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CHAPTER 1113
IMPROVEMENTS

CROSS REFERENCES

Grade levels – see Administrative 103.01
Street excavations and improvements – see Streets, Utilities & Public Services Chapter 901
Construction of sidewalks and curbs – see Streets, Utilities & Public Services 903.02
Storm drainage to sanitary sewer prohibited – see Streets, Utilities & Public Services 925.01, 925.02
Design standards – see Planning and Zoning Chapter 1111
Median strips – see Planning and Zoning Chapter 1119

SECTION 1113.01 CONFORMITY REQUIRED; MINIMUM REQUIREMENTS.

The minimum improvements which the subdivider will be required to make or enter into agreement to make in a subdivision prior to the approval of the final map by the Planning Commission shall be prescribed by the following provisions. All these improvements shall be carried out in full compliance with the specifications for each of the various branches of the work. Nothing in these Regulations shall be construed to prohibit the

subdividers from constructing higher types of improvements than the minimum required by the City as hereinafter described. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.02 STREET IMPROVEMENTS; PERMIT.

The subdivider shall improve all streets or highways which are a part of the subdivision. Streets shall be constructed in accordance with one of the two alternates specified in these Subdivision Regulations; that is, Section 1113.05, Rigid Pavement, or Section 1113.09, Flexible Pavement. In addition, new or existing construction within the right of way damaged beyond reasonable wear or tear by construction equipment or excessive trench work shall be restored to its original condition.

Any construction performed within the right of way of an unaccepted subdivision under bond by anyone other than the subdivider will require approval and permits from the City in accordance with Chapter 901 of the Streets, Utilities and Public Services Code. However, if the subdivider agrees in writing to assume responsibility for the work performed, permits will not be required. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.03 EARTHWORK.

(a) Roadway Excavation. The roadway shall be excavated to conform to the cross sections shown on the plans. Roadway excavation shall be performed according to the State of Ohio Department of Highways Construction and Material Specifications except as specified below. The subgrade shall be compacted to the requirements of Section 1113.05(b) for rigid pavements and Section 1113.10 for flexible pavements.

(b) Trench Excavations. The excavations within the dedicated right of way for sewers, water, gas or electrical conduits over five feet in depth shall be shored or sheeted and braced in accordance with Specific Safety Requirements of the Industrial Commission of Ohio Relating to Construction (IC-3), effective April 1, 1968, published by the State of Ohio, Department of Industrial Relations. Trenches shall be backfilled as follows:

(1) Within the Traveled Roadway. Trenches shall be backfilled with granular material. Granular material shall meet the requirements set forth in Section 203.02 of the State of Ohio Department of Highways Construction and Material Specifications, the January 1, 1971 edition, except that slag and cinders may not be used.

(2) Outside the Limits of the Traveled Roadway. Trenches may be backfilled with granular material or excavated materials where tests by an independent testing laboratory show that the material is acceptable.

However, the trench shall be backfilled with granular material to a point one foot above the top of the pipe or conduit.

All backfill material shall be compacted by mechanical or other approved means to the requirements of Subsection (c) hereof.

(c) Embankment. Where a roadway, sidewalk or curb is built on a fill, the same shall be constructed by placing approved fill material in maximum eight-inch lifts, as specified below. From the surface of the subgrade to a point two feet below the surface of the subgrade, the embankment shall be compacted to at least ninety-five percent of the material's maximum density based on optimum water content of the material (AASHO Designation T-180-57 Method "C"), as determined by an independent testing laboratory, if determined necessary by the City Engineer. The remainder of the embankment shall be compacted to at least ninety percent of the material's maximum density based on optimum water content of the material (AASHO Designation T-180-57 Method "C"), as determined necessary by the City Engineer. The location and number of tests are to be determined by the City Engineer.

All such tests required shall be paid for by the developer, and additional tests may be required if subsequent circumstances occur rendering the above required test inconclusive. Embankment shall be constructed according to the current requirements of the State of Ohio Department of Highways Construction and Material Specifications, the January 1, 1971 edition, except as specified above. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.04 STANDARD DRAWINGS.

The following standard drawings, on file in the Division of Engineering, are for the guidance of the developer or builder and are to be considered as part of the requirements of these Subdivision Regulations.

DRAWING NO. 1036

1 of 11 Typical Street Sections
2 of 11 Rigid Pavement Details
3 of 11 Curb and Gutter Details
4 of 11 Sidewalk Details
5 of 11 Drive Approach Details
6 of 11 Alley Details
7 of 11 Open Channel Details
8 of 11 Catch Basin Details
9 of 11 Manhole Details
10 of 11 Casting Details
11 of 11 Flexible Pavements and Trench Details

(Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.05 RIGID PAVEMENT.

The following specifications shall be complied with when a street is constructed with Portland cement concrete:

(a) Thickness. The uniform thickness of plain Portland cement concrete pavement shall be six inches for residential and collector streets, and nine inches for arterial streets (100 feet right of way) and thoroughfares (120 feet right of way).

(b) Subgrade. The subgrade shall be constructed to the required elevation below the finished street surface and shall be rolled until it is compacted to at least ninety-five percent of the material's maximum density based on optimum water content of the soil (AASHO Designation T-180-57 Method "C"), as determined by an independent testing laboratory, if determined necessary by the City Engineer. The minimum number of tests shall be at least one for each day's placement or 500 linear feet of pavement, whichever length is shorter. The location of these tests is to be determined by the Engineer. The developer shall furnish the Engineer with proof of proper compaction before placing any concrete. All such tests required shall be paid for by the developer. Additional tests may be required if subsequent circumstances occur rendering the above required tests inconclusive.

(c) Material. Prior to use of any Portland cement concrete within a subdivision, the developer shall supply the City with a mix design prepared by an independent testing laboratory according to A.C.I. Standard 613 that will meet all of the requirements set forth in Section 1113.06 and 1113.07. This mix design will remain in effect until a new source of material is sued, at which time a new mix design shall be submitted.

(d) Construction. The specifications set forth in Section 1113.08 shall be complied with in the construction of a Portland cement concrete pavement. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.06 CONCRETE DESIGN.

(a) Concrete shall develop at seven and twenty-eight days. The average compressive strength is indicated in the following table.

	Average Strength (psi)	Minimum Strength (psi)
7-day test	2,900	2,400
28-day test	3,900	3,400

(b) The amount of cement shall not be less than six sacks per cubic yard of concrete. In proportioning materials for concrete, one sack of cement weighing ninety-four pounds shall be considered as one cubic foot.

(c) Fine and coarse aggregate shall be measured separately and fine aggregate shall not be less than thirty percent nor more than forty-five percent of the volume of the aggregate.

(d) The amount of water shall be only sufficient to obtain a workable mix. The water-cement ratio (gallons/sack) shall not be more than six to one, but in no case shall the slump of concrete exceed four inches when tested according to ASTM Method C-143.

(e) The percentage of entrained air shall be between five and eight percent, by volume, when tested according to ASTM C-231. An air entraining agent may be added at the site if the first load of concrete proves to be deficient. However, the second load and succeeding loads shall be rejected and the air content corrected by the concrete producer.

(f) The developer and supplier shall permit access to the work and materials for all required tests and inspections. Yield tests will be made by the Engineer for the purpose of determining the cement content per cubic yard of concrete if determined necessary. If at any time such cement content is found to be less than that specified above, the batch weights of fine and coarse aggregate shall be reduced proportionally until the cement per cubic yard of concrete is not less than specified.

Test cylinders will be made from concrete incorporated in the work and test cores will be cut from the completed work when required by the Engineer. Cylinders falling below the average compressive strengths shown in the table in Subsection (a) hereof will be sufficient reason for increasing the cement content without additional cost to the City. Cylinders falling below the minimum compressive strength shown in the table in Subsection (a) hereof will be sufficient reason for rejection of the work involved.

The measurement of the volume of entrained air in the freshly mixed Portland cement concrete will be determined by the Engineer. Failure of the percentage of entrained air to fall within the specified limits will be sufficient reason for rejecting the material. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.07 MATERIALS.

(a) Portland cement shall meet the requirements of ASTM Designation C-150 for plain cement or C-175 for air-entraining cement. Type I or IA cement shall be used. The letter "A" designates air-entraining Portland cement. If high early strength concrete is required, Type III or IIIA shall be used.

(b) Fine and coarse aggregates shall meet the requirements of Section 703.02 of the State of Ohio Department of Highways Construction and Material Specifications, the January 1971 edition, except that the use of slag shall not be permitted. The gradation of coarse aggregate shall meet the requirements of Section 703.01 for size No. 57 Aggregate.

(c) Water used in mixing concrete shall be clean and free from deleterious amounts of acids, alkalis or organic materials.

(d) Air-entraining admixtures used with plain cement or with air-entraining cement shall meet the requirements of Section 705.10 of the State of Ohio Department of Highways Construction and Material Specifications, the January 1, 1971 edition, and shall be specifically prepared for air-entrainment only.

(e) The above materials shall be the only ingredients in the concrete.

(Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.08 CONSTRUCTION

(a) Job-mixed concrete shall not be used unless permission is obtained from the City Engineer. Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in "Standard Specifications for Ready-Mixed Concrete" (ASTM Designation C-94) except that concrete shall be delivered to the work site and discharged from the mixer or agitator within one hour after all ingredients are in the mixer or agitator. Delivery tickets shall be time stamped when all ingredients are in the mixer or agitator.

(b) Forms shall conform to the shape, lines and dimensions of the members as called for on the plans, shall be substantial and sufficiently tight to prevent leakage of mortar, and properly braced or tied together so as to maintain position and shape. The use of bent or damaged side forms varying more than one-eighth of an inch in ten feet of length from the true plane of the top and one-fourth of an inch in ten feet on the vertical face shall not be permitted.

(c) Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not fall free more than five feet. The concreting shall be carried on at such a rate that the concrete is at all times plastic

and flows readily. No concrete that has partially hardened or been contaminated by foreign material shall be deposited on the work, nor shall retempered concrete be used. When concreting is once started it shall be carried on as a continuous operation until the placing of a section is completed. The top surface shall conform to the specified cross-section and profile as shown on the plans. No water or cement shall be added to the surface of the pavement at any time during construction.

(d) Joints shall be constructed where shown on the construction drawings or where required by the Engineer and shall conform to the details set forth on the standard drawings.

(e) Following compacting, the concrete shall be finished and floated in a manner approved by the Engineer. After floating has been completed and while the concrete is still plastic, it shall be tested for trueness with ten foot straightedges. After final curing, the concrete pavement will be tested for smoothness with an approved surface testing machine and all such surface variations of more than one-fourth of an inch in a ten-foot length of pavement for a fifty-foot right of way and more than three-sixteenths of an inch in a ten-foot length of pavement for rights of way of 60 through 120 feet, inclusive, shall be ground off to within the specified tolerances. Sections of pavements containing depressions which cannot be corrected by grinding shall be replaced by the contractor to the satisfaction of the Engineer.

Before the concrete has taken its initial set, the edges of the pavement along each side of each slab and on each side of transverse expansion joints shall be worked with an approved tool and rounded to a radius of one-quarter inch. Any tool marks left by the edging shall be eliminated by texturing the surface. The final surface shall be a broomed finish.

(f) The following provision shall be made for the proper curing of all concrete. Immediately after the final finishing and after the free water has disappeared, all exposed surfaces of the concrete shall be sealed by spraying thereon, as a fine mist, a uniform application of the curing material in such a manner as to provide a continuous, uniform, water-impermeable film without marring the surface of the concrete. A minimum of one gallon of material shall be used for each 200 square feet of surface treated. Curing material shall be white in color and in accordance with ASTM Designation C-156. The material shall be of such a nature or so treated that it will be distinctly visible for at least four hours after application. Concrete to be placed after October 31 of any year, which will be opened to traffic during the following winter shall be cured by the use of polyethylene sheeting placed as soon after the finishing operations as possible without marring the surface of the concrete. The entire surface of the top and sides of the newly placed concrete shall be covered and maintained covered for seven days after it has been placed and shall be cured as specified above.

(g) Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near freezing weather. No concrete shall be placed

when the temperature of the surrounding air is below thirty-two degrees Fahrenheit, unless permission is obtained from the City Engineer. All concrete materials and all reinforcement forms, fillers and ground with which the concrete is to come in contact shall be completely free from frost. Whenever the temperature of the surrounding air is below forty degrees Fahrenheit, all concrete placed in the forms shall have a temperature of between fifty and seventy degrees Fahrenheit, and adequate means shall be provided for maintaining a temperature of not less than fifty degrees Fahrenheit for a minimum of three days, except that when high early strength concrete is used, the temperature shall be maintained at not less than fifty degrees Fahrenheit for two days or for as much more time as is necessary to insure proper curing of the concrete.

The above requirements for curing are minimum requirements only. Any concrete showing injury or damage due to inadequate curing shall be repaired or replaced by the developer prior to acceptance. No dependence shall be placed on salt or other chemicals for the prevention of freezing. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.09 FLEXIBLE PAVEMENT.

The specifications as set forth in Sections 1113.10 through 1113.17 shall be complied with when a street is constructed with an asphalt concrete surface over a waterbound macadam (modified) base, No. 304 aggregate base, bituminous aggregate base or lime-fly ash stabilized base, as the same are set forth in the State of Ohio Department of Highways Construction and Material Specifications, the January 1971 edition. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.10 FLEXIBLE PAVEMENT SUBGRADE.

The subgrade shall be constructed to the required elevation below the finished street surface and compacted according to the requirements of Section 1113.05(b). (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.11 WATERBOUND MACADAM (MODIFIED) BASE.

(a) Thickness. The required compacted thickness of courses shall be as follows:

	Right of Way Widths	
	50 feet to 60 feet (in inches)	100 feet to 120 feet (in inches)
*Screenings	1	1
No. 2 Size Aggregate	4	10
No. 304 Aggregate	3	4
TOTAL:	7	14

*Not included in the total thickness of the base.

(b) Material. The base shall be composed of crushed limestone or crushed gravel and screenings meeting the following requirements of the Construction and Material Specifications of the Ohio Department of Highways, the January 1971 edition:

Sections 703.01 and 703.04 for No. 2 Aggregate
Sections 304.02 and 703.04 for No. 304 Aggregate
Section 703.10 for Screenings.

(c) Construction.

(1) Forms. Except where the base course is placed between curbs, edge support shall be provided by means of a minimum eighteen inch width of soil, placed to a height that will consolidate to the height of the lift being compacted. The edge of the soil shall be supported by forms until the base material is spread.

(2) Spreading Materials. A one-inch course of screenings shall be spread on the prepared and accepted subgrade. This layer of screenings constitutes a dry inverted choke and shall not be rolled.

The No. 2 size aggregate shall be uniformly spread on the inverted choke and when placed shall have a uniform distribution as to size. When used, side forms shall be removed and the voids filled prior to compacting the material.

When rollers alone are used for keying and filling, the maximum compacted thickness of any one lift shall be five inches. When approved vibratory compactors are used in conjunction with rollers, the maximum compacted thickness of any one lift shall be ten inches.

The No. 304 aggregate shall be placed on the completed waterbound No. 2 size aggregate according to the requirements of Section 1113.12(c).

(3) Compaction. The No. 2 size aggregate shall be keyed, filled and compacted as follows: rollers weighing at least eight to ten tons or rollers and approved vibratory compactors shall be used for the keying and filling operation. The rolling of unfilled aggregate shall be only sufficient to obtain maximum keying, i.e. the aggregate does not creep or wave ahead of the roller, but the total rolling time shall be equivalent to eight hours for each 1,000 square yards of each lift. Keying shall not be started until the coarse aggregate has been spread for the full width of the pavement. Rolling shall begin at the edges of the lift and, where curbs are not a part of the new construction, the roller shall cover the full eighteen inches of the earth backing and extend over the loose aggregate. After the edges have been so rolled, the rolling shall progress gradually toward the center line.

After the aggregate has been thoroughly keyed, dry screenings shall be applied evenly and gradually on the surface of the coarse aggregate. The filling shall be accompanied by using rollers, graders, spreaders or other approved methods, and shall be continued, placing and sweeping screenings by hand where necessary, until no more screenings will go in dry and there is an excess on the surface of the lift just sufficient to cover the pattern of the coarse aggregate.

The No. 304 aggregate shall be compacted according to the requirements of Section 1113.12(c).

(4) Waterbinding. After the voids of a section of the No. 2 size aggregate lift have been filled with screenings, the section shall be waterbound as soon as possible. This water shall be applied with suitable sprinkler trucks or pressure distributors of such capacity that once the waterbinding of a section is started the water shall be adequate and the operation shall be continuous until complete. Sprinkling of the lift shall be accompanied by rolling and brooming. More screenings shall be added if necessary. This rolling and brooming shall be continued until a grout of the screenings and water has been formed sufficient to form a wave in front of the rolls of the roller. When the first lift has been completed, no free water shall be permitted on its surface before the second lift, when required, is constructed upon it. The contractor is responsible for insuring that no waterbinding takes place when the atmospheric temperature is at or below freezing.

(d) Protection. The first course shall be maintained in its finished condition until the second course is constructed upon it. Normal traffic will be permitted upon the completed No. 304 aggregate base course provided that the surface is restored to its original finished condition before the asphalt concrete intermediate course is applied. Restoration to

proper grade shall be accomplished by the removal of all dirt, debris and loose stone and, when necessary, by the addition of No. 304 aggregate, well watered and rolled into place. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.12 NO. 304 AGGREGATE BASE.

(a) Thickness. The required compacted thickness shall be as follows:

	Right of Way Widths	
	50 feet to 60 feet (in inches)	100 feet to 120 feet (in inches)
No. 304 Aggregate	8	16

(b) Material. The base shall be composed of crushed limestone or crushed gravel and screenings, meeting the following requirements of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition:

Sections 304.02 and 703.04 for No. 304 aggregate.

Prior to the use of No. 304 aggregate, the developer or subdivider shall require the aggregate producer to supply the City with the results of tests, specified by the City Engineer, performed on the material. Whenever a new source of material is used or the aggregate characteristics change appreciably, new test results shall be submitted.

(c) Construction.

(1) Placing. The No. 304 aggregate shall be placed according to the requirements of Section 304.03 of the State of Ohio Department of Highways Construction and Materials Specifications, the January 1, 1971 edition.

(2) Compaction. The No. 304 aggregate shall be compacted to ninety-eight percent of its maximum density based on optimum water content of the material (AASHO T-180 Method "C"). The surface of each layer shall be maintained during the compaction operations in such a manner that a uniform texture is produced and the aggregates firmly keyed. Water shall be uniformly applied over the base materials during compaction in the amounts necessary to maintain the moisture at or near optimum. The No. 304 aggregate shall be primed as soon as possible after compaction has been completed and material has dried out. All tests required for the construction of the No. 304 aggregate course shall be paid for by the developer.

(d) Protection. The first course shall be maintained in its finished condition until the second course is constructed upon it. Normal traffic will be permitted upon the completed No. 304 aggregate base course provided that the surface is restored to its original finished condition before the asphalt concrete intermediate course is applied. Restoration to proper grade shall be accomplished by the removal of all dirt, debris and loose stone and, when necessary, by the addition of No. 304 aggregate, well watered and rolled into place. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.13 BITUMINOUS AGGREGATE BASE.

(a) Thickness. The required compacted thickness of courses shall be as follows:

	Right of Way Widths	
	50 feet to 60 feet (in inches)	100 feet to 120 feet (in inches)
No. 304 Aggregate	5	5
Bituminous Aggregate	3	5-1/2
TOTAL:	8	10-1/2

(b) Material. The No. 304 aggregate shall meet the requirements specified in Section 1113.12(b).

Bituminous aggregate shall meet the requirements of Sections 301.02 and 301.03 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition, except that slag shall not be used. Prior to the use of any bituminous aggregate base within a subdivision, the developer or subdivider shall require the bituminous aggregate producer to supply the City with a mix design. This mix design will remain in effect until a new source of material is used, at which time a new mix design shall be submitted.

(c) Construction. The No. 304 aggregate shall meet the construction requirements specified in Section 1113.12(c).

The bituminous aggregate course shall be replaced on the completed No. 304 aggregate course in accordance with the requirements of Item 301 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition, except that the requirements of Sections 301.16 and 401.16 will not be applicable. The maximum compacted depth of any one layer shall be six inches. Bituminous aggregate shall not be placed when the prepared surface is wet, when the air temperature is below forty degrees Fahrenheit or when weather conditions otherwise prevent proper handling.

(d) Protection. The No. 304 aggregate course shall be maintained in its finished condition until the bituminous aggregate course is constructed upon it. Normal traffic will be permitted upon the completed bituminous aggregate base provided that the surface is thoroughly cleaned and defective areas repaired before the asphalt concrete intermediate course is placed. If the intermediate course is not placed at the same time as the bituminous aggregate base, a tack coat shall be placed on the base course prior to placing the intermediate course. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.14 LIME-FLY ASH STABILIZED BASE.

(a) Thickness. The required compacted thickness of courses shall be as follows:

	Right of Way Widths	
	50 feet to 60 feet (in inches)	100 feet to 120 feet (in inches)
TOTAL STABILIZED BASE	6	9

(b) Material. The base material shall consist of a mixture of aggregate, hydrated lime and fly ash meeting the following requirements:

(1) Hydrated lime shall meet the requirements prescribed in Standard Specifications for Hydrated Lime for Masonry, ASTM Designation C-207, Type N, for chemical composition, residue, sampling, inspection and methods of test. Sections 3-b, 4 and 5 are not relevant to the intended usage.

(2) Fly ash shall conform to the following requirements:

Chemical requirements: Silicon Dioxide ($Si O_2$) minimum 35%, Ferric Oxide ($Fe_2 O_3$) plus Aluminum Oxide ($Al_2 O_3$), minimum 25%, less on ignition 15%.

Physical requirements shall conform to the requirements of ASTM Designation C-593.

(3) Aggregate shall be sound, durable limestone or gravel meeting the requirements of Sections 304.02 and 703.04 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition.

(c) Mix Composition. The aggregate, hydrated lime, water and fly ash shall be accurately proportioned and thoroughly mixed in a mix plant. The quantity of fly ash to be used shall be approximately ten percent of the weight of the aggregate treated and the

quantity of hydrated lime to be used shall be between three and one-half and eight percent of the weight of the aggregate and fly ash combination. Moisture shall be added to insure that optimum moisture will be obtained when the mixture is compacted. The mixing operations shall be continued until all the materials are distributed evenly throughout the mixture. The proportioning of the ingredients in the mix shall be controlled within the following tolerances:

Lime	±	0.15%	by weight
Fly ash	±	1.00%	by weight
Aggregate	±	1.50%	by weight

The actual proportions of lime, fly ash, water and aggregate shall be determined by an independent testing laboratory at no cost to the City. Whenever any one of the ingredients differs from that used in the original mix design, a new design shall be established by the testing laboratory. However, when tests indicate that the requirements specified in this section and in subsection (d)(3) hereof are not being met, the proportions may be altered and additional mix designs obtained.

The proportions of the mixture shall be such that when tested in the laboratory as specified herein, the unconfined compressive strength, in seven days, will be a minimum of 750 pounds per square inch. The mixture, obtained from the plant, shall be adjusted to optimum moisture content by the laboratory, placed in a mold and compacted in accordance with the appropriate sections of AASHO T-99 Method "C". The prepared four-inch diameter cylinder shall then be placed in a sealed container to preserve the moisture content, placed in an oven and cured seven days at a temperature of 140 degrees Fahrenheit. At the end of seven days, the cylinders shall be removed from the containers, capped and broken.

The mixture obtained in the field shall be placed in the mold, compacted and tested as specified above, except that the moisture content shall not be altered from its existing field condition.

(d) Construction.

(1) Forms. Forms shall meet the requirements of Section 1113.11(c)(1).

(2) Spreading. The stabilized material shall be spread uniformly on the prepared subgrade for the full width of pavement being constructed. When used, side forms shall be removed and the voids filled prior to compacting the material. The maximum compacted thickness of any one lift shall be six inches. When additional material is to be placed on a completed lift, the top one inch of the compacted lift shall be scarified. When the weather is hot and dry, as determined by the City Engineer, the subgrade shall be moistened prior to spreading the material. No stabilized material shall be placed or treated during wet

or unsuitable weather or when the atmospheric or ground temperature is below forty degrees Fahrenheit.

(3) Compaction. The material shall be compacted starting at the edge of the course and progressing toward the center line. Where curbs are not a part of the construction, the roller shall cover the entire earth backing and extend over the loose base material. The material shall be compacted until the density is not less than ninety-five percent of the material's density based on optimum moisture content (AASHO T-180 Method "C"), as determined by an independent testing laboratory at no cost to the City. Density tests and test cylinders made from material obtained in the field shall be made as directed by the City Engineer, but at least one set of tests will be required for every 1,000 square yards of base laid.

If for any reason construction operations are delayed or suspended, the uncompacted material shall be removed and disposed of, if determined necessary by the City Engineer.

(4) Finishing. After the material has been compacted, the surface shall be shaped to the lines, grades and cross sections specified. During the shaping operation, the surface shall be lightly scarified to eliminate any imprints left by shaping or compaction equipment. The surface shall then be compacted to the specified density.

During the finishing operation, the moisture content of the surface material shall be maintained at not less than that specified. The surface compaction and finishing operation shall produce a smooth, dense surface, free of compaction planes, cracks, ridges or loose material. The finishing operation shall be continuous and shall be completed during normal construction hours.

Construction joints shall be placed at the end of each day's work and/or when directed by the City Engineer. The joint shall be made by trimming the end of the compacted base to a straight line, normal to the center line of the pavement, and with a vertical edge in the compacted portion of the material. When additional material is placed against this edge, it shall be scarified and the new material blended in.

The completed stabilized base shall be covered within twenty-four hours with bituminous material meeting the requirements of Section 1113.16 and applied at the rate of one-tenth to fifteen-hundredths of a gallon per square yard.

(e) Protection. No traffic will be permitted on the base course until the intermediate asphalt concrete course has been placed on the base material. Prior to placing the asphalt concrete, the base shall be cleaned and repaired and additional bituminous material applied, as directed by the City Engineer. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.15 PRIME COAT.

Prime coats shall be prepared and applied in accordance with the requirements of Item 408 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition. The material shall be MC-30 or RC-70 and shall be applied at the rate of three-tenths to one-half gallon per square yard. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.16 TACK COAT.

Tack coats shall be prepared and applied in accordance with the requirements of Item 407 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition. The material shall be RC-70, RS-1 or RS-2 and shall be applied at the rate of one-tenth to fifteen-hundredths of a gallon per square yard. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.17 ASPHALT CONCRETE.

(a) Thickness. The required compacted thickness of courses shall be as follows:

	Waterbound Macadam (Modified) base and 304 Aggregate Base		Bituminous Aggregate Base		Lime-Fly Ash Stabilized Base	
	50-60 ft. R/W (in.)	100-120 ft. (R/W (in.)	50-60 ft. R/W (in.)	100-120 ft. R/W (in.)	50-60 ft. R/W (in.)	100-120 ft. R/W (in.)
No. 403 Intermediate course	1-1/2	2		1-1/2	1-1/4	1-1/2
No. 404 Surface course	1-1/2	2	2	1-1/2	1-1/4	1-1/2
TOTAL:	3	4	2	3	2-1/2	3

(b) Material. The asphalt concrete material shall meet the requirements of Item 403 for the intermediate course, and Item 404 for the surface course, of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition. Prior to the use of any asphalt concrete within a subdivision the developer or subdivider shall require the asphalt concrete producer to supply the City with a mix design. This mix design

will remain in effect until a new source of material is used, at which time a new mix design shall be submitted.

(c) Construction. The asphalt concrete courses shall be constructed in accordance with the requirements of Item 403 of the Construction and Material Specifications of the Ohio Department of Highways, the January 1, 1971 edition, for the intermediate course and Item 404 for the surface course, except that the surface course need not be placed within ten days, as specified in Section 404.11. The requirements of Sections 403.16, 404.16 and 401.16 will not be applicable.

The developer or subdivider may proceed at this or its own option with the construction of waterbound macadam (modified) base, 304 aggregate base, bituminous aggregate base, or lime-fly ash stabilized base and the intermediate and surface courses of asphalt concrete, in the same season that underground utilities have been constructed. When the surface and intermediate courses are not placed at the same time, a tack coat shall be placed on the intermediate course prior to placing the surface course. Further, during the ensuing weather period, the developer or subdivider shall fill any and all holes and settlements which are detrimental to traffic safety and shall maintain the street in a safe, accessible manner. Defective areas in the intermediate course shall be removed, repaired and inspected before placing the surface course.

Asphalt concrete shall not be placed when the prepared surface is wet, when the air temperature is below forty degrees Fahrenheit at the job site, when weather conditions otherwise prevent proper handling or when frost is evident in the base. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.18 SURFACE TOLERANCE.

The completed surface course of the flexible pavement will be tested for smoothness with an approved surface testing machine and all such surface variations of more than one-quarter inch in a ten-foot length of pavement shall be ground off to within the specified tolerances. Sections of pavements containing depressions which cannot be corrected by grinding shall be replaced by the contractor to the satisfaction of the City Engineer. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.19 EQUIPMENT.

All equipment which is proposed to be used in constructing the pavements shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. All equipment shall be subject to the approval of the City Engineer and, when found unsatisfactory, shall be replaced or improved. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.20 CURBS AND GUTTERS.

Curbs and gutters shall be required in all subdivisions. Whenever all lots in a subdivision have a width of 100 or more feet at the building line, or when a public sanitary or storm sewer system is not available nor planned for the district, the Planning Commission may waive the requirements of this section, provided that sidewalks are not also required.

Use of curbs and gutters shall be as follows:

Type A - Integral Roll Curb
Concrete streets in residential areas with rights of way of fifty feet and sixty feet

Type B - Combined Curb and Gutter
With all flexible pavements.

Type BA - Combined Roll Curb and Gutter
With flexible pavements in residential areas with rights of way of fifty feet and sixty feet.

Type C - Integral Curb and Gutter
Concrete streets in business and industrial areas and with rights of way of 100 feet and 120 feet.

Type D - Median Curb
Around all median sections.

Types A and C shall be placed integrally with Portland cement concrete pavements. Types B, BA and D shall be placed on at least three inches of gravel, when determined necessary by the City Engineer. Concrete for all types of curbs and combined curbs and gutters shall meet the requirements set forth in this chapter. All curbs shall be backfilled prior to the movement of any vehicle over the roadway area, or within thirty days from the date of the initial concrete placement, whichever is sooner.

A minimum of two drain tiles shall be installed on each lot and shall be placed so as to conform with the side yard requirements of that particular zoning district. Should additional drain tile outlets be required after the curb is in place, a permit shall be obtained in accordance with the requirements of Chapter 901 of these Codified Ordinances. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.21 SIDEWALKS.

(a) Requirements. Sidewalks shall have a width of four feet in all residential areas. On thoroughfares, arterials or residential streets serving as collectors of traffic from minor streets, five feet wide sidewalks shall be required. Where sidewalks intersect at street intersections, the area between them and the curb shall be filled in as additional sidewalk when required by the City Engineer. At least three inches of gravel shall be filled in as additional sidewalk when required by the City Engineer. At least three inches of gravel shall be placed under all sidewalks when determined necessary by the City Engineer. Concrete for sidewalks shall meet the requirements set forth in this chapter.

(b) Grading of Streets for Future Sidewalks. Notwithstanding any waiver of requirements for immediate construction of sidewalks, all streets shall be graded within the rights of way for future sidewalk construction at the estimate design with the width of the right of way in conformity with the Official Thoroughfare Plan. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.22 DRIVE APPROACHES.

Drive approaches shall be constructed as shown on the standard drawings. The location, type and width shall be approved by the City Engineer. Concrete drive approaches shall be used in all subdivisions where curb and gutters are required. They shall be a minimum of six inches thick and the concrete shall meet the requirements set forth in this chapter. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.23 WATER MAINS.

Where a public water supply is within a reasonable distance as determined by the Planning Commission, the subdivider or developer shall construct a system of water mains and connect with such public water supply and provide a connection for each lot with laterals extended to the lot line. All water mains shall have at least forty-eight inches of cover. all water mains shall be sectionalized and looped. No dead-end lines will be permitted. No water line shall be less than six inches in diameter in single-family residential areas nor less than eight inches in diameter in multi-family, business and industrial areas. Larger water mains may be required for manufacturing districts, depending on the type of industry.

Fire hydrants shall be placed not over 500 feet from principal structures in a Residential Estates (R-E) District with their location to be approved by the Fire Chief. Hydrants shall be placed not over 500 feet apart, measured on the main, in Single-Family (R-1 and R-2) Residential Districts. In Multi-Family Residential (R-3 and R-4), Commercial (B-1-A, B-1, B-2, B-3) and Industrial (M) Districts, fire hydrants shall not be over 300 feet

apart, measured on the main, and not more than 400 feet from any opening in any building. Further, when dedicated streets exist, water mains should be located in the required street right of way. When water mains are located on private property, the location of hydrants must be approved by both the Fire Chief and the City Engineer and fire trucks must be provided with safe and unconstrained access to all fire hydrants.

All fire hydrants shall have two 2-1/2 inch hose nozzles and one 4 inch steamer nozzle. All hydrant outlet nozzles shall be set at eighteen inches to twenty-one inches above finished grade in all cases.

All main line valves shall be placed not over 800 feet apart in single-family residential areas and not over 500 feet apart in multi-family residential, business and industrial areas. Main line valves shall be so located that when necessary only small local areas need be isolated. (Ord. 1942-69. Passed 4-8-69; Ord. 2400-72. Passed 5-23-72.)

SECTION 1113.24 SANITARY SEWERS.

If a subdivision can be reasonably served by the extension of an existing public sanitary sewer, as determined by the Planning Commission, the subdivider or developer shall provide a system of sanitary sewer mains and shall provide lateral connections for each lot to the lot line.

Where a public sanitary sewer is not reasonably accessible, the subdivider or developer may, with the approval of the Dayton-Montgomery County Combined Health District, provide for septic tanks or other mechanical means of sewage disposal for each lot or group of lots. The design of sanitary sewers shall meet the requirements of the County Sanitary Engineer. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.25 STORM SEWERS.

Storm sewers shall be designed to flow full and shall be adequate for a storm of that intensity which can be expected two times in ten years. The run-off from platted areas shall in no case be considered less than thirty-five percent and in case of large paved areas (e.g. shopping centers, industrial areas) not less than seventy percent. Storm sewers shall be connected on crown and, when the velocity exceeds twenty feet per second, the invert shall be paved with vitrified tile or other abrasion resistant material. Storm sewers may be concrete pipe or galvanized corrugated pipe of adequate load carrying capacity as determined by the City Engineer. Manning's roughness coefficients (N) to be used in determining the capacity of storm sewers shall be as follows:

Concrete Pipe N-0.013

Corrugated Pipe (in inches)
2-2/3 x 1/2 Corrugations N-0.024
3 x 1 Corrugations N-0.027
6 x 2 Corrugations N-0.032

When new designs or materials are proposed, the characteristics shall be determined by the Engineer. All storm sewers shall be constructed to the line and grade as approved on the plans. Catch basins shall be so placed that the line of travel from the sidewalks can be made without crossing gutter flow.

The subdivider shall be responsible for adequate and safe disposal of all surface waters in the subdivision. Where the physical conditions and locations of the land to be developed are of such a character that a storm sewer is required in a size larger than sixty inches inside diameter (using a coefficient of roughness of N-0.013) to provide adequate drainage facilities for the plat and for areas beyond the limits of the plat which drain through it, the City may participate in the installation costs of the sewers in excess of the cost of sixty inch sewers or may, on petition by the subdivider, establish a drainage district to be financed by assessment as provided by law. Where it is deemed impossible or impracticable by Council for the City to participate in these excess costs or for a drainage district to be established, open channels will be permitted, provided health hazards will not result and proper safety measures are taken by the developer. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.26 OPEN CHANNELS.

New, existing or relocated channels shall be developed and improved according to the following requirements and the pertinent standard drawings of Section 1113.04.

(a) Design.

(1) General. Storm intensity, frequency and run-off shall be the same as set forth in Section 1113.25.

Manning's formula for flow in open channels shall be used for determining the channel capacity. An "N" factor of 0.030 shall be used for grass-lined channels and an "N" factor of 0.021 for concrete-lined channels. Abrupt changes in channel cross-sections or direction shall not be permitted.

(2) Side Slopes. The side slope for grass-lined channels shall be two feet horizontal to one foot vertical. Where development permits, consideration may be given to three feet horizontal to one foot vertical

slopes. Where the entire channel is lined with concrete, the maximum side slope may be one to one. Where aesthetics are concerned and flow characteristics can be maintained, a structural channel may be used. When the velocity of flow in the channel exceeds three feet per second, all curves shall be lined with concrete. When the velocity is less than ten feet per second, the existing soil conditions shall govern the type of slope protection. When the velocity exceeds ten feet per second, the entire channel shall be lined with concrete.

(3) Channel Bottoms. Where the velocity of flow in the channel exceeds three feet per second, the bottom of the channel through curved areas shall be lined with concrete. When the velocity exceeds ten feet per second, the entire channel bottom shall be lined with concrete. When the slopes are protected with concrete, the bottoms shall also be protected with concrete.

(4) Miscellaneous Protection. Precast or placed concrete will be required on the slopes and bottom of the channel where two or more channels intersect, adjacent to bridges and culverts, and at the outlets of storm sewers.

(b) Construction.

(1) Sodded and Seeded Areas. All sloping bank surfaces and bottoms where rip-rap is not required shall be sodded and all areas on top of slopes within the designated channel easement shall be seeded or sodded. All areas shall have a healthy growth of grass prior to acceptance by the City for future maintenance.

(2) Bank Compaction. All channel banks which are constructed by filling of material shall be compacted in accordance with the requirements of Section 1113.03(c) for a width of approximately fifteen feet parallel with the channel to provide for stability of the channel bank.

(3) Concrete Areas.

A. Slopes. Placed concrete shall be a minimum of four inches thick and be reinforced with wire mesh. Precast concrete blocks shall be rectangular or square, capable of interlocking with adjoining block, be a minimum of three inches thick, have adequate reinforcement and have a minimum surface area of four square feet. The slope protection shall extend from the bottom subgrade to the height of the design flow.

B. Bottom. Placed concrete shall be a minimum of four inches thick. Precast concrete shall meet the requirements of subparagraph A hereof.

C. Miscellaneous. Expansion material shall be placed around structures as directed by the City Engineer. Contraction joints shall be placed as directed by the City Engineer. Cut-off walls shall be placed at the ends of all areas protected with precast or placed concrete.

D. Concrete. All concrete for channel protection shall meet the requirements set forth in this chapter and contain six percent to eight percent entrained air.

(c) Utilities. Where practicable, all utilities shall be prohibited in open channel bottom and slopes. If it becomes necessary to install utilities in an open channel bottom, such utilities shall be adequately protected and deep enough to permit future maintenance of the channel.

(d) Existing Channels. An existing channel, when determined by the Engineer to be of sufficient size, may remain in its original condition. When an open channel falls between an existing development and a new development, that portion within the new development shall receive the same treatment insofar as it is possible as that in the existing development. When an open channel falls between undeveloped land and a new development, that portion within the new development shall be treated as a new channel. (Ord. 1942-69. Passed 4-8-69.)

SECTION 1113.27 SURVEY MONUMENTS

(a) Surveyor. A complete survey shall be made by a registered surveyor.

(b) Exterior Boundary Traverse. The traverse of the exterior boundaries of the tract and of each book, when computed from field measurements of the ground, shall close within a limit of error of one foot to 10,000 feet of the perimeter before balancing the survey.

(c) Permanent Reference Monuments. Permanent reference monuments shall be located and set with at least four permanent markers in each plat containing over ten lots.

Monumentation shall be in accordance with Chapter 4733-37 of the Administrative Code of the State of Ohio filed pursuant to Chapter 119 of the Ohio Revised Code. (Ord. 3008-82. Passed 5-11-82.)

SECTION 1113.28 PERFORMANCE BOND.

No improvements shall be constructed prior to the time the Planning Commission votes to finally approve the plat. In lieu of the completion of the improvements within the ninety-day period, the ninety-day period, the developer shall enter into an agreement with the City, setting forth the remaining construction work to be performed, the same to be secured by a bond in an amount sufficient to cover the cost of the work to be completed, and in addition thereto an amount equal to ten percent of the cost of all improvements completed, which ten percent shall be released upon completion and acceptance for maintenance by the City. If the subdivider agreement is extended by the Commission for an additional twelve months at the end of the initial twelve-month period, the remaining construction work to be performed shall be secured by a bond or certified check in an amount sufficient to secure the cost of the work to be completed and in addition thereto an amount equal to twenty-five percent of the cost of all improvements completed. All bonds will be released upon completion and acceptance for maintenance by the City.

All bonds shall be executed by a surety satisfactory to the City. The surety will be subject to the condition that the improvements will be completed within twelve months after recording of the plat and in the event they are not completed, and provided an extension up to an additional twelve months has not been granted by the Commission, the City shall declare the principal and surety to be in default under the agreement. The surety shall promptly complete the contract in accordance with its terms and conditions or shall have the work to be performed under contract within ninety days from the date of default. The work specified in the contract shall be completed within a maximum of nine months from the date of the contract. If the surety does not complete the work or fails to have the work to be performed under contract within ninety days from the date of default, the unreleased penal amount shall be paid to the City upon demand and the City shall proceed with the work. The bond shall be subject to the approval of the Commission.

As an alternative, the subdivider may deposit a certified check with the Finance Director, payable to the City, in place of a surety bond. The principal shall enter into a contract to provide for the performance bond. (Ord. 2336-71. Passed 11-9-71.)

SECTION 1113.29 INSTALLMENT AGREEMENT.

When a certified check is deposited or performance bond is executed pursuant to Section 1113.28, the City shall have the authority to enter into a written agreement or to accept a release-type performance bond, either of which itemizes the several phases of

construction in sequence including an amount equal to the cost of each such phase. However, the penal amount or deposit may be reduced by ninety percent of each such amount upon completion, inspection and approval of the particular phase of such work. If the subdivider agreement is extended by the Planning Commission for an additional twelve months at the termination of the one-year agreement, the penal amount or deposit during this second period may be reduced by seventy-five percent of each such amount upon completion, inspection and approval of the particular phase of such work. Further, the City Engineer shall have the authority to effect the partial releases and shall notify the surety or the Finance Director of the amount to be released. However, the percentage of the deposit or performance bond retained by the City shall not be released until all construction and improvements covered by the deposit or bond are completed, inspected and accepted for maintenance by the City. (Ord. 2336-71. Passed 11-9-71.)

SECTION 1113.30 STREET NAME SIGNS.

The subdivider shall, upon filing the final subdivision, pay a material cost and installation fee for name signs, said fee as listed in the fee schedule established by the Planing Director shall include all cost of materials, installation and labor. (Ord. No. 2910-80. Passed 9-9-80.)

SECTION 1113.31 INSPECTIONS.

It shall be the responsibility of the subdividers to notify the City Engineer at least four hours in advance of the time that all is in readiness for the following periodic inspections which must be made.

(a) When all sewers, public and private utilities, laterals and catch basins are installed and before trenches for the same are backfilled;

(b) After the forms for curbs and gutters are set, where combined curbs and gutters are required, and gravel base is in place and before any concrete is placed;

(c) After the forms for drive approaches or sidewalks are set and gravel base is in place and before any concrete is placed;

(d) After subgrade is shaped and rolled and before the compaction test is made when Portland cement concrete is used;

(e) After the forms are in place and immediately before any pavement or channel concrete is placed;

(f) Immediately before any flexible base materials are placed in base courses;

(g) Immediately before any prime coat or tack coat is applied;

(h) Immediately before any asphalt concrete is laid.

After written notice from the developer or land holder requesting final inspection, such inspection shall be completed within a fifteen-day period by the Engineering Division. Following this final inspection, the developer or land holder has thirty days to correct the deficiencies listed on the final inspection list. If these deficiencies are not completed within this required period, then any additional items which require correction will be included in a subsequent final inspection.

No work shall be accepted or bonds released unless these inspections have been made and the work found to be satisfactory. (Ord. 1942-69. Passed 4-8-69.)