



Legislation Text

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AN ORDINANCE ESTABLISHING STANDARDS FOR STREETS AND STORM SEWER CONSTRUCTION WITHIN THE AREA AND JURISDICTION OF THE CITY OF JONESBORO, ARKANSAS, INCLUDING AND COVERING DESIGN, MATERIALS, CONSTRUCTION METHODS AND APPROVALS OF STREETS WITHIN THE JURISDICTION OF JONESBORO, ARKANSAS (NOTE: THIS ORDINANCE WAS AMENDED BY ORD-88:1340 ON SEPTEMBER 19, 1988)

BE IT ORDAINED by the City Council of the City of Jonesboro, Arkansas:

Section 1: BASIS OF DESIGN_

A: CLASSIFICATION: Streets shall be placed under (4) classifications as follows:

1. Major Highways - As determined by the City Planning Commission, after consultation with State Highway Department and Jonesboro City Council.
2. Internal Major Streets - As determined by the City Planning Commission and the City Council.
3. Collector Streets - A street which carries traffic from the minor streets to the major system or arterial streets and highways including the principal entrance streets of a residential development and streets for circulation within such a development.
4. Residential Streets - Streets not expected to carry any heavy traffic as necessary to provide everyday ingress, egress and service to residential of area served.

B: THICKNESS REQUIREMENT FOR RIGID PAVEMENTS: Thickness of all rigid concrete pavements for all street classes 1 through 4 may be determined from soil tests as run as run by a reputable testing laboratory; however no soil test will be required unless in the opinion of the City Engineer the sub-grade modulus is less than (100). All concrete used must be of, a mixture resulting in a minimum of (3,000) pounds per square inch compressive strength, in (28) days and said concrete must be poured with a slump not to exceed five inches. Unless otherwise required by City Engineer rigid pavement thickness shall be based on the following standards as herein established:

Classification of Streets	Thickness
1	Arkansas State Highway Specifications
2	7 Inches
3	6 Inches
4	5 Inches (Permitted after submittal and approval by City Engineer of proper soil test and design.)

A sub-grade for rigid pavement construction shall be scarified as instructed, and compacted to the required grade and section. After required grading and compaction, sub-grade must be inspected by City Engineer and any unsatisfactory sub-grade material, on direction of the City Engineer must be removed and replaced with satisfactory material. In the event of any questionable soil conditions the City Engineer may require reinforcement as needed.

C: THICKNESS REQUIRMENTS FOR FLEXIBLE PAVEMENTS: Thickness requirements for all flexible pavements for classes 1 through 4 may be determined by soil rests as run by a reputable testing laboratory. Standard pavement as outlined in these specifications shall be defined as, asphalted concrete hot mix wearing surface on a compacted crushed stone or a compacted gravel base course. All types of flexible pavements including soil cement stabilization with asphalted concrete surfacing shall be permitted when in the opinion of the City Engineer, the plans and specifications and construction will result in a pavement of equal or

greater stability. Flexible pavement street design thickness shall meet the following requirements as herein established and shown in the table following:

Classification	Base	Pavement Thickness
1	As Per State Highway Specifications	
2	10 Inches	3 Inches
3	8 Inches	2 ½ Inches
4	6 Inches	1 ½ Inches

No soil test will be required unless in the opinion of the City Engineer the soil conditions are not applicable to the herein specified thickness table.

D: GENERAL REQUIREMENTS FOR STORM SEWERS: The capacity of all sewers shall be determined by using a rational approach, giving due consideration to rainfall intensity, soil characteristics, proper run-off coefficients, slope, and the hydraulic properties of the pipe used. Interceptors should be placed at intervals not to exceed six hundred (600) linear feet, except under special conditions as approved by the City Engineer. The designed rainfall intensity shall be based on four inches (4) per hour except in new subdivisions, where the rainfall intensity shall be based on a time of concentration of at least once in ten (10) year expectance as determined from local rainfall records. The minimum design velocity shall not be less than two and one-half feet (2 ½ ') per second. The maximum design velocity should not exceed ten feet (10') per second.

Section 2: APPROVAL OF PLAN AND SPECIFICATIONS

A: SPECIFICATIONS: Specifications shall be defined as collectively all of the terms and stipulations contained in the written portion of information furnished. Two (2) complete sets of specifications shall be submitted to the City Engineer by the Owner's Engineer or developer or Owner (hereinafter referred to as "engineer") prior to receiving contractor's bids on the proposed improvements. The main body of the specifications shall include such information and requirements as is necessary to produce and define a first-class, workmanlike job. Attached to each of the two (2) copies of the specifications submitted shall be the soil analysis report of a reputable testing laboratory, if applicable.

B: PLAN: The plan shall be defined as collectively all of the drawings pertaining to the contract and made a part thereof, and also such supplementary drawings as the engineer may issue from time to time in order to clarify the drawings, or for the purpose of showing changes in the work, or for showing details not previously shown. Two (2) sets of complete plans shall be submitted to the City Engineer prior to receiving contractors' bids on the proposed improvements. The plan shall show the plan, profile, and cross section of the proposed improvement, and shall specifically show, by dimensions, alignment, and right-of-way widths, the gradient and vertical curve data, and shall indicate drainage structures as to location, size, material, and gradients.

Section 3: MATERIALS AND METHODS FOR CONSTRUCTING RIGID PAVEMENTS

A: MATERIALS:

1. PORTLAND CEMENT CONCRETE FOR RIGID PAVEMENTS, DRIVEWAY APORNS AND STRUCTURES: Portland Cement Concrete shall have a minimum compressive strength of three thousand (3000) pounds per square inch in twenty eight (28) days, and its maximum slump when placed shall not exceed four inches (4"). Concrete shall be mixed in accordance with current ASTM requirements.
 - (1) CEMENT: Portland cement shall conform to current American Society for Testing Materials (A.S.T.M.) standards.
 - (2) FINE AGGREGATE: Sand shall be clean, sound, properly graded, and free from organic materials that might seriously reduce the strength of the concrete. Sand shall be uniformly graded from one hundred per cent (100%) passing the three eights inch (3/8") sieve to not more than eight per cent (8%) passing the No. 100 sieve. Sands containing at least twelve per cent

(12%) to fifteen percent (15%) passing the No.50 sieve are preferred. Fine aggregate consisting of cubical particles is desired, and will produce concrete of the required workability.

(3) COARSE AGGREGATE: Aggregate shall be of hard, durable rock or gravel, and shall be free from shale, chert, or organic material. Rock shall conform to A.S.T.M. Designation 2, and gravel shall conform to A.S.T.M. Designation D289. Coarse aggregate consisting of rounded or cubicles particles is preferred. The gradation shall be uniform, between the limits of one and one-half inch (1 ½) and one-fourth inch (1/4) size particles. In no case shall the maximum size aggregate exceed one-third (1/3) of the design depth of the pavement.

(4) WATER: Water to be used shall be potable, i.e., drinkable and shall be clean and free from oils, salts, and other injurious substances.

2. REINFORCEMENT: All reinforcing shall meet current American Association of State Highway Officials (A.A.S.H.O.) specifications for welded steel wire fabric, billet steel bars, rail steel bars, or axle steel bars, all for concrete reinforcement. Deformed bars shall comply with current A.A.S.H.O. Designation M-137.

a. LOAD TRANSMISSION CONNECTORS; “Starlug” load transmission connectors or equal are permissible.

3. JOINT FILLER: Joint filler shall consist of pre-molded, poured, deformed metal plates, or structural grade redwood planks.

a. PRE-MOLDED JOINT FILLER: Pre-molded joint filler shall be of the non-extruding type, shall be from three-fourths inch (3/4”) to one and one-half inches (1 ½”) inches thick, and shall be of the same height as the slab in which it is placed.

b. POURED JOINT FILLER: Poured joint filler shall be bituminous material of any approved type, conforming to A.A.S.H.O. Designation M-18 or rubber-base compound conforming to Federal Specification SS -F336, or asphalt with mineral filler as defined by special provision 701 Arkansas State Highway Department.

c. DEFORMED METAL PLATE JOINTS: Deformed metal plate joints shall be of an approved type.

d. REDWOOD PLANK JOINT FILLER: Structural grade redwood planks shall be used as joint filler when load transmission connectors are utilized in making transverse joints. The planks shall be three fourths inch (3/4”) thick and shall have a minimum width of one-half (1/2”) less than the slab thickness at any point. Joint filler shall be poured into the one-half inch (1/2”) recess.

4. CURING COMPOUNDS: Curing compounds may include such materials as silicate of soda, calcium chloride, or any of several other curing compounds approved by the City Engineer. While clear curing membranes with a fugitive dye is acceptable, the white pigmented curing membrane is preferred.

B: METHODS

1. PLACING REINFORCING: All pavements in Classes 1 and 2 may be reinforced with #3 deformed bars at twenty-four inch (24”) centers both directions. Welded wire mesh may be used as an alternate if an equal of steel is installed. Mats of reinforcement shall be lapped twelve inches (12”). Slab reinforcement should be placed about two inches (2”) below the finished surface of the pavement unless otherwise directed by the engineer. Reinforcement may be required in all classes as directed by the City Engineer.

2. JOINTS:

a. TRAVERSE JOINTS: Traverse joints fall into two (2) general classes: expansion joints and contraction joints, and shall be of the type and dimensions shown on the approved plan, and shall be constructed perpendicular and at right angles to the center-line of the pavement.

(1) EXPANSION JOINTS: Maximum spacing shall be sixty feet (60’) center to center as nearly as is practical. All edges shall be tooled and rounded. When dowel bars are used, they shall be placed at one-half (1/2) of the slab depth and a line through the horizontal axis shall be parallel to the surface of the slab. One end of all dowels on a common side of the joint shall be greased

and fitted with an expansion cap. When load transmission connectors are used, greasing may be dispensed with.

- (2) **CONTRACTION JOINTS:** Contraction joints shall be spaced at a maximum of twenty feet (20") when crushed stone is used in the mixture. The maximum of fifteen feet (15') spacing shall be used when gravel is used. All contraction joints shall be cut to a minimum of twenty percent (20%) of the total thickness of the slab including sawed joints.
 - b. **EXPANSION JOINTS OTHER THAN TRANSVERSE:** Expansion joints shall be formed about all features projecting through or into the pavement, such as poles, hydrants, manholes, and storm sewer appurtenances, and shall be formed between the pavement slab and existing curbs, buildings, or other structures. Unless otherwise designated, such joints shall be constructed one-half inch (1/2") in width and may be of either pre-molded or poured type.
 - c. **LONGITUDINAL JOINTS:** Longitudinal joints shall be placed perpendicular and parallel to the center-line of the pavement and shall be keyed in multi-lane pavement. Longitudinal joints shall be free or tied, as determined by the engineer.
3. **FORMS:** Forms shall be of steel and/or of wood, two inches (2") thick, dressed on the top and inside. Battered, bent, twisted or broken forms shall not be used. All forms used shall be cleared and oiled before concrete is placed against them, and when staked and placed, shall have rigid, tight connections at the joints.
 4. **PLACING OF CONCRETE:**
 - a. **POURING:** No pouring of concrete on any street shall begin with out notifying the City Engineer at least twelve (12) hours prior to beginning operations. If the City Engineer does not inspect the base with in the said 12 hour period, the base shall be deemed approved. Concrete shall not be placed until the sub-grade has been checked and accepted by the Engineer. All forms shall be set and securely staked to the lines and grades established by the Engineer. The concrete shall be deposited on a thoroughly wetted sub-grade in such a manner as to minimize re-handling, and shall be deposited in one course. Spading or vibrating shall be required adjacent to all forms and joints. Placing shall be a continuous operation without bulkheads as nearly as is practical. Concreting operations will not be permitted when a descending air temperature falls below forty degrees Fahrenheit (40°F.) nor resumed until an ascending air temperature reaches thirty-five degrees Fahrenheit (35°F.) The City will not accept any pavement which has been damaged by frost. Under no circumstances shall be placing of concrete on a frozen sub-grade be permitted.
 - b. **SCREEDING:** Screeding, spreading, and finishing machines shall be preferred. If the scope of the work does not permit the use of this machine the following procedure shall be followed. After the concrete has been deposited, it shall be approximately leveled and struck off to such depth below the finish grade as required to place reinforcing mats or wire mesh, and shall be properly consolidated prior to placing the reinforcing mats or mesh, when applicable, as the case may be. Additional concrete shall be deposited and struck off to a depth above the finish grade that when properly consolidated, the surface shall conform to the line and grade desired. The strike-off board shall be straight, free from warp, and shod on the striking surface with a street strip, and shall be shaped to the required curvature and crown. The strike-off board shall be moved forward with a combined longitudinal and transverse motion and without raising either and above the side forms during the strike-off process. A slight excess of material must be kept in front of the cutting edge at all times. The entire area of the pavement shall be tamped in such a manner as to secure maximum compaction and to reduce voids to a minimum.
 - c. **INTEGRAL CURB:** The cross-section of the integral curb shall conform to the City's standard, and the concrete mix used shall be the same as that used in the concrete pavement, and shall be poured as one course construction, with special attention being given to spading and tamping, to

insure adequate compaction and surfaces free from honeycomb. All integral curb sections shall make allowance for driveway opening in accordance with City standards. The concrete for integral curb may be left high on the outside form by a notch in the screed, or it may be carried back from the pavers after the pavement surface has been struck off. The integral curb shall be shaped by a "mule" or by a straight-edge guided by temples of proper shape, temporarily inserted in the concrete at regular intervals. Joint spacing shall be the same as required in the pavement. The final finish shall match the texture of the adjoining pavement. Designed low points and flat grades shall be checked by pouring a small amount of water into the gutter at some distance from the inlet before final finishing operations are completed.

- d. STRAIGHT-EDGE TESTING AND LONGITUDINAL FLOATING: Immediately following screeding and compaction operations, the slab surface shall be tested for trueness with a straight-edge. Any depressions found shall be filled with freshly mixed concrete, struck off, consolidated, and refinished. Longitudinal floating shall be done in conjunction with checking with the straight-edge. The float shall not be less than twelve inches (12") in length, and from eight inches (8") to ten inches (10") in width, and shall be properly stiffened to prevent flexibility and warping. The straight-edge testing and floating operation shall continue until the entire surface is found to be free from observable departures from the straight-edge, and until the surface of the slab has the required grade and contour.
 - e. The pavement shall be finished by two applications of belting or floating and a final finish of brooming. Forms shall not be removed for at least twelve (12) hours after placing of concrete. All, holes void, or honeycomb, shall be moistened and filled with 1:2 mortar and floated smooth.
5. CURING: As soon as the pavement has been finished and has attained sufficient set to prevent marring the surface, it shall be cured by an approved, moist curing method or by spraying with an approved compound. Extreme care shall be exercised during the early curing period to prevent extreme reductions in the surface temperature of the slab. No edge of the slab shall be exposed to the air during the curing period. The length of the curing period depends upon the rate at which the concrete hardens, normally from three (3) to ten (10) days.
 6. OPENING TO TRAFFIC: The normal period of time for keeping the pavement closed to traffic shall be fourteen days (14). This period may be shortened subject to the result of suitable tests to determine the quality and strength of the concrete, and only then with the consent of the City Engineer, and in no case shall pavement be opened before the longitudinal and transverse joints are properly poured and the pavement cleaned of all foreign substances. The City Traffic Engineer shall be notified at least seven (7) days in advance of opening any pavement to traffic.

C: TESTS AND INSPECTION:

1. TEST OF CONCRETE: Tests as outlined in this section shall be made during and after paving is completed in order to determine consistency, air content, strength, thickness, and surface variations for each strength of concrete placed. All tests except slump and air content tests when they are performed by the engineer shall be made by a reputable testing laboratory and shall be at the contractor's expense. Results shall be mailed directly to the engineer or owner or developer and the City Engineer by the laboratory.
 - a. SLUMP TESTS: Slump shall be checked to test the consistency of the mix by the method described in A.S.T.M. Standard C143.
 - b. AIR CONTENT: Air content may be determined by any of the following A.S.T.M. methods: Air Content Designations C138, C173, and C231.
 - c. STRENGTH TESTS: Flexural strength of concrete shall be determined in accordance with A.S.T.M.

Standard method test, Designations C31 and C78. When compressive test cylinders are required, they shall be taken in accordance with A.S.T.M. Designation C31. Three (3) test cylinders shall be taken for each days' run, one of which shall be broken at seven (7) days and two (2) of which shall be broken at twenty eight (28) days.

2. FINAL INSPECTION: Prior to final inspection, the contractor shall be required to make a general clean-up of the construction area. The pavement, curbs, and all appurtenances shall be properly backfilled, and shall be clean and free from fractures, spalling, or defects. Providing all construction meets the requirements of the City, a letter of approval of construction shall be written by the City Engineer.

Section 4: MATERIALS AND METHODS FOR CONSTRUCTING FLEXIBLE PAVEMENTS:

A: MATERIALS:

1. PORTLAND CEMENT CONCRETE FOR CURB AND GUTTER: The concrete mix used shall meet the requirements specified in Section 3, "Materials and Methods for Constructing Rigid Pavements."
2. BASE COURSE MATERIAL: Base course material shall be composed of crusher run, and shall conform to the current Arkansas State Highway Specifications, Base Course Material Designation GM-2. Base Course material may also be uncrushed base gravel containing no more than 5% exceeding two (2) inches in size.
3. BITUMINOUS MATERIAL FROM PRIME COAT: Prime coat shall be MC-O or MC-1 asphalt or asphalt emulsion unless otherwise specified by City Engineer and shall be applied in the quantities as specified for each individual project.
4. ASPHALT CONCRETE HOT MIX WEARING SURFACAE: Asphalt concrete hot mix wearing surface shall be composed of a compacted mixture of mineral aggregate and asphalt cement, and shall be the product of an approved mixing plant of the separate weight batch type or continuous mixing type. Asphaltic concrete hot mix wearing surface shall conform to the compositions specified herein. The materials forming the mixture shall be in all cases by measured separately by weight, and shall be heated before entering the mixer to a temperature between Two Hundred Seventy-Five degrees Fahrenheit (275°) to Three Hundred Seventy Five degrees Fahrenheit (375°).

a. COMPOSITION OF MIX: The hot asphaltic concrete shall conform to the standard specifications set forth by the Arkansas State Highway Department for dense graded hot mix and hot laid asphaltic material

(1) ASPHALTIC CEMENT:

Penetration Grade	Per Cent by Weight	Tolerance
50-100 penetration	6-9%	+ or-0.3%

Asphalt cement shall meet current A.S.T.M. specifications tested by the latest revised methods for fifty-one hundred (50-100), penetration.

B: METHODS:

1. FORMS: Forms shall be of steel and/or of wood, two inches (2") thick, dressed on the top and insides. Battered, bent, twisted or broken forms shall not be used. All forms used shall be cleaned and oiled before concrete is placed against them, and when staked and placed, shall have rigid, tight connections at the joints.
2. PORTLAND CEMENT CONCRETE CURB AND GUTTER: All curb and gutter shall be poured as one course construction. Concrete shall be placed in the forms on a compacted, wetted sub-grade and shall be tamped and spaded until mortar covers the entire surface. Tamping and spading shall be given special attention to insure adequate compaction and surfaces free from honeycomb. The cross section of

the curb and gutter shall conform to the City's Standard. The surface shall be struck off smooth between templates, shaped to the required cross-section, and it shall be finished with a wooden float and steel trowel and broomed to produce a uniform surface of roughened texture. Joint spacing shall be the same as required in Section 3, "Materials and Methods for Constructing Rigid Pavements." Expansion joints shall be used behind or at the ends of the curb wherever it abuts sidewalks, driveways, or other structures. The curb and gutter shall be grooved one inch (1") deep with an approved grooving tool at intervals as specified under Section 3, paragraph B-2, Joints. All curb and gutter section shall make allowance for driveway openings in accordance with City standards.

3. **PLACING CRUSHED STONE BASE COURSE OR GRAVEL:** The base course shall be placed in courses not to exceed six inches (6") in compacted thickness each course having a compacted thickness as directed by the engineer. The base material shall be spread the same day it is hauled, and shall be thoroughly mixed by approved mechanical equipment to secure a uniform distribution of the fine and course particles. Proper compaction shall be ninety-five percent (95%) Modified Proctor. The City Engineer shall be notified at least twelve (12) hours prior to placing prime to permit checking the base for stability, line grade, and crown. If the City Engineer fails to make an inspection after proper notification within the said twelve (12) hour period, the base will be deemed approved.
4. **PREPARATION OF BASE COURSE FOR RECEIVING ASPHALTIC CONCRETE:**
SURFACE: Prior to the arrival of the surface course mixture on the work, the prepared base shall be cleaned of all loose and foreign materials, and shall be primed with bituminous material specified. The prime coat shall be applied with an approved type, self-propelled asphalt distributor, as approved by the City Engineer, with minimum pressure of forty pounds (40) at the rate of five-hundredths (.05) to four tenths (.4) gallon per square yard of surface. The specific rate of application shall be as directed by the engineer. The prime coat shall in any case be placed sufficiently in advance of laying the wearing surface as to permit thorough curing. Contract surfaces of curbs, gutters, manholes, and other structures adjacent to the paving area shall be painted with a thin, uniform coating of hot asphaltic cement, cutback, or emulsified asphalt before the surface mixture is applied against them.
5. **TRANSPORTING AND PLACING ASPHALTIC CONCRETE HOT MIX WEARING:**
SURFACE: The methods employed in performing the work, and all equipment, tools and machinery used in handling materials and in executing any part of the work, shall be subject to the approval of the engineer before the work is started, and whenever found unsatisfactory, shall be changed or improved as required by the engineer.
 - a. **TRANSPORTATION OF MIXTURE:** The mixture shall be transported from the paving plant to the work in tight vehicles with metal bottoms, previously cleaned of all foreign substances, and lightly lubricated with oil or soap solution. Excessive lubricant will not be permitted. When directed by the engineer, the vehicles shall be suitable insulated, and each load shall be covered with a canvas or other suitable material. Care shall be exercised by truck drivers so as not to disturb or loosen the prepared base course when entering or leaving the project area.
 - b. **PLACING THE MIXTURE:** The mixture shall be laid only upon a base which is dry, or at least free from sanding water, and only when weather conditions are suitable and the mixture shall have a temperature range of from two-hundred seventy-five degrees Fahrenheit (275°F) three-hundred twenty-five degrees Fahrenheit (325°F.). Prior to the delivery of the mixture on the work, the prepared base shall be cleaned of all loose or foreign material. No asphaltic concrete material shall be mixed or placed when a descending air temperature reaches forty degrees Fahrenheit (40°F.), or shall not be started until an ascending air temperature reaches thirty-six degrees Fahrenheit (36°F.). All asphaltic concrete mixture shall be unladed into a mechanical, self-powered paver, which is capable of spreading the mixture true to the line, grade, and crown set by the engineer. Care shall be exercised to insure the mixture being unloaded into the mechanical paver so that no material will fall between the truck and paver onto the prepared

base course. Such deposits shall be removed immediately. Hand spreading shall be allowed in areas inaccessible to the paving machine, and/or such areas as directed by the engineer. The laying process shall be continuous as nearly as is practicable. Care shall be exercised by the contractor not to destroy or loosen the base course material during the laying operation.

- c. **ROLLING:** The asphaltic concrete mixture shall be compressed while in a plastic condition and as soon after being raked as it will bear the rollers without undue displacement or hair-cracking. All rollers used shall be an approved type in the eight (8) ton to twelve (12) ton class, self-propelled, and in good condition. Each roller shall be manned by a competent, experienced operator, and shall be kept in continuous operation as nearly as is practicable. The rolling surface of the wheels shall be properly moistened with water, but an excess of such moisture will not be permitted. Along curbs, headers, and similar structures, and all places not accessible to the roller, the surface mixture shall be thoroughly compacted with hot tampers to produce sealed joints.
 - d. **JOINTS:** The roller shall pass over the unprotected and freshly laid mixture when the laying of the course is to be discontinued for such length of time as to permit the mixture to become chilled. In all such cases, provisions shall be made for a proper bond with new surface mixture by cutting back the joint so as to expose an unsealed, granular surface for full specified depth of the course. The exposed edge of the cut joint shall be painted with a thin coat of hot asphaltic cement, cutback or emulsified asphalt and the hot mixture shall be raked against the joint, thoroughly tamped with hot tampers, and rolled. Hot smoothing irons may be used for sealing joints, but in such cases extreme care shall be exercised to avoid burning the surface.
 - e. **SURFACE TESTS:** Before the completion of rolling, the surface shall be tested for thickness and contour corrected as necessary while still hot by properly adding or removing material, and by re-shaping and re-rolling until the finished surface complies with the best requirements. The finished surface shall show no deviation from the general surface in excess of one-sixteenth inch (1/16') per foot. Ordinates measured from the face of a ten-foot (10') straight-edge to the surface of the pavement shall not exceed one-sixteenth inch (1/16") per foot in distance from the nearer point of contact, with the further provision that the maximum variation in ten feet (10') shall not exceed one-fourth inch (1/4"). Such portions of the completed surface course found defective in compression or finish shall be removed and replaced with suitable material by the contractor.
6. **OPENING TO TRAFFIC:** The normal period of time for keeping the pavement closed to traffic is the period required for the finished pavement to cool to atmospheric temperature; however, upon completion of the work, the contractor or engineer shall so notify the City Engineer in order that traffic control signs and devices may be installed prior to general traffic use.

C: TESTS AND INSPECTION:

1. **TESTS OF CONCRETE:** Tests shall be specifications as outlined in Paragraph C.1., Section 3, "Materials and Methods for Constructing Rigid Pavements."
2. **TESTS OF ASPHALT AND CRUSHED STONE:** Test of all material used in the base course and wearing surface shall be made during and after paving is completed in order to control and determine the quantity, quality, and thickness of the various materials placed. All tests shall be made by the Engineering staff of the City of Jonesboro, or a reputable testing laboratory, and any test made by a laboratory, shall be at the contractor's expense. Results shall be mailed directly to the engineer or owner or developer and the City Engineer by the laboratory. The laboratory report shall show the sieve analysis in per cent passing, batch weight in pounds for the various materials used, temperature of mixture, and an analysis of the surface course mixture leaving the plant. Only current A.S.T.M. standard methods shall be employed. At least one test shall be taken for each 400 tons of asphaltic material but not less than one per day.
3. **FINAL INSPECTION:** Prior to final inspection, the contractor shall be required to make a general clean-up of the construction area. The pavement, curbs and all appurtenances shall be properly back-filled,

and shall be clean and free from fractures, spalling or defects. Providing all construction meets the requirements of the City, a letter of approval of construction shall be written by the City Engineer.

Section 5: MATERIALS AND METHODS FOR CONSTRUCTING EXCAVATION AND FILLS, PIPE CULVERTS AND STORM SEWERS, CATCH BASINS, DROP INLETS AND JUNCTION BOXES, SUBDRAINS, SIDEWALKS, ETC.

A: MATERIALS:

1. **FILLS:** Materials used in the construction of compacted fills for roadways, storm sewers, sidewalks, etc., shall be composed of earth, sand, gravel, or other suitable material meeting the approval of the engineer.
2. **PIPE:** Pipe used in the construction of culverts and storm sewers, shall be plain concrete, reinforced concrete or bituminous coated corrugated metal pipe or pipe arch with paved invert. Plain concrete pipe may be used up to eighteen inches (18”) with the approval of the City Engineer.
 - a. **REINFORCED CONCRETE PIPE:** Reinforced concrete pipe shall conform to A.S.T.M. Designation C76.
 - b. **BITUMINOUS COATED CORRUGATED METAL PIPE OR PIPE ARCH WITH PAVED INVERT:** Bituminous coated corrugated metal pipe or pipe arch with paved invert shall be Armco Standard or equal, and shall meet requirements for H-15 truck loading plus impact.
 - c. Plain concrete pipe shall conform to A.S.T.M. Designation C-14.
3. **RINGS AND COVERS, AND GRATES AND FRAMES:** Cast iron shall be of good quality and of such character that it shall make the metal of the castings strong, tough, and of even grain. All castings shall be smooth, free from scale and cracks and other defects that might render them unsuitable for the use for which they are intended.
 - a. **RINGS AND COVERS:** Rings and covers shall be of two (2) main types; sidewalks and street type. The combined weight of the standard sidewalk type shall be approximately one hundred twenty-five (125) pounds total, and the standard combined weight of the street type shall be approximately two hundred fifty (250) pounds total.
4. **BRICK OR 6’ VERTICAL CELL TILE:** Brick shall be clean, whole, free from cracks or warp-age, and shall produce a ringing sound when two (2) bricks are stuck together.
5. **SUBDRAIN TILE:** Sub-drain tile shall conform to current A.S.T.M. specifications and shall pass standard methods of testing A.A.S.H.O.
6. **FILTER MEDIUM:** Filter medium shall meet current Arkansas State Highway specifications for filter rock.
7. **PORTLAND CEMENT CONCRETE FOR SIDEWALKS AND APPURTENANCES:** Portland Cement Concrete for sidewalks and appurtenances shall have a minimum compressive strength of not less than two-thousand (2,000) pounds per square inch in twenty-eight (28) days. Its maximum slump in place shall not exceed four (4”) inches. Concrete shall be mixed in accordance with current A.S.T.M. requirements.
 - a. **CEMENT:** Portland cement shall conform to current A.S.T.M. standards.
 - b. **FINE AGGREGATE:** Sand shall be clean, sound, properly graded, and free from organic materials that might seriously reduce the strength of the concrete, and shall meet all requirements of Paragraph a. (2), Section 3, “Materials and Methods for Constructing Rigid Pavements.”
 - c. **COARSE AGGREGATE:** Aggregate shall be of hard, durable rock or gravel and shall be free from shale, chert, or organic material. The aggregate shall be well graded in size between one-fourth inch (1/4”) and one inch (1”).
 - d. **WATER:** Water used in mix shall be potable; i.e., drinkable, and shall be clean and free from oils, salts, and other injurious substances.

B: METHODS:

1. EXCAVATION AND FILLS: Excavation shall consist of all cutting in the roadway and adjacent areas, and the cutting and removal of all unsuitable material, regardless of character, from the sub-grade, all in conformity with the lines and grade shown on the plans. Unless directed by the engineer, excavation shall not be carried below the elevations indicated on the drawings except when soft or otherwise unsuitable material is encountered. This material shall be removed and replaced with suitable material in accordance with the procedure specified for fills, with the further provision that all loose rock or boulders found in the sub-grade. Suitable material shall consist of earth, sand, gravel, or other satisfactory materials. Fills shall be built up with suitable materials. From excavation which is free from mulch, trees, tree boles, rubbish and frozen materials. Earth or friable materials used in construction fills shall be placed in successive horizontal layers of loose material not more than eight inches (8") in depth. Each layer shall be spread uniformly and shall be wetted and rolled with a sheep-foot roller, pneumatic tired roller, or other approved equipment, until thoroughly compacted to ninety per cent (90%) of maximum density obtained at optimum moisture content, as determined by the Modified Proctor Compaction Test. Where rock is to be incorporated in fills composed largely of earth or friable materials, the rock shall be reduced to a maximum size or six inches (6") with the further provision that no rock of six (6") maximum sizes be within six inches (6") of the finished sub-grade. Sub-grade compaction shall extend a minimum distance of one foot (1') beyond the outside edge of the pavement and/or curb and gutter, or a maximum distance as determined by the width or right-of-way. Except as otherwise provided, the top six inches (6") of sub-grade in every area shall be compacted to ninety-five percent (95%) of maximum density obtained at optimum moisture content, as determined by the Modified Proctor Compaction Test. The engineer shall notify the City Engineer at least twelve (12) hours prior to placing any material on the completed sub-grade in order that the City Engineer may check the line, grade, and crown of the sub-grade. If the City Engineer does not make the inspection after proper notification within the said twelve (12) hour period the sub-grade shall be deemed approved.
 - a. BACKFILL OF UTILITY LINES: All utility lines shall be laid prior to setting any forms for construction. As soon as the joints of the utility lines have hardened to such a extent that they will not be damaged by backfilling, suitable materials from the spoil bank shall be brought up in compacted layers not exceeding eight inches (8") in depth of loose material. The first layer shall not extend above the spring line of the pipe in any case. Compaction of backfill shall be carefully and thoroughly done so as not to displace utility lines from their original positions. All the back fill material shall be at optimum moisture and shall be thoroughly compacted to 90% of maximum density as determined by the Modified Proctor Compaction Test.
 - b. CUTS IN PERMANENT TYPE PAVEMENT: When any permanent concrete or asphalt has been cut, the following procedures will be used:
 - (A) After the backfill material has been brought within 7-1/2" of the finish surface, the material on either side of the trench shall be removed for a horizontal distance of 9" from the widest point of the trench to a depth of 7 1/2". This will provide a shoulder of undisturbed bearing along each side of the trench 9" wide. The Cut shall have a uniform width as nearly as is practicable, and shall be made perpendicular to the surface of the pavement in order that the repair shall result in a uniform, neat appearance. If the street is concrete, 7-1/2" of 3,000 pound concrete meeting the City specifications is then to be placed on this shoulder. If the street is asphalt, 6" of 3,000 pound concrete will be poured to within 1-1/2" of the surface. As soon as the concrete has obtained its final set, the surface will be tack

coated and surfaced with 1-1/2" of hot-mixed asphaltic concrete meeting the City of Jonesboro and Arkansas Highway Department specifications. The above requirements shall apply for all pavement thickness up to and including the thickness outlined above, but in no case shall the total thickness of repairs to streets be less than the total thickness of the pavement in each individual case.

- c. CUTS IN SINGLE AND DOUBLE PENETRATION STREETS: Backfill on streets which are single penetration or double penetration asphalt streets will be done in the following manner:
 - (A) Compaction requirements will be the same as outlined for all utility lines.
 - (B) The backfill will be brought to within six inches (6") of the surface. Regular base material will be used to within two inches (2") of the surface. The final two inches (2") will be hot mix asphalt.
- d. CUTS IN GRAVEL STREETS: Backfill on gravel streets will be as follows:
 - (A) Compaction requirements will be as outlined above to within six inches (6") will be clay gravel. This final six inches (6") will be tamped in place by using, an air tamp.
- e. No streets may be paved in less than 90 days after completion of any underground utilities or storm sewers unless laboratory test proves compaction would permit paving in a lesser period of time.

2. PIPE CULVERTS AND STORM SEWERS: All excavation shall be carried to an elevation where foundation materials are satisfactory to the engineer, regardless of elevations shown on the plans. Pipe culverts and storm sewers shall be placed either by hand or be mechanical means, and shall be laid and backfilled as specified herein.

a. FORMING BED FOR PIPE: Where pipe is laid below the ground line, the trench shall be excavated to the required depth and to the minimum width practicable for the existing working conditions. The bottom of the trench shall be shaped to conform to the bottom of the pipe, and to afford a uniform bearing through its entire length. Recesses shall be excavated to receive the bells where bell and spigot pipe is used. When rock is encountered in the trench, it shall be removed to a minimum depth of six inches (6") below the pipe, and this excess depth shall be re-filled with suitable material and stabilized. Where pipe is not laid in a trench, a uniform, firm bed shall be made as specified above.

b. LAYING THE PIPE: Pipe culverts and storm sewers shall be laid to the lines and grades established by the engineer, with the hubs and bells upgrade. Spigot ends shall be fully entered into the adjacent hubs or bells. All joints shall be cemented with 1:3 Portland cement mortar. The insides of all joints shall be wiped and finished smooth. When corrugated metal pipe or pipe arch sections are used, they shall be joined with a band made of the same material as the pipe. Any pipe which is not in true alignment or which shows settlement after laying shall be taken up and re-laid by the contractor.

c. BACKFILLING: The material used for backfilling pipe culverts and storm sewers under any improvement shall be at optimum moisture, and shall be free from large lumps, clods or rocks, and it shall be placed alongside the pipe culverts or storm sewers in layers of approximately eight inches (8") and thoroughly compacted to an elevation equal to the spring line of the pipe. Subsequent layers of backfill material shall be placed uniformly over the contour of the pipe in layers not to exceed eight inches (8"), and shall be compacted for the entire depth of the trench. Backfill compaction by puddling or jetting with water shall not be permitted unless it is non-plastic materials.

3. CATCH BASINS, DROP INLETS, AND JUNCTION BOXES: Concrete floors for catch basins, drop inlets, and junction boxes shall be poured at least twenty four (24) hours prior to beginning construction on the walls. Floors shall be constructed to the full outside dimensions indicated in the plans. Walls shall be so constructed as to form a tight joint with the floor and around all inlets and the outlet pipes. Walls may be constructed of plain concrete or reinforced concrete meeting requirements outlined in Paragraph A.1., Section 3, "Materials and

Methods for Constructing Rigid Pavements,” or brick masonry, as required by the Engineer. Forms for concrete walls shall be smooth on the inside face and shall be securely staked to conform to the lines and grades established by the engineer. They shall be set in such a way to prevent springing when concrete is placed against them. All forms shall be cleaned and oiled before concrete is placed against them. No concrete shall be poured until the engineer has inspected the forms, the placing of reinforcing steel and castings, and has given his approval to proceed with the work. All castings shall be set accurately to the finished elevations. They shall be set in full mortar beds with firm bearing on the walls or securely fastened to the forms so that no movement will occur when concrete is poured around them. In construction of brick masonry walls, the brick shall be thoroughly wetted immediately before being laid, and they shall be laid in full courses in full and close mortar joints. At least one (1) course in every seven (7) courses shall be composed of headers. No spalls or bats shall be used except for shaping around irregular openings. All joints shall be completely filled with mortar. Portland Cement Mortar shall be proportioned one (1) part of cement to two (2) parts of sand. Re-tempering of mortar will not be permitted.

4. **SUBDRAIN TILE:** The engineer shall determine areas where sub-drain tile will be required. All trench excavation for the installation of sub-drain tile shall be carried to the depth and width deemed necessary by the engineer. Trenches shall be inspected and approved by the engineer prior to placing any filter stone or sub-drain tile. The uniform layer of filter stone at least four (4”) inches deep shall be placed in the bottom of the approved trench prior to installing sub-drain tile. The sub-drain tile shall be laid to the lines and grades established by the engineer. The joints between successive tiles shall be opened approximately one-fourth inch (1/4”), and the upper half of the joint shall be covered with building felt or other approved material. The tile shall then be covered with filter stone to the required elevation.
5. **CONSTRUCTION OF SIDEWALKS:** All sidewalks shall be constructed to the grades here in fore established for the streets on which sidewalks are to be laid, and the responsibility for establishing sidewalk grades with relation to the top elevation of the curb for the various streets shall rest with the City Engineer. Sidewalks shall be constructed with a flat surface and shall be pitched toward the curb at the rate of one-fourth inch (1/4”) per foot, unless otherwise directed by the City Engineer. The width of sidewalks in all residential areas shall be four feet (4’) except in the case of repairs to existing sidewalks, in which case the repairs shall conform to the present width. Transverse expansion jackets or joints not less than one-half inch (1/2”) thick of the pre-molded, non-extruding type shall be placed every sixty feet (60’) along sidewalks, and at all points where walks bear against curbs, buildings, or other structures. All concrete shall be cut at least twenty percent (20%) of the full depth of the sidewalk at intervals equal to the width of the walk. All corners shall be rounded so as not to leave any square edges or sharp projections.
6. **ADJUSTING MANHOLES, ETC., TO PROPER GRADE:** The paving contractor shall see that all valve boxes, manhole covers, cleanouts, etc., are set to the proper grade as established by the engineer, and shall carefully finish all pavements to them. The contractor and utility company shall be responsible for all valve boxes, manhole covers, and cleanouts, etc., which might be sealed, shut during construction operations. Any boxes or covers damaged by the contractor shall be repaired by him before paving, and he shall bring such damages to the engineer’s attention.

C. TESTS AND INSPECTION:

1. **TESTS FOR COMPACTION OF FILLS AND SUB-GRADE:** Tests for compaction of fills and sub-grade shall be a reputable testing laboratory or the City Engineers office, and shall be made in accordance with procedures outlined by “Modified Proctor” by the A.A.S.H.O.
2. **TESTS OF CONCRETE:** Tests of concrete shall be in accordance with Paragraph C.1., Section 3, “Materials and Methods for Constructing Rigid Pavement.”
3. **TESTS OF PIPE AND SUB-DRAIN TILE:** Tests of pipe and sub-drain tile shall be in accordance with latest revised standard methods of A.S.T.M.

4. FINAL INSPECTION: Prior to final inspection, the contractor shall be required to make a general clean-up of the construction area. All back slopes of cut and fill areas and backfills of storm sewers, catch basins, drop inlets, junction boxes, sub-drain tiles, sidewalks, and other structures shall be properly dressed to a firm, neat, and clean surface, free from defects of any kind. Providing all construction meets the requirements of the City, a letter of approval of construction shall be written by the City Engineer within five (5) days of the receipt of request for inspection. The City's acceptance for maintenance shall be in accordance with maintenance bonds as hereinafter provided. If the City Engineer fails to approve or disapprove the construction within the said five (5) day period, it shall be deemed approved.

Section 6: BONDS AND INSURANCE:

A: GENERAL: When required by the Mayor and City Council Contractors submitting bids must be licensed under the terms of Act. No.124 of the 1939 Arkansas General Assembly, which regulates the practice of general contracting in the State of Arkansas, and he shall furnish satisfactory proof of the carriage of all insurance, statutory performance bonds, and maintenance bonds as specified herein.

1. PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE: Public liability and property damage insurance may be required at the discretion of the Mayor or the Jonesboro City Council.
2. STATUTORY PERFORMANCE BONDS: Statutory performance bonds may be required at the discretion of the Mayor and Jonesboro City Council.
3. MAINTENANCE BONDS: When required by the Mayor and City Council the contractor shall furnish a one-year maintenance bond, in the amount of 50% of the total cost price, which shall be in full force and effect from the date of the City Engineer's letter of approval of construction as herein before provided. Prior to the end of the one-year period covered by the maintenance bond, the City engineer and/or contractor of all defects, which must be corrected prior to the City acceptance full maintenance of the work. When the work meets the requirements of the City, the City Engineer shall then write a letter of approval and acceptance for City Maintenance.

Section 7: VALIDITY AND SEPARABILITY: If any clause or section, sentence or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by the courts, such decision or decisions shall not affect the validity or constitutionality of the remaining portions of this Ordinance; and the City Council of the City of Jonesboro, Arkansas hereby declares that it would have passed this Ordinance and each section, sentence, clause or phrase thereof irrespective of the fact that any one or more of the other clauses, sentences, sections or phrases were to be declared invalid or unconstitutional.

Section 8: It has been determined that the lack of standards and specifications for streets storm sewers and other improvements within the area of jurisdiction of the City of Jonesboro including improvements districts, covering design, approvals, materials, construction methods, construction materials, and maintenance of streets creates a condition hazardous to the public peace, health and safety of the citizenry of this City; that this Ordinance will correct the evil; therefore, an emergency is hereby declared to exist and this Ordinance being necessary for the public peace, health and safety, shall be in full force and effect from and after its passage and approval and all ordinances and parts of ordinances in conflict herewith are hereby repealed.

PASSED and ADOPTED this 21st day of August, 1967.