SECTION 02512

PLANT MIX PAVEMENTS

PART 1 GENERAL

1.01 SUMMARY

A. This section consists of general requirements that are applicable to all types of bituminous pavements of the plant mix type irrespective of gradation of aggregate, kind, and amount of bituminous material or pavement use. Deviations from these general requirements shall be indicated in the specific requirements for each type.

B. This section consists of one (1) or more courses of bituminous mixture constructed on the prepared foundation in accordance with these specifications and the specific requirements of the type under contract, and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown on the plans or established by ENGINEER.

1.02 RELATED WORK

A. Section 02190 - Aggregates.

B. Section 02514 - Crack Sealing of Asphalt Pavements.

C. Section 02515 - Asphalt Patching.

D. Section 02545 - Bituminous Materials.

E. Section 02551 - Tack Coat.

F. Section 02552 - Seal Coat.

1.03 REFERENCES

A. ASTM C150: Standard Specification for Portland Cement.

B. AASHTO M303: Lime for Asphalt Mixtures.

C. AASHTO T283: Resistance of Compacted Asphalt Mixtures to Moisture Induced Damage.

D. Asphalt Institute MS-2: Mix Design Methods for Asphalt Concrete.

E. ASTM D140: Standard Practice for Sampling Bituminous Materials.

F. ASTM D979: Standard Practice for Sampling Bituminous Paving Mixtures.

G. ASTM C1097: Standard Specification for Hydrated Lime for Use in Asphalt Cement or Bituminous Pavements.

H. ASTM D1188: Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.

I. ASTM D1559: Standard Test Method for Resistance of Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

J. ASTM D2041: Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

K. ASTM D2726: Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

L. ASTM D2950: Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Method.

M. ASTM D3665: Standard Practice for Random Sampling of Construction Materials.

N. ASTM D4125: Standard Test Method for Asphalt Content of Bituminous Mixtures by the Nuclear Method.

O. ASTM D5361: Standard Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing.

P. ASTM D5444: Standard Test Method for Mechanical Size Analysis of Extracted Aggregate.

Q. ASTM D6307: Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method.

1.04 SUBMITTALS

A. ~~CONTRACTOR shall submit for ENGINEER's approval a job-mix formula for each mixture to be utilized for the project fourteen (14) days prior to the use in the work. An annual~~ Mix design shall be submitted to the ENGINEER for approval. ~~prior to April 15th.~~ The job-mix formula *(JMF)* with the allowable tolerances shall be within the master range specified. The job-mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size and a single mixing temperature. *Mix designs shall be updated on an annual basis by mix verification tests performed by an independent testing laboratory. Mix verification tests shall include a laboratory batched verification point at optimal oil content and aggregate blend of the previously approved mix design. The mix verification will be approved if:*

1. Do not furnish mix with virgin aggregate fractions that exceed the wide band limits or the tolerance ranges from the target JMF, in accordance with the following table:

Passing #4 and Larger Sieves	*± 5%*
Passing #8 Sieve	*± 4%*
Passing #30 Sieve	*± 3%*
Passing #200 Sieve	*± 2%*

~~*Using the same virgin aggregate source as the approved mix design and JMF is within three (3) percent for the No. 8 and larger seives and two (2) percent for the sieves smaller than the No. 8 of the approved mix design.*~~

2. The maximum theoretical unit weight must be within two (2) pounds per cubic foot of the previously approved mix design.

Should a change in material be made, a new job-mix formula shall be approved before the new material is used. When unsatisfactory results or other conditions make it necessary, ENGINEER may approve a new job-mix formula.

B. Mixing plant scales shall be checked as often as deemed necessary by the ENGINEER to assure their continued accuracy. CONTRACTOR shall have on hand not less than ten (10) fifty (50) pound weights for checking of the scales.

C. Mix designs shall be submitted for review to the ENGINEER a

minimum of fourteen (14) days prior to anticipated use in the work.

D. During production for CITY roadways with 500 tons or greater daily, the following shall be submitted to the CITY Construction Division on a daily basis:

1. Gradation Verification

~~1~~2. Copy of asphalt heat chart.

~~2~~3. Copy of total day's production quantities for the mix.

~~3~~4. Records of tank stabs and asphaltic concrete manifests throughout production period for CITY mix.

~~4~~5. Lime weights and manifests shall be provided.

~~5~~6. Manifests for liquid anti-strip shall be provided.

E. During production for CITY roadways with less than five hundred (500) tons daily, excluding patching, a gradation and asphalt binder content by tank stabs shall be submitted to the ENGINEER.

1.05 DEFINITIONS

A. Plant mix pavement is considered a surface course in all cases.

B. Plant mix bituminous base is considered a subsurface course.

PART 2 PRODUCTS

2.01 MATERIALS

A. BITUMINOUS MATERIALS

1. The percentage of bituminous material to be added to the job-mix formula shall be designated by mix design.

2. The type and grade of bituminous material shall be PG 64-22 unless otherwise shown on the plans or as approved by the ENGINEER.

3. The bituminous material shall meet the applicable requirements of SECTION 02545, BITUMINOUS

MATERIALS.

B. AGGREGATE MATERIALS

1. Aggregates shall meet the applicable requirements of SECTION 02190, AGGREGATES.

2. During crushing operations, the coarse and fine aggregates shall be stockpiled in separate piles in such manner that they can later be combined to meet the required specifications.

3. Stockpiled material shall meet the requirements of SECTION 02190, AGGREGATES.

4. Natural filler, when required, shall be stockpiled separately. The plans may limit or prohibit the use of crusher rejects or material from the same source as the aggregate material.

C. COMMERCIAL ADDITIVES

1. The type of commercial additive to be used will either be designated on the plans, or when no specific type is designated, any of the commercial additives conforming to either of the following requirements may be used:

a. HYDRATED LIME - Hydrated lime shall conform to the requirements of ASTM C1097, except that not less than ninety-three (93) percent of the hydrated lime shall consist of calcium and magnesium oxides. A minimum of one and one-half (1.5) percent hydrated lime shall be used in all plant mix pavements. Hydrated lime and water shall be mixed with the aggregate prior to entering the dryer. Payment shall be subsidiary to the pavement and not by the ton. The rate of application shall be one and one-half (1.5) percent and must achieve a minimum Tensile Strength Retained (TSR) of 75%.

b. LIQUID ANTI-STRIP AGENTS - Liquid anti-strip agents may be used provided the anti-strip agent is thermally stable and compatible with the asphalt binder. The liquid anti-strip shall be applied at the rate required to achieve a minimum TSR of 80%.

D. COMPOSITION OF MIXTURES

1. The bituminous plant mix shall be composed of a mixture of aggregate, natural filler or commercial additive, if required, and bituminous material. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resultant composite blend meets the job-mix formula. The suggested job mix formula may require adjustments due to variation in aggregate, gradation, or other actual field conditions encountered.

2. Do not furnish mix with virgin aggregate fractions that exceed the wide band limits or the tolerance ranges from the target JMF, in accordance with the following table:

Passing #4 and Larger Sieves	± 5%
Passing #8 Sieve	± 4%
Passing #30 Sieve	± 3%
Passing #200 Sieve	± 2%
Bituminous Material	± 0.25%
Mixing Temperature	± 20°F

a. The physical properties of the mix design and plant mix product during production shall meet or fall within the following mixture properties:

Voids, Total Mix	3-5%
Voids in mineral aggregate	13% - 16%
Stability (lbs)	2000 Minimum (50 Blows) 2500 Minimum (75 Blows)
Flow, (0.01in.)	8-18
Tensile Strength Retained (AASHTO T283)	75 % Minimum w/ Lime Additive 80% Minimum w/Liquid Anti-Strip Agent
Film Thickness Aggregate/Lime	~~8-10~~ ~~6~~*8-12* Microns
Moisture Content % Minimum	*4.0*

b. Asphalt Binder Content will be determined on 500 tons or more by determining asphalt binder used as a percentage of plant mix produced. The binder's weight (mass) will be determined from delivery

invoices and the quantity of material remaining in the storage tank at the end of a day's production. The calculation to determine content will include all material used during the day's production of plant mix, including asphalt binder and plant mix not incorporated into the project.

c. If the oil content is between ± 0.25% and ± 0.5%, of the approved mix design, the plant will be shut down and plant will be recalibrated before production is resumed. A letter will be sent to the project engineer explaining correction. If the oil content exceeds ± 0.5% based on tank stabs on production tons of 500 tons or more, asphalt paving will be removed and replaced.

3. When a recycled plant mix is specified, use RAP for at least ten (10) percent of the total aggregate. The amount of RAP may be increased or decreased up to ten (10) percent (by weight of total aggregate) from the amount specified. Adjustment of the percent of RAP may result in an adjustment of the virgin aggregate gradation.

4. In general, the point of acceptance for the aggregate shall be after the material has passed through the gradation unit and prior to the addition of bituminous material. If this point of acceptance proves unsatisfactory, an alternate point of acceptance may be selected by ENGINEER.

PART 3 EXECUTION

3.01 PREPARATION

A. CONDITIONING OF EXISTING SURFACE

1. Irregular surfaces of existing pavements or bases shall be brought to uniform grade and cross section as directed.

B. PREPARATION OF BITUMINOUS MATERIAL

1. The bituminous material shall be heated to the specified temperature in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform temperature at all times and in conformance with SECTION 02545, BITUMINOUS MATERIALS.

C. PREPARATION OF AGGREGATE

1. The aggregates for the mixture shall be dried and heated to the required temperature. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate or coating the aggregate with soot, oil, or other contaminants. Burner fuels may be specified by ENGINEER in the Special Provisions.

D. MIXING

1. 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.

2. For hot mix bituminous pavement, the mixture shall be produced at the lowest possible temperature that will produce a workable mix within the application temperatures specified under SECTION 02545, BITUMINOUS MATERIALS. The bituminous material and aggregate shall be introduced into the mixer within the specified temperature range and shall be within 25°F of each other.

E. BITUMINOUS MIXING PLANT - GENERAL

1. Sufficient storage space shall be provided for each size of aggregate, and the different aggregate sizes shall be kept separated until they have been delivered to the cold elevator feeding the dryer.

2. Plants used for preparation of bituminous mixtures shall conform to all requirements under subsection 3.01(F) below. In addition, dryer-drum mixers shall conform to the requirements under subsection 3.01(H) herein.

3. Mixing plants shall be of sufficient capacity and coordinated to adequately handle the proposed bituminous construction.

F. REQUIREMENTS FOR ALL PLANTS

1. Scales shall be accurate to one-half (½) percent of the

maximum load that may be required. Poises shall be designed to be secured in any position to prevent inadvertent change of position. CONTRACTOR may provide an approved automatic printer system which will print the weights of the material delivered, provided the system is used in conjunction with an approved automatic batching and mixing control system. Such weights shall be evidenced by a weigh ticket for each load.

2. Tanks for the storage of bituminous material shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by steam coils, electricity, or other approved means so that no flame shall be in contact with the tank. Provision shall be made for measuring and sampling storage tanks.

3. The plant shall be provided with accurate mechanical means for uniformly feeding the aggregate into the dryer so that uniform production and uniform temperature will be obtained.

4. The plant shall include a dryer or dryers which continuously agitate the aggregate during the heating and drying process. For cold-type bituminous mix, equipment for mechanical cooling of the dried aggregate to the temperature prescribed for cold mixtures shall be provided and shall be capable of supplying prepared material for the mixer to operate at full capacity.

5. The plant shall include storage bins of sufficient capacity to supply the mixer when it is operating at full capacity. Bins shall be arranged to assure separate and adequate storage of appropriate fractions of the mineral aggregates. Separate dry storage shall be provided for commercial additives when used, and the plant shall be equipped to feed such material into the mixer. Each bin shall be provided with overflow pipes of such size and at such location as to prevent backing up of material into other compartments or bins.

6. The plant shall be equipped with suitable sampling devices or facilities to insure representative samples. If ENGINEER is unable to obtain samples which represent the material being accepted for incorporation into the project, CONTRACTOR shall make necessary adjustments or revisions to the plant before any further mixing is done.

7. Satisfactory means, either by weighing, metering or tank stabs, shall be provided to obtain the proper amount of bituminous material in the mix. The accuracy of bituminous content measured either by weighing, metering or tank stabs, may be checked by computing the daily yield of total material being processed.

8. Thermometric Equipment:

   a. An armored thermometer of adequate range in temperature reading shall be fixed in the bituminous feed line at a suitable location near the charging valve at the mixer unit.

   b. The plant shall also be equipped with an approved temperature recording device so placed at the discharge chute of the dryer as to register automatically or indicate the temperature of the heated aggregates or plant mix. The printed temperature recordings shall be furnished to ENGINEER after each day's run.

9. The bituminous mixture shall be weighed on approved scales. Such scales shall be inspected as often as ENGINEER deems necessary to assure their accuracy.

G. REQUIREMENTS FOR DRYER-DRUM MIXER

1. The plant shall be equipped to control aggregate gradation as described for cold feed control. The total cold aggregate feed shall be weighed continuously by an approved belt scale. When tested for accuracy, the weighing system shall register within $\pm$ 0.5%.

2. An automatic digital record of the dry aggregate and the asphalt shall be displayed, recorded and totaled in appropriate units of weight and time. A positive interlock shall be provided between the dry weight of the aggregate and the bituminous material. The flow of the bituminous material shall be adjusted to compensate for the changes in the dry weight of the aggregate.

3. The dryer-drum mixer shall be capable of drying and heating the aggregate to the moisture and temperature requirements. A uniform mixture of aggregates and

bituminous material shall be produced. The plant shall have a temperature recording device at the discharge chute of the dryer.

H. REQUIREMENTS FOR ADDING HYDRATED LIME

1. Provide a mechanical mixing device that creates a uniform and homogeneous mixture with all aggregate particles coated with hydrated lime as approved by the ENGINEER.

2. Equip the mixing plant with facilities to weigh check samples and to calibrate gate openings and metering devices. Equip with weighing or metering devices (such as a vane feeder with a calibrated revolution counter) to determine the rate of hydrated lime introduced into the aggregate while the plant is in full operation. Do not use belt scales.

3. Use a spray bar or other approved method to wet the aggregate uniformly. Equip the plant with devices that meter the water and hydrated lime into the mixer. Interlock and synchronize the metering devices and feeders to maintain a constant rate of hydrated lime and water to the aggregate.

4. To control the daily quantity of hydrated lime added to the aggregate and to facilitate calibration of the metering devices, place the bulk storage container from which hydrated lime is metered on scales or equip with load cells to enable the accurate measurement of the remaining weight [mass] in the container at the end of each day. Do not use strain gages.

5. Use a pug mill with a mixing chamber to mix the hydrated lime and water with the aggregate. Keep the materials in the chamber until obtaining a uniform and homogeneous mixture of lime, water, and aggregate. Do not use devices that allow the materials to drop directly through the mixture paddles.

6. Locate the pug mill to allow inspection of the mixture during mixing and after discharge from the mixer. Make the belt from the pug mill to the dryer accessible for sampling. Provide a template of the belt for taking a sample to determine moisture content. Moisture shall be 4% minimum or as determined by ENGINEER.

7. *Mix the hydrated lime and water with the aggregate before they enter the dryer.*

3.02 APPLICATION

A. The temperature of the mixture prior to lay down shall not be more than 25°F less than the mixing temperature.

B. Plant mix wearing course shall be placed between the dates of April 15th and November 15th unless otherwise specified by ENGINEER.

C. Bituminous plant mix shall not be placed on any wet pavement surface; when the atmospheric temperatures are less than those specified in the following table; or, when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures:

	Minimum Ambient Temperature and Rising (°F)	
COMPACTED THICKNESS	**SURFACE COURSE**	**SUBSURFACE COURSE**
Less than 1"	60	55
1" - 2"	40	40
> 2"	40	35

D. Spot leveling or the bottom lift of a leveling course may be placed at 50°F if additional courses are placed on the same contract.

E. HAULING EQUIPMENT

1. Trucks used for hauling bituminous mixtures shall have tight, clean, metal beds which have been thinly coated with a minimum amount of paraffin oil or other approved material to prevent the mixture from adhering to the beds. This material shall not be used in amounts which will contaminate the mixture.

F. SPREADING AND FINISHING

1. The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

2. When the total compacted thickness of the mat is to be in excess of three (3) inches, it shall be placed in two (2) or more lifts. The compacted thickness of any one (1) lift in multiple-lift construction shall not exceed three (3) inches.

3. Except on tapers, narrow median areas, shoulders, and other such areas of irregular shape, limited length or restrictive width, or such other areas as directed, the paver screed shall be controlled by the automatic screed control described under subsection 3.02(G) herein.

4. CONTRACTOR shall furnish, place, and maintain such materials, devices, and equipment as may be required to provide specified independent line and grade control references and other controls which may be required for proper execution of the work.

5. Line and grade control for use with automatic paver control systems shall be an independent control reference consisting of:

    a. A tightly stretched wire or string line offset and paralleling true line for pavement edge and established grade for pavement surface; or

    b. A floating beam of not less than twenty (20) feet in length attached to the paver and riding on previously placed base or pavement material. The beam shall be equipped with a floating string or other device that will actuate the automatic screed control in reference to the base on which it is riding. Unless otherwise permitted by ENGINEER, the first ribbon of the first course of pavement material shall be controlled by the independent control wire. Subsequent ribbons may be controlled by the beam reference system; or

    c. Non-contact electronic sensors may be used.

6. The longitudinal joint in one (1) layer shall offset that in the layer immediately below, by at least six (6) inches. The longitudinal joints in the top lift need to coincide with the centerline and/or planned lane lines of the roadway unless otherwise shown in the plans or approved by the engineer.

7. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked and luted by hand tools. For such areas the mixture shall be dumped, spread, and screeded to give the required compacted thickness.

G. BITUMINOUS PAVERS

1. Bituminous pavers shall be self-contained, power-propelled units, provided with an activated screed or strikeoff assembly, heated, 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. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of bituminous plant mix material in widths 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.

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

4. Pavers shall be equipped with a paver control system which will automatically control the laying of the mixture to specified transverse slope and established longitudinal grade. The paver control system shall be automatically actuated from an independent line and grade control reference and through a system of mechanical sensors and sensor directed devices which shall maintain the paver screed at the proper transverse slope and at proper height to establish the top surface of the finally compacted mixture at specified slope and grade. In case of failure of the control system, the paver shall be operated by mechanical control only until the material under production at the time of breakdown is laid.

5. The paver shall be capable of being operated, when laying mixtures, at forward speeds consistent with satisfactory laying of the mixture.

H. ROLLERS

1. All 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. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment which results in excessive crushing of the aggregate will not be permitted.

2. The pneumatic-tired roller shall be self propelled with a total weight, including ballast, not greater than thirty (30) tons. The roller shall be constructed so contact pressure may be varied between forty (40) psi and ninety (90) psi. Each roller shall be equipped with not less than seven (7) wheels with tires of equal size and ply and having a smooth tread design. The wheels shall be staggered on the front and rear axles to provide complete coverage, have a system for uniformly moistening each wheel without an excess of water, and have close-fitting scrapers for each wheel. The tire pressures shall not vary by more than five (5) psi between individual tires from the designated pressure.

I. COMPACTION

1. Immediately after the bituminous mixture has been spread and struck off and the surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. Rolling shall be continued while the mixture is in a workable condition until all roller marks are eliminated and, unless otherwise designated on the plans, until a minimum of the required density (see table below), as established by test results as determined by an approved laboratory, has been obtained. Samples shall be taken in accordance with ASTM D5361, or density shall be determined by the use of properly calibrated nuclear density gauge.

TABLE OF MINIMUM DENSITY REQUIREMENTS

New construction inside city right-of-way.	92% of theoretical maximum density as established by ASTM D2041.
Construction outside the city right-of-way (patching, parking lots).	94% of maximum density as established by ASTM D1559.

Patching inside city right-of-way.	94% of maximum density as established by ASTM D1559.
Overlays.	Density requirement shall be achieved when a determined number of passes of a steel wheel roller establishes the compaction of the mix no longer increases as determined by use of a nuclear density gauge.

2. The number, weight, and type of rollers furnished shall be sufficient to obtain the required compaction without undue displacement, cracking, or shoving.

3. When the pavement is placed by machines in echelon or abutted against a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. On superelevated curves, the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centerline.

4. Any displacement occurring as a result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture when required. Care should be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture.

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. Excess liquid shall not be permitted.

6. Along forms, curbs, headers, walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or mechanical tampers. On depressed areas, a trench roller may be used, or cleated compression strips may be used under the roller to transmit compression to the depressed area.

7. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture, 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.

J. JOINTS

1. Placing of the bituminous paving shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by ENGINEER. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. When directed by ENGINEER, a brush of bituminous material shall be used on contact surfaces of transverse joints just before additional mixture is placed against the previously rolled material.

3.03 PROTECTION

A. During any delays or suspensions of work, as outlined in the Contract Documents, CONTRACTOR shall be responsible for maintaining the quality of all leveling courses until the placement of additional courses. Maintenance of leveling courses because of delays or suspension of work shall be done at CONTRACTOR's expense unless otherwise specified in the Contract Documents.

3.04 QUALITY CONTROL

A. The surface shall be tested by ENGINEER using an approved a ten (10) foot straightedge provided by the CONTRACTOR at selected locations. The variation of the surface from the testing edge of the straightedge between any two (2) contacts with the surface shall at no point exceed one-quarter (¼) inch. All humps or depressions exceeding the specified tolerance shall be corrected by removing defective work and replacing it with new material, or as directed.

B. CONTRACTOR shall perform gradation verification testing every one thousand (1,000) tons of material produced. Particle size analysis sample to be taken at the hot mix plant from the cold feed belt.

C. Minimum compaction of the mat shall be in accordance with the table indicated in Section 3.02.I.1 as established by ASTM D2041 or ASTM D6926 and D2726. Density shall be determined by coring in accordance with ASTM D5361 and compaction verified by ASTM D1188 or ASTM D2726. The rate of testing shall be every five hundred (500) tons or every three hundred (300) linear

feet of street ~~or patch~~. The use of a nuclear density gauge, per ASTM D2950, is acceptable for quality control ~~not~~ and acceptance. To use for quality control and acceptance, a nuclear density gauge must be correlated by coring and must be based on a minimum of seven (7) cores. Samples for determining maximum density shall be taken in accordance with ASTM D979. Testing will be paid by for the CONTRACTOR.

D. Testing for moisture after pug mill shall be once per day when producing for CITY roads.

PART 4 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.01 METHOD OF MEASUREMENT

A. Plant mix bituminous pavement shall be measured by the ton.

B. Weigh tickets shall be issued for each load either by an automatic printer system as described under subsection 3.01(F) herein, or by a weighman. In the case of a nonautomatic plant, an inspector may be assigned to check the scales and metering devices during the batching process.

C. No deduction shall be made for the weight of bituminous material in the mixture.

D. When specified in the contract as pay items, the quantity of bituminous materials and commercial additive shall be the number of tons of each used in the accepted work.

4.02 BASIS OF PAYMENT

A. All work performed and measured as prescribed above shall be paid for as provided in the respective sections for each type specified.

B. Work prescribed in subsection 3.01(A) herein shall be paid for at the contract unit prices for the material used. Payment shall be made under:

Pay Item	Pay Unit
Plant Mix Bituminous Base	Ton or Sq. Yd.
Plant Mix Bituminous Pavement	Ton or Sq. Yd.
Plant Mix Wearing Course	Ton or Sq. Yd.
Leveling Course	Ton

END OF SECTION