

Section 5: The Code of Ordinances, City of Rogers, Arkansas, is hereby amended by adding a new chapter, which shall read as follows:

DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS FOR DIVISION,
DEVELOPMENT AND IMPROVEMENT OF LAND

ARTICLE ONE

Section 1: General Provisions

- a. Purpose
The purpose of these regulations is to set forth the procedures, criteria and specifications for development of streets, sidewalks and drainage including inspection, sampling and acceptance of same.
- b. Authority
This Ordinance is adopted in accordance with the authority granted by the laws of the State of Arkansas.
- c. Jurisdiction
This Ordinance applies to all lands in the City of Rogers and its planning area jurisdiction where the subdivision of land is being regulated.

Section 2: Definition of Construction Terms

- a. AASHTO: American Association of State Highway and Transportation Officials.
- b. AASHTO T 99 (Standard Proctor): Laboratory determination of the maximum density to which a soil can be compacted using a 5.5 pound hammer and a twelve (12) inch drop.
- c. AASHTO T 180 (Modified Proctor): Laboratory determination of the maximum density to which a soil can be compacted using a ten (10) pound hammer and an eighteen (18) inch drop.
- d. ACHM: Asphaltic Concrete Hot Mix.
- e. ADT: Average Daily Traffic.
- f. AHTD: Arkansas Highway Transportation Department.
- g. ASTM: American Society for Testing and Materials.
- h. CT Base: Cement Treated Base.
- i. CS Base: Crushed Stone Base.
- j. DBS: Double Bituminous Surface Treatment (double chip-and-seal).
- k. EAL: Equivalent Axle Load, usually eighteen (18) Kip EALS.
- l. FHWA: Federal Highway Administration.

- m. Kip: A unit of measure equal to one thousand (1000) pounds.
- n. LL: Liquid Limit; the moisture content at which a soil passes from a plastic state to a liquid state.
- o. PL: Plastic Limit: the lowest moisture content at which a soil passes from a dry loose state to a plastic cohesive state.
- p. PI: Plastic Index; the difference between the liquid limit and the plastic limit of a soil.
- q. PSI: Pounds per square inch.

ARTICLE TWO

Section 1: Street Geometry For Subdivisions and Mobile Home Park Roads and Streets

Table 1

Requirements	Minor	Collector	Minor Arterial	Major
	Class I	Class II	Class III	Class IV
Min. ROW Width	50'/C&G	60'/C&G	80'/C&G	80-100'/C&G
Min. fore/back Slope	3:1/2:1	3:1/2:1	3:1/2:1	3:1/2:1
Pavement Width/C&G	30'B-B	39'B-B	52'B-B	66'B-B
Pavement Thickness	**See Note 1**			
Shoulder Thickness	**See Note 1**			
Parking/Shoulders	None		No Parking	No Parking
Parking/Curb & Gutter	One Side	No Parking	No Parking	No Parking
Sidewalks	Required	Required	Required	Required
Design Speed	25 mph	30 mph	35 mph	45 mph
Sight Distance	250'	275'	300'	350'
Int. to Curb Cut/Drive	40'	100'	250'	250'
Min. Curb Radius	30'	30'	40'	50'
Min. Street Jog	**See Note 2**			

Street Grades **See Note 3**

Minimum Intersection Approach Speed Note 4**	25 mph for ALL CLASSES **See
Minimum Intersection Angle	75 Degrees for ALL CLASSES
Maximum Residential Driveway Width	24' for ALL CLASSES
Maximum Commercial/Industrial Drive Width	40' for ALL CLASSES
Bridge/Culvert Design Load	HS-20 for ALL CLASSES

General Note – Any street or roadway construction involving Federal and/or State Highway Department funds shall meet the Federal/State requirements.

Note 1 - The pavement structure shall meet or exceed the pavement structure in Table 2 for the particular traffic classification and soil type.

Note 2 - Normally the distance shall be one hundred fifty (150) feet, however this distance may be varied in unusual terrain and topography.

Note 3 - eight percent (8%) (ten percent (10%) with special justification)

Note 4 - In hilly terrain the approach speed may be reduced to 20 mph; the sight distance reduced to seventy (70) feet; If the intersection is signalized the approach speed will be the posted speed of the road.

SECTION 2: Minimum Pavement Section By Street and Soil Classification

For a Class I Minor Street the street will have six inch (6”) CSBase and two inch (2”) Surface Coat. If the street is greater than a Class I street the engineer must submit a formal design only, using PCA, The Asphalt Institute, AASHTO, or other Higher Formal Pavement Design Procedures and be tested by a Certified laboratory.

Unless otherwise approved by the Street Superintendent or City Engineer, all PCC pavements shall have a minimum of two (2) inches of special base unless the Street Superintendent specifies a thicker depth, but in no case shall the depth of the special base exceed four (4) inches. The special base specifications are contained in Article Three, Section 6.

SECTION 3: The Engineer, with the approval of the Street Superintendent, may use other material combinations if the flexible pavement layered theory is followed; the required Structural Number (SN) is provided; and the Minimum Layer Thickness and the Material Coefficients shown below are used, with the exception that the ACHM Surface thickness as indicated in the table is the minimum thickness allowed for each minimum pavement section shown. The LL and PI test results of the subgrade shall be used for verifying the final pavement structure.

SECTION 4: If the Developer requests reduction to the street widths or pavement section and/or right-of-way width, the Planning Commission may obtain the services of a knowledgeable Registered Professional Engineer to review the site, the Developer's proposal and submit a written report with recommendations. The Developer shall agree to the Engineering Study and the Developer shall be responsible for reimbursing the City for any Engineering Study fees.

SECTION 5:

TYPE OF MATERIAL LAYER	MATERIAL COEFFICIENT PER INCH OF MATERIAL	MINIMUM THICKNESS
Portland Cement Concrete Pavement	-**-	5 Inches
Special Base	-**-	**NOTE 1**
ACHM Surface Course	0.44	2 Inches
ACHM Binder Course	0.44	2 Inches
Asphalt Stabilized Base (Black Base)	0.25	4 Inches
Cement Treated Crushed Stone Base	0.25	4 Inches
Treated Subgrade (Lime, Flyash, etc.)	0.00	6 Inches
Crushed Stone Base (ABC CL 7)	0.14	4 Inches
Soil Cement (400 to 600 PSI)	0.20	6 Inches
Levelup Course Needed	0.00	Thickness as

-**- Part of the Rigid Pavement Design, and the Flexible Pavement Coefficients do not apply.

****NOTE 1**** See Section 2 of this Article

ARTICLE THREE

SECTION 1: Roadway, Base and Pavement Plans and Specifications for Land Development

The roadway, base, drainage, and pavement plans and Specification r proposed streets and roads shall equal the following minimum standards and be in accordance with the following minimum standards and be in accordance with the standards set forth in this Ordinance. Any conditions or items not covered shall be in accordance with the current Arkansas Highway and Transportation Department's Standard Specifications.

SECTION 2: Clearing and Grubbing

- a. All trees, stumps, roots, and other obstructions, not designated to remain shall be cleared and/or grubbed in such a manner so as to not cause injury to other items designated to remain. Stump holes shall be filled with suitable material and compacted.
- b. If material is to be burned, it shall comply with all applicable laws and ordinances, and shall be under the constant care of competent watchmen.

SECTION 3: Roadway Excavation and Embankment

- a. Suitable material shall consist of soil; or a mixture of soil, stone or gravel. It shall be free of sod, logs, stumps, roots and other deleterious matter; and it shall be capable of forming a stable embankment when compacted.
- b. All suitable material obtained during the excavating operations shall be used in the construction of the roadway embankments and subgrade; and all unsuitable material shall be used behind the curb or hauled to an approved waste area.
- c. All roadway cuts and grades shall conform to those shown on the approved plans or approved plan changes.
- d. Sod and vegetable matter shall be removed from the surface upon which embankment of less than four (4) feet is to be placed.
- e. Roadway embankment shall be constructed in layers not to exceed eight (8) inches (loose measurement). Each layer shall be compacted at or near optimum moisture for that particular soil to at least 95% of the maximum density, as determined by AASHTO T 99 (Standard Proctor).
- f. In areas where solid rock is encountered, it shall be excavated to a depth of eight (8) inches below subgrade elevation and replaced with approved material.
- g. Rock obtained during excavation operations may be placed in layers not exceeding thirty (30) inches below subgrade elevation and replaced with approved material.
- h. Embankment which is adjacent to structures and inaccessible to normal compaction equipment shall be placed in four (4) inch (loose measurement) layers and compacted to at least ninety five percent (95%) of maximum density as obtained by AASHTO T 99. The material shall be compacted with mechanical equipment where it is inaccessible to the normal compaction equipment.

SECTION 4: Subgrade

- a. In fill sections where A-5, A-6, or A-7 soils are encountered which have a Liquid Limit (LL) greater than forty (40) or a Plastic Index (PI) greater than seventeen (17), an upgraded embankment material should be used in the top two (2) feet of the subgrade; or the top six (6) inches of the subgrade treated with lime. In cut sections where A-5, A-6, or A-7 soils are encountered which have a LL greater than forty (40) or a PI greater than seventeen (17), the top six (6) inches of the subgrade should be treated with lime. These requirements are in addition to the pavement section required based upon the soil type of the existing subgrade material.
- b. When lime treatment is required, the subgrade shall be finished to stringline grade prior to adding and mixing the lime. The depth of the lime treatment shall be checked at five hundred (500) foot intervals. The depth of the lime treatment shall be at least five and one-half inches (5 ½"). If the depth is less than five and one-half inches (5 ½"), the section represented by the test shall have additional lime added and the section reprocessed.
- c. The top eight (8) inches of the subgrade shall be compacted to a density, as determined by AASHTO T 191 or T 238, of not less than ninety five percent (95%) of the maximum density obtained by AASHTO T 99. This shall be accomplished by scarifying as necessary, shaping and compacting to the required grade and section at near optimum moisture content.
- d. The finished subgrade shall be stringlined within ½ inch above to ¾ below the lowest elevation of the typical paving and base section shown on the approved plans.

SECTION 5: Curb and Gutter

- a. The subgrade shall be shaped and compacted to the required grade and section as shown on the plans. All unsuitable material, including soft and yielding material, shall be removed and replaced with suitable material and compacted to the proper density.
- b. The flexible pavements, the appropriate depth of base material shall be carried at least one (1) foot beyond the back of the curb for drainage. This requirement only applies when the total flexible pavement structure is ten (10) inches or more. This will require a minimum of four (4) inches of ABC C1.7, asphalt stabilized base, or cement treated base between the subgrade and the curb and gutter. In efforts not to produce a trench section, the base material should be daylighted where possible and feasible. If the flexible pavement structure is less than ten (10) inches it is not required to carry the base material under the curb and gutter.

- c. For concrete pavement, The special base shall be carried at least one (1) foot beyond the back of the curb and gutter. The slope of the subgrade shall be maintained under the curb and gutter and for at least one (1) foot behind. Any buildup for the curb and gutter shall be with the special base. In efforts not to produce a trench section, the special base should be daylighted where possible and feasible.
- d. All utility lines, including service lines, shall be laid, backfilled and compacted with ABC Class 7 base or other material suitable to the Street Superintendent before the curb and gutter is constructed.
- e. Any service or utility line crossing not placed before the pavement and curb and gutter are constructed shall be installed by boring, and the procedures shall be approved by the Street Superintendent. A permit and a cash deposit or bond shall be required. **CUTTING OF THE PAVEMENT WILL NOT BE PERMITTED**, except in extreme and unusual conditions. Such exceptions shall be approved by the Street Superintendent or City Engineer in writing.
- f. All curb and gutter shall be constructed of Portland Cement Concrete. The concrete shall meet the AHTD requirements for Class S(AE) Air Entrained Concrete, and have a minimum twenty eight (28) day compressive strength of four thousand (4000) psi when tested in accordance with AASHTO T 23.
- g. Where flexible pavements are used, concrete curb and gutter contraction joints shall be provided at twenty five (25) foot intervals. Expansion joints shall be provided at all stationary structures, such as drop inlets and at curb returns. They are to be constructed at right angles to the curb line. Where rigid pavements are used, sawed joints shall be provided to match the transverse joints in the concrete pavement and expansion joints shall be provided at stationary structures such as drop inlets, and at curb returns.
- h. All contraction joints shall be constructed to the proper width and depth, cleaned, and the joint material installed in strict compliance with the manufacture's recommendations.
- i. The contraction joint material shall meet the AHTD requirements for pavement joint material, and the supplier shall furnish a Materials Certification on the joint material.
- j. The expansion joint material shall have a thickness of one half inch (1/2") and conform to AASHTO M 213.
- k. The curb and gutter shall be cured with a curing compound or wet burlap.
- l. If the subgrade, subbase, or base is dry, it shall be wetted just prior to placing the concrete so the moisture will not be pulled from the concrete.
- m. After the concrete curb and gutter has set, the area behind the curb shall be partially backfilled before the base material is placed and compacted.

- n. Curb modifications for driveways shall be in accordance with the Standards for City of Rogers Detail. The driveway shall slope up to a minimum elevation at the roadway right-of-way equal to the height of the curb. As an alternate, the entire curb and gutter sections for the driveway may be sawed vertically for the full depth and removed. The curb and gutter shall then be constructed as a part of the driveway. The modified curb and gutter must have the shape shown in the Standard detail, and have ½ inch filled construction joints at each end of the driveway.
- o. Sidewalks shall be required to be located at the right-of-way line and constructed within the right-of-way.
- p. The sidewalk material, width, and depth shall be as follows:
 - 1. The concrete shall meet the AHTD requirements for Class S(AE) Air Entrained Concrete, with a minimum twenty eight (28) day compressive strength of four thousand (4000) psi.
 - 2. In residential areas the sidewalks shall be four (4) feet width and four (4) inches thick. The sidewalks must be back a minimum of three (3) feet behind the curb.
 - 3. In commercial areas and along collector, minor and major arterial, the sidewalks shall be five (5) feet wide and four (4) inches thick. The sidewalks must be back a minimum of three (3) feet behind the curb.
- q. At all roadway intersections and where necessary at driveways, the curb and gutter and sidewalk shall be modified to accommodate the handicapped.
- r. Crushed Stone Base must be provided under sidewalks where compacted subgrade is not provided. Sidewalks subgrade must be inspected by the Street Superintendent and/or City Engineer prior to pouring sidewalk concrete.

SECTION 6: Special Base

- a. Unless waived in writing, by the Street Superintendent and/or City Engineer, a special base shall be placed under all rigid pavements. The minimum thickness of the special base shall be two (2) inches unless the Street Superintendent specifies a thicker depth. But in no case should the depth exceed four (4) inches.
- b. The special base shall be one of the materials listed below.
- c. Coarse limestone screenings meeting the following gradation:

Screen Size	Percent Retained
½"	0
#4	24 – 35
#10	78 – 88
#20	92 – 100

#40
#200

94 – 100
96 – 100

- d. Surface treatment aggregate meeting the AHTD standard specification requirements for Class ten (10) Mineral aggregate.
- e. Any other well draining material approved by the Street Superintendent.
- f. If necessary, the special base shall be rolled with a light steel roller, but a specific density will not be required.

SECTION 7: Prime and Tack Coats

- a. The materials and workmanship for prime and tack coats shall be AHTD Standard Specification requirements for prime and tack coats, with emphasis on the following items:
 - 1. The prime coat shall be an asphalt penetrating prime. The tack coat shall be emulsified asphalt. The type and application rate of each shall be determined by the Engineer.
 - 2. Care shall be taken to clean the surface to be tacked or primed of dust, dirt and loose or foreign materials prior to the application.
 - 3. Prime coats shall not be placed when the surface temperature is below fifty (50) degrees F., nor shall it be applied to a surface having an excess of moisture, nor when the general weather conditions, in the opinion of the Engineer, are not suitable.
 - 4. If the prime coat becomes damaged before the surface course is placed, it shall be repaired at the contractor's expense.
 - 5. The surface of all structures, such as curbs and bridge rails, shall be protected from the prime or tack coat.
 - 6. If traffic is to use the prime coat before the surface is placed, it shall be covered with a blotter course consisting of clean sandy material or commercially processed sand or sand size screenings.
 - 7. Excess material shall be removed and then blotted.

SECTION 8: Asphalt Hot Mix Binder and Asphalt Hot Mix Surface Courses

- a. The asphalt hot mix binder and surface courses shall meet the AHTD Standard Specifications for hot mix binder and surface courses and submit a formal pavement design to the Street Superintendent or City Engineer and testing must be done by a certified testing laboratory.
 - 1. The crushed stone base course or cement treated crushed stone base course shall be primed. The prime coat shall meet the AHTD standard specification requirements for prime coat. The prime shall cure for at least seventy two (72) hours, or as approved by the Street Superintendent before placing any asphalt layer.

2. Unless otherwise directed by the Street Superintendent and/or City Engineer, a tack coat shall be used between succeeding asphalt layers. The tack shall meet the AHTD standard specification requirements for tack coat.
3. The binder course shall meet the AHTD gradation requirements for Type II or Type III surface course.
4. The binder and surface course shall be designed with a minimum fifty (50) blow Marshall stability of one thousand (1000) pounds; a flow of eight (8) to sixteen (16); and two (2) to five (5) percent air voids. A job mix formula shall be established and approved by the Engineer for both the binder course and the surface course.
5. The supplier shall submit a materials certification giving the stability, gradation, asphalt type and content, flow, voids, and maximum theoretical density of both the binder and surface course mixes used.
6. Both binder course and surface course shall be compacted to a minimum of ninety two 92% of maximum density as determined by the fifty (50) Marshall design procedures.
7. If the nuclear gauge is used to determine density, it must be correlated with cores taken from the roadway.
8. The minimum thickness of binder or surface course shall be two (2) inches. The maximum thickness that can be placed is four (4) inches provided the contractor can demonstrate that he can obtain the required density.
9. In no case shall the speed of any roller exceed three (3) miles per hour. If the vibratory roller is used for compaction, special care shall be taken not to de-compact the mixture by over rolling. The number of roller passes is very critical to proper compaction.
10. The surface course surface, when checked with a ten (10) foot straightedge parallel to the centerline, shall not exceed + or - 1/4 inch.

SECTION 9: Portland Cement Concrete Pavement

- a. Portland Cement Concrete Pavement shall meet the AHTD standard specification requirements for Portland Cement Concrete Pavement, with the following exceptions:
 1. The concrete shall have a minimum twenty eight (28) day compressive strength of four thousand (4000) psi. The concrete shall contain an air entraining agent which produces five percent (5%) +/- two percent (2%) air entrainment in the concrete. The slump shall be two (2) to four (4) inches if conventional paving equipment is used, and one (1) to two (2) inches if slip for paving equipment is used.

2. The concrete shall be placed on the special base or an approved subgrade which shall be wetted just prior to placing the concrete.
3. After the concrete has been placed, consolidated and struckoff with a transverse screed or slip form paver, it shall be checked for surface smoothness with a ten (10) foot straightedge parallel to the centerline for surface compliance. The straightedge shall be lifted and placed on the centerline and pulled to the edge of the pavement. Each time the straightedge is moved forward, it shall overlap the preceding area by at least $\frac{1}{2}$ of the straightedge length. Any surface irregularities shall be corrected at this time while the concrete is still in a plastic condition. Care shall be taken in a slip form operation not to pull down the pavement edge during the straightedge operation. Completed concrete pavement shall have a broom or tined texture.
4. Unless otherwise specified by the Street Superintendent, the pavement lane pours shall be tied together with a thirty (30) inch long #4 deformed reinforcing bars on thirty six inch (36") centers.
5. The concrete pavement shall be cured with a curing compound meeting the AHTD standard specifications for curing compound.
6. Unless otherwise specified by the Street Superintendent, the transverse joints shall be sawed in the concrete pavement perpendicular to the centerline and on fifteen (15) foot centers. The depth of the joint shall not be less than $\frac{1}{4}$ the slab thickness (T) PLUS $\frac{1}{2}$ inch. The joint width shall be approximately $\frac{1}{4}$ inch. The longitudinal centerline joint and the longitudinal joint between lanes of a four (4) lane roadway shall be sawed to the same joint depth and width dimensions, or the new lane may be keyed to the adjacent lane.
7. All joints shall be filled with a silicone joint material, performed joint material, or joint material meeting the AHTD requirements for PCC pavement contraction and warping joint material. The joint preparation and installation of the joint material shall be in accordance with the manufacturers recommendations.

SECTION 10: Surface Tests

- a. The contractor shall check the surface of each material with a ten (10) foot straightedge and any correction to the surface shall be made to the flexible layers prior to final compaction or to the concrete surface while the concrete is still plastic.
- b. The finished surface, when checked with a ten (10) foot straightedge parallel to the centerline, shall show no deviation more than $\frac{1}{4}$ inch for ACHM surfaces or PC concrete surfaces.

- c. Skin patching and feather edging of the final surface course will not be permitted, except at the beginning or ending of the project. Surface deviations in excess of ¼ inch shall be corrected by grinding or overlaying, or as directed by the Street Superintendent and/or City Engineer.

SECTION 11: Structural Concrete

- a. All structural concrete for traffic bearing structures and any structures in which the surface may be exposed to de-icing chemicals, such as curbs, gutters, sidewalks, steps, pavement, driveways, bridge decks, parapet walls, drop inlets, etc., shall meet the AHTD requirements for Class S (AE) Air Entrained concrete with a minimum twenty eight (28) day compressive strength of four thousand (4000) psi.
- b. The concrete for all other non-traffic bearing structures and structures not exposed to de-icing chemicals shall meet the AHTD requirements for Class A concrete with a minimum twenty eight (28) day compressive strength of three thousand (3000) psi.

ARTICLE FOUR

SECTION 1: Storm Drainage, Pipe and Pipe Underdrain Requirements

The plans and specifications for proposed storm drainage systems shall be equal to the following minimum standards.

SECTION 2: Pipe

Reinforced concrete pipe shall be used for culverts under roadways and running parallel to the roadway in the Street right-of-way and under all parking areas. Otherwise, corrugated metal pipe may be used. All pipe shall have a minimum cover at subgrade elevation of one (1) foot at the shoulder or curb line, unless otherwise approved by the Street Superintendent and/or the City Engineer.

2.01: Reinforced Concrete Pipe

- a. Reinforced concrete pipe shall conform to AASHTO M 170 for circular pipe and to AASHTO M 206 for arch shaped pipe. Class III shall be the minimum class of pipe used. The joint seal shall be either cement mortar, three (3) parts sand and one (1) part cement, or cold applied performed plastic gaskets conforming to AASHTO M 198, Type B.

- b. The reinforced concrete flared end section for circular and arch concrete pipe shall meet the applicable requirements for Class II or higher class of pipe.

2.02: Corrugated Metal Pipe

- a. Corrugated metal pipe shall conform to AASHTO M 36 and M 218. Each end of individual metal pipe sections of eighteen inch (18") or equivalent diameter and larger shall be reformed so as to have not less than two annular corrugations.
- b. Flared end sections shall be of the same material as the culvert pipe for a given installation, and shall be fabricated from steel sheets having a thickness of 0.064" or more.
- c. Coupling bands and other hardware for corrugated metal pipe shall conform the AASHTO M 36, and shall be made of the same base metal and coating as the pipe. Band widths shall be as specified in AASHTO M 36 and M 196.

SECTION 3: Excavation, Trench Preparation and Installation

- a. Where the pipe is laid below ground line, the trench shall be excavated to the required depth and width to allow sufficient room for tamping of backfill. The bottom of the trench shall be shaped to conform to the bottom of the pipe with recesses excavated to receive the bells and where bell and spigot pipe are used. Where pipe is not laid in a trench, a uniform firm bed shall be made as specified above.
- b. When rock is encountered in the trench, it shall be removed to minimum depth of six (6) inches below the pipe, and the excess depth shall be filled with Aggregate Base Course Class 7, Section 3.03 AHTD Standards Specification and compacted.
- c. All unsuitable material, including soft and yielding material, shall be removed and replaced with ABC Class 7 material and compacted to insure a firm support.
- d. The pipe shall not be laid in water or in unsuitable weather or trench conditions, unless approved by the Street Superintendent and/or City Engineer.
- e. After each joint of pipe has been graded, aligned and placed in final position, the bedding material shall be deposited and compacted under and around each side of the pipe and back of the bell, or the end thereof, to firmly hold and maintain the pipe in proper position and alignment for backfilling operations.
- f. No debris creating a clogging action shall be allowed to remain in the storm drainage system.
- g. All storm drainage pipe, under any roadway improvement, shall be backfilled with ABC Class 7 base or other material approved by the Street Superintendent and/or City Engineer and compacted before the

base and curb and gutter are constructed. The backfill base material shall be brought up evenly on each side of the pipes to avoid displacement. Special care shall be taken to compact the material under the haunches of the pipe. The base material shall be compacted with mechanical equipment to at least ninety five percent (95%) of the maximum density as determined by AASHTO T 180.

- h. When culvert pipe is to be relayed, the construction procedures shall be in accordance with the AHTD standard specifications requirements for relaying culvert pipe.

SECTION 4: Headwalls, Drop Inlets and Junction Boxes

- a. All drainage structures shall be constructed of reinforced concrete. Precast structures will be allowed only with specific approval of the Street Superintendent and/or the City Engineer.
- b. The minimum thickness of reinforced concrete walls, shall be six (6) inches.
- c. Concrete drainage structures shall be constructed with reinforcing steel having a maximum spacing of twelve (12) inches on centers and a minimum size of number four (4) bar. Proper engineering designs shall be submitted for nonstandard applications.
- d. Concrete bottoms for structures shall be poured at least twenty four (24) hours prior to beginning construction of the vertical walls.
- e. Junction boxes shall have a minimum interior dimension of four (4) feet.
- f. Walls shall be constructed to form a tight joint with the floor and around the inlet and outlet pipes. The pipes shall be flush with the inside surface of the wall.
- g. Unless otherwise directed by the Street Superintendent, all drop inlets, box culverts and junction boxes shall have two (2) inch to three (3) inch weep holes at the subgrade elevation.
- h. Headwalls shall be constructed on the upstream and downstream ends of the storm drainage system where no other drainage structures are required, or flared end sections may be used when approved by the Street Superintendent.

SECTION 5: Rings, Covers, Grates and Frames

- a. Iron castings shall conform to ASTM A 48 Class 30A for gray iron castings.
- b. The combined weight of the ring and lid for sidewalk type shall be a minimum of one hundred twenty five (125) pounds and for the street type shall be a minimum of three hundred (300) pounds.

SECTION 6: Pipe Underdrain

- a. Pipe underdrain shall be installed in all sidehill cut section areas where subsurface water is encountered and other areas as determined by the Street Superintendent.
- b. The underdrain shall be located just behind the curb and below subgrade elevation.
- c. Outlets shall be provided on at least three hundred (300) foot intervals, or as approved by the Street Superintendent. To the extent possible, the underdrain pipe should be connected to the drop inlets or box culverts of the storm drainage system.
- d. The underdrain material and construction procedures shall be in accordance with the AHTD standard specifications for pipe underdrain, with the following exceptions:
 1. Only corrugated polyethylene tubing and acrylonitrile – butadiene – styrene pipe shall be used in the construction of pipe underdrain.
 2. Granular filter material shall meet the requirements of the AHTD standard specifications for coarse aggregate for Class A concrete.
 3. The nonwoven geotextile fabric having the following properties shall be used as a liner for filter material and the pipe underdrain:

PROPERTIES	TEST PROCEDURE	VALUE
Weight, oz./sq. yd.	ASTM D – 1910	4.1 min.
Thickness, mils	ASTM D – 1777	40 min.
Tensile strength, lbs	ASTM D – 1682	115 min.
Elongation, %	ASTM D – 1682	55 min.
Puncture Strength, lbs	ASTM D – 751 (Modified)	70 min.
Mullen Burst Strength, psi	ASTM D – 751	260 min.
Coefficient of Permeability, Constant head cm./sec.		.10 min.

4. Trenches shall be excavated to a minimum depth of twenty six (26) inches below the top of the curb or as directed by the Street Superintendent.
5. Following excavation of the trench, the nonwoven geotextile fabric liner shall be placed in the trench. The liner shall be of sufficient width to cover the bottom and sides of the trench and lap a minimum of one (1) foot across the top of the granular filter material used to backfill above the top of the pipe.

ARTICLE FIVE

SECTION 1: Inspection and Sampling and Testing Requirements For Land Development

The following procedures will be used in the inspection, sampling and testing of improvements in the development process.

SECTION 2: Inspection

- a. The following three (3) types of inspections will be made during the progress of the project.
- b. Intermediate progress inspections, which can be made at any time.
- c. Phase inspections which are REQUIRED at the completion of a major phase of work.
- d. Final acceptance inspection which will be made upon completion of all work and approval of the final plat.
- e. All inspections will be made by the Street Superintendent or his designated representative. The phase inspections and the final inspection will be made with the Contractor and the Engineer.
- f. The street Superintendent has the authority to increase the amount of inspections and/or sampling and testing.
- g. A phase inspection is REQUIRED upon the completion of the following phases of work.
- h. Completion of the subgrade.
- i. Completion of the base course and curb and gutter.
- j. Completion of the paving.
- k. Any work performed on a phase prior to the approval of the previous phase shall be removed and replaced with satisfactory materials and workmanship.
- l. If the project is long, the phase inspections may be made on a smaller portion of the project, but not less than one thousand (1000) feet in length.
- m. The Engineer is responsible for contacting the Street Superintendent at least twenty four (24) hours prior to the need of a major phase inspection.

SECTION 3: Testing

- a. The Developer shall, with the approval of the Street Superintendent, retain the services of a testing laboratory or Registered Professional Engineer, practicing in the materials and testing field, hereafter referred to as the Lab Engineer, to perform all sampling and testing. The Developer will be responsible for the costs of all sampling and testing performed on the project, including any additional sampling and testing as a result of failing tests and/or poor workmanship.

- b. The Lab Engineer will report all test results to the Street Superintendent.
- c. In the case of failing tests or poor workmanship, the Street Superintendent may direct the Lab Engineer to perform additional sampling and testing. The Developer will be responsible for the costs of any additional sampling and testing resulting from failing tests and/or poor workmanship.
- d. The following is the minimum sampling and testing frequency:
 - 1. Cross Drain Backfill – minimum of one (1) density test per pipe or box culvert location.
 - 2. Storm drain Backfill – minimum of one(1) density test per five hundred (500) lineal feet of pipe when the storm drain is located in the street or under the curb and gutter.
 - 3. Embankment – minimum of one (1) density test per layer per five hundred (500) lineal feet or roadway.
 - 4. Subgrade – minimum of one (1) density test, one (1) Liquid Limit (LL) and one (1) Plastic Index (PI) per five hundred (500) lineal feet of roadway with a minimum of three (3) density tests and three (3) depth measurements per project. Also, there will be a minimum of one (1) gradation test and one (1) PI test per project.
 - 5. Lime Treated Subgrade – minimum of one (1) density test, one (1) depth measurement, one (1) Liquid Limit (LL) and one (1) Plastic Index (PI) per five hundred (500) lineal feet of roadway with a minimum of three (3) density and three (3) depth measurements per project.
 - 6. Base Course – minimum of one (1) density test and one (1) depth measurement (depth sounding) per five hundred (500) lineal feet of roadway, with a minimum of three (3) density tests and three (3) depth measurements per project. Also, there will be a minimum of one (1) gradation test and one (1) PI test per project.
 - 7. Asphalt Stabilized Base (Black Base), ACHM Binder, and ACHM Surface Courses – for each material, a minimum of one (1) density test and one (1) depth measurement per five hundred (500) lineal feet of roadway, with a minimum of three (3) density tests and three (3) depth measurements per project. Also, there will be a minimum of one (1) extraction to determine the asphalt content and aggregate gradation for each material for the project.
 - 8. Structural concrete for Drainage Structures – a minimum of one (1) set of three (3) concrete cylinders per fifty (50) cubic yards of concrete or portion thereof. One (1) cylinder will be broken at seven (7) days and the other two (2) will be broken at twenty-eight (28) days.

9. Structural Concrete for Curb and Gutter – a minimum of one (1) set of three (3) concrete cylinders per one thousand (1000) lineal feet of curb and gutter. One (1) cylinder will be broken at seven (7) days and the other two (2) will be broken at twenty-eight (28) days.
10. Concrete Pavement – a minimum of one (1) set of three (3) concrete test beams per five hundred (500) lineal feet of pavement, with a minimum of one (1) set per project. One beam shall be broken in seven (7) days and the second beam will be broken in twenty-eight (28) days. Also, one (1) core and depth measurement per five hundred (500) feet of completed pavement with a minimum of one (1) per project.

ARTICLE SIX

SECTION 1: Provisions for Acceptance of Non-specification Material and Workmanship for Land Development

- a. The following provides for corrective actions to be taken and/or provisions for accepting a street or road into the City system when test results indicate non-specification materials or workmanship have been incorporated into the street project. Any penalties which are assessed shall be paid to the City of Rogers Street Department Fund by the Owner/Developer before a street or road will be accepted by the City of Rogers. The penalties paid shall be used at the discretion of the City Council to maintain and/or construct roads and streets in the City of Rogers.
- b. Density for Embankment, Subgrade, Pipe Backfill, and Crushed Stone Base Course: Recompact until the minimum density is obtained.
- c. Depth of Lime Treated Subgrade: the depth of the lime treated subgrade shall be at least 5 ½ inches. If the depth is less than 5 ½ inches, additional lime shall be added to the section represented by the test and the section re-processed.
- d. Depth of Crushed Stone Base Course: The compacted base course shall be tested for depth and any deficiencies corrected by scarifying, placing additional material, mixing, reshaping, and recompacting to the specified depth and density.
- e. Density of ACHM Binder and Surface: No individual density shall be lower than 90.0% of maximum theoretical density. Any section with a density below that value shall be removed and replaced. The average of all densities for the project shall be not less than 92.0% of maximum theoretical density. If this average is less than 92%, the following penalties shall be assessed:
 - 91.5% to 91.9% -- 3% of the cost of in place material.
 - 91.0% to 91.4% -- 5% of the cost of in place material.

90.5% to 90.9% -- 15% of the cost of in place material.

90.0% to 90.4% -- 30% of the cost of in place material.

Below 90.0% -- Remove and Replace.

- f. Depth of ACHM Binder: The depth of the binder shall be as indicated in Article 3, Section 8 of this document. The average of all binder course depth measurements shall not be less than the depth shown in Table 2, and any depth in excess of + 3/8 inch will not be used in computing the binder course average depth. If the depth is less than shown in Table 2, the deficient depth will be added to the required depth of the surface course or concrete pavement
- g. Depth of ACHM Surface: The depth of the asphalt hot mix surface course shall be as indicated in Article 3, Section 8 of this document. The average of all surface course depth measurements shall not be less than the depth shown in Table 2, and any depth in excess of + 1/4 inch will not be used in computing the surface course average depth. If the total average depth of all courses above subgrade is less than indicated in Table 2, it will be corrected by overlaying with additional ACHM surface, or as directed by the Street Superintendent.
- h. Surface Tolerance of ACHM Surface: If the surface deviation is greater than + or - 1/4 inch when checked with a TEN (10) foot straightedge, the surface smoothness will be corrected as directed by the Street Superintendent.
- i. Class A Structural Concrete Strength: The average 28 day compressive strength of the two (2) cylinders of a set shall be at least 3000 PSI. If the average strength is lower, the following penalties shall be assessed:
 - 2750 to 2999 PSI – 5% of the cost of in place material.
 - 2500 to 2749 PSI – 10% of the cost of in place material.
 - 2250 to 2499 PSI – 20% of the cost of in place material.
 - 2000 to 2249 PSI – 40% of the cost of in place material.
 - Below 2000 PSI – Remove and Replace.
- j. Class S (AE) Air Entrained Structural Concrete Strength: The average 28 day compressive strength of the two (2) cylinders of a set shall be at least 4000 PSI. If the average strength is lower, the following penalties shall be assessed:
 - 3750 to 3999 PSI – 5% of the cost of in place material.
 - 3500 to 3749 PSI – 10% of the cost of in place material.
 - 3250 to 3499 PSI – 20% of the cost of in place material.
 - 3000 to 3249 PSI – 40% of the cost of in place material.
 - Below 3000 PSI – Remove and Replace.
- k. Concrete Pavement Strength: The average 28 day compressive strength of the two (2) cylinders of a set shall be at least 4000 PSI. If the average strength is lower, the following penalties shall be assessed:
 - 3750 to 3999 PSI – 3% of the cost of in place material
 - 3500 to 3749 PSI – 7% of the cost of in place material.
 - 3250 to 3499 PSI – 15% of the cost of in place material.
 - 3000 to 3249 PSI – 30% of the cost of in place material.

Below 3000 PSI – Remove and Replace.

- l. Concrete Pavement Depth: The concrete pavement depths shall be within + or – ¼ inch of the required depth plus any additional depth required as a result of deficient base preparation. The average of all concrete depth measurements shall not be less than the required depth, and any depth in excess of + ¼ inch will not be used in computing the average depth. If the average depth is less, the following penalties shall be assessed:
 - Req Depth to –1/8 inch – 3% of the cost of in place material.
 - Minus 1/8 to –1/4 inch – 7% of the cost of in place material.
 - Minus 1/4 to –3/8 inch – 15% of the cost of in place material.
 - Minus 3/8 to –1/2 inch – 30% of the cost of in place material.
 - More than minus 1/2 inch – Remove and Replace.
- m. Surface Tolerance of Concrete Pavement: The concrete surface shall not show any deviation greater than ¼ inch when checked with a ten (10) foot straightedge. Any deviation greater than this shall be corrected by grinding, removing and replacing, or as directed by the Street Superintendent.

ARTICLE SEVEN

SECTION 1: Administration, Enforcement and Amendment

- a. The Street Superintendent and/or City Engineer shall be responsible for the approval of proposed street and storm drainage plans and specifications; and the inspection, testing and acceptance of said improvements, including off-site improvements.
- b. The City Council shall be responsible for maintaining, amending, modifying and updating this Ordinance with assistance from the Planning commission and street Superintendent.

SECTION 2: Appeal

Appeals of a decision of the Street Superintendent and/or City Engineer shall be to the Planning Commission, which shall make a recommendation to the City Council. The developer or Engineer shall file a letter of appeal with the Planning commission within 15 days of a decision by the Street Superintendent and/or City Engineer. The letter shall state the decision of the Street Superintendent and/or City Engineer and the reasons for the appeal.

SECTION 3: Variations

- a. If the provisions of this Ordinance are shown by the Developer to cause undue hardships as they apply to the proposed land development, a variance request may be made to the Planning Commission. The Planning Commission shall review the variance request and make a recommendation to the City Council.

The City Council may grant a variance, deny a variance or return the request to the planning commission for further study and recommendation. The granting of a variance shall not have the effect of nullifying the intent and purpose of this Ordinance. In granting a variance the City Council may impose such conditions as will, in its judgement, secure substantially the objectives of the standards or requirements so varied or modified.