBSERVATION

No work shall be covered before the Project Representative or Engineer has approved the work. If any piping or appurtenance is covered without the approval of the Engineer or Project Representative, at the discretion of the Engineer, the Contractor will be required to re-excavate to expose the covered materials. The cost of exposing those materials and then backfilling and compaction will be at the Contractor's expense, regardless of the condition of the pipe and/or the materials under question.

1.04 CONSTRUCTION WATER

The Contractor is responsible for supplying water for construction purposes. If the Contractor wishes to use existing fire hydrants for water, he shall make the proper arrangements with the owner of the hydrant. The Contractor will be responsible for compliance with that owner's requirements as well as the payment of any fees for its use. Construction water is considered incidental to this project and no separate payment will be made to the Contractor for this item. If the Contractor wishes to use water from a resident, he shall obtain written permission from that resident to do so.

1.05 SAFETY

In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for safety conditions at and adjacent to the job site, including the safety of all persons and property during the performance of the work. The Contractor shall comply with all federal, state, and local safety laws and regulations. This requirement shall apply continuously, and shall not be limited to normal working operations. The Engineer's construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site. This paragraph shall be applicable to the Contractor and all of the Contractor's subcontractors.

In addition, the Contractor shall provide barriers, fences, signs, lights, etc. as necessary to control access to the site.

Contractor shall provide Owner a written copy of their confined spaced program, proof of record-keeping protocol and inventory of appropriate equipment such as monitors for atmospheric hazards and rescue equipment. These documents shall be submitted at the preconstruction conference.

1.07 DUST CONTROL

The Contractor shall be responsible for dust and erosion control, and for minimizing dust and erosion to the Owner's satisfaction. Dust and erosion control shall be deemed to be incidental and shall not be a pay item.

1.08 DISPOSAL OF WASTE MATERIALS

Excess, unsuitable, and waste materials from this project (including that from trench excavation, pavement removal, piping removal, and grading operations), shall be disposed of, offsite, by Contractor. Such disposal shall be considered incidental, and shall not be a pay item.

1.09 CODES AND STANDARDS

All materials and the completed installation shall comply with applicable standards promulgated pursuant to the State of Tennessee and City of Lakeland.

1.10 OPEN EXCAVATIONS

The Contractor shall completely backfill all excavations before stopping work for the day. No excavation (fenced or unfenced) shall be left open overnight, over a weekend, nor any period in which no work at that location is underway. The cost of reopening or re-excavation due to this provision will be borne by the Contractor.

1.11 CONSTRUCTION SURVEYING AND STAKING

In this project, lines and grades of replaced appurtenances shall match those existing. When new appurtenances such as drain lines, catch basins, curb, sidewalks, and new roadway crowns are to be installed, the Contractor will provide construction surveying and staking, unless otherwise noted.

1.12 CLEANING AND FINISHING

After completion of all work all debris and foreign material will be removed by the contractor. The project area, including staging areas, shall be clean and functional. This will include the restoration of any disturbed landscaping in the work area.

1.13 TRAFFIC CONTROL

A traffic control plan is required for repairs in areas affecting traffic. The Contractor is responsible for furnishing a traffic control plan to the City Engineer at least one week prior to the start of construction. Excavations which traverse a street shall be limited to one-half the width of the street at any one time, unless an emergency situation exists which requires the entire width of the street be excavated. The City Engineer's approval is required prior to traversing an entire street. The closure should not exceed forty-eight (48) hours and proper signage shall be installed detouring traffic and warning of construction.

END OF SECTION

SECTION 02340

GEOTEXTILE FABRICS AND MEMBRANES

PART 1 - Description

This section covers furnishing and placing geotextiles as shown on the plans or directed, in accordance with these specifications. The geotextile usage will determine the applicable specifications and the corresponding pay item.

PART 2 - Materials

A. The geotextile shall consist only of woven or non-woven, long-chain polymeric filaments or yarns such as polyethylene, polyester, polypropylene, polyamide, or polyvinylidene chloride formed into a stable network such that the filaments or yarns retain their relative positions to each other.

B. Membrane Requirements

Geotextile and Impermeable Plastic Membrane Specifications								
Fabric and Membrane Property	Test Method	Drainage And Filtration	Erosion Control	Silt Fence	Separation & Stabilization		Embankment & Retaining Wall Reinforcement	Impermeable Plastic Membrane
					Woven	Non-Woven		
*EOS (mm)	ASTM D4751	40-70	40-100	40-100	30-50	40-100	30-70	-----
Thickness, Mils (mm)	ASTM D5199	-----	-----	-----	----	-----	-----	12 (0.305)
Permittivity, cm/sec	ASTM D5199	1.0	1.0	0.1	0.05	1.0	0.05	<10 ⁻⁷ cm/sec
Grab Tensile Strength	ASTM D4632	90	180	90	200	160	300	150
Elongation at Failure% Min	ASTM D4533	40	40	50	15	40	15	20
Trap Tear Strength, lbs	ASTM D4833	40	70	50	65	60	110	50
Puncture Strength, lbs	ASTM D4632	50	90	60	90	80	110	60

*Equivalent or Apparent Opening Size, U.S. Standard Sieve (mm)

PART 3 – Execution for Stabilization Fabric

3.01 Equipment

- A. Equipment loads when placing and compacting the material placed over the stabilization geotextiles shall comply with the following:
 - 1. Maximum wheel load shall be 9,945 pounds (4500 kg), or as specified.
 - 2. Maximum contact pressure shall be 60 psi (400kPa). The contact pressure is calculated from the applied wheel load in newtons and the resulting contact area in square meters.
 - 3. Rutting in excess of three inches (3”) (75mm) will not be allowed. Equipment loads are to be lightened if this occurs. Ruts shall be repaired by filling the ruts with additional material.

3.02 Construction Requirements.

- A. The geotextile shall be lapped at the ends and sides of adjoining sheets unless shown otherwise on the plans or described herein. Geotextile that is joined by sewing shall have strength properties at the seam equal to the specified strength requirements of the geotextile. All seams shall be exposed for ease of inspection. High-strength polyester, polypropylene or kevlar thread shall be used for sewn seams. Nylon threads shall not be used. Overlapping J seams and double sewing are required for field seams.
- B. Gravel, pit run base course, sand, or other specified material shall be placed on the geotextile so that it is not torn, punctured, or shifted. Maximum pile heights of materials shall be limited to prevent geotextile distortion. Any geotextile that is torn or punctured shall be repaired. The repair shall consist of a patch of the same type of geotextile placed over the ruptured area and overlapped a minimum of three feet (3’) (1m) from the edge of any part of the rupture, or a sewn patch with the same requirements for seam strength as that of the geotextile being repaired.
- C. Pegs or pins, as approved by the Engineer, may be used to hold the geotextile for embankment erosion control in place until the specified cover material has been placed. Pegs or pins shall not be used for other types of geotextile installations without approval of the Engineer. If such approval is given, pegs or pins shall be used only at locations that are not detrimental to the finished product.
- D. When geotextile is used for foundation stabilization, the following criteria shall govern:
 - 1. The cover material shall be placed over the geotextile in 1-foot (0.3m)+/- lifts.
 - 2. Equipment shall not be operated directly on the geotextile. The minimum lift thickness shall be maintained at all times.

3. The cover material shall be compacted with a roller or other equipment as approved by the Engineer.
 4. Prior to the installation of geotextile, the subgrade shall be leveled and smoothed to remove ruts, depressions, or humps, which exceed four inches (4") (100mm). The surface also shall be free of rocks, stumps, roots, brush, limbs, or other objects that might tear or puncture the geotextile or result in geotextile wear.
- E. During periods of shipment and storage, the geotextile shall be enclosed in heavy duty wrapping to protect it from direct sunlight, ultraviolet rays, temperatures greater than 140°F (60°C), mud, dirt, dust, and debris. Any geotextile left unprotected shall be removed from the project.
- F. The product name, type of material and the lot or batch identification shall be clearly labeled on each roll.
- G. Except for geotextile used for erosion control and silt fence, the cover material shall be placed over the fabric within five (5) days.
- H. Test results, with a certification by the manufacturer showing the geotextile performance in regard to the material requirements of this specification, shall be submitted to the Engineer. At least two weeks before the use of any geotextile, a sample six feet (6') (2 m) in length by the full width of the roll shall be submitted to the Engineer. The sample shall be labeled with the product name, machine direction, the lot and batch number, date of sampling, project number, and certification of compliance with the material specifications. If sewing is specified, a seam sample also shall be submitted to the Engineer. The sample sewn section shall be six feet (6') (2 m) by three feet (3') (1 m) with the seam in the center and parallel to the six feet (6') (2 m) length.

3.03 Installation

- A. The geotextile shall be laid smooth without wrinkles or folds on the prepared subgrade in the direction of construction traffic. Adjacent geotextile rolls shall be overlapped, sewn, or joined as required in the plans. Overlaps shall be in the direction as shown on the plans. See table below for overlap requirements.

Stabilization Fabric

Soil CBR	Method of Joining
Greater than 3	300 - 450 mm (12 - 18 in) overlap
1 - 3	600 - 1000 mm (24 - 40 in) overlap
0.5 - 1	1000 mm (40 in) overlap or sewn
Less than 0.5	Sewn
All roll ends	1000 mm (40 in) overlap or sewn

- B. On curves, the geotextile may be folded or cut to conform to the curves. The fold or overlap shall be in the direction of construction and held in place by pins, staples, or piles of fill or rock.
- C. Prior to covering, the geotextile shall be inspected by a certified inspector of the Engineer to ensure that the geotextile has not been damaged during installation. Damaged geotextiles, as identified by the Engineer, shall be repaired immediately. Cover the damaged area with a geotextile patch which extends an amount equal to the required overlap beyond the damaged area.
- D. The subbase shall be placed by end dumping onto the geotextile from the edge of the geotextile, or over previously placed subbase aggregate. On soils with $CBR > 3$, most rubber-tired vehicles can be driven at slow speeds, less than 10 mph (16 km/h) and in straight paths over the exposed geotextile without causing damage to the geotextile. Sudden braking and sharp turning should be avoided. Tracked construction equipment should not be operated directly upon the geotextile. A minimum fill soil thickness of 6 in (15cm) is required prior to operation of tracked vehicles over the geotextile. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geotextile. Turning of vehicles shall not be permitted on the first lift above the geotextile.
- E. On subgrades having a CBR value of less than 1, the subbase aggregate should be spread in its full thickness as soon as possible after dumping to minimize the potential of localized subgrade failure due to overloading of the subgrade.
- F. Any ruts occurring during construction shall be filled with additional subbase material, and compacted to the specified density.
- G. If placement of the backfill material causes damage to the geotextile, the damaged area shall be repaired as previously described above. The placement procedure shall then be modified to eliminate further damage from taking place.

END OF SECTION

SECTION 02710

BOUND AGGREGATE BASE COURSES

PART 1 – Description

- 1.01 This section describes the work and materials associated with various aggregates, and binders to produce the following bound aggregate base courses: Cement Stabilized Aggregate Base, Portland Cement Concrete Base (Plain), Asphaltic Concrete (General), and Soil Cement, in accordance with these Specifications and in conformity with the lines, grades, thickness, and typical cross-section shown on the Plans or as directed by the Owner.

PART 2 – Materials

2.01. Submittals

- A. Before any soil cement aggregate base course or cement stabilized aggregate base are applied the following submittals shall be submitted for review to the Engineer: a geotechnical report describing and classifying the soil, previously prepared soil cement mix designs covering durability tests such as wet-dry and freeze thaw report which are less than one year old and which specify a recommended cement content by volume for the type of soil. In general ranges of cement content by volume shall be applied to differing types of soil (classified as per AASHTO) as follows:

Soil Groups A-1, A-2-4, A-2-5, and A-3 not over 14 percent
Soil Groups A-2-6, A-2-7, A-4 and A-5, not over 10 percent
Soil Groups A-6 and A-7, not over 7 percent.

Compressive strengths should increase both with age and with increases in cement content within the ranges of cement content producing results that meet requirements of the freezer-thaw and the wet-dry test. The 14 days unconfined compressive strengths shall be used to determine the design cement content. The design cement content shall produce a minimum unconfined compressive strength of 300 psi within fourteen (14) days.

- B. Pavement and Base Design Criteria

To facilitate the structure design process, several standard combinations of pavement and base courses are provided below.

Projected Traffic ADT	Pavement Type and Thickness	Bituminous Surfacing Course over Binder Course over Cement Treated Course Thickness
Under 1000	Dbl Bituminous Surface Tr	1 ½ inches over 2 inches over 6 inches
1000 to 2000	Dbl Bituminous Surface Tr	1 ½ inches over 2 inches over 8 inches
2000 to 4000	Dbl Bituminous Surface Tr	1 ½ inches over 2 inches over 8 inches

2.02 Materials

A. Cement Stabilized Aggregate Base

1. Aggregate

- a. Aggregates for Graded Aggregate Base Course shall be crushed stone or crushed or uncrushed gravel together with such material as manufactured sand or other fine materials naturally contained or added thereto as needed to conform with one of the three gradations shown in the table below, as specified

Grading Table for Graded Aggregate Base Course
Total Percent, by Dry Weight, Passing Each Sieve (U.S. Standard)

Size No.	2 ½ “	2”	1 ½ “	1”	3/8”	No. 40	Clay*
1	100	95-100			35-65	10-30	1-12
2		100	95-100		40-65	10-30	1-12
3			100	90-100	45-65	10-35	2-12

* Clay content shall be determined by the Hydrometer Test – AASHTO T 88 4. Clay content may exceed 12 percent with the written permission of the Owner.

- b. Mineral aggregate for graded aggregate base course shall consist of hard durable particles or fragments of stone or gravel and other finely divided mineral matter. Individual materials shall meet the requirements specified hereinafter.
 - i. Crushed Stone - Crushed stone shall be free of silt and clay. The coarse aggregate portion of the stone shall have a percentage of wear of not more than 50, and when subjected to five (5) alternations of the sodium sulfate soundness test, the weighted percentage of loss shall not exceed fifteen (15).

- ii. Gravel - Gravel shall be screened and all oversize material may be crushed and fed uniformly back over the screen. The coarse aggregate portion (retained on the No. 4 sieve) shall have a percentage of wear of not more than 50, and when subjected to five (5) alternations of the sodium sulfate soundness test, the weighted percentage of loss shall not exceed fifteen (15). The portion of the material passing the No. 40 sieve shall be nonplastic or shall have a liquid limit of not more than thirty (30) and plasticity index of not more than eight (8).
- iii. If fine aggregate, coarse aggregate, or binder, in addition to that present in the base material, is needed in order to meet the gradation or density requirements or for satisfactory bonding of the material, it shall be uniformly blended with the base course material at the mixing plant by a mechanical feeder to maintain a uniform flow on the belt to the mixer. Blending of materials on the stockpiles or in the pits by bulldozer, clamshell, dragline, or similar equipment will not be permitted. The composite gradation of aggregate shall be the grading specified.

2. Portland Cement

- a. Portland Cement shall comply with the latest specifications for Portland Cement, AASHTO M 85 or AASHTO M 240 for the type specified.

3. Water

- a. Water shall be free of injurious quantities of oil, salt, acid, alkali, sugar, vegetable matter, or other substances detrimental to hardening of the treated base.

4. Bituminous Material

- a. Bituminous material for curing shall be Emulsified Asphalt Type SS-1, RS-2, or Cut-Back Asphalt, Grade RC-250.

B. Soil Cement Base

1. Soil.

- a. Soil for soil-cement base shall be of such general character as to be classified as Group A-1 or A-2, AASHTO M 145. The material shall be of such size that all will pass the standard two (2) inch sieve. Samples shall be tested by the Owner before work is started for determination of cement application rates and optimum moisture content.

2. Portland Cement.

- a. Portland Cement shall comply with the latest specifications for Portland Cement, AASHTO M 85 or AASHTO M 240 for the type specified.

3. Water.

- a. Water shall be free of injurious quantities of oil, salt, acid, alkali, sugar, vegetable matter, or other substances detrimental to hardening of the treated base.
4. Bituminous Material.
- a. Bituminous material for curing shall be Emulsified Asphalt Type SS-1, RS-2, or Cut-Back Asphalt, Grade RC-250.
5. Hydraulic Cement
- a. Hydraulic Cement shall comply with the latest specifications for Hydraulic Cement, ASTM C1157 for the type specified.
- C. Portland Cement Concrete Base (Plain)
1. Concrete Material
- a. Concrete materials shall meet the requirements of Specification Section 03050, Portland Cement Concrete, for Class B concrete.
2. Curing Materials
- a. Curing materials shall conform to the applicable provisions of Specification Section 02750 Paragraph 2.03.
3. Chemical Additives
- a. Chemical additives shall conform to the applicable provisions of Specification Section 02750 Paragraph
- D. Asphaltic Concrete (General)
1. Aggregates, Filler, and Bituminous Material
- a. Aggregates, filler if required, and bituminous material for the various types of hot mix asphaltic concrete will be stipulated in the applicable Section of these Specifications.
 - b. Each size and type of aggregate shall be stocked in a separate bin or stall in a manner that will prevent segregation. The mineral aggregate will be accepted for quality in the stockpile and for gradation immediately preceding addition of bituminous material. This acceptance will be based on periodic samples of the various sizes of aggregate taken as they are weighed from the bins, of the combined aggregate as it is fed to the pugmill, or of batches to which the bituminous material has not been added. The bituminous material may be conditionally accepted at the source.
 - c. The plant mixed material will be accepted after blending and mixing at the plant.

E. Asphaltic Concrete Base (Black Base)

1. Asphalt Cement

- a. Asphalt cement for this construction shall be penetration grade AC-20 or AC-10, or as directed by the Owner if these grades are not available. The proportion by weight of asphalt cement to the total mixture shall be between 3.5 percent and 5.5 percent as approved by the Owner.

2. Course Aggregate

- a. Course aggregate (aggregate retained on the No. 4 sieve) shall be crushed limestone conforming to the quality requirements of AASHTO M 62 or washed gravel, as approved by the Owner.

3. Fine Aggregate

- a. Fine aggregate shall consist of natural sand consisting of hard, clean, tough grains which will have a maximum weight loss of twelve (12) percent when subjected to the sodium sulfate soundness test.

4. Aggregate Gradation

- a. The aggregate gradation for black base shall conform to the following master range:

Sieve Size	Total % Passing by Weight
2"	100
1-1/2"	75-100
3/4"	45-70
3/8"	30-55
No. 4	20-40
No. 8	10-30
No. 30	5-20

F. Equipment.

- 1. All equipment necessary for the satisfactory performance of this construction shall be on the Project and approved before work will be permitted to begin.

PART 3- Execution

3.01 Construction Requirements For Cement Stabilized Aggregate Base

A. Limitations

- 1. No cement shall be applied when the aggregate base is frozen or contains frost. Before beginning construction operations for the day, the ambient temperature

shall be at least 40° F in the shade and rising. Application of cement, mixing, application of water and moist mixing, compaction, and finishing shall be continuous, and surface finishing shall be completed in daylight hours. Mixing, application of water and moist mixing, and compaction inclusively shall be completed within 6 hours.

B. Preparation

1. Before other construction operations are begun, the area to be paved shall be graded and shaped in accordance with Section 02335 of these Specifications in order to construct the base in conformance with grades, lines, thickness, and typical cross-section shown on the Plans. Unsuitable materials shall be removed and replaced with acceptable aggregate. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

C. Spreading

1. After subgrade preparation is complete, aggregate base material shall be spread over the moistened subgrade. The placement shall be uniform in thickness and surface contour and in such quantity that the completed base will conform to the required grade and cross-section. Aggregate shall be placed and initially compacted to specified thickness before proceeding with pulverization and application of cement.

D. Moisture Content

1. The optimum moisture content of the graded aggregate cement mixture shall be considered to be ten (10) percent unless otherwise determined by laboratory testing by the Owner. The maximum percentage of moisture in the aggregate at the time cement is added shall not exceed the specified optimum moisture content for the aggregate cement mixture. When water application and mixing have been completed, the percentage of moisture in the mixture based on oven dried weights shall not be more than one (1) percentage point below or more than three (3) percentage points above the specified optimum moisture content and shall be such that the mixture will not become unstable during compacting and finishing. During finishing operations, the moisture content of the surface material shall be maintained at not less than the specified optimum moisture content.

E. Application of Cement

1. Before application of the cement, the aggregate shall be pulverized as directed by the Owner. Approved Portland Cement shall then be applied uniformly on the base at the rate as specified below for the type of soil. The Owner reserves the right to increase the rate of cement application where in his judgment additional

cement is desired. When bulk cement is used, adequate equipment for handling, weighing, and spreading the cement shall be provided.

2. The percentage of moisture in the aggregate at the time of cement application shall not exceed the quantity that will permit a uniform mixture of aggregate and cement during mixing operations.

F. Mixing

1. After the cement has been applied it shall be mixed with the aggregate so that the base material shall be a homogeneous aggregate cement mixture. Water shall be added and mixing shall continue until the mixture is sufficiently blended to prevent the formation of cement balls when additional water is added. Aggregate cement mixture shall not remain undisturbed for more than thirty (30) minutes.

G. Application of Water and Moist Misting

1. Immediately after the initial mixing operation, required water shall be applied uniformly and incorporated into the mixture, and excessive concentration of water on or near the surface shall be avoided. A water supply shall be provided that will assure the application within three (3) hours of all water required. After all water has been applied, mixing shall continue until a uniform mixture of aggregate, cement, and water has been obtained.

H. Compaction

1. Prior to the beginning of compaction, the mixture shall be in a loose condition for sufficient depth to produce the specified finished thickness. Compaction will be obtained by use of a sheeps-foot roller which will be followed by rolling with pneumatic-tire rollers or other types of rollers as required to thoroughly compact the base for its full thickness. Shaping may be required to obtain uniform compaction. The aggregate cement mixture shall be compacted to ninety-five (95) percent of maximum density as determined by the applicable method of ASTM D698.

I. Finishing

1. After compaction is completed, the surface of the base shall be shaped to the lines, grades, and typical cross-sections shown on the Plans. During shaping operations, the surface shall be scarified as necessary to loosen any imprints left by the compacting or shaping equipment. The resulting surface shall then be compacted to the specified density with steel wheel or pneumatic tire rollers or both. Rolling may be supplemented by broom dragging if required.
2. Surface compaction and finishing shall be done in such a manner as to produce, within two (2) hours, a smooth, dense surface free of surface compaction planes,

cracks, ridges, or loose material. Any approved surface finishing method may be used provided the above final results are produced.

J. Curing

1. After finishing is completed, the aggregate cement shall be protected against drying for seven (7) days by the application of bituminous material as specified or allowed by the Owner. The bituminous material shall be applied as soon as possible, but no later than two (2) hours after finishing is completed. The finished aggregate cement shall be kept moist until the bituminous material is placed. The bituminous material shall be uniformly applied at the rate of approximately 0.2 gallons per square yard with approved heating and distributing equipment.
2. The exact rate and temperature will be specified by the Owner.
3. During application, the surface shall be dense, free of all loose and extraneous material, and shall contain sufficient moisture to prevent penetration of the bituminous material. If necessary, water shall be applied in sufficient quantity to fill any surface voids immediately before the bituminous material is applied.
4. The curing material shall be maintained by the Contractor during the seven (7) day protection period so that all of the aggregate cement will be covered effectively, and should it be necessary for construction equipment or any other traffic to use the bituminous covered surface before it has dried sufficiently to prevent pickup, sufficient granular cover shall be applied before such use as directed by the Owner. Finished portions of aggregate cement that are traveled on by equipment or other traffic for any reason shall be protected in such a manner as to prevent marring or damaging the completed work.
5. When the ambient temperature may be expected to reach the freezing point, sufficient protection from freezing shall be given the aggregate cement for seven (7) days after finishing is completed.

K. Construction Joints

1. At the end of each day's construction a straight transverse construction joint shall be formed by cutting back into the completed work to form a true vertical face free of loose or shattered material.
2. Aggregate cement for large, wide areas shall be built in a series of parallel lanes of convenient length and width meeting the approval of the Owner. Straight longitudinal joints shall be formed at the edge of each day's construction by cutting back into the completed work to form a true vertical face free of loose or shattered material.

L. Manhole Adjustments

1. Drainage and sanitary sewer manholes owned by the City shall be adjusted and set at final grade by the Contractor as necessary for compliance with the Plans. Adjustments of City owned manholes shall be as specified in Sections 02530 and 02632 of these specifications. Manholes, valve boxes, and other utility structures not owned by the City but within the right-of-way of the Project shall be adjusted as necessary by the owner of such facilities. The Contractor shall be responsible for notifying other owners of any required adjustments and for the accomplishment of that work by the owner of such facilities according to the project schedule.

M. Traffic and Maintenance

1. Completed portions of the base may be immediately opened to construction equipment or local traffic and to all traffic after the seven (7) day curing period, provided the base has hardened sufficiently to prevent damage and provided curing is not impaired.
2. The Contractor shall be required to maintain the base in good condition and in a manner satisfactory to the Owner from the time work first starts until all work has been completed and accepted. Maintenance shall include immediate repairs to any defects that may occur. This work shall be done by the Contractor at his own expense and repeated as often as may be necessary to keep the area continuously intact. This work shall include immediate repairs to any defects that may occur in a manner that will ensure restoration of a smooth, uniform surface and durability of the area repaired. Any faulty work shall be replaced to the full depth of the treatment, rather than adding a thin layer of material to the completed work.

3.02 Construction Requirements For Soil Cement Base

A. Limitations.

1. No soil-cement shall be processed that will not be covered with the succeeding stage of base or pavement during the same construction season. No cement shall be applied when the soil is frozen or contains frost. Before beginning construction operations for the day, the ambient temperature shall be at least 40° F in the shade and rising. All operations shall be continuous, and all operations but final surface finish shall be completed within four (4) hours from the time cement is applied. No uncompacted soil cement mixture shall be left undisturbed for more than thirty (30) minutes.

B. Preparation.

1. Before other operations are begun, the roadbed, including depth of soil for the soil-cement base, shall be graded and shaped in accordance with Section 02335 of these Specifications. After grading operations are complete and approved, any

work and material required to regrade the roadbed to finished grade shall be at the Contractor's expense. The area to receive treatment shall be thoroughly scarified and pulverized for sufficient depth and width to give, after treatment and compaction, the cross-sections shown on the Plans.

C. Moisture Content

1. The optimum moisture content should be established by soil tests or as designated by the Owner on the Plans. The maximum percentage of moisture in the soil at the time cement is added shall not exceed the specified moisture content of the soil-cement mixture by more than three (3) percentage points. When water application and mixing have been completed, the percentage of moisture in the mixture, based on oven dried weights, shall not be more than one (1) percentage point below or more than three (3) percentage points above the specified optimum moisture content and shall be such that the mixture will not become unstable during compacting and finishing. During finishing operations, the moisture content of the surface material shall be maintained at not less than the specified optimum moisture content.

D. Application of Portland or Hydraulic Cement.

1. Before application of the cement, the aggregate shall be pulverized as directed by the Owner. Approved Portland or Hydraulic Cement shall then be applied uniformly on the base at the rate as specified by previously approved mix submittals. The Owner reserves the right to increase the rate of cement application where in his judgment additional cement is desired. When bulk cement is used, adequate equipment for handling, weighing, and spreading the cement shall be provided.
2. Approved Portland Cement shall be applied uniformly on the in-place soil at the rate shown on the Plans or established by the Owner, based on tests of the soil performed before work is begun. The Owner reserves the right to increase the rate of cement where in his judgment additional cement is desired. When bulk cement is used, adequate equipment for handling, weighing, and spreading the cement shall be provided.

E. Mixing.

1. After the cement has been applied it shall be mixed with the soil so that the specified thickness of base shall be a homogeneous soil-cement mixture. Water shall be added and mixing shall continue until the mixture is sufficiently blended to prevent the formation of cement balls when additional water is added.

F. Application of Water And Moist Misting.

1. Immediately after the soil and cement have been mixed, water shall be applied uniformly and incorporated into the mixture. Excessive concentration of water on or near the surface shall be avoided. A water supply and pressure distributing equipment that will assure the application within three (3) hours of all water required. After all water has been applied, mixing shall continue until a uniform and intimate mixture of soil-cement and water has been obtained.

G. Compaction.

1. Prior to the beginning of compaction, the mixture shall be in a loose condition for a depth to produce the specified finished thickness. As a continuation of mixing operations, the loose mixture then shall be uniformly compacted to ninety-five (95) percent of maximum density as determined by ASTM D698 with two (2) hours. Initial compaction shall be obtained by use of a sheeps-foot roller of adequate weight to thoroughly compact the base for the full thickness. During compaction operations, shaping may be required to obtain uniform compaction and required grade and cross.

H. Finishing.

1. After the mixture has been compacted, the surface of the soil-cement shall be shaped, if necessary, to the required lines, grades, and cross-sections shown on the Plans. During shaping operations, the surface shall be lightly scarified as necessary to loosen any imprints left by the compacting or shaping equipment. The resulting surface shall then be compacted to the specified density with steel wheel or pneumatic tire rollers or both. Rolling shall be supplemented by broom dragging if required.
2. Surface compaction and finishing shall be done in such a manner as to produce, within two (2) hours, a smooth, dense surface free of surface compaction planes, cracks, ridges, or loose material. Any approved surface finishing method may be used provided the above final results are produced.

I. Curing.

1. After the soil-cement has been finished as specified herein, it shall be protected against drying for seven (7) days by the application of bituminous material as specified or allowed by the Owner. The bituminous material shall be applied as soon as possible, but no later than two (2) hours after finishing is completed. The finished soil-cement shall be kept continuously moist until the bituminous material is placed.
2. The bituminous material shall be uniformly applied at the rate of approximately 0.2 gallons per square yard with approved heating and distributing equipment. The exact rate and temperature of application to give complete coverage without excessive run-off will be specified by the Owner.

3. At the time the bituminous material is applied the soil-cement shall be dense, free of all loose and extraneous material, and shall contain sufficient moisture to prevent penetration of the bituminous material. Water shall be applied in sufficient quantity to fill any surface voids immediately before the bituminous material is applied.
4. The curing material shall be maintained by the Contractor during the seven (7) day protection period so that all of the soil-cement will be covered effectively.
5. Should it be necessary for construction equipment or any other traffic to use the bituminous covered surface before it has dried sufficiently to prevent pickup, sufficient granular cover shall be applied before such use as directed by the Owner. Finished portions of the soil-cement that are traveled on by equipment or other traffic for any reason shall be protected in such a manner as to prevent marring or damaging the completed work.
6. When the ambient temperature may be expected to reach the freezing point, sufficient protection from freezing shall be given the soil-cement for seven (7) days after finishing and until it has hardened.

J. Construction Joints.

1. At the end of each day's construction a straight transverse construction joint shall be formed by cutting back into the completed work to form a true vertical face free of loose or shattered material.
2. Soil-cement for large, wide areas shall be built in a series of parallel lanes of convenient lengths and width meeting the approval of the Owner. Straight longitudinal joints shall be formed at the edge of each day's construction by cutting back into the completed work to form a true vertical face free of loose or shattered material.

K. Manhole Adjustments.

1. Drainage and sanitary sewer manholes owned by the City shall be adjusted and set at final grade by the Contractor as necessary for compliance with the Plans. Adjustments of City owned manholes shall be as specified in Sections 02530 and 02632 of these specifications. Manholes, valve boxes, and other utility structures not owned by the City but within the right-of-way of the Project shall be adjusted as necessary by the owner of such facilities. The Contractor shall be responsible for notifying other owners of any required adjustments and for the accomplishment of that work by the owner of such facilities according to the project schedule.

L. Traffic And Maintenance.

1. Completed portions of the soil-cement may be opened immediately to construction equipment and local traffic, and to all traffic after the seven (7) day curing period, provided the soil-cement has hardened sufficiently to prevent marring or distorting of the surface by equipment or traffic and provided curing specified above is not impaired.
2. The Contractor shall be required to maintain the soil-cement in good condition and in a manner satisfactory to the Owner from the time work first starts until all work has been completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done by the Contractor at his own expense and repeated as often as may be necessary to keep the area continuously intact. This work shall include immediate repairs to any defects that may occur in a manner that will ensure restoration of a smooth, uniform surface and durability of the area repaired. Any faulty work shall be replaced to the full depth of treatment, rather than adding a thin layer of material to the completed work.

3.03 Construction Requirements For Portland Cement Concrete Base (Plain)

A. Proportioning

1. The proportioning of materials for Portland cement concrete base shall be in accordance with the provision of Specification Section 03050 Portland Cement Concrete, for Class B concrete.

B. Mixing Limitations and Placing Concrete

1. Limitations of mixing of concrete due to weather shall be in accordance with limitations specified herein and in Section 03050.
2. The concrete shall be unloaded into an approved spreading device, or deposited on the subgrade or subbase, and spread in such manner as to prevent segregation of the materials. As deposited, the mixture shall be placed where it will require as little re-handling as possible.
3. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels or other approved tools. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or other foreign substances.
4. Where concrete is to be placed adjoining a previously constructed lane of pavement and mechanical equipment will be operated upon the existing lane of pavement, that lane shall meet the requirements for opening to traffic stipulated in Specifications elsewhere. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after 7 days.

5. Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies, by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than 5 seconds in any one location.
6. The use of hand operated vibrators will be permitted. Vibrators mounted on a machine shall be operated only while the machine is in motion.
7. Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is well centered on the joint assembly.
8. Should any concrete materials fall on or be worked into the surface of a completed slab, they shall be removed immediately

C. Preparation and Construction Procedures

1. The subgrade shall be prepared in accordance with the provisions of Specification Section 02335.

D. Surface Finish And Tolerances

1. As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 12 foot steel straightedge provided by the Contractor or other specified device. When the straightedge is placed parallel to the centerline of the pavement, the surface shall not vary more than 1/8 inch from the lower edge of the straightedge. Areas showing high spots of more than 1/8 inch, but not exceeding 1/2 inch in 12 feet, shall be marked and immediately ground down with an approved grinding tool to an elevation where the area will not show surface deviations in excess of 1/8 inch when tested with a 12 foot straightedge.
1. When a bituminous concrete surface is specified, the surface of the base shall be rolled prior to initial set with a roller having projections that will form grooves in the surface approximately one (1) inch wide and one-half (1/2) inch deep at intervals of approximately five (5) inches. These grooves shall form an angle of approximately 60° with the pavement centerline. A tamping device may be used which will produce the same general results.

E. Traffic And Maintenance

2. The Owner will determine when the concrete base has cured sufficiently for the application of bituminous concrete surface material or when local traffic or construction equipment will be allowed on the base.

F. Tolerance In Base Thickness

1. The owner will determine the thickness of the base by average measurements taken at the frequency he determines to be sufficient. When the finished base thickness is not deficient by more than one-quarter (1/4) inch from the Plan thickness, full payment will be made. When concrete base is determined to be deficient by more than one-quarter (1/4) inch, the Contractor shall remove and replace the deficient base at his expense.

G. Manhole Adjustments

1. Drainage and sanitary sewer manholes owned by the City shall be adjusted and set at final grade by the Contractor as necessary for compliance with the Plans. Adjustments of City owned manholes shall be as specified in Specification Sections 02530 and 02632 respectively. Manholes, valve boxes, and other utility structures not owned by the City but within the right-of-way of the project shall be adjusted as necessary by the owner of such facilities. The Contractor shall be responsible for notifying other owners of any required adjustments and for the accomplishment of that work by the owner of such facilities according to the project schedule.

3.04 Construction Requirements For Asphaltic Concrete Pavement (General)

A. Composition of Mixtures

1. The bituminous plant mix shall be composed of a job-mix formula of aggregate, filler if required, and bituminous material approved by the Owner. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the job-mix formula. The job-mix formula shall establish a single percentage of aggregate passing each required sieve size, a single percentage of bituminous material to be added to the aggregate, and a single temperature at which the mixture is to be discharged from the plant. All mixtures shall continually conform to the job-mix formula within tolerances established by Subsection 407.03 of the Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction. When unsatisfactory results or other conditions make it necessary, the job-mix formula may be adjusted by the Owner.

B. Equipment

1. Bituminous Mixing Plants

- a. Bituminous mixing plants, regardless of type, shall conform to the current requirements of the Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction, Subsection 407.04.

- b. At any time and without notice, the Owner shall have free access to any plant producing hot mix asphaltic concrete for the City of the purpose of checking equipment, materials, scales, or plant mixed material for compliance with these Specifications. He shall be furnished whatever assistance he requests in checking the plant, including the provision of testing equipment to check the mix and materials.

2. Trucks

- a. Trucks used for hauling bituminous mixtures shall have tight, clean, smooth metal beds.
- b. The beds shall have been coated with an approved material not harmful to the mixture to prevent adherence to the beds. Each truck shall have a canvas cover to protect the mixture from the weather, and when necessary to control temperature, truck beds shall be insulated and covers securely fastened.

3. Bituminous Pavers

- a. Bituminous pavers shall be self-contained units, provided with an activated screed or strike-off assembly equipped to be heated and capable of spreading and finishing courses of plant mix material in lane widths according to the typical sections and thicknesses shown on the Plans. Materials for shoulders and similar construction shall be placed by any mechanical spreading equipment approved by the Owner.
- b. Bituminous pavers shall be equipped with a receiving hopper of sufficient capacity to ensure a uniform spreading operation. The hopper shall be equipped with a distribution system which prevents “cold spots” and which will place the mixture uniformly in front of the screed. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. When laying mixtures, the paver shall be capable of forward speeds consistent with satisfactory laying of the mixtures.
- c. All asphalt paving machines shall be equipped with automatic grade and slope controls which shall be in good working order at all times. In the event of mechanical failure of any of the automatic controls, the Contractor will be permitted to complete only the current day’s work using manual controls.

4. Rollers

- a. Rollers shall be self-propelled and of the steel-wheel, pneumatic tire, and/or vibratory type. Rollers shall be in good condition, capable of reversing without backlash and shall be operated at speeds slow enough to avoid displacement of the bituminous mixture. All rollers shall be equipped with devices to moisten and clean the wheels as required.
- b. The steel wheel roller shall weigh a minimum of eight tons and may be a three-wheel or tandem type.
- c. The pneumatic tire roller shall meet the requirements of Specification Section 02335.
- d. The use of vibratory rollers will be permitted only after being specifically approved by the Owner.
- e. All required rollers shall be on the job, inspected, and approved before paving operations will be permitted to begin.

5. Platform Truck Scales

- a. Platform truck scales shall meet the requirements of Subsection 109.01 of the Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction.

6. Small Tools

- a. The Contractor shall provide all necessary small tools and suitable means for keeping them clean and free from accumulations of bituminous materials.

C. Weather Limitations

- 1. Bituminous plant mix may be placed on properly constructed and accepted subgrade, base, previously applied layers of asphaltic concrete, or concrete pavement provided the following conditions are met:
 - a. The area to be paved is not in a frozen condition and is free from snow, ice, and excessive moisture.
 - b. Plant production and paving operations shall be so coordinated that a uniform continuity of operation is maintained.
 - c. The bituminous plant mix shall be placed in accordance with the following:

1. when the compacted thickness of the mix is less than 1-1/2 inch, the minimum air or surface temperature shall be 50°F
2. when the compacted thickness of the mix is 1-1/2 inch or more, the minimum air or surface temperature shall be 40° F.

D. Conditioning of the Existing Surface

1. When bituminous mixes are to be placed upon an existing concrete pavement, with or without a bituminous overlay, all loose or excess bituminous material shall be removed from joints and cracks. Sections of existing pavement that are broken and pumping under traffic shall be removed to subgrade as directed by the Owner. Unsatisfactory subgrade material encountered when existing pavement is removed shall also be removed as directed by the Owner. Materials removed from existing pavement, including base and subbase, and from subgrade shall be replaced with asphaltic concrete Mix No. 2, as specified in Specification Section 02741
2. B. When the bituminous mixture is to be placed upon an existing bituminous pavement, any areas having excess bitumen and any failures in the existing surface and base shall be removed to subgrade as directed by the Owner. Unsatisfactory subgrade material encountered when existing pavement is removed shall also be removed to subgrade as directed by the Owner. Materials removed from existing pavement, including base and subbase, and from subgrade shall be replaced with asphaltic concrete Mix No. 2, as specified in Specification Section 02741, to the level of existing pavement surface or as directed by the Owner. Payment for removal and replacement shall be made as defined for in Specification Section 02741.

E. Prime or Tack Coats

1. A prime coat shall be applied to Graded Aggregate Base Course, Cement-Stabilized Aggregate Base, and Soil-Cement Base uniformly at the rate of 0.25 gallons per square yard. Prime coat shall be grade MC-30. Bituminous material for tack coat shall be applied to concrete or asphaltic concrete bases or surfaces to provide bond for superimposed courses. Tack coat shall be emulsified asphalt, grade SS-1, applied at a uniform rate not to exceed 0.05 gallons of residual bitumen per square year.

F. Preparation of Bituminous Material

1. The bituminous material for hot mixes shall be heated to a temperature between 275° F and 325° F in a manner that will avoid local overheating and provide a continuous supply to the mixer at a uniform temperature at all times.

G. Preparation Of Aggregates

1. The aggregates for hot mixes shall be dried and heated to a uniform temperature between 225° F and 325° F. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate and to avoid soot on the aggregate.
2. B. On all plants requiring screens, the hot dried aggregate shall be screened into two (2) or more fractions as specified. The separated fractions shall then be conveyed into separate compartments ready for batching and mixing with bituminous material.

H. Mixing

1. The dried aggregates shall be combined within the mixer in the amount of each fraction of aggregates required to meet the job-mix formula. The bituminous material shall be measured or gauged and introduced into the mixer in the amount specified by the job-mix formula.
2. After the required amounts of aggregate and bituminous material have been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the bituminous material throughout the aggregate is secured. Wet-mixing time shall be determined by the Owner for each plant and for each type of aggregate used, but in no case shall the wet-mixing time be less than twenty-five (25) seconds for batch type plants and forty (40) seconds for continuous mix plants.
3. For hot-mix bituminous pavement, the temperature of the completed mixture, determined at the time it is dumped from the mixer, shall be not less than 275° F, except that the temperature of mixtures made with aggregates containing absorbed moisture which causes foaming or boiling in the completed mixtures at these higher temperatures shall be not less than 225° F.
4. Hot-mix bituminous mixtures may be stored in surge or storage silos provided that the mixture as used from the silos meets all the specification requirements for the particular mix involved. When the use of surge or storage silos is permitted, the following additional requirements shall apply:
 - a. The surge and storage systems shall be of such design that there are no appreciable differences between material being discharged from the silo and material being discharged directly from the pugmill.
 - b. The surge and storage silos must be equipped with low and high mix level indicators. The low level indicator shall be placed at a location on the silo that has been predetermined to prevent segregation of the mix.

- c. The conveyor system used with the surge or storage silos shall be arranged in such a manner that samples of the mix or dry material may be conveniently taken from the pugmill.
- d. Storage silos shall be closed, insulated, and heated in such a manner that localized heating (hot spots) does not occur. The storage system shall be capable of sealing the bin to prevent oxidation of the mixture.
- e. Surge silos shall be equipped with a rain cover capable of preventing water from entering the mix in the silo.
- f. Approval of a surge or storage system will be dependent upon inspection and tests which indicate that the system is capable of conveying, retaining, and delivering the bituminous mixture within the tolerance ranges as set forth on the job, mix formula without segregation, and without balling or hardening.
- g. Approval of a surge or storage system may be withdrawn if tests and/or inspections indicate that the system is having a detrimental effect on the bituminous mixture.
- h. Any bituminous mix which, in the judgment of the Owner, is damaged in any way by the use of a surge or storage system will be rejected.
- i. Platform truck scales meeting the requirements of Specification Section 02710 shall be mounted under the loading hopper and shall be capable of recording tare and gross weight.
- j. The storage or surge bin shall be emptied when directed by the Owner in order to check material quantities.
- k. Hours of plant operation, whether for storage or direct shipment to the road, shall be limited to reasonable working hours in order that normal inspection of plant operations may be performed.
- l. Bituminous material in a surge silo must be removed on the same day in which it is placed.
- m. Samples of the stored material may be taken following the period of storage.
- n. Material stored will be subject to the temperature, segregation, and laying requirements as required for normal un-stored plant production.
- o. Excessive segregation, lumpiness, or stiffness of the mix shall be sufficient cause for rejection by the Owner.
- p. Surge and storage silos shall be located in a position that enables the top of the truck bed to be visible to the load operator during the loading operation.

I. Spreading and Finishing

1. Unless otherwise specified or permitted, bituminous mixtures shall be and spread on the roadway in ample time to secure thorough compaction during daylight hours. Its temperature at the time of depositing in the paver hopper shall be not more than 25° F less than the temperature at which it is discharged from the mixer. The mixture shall be laid upon an approved surface to which the appropriate tack coat or prime coat has been applied and spread and struck off to the established line, grade, and elevation by means of approved asphalt paving machines in echelon or by one (1) paver when echelon paving is not permitted. Echelon paving will not be permitted on two (2) lane projects where traffic is being maintained. Alignment of the outside edges of the pavement shall be controlled by preset control string lines. Where multicourse pavements are placed, the longitudinal joint in one (1) layer shall offset that in the layer immediately before by approximately one (1) foot; however, the joint in the top layer shall be at the centerline of the pavement if the roadway comprises two (2) lanes of width or at lane lines if the roadway is more than two (2) lanes in width.
2. Automatic screed controls utilizing either the string line or ski type grade reference systems will be required on all work regardless of the paver width. The string line reference system may be required on new construction. In the event the base has been finished with equipment having automatic grade controls or the Contractor demonstrates that an alternate method of spreading and finishing will result in a satisfactory riding surface, the Owner may conditionally waive the string line requirement and authorize use of the ski type reference system. In any event, the Owner may at any time require the use of a string line reference system even though it may have previously been waived, if in his opinion the use of the string line will result in a superior riding surface. Where the ski type system is used, the ski shall have the maximum practical length and in no case shall it be less than forty (40) feet in length. Pavement lanes previously placed with automatic controls or to form grade may serve as longitudinal control reference for laying adjacent lanes by utilizing a ski or joint matching shoe.
3. The string line reference system shall consist of suitable wire or twine supported by approved devices which will be compatible with the type of automatic paver control systems used. The string line and supports shall be capable of maintaining the line and grade designated by the Plans at the point of support while withstanding the tensioning necessary to prevent sag in excess of ¼ inch between supports spaced fifty (50) feet apart. Additional supports shall then be installed to provide a minimum spacing of twenty-five (25) feet, or less, as directed by the Owner and to remove and deviation of the string line from Plan grade.
4. The Owner will furnish sufficient control reference stakes to enable the Contractor to establish the string line reference system. The Contractor shall furnish all materials, equipment, labor, and incidentals required to construct the string line reference system as described herein and shall maintain same until its use is no longer required.

5. The string line reference system shall be complete in place at least 300 feet in advance of the point where the pavement is being place.
6. Automatic screed controls will not be required on sections of projects where service connections and other conditions interfere with their efficient operation.
7. The cost of erecting and maintaining the string line reference system shall be included in the unit price bid for other items of construction.
8. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be taken from the hopper of the spreading machine and shall be distributed immediately into place by means of suitable shovels and other tools and spread with rakes and lutes in a uniformly loose layer of such depth as will result in a completed course having the required thickness.

J. Compaction

1. After the bituminous mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly compacted. The method employed must be approved by the Owner and capable of compacting the mixture to the desired density while it is in a workable condition. When no density requirements are specified, a system of compaction for roadway pavements shall be employed which has previously produced required bituminous pavement densities. A control strip and random density samples may be employed to aid the Owner in evaluating the system.
2. In general, compaction shall be accomplished by the use of a combination of the equipment designated in Specification Section 02710. The following are minimum roller requirements; however, the number of rollers shall be increased if the required results are not being obtained.
 1. For each paver up to sixteen (16) feet wide, two (2) rollers shall be required.
 2. For each paver over sixteen (16) feet wide, three (3) rollers shall be required.
3. The minimum number of rollers listed above may, with the approval of the Owner, be reduced to one roller of either the steel-wheel or vibratory type on the following types of construction:
 1. on shoulder construction
 2. on incidental construction such as bridge approaches, driveways, etc.
 3. on projects containing less than 10,000 square yards of bituminous pavement

4. Unless otherwise directed, rolling shall begin at the low side and proceed longitudinally parallel to the road centerline. When paving in echelon or abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. When paving in echelon, rollers shall not compact within six (6) inches of an edge where an adjacent lane is to be placed. Rollers shall move in a slow uniform speed with the drive wheels nearer the paver and shall be kept as nearly as possible in continuous operation. Rolling shall continue until all roller marks are eliminated.
5. To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. An excess of liquid shall not be used.

K. Density Requirements

1. Asphaltic Concrete Surface Course, Mix No. 1 as specified in Specification Section 02741, shall be compacted to 93 percent of laboratory density as determined by the Marshall Method, 75 blow.
2. Asphaltic Concrete Binder Course (Leveling or Bushing), Mix No. 2 as specified in Specification Section 02741, shall be compacted to 90 percent of maximum theoretical density.
3. Asphaltic Concrete Base (Black Base), as specified in Specification Section 02710, shall be compacted to 90 percent of maximum theoretical density.
4. It is intended that acceptance density testing will be accomplished while the bituminous mixture is hot enough to permit further densification if such is shown to be necessary.
5. If the density does not conform to the requirement stated herein above, the Contractor shall continue his compactive effort until the required density is obtained.
6. Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be compacted thoroughly with hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, a trench roller or cleated compression strips may be used to compact the mix.
7. Any mixture that becomes loose or broken, mixed with dirt, or is in any way defective shall be repaired with rakes and the addition of fresh mix or shall be removed and replaced with fresh mix which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of bituminous material shall be removed and replaced.

L. Density by Control Strips

1. When approved by the Owner, the required density may be determined by the control strip method. The target density obtained by the control strip method shall be used in lieu of theoretical or laboratory densities.
 - a. When this method is used, the density of all paving shall be at least 96 percent of the density obtained on the control strip. Construction of the control strip shall be as follows:
 - a. The base course or other pavement structure course upon which a control strip is constructed shall have been approved by the Owner prior to the construction of the control strip.
 - b. Equipment proposed for use in the compaction of control strips meet the requirements set forth in Specification Section 02710.
 - c. To determine the target density, a control strip shall be constructed at the beginning of work on the pavement course. New control strips shall be required when
 1. a change in the Job Mix Formula is necessary
 2. a change in the source of materials occurs
 3. a change in the material from the source is observed
 4. a change in the paving or rolling equipment occurs
 5. there is reason to believe that the control strip density is not representative of the bituminous mixture being placed
2. With the approval of the Owner, the Contractor may be permitted to construct additional control strips.
3. Each control strip shall be constructed with approved bituminous mixture and shall remain in place as a section of the completed work. Each control strip shall be one paver width wide and have an area of at least 400 square yards and shall be of the depth specified for the pavement structure course concerned.
4. Compaction of the control strip shall commence immediately after placement of the bituminous mixture and be continuous and uniform over the entire control strip.
5. The compaction of the control strip shall be continued until no appreciable increase in density (1.0 lbs/ft³) can be obtained by additional roller coverage.
6. During the rolling process, the density of the control strip will be determined by the Owner from randomly selected tests within the control strip.

M. Surface Requirements

1. The surface shall be tested with a twelve (12) foot steel straightedge, furnished by the Contractor, applied parallel to the centerline of the pavement. The deviation of the surface from the testing edge of the straightedge shall not exceed that specified for the respective types of bituminous construction as follows:
 - a. Surface Courses shall not deviate more than 1/4"
 - b. Base Courses shall not deviate more than 3/8"
2. The Contractor shall be required to repair all straightedge deviations as approved by the City Engineer.
3. The transverse slopes of tilted pavements shall be tested with a string line and string level applied at right angles to the centerline of the pavement and the percent of slope, when computed for the full width of the pavement, shall not deviate more than one-half (1/2) of one percentage point from that specified on the Plans.
4. The crown in crowned pavements shall be tested with a string line applied at right angles to the centerline of the pavement, and the crown shall not deviate more than one-half (1/2) inch from that specified on the Plans.
5. Deviations greater than the specified tolerances shall be corrected by methods best suited for the purpose. Pavement that cannot be corrected to comply with the specified tolerances shall be removed and replaced at the Contractor's expense.

N. Blotting Sand

1. When directed by the Owner in order to control tracking of excess bituminous material from curing of base materials or from application of prime coat, a protective cover of blotting sand shall be spread over the bituminous material at a rate specified by the Owner, but not to exceed ten (10) pounds per square yard. Application of blotting sand shall be considered incidental to the work and no separate payment will be made.

3.04 Construction Requirements For Asphaltic Concrete Base (Black Base)

A. General

1. The general construction requirements for black base shall be as prescribed in the applicable portions of Specification Section 02710.

B. Preparation of Subgrade or Surface

The surface upon which black base is to be placed shall meet the requirements of Specification Section 02335 or 02710, whichever is applicable. Black base shall be placed only upon a surface that is dry and cleaned of all loose particles.

C. Thickness and Surface Requirements

1. Thickness shall be controlled during the spreading operations by frequent measurements taken of the freshly spread mixture to establish a relationship between the uncompacted and compacted material. This thickness shall remain in conformity with that specified on the Plans. The surface of the base shall meet the requirements specified under Specification Section 02710 and when tested in accordance with the provisions of Specification Section 02710, the deviation of the surfaces from the testing edge of the straightedge shall not exceed 3/8 inch.

D. Manhole Adjustments

1. Drainage and sanitary sewer manholes owned by the City shall be adjusted and set at final grade by the Contractor as necessary for compliance with the Plans. Adjustments of City owned manholes shall be as specified in Specification Sections 02530 and other utility structures not owned by the City but within the right-of-way of the Project shall be adjusted as necessary by the owner of such facilities. The Contractor shall be responsible for notifying other owners of any required adjustments and for the accomplishment of that work by the owner of such facilities according to the project schedule.

E. Traffic And Maintenance

1. The Owner will determine when the base has sufficient compaction and has cured sufficiently to allow construction equipment, local traffic, and/or normal traffic on the base.

END OF SECTION

SECTION 02741

ASPHALTIC CONCRETE PAVEMENT

PART 1 – Description

This work shall consist of an asphaltic concrete pavement constructed in one or more layers for surface course(s) and binder course(s). The binder course may also be used as a leveling or bushing course. Binder course shall consist of a hot mixture of aggregate and asphalt prepared in a hot bituminous mixing plant. The binder course shall be constructed on a prepared subgrade, subbase, or base conforming to the lines, grades, thicknesses, and cross-sections shown on the Plans or as directed by the Engineer. The surface course shall consist of an asphaltic concrete pavement composed of a mixture of coarse aggregate, fine aggregate, mineral filler, and asphalt cement, constructed on a prepared roadbed in conformity with the lines, grades, thicknesses, and cross-sections shown on the Plans or directed by the Owner.

PART 2 – Materials And Equipment

2.01 MATERIALS

- A. Asphalt Cement. Asphalt cement shall conform to the requirements of ASSHTO M 226, Table 2, for the grade specified. Unless otherwise directed, asphalt shall be Viscosity Grade AC-20, PG64-22, or PG 64-28. The type and grade of bituminous material may be changed one step by the Engineer during construction, at now change in unit price.
- B. Course Aggregate. Course aggregate (aggregate retained on the No. 4 sieve) shall be crushed stone meeting the quality requirements of ASTM D 692 with the following exceptions:
 - 1. Crushed limestone shall have a sodium sulfate soundness loss not exceeding 9 percent.
 - 2. For Mix No. 1, material retained on the No. 4 sieve shall have a maximum of 20 percent elongated pieces (length greater than five times the average thicknesses).
 - 3. For Mix No. 2, the aggregate shall contain no more than 5 percent soft or nondurable particles.
 - 4. For Mix No. 3, the aggregate shall contain no more than 5 percent soft or nondurable particles.
- C. Fine Aggregate. The fine aggregate shall consist of natural sand consisting of hard, clean, tough grains which will have a maximum loss of 12 percent when subjected to the sodium sulfate soundness test.
- D. Composition of Mixtures

1. Asphaltic Concrete Surface, Mix No. 1, shall be laid in one course to the thickness shown on the Plans.
2. Asphaltic Concrete Binder, Mix No. 2, shall be laid in one or more courses to the thicknesses shown on the Plans. Mix No. 2 may also be used as a leveling course or bushing course.
3. Asphaltic Concrete Binder, Mix No. 3 shall be laid in one or more courses to the thickness shown on the plans.
4. The composition of the mixes shall be as follows:

Sieve Size	Total Percent Passing by Weight		
	Mix No. 1	Mix No. 2	Mix No. 3
2"	100	100	100
1-1/2"	100	100	90 - 100
3/4"	100	100	65 - 90
3/8"	76 - 96	65 - 95	-----
No. 4	51 - 76	45 - 70	30 - 55
No. 8	36 - 60	25 - 50	20 - 45
No. 30	16 - 40	12 - 30	8 - 25
No. 100	3 - 12	2 - 12	2 - 12
No. 200	2 - 8	1 - 6	1 - 6

5. The proportions of the total mixture, in percent by weight, shall be as follows:

Courses	Combined Mineral Asphalt	Aggregate Cement
Mix No. 1, Surface(Limestone)	92.0 - 96.0	4.0 - 8.0
Mix No. 2, Binder	93.0 - 97.5	2.5 - 7.0
Mix No. 3, Binder	93.0 - 97.5	2.5 - 7.0

6. It is the intent of this Section of the Specifications that the above described mixes shall conform to the following mixtures specified in the Tennessee Department of Transportation Standard Specifications for Road and Bridge construction.

Mix No. 1 - Section 411, Asphaltic Concrete Surface (Hot Mix), Aggregate Grading E.
 Mix No. 2 - Section 307, Bituminous Plant Mix Base (Hot Mix), Aggregate Grading C.

Mix No. 3 – Section 307, Bituminous Plant Mix Base (Hot Mix),
Aggregate Grading B.

7. For multiple layer construction, succeeding layers shall not be laid until the previous layer has cooled sufficiently to support the construction equipment
8. When Mix No. 1 is to be used as a surface for traffic lanes, the mineral aggregate shall be composed of not less than 50 percent nor more than 80 percent crushed limestone and not more than 50 percent nor less than 20 percent natural sand. When Mix No. 1 is used for surfacing of shoulders or other non-traffic lane construction, the mineral aggregate may be composed entirely of limestone, including screening and manufactured sand, but in no case shall the mineral aggregate for this construction consist of less than 50 percent limestone. The natural sand shall be so graded that not more than 5 percent will be retained on the No. 4 sieve.

2.02 EQUIPMENT

- A. All equipment necessary for the satisfactory performance of this construction shall be on the Project and approved of before work will be permitted to begin. The equipment shall meet the requirements of Specification Section 02710.

PART 3 – Execution

3.01 General

- A. The general construction requirements for surface and binder courses shall be as prescribed in the applicable portions of Specification Section 02710

3.02 Preparation of Base or Existing Surface

- A. The designated surface upon which asphalt concrete courses are to be placed shall meet the applicable requirements of Specification 02710 and be thoroughly cleaned of all dirt and other foreign or loose matter prior to the application of the Tack Coat or Prime Coat, as specified in TDOT Specification Sections 402 and 403.

3.03 Thickness And Surface Requirements

- A. Thickness shall be controlled during the spreading operations by frequent measurements taken of freshly spread mixture to establish a relationship between the un-compacted and compacted material. This thickness shall remain in conformity with that specified on the Plans. The surface of all courses shall meet the requirements specified under Specification Section 02710 and when tested in

accordance with the provisions of Specification Section 02710 the deviation of the surfaces from the testing edge of the straightedge shall not exceed 1/4 inch for Mix No. 1 or 3/8 inch for Mix No. 2 and Mix No. 3.

3.04 Manhole Adjustments

- A. Drainage and sanitary sewer manholes owned by the City shall be adjusted and set at final grade by the Contractor as necessary for compliance with the Plans. Adjustments of City owned manholes shall be as specified in Section 02530 or 02632 of these Specifications. Manholes, valve boxes, and other utility structures not owned by the City but within the right-of-way of the project shall be adjusted as necessary by the owner of such facilities. The Contractor shall be responsible for notifying other owners of any required adjustments and for the accomplishment of that work by the owner of such facilities according to the project schedule.

3.05 Traffic And Maintenance

- A. The Owner will determine when the surface course has sufficient compaction and has cured sufficiently to allow construction equipment, slow moving local traffic, or normal traffic to use the completed surface.

END OF SECTION

SECTION 03050

PORTLAND CEMENT CONCRETE

Part 1-Description.

The work covered in this section includes the classification, materials, proportioning of materials, equipment, mixing requirements, and testing for Portland Cement Concrete to be used for curbs, curb and gutter, and sidewalks, streets, bridges, and miscellaneous structures.

Part 2 - Materials

2.01. Classes of Portland Cement Concrete. Portland cement concrete used for construction of the various items specified elsewhere in these Specifications shall be classified by usage as follows:

A. Class A.

Class A concrete shall be used as specified for such items as directed by the Engineer and other uses as noted in the Special Provisions.

B. Class AS.

Class AS concrete shall be used for storm and sanitary structures, concrete curb, curb and gutter, valley gutters, sidewalks, ditch paving, and similar structures unless otherwise noted in the Special Provisions.

C. Class B.

Class B concrete shall be used for roadway base, soil cement, and pavement.

D. Class C.

Class C concrete shall be used as specified for such items as concrete cradles, encasements, embankment slope paving at bridge abutments, and other low strength applications.

E. Class P.

Class P concrete shall be used for cast-in-place box culverts and precast and precast-prestressed concrete structures or structural members. High-early-strength concrete shall be as specified in Specification Section 03050 Paragraph 6.05.

2.02 Materials.

A. Portland Cement.

1. Type I or Type I-SM cement shall be used unless otherwise specified. Different types of cement shall not be mixed. Portland Cement shall conform to all requirements of the "Standard Specifications for Portland Cement," AASHTO M 85. M. Specification C150

for Class Type I, except that for high early strength concrete, Type III cement may be used.

B. Fine Aggregate.

1. Fine aggregate for concrete shall consist of sand and shall conform to the following ASSHTO M6 with the following exceptions.

i. General Composition. Concrete sand shall be composed of clean (washed), hard, durable, uncoated grains, free from injurious amounts of clay, dust, soft flaky particles, loam, shale, alkali, organic matter, or other deleterious matter. Fine aggregate shall not contain appreciable materials which have unsatisfactory expansive properties when combined with Portland Cement and water.

ii. Sieve Analysis. Fine aggregate shall be graded within the following limits:

Sieve	% Passing by Weight	
	Min.	Max.
3/8" (9.5mm)	100	---
No. 4 (4.75mm)	95	100
No. 8 (2.36mm)	80	100
No. 16 (1.18mm)	50	90
No. 50 (330um)	5-30	
No. 100 (150um)	0	10
No. 200 (75um)	0	3

Deleterious Substances. The fine aggregate shall not contain more than the following maximum amounts of deleterious substances:

	Max. % of Weight
Clay lumps.	0.5
Coal, lignite, or shale.	0.5
Material passing the No. 200 Sieve.	3.0
Other deleterious substances such as Shale, alkali, mica, coated/grains soft and flaky particles.	3.0

If the fine aggregate is manufactured from limestone or dolomite and if the material finer than the No. 200 sieve consists of dust of fracture, essentially free from clay or shale, this limit may be increased from 3% to 5%

iv. Organic Impurities. Fine aggregate subjected to the colorimetric test as per ASTM C40 for organic impurities and producing a color darker than the standard shall be rejected unless it passes the mortar strength test as specified herein, Organic Impurities ASTM

C40.

C. Coarse Aggregate. Coarse aggregate for concrete shall consist of crushed stone or gravel or crushed or uncrushed gravel and shall conform to the following requirements:

1. Coarse aggregate for Class A, Class B, or Class C concrete shall be furnished in two sizes: Size No. 4 and Size No. 67 as shown hereinafter in the attached Table Coarse Aggregate Gradation Table.

2. The two sizes shall be manufactured, within the specified limits, to produce Size No. 467 when combined in the proper proportions at the batching plant. If the supplier provides a proper stockpile to prevent segregation, then a combined Size No. 467 can be used in lieu of blending Size No. 4 and Size No. 67.

3. Coarse aggregate for Class AS concrete shall be Size No. 57. Only limestone coarse aggregate will be used for Class AS concrete; gravel coarse aggregate will not be permitted.

4. Coarse aggregate for Class P concrete shall be size No. 57 or Size No. 67 as may be specified or directed. Only limestone coarse aggregate shall be used for Class P concrete; gravel coarse aggregate will not be permitted.

5. Coarse aggregate for concrete curbing placed by machine extrusion methods shall be Size No. 57 or Size No. 67.

6. The coarse aggregates shall otherwise conform to the requirements of AASHTO M 80 and ASTM C 33 with the following exceptions and stipulations:

a. Deleterious Substances. The coarse aggregate shall not contain more than the following maximum amounts of deleterious substances:

	<u>Max. % of Weight</u>
Clay lumps	0.25
Material passing No. 200 sieve	1.0
Coal or Lignite	1.0
Other deleterious substances such as	
friable, thin, elongated, or laminated pieces	10.00
Other Local deleterious substances	1.00
Soft or nondurable fragments (fragments which	
Are structurally weak such as shale, soft	
Sandstone, limonite concretions, gypsum,	
Weathered schist, or cemented gravel.	3.0

7. The sum of the above, excepting thin or elongated pieces, shall not exceed 5% by weight.

8. Soundness. When subjected to 5 cycles of the soundness test, as set forth in ASTM C88, the loss in weight of coarse aggregate weighted in accordance with the grading of a sample complying with the grading requirements specified, shall not exceed nine (9) percent for sodium sulfate.
9. Abrasion. The coarse aggregate shall not have an abrasive loss greater than 40% as determined by AASHTO T96.
10. In the case of crushed aggregate, if all the material finer than the 200 mesh sieve consists of the dust of fracture essentially free of clay or shale, Item 4, Maximum Per Cent by Weight, may be increased to 1.5.

COARSE AGGREGATE GRADATION TABLE
Amounts Finer than Each Lab. Sieve (Sq. Opening), %By Weight

SIZE NO.	2"	1-1/2"	1"	3/4"	1/2"	3/8"	NO. 4	NO. 8
4	100	90-100	20-55	0-15	-----	0-5	----	----
467	100	95-100	-----	35-70	-----	10-30	0-5	----
57	-----	100	95-100	----	25-60	----	0-10	0-5
67	----	----	100	90--100	----	20-55	0-10	0-5

- D. Water for Concrete. The water shall be clean and free from objectionable amounts of oil, acid, alkali, organic matter, or other deleterious materials and shall not be used until the source of supply has been approved. If at any time the water from an approved source becomes of unsatisfactory quality or insufficient quantity, the Contractor will be required to provide satisfactory water from another source. Water of questionable quality shall be subject to the acceptance criteria of Table I, as specified in ASHTO T26.
- E. Air-Entraining Admixture. The Contractor shall use a regular Portland Cement with the addition of an air-entraining admixture meeting requirements of AASHTO M 154. Air-entraining admixtures to be used in air-entrained concrete shall be Darex AEA, Neutralized Vinsol Resin, and Protex, or any other air-entraining agent meeting the approval of the Engineer. Air-entraining admixtures shall contain no chlorides. The air-entraining characteristics of the admixture, in suitable proportions in combination with Portland Cement, fine aggregate and water, within the limits of the proportion specified, shall be such that the resulting concrete will have a satisfactory workability, and the total air content shall be as provided below in the following table.

Nominal Max Size of Coarse Aggregate	Total Air Content Percentage by Volume Concrete
3/8 inch	6 to 10
1/2 inch	5 to 9
3/4 inch	4 to 8
1 inch	3 1/2 to 6 1/2
1 1/2 inch	3 to 6
2 inch	2 1/2 to 5 1/2
3inch	1 1/2 to 4 1/2

- F. Chemical Admixtures. Chemical admixtures shall conform to ASTM C494, except TYPE C accelerating admixtures shall contain no chlorides, shall be non-toxic after thirty (30) days, and shall be compatible with air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations.
- G. Pozzolan Admixture. Pozzolan admixture shall conform to the requirements of ASTM C311 and ASTM C618-85 (including Table IA) for either Class C or Class F. Class C fly ash may be used as a replacement for Portland cement if approved in writing by the Owner. The maximum amount of cement being replaced by fly ash shall not exceed 15 percent. When a specific air content has been required and fly ash is being used, the air content shall be tested on each truck load of concrete at the batch plant and the tested value shall be indicated on the ticket.
- H. Fiber-Reinforced Concrete shall conform to ASTM C1116 material requirements and classifications. Concrete containing fibers (steel, glass fibers, or synthetic fibers) shall conform to the manufacturers addition rate and shall be included in the mix design approved by the Engineer. Glass Fiber and synthetic fiber reinforced concrete shall not be used to replace structural reinforcement, and shall be added at the batch plant.

PART 3 – Execution

3.01 Sampling and Testing and Storage of Materials.

- A. Cement. Cement may be accepted on the basis of mill tests and the manufacturer's certification of compliance with the specifications, provided the cement is the product of a mill with a record for production of high quality cement. Certificates of compliance shall be furnished the Engineer by the Contractor, for each lot of cement furnished prior to use of cement in the work. This requirement is applicable to cement for job- mixed, ready-mixed, or transit-mixed concrete. Cement proposed for use where no certificate of compliance is furnished, or where,

in the opinion of the Engineer, the cement furnished under certificate of compliance may have become damaged in transit or deteriorated because of age or improper storage, will be sampled at the mixing site and tested for conformance to the specifications.

1. Cement will be approved for use if it satisfactorily passes the fineness, soundness, and time of set test requirements specified, provided the general run of materials has been satisfactorily meeting the 28-day strength requirements. Any approved cement failing to pass the 28-day strength requirements, if unused, shall be rejected. If, in the judgement of the Engineer, it is considered necessary, other lots of shipments from the same mill may be held for the results of tests before being used.
 2. If cement is supplied from a new source or from a source of unknown quality, it may be held for the results of strength test before being approved.
- B. Fine and Coarse Aggregate. At least two (2) weeks in advance of the beginning of concrete work the Contractor shall submit to an approved materials testing laboratory approximately five hundred pound (500#) (225kg) samples of each concrete aggregate proposed for use unless otherwise waived by the Engineer in writing. All tests which are necessary to determine the compliance of the concrete materials with these specifications shall be performed on these samples. These samples shall also be used by the laboratory as the basis for a concrete mix design. The results of all tests and the concrete mix design shall be submitted to and approved by the City Engineer prior to the start of any concrete work. Standards shall conform to the latest applicable codes. The sampling and testing shall conform to the following standard procedures:
- C. Cement. The Contractor shall provide adequate protection for the cement against dampness. No cement shall be used that has become caked or lumpy. Accepted cement which has been held in storage more than 90 days after shipment from the mill shall be retested, and if failing to meet the requirements specified herein shall be rejected.
1. Accepted cement which has been stored in approved sealed bins at the mill for not more than six (6) months may be used without further testing unless a retest is specifically requested by the Engineer.
- D. Aggregate. Aggregates shall be handled and stored in separate piles at the site in such manner as to avoid a separation of the coarse and fine particles and contamination by foreign materials. Sites for stockpiles shall be prepared and maintained in such a manner as to prevent the mixing of deleterious materials with the aggregate. The Contractor shall deposit material in stockpiles at the batching plant site until the moisture content becomes uniform. Stockpiles shall be built in layers not to exceed three feet (3') (1m) in height, and each layer shall be completed before beginning the next one.

1. Coning or building up stockpiles by depositing the materials in one place will not be permitted. The storing of aggregates in stockpiles, or otherwise, upon the subgrade or shoulders will not be permitted.

3.02 Concrete Mixture Requirements.

- A. The concrete shall meet the following requirements as outlined in the Concrete Classification Table attached to the end of this Section.
 1. If it is found impossible to produce concrete having the required air content with the materials and mixing procedures that are being used, the Contractor shall make such changes in the materials or mixing procedures, or both, as may be necessary to insure full compliance with the requirements of air content in the concrete.
 2. The total weight of aggregates per sack of cement and the relative proportions of coarse and fine aggregate shall be determined by yield tests made during the progress of the work. The Engineer may, at his discretion, adjust the laboratory mix design to obtain the proper yield, and consistency of concrete.
 3. The Contractor shall receive written permission from the Engineer prior to adding Pozzolan admixture to Portland Cement Concrete.
 4. Any combination of aggregates which requires the use of more than six and one-half gallons (6.5g) (25l) of water per sack of cement to produce a workable mixture, with the brand of cement used will be considered as being unsatisfactory, and all such combinations of aggregate will be rejected.
 5. Concrete shall be uniformly plastic, cohesive, and workable. Workable concrete is defined as concrete which can be placed without honeycomb and without voids in the surface. Workability shall be obtained without producing a condition such that free water appears on the surface when finished. The consistency of the mixture shall be that required for the specified conditions and methods of placement; however, the previously determined maximum water cement ratio shall not be exceeded.

3.03 Proportioning of Materials.

All materials shall be separately and accurately measured by weight, and each batch shall be uniform. The coarse and fine aggregates shall be weighed separately. A sack of cement shall weigh ninety-four pounds (94#) (43kg). When bulk cement is used, ninety-four pounds (94#) (43kg) shall be considered as one sack. The Contractor shall furnish and use approved weighing devices, which, in operation, will give the exact quantity of materials required for the class of concrete. When the cement is in contact with the aggregate, it shall not remain more

than forty-five (45) minutes before being deposited into the mixer.

3.04 Measurement of Aggregate.

- A. Where sack cement is used, the quantities of aggregate for each batch shall be exactly sufficient for one or more sacks of cement. No batch requiring a fraction of a sack of cement will be permitted. All measurements shall be by weight, upon approved weighing scales and shall be such as will insure separate and uniform proportions. Scales shall be of either beam or springless dial types, and shall be suitable for supporting the hopper or hoppers. They shall be set accurately in substantial mountings which will insure a permanent spacing of the knife edges under all conditions of loading and use. They shall be so designed and maintained that they will at all times be accurate to within one-half (1/2) of one (1) percent throughout the entire weight range. Clearance shall be provided between the scale parts and the hopper or the bin structure to prevent displacement of the scale parts due to vibrations, accumulations, or any other cause. The value of the minimum gradations on any scale shall not be greater than five pounds (5#) (2.3kg). The weighing beam or dial shall be so placed that it will be in full view of the operator during the operation of the gate which delivers the material to the hopper. Scales shall be protected from air currents that may affect the accuracy of weighing.
- B. Separate hoppers shall be provided for weighing fine and coarse aggregate. They shall be of suitable size and tight enough to hold the aggregate without leakage, and shall be supported entirely upon the scales. Suitable provisions shall be made for removal of overload from the hopper by the operator while he operates the bin gates.
- C. The Contractor shall provide a sufficient number of fifty-pound (50#) (23kg) standard test weights for calibrating the weighing equipment.
- D. The volume of concrete mixed per batch shall not exceed the manufacturer's guaranteed capacity of the mixer.
- E. When the aggregates are delivered to the mixer in trucks, each batch shall be in a separate compartment of the capacity required by the Engineer. Suitable covers shall be provided for the batch compartments of the trucks to protect the cement from the wind. All trucks, truck bodies, bulkheads, and compartments used in proportioning and transporting to the mixer of concrete materials shall be so designed and operated to insure the charging of the mixer, batch by batch, with the proper amounts of each material without overspillage, intermixing of batches or wastage. Any units which, in the opinion of the Engineer, do not operate satisfactorily, shall be removed from the work until properly rebuilt and corrected.

3.05 Mixing Concrete.

- A. Consistency. The quantity of water to be used shall be determined by the Engineer and shall not be varied without his consent. The Contractor shall furnish and use with the mixer an

approved adjustable, water measuring device which will prevent excess water flowing into the mixer, in order that the consistency may be under positive control and that all batches may be of the same consistency.

1. In general, the minimum amount of water shall be used which will produce the required workability. The mortar shall cling to the coarse aggregate and shall show no free water when removed from the mixer.
- B. Mixer. The mixing machine used shall be of an approved type known as a batch mixer, and of a design having a suitable device attached for automatically measuring the proper amount of water accurate to one percent (1%) and for automatically timing each batch of concrete so that all materials will be mixed together for the minimum time required. Such device shall be easily regulated and controlled to meet the variable conditions encountered. If the time device becomes broken or fails to operate, the Contractor will be permitted to continue the balance of the day without the timing device while the same is being repaired, provided that each batch of concrete is mixed two (2) minutes.
1. The normal mixing time for each batch shall be one (1) minute, and the measuring of this period shall begin after all the materials are in the drum. During this mixing period, the drum shall revolve at the speed for which the mixer is designed, but shall make not less than fourteen (14) nor more than twenty (20) revolutions per minute.
 2. No materials for a batch of concrete shall be placed in the drum of the mixer until all of the previous batch has been discharged therefrom. The discharge of water into the drum shall commence with the flow of the aggregates, but shall not be started before the entrance into the drum of part of the aggregates. The discharge of all of the mixing water for any batch shall be completed within ten (10) seconds after all of the aggregates are in the drum. The inside of the drum shall be kept free from hardened concrete.
 3. The use of mixers having a chute delivery will not be permitted except by permission of the Engineer. In all such cases the arrangement of chutes, baffle plates, etc., shall be such as will insure the placing of fresh concrete without segregation.
 4. Ready-mixed concrete from a central mixing plant delivered at the work ready for use, will be permitted, provided the mixture is transported to the job site in an agitating truck having the concrete contained in a revolving drum and provided there is no segregation of the mixture at the point of placing. Ready-mixed concrete from a central batching plant and mixed in transit will be permitted; however, the mixing and transporting equipment will be subject to the special approval of the Engineer. Any ready-mixed concrete shall comply with all of the requirements of these specifications.
 5. The time elapsing from the time the water is added to the mix until the concrete is deposited in place at the site of the Work shall not exceed 30 minutes when hauled in non-agitating

trucks, not 60 minutes when hauled in truck mixers or truck agitators. In addition, the total revolutions at mixing speed shall not be less than 70 nor more than 100. When truck mixers are used on hauls in excess of 1 hour, the cement shall be added at the site of the work. The concrete must be of workable consistency when placed. No mixer which has a capacity of less than a two-sack batch shall be used.

- i. Hand mixing will not be permitted except with the permission of the Engineer and then only in very small quantities or in case of an emergency.
6. Retempering concrete by adding water or by other means will not be permitted; however, a portion of the mixing water may be withheld from transit mixers and added at the work site provided the delivery ticket indicates the amount withheld. The batch shall be mixed for 30 revolutions at mixing speed after adding the water. Water cannot be added to a partial load of concrete mix. Concrete that is not within the specified slump limits at time of placement shall not be used.
7. In using air-entraining admixtures, the mixer shall be equipped with a suitable automatic dispensing device which will proportion the air entraining admixture accurately to each batch of concrete. The device shall be calibrated and adjusted to deliver to each batch of concrete the quantity of admixture required to produce the specified air content in the concrete.
8. The manufacturer of the concrete shall furnish to the purchaser with each batch of concrete before unloading at the site, a delivery ticket. The purchaser shall provide the Engineer with one (1) copy of each delivery ticket.

3.06 Forms.

- A. Forms shall be made of wood or metal. Forms shall be provided with adequate devices for secure setting so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. The top and face of forms shall be cleaned and oiled prior to the placing of concrete.

3.07 Placing Concrete.

- A. The concrete shall be unloaded into an approved spreading device, or deposited on the base, and spread in such a manner as to prevent segregation of the materials. As deposited, the mixture shall be placed where it will require as little rehandling as possible. No concrete shall be placed on frozen grade.
- B. Necessary hand spreading shall be done with shovels or other approved tools. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated in earthen or

other foreign substances.

- C. Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies, by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than 5 seconds in any one location.

3.08 Protection.

- A. It shall be the responsibility of the Contractor to protect from damage all freshly poured concrete regardless of the location or type of structure for a minimum period of seven (7) days or for such longer period as the Engineer may direct. Any concrete which is damaged shall be repaired to the satisfaction of the Engineer prior to acceptance of the completed work.

3.09 Quality Control Testing.

- A. The Owner or Consultant will employ a testing laboratory to perform test and submit test reports. Test reports will be reported in writing to Consultant, Owner, and Contractor as soon as possible upon completion of tests.

- 1. Compressive Strength Tests. Concrete test cylinders will be made by a qualified technician from a certified material testing laboratory.

- 2. The cylinders shall be made and tested in accordance with ASTM C39.

- 2. Tests may be required for each day's run or according to the following schedule:

<u>Total Cubic Yards of Concrete Placed (m³)</u>	<u>Minimum Number of Tests* (3 cylinders each)</u>
0 – 100(0-75)	One for 7 days, two at 28 days
100 – 1000 (75 -750)	One for each 50 cu. Yds. (38m ³)
1000 – 2000 (750 – 1500)	One for each 125 cu. Yds. (100m ³)
2000 and Over (1500)	One for each 175 cu. Yds. (125 m ³) One for each 250 cu. Yds. (200 m ³)

*One test per pour minimum.

- iii. Results of all tests shall be furnished to the Engineer as soon as they are available.

- 2. Slump. Slump test shall be conducted in accordance with ASTM C172. A test shall be performed for each day's pour of each type of concrete and for each set of compressive strength test.

2. Air Content. Air content shall be tested in accordance with ASTM C143 or ASTM C231. Air content test shall be performed for each set of compressive strength tests of each type of air-entrained concrete.

CONCRETE CLASSIFICATION TABLE

Class of Concrete	Min. 28 day Compressive Strength (psi)	Slump in Inches	Min Cement-Sacks//CY (3)		Min Cement-#/CY (3)		Net Water Max. Gal/CY (3)		Net Water Max-#/CY (3)	
			Gravel Course Aggregate	Limestone Course Aggregate	Gravel Course Aggregate	Limestone Course Aggregate	Gravel Course Aggregate	Limestone Course Aggregate	Gravel Course Aggregate	Limestone Course Aggregate
A	3000	3-5	6.0	5.5	564	517	36	33	300	275
AS	4000	3-5	(2)	6.2	(2)	583	(2)	37.2	(2)	310
B	3500(1)	1-2.5	6.2	5.8	583	545	34.1	31.9	284	266
C	2500	2-4	5.0	4.5	470	423	34	30.6	283	255
P	5000	1-3	(2)	7.0	(2)	658	(2)	35	(2)	292

Notes:

- (1) Minimum compressive strength at 14 days. Minimum flexural strength at 14 days of 550 psi per AASHTO T 22
- (2) Gravel Coarse Aggregate not permitted.
- (3) Tabulated values are for Type I cement conforming to the requirement of AASHTO M 85 only.

END OF SECTION

SECTION 02745

FULL DEPTH RECLAMATION (FDR) OF FLEXIBLE PAVEMENT

PART 1 - Description

This work consists of the Full Depth Reclamation (FDR) process to reclaim existing flexible pavement by pulverizing the bituminous asphalt layers, mixing the pulverized material with the existing base and subgrade layers, and adding a specified amount of cement and water to achieve a homogeneous mixture of reclaimed material. The reclaimed material shall be constructed to the lines and grades as specified in the plans and/or as directed by the Engineer

PART 2 – Materials and Equipment

2.01 MATERIALS

Provide materials as specified in:

- Asphalt Concrete PavementSection 02741
- Portland Cement ConcreteSection 03050
- Water.....Section 03050 2.02 D

2.02 EQUIPMENT

A. Cement Spreader

Provide a self-propelled mechanical cement spreader that has an adjustable/metered rate of flow and will uniformly distribute the cement at the required rate. Cement spreader must be equipped with a digitally controlled rate which adjusts for RPM.

B. Mechanical Reclaimer

Provide a self-propelled mechanical reclaimer capable of pulverizing and mixing the existing pavement, base, sub-grade, and cement uniformly. The reclaimer shall be equipped with a reclaiming drum. A soil stabilization drum is unacceptable. Provide a reclaimer that is equipped with a metered water additive system which uniformly adds water in the mixing chamber. Equipment that requires the application of water separate of the mixing operation is not acceptable.

If the depth of reclamation specified in the contract plans exceed the ability to provide a consistent pulverized material, then a milling machine may be used to mill off a portion of the

existing asphalt pavement leaving the gates open so the asphalt material is left in place, as approved in writing by the Engineer.

C. Rollers

Provide a minimum of two rollers having a capacity to compact the reclaimed material to 100% MDD as determined in accordance with AASHTO T 134. Provide suitable compaction equipment as follows:

1. Perform initial compaction of the reclaimed material using a sheepsfoot roller.
2. Perform finish compaction using a pneumatic tire roller.

D. Motor Grader

Provide a motor grader with an electronic grade/slope control system or provide other means to control the roadway profile and slope. Alternate methods shall be approved in writing by the Engineer.

PART 3 - EXECUTION

3.01 Limitations

- A. Only apply cement to reclaimed material that is not frozen, between April 1 through October 31, and when the air temperature in the shade is 35°F and rising. Construction of reclaimed material shall not proceed during periods of high wind, in the rain, when the forecasted chance for rain exceeds 50%, or if the weather forecast predicts freezing temperatures within 7 days of the planned date of application, unless approved by the Engineer.

Limit the application of cement to an area that will allow for continuous completion of the FDR process, clipping, finishing, and final compaction, within 3 hours from the time the cement is applied. Do not leave any uncompacted reclaimed material undisturbed for more than 30 minutes. If the uncompacted reclaimed material is wetted by rain and exceeds the average moisture content above the specified tolerance, reconstruct the entire section.

3.02 Pulverizing

- A. Pulverize the existing pavement structure and uniformly mix with existing base, and/or subgrade to the depth and width specified in the plans such that 100% passes a 3-inch sieve and 95% passes a 2-inch sieve prior to the application of cement. Verify particle size in the presence of the Engineer initially and periodically during the process of work.

3.03 Cement Application, Spreading and Mixing

- A. Uniformly spread the required quantity of cement on the pulverized material and immediately blend the cement until evenly distributed. Thoroughly mix water, cement, and

the pulverized materials until the water and cement are uniformly distributed throughout the reclaimed material. Maintain moisture content in the range of $\pm 2.0\%$ of OMC during final mixing. Measure the moisture content after final mixing and prior to initial compaction using a nuclear gauge by direct transmission method in accordance with AASHTO T 310.

3.04 Initial Compaction

- A. Begin compaction immediately after cement and water has been incorporated and thoroughly blended with the reclaimed material. Compact the reclaimed materials using approved sheepsfoot roller(s) to 100% of MDD specified in the mix design. Maintain the moisture content prior to breakdown rolling in the range of $\pm 2\%$ OMC. If the reclaimed mixture becomes too wet for initial compaction, adjust moisture content as directed by the Engineer. Compact the entire area using uniform passes of compaction equipment as determined from the test strip, ensuring that uniform density is achieved.

3.05 Shaping

- A. After mixing and initial compaction, shape the surface of the reclaimed material to the required lines, grades, and cross-sections using an approved motor grader. If no lines or grades are provided, maintain the existing profile and provide correction to noticeable imperfections and cross slopes as instructed by the Engineer. Sprinkle the surface until it is damp, but not wet, and clip with a motor grader as directed by the Engineer. Dispose of the material removed by clipping. Intermediate and Final Compaction Following shaping, perform intermediate compaction using a pneumatic tire roller and then seal the surface with a self-propelled steel wheel roller in static mode. At no time shall the finish roller be operated in vibratory mode.

The centerline must be maintained with a max crown of 2.0% in each direction. Any materials not used shall be hauled offsite and incidental to the cost of reclamation.

3.06 Construction Joints

- A. At the beginning of each day's construction, form a straight transverse construction joint by cutting back into the previously completed work a minimum of 5 feet to form a true vertical face, free of loose or shattered material. Straightedge the transverse joints using a 12-foot straightedge during final grading.

If longitudinal joints between adjacent stabilization passes are necessary, the joints shall be overlapped 2 to 4 inches in a neat straight line. Pre-determined cut lines shall be marked in a manner visible to the operator. The overlap cut width should be confirmed before starting a new cut sequence.

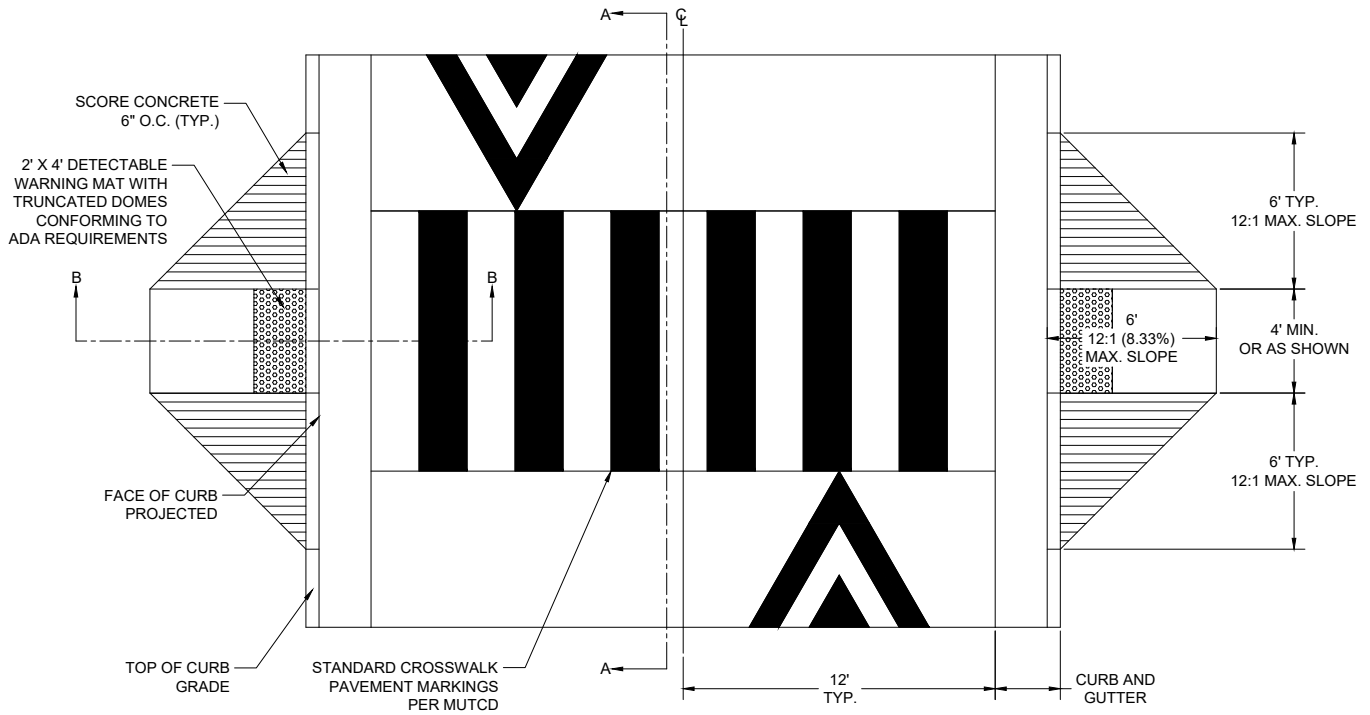
The longitudinal joint shall be offset at least 6 inches with the succeeding layer of HMA or surface treatment.

3.07 Surface Tolerances

- A. After finishing and final compaction of the reclaimed material, test the entire reclaimed surface with a 12-foot straightedge applied parallel to the centerline of the pavement. The deviation of the surface from the testing edge of the straightedge shall not exceed 1/2 inch. Any areas failing to meet the surface tolerances shall be corrected at no additional expense to the City.

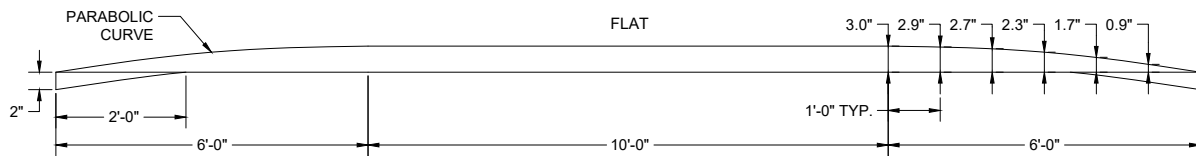
3.08 Curing

- A. The Contractor is required to proof roll the compacted material. The reclaimed mixture should be allowed to cure for the specified time as in the approved full depth reclamation mix design. Curing is the Contractor's responsibility, who should consider all factors, including the weather limitations and restrictions.



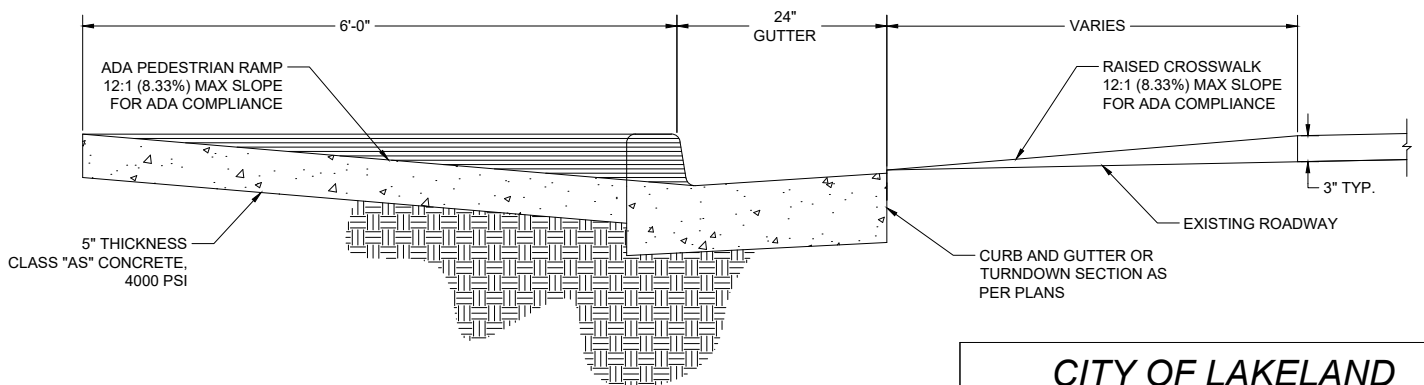
PLAN VIEW

NOT TO SCALE



SECTION A-A

NOT TO SCALE



SECTION B-B

NOT TO SCALE

NOTES:

1. ALL SIGNING AND STRIPING SHALL CONFORM TO THE LATEST EDITION OF THE MUTCD.
2. SEE 6-30 CURB AND GUTTER DETAILS FOR EXPANSION JOINTS INFORMATION.
3. KEEP MIN. 3" FROM CROWN OF EXISTING ROADWAY TO FLAT SECTION OF RAISED CROSSWALK.

CITY OF LAKELAND ENGINEERING DIVISION

TYPICAL RAISED CROSSWALK DETAIL

REV.	DESCRIPTION	DATE
1	ORIGINAL ISSUE	10/2020