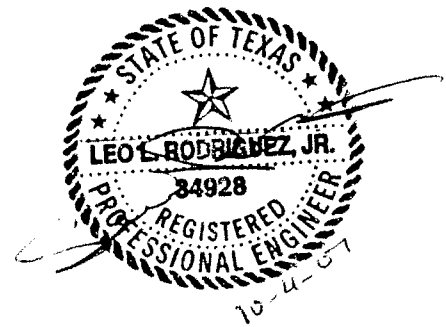


**SPECIFICATIONS
FOR
PRECINCT # 1
STREET PAVING**



**PREPARED BY: RODRIGUEZ ENGINEERING
P.O. BOX 1830
EDINBURG, TEXAS 78540
(956) 491-1013**

SPECIAL CONDITIONS

1. All work shall be barricaded in conformance with TMUTCD. No trenches or excavations may be left open overnight. The traffic control plans are to be used as a guide. The Contractor shall in all cases provide a work area signed and barricaded in conformance with TMUTCD.
2. Any damage to fences, walks, mail boxes or private property shall be repaired by the Contractor at his expense.
3. Contractor must contact all utilities prior to start of work including but no limited to the following:

Central Power and Light	956-686-7453
Southwestern Bell	1-954-4611
Rio Grande Valley Gas	1-800-344-8377
4. Locations of underground facilities are from the best information available. Neither the owner or engineer warrant the accuracy of the information provided. Any deviations shall be called to the engineer's attention immediately.
5. Excavation material shall be used for backfill.
6. Contractor to expose any existing facility that may be in conflict prior to start of construction.
7. All existing utilities shown are from best information available, neither engineer nor the owner take responsibility for accuracy of locations.
8. It shall be the contractor's responsibility to remove all excavated material from the site.
9. Contractor shall at all times allow access to existing driveways.
10. The ROADBOND EN-1 will be used in lieu of Lime and will be furnished by Precinct #1 as well as the MS-1 used to prime the Roadway. However, it will be the Responsibility of the contractor to transport the material. The caliche and asphalt being furnished by Precinct #1 will also be hauled by Precinct #1.
11. The contract will be awarded based on the LABOR ONLY bid proposal. The material and labor bid will be an alternate bid proposal.

PROPOSAL

TO OWNER:

The undersigned, as bidders, declared that the only person or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the form of contract, Notice to Contractors, specifications and the plans thereon referred to, and has carefully examined the locations, and conditions and classes or materials of the proposed work; and agrees that he will provide all the necessary labor, machinery, tools, and apparatus, and other items incidental to construction, and will do all the work and furnish all the materials called for in the contract and specifications in the manner prescribed therein and according to the requirements of the Engineer as therein set forth.

The Bidder shall attach to his bid sheet a list of any exceptions to the specifications.

It is understood that the following quantities of work to be done at unit prices are approximately only and are intended principally to serve as a guide in evaluating bids.

It is further agreed that the quantities of work to be done at unit prices and materials to be furnished, may be increased or diminished as may be considered necessary, in the opinion of the Engineer, to complete the work fully as planned or contemplated, and that all quantities of the work, whether increased or decreased, are to be performed at the unit prices set forth below except as provided for the specifications.

It is further agreed that lump sum prices may be increased to cover additional work ordered by the Engineer, but not shown on the plans or required by the specifications, in accordance with the provisions of the General Conditions. Similarly, they may be decreased to cover deletion of work so ordered.

The bid security accompanying this proposal shall be returned to the bidder, unless in case of the acceptance of the proposal the bidder shall fail to execute a contract and file a performance bond and payment bond within the ten (10) days after its acceptance, in which case the bid security shall become the property of the OWNER, and shall be considered as a payment for damages due to delay and other suffered by the Owner reserves the right to reject any and all bids.

BID PROPOSAL FORM Continued:

BIDDER'S BOND in the amount of \$ 5% in compliance with the INSTRUCTION TO BIDDERS.

The above check or Bidder's Bond is to become the property of THE COUNTY OF HIDALGO in the event the construction contract (when offered by Owner) and bonds are not executed within the time set forth.

**ENGINEER'S ESTIMATE OF QUANTITIES - APPROXIMATE ONLY:
STREET IMPROVEMENTS**

MILE 13 1/2 (From FM 1015 to Mile 6)

BID LABOR ONLY For Items

Shown with an (*) (See ITEM # 10 Under Special Conditions)

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	16,427	\$	\$
(*) 8" Caliche Base	SY	49,280	\$	\$
(*) 2" Hot MIX and MS-1	SY	42,240	\$	\$
(*) EN-1 (Emulsion)	GAL	372	\$	\$
Driveways	LS	49	\$	\$
Bar Ditch Excavation	LF	31,680	\$	\$
Striping	LF	15,840	\$	\$

TOTAL: \$ _____

CONTINUED ON FOLLOWING PAGE:

BID MATERIAL AND LABOR

(ALTERNATE)

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	16,427	\$	\$
8" Caliche Base	SY	49,280	\$	\$
2" Hot Mix (Include Prime)	SY	42,240	\$	\$
EN-1 (Emulsion)	GAL	372	\$	\$
Driveways	LS	49	\$	\$
Bar Ditch Excavation	LF	31,680	\$	\$
Striping	LF	15,840	\$	\$

TOTAL: \$ _____

MILE 5 (From Milano to Midway)

BID LABOR ONLY FOR Items

Shown With An (*) (See ITEM 10 Under Special Conditions)

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	2738	\$	\$
(*) 8" Caliche Base	SY	8213	\$	\$
(*) 2" Hot Mix and MS-1	SY	7040	\$	\$
(*) EN-1 (Emulsion)	GAL	62	\$	\$
Driveways	LS	26	\$	\$
Bar Ditch Excavation	LF	5280	\$	\$
Striping	LF	2640	\$	\$

TOTAL: \$ _____

BID MATERIALS and LABOR
(ALTERNATE)

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	2738	\$	\$
8" Caliche Base	SY	8213	\$	\$
2" Hot Mix (Include Prime)	SY	7040	\$	\$
EN-1 (Emulsion)	GAL	62	\$	\$
Driveways	LS	26	\$	\$
Bar Ditch Excavation	LF	5280	\$	\$
Striping	LF	2640	\$	\$

MILE 12 (From FM 88 to Mile 6)

BID LABOR ONLY

For Items Shown With An (*) (See Item 10 Under Special Conditions)

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	5,476	\$	\$
(*) 8" Caliche Base	SY	16,427	\$	\$
(*) 2" Hot Mix and MS-1	SY	14,080	\$	\$
(*) EN-1 (Emulsion)	GAL	124	\$	\$
Driveways	LS	26	\$	\$
Bar Ditch Excavation	LF	10,560	\$	\$
Striping	LF	5,280	\$	\$

TOTAL: \$ _____

**BID MATERIALS AND LABOR
(ALTERNATE)**

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
Sub-grade Excavation	CY	5476	\$	\$
8" Caliche Base	SY	16,427	\$	\$
2" Hot Mix (Include Prime)	SY	14,080	\$	\$
EN-1 (Emulsion)	GAL	124	\$	\$
Driveways	LS	26	\$	\$
Bar Ditch Excavation	LF	10,560	\$	\$
Striping	LF	5,280	\$	\$

BID PROPOSAL FORM Continued:

Number of working days to complete contract 120.

The undersigned agrees, unless hereinafter stated otherwise to furnish all materials as shown and specified in the Plans and Specifications.

Bidder hereby agrees to commence work under this contract within 10 days after notice to proceed is issued and complete the work within 120 working days, except Saturdays, Sundays and County recognized holidays.

Receipt is acknowledged of the following addendas:

NO. _____ DATED _____ NO. _____ DATED _____

Bidder agrees that the Owner has the right to accept or reject any or all bids and to waive all formalities.

DATE: _____

Respectfully Submitted,

By:

(Signature)

(Type or Print Name)

(Company)

(Address)

(Phone Number)

(Fax Number)

(SEAL - IF BIDDER IS A CORPORATION)

TECHNICAL SPECIFICATIONS

- 02102 CLEARING AND GRUBBING**
- 02225 UNCLASSIFIED STREET EXCAVATION**
- 02601 FLEXIBLE BASE**
- 02612 HOT MIX ASPHALT CONCRETE PAVEMENT**

SECTION 02102

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. Cleaning and grubbing on project site of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter within limits described in specifications or as shown on plans.
- B. Cleaning and grubbing shall be in advance of grading operation except that in cuts over 3 feet in depth, grubbing may be done simultaneously with excavation, provided objectionable matter is removed as specified.
- C. Disposal of all debris resulting from clearing and grubbing work.

1.02 PROTECTION OF ADJACENT WORK:

- A. Protect all areas outside indicated construction areas.
- B. Protect existing improvements, adjacent property, utilities and other facilities, and trees and plants not to be removed from injury or damage.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 CLEARING:

- A. Clear all areas covered by dikes, roads, structures and embankments within project limits unless otherwise shown in plans.
- B. Remove all saplings, brush, down-timber and debris unless shown or directed otherwise.
- C. Use tree wound paint to treat scars, gashes or limb stubs on trees not removed.

3.02 GRUBBING:

- A. Trees, stumps, root systems, rocks and other obstructions shall be removed to the depths shown when they fall within the construction templates for the following items:

- | | |
|--|------------------------------|
| 1. Footings | 18" below bottom of footing |
| 2. Sidewalks (or other types of walks) | 12" below bottom of walk |
| 3. Roadways or Streets | 18" below bottom of subgrade |
| 4. Parking Areas | 18" below bottom of subgrade |
| 5. Grassed Areas | 18" below top soil |
| 6. Fills | 24" below bottom of fill |

B. Blasting not permitted.

3.03 REMOVAL OF DEBRIS AND CLEANUP:

- A. Burn as permitted by regulating agencies or the ENGINEER as work progresses.
- B. Unguarded fires will not be permitted.
- C. Permits will be obtained, where required, for necessary burning or disposal sites.
- D. Dispose of all waste materials not burned by removal from site.
- E. Materials cleared and grubbed shall be the property of the CONTRACTOR and shall be his responsibility for disposal.

PART 4 - MEASUREMENT AND PAYMENT

4.01 CLEARING AND GRUBBING:

- A. Clearing and Grubbing shall be measured for payment either in acres or by lump sum only for areas indicated on the plans, or as provided in the proposal and contract.
- B. When not listed as a separate contract pay item, Clearing and Grubbing shall be considered as incidental work, and the cost thereof shall be included in such contract pay items as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

* * * END OF SECTION * * *

SECTION 02225

UNCLASSIFIED STREET EXCAVATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. Perform all required excavation within the limits of right-of-way and adjacent thereto (except excavations specifically described and provided for elsewhere in the specifications).
- B. Remove, properly use, or dispose of all excavated materials.
- C. Shape and finish all earthwork in conformance with lines and grades as shown on the plans or as specified by the ENGINEER.
- D. Schedule work to avoid property owner inconvenience as practical during construction.
- E. Exercise care in operating applicable equipment beneath or adjacent to trees, sidewalks, poles, and other existing features to prevent damage.
- F. Restore obstructions removed to accommodate construction equipment or to facilitate excavation.

1.02 CLASSIFICATION:

- A. All street excavation shall be unclassified, regardless of material encountered.
- B. Any reference to rock or any other material on the plans, or in these specifications, is not to be construed as classification of the excavation.

PART 2 - PRODUCTS

2.01 SUBGRADE:

- A. Use on-site material moved from cut areas to fill areas as approved by ENGINEER.
- B. Use borrow materials from areas designated as needed.

2.02 DRAINAGE PROVISIONS:

- A. Interruptions of natural surface drainage, or flow of artificial drains shall be mitigated by the CONTRACTOR by use of temporary drainage facilities, as approved by the ENGINEER, to prevent damage to public or private interest.

- B. Restore original drainages as soon as the work shall permit.
- C. The CONTRACTOR shall be held liable for all damages which may result from neglect to provide for either natural or artificial drainage which his work may have interrupted.

PART 3 - EXECUTION

3.01 UNCLASSIFIED STREET EXCAVATION:

- A. Perform all excavation, embankment and grading required for pavement and/or curb and gutter as shown on plans.
- B. Move suitable excavated material to areas requiring fill and place in accordance with these specifications. Determination of suitable material will be made by ENGINEER. Haul unsuitable material to waste sites.
- C. Slope cut or fill sections uniformly from curb line to sidewalk or other controlling feature, as designated by ENGINEER. Smooth bank to provide a neat finished appearance.
- D. Remove and replace unstable soils encountered during grading operations with suitable material. Notify ENGINEER of suspected unsuitable material before commencing removal. Authorized replacement with select material will be paid for by change order.
- E. Replace gravel or rock driveway surfaces disturbed by grading with like material at no additional cost to OWNER.
- F. Strip, salvage and stockpile topsoil in sufficient quantity to allow a uniform 6-inch lift over all disturbed areas not otherwise surfaced. Topsoil is included in unclassified excavation.
- G. Remove existing culvert pipe where shown as part of and incidental to unclassified excavation.

3.02 UNSTABLE OR UNSUITABLE SUBGRADE:

- A. Excavate unstable subgrade at least 2 feet below grade where directed by ENGINEER.
- B. Replace with suitable stable material approved by ENGINEER.
- C. Compact to uniform density in 6-inch lifts.
- D. Density of compacted subgrade to be equal to or greater than adjacent undisturbed grade.
- E. Payment will be as specified for unclassified excavation.
- G. Conduct operations in such a manner such that measurements may be taken before any backfill, as required above, is placed.

3.03 EXCESS OR UNSUITABLE EXCAVATION:

- A. Dispose of excavation in excess of that needed or unsuitable for construction. As directed by the ENGINEER, excess or unsuitable excavation may be used for widening of embankments, or flattening of slopes, or as otherwise specified.
- B. Obtain approval of the ENGINEER as to disposition and method for disposal of excess or unsuitable excavation.

3.04 GENERAL:

- A. Provide all labor, equipment and associated materials to excavate areas specified.

PART 4 - MEASUREMENT AND PAYMENT

4.01 UNCLASSIFIED STREET EXCAVATION:

- A. Unclassified street excavation, as authorized, shall be measured in its original position and the volume determined by the average end area method. All work performed shall be paid for at the contract bid price per cubic yard for unclassified street excavation.
- B. When not listed as a separate contract pay item, unclassified street excavation shall be considered as incidental work, and the cost thereof shall be included in such contract pay items as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required by the work, all in accordance with the plans and these specifications.

* * * END OF SECTION * * *

ITEM 02601

FLEXIBLE BASE

PART I - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.
- B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, iron ore topsoil, shell, or crushed slag.
- C. Flexible base shall be constructed as specified herein in one or more courses in conformance with details, lines and grades shown on the plans, and as established by the ENGINEER.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials for flexible base shall be crushed or uncrushed as necessary to comply with the requirements hereinafter specified.
- B. Materials shall consist of durable course aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

- A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with the provisions of Section 02240.

2.03 TYPES:

- A. Type A - Crushed or broken aggregate (excluding gravel aggregate).
- B. Type B - Gravel Aggregate
- C. Type C - Iron Ore Topsoil
- D. Type D - Shell Aggregate with Sand Admixture
- E. Type E - Shell Aggregate with Sand and Caliche Admixture
- F. Type F - Caliche
- G. Type G - Crushed Slag

H. Unless otherwise noted on the plans, the CONTRACTOR may use any one type of these types, provided the material used meet the requirements set forth in the specification test limits herein.

2.04 GRADES:

- A. Unless otherwise shown on the plans or directed by the ENGINEER, the final course of base material shall consist of Grades 1 or 2 as specified in Table 02601-1.
- B. Base courses or subbase materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.
- C. All Grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02601-1.
- D. Testing of flexible base materials shall be in accordance with the following test procedures:

<u>TEST</u>	<u>TESTING PROCEDURE</u>
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Limit	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Tests	TEX-117-E (Part I or II)

- E. Unless otherwise specified on the plans, samples for testing the material for Soil Constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.
- F. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.

TABLE 02601-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

GRADES

TYPES	Grade 1: (Triaxial class 1 Min. compressive strength, psi: 45 at 0 psi lateral pressure and 175 at 15 psi lateral pressure	Grade 2: (Traxial Class 1 to 2.3) Min. com- pressive strength, psi: 35 at 0 psi lateral pressure and 175 at 15 psi lateral pressure	Grade 3: (Unspecified Tri axial Class)	Grade 4:
TYPE A Crushed or Broken Aggregate (excluding gravel aggregate)	Retained on Sq. Sieve 1-3/4".....0 7/8".....10-35 3/8".....30-50 No. 4.....45-65 No. 40.....70-85 Max LL.....35 Max PI.....10 Wet Ball Mill Max. Amt.....40 Max. Increase in Passing No. 40.....20	Retained on Sq. Sieve 1-3/4".....0-10 No. 4.....45-75 No. 40.....60-85 Max LL.....40 Max PI.....12 Wet Ball Mill Max. Amt.....50 Max. Increase in Passing No. 40.....20	Retained on Sq. Sieve 1-3/4".....0-10 No. 40.....60-85 Max LL.....45 Max PI.....15 Wet Ball Mill Max. Amt.....55 Max. Increase in Passing No. 40.....20	As Shown on Plans
TYPE B Gravel Aggregate		Retained on Sq. Sieve 1-3/4".....0-10 No. 4.....30-75 No. 40.....70-85 Max LL.....35 Max PI.....12	Retained on Sq. Sieve 1-3/4".....0- 5 No. 4.....30-75 No. 40.....65-85 Max LL.....35 Max PI.....12	As Shown On Plans
TYPE C Iron Ore Topsoil		Retained on Sq. Sieve 2-1/2".....0 No. 40.....50-85 Max LL.....35 Max PI.....12	Retained on Sq. Sieve 2-3/4".....0 No. 40.....45-85 Max LL.....35 Max PI.....12	As Shown on Plans

TABLE 02601-1 CONT'D

TYPE D Sand-Shell	Retained on % Sq. Sieve 1-3/4".....0-10 No. 4.....45-65 No. 40.....50-70 Max LL.....35 Max PI.....12	Retained on % Sq. Sieve 1-3/4".....0-10 No. 40.....45-65 Max LL.....35 Max PI.....12	As Shown on Plans
TYPE E Shell with Sand and Caliche	Retained on % Sq. Sieve 1-3/4".....0 No. 40.....45-65 Max LL.....35 Max PI.....10	Retained on % Sq. Sieve 1-3/4".....0 No. 40.....45-65 Max LL.....35 Max PI.....12	As Shown on Plans
TYPE F Caliche	Retained on % Sq. Sieve 1-3/4".....0 No. 4.....45-75 No. 40.....50-85 Max LL.....40 Max PI.....12	Retained on % Sq. Sieve 1-3/4".....0 No. 40.....50-85 Max LL.....40 Max PI.....12	As Shown on Plans
TYPE G Crushed Blast Fur- nace Slag			As Shown on Plans

G. The limits establishing reasonably close conformity with the specified gradation and plasticity index are defined by the following:

1. The ENGINEER may accept the material, providing not more than 2 out of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.
2. The ENGINEER may accept the material providing not more than 2 out of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:

- A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.
- B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stockpile for delivery to the road.
- C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.
- D. If the CONTRACTOR elects to produce the Type a material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the coarse aggregate stockpiles will be retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.
- E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the CONTRACTOR will be required to secure other materials which will meet specification requirements.
- F. The central mixing plant shall be either the batch or continuous flow type, and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.
- G. Mixing shall continue until a uniform mixture is obtained.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

- A. The roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.
- B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.
- C. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material.
- D. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans, and any deviation in excess of 1/2 inch in cross section and in a length of 16-foot measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.
- E. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.
- F. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed on as directed, and any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as directed by the Engineer.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE C, TYPE F, AND TYPE G MATERIAL:

- A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.
- B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered in each 100-foot station.
- C. Material deposited upon the subgrade shall be spread and shaped the same day.
- D. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24-hour period, the materials shall be scarified and spread as directed by the Engineer.
- E. The material shall be sprinkled, if directed, and shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

- F. All areas and "nests" of segregated coarse or fine material shall be corrected to removed and replaced with well graded material, as directed by the ENGINEER.
- G. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplied in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.
- H. The course shall be compacted by the method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.
1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:
 - a) The course shall be sprinkled as required and rolled as directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading and the surface upon completion shall be smooth and in conformity with the typical sections shown on plans and to the established lines and grades.
 - b) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.
 - c) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.
 2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:
 - a) The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".
 - b) In addition to the requirements specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.
 - c) After each section of flexible base is completed, tests as necessary will be made by the ENGINEER. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

- d) Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to the established lines and grades.
 - e) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.
 - f) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.
- I. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete, it shall be recompact and refinished at the sole expense of the CONTRACTOR.
 - J. Where Type C material is used, the material shall be scarified, thoroughly wetted, mixed, manipulated, and bladed so as to secure a uniformly wetted material, and pulled in over the subgrade in courses and set under the action of blading and rolling. The work of mixing, blading, rolling, shaping, and subsequent maintenance shall be performed by the continuous use of sufficient number of satisfactory rollers and power maintainers with adequate scarifier attachments.

3.03 PLACEMENT OF FIRST COURSE - TYPE D MATERIAL:

- A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section, and corrections made if necessary.
- B. All materials shall be delivered in approved vehicles of a uniform capacity.
- C. The required amount of shell shall be uniformly spread across the section and allowed to dry sufficiently to insure proper slaking and mixing of the binder material. Immediately upon completion of the drying period, as determined by the ENGINEER, the specified amount of sand admixture as required to produce a combined material meeting the requirements hereinbefore specified, shall be spread uniformly across the shell.
- D. The material shall then be sprinkled as required and thoroughly mixed by blading and harrowing, or other approved methods.
- E. Failure to proceed with the placing of sand admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

- F. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.
- G. The course shall be compacted by the method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.
1. When the plans indicate that the "Ordinary Compaction" method is to be used, the following provisions shall apply:
 - a) After mixing, all material shall be windrowed, and then spread over the section in layers.
 - b) The layers shall not exceed 2 inches in loose depth.
 - c) If necessary to prevent segregation, the material shall be wetted in the window prior to spreading.
 - d) After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction as directed by the ENGINEER. Succeeding layers shall then be placed similarly until the course is completed.
 - e) All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replaced with well graded material, as directed by the ENGINEER.
 - f) The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured.
 - g) Throughout this entire operation, the shape of the course shall be maintained by blading; and the surface, upon completion, shall be smooth and in conformity with the typical sections shown on plans, and to the established lines and grades.
 - h) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.
 - i) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.
 2. When the plans indicate that the "Density Control" method of compaction is to be used, the compaction method shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

- II. When indicated on the plans or permitted by the ENGINEER, Type D material may be mixed in a central mixing plant and delivered to the road as a combined mixture. When this method is used, the combined mixture shall meet the requirements for type D material as hereinbefore specified and the placing and compaction requirement shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

3.04 PLACEMENT OF FIRST COURSE - TYPE E MATERIAL:

- A. The construction methods for placing the first course of Type E material shall be the same as prescribed for Type D material except that after the shell and sand have been placed, the prescribed amount of caliche shall then be spread across the sand and shell.
- B. The composite mixture shall then be sprinkled as required and thoroughly mixed by blading and harrowing or other approved methods.
- C. Compaction of the first course of Type E material shall be the same as prescribed above for Type D material.
- D. Failure to proceed with placing the sand and caliche admixture or mixing and placing operations will be grounds for the suspension of placing of shell.
- E. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

3.05 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

- A. Construction methods shall be the same as prescribed for the first course.
- B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.06 DENSITY CONTROL:

- A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.
- B. The testing will be as outlined in Test Method Tex-114-E.
- C. It is the intent of this specification to provide in that part of the base included in the top 8 inches immediately below the finished surface of the roadway not less than 100 percent of the density as determined by the compaction ratio method.
- D. Field density determination shall be made in accordance with Test Method Tex-115-E.

3.07 TOLERANCES:

- A. When tolerances are permitted by the plans, the limits establishing reasonable close conformity with percent density specified are defined by the following:
 - 1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

- A. Flexible base will be measured by the square yard of surface area of completed and accepted work based on the width of flexible base as shown on the plans.
 - 1. The flexible base shall be measured for depth by the units of 2000 square yards, with one measurement taken at a location selected by the ENGINEER.
 - 2. In that unit where flexible base is deficient by more than 1/2 inch in thickness, the deficiency shall be corrected by scarifying, adding material as required, reshaping and recompacting by sprinkling and rolling.
 - 3. No additional payment over the contract unit price will be made for any flexible base of a thickness exceeding that required by plans.
- B. The CONTRACTOR shall schedule his operations in such a manner as to facilitate the measurement of the pay item.
- C. The ENGINEER may accept the work provided no more than 2 out of 10 depth tests performed are deficient by not more 1/2 inch and where no two consecutive tests on continuous work are outside the specified depth.

4.02 PAYMENT:

- A. The accepted quantities of flexible base of the type, grade, and compaction method specified will be paid at the contract unit bid price per square yard, complete in place.
- B. Where "Ordinary Compaction" is used, all sprinkling, rolling, and manipulation required will not be paid for directly, but will be incidental to other bid items.

- C. The unit prices bid shall each be full compensation for shaping and fine grading the roadbed; for securing and furnishing all materials, including all royalty and freight involved; for furnishing scales and labor involved in weighing the material when required; for loosening, blasting, excavating, screening, crushing and temporary stockpiling when required; for loading all materials, for all hauling and delivering on the road; for spreading, mixing, blading, dragging, shaping and finishing; and for all manipulation, labor, tools and incidentals necessary to complete the work.

* * * END OF SECTION * * *

SECTION 02612

HOT MIX ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Hot mix asphalt concrete (HMAC) pavement shall consist of a binder course, a leveling up course, a surface course or a combination of the courses as shown on the plans, or as directed by the ENGINEER.
- B. HMAC pavement shall be composed of a compacted mixture of mineral aggregate and asphaltic material, constructed on previously completed and approved subgrade, subbase course, base course, or existing pavement.
- C. HMAC pavement shall be in accordance with the specifications herein and in conformity with the lines, grades, quantities and typical sections in the contract and/or as directed by the ENGINEER.

1.02 QUALITY CONTROL:

- A. HMAC pavement and its constituent part shall conform to the ASTM, AASHTO and/or Texas SDIPT test methods noted below.

PART 2 - PRODUCTS

2.01 ASPHALTIC MATERIALS:

- A. Asphalt cement binders shall be uncracked petroleum asphalts and shall be carefully refined, by steam, vacuum, or solvent, from asphaltic or semi-asphaltic base crude petroleum at a temperature not to exceed 700 degrees F. Asphalt cements shall be free from thermal decomposition products and shall not be blended with any materials which have been subjected to cracking or produced from a crude petroleum source other than that of the original material. The asphalt cement shall not contain residues from non-asphaltic sources. Asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 347 degrees F.
- B. Paving asphalt shall be classified by penetration or viscosity and shall conform to the requirements set forth in one of the following tables as designated by the ENGINEER. The CONTRACTOR may supply asphalt meeting the requirements of one of the following tables provided that he obtains prior approval of the ENGINEER and with the provision that once approval has been obtained, that the CONTRACTOR will remain with that grade throughout the project.

TABLE 02612-1

Specification Designation	AASHTO Test Method	ASTM Test Method	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Flash Point (Open Cup) Min.	T48	D92		450	450	450	425	350
Penetration of Orig. Sample at 77°F	T49	D5	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Thin-Film Oven Loss, Hours at 325°F, % Max	T179	D1754	0.75	0.75	0.75	0.75	1.00	1.00
Test of Residue from Thin-Film Oven Test: % of Orig. Pen., Min.	T49	D5	52	50	50	50	50	50
Ductility at 77°F, cm. after Loss at 325°F, Min.	T51	D113	50	50	100	100	100	100
Solubility in CCl ₄ Min.	T44*	None	99.5	99.5	99.5	99.5	99.5	99.5
Reaction to Spot Test	T102**	None	-0-	-0-	-0-	-0-	-0-	-0-

* Procedure No. 1 with CCl₄ substituted for CS₂.

**Using 85% Standard Naphtha Solvent and 15% xylene.

TABLE 02612-2

TYPE-GRADE	OA-30		OA-175**		OA-400	
	Min.	Max.	Min.	Max.	Min.	Max.
Penetration at 32 F, 200g., 60 sec	15	--	--	--	--	--
Penetration at 77 F, 100g., 5 sec.	25	35	150	200	--	--
Penetration at 115 F, 50g., 5 sec.	--	65	--	--	--	--
Ductility at 77 F, 5 cm/min., cms: Original OA.	2	--	70	--	--	--
Flash Point C.O.C., F	450	--	425	--	425	--
Softening Point, R. & B., F	185	--	95	130	--	--
Thin Film Oven Test, 1/8 in. Film, 50 g., 5 hrs., 325 F, % Loss by wt	--	0.4	--	1.4	--	2.0
Penetration of Residue, at 77 F, 100g., 5 sec. % of Original Pen.	--	--	40	--	--	--
Ductility of Residue at 77 F, 5 cm/min., cms	--	--	100	--	--	--
Solubility in Trichloroethylene, %	99.0	--	99.0	--	99.0	--
Spot Test on Original OA.	Neg.		Neg.		Neg.	
Float Test at 122 F, sec.	--	--	--	--	120	150
Tests on 85 to 115 Pen. Residue* Residue by Wt., %	--	--	--	--	75	--
Ductility, 77 F, 5 cm/min: Original Res., cms	--	--	--	--	100	--
Subjected to Thin Film Test, cms	--	--	--	--	100	--

*Determined by Vacuum Distillation (by evaporation if unable to reduce by vacuum).

**For use with Latex Additive only.

TABLE 02612-3

PROPERTIES	AC-1.5		AC-3		AC-5		AC-10		AC-20		AC-40	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Viscosity, 140F stokes.	150	50	300	100	500	100	1000	200	2000	400	4000	800
Viscosity, 275 F stokes.	0.7	--	1.1	--	1.4	--	1.9	--	2.5	--	3.5	--
Penetration, 77 F, 100 g, 5 sec. . .	250	--	210	--	135	--	85	--	55	--	35	--
Flash Point, C.O.C.,F.	425	--	425	--	425	--	450	--	450	--	450	--
Solubility in trichloroethylene, percent	99.0	--	99.0	--	99.0	--	99.0	--	99.0	--	99.0	--
Tests on residues from thin film oven test:												
Viscosity, 140F stokes.	--	450	--	900	--	1500	--	3000	--	6000	--	12000
Ductility, 77 F, 5 cms per min, cms	100	--	100	--	100	--	70	--	50	--	30	--
Spot test.	Negative for all grades											

C. A minimum of two percent, by weight, latex additive (solids basis) shall be added to the OA-175 Asphalt or to AC-5 Asphalt when specified on the plans or in other specifications in the contract. The latex additive shall be governed by the following specifications:

The latex is to be an anionic emulsion of butadiene-styrene low-temperature copolymer in water, stabilized with fatty-acid soap so as to have good storage stability, and possessing the following properties:

- Monomer ratio, B/S 70/30
- Minimum solids content 67%
- Solids content per gal. @ 67%. 5.3 lbs.
- Coagulum on 80-mesh screen 0.1% max.
- Type Anti-oxidant. staining
- Mooney viscosity of Polymer (M/L 4 @ 212F) . 100 min.
- pH of Latex. 9.4 - 10.5
- Surface tension28-42 dynes/cm²

The finished latex-asphalt blend shall meet the following requirements:

Viscosity at 140 F, stokes 1500 max.
 Ductility at 39.2 F. 1 cm. per min., cm. . . 100 min.

D. Asphalt content shall be within the limits noted below:

Table 02612-4

HMAC Type	Percent of Mixture by Weight	Percent of Mixture by Volume
"A"	3.5 - 7.0	8.0 - 16.0
"B"	3.5 - 7.0	8.0 - 16.0
"C"	3.5 - 7.0	8.0 - 16.0
"D"	4.0 - 8.0	9.0 - 19.0
"F"	3.5 - 6.5	8.0 - 16.0

- E. At the time of delivery of each shipment of asphalt, the vendor supplying the material shall deliver to the purchaser certified copies of the test report which shall indicate the name of the vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, and results of the above-specified tests. The test report shall be certified and signed by an authorized representative of the vendor that the product delivered conforms to the specifications for the type and grade indicated.
- F. Until the certified test reports and samples of the material have been checked by the ENGINEER to determine their conformity with the prescribed requirements, the material to which such report relates and any work in which it may have been incorporated as an integral component will be only tentatively accepted by the City. Final acceptance will be dependent upon the determination of the ENGINEER that the material involved fulfills the requirements prescribed therefor. The certified test reports and the testing required in connection with the reports will be at the expense to the City.
- G. Unless otherwise specified in these specifications or in the Supplementary Specifications, the various grades of paving asphalt shall be applied at a temperature range of from 210°F to 325°F, the exact temperature to be determined by the ENGINEER.
- H. Paving asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the paving asphalt during heating. The CONTRACTOR shall furnish and keep on the site, at all times, an accurate thermometer suitable for determining the temperature of the paving asphalt.
- I. HMAC asphalt shall be the grade having the highest penetration, within specified limits, to produce a mix having a maximum stability of the compacted mixtures.

J. Only one (1) grade of asphalt shall be required unless otherwise shown on the plans or as required by the ENGINEER.

2.02 AGGREGATES:

A. HMAC aggregate will be tested in accordance with the following tests:

AASHTO T-30	Mechanic Testing
AASHTO T-27	Passing No. 200 Sieve
AASHTO T-89	Liquid Limit
AASHTO T-96	Los Angeles Abrasion
AASHTO T-104	Soundness (Magnesium Sulfate)
ASTM C-131	Resistance to Degradation
ASTM C-136	Sieve Analysis
ASTM D-2419	Sand Equivalence Value
SDHPT Tex-106-E	Method of Calculating Plasticity
	Index of Soils
SDHPT Tex-217-F	(I & II) Determination of Deleterious
	Materials and Decantation Test
SDHPT Tex-203-F	Quality Tests for Mineral Aggregates

B. Aggregates shall have an abrasion of not more than 40 for all course except the non-skid surface course, which shall have an abrasion of not more than 35.

C. When properly proportioned, HMAC aggregate shall produce a gradation which will conform to the limitations for classification for HMAC type shown below, or as directed by the ENGINEER.

D. Coarse Aggregate to be crushed Limestone rock, or crushed gravel with limestone filler. (Crushed gravel shall be per Highway Department Specif
 E. Binder Aggregate to be composed of crushed Limestone screenings.

1. Type "A" - Course Graded Base Course

	Percent Aggregate by Weight or Volume
Passing 2" sieve.	100
Passing 1-3/4" sieve.	95 to 100
Passing 1-3/4" sieve, retained on 7/8" sieve.	16 to 42
Passing 7/8" sieve, retained on 3/8" sieve.	16 to 42
Passing 3/8" sieve, retained on No.4 sieve	10 to 26
Passing No.4 sieve, retained on No.10 sieve	5 to 21
Total retained on No.10 sieve	68 to 84
Passing No.10 sieve, retained on No.40 sieve.	5 to 21
Passing No.40 sieve, retained on No.80 sieve.	3 to 16
Passing No.80 sieve, retained on No.200 sieve	2 to 16
Passing No.200 sieve.	1 to 8

2. Type "B" - Fine Graded or Leveling-Up Course

Percent Aggregate by
Weight or Volume

Passing 1" sieve.	100
Passing 7/8" sieve.	95 to 100
Passing 7/8" sieve, retained on 3/8" sieve.	21 to 53
Passing 3/8" sieve, retained on No.4 sieve.	11 to 42
Passing No.4 sieve, retained on No.10 sieve	5 to 26
Total retained on No.10 sieve	58 to 74
Passing No.10 sieve, retained on No.40 sieve.	6 to 32
Passing No.40 sieve, retained on No.80 sieve.	4 to 21
Passing No.80 sieve, retained on No.200 sieve	3 to 21
Passing No.200 sieve.	1 to 8

3. Type "C" - Course Graded Surface Course

Percent Aggregate by
Weight or Volume

Passing 7/8" sieve.	100
Passing 5/8" sieve.	95 to 100
Passing 5/8" sieve, retained on 3/8" sieve.	16 to 42
Passing 3/8" sieve, retained on No. 4 sieve	11 to 37
Passing No.4 sieve, retained on No. 10 sieve.	11 to 32
Total retained on No.10 sieve	54 to 74
Passing No.10 sieve, retained on No.40 sieve.	6 to 32
Passing No.40 sieve, retained on No.80 sieve.	4 to 27
Passing No.80 sieve, retained on No.200 sieve	3 to 27
Passing No.200 sieve.	1 to 8

4. Type "D" - Fine Graded Surface Course

Percent Aggregate by
Weight or Volume

Passing 1/2" sieve.	100
Passing 3/8" sieve.	85 to 100
Passing 3/8" sieve, retained on No.4 sieve.	21 to 53
Passing No.4 sieve, retained on No.10	11 to 32
Total retained on No.10 sieve	54 to 74
Passing No.10 sieve, retained on No.40 sieve.	6 to 32
Passing No.40 sieve, retained on No.80 sieve.	4 to 27
Passing No.80 sieve, retained on No.200 sieve	3 to 27
Passing No.200 sieve.	1 to 8

5. Type "F" - Fine Graded Surface Course

Percent Aggregate by
Weight or Volume

Passing 3/8" sieve.	100
Passing No.4 sieve	95 to 100
Passing No.4 sieve, retained on No.10 sieve	58 to 73
Passing No.10 sieve, retained on No.40 sieve.	6 to 26
Passing No.40 sieve, retained on No.80 sieve.	3 to 13
Passing No.80 sieve, retained on No.200 sieve	2 to 11
Passing No.200 sieve.	1 to 8

2.03 PRIME COAT:

- A. Prime coat, when specified on the plans, or as directed by the ENGINEER, shall be in accordance with Section 02610 - Prime Coat, and as specified herein.
- B. Prime coat shall be applied to surfaces of bases at least 12 hours prior to placing the HMAC unless otherwise directed by the ENGINEER.
- C. Asphalt prime shall be applied uniformly at the rate of 0.10 to 0.30 gallon per square yard or as directed by the ENGINEER. It shall be applied only when permitted by the ENGINEER and when the air temperature is not less than 40°F.
- D. In order to prevent lapping at the junction of two applications, the distributor shall be promptly shut off. A hand spray shall be used to touch up all spots unavoidably missed by the distributor.
- E. Immediately prior to application of the asphalt prime, an inspection will be made by the ENGINEER to verify that the base course has been constructed as specified. Also, all loose and foreign material shall be removed by light sweeping. Material so removed shall not be mixed with cover aggregate.
- F. The surface to be primed shall be in a smooth and well-compacted condition, true to grade and cross section, and free from ruts and inequalities.
- G. The pressure distributor used for applying prime coat material shall be equipped with pneumatic tires and shall be so designed and operated as to distribute the prime material in a uniform spray without atomization, in the amount and between the limits of temperature specified. It shall be equipped with a speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate.
- H. The pressure distributor shall be equipped with a tachometer registering the pump speed, pressure gauge, and a volume gauge. The rates of application shall not vary from the rates specified by the ENGINEER by more than 10%. Suitable means for accuracy indicating at all times the temperatures of the prime material shall be provided. The thermometer well shall be so placed as not to be in contact with a heating tube.
- I. The distributor shall be so designed that the normal width of application shall be not less than 6 feet, with provisions for the application of lesser width when necessary. If provided with heating attachments, the distributor shall be so equipped and operated that the prime material shall be circulated or agitated through the entire heating process.
- J. The asphalt prime coat should preferably be entirely absorbed by the base course and, therefore, require no sand cover. If, however, it has not been completely absorbed prior to the start of

placing the asphalt concrete mixture and in the meantime it is necessary to permit traffic thereon, just sufficient sand shall be spread over the surface to blot up the excess liquid asphalt and prevent picking it up under traffic. Also, sand shall be used in amounts deemed necessary by the ENGINEER at intersections and such areas where traffic may pass over the prime coat. Prior to placing the asphalt concrete, loose or excess sand shall be swept from the base. If a sand cover is specified in the Supplementary Specifications or noted on the plans to cover asphalt prime, it shall be applied within 4 hours after the application of said prime coat, unless otherwise ordered by the ENGINEER.

- K. Liquid asphalt shall be prevented from spraying upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; and other facilities or that portion of the traveled way being used by traffic.
- L. The CONTRACTOR shall protect the prime coat against all damage and markings, both from foot and other traffic. Barricades shall be placed where necessary to protect the prime coat. If, after prime coat has been applied to the satisfaction of the ENGINEER and has been accepted by him, it is distributed by negligence on the part of the CONTRACTOR, it shall be restored at his expense to its condition at the time of acceptance. No material shall be placed until the prime coat is in a condition satisfactory to the ENGINEER.

2.04 TACK COAT:

- A. If the asphalt concrete pavement is being constructed directly upon an existing hard-surfaced pavement, a tack coat shall be evenly and uniformly applied to such existing pavement preceding the placing of the asphalt concrete. The surface shall be free of water, all foreign material, or dust when the tack coat is applied. No greater area shall be treated in any one day than will be covered by the asphalt concrete during the same day. Traffic will not be permitted over tack coating.
- B. Tack coat for HMA shall consist of either rapid curing cut-back asphalt RC-2 diluted by addition of (not to exceed 15 percent by volume) an approved grade of gasoline and/or kerosene; emulsified asphalt, EA-11M diluted with 50 percent water, or a cut-back asphalt made by combining 50 to 70 percent of the asphaltic materials specified for the paving mixture with 30 to 50 percent gasoline and/or kerosene by volume.
- C. Tack coat shall conform to the requirements of Section 02620 Tack Coat, or as specified herein.
- D. Application rate shall be 0.10 to 0.15 gallons per square yard as directed by the ENGINEER.
- E. A similar tack coat shall be applied to the surface of any course if, in the opinion of the ENGINEER, the surface is such that a satisfactory bond cannot be obtained between it and the succeeding course.

- F. When required, the contact surfaces of all cold pavement joints, curbs, gutters, manholes, and the like shall be painted with a tack coat immediately before the adjoining asphalt concrete is placed. Asphalt tack coat shall be applied in controlled amounts as shown on the plans or determined by the ENGINEER. Surfaces where a tack coat is required shall be cleaned to the satisfaction of the ENGINEER before the tack coat is applied.

2.05 MINERAL FILLER:

- A. Mineral filler, other than hydrated lime, shall consist of a thoroughly dry stone dust, portland cement or other mineral dust approved by the ENGINEER.
- B. The mineral filler shall be free from foreign or other deleterious matter.
- C. When tested by the method outlined in SDHPT Test Method Tex-200-F (Part 1 or 3), mineral filler shall meet the following gradations by weight:

Passing No. 30 Sieve	95-100%
Passing No. 80 Sieve	75%
Passing No. 200 Sieve	55%

2.06 HYDRATED LIME:

- A. Hydrated lime shall conform with the requirements of ASTM C-207, Type N.
- B. Hydrated lime shall be furnished in amounts shown on the plans or as directed by the ENGINEER.

2.07 JOB MIX FORMULA:

- A. A job mix formula based on representative samples, including filler if required, shall be determined by the ENGINEER, or submitted by the CONTRACTOR for approval of the ENGINEER.
- B. The resultant job mix formula shall be within the master range for the specified type of HMA.
- C. When lime is added, it shall be included in the gradation for establishing job mix formula.
- D. The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, and a single percentage of bituminous material to be added to the aggregate and shall provide for 3 to 5% air voids in the resultant design mix. During the mix design process the ENGINEER will consider other factors, in addition to air voids and Marshall stability, such as durability, water resistance and asphalt film thickness when developing the mix design.

E. After the job mix formula is established, mixtures for the project shall conform thereto within the following tolerances which may fall outside of the specified master range:

	Percent by Weight or Volume as Applicable
Passing 1-3/4" sieve, retained on 7/8" sieve.	Plus or minus 5
Passing 7/8" sieve, retained on 3/8" sieve.	Plus or minus 5
Passing 5/8" sieve, retained on 3/8" sieve.	Plus or minus 5
Passing 3/8" sieve, retained on No.4 sieve.	Plus or minus 5
Passing No.4 sieve, retained on No.10 sieve	Plus or minus 5
Total retained on No.10 sieve	Plus or minus 5
Passing No.10 sieve, retained on No.40 sieve.	Plus or minus 3
Passing No.40 sieve, retained on No.80 sieve.	Plus or minus 3
Passing No.80 sieve, retained on No.200 sieve	Plus or minus 3
Passing No.200 sieve.	Plus or minus 3
Asphaltic Material.	Plus or minus 0.5 by wt or 1.2 by vol.
Hydrated Lime	Plus or minus 0.3
Mixing Temperature.	Plus or minus 20°F

F. Asphaltic mixtures shall be tested in accordance with SDHPT Test Method Tex-200-4 (Part I or Part III) and shall have the following laboratory values:

	<u>Surface Course</u>	<u>Base Course</u>
Density - Minimum	95%	95%
Maximum	99%	99%
Optimum	97%	97%
Stability (Hveem)		
Minimum	30%	30%
Maximum	45%	45%
Stability (Marshall - 75 Blow Briquette)	1500 lbs.	1500 lbs.
Voids	3 - 7%	4 - 7%
Voids Filled With Asphalt	75 - 85%	65 - 80%
Sand Equivalent	40	40

2.08 EQUIPMENT:

A. All equipment for the handling of all material, mixing, and placing of HMAC shall be in accordance with the provisions of Texas SDHPT Item 340.

2.09 STOCKPILING, STORAGE, PROPORTIONING AND MIXING:

- A. Stockpiling, storage proportioning and mixing operations shall be in accordance with the Provisions of Texas SDHPT Item 340.

PART 3 - EXECUTION

3.01 WEATHER AND TEMPERATURE LIMITATIONS:

- A. Asphaltic mixture, when placed with a spreading and finishing machine, or the tack coat shall not be placed when the air temperature is 50°F and falling, but may be placed when the air temperature is 40°F and rising.
- B. Asphaltic mixture, when placed with a motor grader, shall not be placed when the air temperature is 60°F and falling, but may be placed when the air temperature is 50°F and rising.
- C. Mat thicknesses of 1½ inches or less shall not be placed when the temperature on which the mat is to be laid is below 50°F.
- D. No tack coat or asphaltic mixture shall be placed when the humidity, general weather conditions and temperature and moisture condition of the base, in the opinion of the ENGINEER, are unsuitable.
- E. If, after being discharged from the mixer and prior to placing, the temperature of the asphaltic mixture is 50°F or more below the temperature established by the ENGINEER, all or any part of the load may be rejected and payment will not be made for the rejected material.

3.02 EQUIPMENT:

A. Hauling Equipment:

1. Trucks used for hauling asphaltic mixtures shall have tight, clean, smooth metal beds which have been thinly coated with a minimal amount of paraffin oil, lime slurry, tene solution or other approved material to prevent mixture adhesion to the bed.
2. The dispatching of hauling equipment shall be arranged so that all material delivered may be placed and all rolling completed during daylight hours, unless otherwise directed by the ENGINEER.
3. All trucks shall be equipped with a cover of canvas, or other suitable material to protect the mixture from weather or on hauls where the temperature of the mixture will fall below specified level. Use of covers will be as directed by the ENGINEER.

B. Rollers:

1. Pneumatic Tire Roller. This roller shall consist of not less than seven pneumatic tire wheels, running on axles in such manner that the rear group of tires shall cover the entire gap between adjacent tires of the forward group; mounted in a rigid frame; and provided with a loading platform or body suitable for ballast loading. The front axle shall be attached to the frame in such manner that the roller may be turned within a minimum circle. The tire shall afford surface contact pressures up to 90 pounds per square inch or more. The roller shall be so constructed as to operate in both a forward and a reverse direction with suitable provisions for moistening the surface of the tires while operating; and shall be approved by the ENGINEER.
2. Two Axle Tandem Roller. This roller shall be acceptable power-driven, steel-wheel, tandem roller weighing not less than eight tons. It must operate in forward and reverse directions; contain provision for moistening the surface of the wheels while in motion; and shall be approved by the ENGINEER.
3. Three Wheel Roller. This roller shall be an acceptable power-driven, all steel three wheel roller weighing not less than 10 tons. It must operate in forward and reverse directions; contain provisions for moistening the surface of the wheels while in motion; and shall be approved by the ENGINEER.
4. Vibratory Steel Wheel Roller. If approved for use by the OWNER, this roller shall have a minimum weight of six tons. The compactor shall be equipped with amplitude and frequency controls and shall be specifically designed to compact the material on which it is used. It shall be operated in accordance with the manufacturer's recommendations.

C. StraightEdges:

1. The CONTRACTOR shall provide an acceptable 16-foot straightedges for surface testing. Satisfactory templates shall be provided as required by the ENGINEER.

D. Spreading and Finishing Machine:

1. Bituminous pavers shall be self-contained, power-propelled units, provided with an activated screed or a strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the plans.
2. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. Design will be

such that no part of the truck weight will be supported by the paver.

3. 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 being operated at forward speeds consistent with satisfactory laying of the mixture. The screed shall be adjustable for both height and crown and shall be equipped with a controlled heating device.
4. The bituminous paver shall be equipped with an automatic leveling device controlled from an external guide. The initial pass for each course shall be made using a paver equipped with a 40-foot minimum external reference, except that this requirement will not apply when asphalt concrete is placed adjacent to portland cement concrete pavement. Subsequent passes may utilize the matching device of one foot minimum length riding on the adjacent lay.

3.03 CONSTRUCTION METHODS:

A. Addition of Hydrated Lime:

1. Hydrated lime shall be added to the entire portion of asphalt concrete aggregate in an enclosed plug mill or other methods approved by the ENGINEER.
2. The hydrated lime shall be added to the aggregate such that loss of hydrated lime is minimal or nonexistent. Placement of the lime on an open conveyer belt will not be permitted. Placement of the lime on an enclosed belt that does not permit blowing or loss of lime is acceptable.
3. The CONTRACTOR shall provide appropriate weighing devices, approved by the ENGINEER, to assure that the proportionate amounts of hydrated lime are being added to the coarse aggregate, fine aggregate and filler (if required).
4. The addition of the hydrated lime to the aggregate shall be accomplished by Method A or B as follows:

Method A

The hydrated lime shall be added to the entire aggregate portion prior to stockpiling. The lime, aggregate and moisture will be mixed in a pugmill prior to the aggregate being stockpiled. Twenty-five (25) percent by weight of the hydrated lime shall be added to the coarse aggregate and seventy-five (75) percent by weight of the hydrated lime shall be added to the fine aggregate. If filler is required, the above percentages by weight will be adjusted by the ENGINEER to provide for addition of lime to all aggregate fractions to be incorporated into the PMBP.

Minimum moisture content shall be 2 percent by weight for the coarse aggregate and 4 percent by weight for the fine aggregate, at the time the aggregate and lime are mixed.
OR

5. Method B

Hydrated lime shall be added to the combined aggregate materials in a pugmill immediately after leaving the cold feed and just prior to introduction into the dryer drum or dryer.

6. Minimum moisture content of the combined aggregates shall be 3 percent by weight, at the time the aggregate and lime are mixed.

7. The following parameters are applicable when utilizing Method A or Method B:

a) ENGINEER may increase the moisture content of the coarse and fine aggregates or the combination of coarse and fine aggregates to obtain proper coating of the aggregates with hydrated lime and to eliminate dust pollution. The CONTRACTOR will provide a method to positively determine the amount of moisture added to lime-aggregate mix.

b) The CONTRACTOR shall provide a method for determining the weight of the lime used in the plant mix bituminous pavement. The method to be used will be approved by the Materials Laboratory Bureau prior to the production of any plant mix bituminous pavement.

B. Spreading and Finishing:

1. The asphalt concrete mixture shall be laid on the approved surface, spread and struck off to the grade and elevation established. It shall be spread and compacted in layers as shown on the plans or as directed by the ENGINEER. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

2. The ENGINEER will determine a minimum placement temperature within a range from 220°F to 300°F which will produce the required density. The established placement temperature, which is measured immediately behind the laydown machine, shall not vary more than 20°F.

3. A conventional paver or suitable equipment approved by the ENGINEER may be used to place asphalt concrete material on shoulders depressed from the traveled lanes in order to establish a uniform typical section. Approval of the equipment used will be based upon the results obtained.

4. The asphalt concrete may be dumped from the hauling vehicles directly into the paving machine or it may be dumped upon the surface being paved and subsequently loaded into the paving machine; however, no asphaltic concrete shall be dumped from the hauling vehicles at a distance greater than 250 feet in

front of the paving machine. When asphaltic concrete is dumped first upon the surface being paved, the loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete dumped shall be picked up and loaded into the paving machine.

5. To achieve, as far as practicable, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant. Sufficient hauling equipment shall be available to insure continuous operation.
6. The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other indirectly either through controlling the transverse slope or alternately when directed, by controlling the elevation of each end independently, including any screed attachments used for widening, etc. Failure of the control system to function properly shall be cause for the suspension of the asphaltic concrete operations.
7. When dumping directly into the paving machine from trucks, care shall be taken to avoid jarring the machine or moving it out of alignment.
8. All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the ENGINEER deems the use of self-propelled paving machines impracticable.
9. Self-propelled paving machines shall spread the asphaltic concrete without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the plans. Pavers shall be equipped with hoppers and augers which will place the asphaltic concrete evenly in front of adjustable screeds without segregation. Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the asphaltic concrete and which produces a finished surface of an even and uniform texture for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required.
10. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked, fluted and compacted with hand tools. For such areas the mixture shall be dumped, spread and screed to give the required compacted thickness.

C. Compaction:

1. Rolling with the 3-wheel and tandem roller shall start longitudinally at the sides and proceed toward the center of the

3. Density shall be determined with a portable nuclear test device in conformity with ASTM D-2950.76.
4. Calibration of the portable nuclear device will be established by the ENGINEER from cut pavement samples tested in accordance with AASHTO T-166 (weight, volume method). The density readings of the cut pavement samples determined in accordance with AASHTO T-166 (weight, volume method), and the density readings of the pavement determined by the portable nuclear density test device in conformity with ASTM D 2950 will be correlated by the ENGINEER.
5. Other methods of determining in-place density may be used as deemed necessary by the ENGINEER.
6. It is intended that acceptance density testing will be done while the bituminous mixture is hot enough to permit further compaction if necessary. If the density of an acceptance section does not meet the specified requirements, the CONTRACTOR shall continue the compaction effort until the optimum density is obtained, but rolling for any compactive effort will not be allowed when the temperature of the mix is below 175°F unless authorized in writing by the ENGINEER. Rerolling the paved surface after it has initially cooled will not be allowed.
7. If in-place density tests of the mixture produce a value lower than specified and in the opinion of the ENGINEER is not due to a change in the quality of the material, production may proceed with subsequent changes in the mix and/or construction procedures until in-place density equals or exceeds the specified density.
8. In-place density tests will be provided by the ENGINEER unless otherwise specified.

E. Joints:

1. Placing of the asphalt concrete shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the ENGINEER.
2. When plant mix bituminous pavement is placed over plant mix bituminous treated base or when plant mixed seal coat is placed over plant mix bituminous pavement, longitudinal joints shall be staggered at least 6 inches with relation to the longitudinal joints of the underlying course.
3. Transverse joints shall have a two foot or 12:1 minimum taper. Longitudinal joints shall have a one foot or 6:1 minimum taper. All transverse tapers shall be cut and squared off prior to commencing new work. Tapered longitudinal joints from previous operations shall be cleaned and tack coated if directed by the ENGINEER. All joints shall be completely bonded. The surface of each course at all joints shall be smooth and shall not show any deviations in excess of 3/16 of

an inch when tested with a 10-foot straightedge in any direction.

4. When paving under traffic the CONTRACTOR shall plan his daily surfacing operations on a schedule which will result in not more than one (1) day's operation of exposed longitudinal joints. The longitudinal joints shall not have a height greater than two (2) inches and shall not be left exposed longer than 24 hours.

F. Surface Tolerance:

1. Upon completion, the pavement shall be true to grade and cross section. Except at intersections or any changes of grade, when a 16 foot straight edge is laid on the finished surface parallel to the centerline of the roadway, the surface shall not vary from the edge of the straight edge more than 1/16-inch per foot. Areas that are not within this tolerance shall be brought to grade immediately following the initial rolling. After the completion of final rolling, the smoothness of the course shall be checked, and the irregularities that exceed the specified tolerances or that retain water on the surface shall be corrected by removing the defective work and replacing with new material as directed by the ENGINEER at the expense of the CONTRACTOR.

G. Manholes and Valve Covers:

1. Manhole frames and valve covers shall be adjusted prior to placing the surface course.

H. Compacted Thickness of HMAC Surface and Base Courses:

1. Surface Courses. The compacted thickness or depth of the asphaltic concrete surface course shall be as shown on the plans. Where the plans require a depth or thickness of the surface course greater than two inches compacted depth, same shall be placed in multiple courses of equal depth, each of which shall not exceed two inches compacted depth. If, in the opinion of the ENGINEER, an additional tack coat is considered necessary between any of the multiple courses, it shall be applied at the rate as directed.
2. Base Courses. The compacted thickness or depth of each base course shall be as shown on the plans. Where the plans require a depth or thickness of the course greater than 4 inches, same shall be accomplished by constructing multiple lifts of approximately equal depth, each of which shall not exceed these maximum compacted depths. If, in the opinion of the ENGINEER, an additional tack coat is considered necessary between any of the multiple lifts, it shall be applied as hereinbefore specified and at the rate as directed.

I. Pavement Thickness Tests:

1. Pavement Thickness Test. Upon completion of the work and before final acceptance and final payment shall be made, pavement thickness test shall be made by the ENGINEER or his authorized representative unless otherwise specified in the special provisions or in the plans. The number and location of tests shall be at the discretion of the OWNER. The cost for the initial pavement thickness test shall be at the expense of the ENGINEER. In the event a deficiency in the thickness of pavement is revealed during normal testing operations, subsequent tests necessary to isolate the deficiency shall be at the CONTRACTOR's expense. The cost for the additional coring test shall be at the same rate charged by commercial laboratories.

J. Price Adjustment for Roadway Density:

1. The payment of the unit price will be adjusted for roadway density as outlined in the following table. The adjustment will be applied on a lot by lot basis for each lift. The adjustment will be based on the average of five density tests. The price adjustment will be applied to the entire asphalt concrete mix which includes the HMAC aggregate, the asphalt cement and the lime.

Average Density % of Lab Density	Percent of Contract Price To Be Paid
Above 96%	100%
95.0 to 95.99	96%
94.0 to 94.99	91%
93.0 to 93.99	85%
Less than 93.00	*

*This lot shall be removed and replaced to meet specification requirements as ordered by the ENGINEER. In lieu thereof, the CONTRACTOR and the ENGINEER may agree in writing that for practical purposes, the lot shall not be removed and will be paid for at 50% of the contract price.

PART 4 - MEASUREMENT AND PAYMENT

4.01 INCIDENTAL WORK:

- A. Prime coat, lime, and tack coat shall not be measured for direct payment, but shall be considered as subsidiary work pertaining to the placing of asphaltic mixtures of the type specified.

4.02 MEASUREMENT:

- A. Hot-mix asphalt concrete material shall be measured by the ton of 2,000 pounds or by the square yard of the type or types used in the completed and accepted work.

- B. Weight shall be determined by a certified scale approved by the OWNER and recorded serially numbered weight tickets, identifying the vehicle and presented to the ENGINEER's representative on the job.

4.03 PAYMENT:

- A. Work performed and materials furnished, as prescribed by this item, measured as provided herein, shall be paid at the unit bid price per ton or square yard for the type or types of hot mix asphalt concrete pavement shown on the proposal.
- B. Unit bid price shall be payment in full for quarrying; furnishing all materials; for all heating; mixing; hauling; cleaning existing base course or pavement; placing asphaltic mixtures; rolling and finishing; and for all labor, tools, equipment and incidentals necessary to complete the work, including the work and materials involved in the application of prime coat and tack coat.

* * * END OF SECTION * * *