SUBDIVISION REGULATIONS
FOR
INCORPORATED AND
UNINCORPORATED

GRANT COUNTY, KENTUCKY

ADOPTED BY
GRANT COUNTY
PLANNING COMMISSION

Date of Adoption **March 23, 1998**
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APPLICATION AND AUTHORITY OF REGULATIONS

REGULATIONS FOR ESTABLISHING SUBDIVISION PROCEDURES FOR THE SUBMISSION AND APPROVAL OF THE PRELIMINARY AND FINAL PLAT AND RECORDING OF FINAL PLATS; DESIGN STANDARDS AND PRINCIPLES FOR THE LAYOUT OF SUBDIVISIONS AND FOR THE SURVEYING AND PLATTING REQUIREMENTS THEREOF; REQUIRING THE INSTALLATION OF CERTAIN IMPROVEMENTS AND PROVIDING FOR THE NECESSARY CONSTRUCTION AGREEMENTS AND GUARANTEES THEREIN; PROVIDING FOR CERTAIN PRELIMINARY AND FINAL PLAT REQUIREMENTS; DEFINING CERTAIN TERMS USED HEREIN; PROVIDING FOR THE METHOD OF ADMINISTRATION AND ENFORCEMENT AND THE PENALTIES FOR VIOLATION THEREOF; PROVIDING FOR THE MEANS OF ADOPTION AND AMENDMENT; REPEALING ALL REGULATIONS, RESOLUTIONS, ORDERS, ORDINANCES, AND/OR CODES IN CONFLICT HEREWITH.

SECTION 1.1 SHORT TITLE:

These regulations shall be known and may be cited as the "Grant County Subdivision Regulations".

SECTION 1.2 PURPOSE AND AUTHORITY:

A. PURPOSE: These Subdivision Regulations as herein set forth, have been prepared in accordance with the adopted Grant County Comprehensive Plan, to promote the public health, safety, morals, and general welfare of Grant County; to provide for the proper arrangement of streets in relation to existing or proposed streets; to provide for adequate and convenient open spaces for vehicular and pedestrian traffic, utilities, access of fire fighting apparatus, recreation, light and air, and the avoidance of congestion of the population, and to facilitate the orderly and efficient layout and appropriate use of the land. In addition, these regulations also provide for the accurate surveying of land, preparing and recording of plats, and the equitable handling of all subdivision plats by providing uniform procedures and standards for observance by both the approving authority and subdividers.

B. AUTHORITY:

These regulations are adopted in accordance with the Kentucky Revised Statutes - Chapter 100.111 - 100.991.

SECTION 1.3 PLANNING COMMISSION APPROVAL REQUIRED FOR SUBDIVISION OF LAND:

The Grant County Subdivision Regulations sets forth a procedure for Planning Commission approval for the subdivision of land. This procedure is set forth in K.R.S. 100.277.

A. All subdivision of land shall receive Planning Commission approval.

B. No person or his agent shall subdivide any land before securing the approval of the Planning Commission of a plat designating the areas to be subdivided, and no plat of a subdivision of land within the planning unit jurisdiction shall be recorded by the Grant

County Clerk until the plat has been approved by the Planning Commission and the approval entered thereon in writing by the chairman, secretary, or other duly authorized authority officer of the Planning Commission.

C. No person owning land composing a subdivision or his agent, shall transfer or sell any lot or parcel of land located within a subdivision by reference to, or by exhibition, or by any other use of a plat of such subdivision, before such plat has received final approval of the Planning Commission and has been recorded. Any such instrument of transfer or sale shall be void and shall not be subject to be recorded unless the subdivision plat subsequently receives final approval of the Planning Commission, but all rights of the purchaser to damages are hereby preserved. The description of such lot or parcel by metes and bounds in any contract or instrument of transfer or other document used in the process of selling or transferring same shall not exempt the person attempting to transfer from penalties provided or deprived the purchaser of any rights of remedies he may otherwise have. Provided, however, any person or his agent, may agree to sell any lot or parcel of land located within a subdivision by reference to any unapproved or unrecorded plat or by reference to a metes and bounds description of such lot or parcel and any such executor contract of sale or option to purchase may be recorded and shall be valid and enforceable so long as the subdivision of land contemplated therein is lawful and the subdivision plat subsequently receives final approval of the Planning Commission.

D. Pursuant to KRS 100.277 (4), any street or other public ground which has been dedicated shall not be accepted for maintenance by the legislative body until it has received final plat approval by the Planning Commission. Any street that has been built in accordance with specific standards set forth in these Subdivision Regulations, by operation of law, automatically accepted for maintenance by a legislative body forty-five (45) days after inspection and final approval.

E. Any instrument of transfer, sale or contract that would otherwise have been void under this section and under any of its subsections previously, is deemed not to have been void, but merely not subject to be recorded unless the subdivision plat subsequently receives final approval of the Planning Commission.

SECTION 1.4 PLANNING COMMISSION APPROVAL REQUIRED FOR SUBDIVISION IMPROVEMENTS:

The subdivider of any tract or parcel of land located within Grant County shall not proceed with the construction of any improvements until he has obtained: (1) approval or conditional approval of the preliminary plat; (2) approval or conditional approval of the Improvement Drawings.

SECTION 1.5 GENERAL RESPONSIBILITIES:

A. SUBDIVIDER: The subdivider shall use a Kentucky Licensed Land Surveyor and Kentucky Licensed Professional Engineer, as defined herein, to prepare plats and plans consistent with the design standards; accomplish improvements consistent with the improvement requirements; and submit said plats and plans in accordance with these regulations.

B. PLANNING COMMISSION: The Planning Commission is charged with the duty of making investigations and reports on the design and improvements of proposed subdivisions, and requiring conformance of such subdivisions with the Kentucky Revised Statutes, Chapter 100, and these regulations.

C. DELEGATION OF AUTHORITY BY PLANNING COMMISSION TO ITS ENGINEER: Pursuant to KRS 100, the Planning Commission has delegated certain authority to its Engineer. These delegations of authority are as provided in these regulations. However, the Planning Commission shall have final approval authority over all actions of its Engineer as provided for in Article 10 of these regulations.

D. CHIEF ENFORCEMENT OFFICER:
The Planning Commission hereby appoints its Planning Director as its Chief Enforcement Officer. In that capacity, the Planning Director shall have full authority to issue citations for violations of the subdivision regulations which the Planning Director observes. The procedure for the issuance of citations by the Planning Commissions Chief Enforcement Officer shall be as provided for in KRS 431.015.

ARTICLE 2

DEFINITIONS

SECTION 2.1 WORDS AND PHRASES: For the purpose of these regulations, certain terms, phrases, words, and their derivatives, are herewith defined as follows:

Words used in the future tense include the present;
Words used in the present tense include the future;
Words used in the singular form include the plural;
Words used in the plural form include the singular;
Words used in the masculine include the feminine;
Words used in the feminine include the masculine;
The word "shall" is mandatory;
The words "may" and "should" are permissive.

ACCESS DRIVE: A drive, driveway, private street or other vehicular connection providing for the movement of vehicles to or from a public street.

AGRICULTURE: The use of a tract of at least five (5) contiguous acres for the production of agriculture or horticulture crops, including but not limited to livestock products, poultry, poultry products, grain, hay, pastures, soybeans, tobacco, timber, orchard fruits, vegetables, flowers or ornamental plants, including provision for dwellings for person and their families who are engaged in the above agricultural use on the tract, but not including residential building development for sale or lease to the public.

ALLEY: Public right-of-way which normally affords a secondary means of access to abutting property. Any frontage on an alley may not be used for meeting lot frontage requirements.

BLOCK: A parcel of land within a subdivision that is bounded by streets or bounded by streets and the exterior boundary of the subdivision. For this definition, an alley is not considered a street, but part of the block.

BLOCK LENGTH: The distance between intersections of through streets, such distance being measured parallel to the longest street bounding the block and from right-of-way line to right-of-way line of the two intersecting streets.

CERTIFICATE: Refers to the required certificates for final plat and conveyance plat.

CERTIFICATE OF OCCUPANCY: A certificate which must be obtained prior to occupancy of any premises.

COMMISSION (OR PLANNING COMMISSION): The Grant County Planning Commission, State of Kentucky.

CONVEYANCE PLAT: A type of plat used in minor division of land, which is approved by the Grant County Planning Commission and recorded in the county clerk’s office. A conveyance plat is used to transfer a minor division of land in an expeditious manner without subjecting an applicant to the formal subdivision review process or a major division of land procedure.

COMPREHENSIVE PLAN: The comprehensive plan for GRANT County, adopted by the Grant County Planning Commission. It is a guide for public and private actions and decisions to assure the development of public and private property in the most appropriate relationships.

COVENANT: A written promise or pledge which is typically a private restriction that applies to land use matters within certain subdivisions.

CULVERT: A transverse drain that channels under a street, driveway, or sidewalk.

DEVELOPER: Synonymous with the term "subdivider".

DETENTION BASIN: A dry stormwater detention area that is used to detain stormwater runoff a specified length of time to keep the flow of water from the subject area to that of pre-development flow.

EASEMENT: A right, distinct from the ownership of the land, to cross property with facilities such as, but not limited to, sewer lines, water lines, and transmission lines, or the right, distinct from the ownership of the land, to reserve and hold an area for drainage or access purposes.

ENGINEER: A Licensed Professional Engineer in good standing with the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors.

FINAL PLAT: A subdivision plat proposed in accordance with the provisions herein in which said plat is designated to be placed on record with the county clerk after approval by the Planning Commission.

FLAG LOT: An irregular shaped lot where access is provided from a public street frontage through a narrow, unobstructed strip (or “panhandle”) which is part of the building lot, and that may be shared with one adjoining flag lot. The building site within a flag lot does not immediately abut a public street, but is located at the terminus of the access strip (or “panhandle”).

FLOOD: A general and temporary condition of partial or complete inundation of normally dry land areas from: (a) the overflow of inland waters; (b) the unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD - 100 YEAR FREQUENCY: The highest level of flooding that, on the average, is likely to occur once every 100 years.

FLOOD PLAIN OR FLOOD PRONE AREA: Any normally dry land area that is susceptible to being inundated by water from any source.

FLOODWAY: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than one foot at any point.

GRADING PLAN: A temporary plan used in certain cases due to construction time limitations, unique soil conditions, and weather conditions, where an applicant or subdivider may begin to grade a site after approval of a Preliminary Plat, but prior to the submittal of an Improvement Plan and which is subject to the conditions stated in this document.

HOMEOWNERS AGREEMENT: a legal document involving agreement among property owners for certain rights and privileges for the use of land. Homeowners Agreements usually involve the joint use of open space, common areas, sidewalks, recreational facilities, driveways, etc. Typically, such Agreements address items such as legal descriptions of the land area, identifying members of the Agreement, explanation of rights and privileges, purpose of the agreement, assessments, maintenance, etc.

IMPERVIOUS SURFACE; An area that has been compacted or covered by a layer of material, that is highly resistant to infiltration by stormwater. Impervious surfaces include buildings, parking areas, driveways, sidewalks, and graveled areas.

IMPROVEMENT PLANS: The engineering plans showing design layout, types of materials and construction details for the physical structures and facilities to be installed in, or in conjunction with, the subdivision.

INSPECTOR: The Planning Commission's Engineer, whose responsibility it is to inspect, or cause to be inspected, items required by these regulations.

IRREVOCABLE LETTER OF CREDIT: An agreement by a subdivider or developer to the Planning Commission to insure the completion of physical improvements according to the Improvement Plan within the time prescribed by the Planning Commission. A Letter of Credit shall be issued by a federally insured bank with offices in Northern Kentucky unless otherwise agreed by the Planning Commission. Letters of Credit must be approved as to form and content by the Planning Commission.

JUNCTION BOX: A stormwater manhole that connects two or more drainage pipes.

LEGISLATIVE BODY: The elected body of a city or Fiscal Court having territorial jurisdiction over a proposed subdivision, which is responsible for the ownership and maintenance improvements after dedication pursuant to KRS Chapter 100.

GRANT COUNTY: Refers to both the incorporated and unincorporated areas of GRANT County, State of Kentucky.

LOT: A portion of a subdivision or other parcel of land intended for transfer of ownership or for building development.

LOT OF RECORD: A lot which is a part of a subdivision according to a specific recorded plat or survey, the plat of which has been officially approved by the Planning Commission and recorded in the office of the County Clerk. Also means a lot which is part of a subdivision according to a specific recorded plat, survey, or written legal description which is recorded in the office of the County Clerk, but did not legally require approval of the Planning Commission at the time of its recording.

LOT AREA: The total area of a horizontal plane bounded by the front, side, and rear lot lines, but not including any area occupied by street, alley, or railroad rights-of-way, as opposed to an easement.

LOT, CORNER: A corner lot is a lot situated at the intersection of two streets and has frontage on both streets.

LOT, DEPTH OF: The distance measured in the mean direction of the side lot lines from the midpoint of the front lot lines to the midpoint of the rear lot lines.

LOT, DOUBLE FRONTAGE: A lot other than a corner lot that has frontage on more than one street.

LOT, FLAG: See definition of “Flag Lot”.

LOT FRONTAGE: The distance between the side property lines as measured across the required minimum front yard setback line.

LOT, INTERIOR: A lot other than a corner lot with only one frontage on a deeded and occupied public right-of-way.

LOT LINE, REAR: The boundary line of a lot which is most nearly opposite the front lot line of such lot. In the case of a triangular or wedge shaped lot, for measurement purposes only, a line ten (10) feet in length within the lot parallel to and at the maximum distance from the front lot line. In the case of a corner lot, providing that all requirements for yard space are complied with, the owner may choose either side not abutting a street as the rear lot line, even though it is not opposite the front lot line. Once the choice has been made, it cannot be changed unless all requirements for yard space can be complied with.

LOT LINE, SIDE: Any boundary line of a lot, other than a front lot line or rear lot line.

LOT WIDTH: The width of the lot as measured along the building front setback line.

MAJOR DIVISION OF LAND: A major division of land is a procedures, which involves the division of land in to six (6) buildable lots or more from the parent tract, and/or where there is a need for either public or private streets and/or utility improvements.

MINOR DIVISION OF LAND: A minor subdivision of land is a procedure which involves the division of land in five (5) buildable lots or less from the parent tract, and where there is no need for public streets and/or utility improvements.

MONUMENTS: Permanent man-made markers used to mark corners of property boundaries or points of change in street alignment. Monuments must be in accordance with Commonwealth of Kentucky Standards of Practice 201 KAR 18.150.

OFFICIAL MAP: The adopted official zoning map of the applicable legislative body or fiscal court, as provided for in the Kentucky Revised Statutes, Chapter 100.

OWNER: The person, persons, or other entity having legal title to a particular real estate, or such other person, persons, or entity acting on behalf of and with the written permission and authority of the legal title holder, such as a holder of an option or contract to purchase the real estate, or a lessee. In the context of these regulations, “owner” means the person, persons, or entity bearing responsibility for a development review application or proposal, and the term “owner may be used interchangeably with the terms such as applicant, developer, subdivider, owner by option, etc.

PARCEL: Synonymous with the term “lot”.

PARENT TRACT: Any existing parcel of land, shown as a unit or contiguous units in common ownership.

PERFORMANCE BOND or SURETY BOND: An agreement by a subdivider or developer with the Planning Commission for the amount of the estimated construction cost guaranteeing the completion of physical improvements according to the approved Improvement Plan within the time prescribed by the Agreement.

PLANNING COMMISSION: See definition of Commission.

PLANNING COMMISSION'S ENGINEER: The ENGINEER employed by the Planning Commission to be the engineer for the Planning Commission and shall be authorized to check, review, approve, and inspect, or cause to be inspected, where provided in these regulations, all submissions and construction activities regarding their conformance to these regulations.

PLAT: A map of a tract, parcel, or subdivision of land prepared in accordance with the requirements specified in these regulations.

PRELIMINARY PLAT: A tentative plat of a proposed subdivision prepared in accordance with the provisions herein for presentation to the Planning Commission for its action.

PUBLIC DEDICATION: The dedication of land for public use.

RECORD PLAT: A Conveyance Plat or Final Plat, including a Condominium Property Regime Plat, prepared in accordance with the requirements of these regulations.

RE-SUBDIVISION: A subdivision which re-subdivides a previously recorded subdivision plat.

RETENTION BASIN: A pond or lake that is used to retain stormwater runoff until reaching a level of an overflow device that is designed at a specified elevation.

RIGHT-OF-WAY: A general term denoting land, property, or interest therein, usually in a strip and dedicated for or devoted to such uses as a street, alley, or railroad.

ROADS: See definition of "streets".

SETBACK LINE: The minimum distance a building or structure may be place from a lot line, as determine in the Zoning Regulations of the legislative body which has jurisdiction over the lot.

SIDEWALK: A portion of the road right-of-way outside the roadway, or a pathway on private property, which is improved for pedestrian traffic.

STREETS: Any vehicular ways, except alleys, located within dedicated rights-of-way. The following shall be used to classify streets:

STREET, ARTERIAL: Public thoroughfares which serve the major movements of traffic within and through the community, generally a state maintained highway.

STREET, COLLECTOR: Public thoroughfares which serve to collect and distribute traffic primarily from subcollector to arterial streets and serve five hundred (500) or more residential lots or housing units or fifty (50) or more commercial or industrial lots or users.

STREET, CUL-DE-SAC: A street having an outlet at one end only and having the other end permanently closed with facilities permitting vehicles to turn around.

STREET, DEAD-END: A street having an outlet at one end only and terminated at the other end by undeveloped property. It may or may not have facilities permitting vehicles to turn around.

STREET, ENTRY: A public street that provides entry into a subdivision or development.

STREET, EXPRESSWAY: A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.

STREET, FREEWAY: A divided multi-lane highway for through traffic with all crossroads separated in grades and with full control of access.

STREET, FRONTAGE ROAD (SERVICE OR ACCESS ROAD): A street adjacent to a freeway, expressway, or arterial street separated there from by a dividing strip and providing access to abutting properties.

STREET, LOCAL: Roadways which are designed to be used primarily for direct access to abutting properties and serving less than one hundred (100) residential lots.

STREET, PRIVATE: A privately owned and maintained street that provides access to adjoining property for private users of such property.

STREET, PUBLIC: A public roadway, constructed within the boundaries of an officially dedicated public right-of-way, which affords principal means of access to abutting property.

STREET, SUBCOLLECTOR: A street designed to provide a traffic route from local to collector streets and serving one hundred (100) to five (500) residential lots or fifty (50) or less commercial or industrial lots or users.

SUBDIVIDER: Any individual, firm, association, syndicate, co-partnership, corporation, trust, governmental agency, or any other legal entity commencing proceedings under these regulations, to create a subdivision of land as defined herein for himself or for another.

SUBDIVISION: The division of a parcel of land into three or more lots or parcels or tracts for the purpose, whether immediate or future, of sale, lease, or building development, or if a new street is involved, any division of a parcel of land; providing that a division of land for agricultural purposes into lots or parcels of five (5) acres or more and not involving a new street shall not be deemed a subdivision. The term includes re-subdivision and when appropriate to the context shall relate to the process of subdivision or to the land subdivided, and also includes the creation of remainder or residual tracts. (as defined herein). KRS 100.111 (22)

SURVEYOR: A Licensed Professional Land Surveyor or (PLS) in good standing with the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors.

TRACT: A parcel or lot identified by letter or number, the boundaries of which are shown on the recorded subdivision plat (see lot). Also means a parcel or lot defined by a legitimately recorded legal description.

VICINITY MAP: A drawing located on the plat or plan which sets forth by dimension or other means, the relationship of the subdivision or use to other nearby developments or land marks and community facilities in order to better locate and orient the area in question.

WAIVER: An exception to the literal requirements of the regulations that is reviewed and granted by the Planning Commission.

WATERCOURSE: A natural or man-made channel through which water flows. Sheet drainage or minor swales across lots shall not, for the purposes of these regulations, be considered as watercourses.

ARTICLE 3
SUBDIVISION PROCEDURE

Any person desiring to subdivide any lot, tract, or parcel of land, or to change or rearrange any such lot, tract, or parcel of land within Grant County, shall comply with the procedures established in this article and other applicable articles and sections of these regulations and in the sequence specified.

SECTION 3.1 ADVISORY MEETING WITH PLANNING COMMISSION'S ENGINEER;

The subdivider or applicant is encouraged to meet with the Planning Commission's Engineer prior to the submittal of any application. This meeting is intended to familiarize the subdivider or applicant with the current regulations and to ascertain the location of any other planned projects which may affect the property being considered for subdivision. This would include a review of the topography of the area to determine where potential street connections to adjourning properties should occur and determine the preferred location of access points into the subdivision from the road providing the primary access to the subdivision. This step does not require a formal application with the Planning Commission.

SECTION 3.2 PROCESSING OF PRELIMINARY PLAT:

A. The subdivider shall submit an application for a Preliminary Plat to the Planning Commission along with three (3) copies of the Preliminary Plat and the required fees. Such application shall be submitted to the Planning Commission at least twenty one (21) calendar days prior to the next meeting of the Planning Commission.

B. The Preliminary Plat shall be reviewed by the Planning Commission's Engineer for compliance with these regulations. The Planning Commission's Engineer shall forward the resulted of the review to the Planning Commission along with a written recommendation for action by the Planning Commission.

C. The Planning Commission shall review the recommendation of the Planning Commission's Engineer and take one of the following actions: (1) approve the Preliminary Plat, (2) approve the Preliminary plat with conditions, or (3) disapprove the Preliminary Plat. The Planning Commission shall take such action within two (2) consecutive regularly scheduled meetings of the Planning Commission from the date of the office filing, unless such time is extended by written agreement between the Planning Commission and the applicant. If an application is denied, the reasons for denial shall be provided to the applicant, in writing. The basis for action shall be conformance to the applicable zoning regulations and the Grant County Subdivision Regulations.

D. Once the Preliminary Plat has been approved by the Planning Commission, the Preliminary Plat shall be null and void after twenty-four (24) consecutive calendar months from the date of approval, unless an Improvement Plan for at least one (1) section of the subdivision is submitted to the Planning Commission for review and is approved. Approval of the remainder of the Preliminary Plat shall be valid for twenty-four (24) consecutive calendar months after the date of approval of said Improvement Plan.

E. The Planning Commission may, upon receipt of an application and required fee, may grant a twenty-four (24) month extension of the approval, providing requirements have not changed.

F. The subdivider shall bring fifteen (15) copies of the Preliminary Plat to the Planning Commission meeting at which action is to be taken by the Planning Commission.

SECTION 3.3 PROCESSING OF GRADING PLAN:

A. Following the approval of the Preliminary Plat, the subdivider may submit an application for a Grading Plan to the Planning Commission along with three (3) copies of the Grading Plan and the required fees. Such application shall be submitted to the Planning Commission at least twenty one (21) consecutive calendar days prior to the next regular meeting of the Planning Commission.

B. The Grading Plan shall be reviewed by the Planning Commission's Engineer for compliance with these regulations. The Planning Commission's Engineer shall forward the resulted of the review to the Planning Commission along with a written recommendation for action by the Planning Commission.

C. The Planning Commission shall review the recommendation of the Planning Commission's Engineer and take one of the following actions: (1) approve the Grading Plan, (2) approve the Grading Plan with conditions, or (3) disapprove the Grading Plan. The Planning Commission shall take such action within two (2) consecutive regularly scheduled meetings of the Planning Commission from the date of the office filing, unless such time is extended by written agreement between the Planning Commission and the applicant. If an application is denied, the reasons for denial shall be provided to the applicant, in writing.

D. Once the Grading Plan has been approved by the Planning Commission, the subdivider has twelve (12) months from the date of the approval of the Grading Plan to begin and to complete the work as stated in the Grading Plan or the Grading Plan shall become null and void.

E. The Planning Commission may, upon receipt of an application and required fee, may grant a twenty-four (24) month extension of the approval, providing requirements have not changed.

F. The subdivider shall bring fifteen (15) copies of the Plat to the Planning Commission meeting at which action is to be taken by the Planning Commission.

SECTION 3.4 PROCESSING OF IMPROVEMENT PLAN:

A. Following the approval of the Preliminary Plan, the subdivider may submit an application for an Improvement Plan to the Planning Commission along with three (3) copied of the Improvement Plan and the required fees. Such application shall be submitted to the Planning Commission at least twenty one (21) consecutive calendar days prior to the next regular meeting of the Planning Commission.

B. The Improvement Plan shall be reviewed by the Planning Commission's Engineer for compliance with these regulations. The Planning Commission's Engineer shall forward the results of the review to the Planning Commission along with a written recommendation for action by the Planning Commission.

C. The Planning Commission shall review the recommendation of the Planning Commission's Engineer and take one of the following actions: (1) approve the Improvement Plan, (2) approve the Improvement Plan with conditions, or (3) disapprove the Improvement Plan. The Planning Commission shall take such action within two (2) consecutive regularly scheduled meetings of the Planning Commission from the date of the office filing, unless such time is extended by written agreement between the Planning Commission and the subdivider. If an application is denied, the reasons for denial shall be provided to the applicant, in writing.

D. Once the Improvement Plan has been approved by the Planning Commission, the Improvement Plan shall be null and void after twenty-four (24) consecutive calendar months from the date of approval, unless a Final Plat, for at least one (1) section of the subdivision, is submitted to the Planning Commission for review and is approved. Approval of the remainder of the Improvement Plan shall be valid for twenty-four (24) consecutive calendar months after the date of approval of said Final Plat.

E. The Planning Commission, upon receipt of an application and required fee, may grant a twenty-four (24) month extension of the approval, providing requirements have not changed.

F. The subdivider shall bring fifteen (15) copies of the Improvement Plan to the Planning Commission meeting at which action is to be taken by the Planning Commission.

SECTION 3.5 PROCESSING OF FINAL PLAT:

A. The subdivider shall submit an application for a Final Plat to the Planning Commission along with three (3) copied of the Final Plat and the required fees, at any time.

B. The Final Plat shall be reviewed by the Planning Commission's Engineer for compliance with these regulations. The Planning Commission's Engineer shall forward to the Planning Director a written recommendation for approval or denial.

C. The Planning Director shall review the recommendation of the Planning Commission's Engineer and take one of the following actions: (1) approve the Final Plat, or (2) disapprove the Final Plat. The Planning Director shall take such action within twenty (21) calendar days from the date of submittal, unless such time is extended by written agreement between the Planning Commission and the subdivider. If an application is denied, the reasons for denial shall be provided to the applicant, in writing. Once approved by the Planning Director, the original and one (1) copy will be signed by the Planning Commission.

D. A Final Plat shall be recorded, by the applicant, in the Grant County Clerk's Office within one (1) year from the date of approval by the Planning Commission or the Final Plat approval becomes void.

SECTION 3.6 PROCESSING CONVEYANCE PLATS:

A. The provisions for Conveyance Plat Review and approval are intended to provide a convenient and expeditious process for the conveyance or transfer of land in a minor division of land from the parent tract.

B. A Conveyance Plat can be used in a situation where there is a minor division of land of five (5) buildable lots from the parent tract and when no public street improvements or utility improvements are required. Each lot intended for building or development purposes must still meet the minimum standards in the zoning district in which it is located. This type of plat is intended to allow the division of a single buildable lot (maximum 5 lots) from a large tract for building purposes and for the casual sales of property, including the sale of property for non-buildable lots.

C. The Conveyance Plat shall conform to the current minimum standards, as stated by Kentucky Revised Statutes (K.R.S. 322) and in accordance with Commonwealth of Kentucky Standards of Practice 201 KAR 18.150. All Conveyance Plats shall meet the minimum requirements of an “Urban Survey”.

D. A Conveyance Plats maybe submitted to the Planning Commission for review and approval, at any time. The applicant shall submit an application and three (3) copies of the Conveyance plat along with the required fee.

E. The Planning Director shall review the Conveyance Plat for compliance with these regulations. The Planning Director shall take one of the following actions: (1) approve the Conveyance Plat, or (2) disapproved the Conveyance Plat. The Planning Director shall take such action within twenty one (21) calendar days from the date of submittal, unless such time is extended by written agreement between the Planning Commission and the applicant. If an application is denied, the reasons for denial shall be provided to the applicant, in writing. Once approved by the Planning Director, one (1) copy will be signed and returned to the applicant.

F. A Conveyance Plat shall be recorded, by the applicant, in the Grant County Clerk’s Office within two (2) years from the date of the Planning Commission’s approval or the Conveyance Plat approval becomes void.

G. See Article 9 Section 9.2 for certificates required on Conveyance Plats.

SECTION 3.7 PROCESSING CONDOMINIUM REGIME PLATS:

A. The developer shall file an application for a Condominium Regime Plat with the Planning Commission, along with three (3) copies of the Condominium Regime Plat and the required fees, at any time.

B. Simultaneously, with the submission of the Condominium Regime Plat, there shall be attached three (3) copies of a set of floor plans of the building or buildings in accordance with KRS 381.835 bearing the certificate of a Registered Architect or Licensed Professional Engineer.

C. One (1) copy of the master deed or lease, in accordance with the requirements of KRS 381.835 to 381.837.

D The Condominium Regime Plat shall be reviewed by the Planning Commission's Engineer for compliance with these regulations. The Planning Commission's Engineer shall forward to the Planning Director a written recommendation for approval or denial.

E. The Planning Director shall review the recommendation of the Planning Commission's Engineer and take one of the following actions: (1) approve the Condominium Regime Plat, or (2) disapprove the Condominium Regime Plat. If the request is denied, the reason for denial shall be provided to the subdivider in writing. The Planning Director shall take such action within twenty one (21) calendar days from the date of submittal. If an application is denied, the reasons for denial shall be provided to the applicant, in writing. Once approved by the Planning Director, the original drawing and one (1) copy will be signed by the Planning Commission.

F. A Condominium Regime Plat shall be recorded, by the applicant, in the office of the Grant County Clerk within one (1) year from the date of approval by the Planning Commission or the Condominium Regime Plat approval becomes void.

ARTICLE 4

PRELIMINARY PLAT REQUIREMENTS

SECTION 4.1 CONTENT OF THE PRELIMINARY PLAT:

The Preliminary Plat shall meet the minimum acceptable design standards and the general applicable regulations for the construction of public improvements as set forth in this document and contain the following information. The Preliminary Plat shall be drawn at a scale not less than one (1) inch to one hundred (100) feet, except subdivisions with lots having a minimum area of five (5) acres or more, which shall not be less than one (1) inch to two hundred (200) feet.

A. The proposed name of subdivision, which shall not duplicate or too closely approximate, phonetically, or in spelling, the name of any other subdivision in Grant County;

B. The name, address, and phone number of owner(s) of record;

C. The name, address, and phone number of subdivider(s);

D. The name, address, and phone number of person, firm, or organization preparing the preliminary plat, with the seal and signature of the Licensed Professional Engineer and/or Licensed Land Surveyor responsible for its preparation;

E. A north arrow, written and graphic scale, and date shall be noted on the drawing;

F. A vicinity map showing the proposed location of the subdivision in relation to major or minor roads in the area. The vicinity map shall have an approximate scale.

G. The perimeter boundary lines of the tract to be subdivided showing all bearings and distances;

H. The existing use or uses of the property and the outline of any existing buildings or improvements to be retained;

I. The right-of-way lines and names of all existing or platted streets, other public ways and easements adjacent to or in connection with the subdivision including right-of-way widths and other important features within one hundred (100) feet of the boundary lines, such as railroad lines, watercourses, etc.;

J. Names of adjacent subdivisions and owners of record of all adjacent parcels including deed book and page number of each parcel;

K. Location and dimensions of all existing easements and rights-of-way within the subdivision;

L. Existing utilities on and adjacent to the subdivision: location and size of water mains, sanitary sewer lines, storm sewer lines

M. Existing contours at five (5) foot intervals or less with elevations based on mean sea level (U.S.G.S. Datum). Contours shall be provided for all areas within 200 feet of the subdivision boundary;

N. SUBDIVISION LAYOUT.

   a. Layout of streets with names, right-of-way and pavement widths
   b. Other rights-of-way or easements: location, width, and purpose
   c. Lots: lots and blocks numbered
   d. Layout of water lines, storm and sanitary sewer lines
   e. The location of proposed retention/detention facilities

O. Statement of the lot area of the smallest lot in the subdivision.

P. Parcels of land intended to be dedicated or reserved for public use, by protective covenant for use by all property owners in the subdivision.

Q. Proposed uses for all land in the subdivision.

R. Approximate boundaries of the 100-year flood plain using the National Flood Insurance Program (F.E.M.A.) maps.

S. Total site data: including acreage, number of lots, and, if applicable, approximate number of square feet or acres in parks or open space.

T. Where individual on-site disposal systems are proposed, the subdivider must provide certification from the Northern Kentucky District Health Department that the proposed subdivision has been inspected and is suitable for on-site sewage disposal systems. See Section 8.3-D for sanitary sewer easement requirements.

U. When packaged sewage treatment plans are proposed, the subdivider must provide dedicated sanitary sewer easements as set forth in Section 8.3-C.

V. One (1) copy of applicable Board of Adjustments action identifying any dimensional variances granted, if applicable.

ARTICLE 5

FINAL PLAT REQUIREMENTS

SECTION 5.1 SURVEY REQUIREMENTS

The Final Plat shall conform to the current minimum standards as stated by the Kentucky Revised Statutes (K.R.S. 322) and in accordance with Commonwealth of Kentucky Standards of Practice 201 KAR 18.150. All Final Plats shall meet the minimum requirements of an “Urban Survey”.

SECTION 5.2 MINIMUM FINAL PLAT REQUIREMENTS:

A. The name of the subdivision or development as established by the Improvement Plan.

B. Names(s) and address(es) of the owner of the subdivision and the Kentucky Licensed Land Surveyor responsible for the survey and lot design of the subdivision.

C. Names of adjacent property owners with deed book and page number and adjacent recorded subdivisions with lot numbers and section or phase number.

D. Location of the subdivision or development and whether it is within the incorporated limits of a municipality or in the unincorporated area of Grant County.

E. Location and right-of-way width of all streets and easements which are to be dedicated or reserved for public use.

F. Centerline data for the right-of-way of the streets and easements with the data to include: central angle, radius, arc length, long chord and tangent distances.

G. Numbered lots whose boundaries are described by bearing and distance for each tangent course and proper curve data for curve courses. Lot corners that are within curved street sections shall have a reference tie to the tangent line of the centerline curve. Any lots that were subject to a conveyance plat shall be noted with dashed lines and referenced by deed book and page number.

H. North Arrow, written and graphic scale, and date. The scale shall not be less than one inch (1”) equal to fifty (50’), except subdivisions with lots having a minimum area of one (1) acre or more shall not be less than one inch (1”) equal to one hundred feet (100’).

I. Area in acres of the subdivision or section of the subdivision and the area in acres of each lot that is one (1) acre or more.

J. Names of streets within or adjacent to the subdivision.

K. Location of areas to be dedicated for public use and with the planned use clearly indicated. Areas intended to be reserved for common use but not dedicated to public use shall be identified by a lot number and treated as a private lot. A statement shall appear

on the Final Plat that clearly describes the ownership and maintenance responsibility for any public or non-public common areas.

L. The Planning Commission shall assign addresses for all lots or units prior to the approval of a Final Plat. All assigned addresses shall be shown on all lots or units.

M. A record drawing of any public improvements, including location, surface and invert elevations of all accessible structures and final elevations of the bottom of the detention basins, shall be submitted to the Planning Commission with the submittal of the Final Plat.

N. See Article 9 for certificates required on Final Plats.

O. All Final Plats shall be drawn on fixed line Mylar.

ARTICLE 6

GRADING PLAN and IMPROVEMENT PLAN REQUIREMENTS

SECTION 6.1 GRADING PLAN REQUIREMENTS

Upon the approval of the Preliminary Plat, the developer of a proposed subdivision may submit a Grading Plan of the subdivision or section thereof for review and approval by the Planning Commission. The Planning Commission's Engineer may request utility information from other phases of the subdivision if it impacts the site under review.

The Grading Plan shall be designed by a Kentucky Licensed Professional Engineer and installed in accord with these applicable regulations, and shall contain the following information:

A. The proposed name of the subdivision or development.

B. Names and addresses of owner or developer of the subdivision and the Kentucky Licensed Professional Engineer, responsible for the design of all improvements. The plan shall be certified with the seal of the Professional Engineer.

C. A vicinity map showing the proposed location of the subdivision or development in relation to major or minor roads in the area, and the boundaries of the phase or phases under review related to the entire subdivision. The vicinity map shall have an approximate scale.

D. The plan shall be to a scale of not less than one (1) inch equal fifty (50) feet and the submitted drawing shall be a 24" X 36" sheet size, unless another scale is approved by the Planning Commission's Engineer. On lots larger than one (1) acre, this scale may be used to show just the graded portion of the lots and improvements. A graphic and written scale shall be shown on each sheet of the plan.

E. The date shall be on the cover or first sheet of the plan, and a north arrow shall be on all sheets of the plan.

F. The boundary of the subdivision or development and the section of the subdivision or development under review shall be indicated by a heavy black line on one sheet of the plan, at a standard scale, to show the location of the section under review with other sections of the subdivision or development. All boundary lines shall be labeled with bearings and distances.

G. Location, right of way width, and names of all existing or recorded streets, railroads, and public and private utility easements (including drainage easements), public parks and open spaces; buildings (labeled "to remain" or "to be removed"); incorporation and county lines; cemeteries and other historical landmarks or natural features.

H. Location and size of all existing utilities (public and private) within or adjacent to the subdivision or development.

I. Existing contours with intervals of not more than two feet (2') and shall be clearly marked with elevations based on mean sea level (U.S.G.S. Datum) and location and description of benchmark used.

J. A general location of any proposed streets and detailed plans of any storm sewer facilities to be installed at the time of grading. All storm sewer facilities shall meet the requirements of Section 7.0 of these regulations.

K. Show boundaries of Buffer Zones along designated creeks as defined in Section 7.0 of these regulations.

L. Proposed finished contours with intervals of not more than two feet (2') shall be clearly labeled and related to existing contours. Maximum grade for any excavated (cut or fill) slope shall be 2½:1 (2½ feet horizontal for each 1 foot vertical) and the design slope shall be labeled on the plan. Engineered slopes may be steeper upon a report prepared by a Geotechnical Engineer and approved by the Planning Commission. Disturbed limits shall be clearly identified on the submitted plan and in the field.

M. Location of erosion and sediment control facilities shall be shown on the plan, with detail drawings of each type of facility being used. The detailed soil erosion techniques or features shall be in conformance with Section 7.0-D of these regulations and the submitted "Best Management Practice" document. All excavated slopes shall be seeded and mulched immediately upon completion of the grading of that particular slope and all right-of-ways shall be seeded and mulched within sixty days (60) of the Planning Commission's approval of the Final Plat of that section.

N. Addition documentation or information, such as geotechnical studies, may be required, by the by the Planning Commission, if the applicant is proposing to make improvements on property located near or in areas with slopes over twenty (20) percent..

SECTION 6.2 IMPROVEMENT PLAN REQUIREMENTS

The Improvement Plan shall provide the minimum acceptable design and improvement standards which are required as a precondition to development or in conjunction with development for lots, streets, utilities and other physical elements in the subdivision. Based upon the information and design plans of the subdivision, the Planning Commission may request additional information on any of the following requirements in order to clarify design issues.

The Improvement Plan shall be designed by a Kentucky Licensed Professional Engineer and installed in accord with these and other applicable regulations and shall contain the following information:

A. The proposed name of the subdivision or development. In no case shall the name of a proposed subdivision or development duplicate or too closely approximate, phonetically or in spelling, the name of any other subdivision or development in Grant County.

B. Names and addresses of the owner or developer of the subdivision or development and the Kentucky Licensed Professional Engineer responsible for the design of all improvements. The plan shall be certified with the seal of the Professional Engineer.

C. A vicinity map showing the proposed location of the subdivision or development in relation to major or minor roads in the area, and the boundaries of the phase or phases

under review relative to the entire subdivision or development. The vicinity map shall have an approximate scale.

D. The plan shall be on a scale of one (1) inch is equal to fifty (50) feet and the submitted drawing shall be a 24" X 36" sheet size unless another scale is approved by the Planning Commission's Engineer. On lots larger than one (1) acre, this scale may be used to shown just graded portions of the lots and improvements. a graphic and written scale shall be shown on each sheet of the plan.

E. The date shall be shown on the cover or first sheet of the plan and the north arrow shall be shown on all sheets of the plan.

F. The boundary of the subdivision or development and the section of the subdivision or development under review shall be indicated by a heavy black line on one sheet of the plan, at a standard scale, to show the location of the section under review with other sections of the subdivision or development. All boundary lines shall be labeled with bearings and distances.

G. Location, right-of-way, and name of all existing and recorded streets, railroads, public and private utility rights-of-way or easements (including drainage easements); water courses (creeks, swales, drainage ditches, etc.); public parks and open spaces; buildings (labeled "to remain" or "to be removed"); corporation and county lines; cemeteries and other historical landmarks or features.

H. Location and size of all existing utility facilities (public and private) within and adjacent to the subdivision or development. Location of all public and private sidewalks, including the ownership and maintenance of private sidewalks and pathway system.

I. Location and identification of all zoning districts within or adjacent to the subdivision or development.

J. Existing contours with intervals of not than more than two (2) feet and shall be clearly marked with elevations based on mean sea level (U.S.G.S. Datum) and location and description of the benchmark used.

K. Location, right-of-way and pavement width, and name of proposed streets and other public utility right-of-ways or easements. Show striping of all streets lanes on roads with more than two lanes. A typical detail drawing, which depicts the classification of the proposed street, shall be shown on the Improvement Plan. Where divided entrances are proposed, detail plans shall be submitted for review and approval. Street stations and horizontal curve data shall be labeled on the centerline of proposed streets.

L. Proposed location and identification number of all lots with the distances of all proposed lot lines noted and the area in terms of square feet.

M. Profile of each street with finish grades (including adequate extensions, where necessary, beyond the proposed subdivision or development or section) including all existing and proposed underground public utility crossings with catch basins, junction boxes, and manholes and existing private utility crossings including gas, electric and telephone. Horizontal scale shall be the same as the plan scale and the vertical scale shall not be less than one (1) inch equal to ten (10) feet, unless approved by the

Planning Commission's Engineer. Stationing shall be labeled and correspond to the plan view.

N. Location of proposed sanitary, storm water and water resource systems, including all facilities relating thereto, such as manholes, pump stations, sewerage plants, catch basins, junction boxes, headwalls, water valves and fire hydrants. Detention/retention areas shall be clearly identified with the 100 year storm elevation labeled. Detailed drawings of all discharge structures and overflow facilities shall be shown. All stormwater and sanitary sewer facilities (catch basins, junction boxes, headwalls, manholes and other structures) shall be numbered and correspond to those facilities on the profiles as described in paragraph "q" of this section. Connection to existing facilities shall be shown and labeled. Responsibility of maintenance of any detention/retention areas shall be noted on the Improvement Plan. If applicable, a copy of the Kentucky Division of Water Stormwater General Permit shall be submitted.

O. Show boundaries of "Buffer Zones" along designated streams as defined in Section 7.0-

P. Show the located and identify any drainage facility (i.e. man made dams) or natural features (i.e. lake or pond) on the site or within one hundred (100) feet of the subdivision or development boundary which has or could have a significant impact on drainage or siltation control.

Q. Profiles of all proposed stormwater and sanitary sewer pipelines and facilities including percent grade, pipe diameter, material of pipe, pipe length and invert elevations. Profiles shall also show all existing and proposed public utility (water, storm sewer and sanitary sewer) crossings and all existing private utility (gas, electric and telephone) crossings. The facilities (catch basins, junctions boxed, manholes, headwalls) shall be numbered and correspond to those facilities as described in paragraph "n" of this section. Hydraulic grade lines shall be shown for all stormwater systems. Detailed drawings of all detention/retention discharge structures and overflow facilities shall be shown. Connections to existing pipelines or facilities shall be shown and labeled.

R. Design calculations for all drainage facilities including detention/retention basins, sediment basins, stormwater pipelines and drainage channels shall be provide with the Improvement Plan. Calculations shall include flows, hydraulic grade elevations, mean velocities, etc.. All design calculations shall be provided in a bound format and be certified by with the seal of a Kentucky Licensed Professional Engineer.

S. Proposed finished grade contours with intervals of not more than two (2) feet shall be clearly labeled and relate to the existing contours. Maximum grade for any excavated (cut or fill) slopes shall be 2½:1 (2½ feet horizontal for each 1 foot vertical) and the design slope shall be labeled on the plan. Engineered slopes may be steeper upon a report by a Geotechnical Engineer and approved by the Planning Commission. The disturbed limits shall be clearly identified on their submitted plan and in the field.

   If a Grading Plan was approved under Section 6.0 of these regulations, then a copy of that approved plan shall be submitted with the proposed Improvement Plan.

T. The names of adjacent subdivisions and all street rights-of-way within two hundred (200) feet of the subdivision or development boundary and the names of the property owners of all adjoining un-subdivided properties. If the Improvement Plan is an additional section

of an existing subdivision, the plan shall show the numbering of all adjoining sections and lots.

U. A typical cross-section details for each classification of street shall be provided.

V. The minimum setback line as stated in the applicable zoning regulation shall be shown on each lot.

W. Label lots in the proposed subdivision or development that are intended to be dedicated or temporarily reserved for public use, or to be reserved by deed covenant for use of all property owners in the subdivision and the conditions (if any) of such dedication or reservation. The applicant shall provide information regarding any dedication of public lands, restrictive covenants on non-development areas or conservation easements.

X. Location of erosion and sediment control facilities shall be shown on the plan, with detail drawings of each type of facility being used. The detailed soil erosion techniques or features shall be in conformance with Section 7.0-D of these regulations and the submitted “Best Management Practice” document. All excavated slopes shall be seeded and mulched immediately upon completion of the grading of that particular slope and all right-of-ways shall be seeded and mulched within sixty days (60) of the Planning Commission’s approval of the Final Plat of that section.

Y. Addition documentation or information, such as geotechnical studies, shall be required, if the applicant is proposing to make improvements on property located near or in areas with slopes over twenty percent (20%).

Z. For subdivisions planned with individual septic tank systems, it is recommended that the applicant contact the Northern Kentucky Health Department regarding the permit process and preliminary soil testing requirements.

ARTICLE 7

DESIGN STANDARDS FOR THE LAYOUT OF SUBDIVISIONS

The following design standards are intended to assist a developer in creating a subdivision and meeting the purpose of these subdivision regulations. These standards are to be used in preparing a Preliminary Play, Improvement Plan, Final Plat and Conveyance Plat.

The purpose of these standards is to establish minimum design and improvement standards which will be required as a pre-condition to development or in conjunction with development for lots, streets, utilities, and other physical elements of a subdivision or development. The developer's engineer, licensed in Kentucky, shall design these aspects of the subdivision or development.

SECTION 7.1 STREET DESIGN

A. Street Classification: The developer or subdivider is encouraged to meet with the Planning Commission's Engineer to determine the design requirements of proposed streets based upon the streets classification. In addition, a property owner may be required to dedicate land for street right-of way in order to upgrade existing arterial, collector, subcollector or local roads and bring them into conformance with the regulations.

B. Street Rights-of-Way Widths:

The minimum width of right-of-way for a public street, measured from right-of-way line to right-of-way line and at a right angle to the centerline, shall be as follows:

Arterial	80 feet
Collector	60 feet
Sub-Collector	50 feet
Local	50 feet
Cul-de-sac	50 feet
Alley	30 feet

C. Additional right-of-way: Subdivisions or developments that adjoin an existing city or county street, additional rights-of-way shall be dedicated to meet the minimum right-of-way width, if it does not exist, for all streets. The entire right-of-way shall be provided where any part of the subdivision or development is on both sides of the existing street; and one-half of the right-of-way shall be provided, as measured from the centerline for subdivisions or developments that is located only on one side of the existing street.

D. Cul-de-sac: Cul-de-sacs streets shall not be longer than 1,200 feet, unless local topographic or other physical conditions are such as to render these provisions impracticable.

E. Street Names: Proposed streets, which are in alignment with other existing streets, shall bear the name of the existing street unless separated by an intersecting collector or arterial street. In no case shall the name of a proposed street duplicate an existing street name, irrespective of the use of the suffix street, road, lane, avenue, boulevard, way, place, or court, nor shall a proposed street name phonetically approximate the name of any existing street or approved street name in Grant County. Proposed street names will be reserved when the Preliminary Plat is approved. Street names on Improvement Plans and Final Plats shall follow the approved names listed on the Preliminary Plat. Street names may be changed with the approval of the Planning Director.

F. Alleys:

1. Alleys shall be prohibited in residential zoning districts, unless otherwise approved by the Planning Commission.

2. In commercial and industrial areas, adequate alleys shall be provided where the design requires.

G. Intersections: The two centerlines of proposed streets at their intersection shall be as nearly to a right angle as possible and that angle at no time shall be less than eighty (80) degrees.

1. For residential subdivisions, the radius of the curve at the intersection of the two right-of-way lines shall not be less than twenty feet (20'), and for the intersection of the two pavement edges, the radius curve shall not be less than twenty five (25) feet.

2. For industrial and commercial subdivisions, the radius of the curve at the intersection of the two right-of-way lines shall not be less than forty feet (40'), and for the intersection of two pavement edges, the radius curve shall not be less than forty five feet (45').

3 There shall be no greater than four basic street legs at any proposed intersection unless the intersection is divided. Merging lanes, deceleration lanes, "Y" intersections, etc. are considered as being parts of one street leg.

4 Proposed intersections with existing or proposed streets shall not be closer than one hundred twenty five feet (125') to an intersection of any other street as measured from intersection point to intersection point.

H. Easements: When ever any sanitary sewer, storm sewer or water main is located outside of a dedicated public right-of-way there shall be provided an easement at least twenty (20) feet in width and shall be centered on the centerline of the pipe structure. A surface drainage easement, at least twenty (20) feet in width, shall be provided from the discharge point of any storm sewer pipe the receiving drainage channel. See Article 9, Section 9.1-H for Surface Drainage Easement Statement.

I. Cul-de-sac Streets; Proposed cul-de-sac streets shall not be more than twelve hundred feet (1,200') in length when measured from the center of the cul-de-sac along the centerline of the street to the nearest intersection. When topographic conditions or other physical conditions are such to render these provisions impracticable, the Planning Commission's Engineer may waive this requirement.

J. Temporary Dead-End Streets: When any street is temporarily dead-ended a temporary turn-around shall be provided.

K. Street Connections to Adjoining Tracts or Areas: Street connection to adjacent tracts or areas shall be required unless topographic conditions render these provisions impracticable.

The Planning Commission shall consider the following criteria for requiring street connections to adjacent tracts:

1. The adjoining land must be compatible with the subject development as determined by the current zoning.

2. The adjoining land has the potential for compatible uses, as determined by the Planning Commission's Engineer.

3. The Planning Commission may require the connection of local streets to adjoining tracts or areas in order to prevent a local street from becoming a cul-de-sac which exceeds the maximum length permitted for a cul-de-sac.

4. Connections to the existing street system will be consistent with the existing conditions and the design of adjacent streets.

5. In instances where a street connection cannot be constructed all the way to a shared property line due to grading or other construction feasibility issues, until development occurs on an adjacent tract, the connection shall be constructed as far as practical toward the property. The developer shall deposit the cash amount plus contingency with the Planning Commission for the estimated costs of remaining street construction, including water mains, to the property line. The developer shall be responsible for the construction of the remaining street segment when the adjoining tract develops.

6. Subdivisions that are required to provide sub-collector or collector streets shall also be required to provide for connection of such streets to other collector or arterial streets or connection to adjoining lands.

L. Sidewalks: All proposed residential, commercial and industrial subdivisions or developments shall have sidewalks, as follows:

1. Residential Subdivisions: All proposed residential subdivisions shall have sidewalks on both sides of all streets.

2. Commercial subdivision or development shall have sidewalks on both sides of all streets.

3. Industrial subdivisions or developments shall have sidewalks on one side of all streets.

Sidewalks shall be constructed of Portland cement concrete on compacted subgrade and have a minimum depth of four inches (4”), except at driveways, the minimum depth shall be five inches (5”) in residential zones. In commercial and industrial zones, driveways shall have a minimum depth of eight inches (8”). All sidewalks shall be located five (5) feet from the back of curb or the edge of the pavement and shall be five (5) feet in width. At intersections, handicap ramps shall be installed meeting ADA requirements. Handicap ramps shall be installed as part of the original development.

Sidewalks shall be installed by the developer of the subdivision or the builder of each structure as each lot is developed. In cases where sidewalk improvements have not been completed along platted but undeveloped lots, such sidewalk improvements shall be completed by the owner of the lot(s) in question within one (1) years from the date when ninety (90%) percent of the individual lots within a phase or section have been developed. Sidewalk construction shall be inspected by the appropriate legislative body.

M. Street Signs: Street signage installation, maintenance and replacement shall be the responsibility of the appropriate legislative body.

N. Perimeter Requirements: Development in all residential districts shall provide a minimum four foot (4’) high fence along the common boundary with an active agricultural operation or if the adjoining property is currently zoned A-1. An active agricultural operation for the purpose of this section includes the raising of livestock or annual crops on at least fifteen (15) contiguous acres. This fencing shall be placed on the developing property and shown within an easement on the Final Plat. The fencing may be placed on the property of the active agricultural operation by agreement with the property owner. Maintenance of the fence shall be the responsibility of the owner(s) of the property(ies) where the fence is located unless assigned to a specific party or entity such as a Homeowner’s Association. The fencing material shall minimally be stock wire, although chain link, rail fencing with wire inserts, picket fencing, solid privacy fencing, and comparable material are also acceptable. The finished side of the fence shall

face the developing property. Materials or fence location may be altered or the acceptance of an existing fence, upon agreement of an affected property owners. The fencing required by this section may be waived by the Planning Commission.

O. Street Lights: When required by the applicable legislative body, the subdivider or developer of the subdivision will provide street lighting poles, accessories and the necessary easements at the subdivides expense and in accordance to the specifications of the applicable legislative body and appropriate utility company. In general, street lights shall be placed at strategic locations and distances to assure safe pedestrian and vehicular traffic. Distance between street lights will be based upon lot size and street configuration and the appropriate legislative body. The ownership and maintenance of street lights shall be the responsibility of the appropriate legislative body.

SECTION 7.2 BLOCKS:

Intersecting streets which determine block length and width shall be provided at such intervals which include existing street patterns, topography, and requirements for safe and convenient vehicular and pedestrian circulation. Blocks of proposed subdivisions or developments shall not be less than two hundred and forty feet (240') and not more than twelve hundred feet (1,200') in length.

SECTION 7.3 LOTS:

The size, shape and arrangement of lots in a proposed subdivision or development, shall be such as set forward in the applicable zoning ordinance and these subdivision regulations. Rectangular shaped lots shall be encouraged and extremely irregular shaped lots shall be avoided. Side lot lines shall be as closed to right angles with the street centerline as possible, or radial to curve street centerline. Lot lines not at right angles with the street centerline, and lots lines intersecting with curved right-of-way shall have a reference tie to the tangent line of that centerline curve. Lot lines of a subdivision should display an organized and uniform development pattern.

A. Lot Size: The minimum size of a lot in a proposed subdivision or development depends on the current zoning district that said subdivision or development or section thereof lies in. The minimum size for the respective zone is contained in the current zoning regulations as established by the legislative body have territorial jurisdiction over the proposed subdivision or development.

B. Land Adjoining Arterial or Collector Streets: The subdivision of new lots on land with a minimum lot size of less than one (1) acre which adjoin arterial or collector streets shall be platted in a manner which necessitates vehicular access to be provided from a secondary street or private access driveway and not from the arterial or collector streets. A note shall be provided on the final plat which states that vehicular access is prohibited from the arterial or collector street When access is from a secondary street or private access driveway, an earthen berm shall be constructed within the lot and adjacent to the right of way line of the

arterial or collector street, which shall have a minimum height of five (5) feet above the elevation at the right of way line of the arterial or collector street.

C. Irregular Lots: Irregular lots which include corner lots, double frontage lots, flag lots and lots that have irregular shape and size because of topography shall conform to the minimum requirements of the applicable zoning ordinance. Double frontage lots shall be avoided except where essential to provide separation of a residential development from arterial or collector streets or to overcome specific disadvantage of topography and orientation.

D. Corner Lot Driveways: Driveways on corner lots shall be located at the building line farthest from the intersection.

E. Lot Frontage: All lots in a subdivision shall have the minimum frontage on a public street as determined in the applicable zoning ordinance.

F. Flag Lots: Flag lots shall only be permitted in those locations where because of geometric, topographic, or other natural features, it would be impractical to extend a public street. Flag lots shall have a panhandle extending to a publicly dedicated street for the purpose of access, and shall have two conforming lots adjoining the flag lot (see page 7.8).

1. Flag lots in agricultural and residential subdivisions shall meet the following standards:

   Single flag lots shall have twenty feet (20') of frontage on a publicly dedicated street. In the case of two contiguous flag lots, there shall be thirty feet (30') of frontage on a publicly dedicated street with a common driveway. With two contiguous flag lots, a deeded fifteen foot (15') strip of land for each lot is required with a common unobstructed access easement for a shared driveway to the public street

2. Flag lots in commercial and industrial subdivisions shall meet the following standards:

   Flag lots shall have a minimum of thirty feet (30') of frontage and a maximum of fifty feet (50') of frontage on a publicly dedicated street. In the case of two contiguous flag lots, there shall be a minimum of thirty feet (30') of frontage and a maximum of fifty feet (50') of frontage, for both lots combined, on a publicly dedicated street with a common driveway. With two contiguous flag lots, a deeded strip of land that is at least fifteen feet (15') wide, but no greater than twenty five feet (25') in width, is required for each lot with a common unobstructed access easement for a shared driveway to the public street.

3. When the applicable zoning ordinance specifies a minimum lot frontage at the right of way line greater than those specified in paragraph 1 and 2, then the panhandle shall maintain a width equal to the minimum lot frontage required at the right of way line for the full length of the panhandle.

4 All Flag lots shall meet the following standards:

   a. Flag lots shall have a panhandle for the minimum distance (length) of two (2) times the minimum lot frontage required by the applicable zone with a maximum required length of one hundred fifty feet (150') from a publicly dedicated street.

   b. In no case shall more than two flag lots be contiguous to each other at the publicly dedicated street.

   c. The maximum number of flag lots permitted for each phase of a subdivision (Improvement Plan submittal) shall not exceed fifteen percent (15%).

   d. A driveway must be located within the panhandle of the deeded property for a flag lot.

   e. A written agreement, in a recordable form, requiring the perpetual maintenance of the driveway located within the panhandle of the flag lot, shall be recorded with the Grant County Court Clerk at the same time that the final plat is recorded.

   f. The driveway for a flag lot shall be located at a minimum of five feet (5') from each lot line, unless approved by the Grant County Planning Commission.

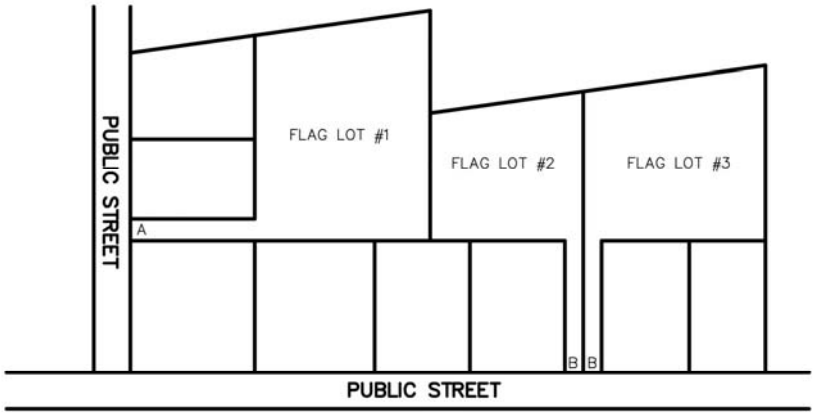
   g. For two contiguous flag lots with a common driveway, a joint access easement shall be shown across the entire width of both panhandle containing the common driveway on the Final Plat.

PROPER USE OF FLAG LOTS

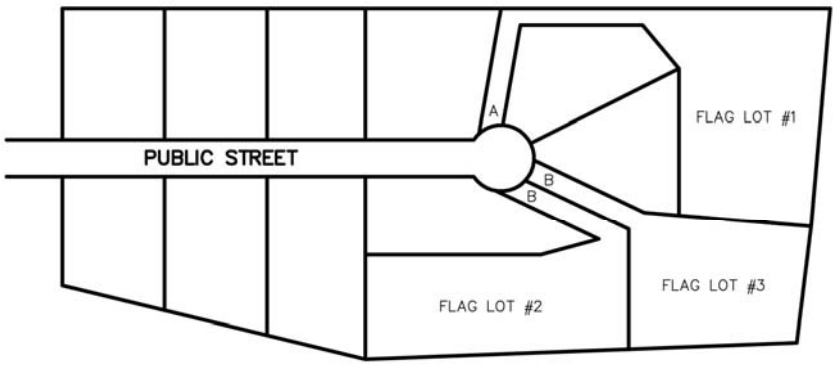
TYPE OF SUBDIVISION	A	B
AGRICULTURAL/RESIDENTIAL	20'	15'
COMMERCIAL/INDUSTRIAL	30' MIN 50' MAX	15' MIN 25' MAX

**PAN HANDLE LENGTH PER SECTION 7.3-F-4-a*

EXAMPLE 1



EXAMPLE 2



SECTION 7.4 SUBDIVISION ACCESS

Each existing tract of land is entitled to one (1) entry street provided that the location and design fulfills, as a minimum, the following requirements:

1. The minimum spacing between entry streets shall be five hundred (500) feet. When conditions make this requirement impractical, the Planning Commission may waive this requirement.

2. A proposed subdivision or development containing more than one hundred (100) lots or living units, a second entry street shall be provided. When topographic or physical conditions make this requirement impractical, the Planning Commission may waive this requirement.

3. An encroachment permit shall be obtained from the appropriate legislative body for whichever road is being accessed.

4. The Planning Commission shall require that all entry streets shall operate in such a manner as to not adversely affect the level of service of the adjacent roadway. Provisions for the present or future construction of a frontage road, restriction or channelization of turning movements or other improvements may be required, as a condition of approval, in order to maintain the level of service of any adjacent roadway. (See Section 7.5)

5. If a property has frontage on more than one (1) street, an entry street will be permitted only on those streets where standards contained in these regulations can be met.

6. If a property cannot be served by any entry street location meeting these standards, the Planning Commission will designate one or more entry street locations based on traffic safety, operational needs and conformance to as much of these requirements as possible.

7. All entry streets shall be designed and located so that the minimum sight distances, as shown in Table 7.1 and 7.2, are provided. The required sight distance must be unobstructed by horizontal and vertical road curves, embankments, structures or vegetation and all other obstructions.

8. All entry streets shall be designed and located to provide sight triangles, as shown in Figure 7.1. Sight triangles are areas clear of visual obstructions to allow for safe egress of vehicles from an access point. Measurements must be calculated with a driver eye height on 3.5 feet and a sight object height of 4.25 feet. The existing driver position at the proposed access point must be calculated at 18 feet back from the pavement edge of the thoroughfare. The sight distance must meet the measurements listed in Tables 7.2 and 7.2.

Table 7.1

Minimum Sight Distance along Through Road For Turning Vehicle From Proposed Access

Posted Speed Limit	**25 MPH**	**35 MPH**	**45 MPH**	**55 MPH**
Passenger Car	**220**	**308**	**396**	**484**
*Truck	**440**	**616**	**792**	**968**

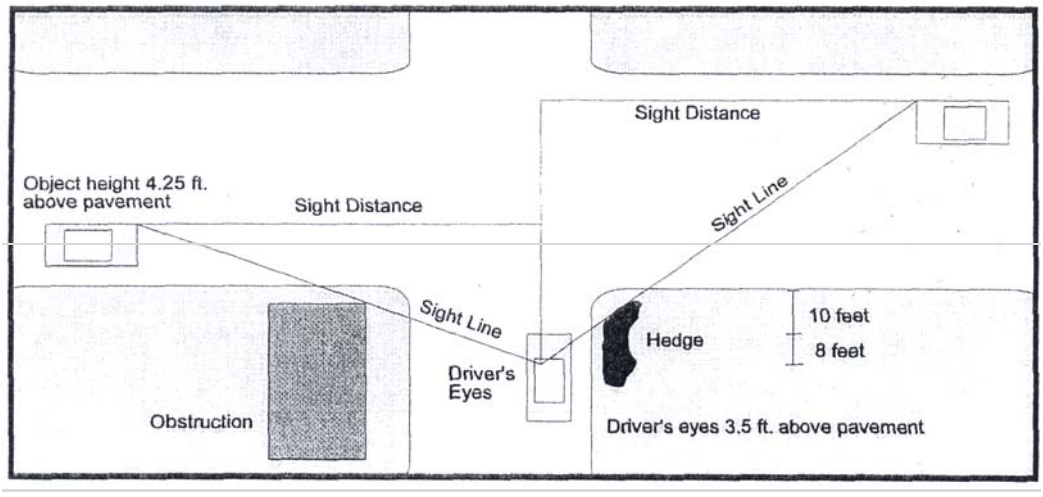
*****When there is substantial truck usage as determined by the Planning Commission's Engineer.

Table 7.2
Minimum Sight Distance For Vehicle on Through Road Turning Left onto Proposed Access

Posted Speed Limit	**25 MPH**	**35 MPH**	**45 MPH**	**55 MPH**
Passenger Car	150	225	326	443
*Truck	225	337	489	665

*When there is substantial truck usage as determined by the Planning Commission's Engineer

FIGURE 7.1
Sight Triangles



SECTION 7.5 TURN LANES:

Turn lanes shall be provided on the intersected street as follows:

1. Subdivision or development containing more than one hundred (100) residential lots or housing units, a left turn lane shall be provided from the thoroughfare into the subdivision or development.

2. Subdivision or development containing more than one (100) lots or housing units but less than two hundred (200) or less residential lots or housing units, turn lanes, both right and left turns, shall be provided from the thoroughfare into the proposed subdivision development. The left turn lane shall have a minimum length of one hundred twenty five (125) feet with a minimum taper of fifty (50) feet. The right turn lane shall have a minimum length of eighty (80) feet with a minimum taper of fifty (50) feet.

3. Subdivision or developments containing two hundred (200) or more residential lots or living units, turn lanes shall be provided. The developer shall have a traffic study prepared to determine the design requirements for the turn lanes. The minimum requirements shall be as specified in paragraph 2 of this Section.

4. All commercial or industrial subdivisions or developments shall provide turn lanes from the thoroughfare into the subdivision or development. The developer shall have a traffic study prepared to determine the design requirements for the turn lanes. The minimum requirements shall be as specified in paragraph 2 of this Section.

5. The minimum turning radius for all right hand turns from the thoroughfare into the subdivision or development shall have a minimum radius of forty-five feet (45'). A fifty foot (50') taper may be used if approved by the Planning Commission's Engineer.

6. Subdivisions or developments that have access from a state maintained roadway shall obtain an Encroachment Permit and comply with all requirements of the Kentucky Transportation Cabinet.

7. All required turn lanes shall be constructed in conjunction with the construction of the intersecting street.

8. When topographic or physical conditions make the installation of turn lanes impractical, the Planning Commission may waive this requirement.

ARTICLE 8

DESIGN STANDARDS FOR SUBDIVISION IMPROVEMENT PLANS

This article establishes standards for the design of improvements for all subdivisions or other developments within Grant County. The purpose of these standards is to establish minimum design and improvement standards which will be required as a pre-condition to development or in conjunction with development of lots, streets, utilities and other physical elements of a subdivision or development. All plans for improvements must be designed by a Kentucky Licensed Professional Engineer, approved by the Planning Commission and reviewed, inspected by the Planning Commission's Engineer and/or other regulatory agencies, where applicable, in accord with provisions of these regulations.

SECTION 8.1 STORM WATER MANAGEMENT and DRAINAGE SYSTEMS

Storm sewer systems are designed to collect and convey storm water runoff from streets inlets, runoff control structures, and other locations where the accumulation of storm water is unsafe. No storm water shall be permitted to run into a sanitary sewer system within a proposed subdivision. In general, the cumulative amount of storm water runoff discharge from the boundary of a site or subdivision shall be equal in terms of pre-development and post-development. Storm water runoff from a site or subdivision shall not adversely impact natural drainage from an uphill drainage basin or to a downhill drainage basin or adjacent properties. The property owner shall be responsible for storm water drainage facilities located on private property where runoff will be principally collected within that property and be minimally discharged over a larger area before the storm water naturally drains on adjacent properties. For isolated areas of the subdivision, where increased runoff may leave the boundary, downstream conditions must be considered to ensure that the increase runoff will not adversely impact existing drainage structures,

All public maintained storm sewer systems shall be designed for a peak flows calculated on the ten year (10) storm frequency. Overflows shall be designed on the one hundred year (100) storm. Safety swales shall be designed to carry all runoff away from any structure.

A. Basic Design Criteria for a Storm Sewer System

1. Degree of Protection Required – The storm drainage system shall be adequate to handle the runoff from storms having various frequencies of occurrence for various degrees of site development, in accord with the following general categories:

a. Conservation, agricultural and low density Residential (2 acre lots or larger)	10 year frequency
b. All other residential and commercial	10 year frequency
c. Industrial areas	10 year frequency
d. For concentrated high value areas	10 year frequency
e. For flood control facilities	10 year frequency

The runoff computed from these storm frequencies shall be from the area within the site or subdivision and all other areas draining thereto.

2. Determination of Quantity of Runoff for Design of Storm Water Collection System

Each portion of the storm water drainage collection system shall be capable of handling the peak flow of runoff. For drainage areas less than one hundred (100) acres, either the "Rational Method" or "Soil Conservation Service (SCS) Method" may be used. For areas greater than one hundred (100) acres, either the "Soil Conservation Service (SCS) Method" or the "Regional Method" of the Kentucky Transportation Cabinet, Bureau of Highways shall be used.

a. Rational Method:

"Rational Method" where Q = CIA
Q = peak runoff quantity in cubic feet per second
C = runoff coefficient varying with perviousness and other characteristics of the drainage area
I = Average intensity of precipitation in inches per hour, varying with frequency of storm occurrence, duration or concentration time and area of the tributary watershed
A = area in acres of the tributary watershed

Runoff Coefficients: The runoff coefficients are the portion of the precipitation, expressed as a decimal that will reach a give storm sewer facility. Each lot within a subdivision contributes runoff from the roof, driveway, sidewalk and street. Generally, the smaller the lot width, the less impervious area. As the lot increases in width so does the impervious area. Weighted coefficient shall be used with the impervious areas C = 0.95 and all other areas C = 0.40.

TABLE 8.1

Rational Method Runoff Coefficients for Composite Analysis

Land Use Description	**Average Percent Imperviousness**	**Runoff Coefficient (C)**
Natural and Undisturbed Areas	Varies	0.40
Single Family Residential Average Lot Size/Width	Varies (See Below for Values	0.43 – 0.76 (See Below for Values)
3 acres/300 feet	6	0.43
2 acres/200 feet	7	0.44
1 acre/100 feet	12	0.47
½ acre/100 feet	23	0.53
12,500 sq. ft./80 feet	34	0.59
9,000 sq. ft./70 feet	42	0.63
7,500 sq. ft./60 feet	44	0.64
6,000 sq. ft./50 feet	48	0.66
<6,000 sq. ft./<50 feet	65	0.76
Industrial	72	0.80
Multi-Family Residential	75	0.81
Commercial/Office	85	0.87

Impervious Areas Including: Pavement, Roofs, Drives, Sidewalks, etc.	100	0.95

Intensity of Precipitation: The “point” values of average precipitation intensity in inches per hour, for Grant County can be determined from Exhibit No. 4-904, Kentucky Bureau of Highways, “Rainfall Intensity-Duration-Frequency Curves”. For any given storm duration (concentration time of runoff) the curves show the average precipitation intensity of storms having 2, 5, 10, 25, 50, and 100 year frequencies or the precipitation intensity can be calculated by using the following formula and constants developed by the Kentucky Transportation Cabinet.

$I_{RI} = B/(T_C+D)^E$

TABLE 8.2

Return Interval (RI)	B	D	E
2	34.5848	6.9000	0.7899
5	54.0284	9.5000	0.8211
10	65.6903	10.6000	0.8262
25	87.9368	12.4000	0.8499
50	100.0737	13.0000	0.8553
100	114.6446	13.8000	0.8614

Time of Concentration: The time of concentration is the time associated with the travel of runoff from the outer point that best represents the shape of the contributing areas. Runoff from a drainage area usually reaches a peak at the time for a drop of water to flow from the most remote point in the watershed to the point of interest. Runoff may reach a peak prior to the time the entire drainage area is contributing. Sound engineering judgement should be used to determine the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which includes storm sewers. The minimum time of concentration for any area shall be six (6) minutes.

b. Soil Conservation Method:

The Soil Conservation Service TR-55 method for calculating the time on concentration shall be used.

At no time shall the Time of Concentration be greater than thirty (30) minutes for design of storm inlets.
The Soil Conservation Service (SCS) Method may be used to calculate the peak discharge rates; develop runoff hydrographs for basins and sub basins; determine runoff volumes; and provide inflow information to determine the required storage

volume for detention and retention basins. The SCS Method will utilize the formulas, constants and data in the current manual from the U.S. Natural Resources Conservation Service. The Soil Conservation Service utilizes a 24-hour storm duration, which is considered to be acceptable for Grant County, When the Soil Conservation Service methods are used, and the Type II rainfall distribution shall be used.

For detailed information, the user is referred to the following Soil Conservation Service publications:

1. NEH-4: "Hydrology", Section 4, National Engineering Handbook:

2. TR-20: Computer Program for Project Formulation, Hydrology;

3. TR-55: Urban Hydrology for Small Watersheds;

4. TP-149: A Method for Estimating Volume and Rate of Runoff in Small Watersheds.

c. Regional Method:

The Regional Method of the Kentucky Transportation Cabinet, Bureau of Highways (Regional Method) may be used to calculate the peak discharge rates required by regulatory agencies such as the Kentucky Division of Water. The Regional Method will utilize the formulas, constants and data from the current Manual of Instruction of Drainage and Design, Kentucky Transportation Cabinet, Bureau of Highways.

C. Storm Water System Facilities:

1. Flow Times – Flow times in sewers or conduits to the point of design may be determined from the hydraulic properties of the sewers upstream of that point, assuming average flow-full velocity at the proposed sewer slopes.

2. Pipe Capacities – Public storm sewer pipe shall be designed to carry peak flows as determined by the methods previously described. At the design storm the drainage system shall be designed as open channel (non-surcharged) flow. Sizes shall be determined by Manning's formula using a range of roughness coefficients (n = 0.009 – 0.024). For roughness coefficients see Appendix "D", Item 1.1.

3. Minimum Pipe Size – The minimum diameter for public storm sewer pipe shall be fifteen inches (15") and twelve inches (12") for systems with a catch basin at the initial point.

4. Minimum and Maximum Velocities – Velocities in public storm sewer pipes, when flowing full at the average peak flows, shall not be less than two feet (2.0') per second and not greater than forty feet (40') per second.

5. Pipe Grades – The sewer pipe shall be laid on gradients so that the velocity (flowing full) shall be kept within the foregoing stated minimum and maximum unless other

special provisions are made. Sewer pipe on twenty percent (20%) slopes or greater shall be anchored securely with concrete anchors or equal, spaced as follows:

a. Not over thirty six feet 36'0 center to center on grades of twenty percent (20%) and up to thirty five percent (35%);

b. Not over twenty four feet (24') center to center on grades of thirty five percent (35%) and under fifty percent (50%);

c. Not over sixteen feet (16') center to center on grades of fifty percent (50%) and over.

6. Hydraulic Grades – To ensure against surface ponding or street flooding due to surcharging, the hydraulic grade line (HGL) of the design storm in any pipe may not be higher than the top of the pipe for the ten year (10 yr.) design storm; and one foot (1') below the inlet or manhole for the twenty five year (25 yr.) check storm.

   Design of all public storm sewer appurtenances shall consider the balance of energy plus the loss due to entrance in all structures having a critical change in horizontal or vertical alignment. In no case shall the difference in invert elevations be less than the result of equal crowns when a smaller pipe empties into a large pipe. In no case shall storm sewer pipe sizes be reduced unless the upstream pipe is an approved underground detention structure.

7. Manholes (Junction Boxes) – Manholes shall be constructed in accord with Standard Construction Drawings, See Appendix "C". Drop manholes may be required to reduce the slope of any sewer line. Pipes shall not extend more than two inches (2") into the side of the manhole and the invert of the outlet pipe shall be at the bottom of the manhole.

8. Inlets (Catch Basins)

   a. Capacity: The capacity of the grate on the inlet should not be less than the quantity of flow tributary to the inlet. Inlets at low points or sags should have extra capacity as a safeguard for street flooding from flows overtopping the street curb. A safety swale designed for the 100 year storm shall be placed at all low points or sags. Curb openings on combination inlets should be used for overflows in the event that the grate is clogged. Special inlets may be required for streets with steep gradients to provide the extra capacity such situations require. Pipes shall not extend more than 2 inches (2") into the side of the inlet box, and the invert of the outlet pipe shall be at the bottom of the inlet box.

   b. Type: Combination type inlets (single or double) shall be used and installed in accord with "Standard Construction Drawings", see Appendix "C". Any catch basin not placed on a lot line or within three feet (3") of a driveway shall use a rolled type grate, see Appendix "C". Capacity calculations must be based on the type of inlet. Curb and gutter inlets and shall accommodate the flow from a storm with an intensity of four inched (4") per hour.

c. Location: Inlet spacing shall be based upon gutter and inlet capacity, street slope and contributing drainage area. The spacing of the inlets should ensure that street drainage generated along continuous grades or in sags will not damage and flood private properties or residential basements. For the design storm, no more than 5 cfs shall enter any grade inlet; no more than 8 cfs shall enter any slump inlet and the maximum spread on any street pavement shall not exceed six (6) feet; and no more than 2.5 cfs is permitted to flow in side yards between houses. The maximum spacing between inlets shall be as follows:

1. Along continuous grades (less than 2 percent) – 400 feet maximum;

2. Along continuous grades (2 percent and over) – 600 feet maximum;

3. At sag locations (draining less than 2 percent grades) – 400 feet maximum between inlets or from a high point;

4. At sag locations (draining 2 percent and over grades) – 600 feet maximum between inlets or from high point.

9. Cul-de-sacs

Special consideration should be given to storm drainage entering cul-de-sacs. Additional inlets shall be required when drainage areas and/or streets slopes are excessive. In addition to a inlet provided at the low point within the cul-de-sac two (2) additional inlets shall be required along each curb prior to the entrance of the cul-de-sac in accord with following criteria:

a. All street slopes less than eight percent (8%) and draining more than 400 feet of pavement;

b. All street slopes eight percent (8%) or greater and draining more than 300 feet of pavement.

10. Intersections – Storm water runoff crossing the intersection of a street shall be kept to a minimum.

11. Outfalls – When a storm sewer system outfalls into a flood plain of any major water course, the outfall must not be subject to frequent flooding or backwaters. Standard headwalls and/or headwalls with wingwalls shall be constructed for all outfalls. To minimize adverse impacts on receiving channels, one of the following conditions must be met:

a. The outlet velocity at a headwall or outfall of a paved channel shall be less than or equal to the natural velocity of the receiving channel or stream for the design stream but shall not be more than ten (10') feet per second;

b. Structurally lined aprons or other acceptable flow spreading or energy dissipating devices shall be installed at the outlet to reduce the velocity;

c. The receiving channel or stream shall be lined as per Article 8, Section 8.0 - D "Basic Design Criteria for Storm Water Drainage Channels, Water Courses and Erosion Control" of these regulations for a sufficient distance to protect against erosion.

   When a storm sewer or paved channel outlets onto a slope without a defined drainage channel, either a channel shall be graded and properly protected down to its convergence with the natural channel, or the outlet flow shall be dispersed on the slope using acceptable flow spreading or energy dissipating devices. Storm sewers or paved channels that outlet at or near defined drainage channels, shall be designed to outlet at as near to parallel to the channel as practical.

   The outlet velocities of all headwalls shall be included in the drainage calculations. The invert of the first storm sewer appurtenance upstream of the outfall structure shall be above the elevation of the calculated one hundred (100) year flood plain, The calculated one hundred (100) year flood plain for all channels with a drainage area of more than fifty (50) acres within the project shall be shown on the Improvement Plan.

12. Culverts and Bridges – Culverts and bridges shall be designed in accordance with the methods given in the "Manual of Location and Design" published by the Kentucky Transportation Cabinet, Bureau of Highways; except that storm water quantities to be handled by the culverts and bridges shall be determined on the basis described in these standards. The allowable headwater (AHW) shall not be greater than HW/D = 2.0.

13. Headwalls – Standard headwalls for pipe sizes twelve (12) thru twenty-four (24) inches and headwalls including wingwalls and aprons for pipes larger than twenty-four (24) inches, shall be constructed at the outfall of all storm sewers in accord with "Standard Construction Drawings" as shown in Appendix "C" of these regulations. No grate shall be placed on any headwall.

    Safety guards and railings shall be provided along the top and slope/winged sidewalls on all headwalls inlet and outlet structures having a vertical drop of four feet (4.0') or greater. Such guards and railings shall be at least 42-inches in height measured vertically above the wall. Guards or railings shall not have an ornamental pattern that would provide a ladder effect. Vinyl coated chain link fencing is an acceptable guard type.

14. Other Drainage Improvement Measures – Other drainage improvements measures may be required to provide the necessary hydraulic characteristics required for adequate drainage. These other measures include stream bed cleaning, removal of obstructions, stabilization of banks or areas to eliminate erosion, widening, deepening or realignment of streams, construction of ponds behind dams or other measures for adequate drainage.

15. Sub-surface Springs – While constructing developments, sub-surface springs may be disturbed. In these cases, it is the responsibility of the developer to adequately

address the removal of the water from the surface. This would include installing a pipe network to transfer water to a storm water structure or natural stream. Discharge of this type of water shall not be onto the lot directed toward the street, or on any part of the lot that will pond water. It is the responsibility of the developer to correct any problem with sub-surface springs up to three (3) years after recording of the Final Plat.

16. All ditch backfill in material shall meet the requirements of Appendix "A", Item 1.4.

17. Specifications for Construction and Materials – See Appendix "C" and Appendix "D".

D. Basic Design Criteria for Storm Water Drainage channels, Water Courses and Erosion Control

Open channels provide many advantages in the management and control of storm water runoff. Such channels provide for natural infiltration of storm water into ground water supply and extend the Time of Concentration (T_C) helping to maintain the runoff rate nearer to that which existed prior to development. The objective of open channel flow design is to: a) determine a channel slope and size that will have sufficient capacity to prevent undue flooding damage during the anticipated peak runoff period; b) determine the degree of protection based on stream velocity to prevent erosion in the drainage channel. Existing drainage channels, which will remain undisturbed, shall not be required to be reconstructed unless additional capacity and erosion control is required.

1. Degree of Protection – Storm water drainage channels and water courses shall be adequate to handle runoff from storms of the frequencies of occurrence shown for the degrees of site development as follows:

   a. For all subdivisions and developments twenty-five year (25 yr.) frequency

   b. For main flood control channels – one hundred year (100 yr.) frequency. The runoff computed from these storms shall be that from the area within the subdivision and from all other areas considered as fully developed in accord with development planned in the Grant County Comprehensive Plan.

   c. Determination of Quantity of Runoff – Each portion of the storm water system of drainage channels and water courses shall be capable of handling the peak flows as determined by the proper method previously described.
   d. Drainage Channel – Capacities – Drainage channels shall be designed to carry flows as determined by methods previously described. Channel cross-sections areas shall be determined by Manning's formula, using a vale of "n" from the following chart.

Drainage Channel Manning's "n" Values

Concrete	0.013
Earth (non-vegetation)	0.022
Rip-Rap	0.035

Rock Cuts	0.035
Grass-mowed short	0.050
Grass-tall stand	0.100
Natural Channels	
Clean and Straight	0.030
Stone and some Weeds*	0.035
Gravel and Rock	0.040
Weedy and Winding	0.060
Dense Weeds and Brush	0.100

*This is typical for a natural intermittent stream

When open drainage channels require various lining types to attain ultimate design capacity, the earth sections of the drainage channel and its structure shall be designed and constructed to the ultimate design required.

2. Erosion Control for Drainage Channels – Runoff flows in open channels may cause accelerated erosion. Such erosion can be controlled by limiting velocities, changing the channel lining and reshaping the channel to spread the flow of runoff. Methods of controlling erosion in open channels include the following:

   a. Sown grass covers, seeded degradable turf reinforcing mats
   b. Sod
   c. Permanent turf reinforcing mats
   d, Aggregate channel lining (minimum KDOT Type II channel lining, underlain with fabric;
   e. Aggregate filled gabion baskets or mattresses (underlain with filter fabric;
   f. Interlocking concrete blocks or cabled mattress (underlain with filter fabric);
   g. Reinforced concrete or precast paving (of at least 4" thickness)
   h. Energy dissipaters.

   Any placement of erosion control materials in a channel may require a permit from the Kentucky Division of Water and the US Army Corp of Engineers.

   Alternate methods of channel erosion control will be considered on an individual case basis. Note that the methods above are generally listed in order of increasing erosion protection ability. The design requirements below indicate the minimum level of protection. Any method listed above with higher erosion protection ability than the minimum listed below will be acceptable.

3. Design Velocities:

   a. Minimum Design Velocities:
      Design velocities should generally be greater than 1.5 fps to avoid excessive deposition of sediment. When flattened slopes are unavoidable, method "g" shall be used to accelerate runoff.

   b. Design velocity between one and one-half (1.5) and five (5) feet per second:

Method “a” shall be used. The bottom and sides of the earth channel shall be seeded, mulched and fertilized to an elevation of three (3) feet above the design water surface, or three (3) feet beyond the top of the channel bank. Seeding shall be a perennial or annual mixture of grass seeds applied at a rate of 75 pounds per acre. Acceptable whole fertilizer shall be applied at a rate of 75 pounds per one thousand square feet. Where seeding is required and the soil is not capable of supporting vegetation (such as sandy soils or clay types), appropriate action shall be taken to bring the soil to an acceptable condition which will support the growth of seed. A degradable turf reinforcing mat is recommended to help stabilize the soil until the grass has become fully established.

c. Design velocities between five (5) and nine (9) feet per second:
Methods “b” and “c” shall be used. The bottom and sides of the earth channel shall be sodded and pegged to remain in place or a permanent turf reinforcing mat shall be installed and seeded. Where seeding or sodding is required and the soil is not capable of supporting vegetation (such as sandy soil or clay types), appropriate action shall be taken to bring the soil to an acceptable condition which will support the growth of seed or sod.

d. Design Velocities between nine (9) and fourteen (14) feet per second:
Methods “c” and “d” shall be used.

e. Design velocities between fourteen (14) and twenty (20) feet per seconds:
Method “d’ and “e’ shall be used.

f. Design velocities greater than twenty (20) feet per second:
Method “e” shall be used.

A method greater than the required minimum, may also be necessary at bends, changed in alignment, junctions with other ditches and at other locations where erosion is more likely to occur. Design velocity at the downstream end of a protected channel shall be equal to or less than the natural velocity in the receiving channel. Energy dissipation may be necessary to reduce the velocity prior to reintroduction into a receiving channel.

4. Buffer Zones – To help protect natural channels and streams within a development, there shall be buffer zones placed over these areas. These buffer zones shall coincide with the buffer zones as defined in the Kentucky Division of Water Permit KYR10. A copy of the application for this permit with the SWPPP shall be submitted with the Improvement Plan Application. Upon approval of the application, a copy shall be submitted to the Planning Commission’s Engineer. The location of these zones shall be shown on the Improvement Plan. The location of the zones shall be field staked prior to any clearing or grading in the vicinity of the zones.

5. Drainage Channel or Water Course Relocation - In order to minimize hillside slippage near relocated drainage channels or water courses due to drainage channel depth or character of the earth in the drainage channel fill and side slopes, precautions shall be taken to compact the fill and side slopes, provisions of under drainage, bank

protection or reinforcing or other measures. Additional easements width shall be provided at such possible slide areas.

6. Erosion Control - All subdivision developments shall have a Best Management Practices (BMP) document prepared and submitted with the Improvement Plan. This document shall meet the minimum requirements as stated in the current "Kentucky Best Management Practices for Construction Activities" prepared by the Kentucky Division of Water (KDOW). A copy shall be on site at all times. Permit application with the KDOW and US Army Corps of Engineers shall be submitted with the Improvement Plan. All graded areas are to be maintained at all times to prevent erosion and excessive runoff. Drainage swales, silt checks, temporary sedimentation basins, etc., are to be used and maintained during the grading operation. All collected sedimentation shall be removed from the detention site. All slopes and graded areas are to be seeded after the grading of that area has been completed.

Additional erosion control measures to prevent erosion and excessive runoff may be required.

7. Mud and Debris - Until all lots and street improvements in the subdivision have been completed, the subdivider shall take such measures, as are necessary, to prevent erosion of graded surfaces and to prevent the deposit of soil and debris from graded surfaces onto public streets, into drainage channels, storm sewers or onto adjacent land.

8. Specifications for Construction and Materials - In all other respects, the design, materials and construction shall be as specified in Sections 206, 212, 601, 610, 703, 710 of the current State of Kentucky "Standard Specifications for Road and Bridge Construction".

9. Equipment on Streets – Operation of any equipment on existing pavements shall per local ordinance.

E. Basic Design Criteria for Stormwater Runoff Control Facilities

In order to minimize damage to downstream properties sediment pollution of public and private waters and hydraulic overloading of existing drainage facilities, the storm water runoff from a subdivision after development shall not exceed the pre-development discharge from that subdivision calculated by using a undeveloped runoff coefficient c = 0.40. Detention shall be provided for all subdivisions and developments. The detention facility may be designed for each individual lot in commercial or industrial zones, but regional basins are encouraged to be provided throughout the subdivision or development. All basins within residential zones must be regional. Such facilities shall be designed so that no standing water will remain in detention basins during dry weather or the design of retention ponds that will allow standing water to stagnate and present health hazards. In certain cases, other non-basin detention/retention techniques such as underground vault storage and ponding water on parking lots may be utilized when approved by the Planning

Commission. Individual site storm water management shall be reviewed under the applicable zoning regulations. The amount of water to be detained shall be determined by the methods described in the following paragraphs:

1. Storm Water Control Facility Volume Calculations – Estimated runoff shall be calculated by an accepted method that generates an inflow/outflow hydrograph such as Soil Conservation Service (SCS) method or the Modified Rational Method (MRM). All calculations shall be generated through a computer program. All documents shall be submitted for review by the Planning Commission's Engineer.

2. Pre-Development Calculations – Calculate the subdivision or development site runoff based on a 2, 10 and 50 year storm frequency curve. The entire acreage contributing to the runoff shall be included in the calculations.

3. Post-Development Calculations – Calculate the proposed ultimate development runoff based on a 2, 10 and 50 year storm frequency curve. The entire acreage contributing to the runoff shall be included in the calculations.

4. Storage Requirement – The amount of detention/retention storage required for a subdivision or development shall be the amount determined from the inflow/outflow hydrograph as previously outlined based on the fifty year (50 yr.) storm frequency. If the Modified Rational Method is used, the storm duration used shall be the one that produces the maximum storage.

5. Discharge from Detention/Retention Basin – The discharge from the detention/retention basin shall be controlled by a multi-stage release outlet structure and not be greater than a pre-development rate based on a 2, 10 and 50 year storm frequency at that particular point where the discharge occurs. Alternate methods using water quality volume design may be used upon approval by the Planning Commission's Engineer. The routing of an emergency spillway shall be shown based on the one hundred year (100 yr.) storm frequency. Trash racks shall be required to be installed on the outlet structure in the detention/retention basin to prevent clogging.

F. Detention/Retention Basins – Standards and Specifications

1. Definition and Scope – These standards apply to permanent and temporary storm water runoff, sediment and debris basins formed by an embankment or excavation. These standards are limited to the installation of basins on sites where:

   a. Failure of the structure will not result in loss of life, damage to homes or interruption of use or service of public utilities

   b. Drainage area does not exceed two hundred (200) acres.

   c. The water surface at the crest of the emergency spillway does not exceed five 95) acres.

d. All detention basins shall be designed and built with side-slopes no greater than 3:1 (three feet horizontal per one foot vertical) and proper outlet structures to insure do standing water during dry periods.

e. All retention basins shall have dams that conform to the current "Design Criteria for Dams and Associated Structures" Kentucky Division of Water. In cases when the top of the dam is also a public dedicated street right-of-way, the developer shall have a geotechnical report prepared with recommendations on the design and construction of the dam.

G. Residential Lot Grading and Drainage

1. Lot Grading – Within the limits of the public right-of-way adjacent to street pavements, all final grading for grass strip, sidewalk and yards to the building structure, shall comply with minimum and maximum grades in accord with the typical sections for streets, as shown in Appendix "C".

2. Swales – Swales carry surface runoff from roofs, yards and other areas to the rear of lots or along common property lines to streets or other drainage areas to prevent ponding of water near building structures or other portions of the lot. Surface drainage swales shall have a minimum grade of two (2) percent and shall be constructed so that the surface water will drain onto a street on into a storm inlet or natural drainage area. Swales for handling lot drainage shall be constructed as a part of the final lot grading and be seeded and mulched or sodded as soon as possible to prevent erosion.

3 Roof and Subsurface Drains – Roof downspout, footing or foundation drains shall be discharged onto the same parcel of land from which the water is generated. Roof downspouts shall terminate onto a splash block. All subsurface drains, including sump pumps, shall be constructed toward the rear of the lot. No roof or subsurface drain shall outlet nearer than two feet (2') to a property line and twenty feet (20') to any right-of-way line. If a collection system was approved, then sump pump drains may be connected to the system.

H. Maintenance of Retention/Detention Areas

In all commercial and industrial subdivisions or developments, the owner of each lot shall be responsible for properly maintaining each retention/detention area in order for such facility to function according to its design and purpose.

In all residential subdivisions or developments, only appropriate storm sewer easements around inlet/outlet structures and related storm sewer piping and a storm water retention/detention easement over the area of the one hundred year (100 yr.) storm event shall be dedicated to the appropriate legislative body. The legislative body shall be responsible for maintaining only those facilities (inlet/outlet structures and storm sewer piping) located within the dedicated storm sewer easements. The area of the retention/detention basin shall be owned and maintained by the adjoining property owners

or Home Owners Association. The maintenance responsibility of the owners of the retention/detention basin shall be included in the Subdivision Restrictive Covenants.

SECTION 8.2 SOIL EROSION and SLOPE CONTROL:

The developer of a proposed subdivision or development shall require submit to the Planning Commission a detailed plan for erosion and/or sedimentation control. The plan shall contain proposed methods for slope stabilization, erosion control and water pollution abatement and shall be reviewed by the Planning Commission. The Planning Commission shall require that such plan or part thereof be submitted with the Improvement Plan and Grading Plan.

A. Prior Grading or Disturbed Site: No Improvement Plan and/or Grading Plan may be approved where the site has been graded, stripped, excavated, de-vegetated or otherwise disturbed so that slipping; erosion and/or water pollution has or may reasonably be expected to occur until conditions are corrected to the satisfaction of the Planning Commission.

B. Soil Survey: The current "Soil Survey of Grant and Pendleton Counties, Kentucky issued by the United Sates Department of Agriculture, Soil Conservation Service in cooperation with the Kentucky Agriculture Station is hereby made a part of these regulations and will be used for informational; and reference purposes.

C. Erosion Control Measures: All proposed erosion and slope control measures must be per the current "Kentucky Best Management Practices for Construction Activities".

SECTION 8.3 SANITARY SEWER SYSTEM:

Connection into either an existing or planned public sanitary sewer system shall be required if the system is sufficient or can be expanded in order to accommodate the additional flow from the proposed subdivision.

A. DESIGN STANDARDS: All sanitary sewer improvements shall meet all design specifications as adopted by the appropriate legislative body or the Grant County Sanitary Sewer District where appropriate.

B. BACKFILL AND COMPACTION WITHIN IN THE PUBLIC RIGHT-OF-WAY**:** All trenches within a Public Right-of-Way shall be backfilled as specified in Appendix "A", Section 1.4. Copies of all testing reports shall be submitted to the Planning Commission's Engineer.

C. PACKAGE SEWAGE TREATMENT PLANTS: Where package sewage treatment plants are proposed, the sewage collection system shall be designed for ultimate connection to the public system. The package sewage treatment plant shall be designed and constructed in accordance with the current standards and specifications of the State of Kentucky and the appropriate legislative body or the Grant County Sanitary Sewer District where appropriate. The developer shall provide a dedicated sanitary sewer easement from the package treatment plant to the developer's property line located at the low point within the subdivision or development and an adequate access easement in order to provide truck and equipment access to the proposed package sewage treatment plant to the nearest

public right of way. The location of this sanitary sewer easement shall be designed so as to permit the future connection into a regional sewer system. The location of this easement shall be approved by the Planning Commission's Engineer and the Grant County Sanitary Sewer District where appropriate and shall be shown on the Preliminary Plat. This sanitary sewer easement shall be recorded, by the developer, at the Grant County Court Clerk's office before the treatment plant is placed in operation. No sanitary sewage treatment plant for any subdivision shall be located nearer than two hundred feet (200') to any residence. In calculating this distance, the applicant can specify the location of any residence to be constructed on lots affected by the treatment plant or the Planning Commission shall calculate this distance based upon the minimum setback and yard requirements of that particular zone.

D. INDIVIDUAL SEPTIC TANK SYSTEMS: Where individual septic tank systems are proposed, the septic tank system must meet the specifications of and receive a permit from the Northern Kentucky District Health Department. The developer shall provide dedicated sanitary sewer easements from all lots within the subdivision to the developer's property line located at the low point within the subdivision or development. The location of these sanitary sewer easements shall be located so as to permit the future connection into a regional sewer system. The location of this easement shall be approved by the Planning Commission's Engineer and the Grant County Sanitary Sewer District where appropriate and shall be shown on the Preliminary Plat and recorded on the Final Plat.

SECTION 8.4 WATER SYSTEM:

Connection into either an existing or planned public water system shall be required if the system is sufficient or can be expanded in order to accommodate the additional flow for the proposed subdivision.

A. DESIGN STANDARDS: The specifications adopted by the appropriate legislative body or water district. Where appropriate, water mains shall be designed to loop back to existing or proposed water mains.

B. FIRE HYDRANTS: Fire hydrants shall be provided in all subdivisions where public water systems are provided. Fire hydrants shall have a maximum spacing of 500 feet, as measured along the street right-of-way line. Fire hydrants should be located no further than 250 feet from any building site. In calculating this distance, the applicant can specify the location of any residence to be constructed on lots affected or the Planning Commission shall calculate this distance based upon the minimum setback and side yard requirements of that particular zone. Additional hydrants are not required to serve a flag lot if a hydrant is located within 150 feet of the vehicular entrance to the flag lot. Where existing public water mains that have existing fire hydrants are to serve a proposed subdivision and no public water main construction is necessary, no additional fire hydrants are required.

C. BACKFILL UNDER STREET PAVEMENT**:** All trenches located under any street pavement shall be backfilled with controlled-low-strength-material (CLSM) (Flowable Fill).

D. INDIVIDUAL ON-SITE WATER SUPPLY: Where individual on-site water supply systems (wells and cisterns) are proposed, the on-site water supply system must meet the

specifications of the Northern Kentucky District Health Department and the State of Kentucky.

SECTION 8.5 STREETS:

All public maintained streets shall be designed and constructed to the following minimum requirement.

A. PAVEMENT SPECIFICATIONS: All streets shall be paved in accordance with the specifications in Appendix "A" or "B" of these regulations.

B. MINIMUM PAVEMENT WIDTHS: No public street shall be constructed except in conformance with the minimum pavement widths as follows:

Arterial Streets	36 feet
Collector Streets	30 feet
Sub-Collector	28 feet
Local Street	25 feet
Cul-de-sac	25 feet
Alley	20 feet

C. CURB AND GUTTER: All curb and gutter shall be constructed of cement concrete as set forth in Appendix “A” and according to the typical section detail in Appendix "C".

D. CURB RADII: The minimum curb radius at intersections shall be as follows:

TYPE OF STREET* INTERSECTION	MINIMUM CURB RADIUS
Alley – Local	25 feet
Local-Local or Subcollector	25 feet
Subcollector-Subcollector	25 feet
Subcollector-Collector	30 feet
Collector-Collector or Arterial	45 feet
Arterial-Arterial	**

∗Streets located in commercial or industrial areas, the minimum curb radii shall be increased to fifty (50) feet.

**Shall be based on current design standards of the Kentucky Department of Transportation.

E. Horizontal Curves: Central angles of horizontal curves shall be kept to a minimum unless there is sufficient radius length to minimize the severity of the curves. At no time shall the radius of the centerline of a proposed street be less than two feet (200) for collector and sub-collector streets, and one hundred feet (100) for local streets.

The tangent distance between horizontal curves of proposed street centerlines shall not be less than one hundred feet (100) for any arterial or collector street.

F. PAVEMENT GRADES - Grades on both public and privates streets in proposed subdivisions or developments shall be as follows:

1. The minimum grade on all streets shall be one and one-half percent (1.50%).

2. The maximum grades permitted on streets are:

Arterial Street	7.0 percent
Collector Street	10.0 percent
Sub-collector Street	10.0 percent
Local Street	12.0 percent
Cul-de-sac Street	12.0 percent
Alley	12.0 percent

3. Centerline grades within an intersection on a collector street or a sub-collector street, the maximum grade on the centerline of the intersecting side street shall not exceed four percent (4%) for a distance of not less than seventy five feet (75'), as measured from the intersection point.

4. These maximum grades may be modified by the Planning Commission where extreme topographic conditions exist.

G. VERTICAL CURVES: The minimum vertical curve length required shall be calculated by multiplying the algebraic difference in grades by a "K" factor, as follows:

Arterial Street	Design Standards of the Kentucky Department of Transportation
Collector Streets	K = 30 for crests curves K = 35 for sag curves
Sub-collector Street	K = 15
Local Street	K = 15
Cul-de-sac Street	k = 15
Alley	K = 15

H. TEMPORARYDEAD-END STREETS: When any street is temporarily dead-ended a temporary turn-around shall be provided.

I. CONSTRUCTION OF REQUIRED PAVEMENT WIDTH ON EXISTING STREETS: When a subdivision is located on an existing street, except for arterial streets, and where the pavement width of such existing street is less than that required by these regulations, the subdivider shall be required to construct one-half (1/2) the required pavement width, as per these regulations, along the side fronting his property on such street. If the required widening is less than two (2) feet then it shall not be required.

When pavement widen is required under the section, the required pavement width shall be 22 feet when no lots front on the street requiring widening. When the subdivision has lots fronting on the street requiring widening, the pavement width shall be as in Section 7.4 - B of these regulations.

SECTION 8.6 DRIVEWAY APPROACHES:

All driveways within a public right-of-way shall be constructed in accordance with standard construction details within Appendix "C"

SECTION 8.7 OFF-STREET PARKING AREAS:

Off-street parking areas shall be constructed in accordance with the requirements of the applicable zoning ordinance.

SECTION 8.8 UTILITY LINES:

All utility lines shall be installed underground and be in conformance with the appropriate utility company's policy and requirements.

SECTION 8.9 CONSTRUCTION INSPECTIONS:

Inspections relative to the construction and installation of public improvements such as sanitary sewers, water mains, driveway aprons and sidewalks shall be made by the appropriate sewer district, water district or legislative body. The inspection of storm sewers, street paving, and site grading, including soil erosion shall be made by the Planning Commission’s Engineer. Inspectors are authorized to inspect all work done and all materials furnished. Such inspections, including final inspection, may extend to all or any part of the work and to the preparation. Fabrication or manufacture of the materials to be used. The inspector shall not be authorized to revoke, alter or waive any requirement of the approved Improvement Plan drawings and specifications. Any changes in the approved improvement plan and specification shall be approved by the Planning Commission.

The contractor shall notify the appropriate inspector(s) a minimum of 24 hours prior to the time when the work is to begin on each phase of construction, such as embankments, subgrade, water systems, storm and sanitary sewer systems, street paving, sidewalks, including all relative testing. The inspector shall begin inspections at the time of construction and maintain inspection as the

work proceeds on each phase of the project until all construction is complete. During the time of construction, any work determined by the inspector not to conform to the requirements of the approved improvement plans, drawings and specifications shall be suspended and corrected, prior to proceeding with that phase of the project.

Any work which cannot be determined to conform to the approved plans, drawing and specifications shall be referred to the design engineer for revision and/or modification and decided upon by the Planning Commission.

SECTION 8.10 SUBDIVIDERS and/or CONTRACTORS CONSTRUCTION RESPONSIBILITIES:

The subdivider and/or contractor shall have available on the project, at all times, a copy of all approved plans and specifications. The subdivider and/or contractor superintendent shall be capable of reading and thoroughly understanding the plans and specification and he or she shall receive instructions from the inspector. A superintendent shall always be present regardless of the amount of work sublet.

SECTION 8.11 FINAL CLEANING UP:

Upon completion of construction work of the subdivision or on an individual lot, the subdivider, developer and/or contractor shall remove all debris and/or excess fill in connection with the completed work prior to final plat approval.

SECTION 8.12 WRITTEN AGREEMENTS AND GUARANTEES:

A subdivision developer or subdivider may execute and file a written agreement or guarantee with the Planning Commission in lieu of actual installation or completion of the required public improvements when requesting approval of the final plat. Such agreements or guarantees shall be in an amount required to complete the public improvements, as estimated by the subdivider's engineer and approved by the Planning Commission. The cost estimate shall have supporting written data and be based on the amount determined to be reasonably necessary to complete all of the public improvements required to be constructed by the subdivider as specified in the approved improvement plans, drawings and specifications, including a twenty (20%) percent contingency.

Such agreements or guarantees can only be used when a substantial amount of the public improvements (e.g. grading and construction work related to sanitary sewers, storm sewers, water mains and streets) of the subject phase or section of the improvement plan are installed and inspected. Specifically, a minimum of seventy-five percent (75%) of all public improvements (e.g. grading and construction work related to sanitary sewers, storm sewers, water mains and streets) and a minimum of seventy-five percent (75%) of public street pavement (measured in lineal feet) shall be installed before an agreement or guarantee for the remaining public improvements can be used and approved by the Planning Commission. The seventy-five percent (75%) of all public improvements is based upon the dollar amount of improvements installed per section or phase divided by the total cost of the improvements of the proposed platted section of the subdivision. The seventy-five percent (75%) figure shall be certified by the subdivider's design engineer with appropriate documentation.

The written agreement or guarantee shall typically be in the form of sureties (e.g. bond payment or performance bond from an insurance company or a financial institution), a cash deposit (e.g. escrow agreement or certified check from a financial institution), or an instrument of agreement from one or more financial institutions (e.g. irrevocable letter of credit) and payable to the Planning Commission. The agreement or guarantee shall be pursued by the subdivider and developer by an insurance company or financial institution. The agreement or guarantee shall be an assurance of faithful performance of any and all work and the construction and installation of all public improvements required to be done by the subdivider, as specified in the approved Improvement Plan, drawings and specifications. Any irrevocable letter of credit shall be in the format provided by the Planning Commission.

The agreement or guarantee shall have no expiration date but all work must be completed within one (1) years of the approval of the Final Plat unless approved by the Planning Commission, and shall contain the condition that should the subdivider fail to complete all construction work and public improvements required, the Planning Commission may elect to complete all required public improvements and construction work on its own. Consequently, the Planning Commission shall be authorized, in the event of any default on the part of the subdivider of the performance of any work or construction of any public improvements for which such guarantees been agreed to, to complete the required work to be done and to withdraw that amount required for payment of all cost.

ARTICLE 9

CERTIFICATES USED ON FINAL PLATS AND CONVEYANCE PLATS

SECTION 9.1 FINAL PLATS CERTIFICATES

The following certificates shall appear on all Final Plats presented to the Planning Commission for approval. The certificate shall be clearly legible; lettering shall not be less than 3/32 inch in height.

A. LAND SURVEYOR'S CERTIFICATE:

"LAND SURVEYOR'S CERTIFICATE"

I hereby certify that the survey depicted by this plat was done by persons under my direct supervision, by (random traverse, with side shots; GPS). The unadjusted error of closure was (error of closure; relative positional accuracy). The survey shown here on is an Urban Survey, and the distances and directions are based on the (adjusted traverse; unadjusted traverse; State Plane Coordinates, state datum). This plat complies with all requirements of (County or City) Zoning Regulations; the Grant County Subdivision Regulations and Commonwealth of Kentucky Standards of Practice 201 KAR 18:150. Areas to be dedicated including public ways or streets are currently owned by the property owner.

_____ _____

DATE LAND SURVEYOR'S SIGNATURE

(SEAL)

B. DEDICATION CERTIFICATE:

"DEDICATION CERTIFICATE"

"(I) (We) hereby certify that (I am) (We are) the owner(s) of the property shown and described hereon and that (I) (We) hereby adopt this plat of subdivision with (my) (our) free consent, establish the minimum building restriction lines and dedicate all streets, alleys, walks, parks and open spaces to public or private use as noted. (I) (We) further certify that title to the property shown hereon was acquired by Deed dated _____ and recorded in Deed Book _____Page _____, as recorded in the Grant County Clerk's office.

_____ _____

DATE Owner(s) Signature

One of the following Notary Public's Certificates shall be included as part of this Dedication Certificate. Note that different Notary Public's Certificates are required for different ownership.

1. For individuals acting in his own right:

   State of _____

   County of _____

   The foregoing instrument was subscribed, sworn to and acknowledged before me this (date) by (name of person(s) acknowledging).

   (Signature of person taking acknowledgement)
   (Title or rank)
   (Serial Number, if any)

2. For a corporation:

   State of _____

   County of _____

   The foregoing instrument was subscribed, sworn to and acknowledged before me this (date) by (name of officer or agent, title of officer or agent) of (name of corporation acknowledging) a (state or place on incorporation), on behalf of the corporation.

   (Signature of person taking acknowledgement)
   (Title or rank)
   (Serial Number, if any)

3. For a partnership:

   State of _____

   County of _____

   The foregoing instrument was subscribed, sworn to and acknowledged before me this (date) by (name of acknowledging partner or agent), partner (or agent) on behalf of (name of partnership) a partnership.

   (Signature of person taking acknowledgement)
   (Title or rank)
   (Serial Number, if any)

4. For an individual acting as principal by an attorney in fact:

State of _____

County of _____

The foregoing instrument was subscribed, sworn to and acknowledged before me this (date) by (name attorney in fact) as attorney in fact on behalf of (name of principal).

(Signature of person taking acknowledgement)
(Title or rank)
(Serial Number, if any)

5. By any public officer, trustee or personal representative:

State of _____

County of _____

The foregoing instrument was subscribed, sworn to and acknowledged before me this (date) by (name and title of position).

(Signature of person taking acknowledgement)
(Title or rank)
(Serial Number, if any)

C. PLANNING COMMISSION APPROVAL CERTIFICATE:

"PLANNING COMMISSION APPROVAL CETIFICATE"

"This has been found to be in compliance with the (city or county) Zoning Regulations and the Grant County Subdivision Regulations and is being submitted for recording in the office of the Grant County Clerk".

_____ _____
Date Chairman's Signature

D. GRANT COUNTY COURT CLERK'S CERTIFICATE:

"GRANT COUNTY COURT CLERK'S CERTIFICATE"

"I, (Name of County Clerk), Grant County Court Clerk, certify that this plat was presented to me in Grant County on the ____ day of _____, 20__ at _____ and made a part of the records of this office.

_____
(Name of County Clerk)
Grant County Court Clerk

E. BUILDING SETBACK REQUIREMENT:

"Building setbacks will be determined by current applicable zoning regulations."

F. RECORDING TIME REQUIREMENT:

"This plat shall be void if not filed with the Grant County Court Clerk for recording purposes within one (1) year of the Planning Commission approval."

G. STANDARD TERMS and CONDITIONS of DEDICATED EASEMENTS:

"DEDICATED EASEMENTS"

"The utility easements shown and described on this plat are dedicated to the use and benefit of the named utility. The respective rights, duties and obligations of the individual lot owner and the respective utility are setforth in a separate recorded document in the Grant County Court Clerk's office. Terms and conditions of the documents listed below are incorporated by reference".

(List each recorded document with name of the utility and the Book & Page number)

H. SURFACE DRAINAGE EASEMENT STATEMENT:

"SURFACE DRAINAGE EASEMENTS"

"Surface drainage easements shown on this plat are not accepted by the legislative body of jurisdiction. The legislative body is not obligated to maintain or repair any channel or installations in said easements. The easement area of each lot and all improvements within the easement shall be maintained continuously by the owner of the lot. Within the easement, no structures, plantings, fill material or other materials shall be placed or permitted to remain which may obstruct, retard or change the direction of flow of water through the drainage channel in the easement".

I. LOTS WITH INDIVIDUAL SEPTIC TANK DISPOPSAL SYSTEMS:

"Plat approval for building development and/or alteration of existing systems on each lot is contingent upon the issuance of a sewage construction permit and inspection by the Northern Kentucky Health Department."

SECTION 9.2 CERTIFICATES FOR CONVEYANCE PLATS

The following certificates shall appear on all Conveyance Plats:

A. LAND SURVEYOR'S CERTIFICATE:

"LAND SURVEYOR'S CERTIFICATE"

I hereby certify that the survey depicted by this plat was done by persons under my direct supervision, by (random traverse, with side shots; GPS). The unadjusted error of closure was (error of closure; relative positional accuracy). The survey shown here on is an Urban Survey, and the distances and directions are based on the (adjusted traverse; unadjusted traverse; State Plane Coordinates, state datum). This plat complies with all requirements of (County or City) Zoning Regulations; the Grant County Subdivision Regulations and Commonwealth of Kentucky Standards of Practice 201 KAR 18:150. Areas to be dedicated including public ways or streets are currently owned by the property owner.

Corner monuments were set (date).

DATE LAND SURVEYOR'S SIGNATURE

(SEAL)

B. FOR CONFORMING PARCELS:

"I certify that I have examined the records of the Grant County Court Clerk and find that this is the (first), (second, (third), (fourth) or (fifth) conveyance under the current ownership of the parent tract".

Date Land Surveyor's Signature

C. FOR NON-CONFORMING PARCELS:

"I certify that this plat of land in and of itself does not meet the current zoning regulations and it is to be transferred to an adjoining property owner."

Date Land Surveyor's Signature

D. DEDICATION CERTIFICATE:

"(I) (We) hereby dedicate the right-of-way of (Name of Road or Street) as shown hereon to public use, forever".

Date

Signature of Grantor(s)

(This certificate must be notarized using one of the notarization certificates as specified in Section 9.1- B of this Section.)

E. GRANT COUNTY PLANNING COMMISION APPROVAL CERTIFICATE:

"Approved by the Grant County Planning Commission, this ____ day of _____, 20__, for recording the transfer of property only.

Chairman's Signature

F. RECORDING TIME REQUIREMENT:

"This plat shall be void if not filed with the Grant County Court Clerk for recording purposes within two (2) year of the Planning Commission approval."

ARTICLE 10

ADMINISTRATION AND ENFORCEMENT

SECTION 10.1 ADMINISTRATION:

It shall be the responsibility of the Planning Commission's Engineer to administer these regulations, including performance of all inspections in behalf of the Planning Commission, except where specific authority is retained by the Planning Commission, as provided per these regulations.

SECTION 10.2 FEES:

The schedule of fees shall be as established by the Planning Commission's By-Laws.

SECTION 10.3 PAYMENT OF FEES:

The subdivider shall pay all fees to the Planning Commission at the time the application is submitted to the Planning Commission. Said fees shall be made payable to the Grant County Planning Commission.

SECTION 10.4 FEES FOR INSPECTING IMPROVEMENTS:

An inspection fee shall be charged to the subdivider for inspections of all public improvements. Said inspection fee shall be as established by the Planning Commission's By-Laws. Inspection fees shall be paid to the Planning Commission with the submittal of the application for Improvement Plan approval. Said fees shall be made payable to the Grant County Planning Commission.

SECTION 10.5 FEES FOR RECORDING FINAL PLATS IN COUNTY COURT CLERK'S OFFICE:

The subdivider shall pay all recording fee as per the requirements of the Grant County Court Clerk's office. It shall be the responsibility of the subdivider to record all required recordable documents in the Grant County Court Clerk's records unless otherwise provided for herein.

SECTION 10.6 VARIANCES:

The Planning Commission may grant variances to these regulations, providing the Planning Commission shall find:

A. That unusual topographical or exceptional physical conditions exist which would substantially restrict compliance with these subdivision regulations; or

B. That strict compliance with these regulations would create an extraordinary hardship in the face of the exceptional conditions; or

C. That the modifications would provide for innovative design layout of the subdivision.

In granting any variances to these regulations, the Planning Commission shall find that said variance will not be detrimental to the public interest nor in conflict with the intent and purpose of these regulations.

The Planning Commission may require certain conditions to be met, to accomplish the purpose of these regulations.

SECTION 10.7 ENFORCEMENT:

A. PLANNING COMMISSION'S APPROVAL REQUIRED FOR ALL SUBDIVISIONS:

No person or his agent shall subdivide any land, before securing the approval of the Planning Commission of a plat designating the areas to be subdivided, and no plat, of a subdivision of land, within the planning unit jurisdiction shall be recorded by the Grant County Court Clerk until the plat has been approved by the Planning Commission and the approval entered thereon in writing by the chairman.

B. SALE OF LAND IN SUBDIVISION:

No person owning land composing a subdivision, or his agent, shall transfer, ~~or~~ sell or agree to sell any lot or parcel of land located within a subdivision by reference to, or by exhibition, or by any other use of a plat of such subdivision, before such plat has received final approval of the Planning Commission, signed by the chairman and has been recorded in the office of the Grant County Court Clerk.

C. REVISION OF FINAL PLAT AFTER APPROVAL:

No changes, erasures, modifications, or revisions shall be made, to any Final Plat after final approval has been given by the Planning Commission, unless the Final Plat is first resubmitted and the changes approved by the Planning Commission.

SECTION 10.8 PENALTIES:

Any person or entity who violates any of these regulations shall, upon conviction, be fined pursuant to KRS 100.991.

SECTION 10.9 SEVERABILITY:

If any article, section, subsection, sentence, clause, or phrase of these regulations is, for any reason, held unconstitutional or invalid, such decision or holding shall not affect the validity of the remaining portions thereof, it being the intent to enact each section and portion thereof, individually, and each such section shall stand alone, if necessary, be in force notwithstanding the validity of any other article, section, subsection, sentence, clause or phrase of these regulations.

SECTION 10.10 APPEALS FROM PLANNING COMMISSION'S ENGINEER:

Any subdivider claiming to be aggrieved by any actions by the Planning Commission's Engineer may appeal such actions to the Planning Commission.

SECTION 10.11 APPEALS FROM PLANNING COMMISSION:

Any person or entity claiming to be injured or aggrieved by any final action of the Planning Commission may appeal from the action to the Grant County Circuit Court. Such appeal shall be taken within thirty (30) consecutive calendar days after the final action of the Planning Commission.

SECTION 10.12 CONFLICTS:

All regulations, resolutions, orders, ordinances, and/or codes in conflict herewith are hereby repealed on the effective date of these regulations; providing, however, that such repeal shall not affect or prevent the prosecution or punishment of any person for any action done or committed in violation of any such Subdivision Regulations, Order, Resolutions, and/or Amendments thereto, hereby repealed prior to the effective date of these regulations.

ARTICLE 11 ADOPTION AND EFFECTIVE DATE

SECTION 11.1 PUBLIC HEARING: Before adoption of these subdivision regulations or any amendments thereto, by the Planning Commission, a public hearing shall be held by the Planning Commission. A public notice of the time and place of the public hearing shall be published in a newspaper of general circulation in GRANT County, in accordance with Kentucky Revised Statutes Chapter 424.

SECTION 11.2 EFFECTIVE DATE: These subdivision regulations shall take effect and be in force upon their adoption as provided for in KRS Chapter 100.

ADOPTED BY THE GRANT COUNTY AND MUNICIPAL PLANNING AND ZONING COMMISSION, STATE OF KENTUCKY

DATE:

_____

CHAIRMAN:

AMENDMENTS

NUMBER	SECTION	DATE ADOPTED
1	7.1, D.	11-2-78
2	6.0, G.	3-1-79
3	3.16	8-5-82
4	3.1, 3.2, 3.3	9-5-86
5	7.0, Appendix "A", "B", & "C"	12-4-86
6	3.1	7-2-87
7	2.0, 3.14, 7.13, 7.14, 8.0, 8.3	12-7-89
8	8.3	3-1-90
9	Article II Definitions; Article III Procedure; Article V Final Plat Requirements; Article VI Design Standards; Article VII Improvements; and Appendices A, B, and C.	3-7-91
10	Article VI, Section 6.0, I, 1. Private Streets	9-5-91
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APPENDIX "A"

CEMENT CONCRETE FOR STREET, CURB AND GUTTER, SIDEWALK AND DRIVEWAY CONSTRUCTION.

The work covered by these specifications consists of furnishing all labor, equipment, and materials, and performing all operations in connection with the construction of air-entrained Portland Cement concrete pavement in accord with these specifications and the applicable Improvement Drawings.

The cement concrete pavement work shall consist of a single course of cement concrete, including reinforcement and longitudinal and transverse joints, where required, constructed on a prepared subgrade in general conformity with the lines, grades and cross-sections shown on the plans.

The data included herewith is based upon general soil conditions which exist in the area. These general soil conditions, representing approximately 75 percent of the soils in the area, are clayey overburden soils, described as lean to moderately plastic silty clays, classified according to the Unified Soil Classification System as CL soils. Any site which is made up of soils substantially different would be evaluated independently by a Qualified Recognized Geotechnical Engineers. This work should consist of drilling, testing, and an engineering evaluation of all field and laboratory data, in light of the proposed design. Example of substantially different soil conditions are the very silty clays or clayey silts along the floodplain of the Licking River.

ITEM 1.0 GRADING

This term shall consist of all grading above or below subgrade elevations of whatever nature required to bring the street to proper subgrade elevations, including: necessary excavation for curb, gutter, sidewalk, construction of embankments, excavation and proper sloping of all cuts, and other work incidental thereto.

1.1 EXCAVATIONS: All excavations shall be made to approximate grade or subgrade elevations consistent with approved plans. Excavations shall not be steeper than a cut slope of 2.5 horizontal to 1 vertical.

1.2 EXCAVATION BELOW SUBGRADE: Whenever excavations below subgrade elevation to remove spongy or unstable material, organic matter, or other materials is required, the contractor shall remove same and shall replace with compactable soils as per Item 1.3. The excavation can be backfilled with
soils that were removed, provided they are clean clayey soils free of organic matter and other deleterious material, aerated and dried to near optimum moisture content or clean clayey borrow soils that have moisture contents near optimum moisture content.

1.3 CONSTRUCTION OF EMBANKMENT: All surface vegetation and heavy root system shall be removed to eliminate all vegetation from the area upon which the embankment is to be

constructed. Soils so removed shall not be used in construction of embankment. These materials shall be stockpiled and respread across scarified areas after the scarified areas have been brought to within inches of finished grade.

Embankments shall be constructed of approved soils to approximate subgrade elevation in shallow level layers, 6 to 8 inches, within two (2) percent of optimum moisture content on the dry side of the curve or within three (3) percent of optimum moisture content on the wet side of the curve, compacted with an appropriate type of compaction equipment to a density not less than 95 percent of maximum density, as determined by the standard Proctor moisture-density test (ASTM D698-78 or AASHTO T-99) or 87 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-78 or AASHTO T-180). Embankments greater than ten (10) feet in height shall have soils below ten (10) feet compacted to 95 percent or 87 percent of maximum density, standard and modified Proctor, respectively. Except as otherwise approved by a Qualified/Recognized Geotechnical Engineer, all soils placed in areas directly impacting public improvements shall be constructed to slopes no steeper than 2.5 (horizontal) to 1 (vertical) and flatter where possible for ease of maintenance.

A recognized testing laboratory shall be required to run moisture-density tests (ASTM D698-78 or ASTM D1557-78) and field density tests (ASTM D1556-64 or ASTM D2922-78) to determine the percentage compaction. The cost of all such testing shall be at the expense of the developer.

1.4 BACKFILL: All individual lifts of compacted soils from the top of bedding to four (4) feet from top of subgrade shall be inspected independently by a qualified Geotechnical Engineer; and individual lifts of compacted soils from four (4) feet deep to top of subgrade shall be tested.

Backfill depths that is two (2) feet or less from the top of proper bedding (one foot maximum above top of pipe or conduit) shall be backfilled with controlled-low-strength-material (CLSM, flowable fill) or compacted and tested dense graded aggregate (DGA),per current KTC Standard Specifications, to the top of subgrade.

Back fill depths that is greater than two (2) feet from the top of proper bedding (one (1) foot maximum above top of pipe or conduit) shall be backfilled with controlled-low-strength-material (CLSM, flowable fill) to the top of subgrade, or backfilled with clayey or granular soils compacted to the densities stated in Item 1.3. All individual lifts of compacted soils must be tested independently by a qualified Geotechnical Engineer from the top of the bedding to the top of the subgrade. Verification of the inspection and testing shall be made prior to placement of any pavement and all copies of all reports of the inspection and testing shall be submitted to the Planning Commission's Engineer for record. Failure to provide the proper verification shall result in the removal of backfill and replacement per this specification.

Backfill of utility trenches whose centerline of the utility is greater than three (3) feet from the edge of pavement and within the street right-of-way shall be backfilled with controlled-low-strength-material (CLSM, flowable fill) to the top of subgrade, or backfilled with clayey or granular soils compacted to the densities stated in Item 1.3.

1.5 SUBGRADE: The subgrade is defined as the top one (1) foot of the soil profile at finished grade prior to placing the pavement. This top one (1) foot of soil will consist of: (a)

compacted fill placed for embankments as outlined in Item 1.3; (b) undisturbed soils in the transitional areas from cut to fill immediately below the topsoil; or (c) undisturbed soils at depths greater than 3 feet below the original ground surface in cut areas. The top one (1) foot of subgrade shall be compacted to 98 percent of maximum density as determined by the standard Proctor moisture-density test (ASTM D698-78 or AASHTO T-99) or 90 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-78 or AASHTO T-180) within three (2) percent of optimum moisture content on the dry side of the curve or four (4) percent of optimum moisture content on the wet side of the curve immediately prior to placing the pavement. In transitional areas from cut to fill, the soils have been subject to seasonal changes of freezing and thawing and wetting and drying. These soils will exist at moisture contents well above optimum moisture content and at densities on the order of 60 to 80 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried in order to obtain the specified percent compaction for sub-grade. Soils in cut areas, three (3) feet below original grade, will exist at moisture contents above optimum moisture content and at densities on the order of 90 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried in order to obtain the specified percent compaction for subgrade.

Any soft or yielding areas, resulting from high moisture content that are encountered at the time of construction shall be scarified, aerated, and dried to reduce the moisture content nearer to optimum moisture content, then recompacted to the specified density.

The subgrade shall be shaped to plan elevation and cross-section. Immediately prior to placing the concrete, the subgrade shall be checked for conformity with the cross-section shown on the plans by means of an approved template on the side forms. If necessary, the materials shall be removed or added, as required, to bring all portions of the subgrade to correct elevations. The subgrade shall be thoroughly compacted and again checked with the template. Concrete shall not be placed on any part of the subgrade which has not been checked for correct elevation. The subgrade shall be clean of loose or wet material prior to placing pavement.

Prior to placing the pavement, the Contractor shall proof roll the compacted subgrade with a fully loaded single axle dump truck. The Inspector shall observe the proof rolling for consistency. Areas which are subject to excessive pumping or rutting shall be reworked and recompacted as described above. All subgrade testing shall be made not more than 48 hours prior to placement of pavement, unless extreme weather conditions dictate retesting (rain, freezing temperature, excessive temperature, etc.)

1.6 EQUIPMENT FOR COMPACTION OF BACKFILL, EMBANKMENT, AND SUB-GRADE: Any compaction equipment capable of producing the required embankment and subgrade densities, without lamination, will be permitted. Clayey type or cohesive soils shall be compacted with a kneading type compaction equipment, such as a sheepsfoot roller. Cohesionless soils shall be compacted with vibratory type equipment, such as a vibrating plate or roller. All compaction equipment shall be in good condition and shall be operated efficiently to assure uniform compaction.

1.7 SUBGRADE FOR SIDEWALKS AND DRIVEWAYS: Subgrade for driveways shall comply with Item 1.5. except soil density tests are not required. Cohesive soils or lean concrete shall be used under driveways (i.e., apron and sidewalk portion of driveway minimum

eight (8) feet back of curb for single- or two-family or nine (9) feet for multi-family or commercial), provided compaction is performed per Item 1.6. For sidewalks between driveways subgrade of cohesive soils shall be uniformly compacted per Item 1.6. Cohesionless or granular soils may be used as a base on subgrade for sidewalks between driveways provided base thickness does not exceed four (4) inches or thickness equivalent to that of the sidewalk and compacted per Item 1.6

1.8 EQUIPMENT OPERATED ON STREETS: The contractor shall be permitted to operate only pneumatic tired equipment over any paved street surfaces and shall be responsible for correcting any damage to street surfaces resulting from the contractor's operation. Slip-form pavers shall take care not to scar adjacent pavement. The use of pads or mats may be required and is at the discretion of the inspector. Paved streets, adjacent to new development, shall have all loose soil or mud removed at the end of each day's work.

1.9 UTILITIES: Special precautions shall be taken by the contractor to avoid damage to existing overhead and underground utilities. Before proceeding with the work, the contractor shall confer with all public or private companies, agencies, or departments that own or operate utilities in the vicinity of the construction work. The contractor shall be diligent in his efforts to use every possible means to locate existing utilities.

1.10 SOIL DENSITY TESTS: All soil density testing shall be at the expense of the developer. The results of these tests shall be mailed directly to the developer, design engineer and the Planning Commission’s Engineer. The results of all soils testing shall be compared to the densities stated in Items 1.3, 1.4, 1.5 and 1.7 of these regulations. Any deficiencies found in construction work must be remedied in the field or resolved between the developer, contractor and the Planning Commission’s Engineer, subject to the approval by a qualified licensed Professional Geotechnial Engineer.

Density tests of soil embankment, utility excavations, or subgrade are not applicable when at least one of the following conditions exist:

(1) more than five (5) percent of the material contains greater than one (1) inch sieve size particles; or

(2) more than 60 percent of the material contains greater than No. 4 sieve size particles except DGA (dense graded aggregate).

Proof of conditions (1) or (2) shall be performed by at least one (1) graduation test by a recognized testing laboratory and mailed directly to the inspector.

All soil density testing shall be at the expense of the developer. The results of these tests shall be mailed directly to the developer, design engineer, inspector, and the contractor. The results of all soil testing shall be compared to the densities, stated in Items 1.3, 1.4, 1.5, and 1.7 of these regulations. Any deficiencies found in construction work must be remedied in the field or resolved between the developer, contractor, and inspector, subject to approval by a qualified registered professional engineer.

ITEM 2.0 MATERIALS

Concrete shall be composed of Portland Cement, air-entraining agent, aggregates, and water.

2.1 PORTLAND CEMENT: Cement of the type specified shall conform to requirements of the current ASTM specifications including Portland Cement Type I or Type III - High Early Strength (Designations C 150, C 175 or C 595). Cement, which for any reason has become partially set or which contains lumps of caked cement, shall be rejected. Either packaged or bulk cement may be used.

2.2 AIR-ENTRAINING AGENT: Air-entraining agents shall conform to the requirements of the current ASTM specifications for air-entraining admixtures for concrete (Designation C 260).

2.3 ADMIXTURES FOR CONCRETE: Chemical admixture of the type specified shall conform to requirements of the current ASTM specifications for Admixtures of Type A ~~thru~~ and Type E (Designation C 494). No pozzolans (Fly Ash) will be allowed as substitute for cement.

2.4 AGGREGATES: All aggregates for concrete shall meet the current standard requirements for concrete pavements of the Kentucky Department for Transportation, Bureau of Highways, or the current ASTM specification for concrete aggregates (Designation C 33).

Aggregates shall be so handled that moisture content and gradation are reasonably uniform and do not change appreciably from batch to batch or hour to hour.

No aggregates shall be used which have become contaminated or intermixed. Frozen aggregates or aggregates containing frozen lumps shall be thawed before use.

2.5 WATER: Water used in mixing or curing concrete shall be clean and free from injurious amounts of oil, acids, salt, alkali, or organic materials or other substances harmful to concrete. Normally, water from public supplies, which is suitable for drinking, is satisfactory.

2.6 REINFORCING STEEL: Reinforcing steel, if specified, shall conform to current Standard Specifications of the Kentucky Department of Transportation, Bureau of Highways.

2.7 JOINTS:

2.7.1 EXPANSION JOINTS: Expansion joints shall be non-extruding pre-formed joint fillers and shall conform to current Standard Specifications of the Kentucky Department of Transportation. The selection of the type will be at the contractor's option.

2.7.2 JOINT SEALING COMPOUND: The material used for filling and sealing cracks and/or joints shall be W. R. Meadows Sealtight #164 - Hot Pour Rubber Asphalt Sealer, W. R. Meadows Sealtight Hi-Spec Hot Pour Joint Sealing Compound or approved equal.

ITEM 3.0 BATCHING

Batching shall conform to Kentucky Department of Transportation, Bureau of Highways Specification 601.08 through 601.18.

3.1 STRENGTH OF CONCRETE: Finished concrete shall attain a minimum expected strength at 28 days of 4000 pounds per square inch compressive strength and/or 570 pounds per square inch flexural strength "modulus of rupture".

At least three (3) test cylinders shall be made for each day's placement for each 100 cubic yards, or portion thereof, by a recognized testing laboratory. One (1) cylinder shall be broken at seven (7) days and one (1) cylinder at 28 days. The results of these tests shall be sent directly to the Design Engineer, Contractor, Planning Commission's Engineer and concrete supplier.

The fabricating, curing, breaking, and reporting the test cylinders, slump test, and air content test shall be made at the contractor's expense.

3.2 PROPORTIONING CONCRETE: The proper proportions of cement, water, and aggregates shall be determined in accordance with ACI Standard 613, "Recommended Practice for Selecting Proportions for Concrete", or the Portland Cement Association booklet, "Design and Control of Concrete Mixtures", latest editions.

The entrained air shall be obtained by using an air-entraining agent. All concrete shall be air-entrained in accordance with the following:

Maximum Size of Aggregate (inches)	Air Content Percent By Volume
1½, 2, 2½	5 +/- 1%
¾, 1	6 +/-1%
3/8, ½	7½ +/- 1%

3.3 CONSISTENCY: The slump of the concrete shall not exceed four (4) inches. Consistency shall be measured as described in the current ASTM Standard Method of Slump Test for Consistency of Portland Cement Concrete (Designation C 143 or Method of Test for Ball Penetration for Portland Cement Concrete, Designation C-360).

3.4 READY-MIXED CONCRETE: All ready-mixed concrete shall be furnished in accordance with current ASTM specifications for ready-mixed concrete (Designation C 94). Any concrete, which is not plastic and workable when it reaches the subgrade, shall be rejected.

When construction conditions are such that it is absolutely necessary for trucks hauling concrete to operated on the grade between forms, they shall not back over previously deposited fresh concrete without the approval of the inspector.

3.4.1 TIME OF DELIVERY: Concrete shall be delivered and discharged from a truck mixer or agitator truck within a period of one and one-half (1-1/2) hours at air temperatures up to eighty-five (85) degrees Fahrenheit, and one (1) hour at air temperatures higher than eighty-five (85) degrees Fahrenheit, after introduction of the water to the cement and aggregates or the cement

to the aggregates. Delivery tickets shall have this time clearly shown thereon, and the inspector shall check to be certain that delivery is made within the period specified.

3.4.2 TYPE OF DELIVERY EQUIPMENT: Concrete shall be delivered in truck mixers or agitator truck (i.e., trucks providing mechanical agitation by revolving drums or revolving blades in a stationary drum) operated after time required for thorough mixing of the concrete at the speed designated by the manufacturer as agitating speed.

3.5 JOB-MIXED CONCRETE: Job-mixed concrete shall be mixed in a drum mixer, which shall conform to the concrete paving mixer standards of the Mixer Manufacturers Bureau of the Association General Contractors of America. The mixer shall be capable of combining the aggregates, cement, and water into a thoroughly mixed and uniform mass within the specified time and of discharging the material without segregation.

The entire contents of the drum shall be discharged before recharging. The volume of the mixed materials per batch shall not exceed the manufacturer's guaranteed capacity of the mixer.

3.5.1 TIME OF MIXING: The mixing of each batch shall continue for not less than one minute after all materials, except water, are in the mixer. The mixer shall rotate at the rate recommended by its manufacturer. The mixer shall be provided with a batch timing device which shall be subject to inspection and adjustment by the inspector.

3.6 ADJUSTING SLUMP OF CONCRETE: Measured amounts of water can be added. After adding water, an additional slump test must be made.

ITEM 4.0 MEASURING AIR CONTENT

The air content shall be measured in accordance with ASTM Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method (Designation C 231) or ASTM Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method (Designation C 173).

ITEM 5.0 FORMS

Forms may be made of wood or metal and shall have a depth equal to or greater than the prescribed edge of thickness of the pavement. Each section or form shall be straight, free from bends or warps. The method of connections between the form sections shall be such that the joint thus formed is tight and free from movement in any direction.

Forms shall be of such cross-sections and strength and so secured as to resist the pressure of the concrete when placed, and the impact and vibration of any equipment which they support without springing or settlement.

5.1 SETTING FORMS: The subgrade under the forms shall be compacted and shaped so that the form set shall provide the specified elevation. The supply of forms shall be sufficient to permit their remaining in place for sufficient time so, when removed; the concrete will not be displaced. All forms shall be cleaned and oiled each time they are used.

5.2 GRADE AND ALIGNMENT: The alignment and grade elevation of the forms shall be checked by the contractor immediately ahead of concrete placement and necessary corrections will be made. Any forms that have been disturbed or subgrade that has become unstable shall be corrected and forms reset and rechecked. Any variations in grade and alignment shall be subject to approval of the Design Engineer and Inspector prior to placing concrete.

ITEM 6.0 PLACING CONCRETE

The concrete shall be mixed in quantities required for immediate use and shall be deposited on the subgrade to the required depth and width of the construction lane in successive batches and in a continuous operation, without the use of intermediate forms or bulk-heads. The concrete shall be placed as uniformly as possible, in order to minimize the amount of additional spreading necessary. While being placed, the concrete shall be vibrated and compacted with suitable tools, so that the formation of voids or honeycomb pockets is prevented.

No concrete shall be placed around manholes or other structures until they have been brought to the required grade and alignment. Additional tamping and compaction will be required after raising manholes.

6.1 COLD WEATHER CONCRETING: Concrete may be placed when the air temperature in the shade and away from artificial heat is thirty-five (35) degrees Fahrenheit or higher. No concrete shall be placed upon frozen subgrade. However, if subgrade has been protected from freezing and concrete temperature is 50 degrees or higher, concrete may be placed until ambient temperature drops to 25 degrees. Concrete shall be protected from freezing for a period up to seven (7) days

6.2 HOT WEATHER CONCRETING: Except by approval of the inspector, concrete placing shall cease if the temperature of the plastic concrete cannot be maintained at ninety (90) degrees Fahrenheit or lower.

To facilitate the placement of concrete in hot weather, a retarding chemical admixture Type B or D, in conformance with ASTM C-494, may be used

ITEM 7.0 CONSOLIDATING AND FINISHING

The pavement shall be struck off and consolidated with a mechanical finishing machine, vibrating screed or by hand-finishing methods. When a mechanical finishing machine is used, the concrete shall be struck off at such a height that after consolidation and final finishing, it shall be at the elevation as shown on the plans.

The finishing machine shall be provided with a screed, which will consolidate the concrete by pressure, vibration or both. The concrete shall be brought to a true and even surface, free from rock pockets. The edge of the screeds along the curb line may be notched out to allow for sufficient concrete to form the integral curb. Hand-finishing tools shall be kept available for use in case the finishing machine breaks down.

When hand-finishing is used, the pavement shall be struck off and consolidated by a vibrating screed to the elevation as shown on the plans. When the forward motion of the vibrating screed is stopped, the vibrator shall be shut off; it shall not be allowed to idle on the concrete.

7.1 SCRAPING AND STRAIGHTEDGING: The pavement may be required, by the inspector, where applicable, to be scraped with a straightedge, equipped with handles long enough to permit it to be operated from the edge of the pavement.

When irregularities are discovered, they shall be corrected by adding or removing concrete. All disturbed areas shall be floated with a wooden or metal float not less than three (3) feet long and not less than six (6) inches wide and again straight-edged.

7.2 EDGING: Before final finishing is completed, and before the concrete has taken its initial set, the edges of the slab and curb shall be carefully finished with an edger.

7.3 FINAL SURFACE FINISH: A burlap drag or medium broom shall be used as the final finishing method for concrete pavement. The drag shall be at least three (3) feet in width and long enough to cover the entire pavement width. It shall be laid on the surface of the pavement and dragged forward in the direction in which the pavement is being laid. If a broom finish is used, the brooming shall be drawn from the center to the edge of pavement using overlapping strokes to produce surface corrugations of uniform appearance about 1/16th inch in depth. The curb shall have the same final finish as the pavement.

The final surface of the concrete pavement and curb shall have a uniform gritty texture, and true to the grades and cross-sections shown on the plans.

ITEM 8.0 CURBS

The integral vertical and rolled curb shall be constructed with or immediately following the finished operation. Special care shall be taken so that the curb construction does not lag the pavement construction and form a "cold joint". Integral vertical curb shall only be used in street islands and intersections unless approve by the Planning Commission.

In placing concrete curb, sufficient spading shall be done to secure adequate bond with paving slab and eliminate all voids within and back face of the curb.

Curbs shall be formed to the cross-section in accordance with Appendix "C".

ITEM 9.0 CURING

Concrete shall be cured by protecting it against loss of moisture, rapid temperature change, from rain, flowing water, and mechanical injury for a period of not less than five (5) days from the beginning of the curing operation. Moist curing, waterproof paper, white pigmented liquid membrane compound, or a combination thereof, may be used for curing. Immediately after finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by the curing medium which is applicable to local conditions and approved by the inspector.

The edge of concrete slabs exposed by the removal of forms shall be protected immediately to provide these surfaces and to prevent injury to concrete edges.

The covering material shall be kept free of any substances which may be detrimental to the surface of the concrete. The initial curing medium shall be effective and shall be applied so as to prevent checking, cracking, and the appearance of dry spots in the surface of the concrete. The contractor shall have the equipment needed for adequate curing at hand and ready to install before actual concrete placement begins. In all cases in which the curing medium requires the use of water, the curing shall have prior right to all water supplies. Failure to provide sufficient cover material of the type selected, failure to maintain saturation for the entire curing period in the moist-curing methods, lack of water to adequately care for both curing and other requirements, or other failures to comply with curing requirements shall be cause for immediate suspension of concreting operations.

9.1 MOIST CURING: Moist curing shall be accomplished by covering of burlap, cotton mats, or other approved fabric mat used singly or in combination.

Curing mats shall be thoroughly wet when applied and kept continuously wet and in intimate contact with the pavement surface for the duration of the moist curing period. Other fabric mats shall conform in design and shall provide a curing medium at least equal to cotton mats. Cotton mats, other fabric mats, and burlap mats and burlap strips shall be furnished in the widths or lengths, after shrinkage, required to cover the entire width and edges of the pavement lane. Mats or burlap shall be lapped at joints between adjacent sheets to prevent drying at this location. Moist curing, when used as initial curing, shall be continued for not less than twenty-four (24) hours. Type and weight of cotton mats for curing concrete shall conform to ASTM C-440 or AASHTO M-73. Burlap strips shall conform to AASHTO M-182.

9.2 WATERPROOF PAPER AND POLYTHENE SHEETING CURING: The surface of the concrete shall be wetted with a fine spray of water and then covered with the waterproof paper or sheeting. The paper or sheeting shall be in pieces large enough to cover the entire width and edges of the slab and shall be lapped not less than twelve (12) inches. Paper or sheeting shall be adequately weighted to prevent displacement or billowing due to wind. Paper or sheeting folded down over the side of the pavement widths shall be secured by a continuous bank of earth. Tears or holes appearing in the paper or sheeting during the curing period shall be immediately repaired.

9.3 LIQUID MEMBRANE CURING COMPOUND: Pigmented liquid membrane curing compound shall meet the specifications under ASTM C 309. The curing compound must be applied to cover the surface completely and uniformly at a rate which will achieve the performance requirement specified in AASHTO specifications M 148 or ASTM Designation C 309. This method of curing shall be applied immediately behind the final finishing operation or after
the initial curing when a combination of methods are used. Failure to provide complete and uniform coverage at the required rate will be cause for discontinuance of this method of curing and the substitution of one of the other approved methods. The compound shall be kept agitated to prevent the pigment from settling. Special care shall be taken to apply the curing compound to the pavement edges immediately after the forms have been removed.

ITEM 10.0 PAVEMENT JOINTS (all joints shall be constructed as per details in Appendix "C")

Concrete pavement shall include expansion, contraction, and longitudinal joints. Transverse joints may be expansion and contraction type joints which shall be continuous across the pavement lane including the curb. Longitudinal joints are parallel to the pavement lanes. Construction joints are necessary when the placement of concrete is delayed. The location of transverse construction joints may be either planned (coincidental with a contraction joint) or emergency (not coincidental with a contraction joint). In general, the location of longitudinal joints shall be centered between pavement lanes except for street widths 30 feet and wider.

The placement and construction of all pavement joints shall comply with joint details in Appendix "C" and shall be shown or referenced on the Improvements Drawings in accord with the following criteria:

10.1 EXPANSION JOINTS

Expansion joints shall be Type 1. Filler material shall conform to Item 2.7.1 of these regulations and extend the entire width of the pavement. All dimensions and spacing shall be placed on the plans or referenced herein, The filler shall be held accurately in place during the placing and finishing of the concrete by a bulkhead, a metal channel cap or other approved method. Expansion joints shall be installed at the following locations: (1) at all street intersections at the point of curvature of the turning radii entering the intersection; and (2) at cul-de-sacs or turnarounds at the point of curvature of the first turning radii approaching the turn-around. In no case shall the expansion joint spacing exceed 300 feet.

No concrete shall be left above the expansion material or across the joint at any point. Any concrete spanning the ends of the joint next to the forms shall be carefully cut away after the forms are removed.

Before the pavement is opened to traffic, the groove above the filler shall be cleaned and sealed with joint sealing material specified in Item 2.7.2 of these regulations.

10.2 CONTRACTION JOINTS

Transverse contraction joints shall be Type 2. They may be sawed or grooved with a metal jointing tool, equal to a depth of one-fourth (1/4) of the pavement thickness. If the pavement is grooved with a metal jointing tool, special care should be taken to prevent surface irregularities at the joint location.

The spacing of un-doweled contraction joints shall be specified by the design engineer and shown on the plans or referenced herein. In no case shall the construction joint be spaced at intervals than a distance of twelve feet, six inches (12’6”) between joints.

If sawed joints are specified, they shall be sawed within a time frame of between four (4) hours and eight (8) hours following placement of each pavement section. However, depending upon temperature, weather conditions, and other factors affecting setting times, variations to these time frames may be required to ensure that joints are sawed early enough to control cracking,

but late enough to prevent any damage by blade action to the slab surface and to the concrete immediately adjacent to the joint.

10.3 CONSTRUCTION JOINTS

Transverse construction joints shall be used wherever the placing of concrete is suspended for more than thirty (30) minutes. A transverse construction joint shall be Type 3, with smooth bars if the joint occurs at the location of a contraction joint. A transverse construction joint shall be Type 4 with deformed tie bars if the joint occurs at any other location.

10.4 LONGITUDINAL JOINTS

Longitudinal joints between lanes shall be Type 6 of the tied construction type. An alternative longitudinal joint Type 7 may be used with slip-form paving operations. The location of longitudinal joints shall be centered between pavement lanes and coincide with lane markings wherever possible, except for street widths of thirty (30) feet and wider where joints shall be located at equal intermediate locations. In these cases, longitudinal joints may be sawed and shall be Type 5.

10.5 INTEGRAL CURB JOINTS

In the construction of transverse joints, special care must be taken to ensure that all transverse joints extend continuously through the pavement and curb. All slip form curb and gutter placement shall conform top details in Appendix “C” and shall be shown or referenced on the plans.

ITEM 11.0 TIE BARS

All tie bar reinforcement for concrete pavement shall conform to Item 2.6 of these regulations. All tie bars shall be deformed bars for Types 4, 5, 6, and 7, and plain or smooth bars for Type 1 and 3, as detailed in Appendix "C".

ITEM 12.0 JOINT SEALER

Pavement joint sealer shall be as specified in Item 2.7.2 of these regulations. Random cracks which will appear in slabs, but have been determined not to be structurally detrimental to the pavement shall be routed to a sufficient width and depth as to be sealed properly, as per 2.7.2. Application of joint sealer shall be as follows:

Material must be melted in a double boiler, oil jacketed melter equipped with a mechanical agitator, pump, gas pressure gauges, and separate temperature thermometers for both oil bath and melting vat, with accessible control valves and gauges.

On start up of melter, raise the oil bath temperature, not to exceed 450 degrees (F). Add small quantities of crack filler material to the melter and, while continuously agitating, add additional

material as needed. Control material temperature at 380 degrees (F). Do not exceed 400 degrees (F) at start up.

The sealing and filling of joints and/or cracks may be done at air temperature of 40 degrees (F) or higher. For best results, cracks should be filled to a depth of 1/4 inch below the surface. Where necessary to limit the depth of the sealant, use cotton or kraft rope inserted to the correct depth of the cleaned joint or crack.

Small quantities of unused material remaining in the melter may be remelted and used the following day.

ITEM 13.0 STRUCTURES ENCOUNTERED IN THE PAVED AREA

13.1 MANHOLES AND CATCH BASINS: All manholes and catch basins encountered in the areas to be paved shall be raised or lowered to the surface of the new pavement. Catch basins may be separated from the pavement and curb by boxing out around basin. See Appendix "C".

ITEM 14.0 PROTECTION AND OPENING TO TRAFFIC

Traffic shall be excluded from the pavement by erecting and maintaining barricades and signs until the concrete is at least fourteen (14) days old or has attained a compressive strength of 3,500 pounds per square inch and/or 550 pounds per square inch flexural strength. This traffic restriction shall apply to the contractor's construction equipment and vehicles, as well as general traffic. As soon as curing and sealing are completed, the con-tractor shall clean up the pavement free from all debris.

ITEM 15.0 CURB, GUTTER, SIDEWALK, AND DRIVEWAYS

Construction of curb, gutter, sidewalk, and driveways shall require the same care as the street pavement. The preceding requirements shall apply, where pertinent, to the construction of curb, gutter, sidewalks, and driveways within the right-of-way. In addition, sidewalks or driveways shall be constructed so that the transverse joint spacing shall be equal to the width of the sidewalk or driveway, but in no case shall the transverse joint spacing for driveways exceed twelve (12) feet and not greater than five (5) feet for sidewalk spacing. Sidewalks and driveways, within the right-of-way, shall be constructed with a pavement thickness of at least four (4) inches and increased to five (5) inches when included as a part of a driveway. Driveways shall be a minimum of five (5) inches in thickness within the right-of-way. (see Appendix "C" for typical section details). Commercial and industrial entrances will require sidewalk thickness conforming to driveway pavement thickness.

ITEM 16.0. PAVEMENT THICKNESS MEASUREMENTS

Pavement thickness for each type street classification shall be as provided in Table A-1. Streets that are subjected to exceptionally heavy truck traffic shall require a more complete detailed analysis by the subdivider’s engineer and approved the Planning Commission.

Upon completing of the base, cores shall be taken at approximately 300 foot intervals alternating lanes, to determine pavement thickness. On streets less than 600 feet in length, a

minimum of three (3) pavement cores shall be taken. A deviation of the specified thickness of 0.2 inches shall be tolerable. When the pavement thickness is less than the allowable deviation, additional pavement cores shall be taken at 25 foot intervals ahead, behind and across, until the specified thickness has been measured. The depth of the total deviation shall be determined by averaging all deficient cored. The length of the deficient area shall be determined by distance between the two farthest deficient cores, plus 25 feet. The minimum deficient area shall be 25 feet in length times the lane width.

When the pavement thickness is less than the specified allowable deviation the developer shall have the following options:

1. Remove the pavement, lower the subgrade, re-compact the subgrade to specifications, retest the subgrade and replace the pavement.

2.The developer shall pay to the appropriate Legislative Body a portion of the contract price. The developer or design engineer shall certify to the Planning Commission's Engineer the actual contract price per square yard for the pavement.

PAVEMENT DEFICIENCY

Deficiency in Thickness Determined by Cross (Inches)	Proportional Part of Contract Price Due to Appropriate Legislative Body
0.00" to 0.20"	0%
0.21" to 0.30"	10%
0.31" to 0.40"	20%
0.41" to 0.50"	30%
0.51" to 0.75"	40%
0.76" to 1.00"	50%

The minimum thickness allowed under this option is as follows:

Designed Depth	Minimum Thickness
7.0"	6.0"
8.0"	7.0"
9.0"	8.0"
10.0"	9.0"

Any pavement that has a thickness deficiency of more than 1" deviation will have to be replaced, as stated in Option #1.

TABLE A-1
MINIMUM PAVEMENT THICKNESS FOR
STREETS - PORTLAND CEMENT CONCRETE*

Street Classification	Pavement** Thickness
Local and Cul-de-sac	7”
Sub-Collector	8”
Collector	9”

* Streets shall be designed in accord with the typical section details in Appendix “C”.

** Where streets are to serve industrial or commercial areas, the pavement design shall be based on a study prepared by the subdivider's engineer projecting the type of vehicles using the street and traffic volumes and approved by the Planning Commission's Engineer.

Note: Welded wire fabric or wire mesh for reinforcing concrete pavements shall not be required unless otherwise specified by the design engineer.

APPENDIX "B"

ASPHALT CONCRETE PAVEMENT FOR STREET AND DRIVEWAY CONSTRUCTION

The work covered by these specifications consists of furnishing all labor, equipment, and materials, and performing all operations in connection with the construction of asphalt concrete pavement, in accord with these specifications and the applicable Improvement Drawings. A string-line or automatic grade control device shall be used.

The asphaltic concrete pavement work shall consist of multiple layers of asphaltic concrete with or without granular base and subbase courses, constructed on a prepared sub-grade in general conformity with the lines, grades and cross-sections shown on the plans.

The data included herewith is based upon general soil conditions which exist in the area. These general soil conditions, representing approximately 75 percent of the soils in the area, are clayey overburden soils, described as lean to moderately plastic silty clays, classified according to the Unified Soil Classification System as CL soils. Any site which is made up of soils substantially different should be evaluated independently by qualified Geotechnical Engineers. this work should consist of drilling, testing, and an engineering evaluation of all field and laboratory data.

ITEM 1.0 GRADING

This term shall consist of all grading above or below subgrade elevations of whatever nature required to bring the street to proper subgrade elevations, including necessary excavation for curb, gutter, sidewalk, construction of embankments, excavation and proper sloping of all cuts, and other work incidental thereto.

1.1 EXCAVATIONS: All excavations shall be made to approximate grade or subgrade elevations consistent with approved plans. Excavations shall not be steeper than a cut slope of 2.5 horizontal to 1 vertical.

1.2 EXCAVATION BELOW SUBGRADE: Whenever excavations below subgrade elevation to remove spongy or unstable material, organic matter, or other materials is required, the contractor shall remove same and shall replace with compactable soils as per Item 1.3. The excavation can be backfilled with soils that were removed, provided they are clean clayey soils free of organic matter and other deleterious material, aerated, and dried to near optimum moisture content or clean clayey borrow soils that have moisture contents near optimum moisture content.

1.3 CONSTRUCTION OF EMBANKMENT: All surface vegetation and heavy root system shall be removed to eliminate all vegetation from the area upon which the embankment is to be constructed. Soils so removed shall not be used in construction of embankment. These materials shall be stockpiled and respread across scarified areas after the scarified areas have been brought to within inches of finished grade.

Embankments shall be constructed of approved soils to approximate subgrade elevation in shallow level layers, six (6) to eight (8) inches, within three (3) percent of optimum moisture content on the dry side of the curve or within four (4) percent of optimum moisture content on the wet side of the curve, compacted with an appropriate type of compaction equipment to a density not less than 95 percent of maximum density, as determined by the standard Proctor

moisture-density test (ASTM D698-78 or AASHTO T-99) or 87 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-58-78 or AASHTO T-180). Except as otherwise approved by a Qualified/Recognized Geotechnical Engineer, all soils placed in areas involving public improvements shall be constructed to slopes no steeper than 2.5 horizontal to 1 vertical and flatter where possible for ease of maintenance.

A recognized testing laboratory shall be required to run moisture-density tests (ASTM D698-78 or ASTM D1557-78) and field density tests (ASTM D1556-64or ASTM D2922-78) to determine the percent compaction. The cost of all testing shall be at the expense of the developer.

1.4 BACKFILL: Clayey soils or granular soils, shall be used to backfill utility crossings beneath and within three (3) feet on either side of the pavement, and compacted to the densities stated in Item 1.3. Under no conditions shall granular backfill be flushed with water to obtain compaction. Utilities which are parallel and within three (3) feet either side of the pavement shall be compacted.

1.5 SUBGRADE: The subgrade is defined as the top one (1) foot of the soil profile at finished grade prior to placing the pavement. This top one (1) foot of soil will consist of: a) compacted fill placed for embankments and as outlined in Item 1.3; b) undisturbed soils in transitional areas from cut to fill immediately below the topsoil; or c) undisturbed soils at depths greater than three (3) feet below the original ground surface in cut areas. The top one (1) foot of subgrade shall be compacted to 98 percent of maximum density as determined by the standard Proctor moisture-density test (ASTM D687-78 or AASHTO T-99) or 90 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-78 or AASHTO T-180) within two (2) percent of optimum moisture content on the dry side of the curve or four (4) percent of optimum moisture content on the wet side of the curve immediately prior to placing the pavement. This specification is similar to the compaction requirement in compacted fill areas since the embankment shall be compacted to 95 percent or 87 percent of maximum density as determined by the standard Proctor or modified Proctor moisture-density test, respectively. In transitional areas from cut to fill, the soils have been subject to seasonal changes of freezing and thawing, and wetting and drying. These soils will exist at moisture contents well above optimum moisture content and at densities on the order of 60 to 80 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried, in order to obtain the specified percent compaction for subgrade. Soils in cut areas, three (3) feet below original grade, will exist at moisture contents above optimum moisture content and at densities on the order of 90 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried in order to obtain the specified percent compaction for subgrade.

Any soft or yielding areas, resulting from high moisture content, that are encountered at the time of construction, shall be scarified, aerated, and dried to reduce the moisture content nearer to optimum moisture content, then recompacted to the specified density.

The subgrade shall be shaped to plan elevation and cross-section. Immediately prior to placing the pavement, the subgrade shall be checked for conformity with the cross-section shown on the plans by means of an approved template on the side forms. If necessary, the materials shall be removed or added, as required, to bring all portions of the subgrade to correct elevations. The subgrade shall be thoroughly compacted and again checked with the template. Pavement shall not be placed on any parts of the subgrade which have not been checked for correct elevation. The subgrade shall be clean of loose or wet material prior to placing pavement.

Prior to placing the pavement, the Contractor shall proof-roll the compacted subgrade with a fully loaded single axle dump truck. The Inspector shall observe the proof-rolling for

consistency. Areas which are subject to excessive pumping or rutting shall be reworked and recompacted as described above. All subgrade testing shall be made not more than 24 hours prior to placement of the pavement, unless extreme weather conditions dictate retesting (rain, freezing temperatures, excessive temperatures, etc.). The inspector shall be contacted not less than 12 hours prior to placement of materials.

1.6 EQUIPMENT FOR COMPACTION OF BACKFILL, EMBANKMENT, AND SUB-GRADE: Any compaction equipment capable of producing the required embankment and subgrade densities, without lamination, will be permitted. Clayey type or cohesive soils shall be compacted with a kneading type compaction equipment such as a sheepsfoot roller. Cohesionless soils shall be compacted with vibratory type equipment, such as a vibrating plate or roller. All compaction equipment shall be in good condition and shall be operated efficiently to assure uniform compaction.

1.7 SUBGRADE FOR SIDEWALKS AND DRIVEWAYS: Subgrade for driveways shall comply with Item 1.5 .

1.8 EQUIPMENT OPERATED ON STREETS: The contractor shall be permitted to operate only pneumatic tired equipment over any paved street surfaces and shall be responsible for correcting any damage to street surfaces resulting from the contractor's operation. Paved streets adjacent to new development shall have all loose soil or mud removed at the end of each day's work.

1.9 UTILITIES: Special precautions shall be taken by the contractor to avoid damage to existing overhead and underground utilities. Before proceeding with work, the contractor shall confer with all public or private companies, agencies, or departments that own or operate utilities in the vicinity of the construction work. The contractor shall be diligent in his efforts to use every possible means to locate existing utilities.

1.10 SOIL DENSITY TESTING: All soil density shall be at the expense of the developer. The results of these tests shall be mailed directly to the developer, design engineer and the Planning Commission’s Engineer prior to the placement of any pavement materials. The results of all soil testing shall be compared to the density requirements, stated in Item 1.3, 1.4, 1.5 and 1.7 of these regulations. Any deficiencies found in the construction work must be remedied in the field or resolved between the developer, contractor and the Planning Commission’s Engineer, subject to approval by a qualified Professional Geotechnical Engineer.

ITEM 2.0 PREPARATION OF EXISTING GRANULAR BASE COURSES FOR SURFACING

2.1 DESCRIPTION AND GENERAL REQUIREMENTS: In areas where granular base course has been placed as a previous stage of street or road construction, the contractor shall blade, shape, and compact the base course in conformance with the required dimensions, line, grade, and cross-section to permit completion of the paving work. When directed by the Inspector, additional base course aggregates shall be provided or excess aggregate removed and disposed of, by the Contractor, as to provide conformance with the required roadway section.

2.2 THICKNESS OF SURFACING REQUIRED FOR EXISTING GRANULAR BASE COURSES: The existing thickness of granular base comprises a portion of the required Design Thickness as specified Table B-3.

ITEM 3.0 ASPHALT PAVEMENT

3.1 DESCRIPTION AND GENERAL REQUIREMENTS: This item shall consist of furnishing all materials and performing all construction procedures required to build an asphalt pavement, on a prepared and approved subgrade, conforming to the requirements of these specifications and to the pavement design shown on the approved plans. It may include any, or all, but is not necessarily limited to, materials and methods specified under Item 3 only.
Asphalt pavement shall consist of an asphalt concrete surface course, or courses, constructed on a base course, or courses and/or subbase course, designed in compliance with the requirements of Item Table B-3.

Successive layers of the pavement shall be offset from the edge of the underlying layer, a distance equal to the course thickness of the lower layer, except when abutting existing construction. When the asphalt layers of the pavement abut a building foundation, barrier curb, or similar vertical surface, the abutting surface shall be heavily painted with asphalt prior to construction of the asphalt course. The surface course shall be finished one-fourth (1/4) inch above adjacent construction to permit proper compaction.

3.2 MATERIALS and CONSTRUCTION MATERIALS:

3.2.1 ASPHALT CONCRETE SURFACE COURSE: Asphalt Concrete Surface Course materials and construction shall conform to the current requirements of the Kentucky Department of Transportation, Bureau of Highways, for Asphalt Concrete Surface and Binder (Section 401, 402). Surface course mixture composition shall conform to the requirements Surface and Binder as set forth in Table B-2. Minimum Asphalt Concrete Surface, Binder and Bases Courses Thickness shall be as stated in Table B-3 of these regulations.

3.2.2 ASPHALT CONCRETE BASE COURSE: Asphalt Concrete Base Course materials and construction shall conform to the current requirements of the Kentucky Department of Transportation, Bureau of Highways, Specifications for Asphalt Concrete Base Course (Section 401, 403).

Composition requirements of the mixture shall conform to the gradation limits for Asphalt Concrete Base Course set forth in Table B-2. Asphalt content used shall fall within the range shown and shall be approved by the inspector.

3.2.3 CRUSHED AGGREGATE BASE COURSE:

3.2.3.1 DESCRIPTION: Crushed Aggregate Base Course, when provided for in the approved structural design of the pavement, shall consist of a granular
layer constructed on prepared subgrade or subbase in accord with these specifications and in conformity with the approved dimensions, lines, grades, and cross-sections.

3.2.3.2 MATERIALS AND CONSTRUCTION METHODS: Crushed Aggregate Base Course shall conform to all the current requirements for materials and construction methods of the Kentucky Department of Transportation for Dense Graded Aggregate Base Course as per Section 303.

3.2.4 GRANULAR SUBBASE COURSE:

3.2.4.1 DESCRIPTION: Subbase, when provided for in the approved structural design of the pavement, shall consist of a granular layer conforming to the following material and construction specifications.

3.2.4.2 MATERIALS AND CONSTRUCTION METHODS: Crushed Aggregate Subbase Course shall conform to all the current requirements for materials and construction methods of the Kentucky Department of Transportation for Dense Graded Aggregate Subbase Course as per Section 303. The minimum Granular Subbase Course thickness shall be as stated in Table-2.

3.2.5 ASPHALT PRIME COAT: Asphalt Prime Coat shall be applied to the surface of granular courses upon which asphalt base or surface courses will be constructed.

Asphalt Prime shall conform to the Kentucky Department of Transportation requirements for Cutback Asphalt Emulsion Primer Type L, as per Section 407. Prime shall be applied to the surface of granular base course at a rate of 0.25 to 0.50 gallons per square yard, as directed by the inspector, in conformance with requirements of the referred to specification.

3.2.6 ASPHALT TACK COAT: Tack Coat shall consist of SS-1h, meeting the current requirements of the Kentucky Department of Transportation. It shall, when directed by the inspector, be diluted with equal parts of water. Application equipment and procedure shall conform to the requirements of the Kentucky Department of Transportation for Tack Coats as per Section 407. Tack Coat shall be applied to the surface of asphalt courses that have become dusty or dry from traffic use at a rate of 0.10 gallons per square yard of the diluted SS-1h before the subsequent course is constructed or in other circumstances when the inspector so directs.

ITEM 4.0 DESIGN OF ASPHALT PAVEMENT STRUCTURE

4.1 DESCRIPTION: Asphalt pavement structures for subdivision streets shall be designed in conformance with the requirements of this specification. Thickness of the total pavement, and of component layers, shall be determined on the basis of Street Classification.

4.2 PAVEMENT THICKNESS REQUIREMENTS: Thickness of component layers of the pavement for streets within the right-of-way and of the total pavement structure shall be determined per Table B-3. Where streets are to serve industrial or commercial areas, pavement design shall be based on a study prepared by the subdivider's engineer projecting type of vehicles using said streets and traffic volumes, and approved by the Planning Commission's Engineer.

ITEM 5.0 STRUCTURES IN THE PAVED ARES:

5.1 Manholes and catch basins encountered in the area to be paved shall be raised or lowered to match the proposed surface elevation of the new pavement. Catch basins shall have a granular backfill or controlled-low-density-strength-material (CLSM, flowable fill) and shall be separate from the pavement and curb by boxing out around the catch basin. Sand shall not be used as a granular backfill.

ITEM 6.0 JOINT SEALING COMPOUND

The material used for filling and sealing cracks and/or joints between concrete and/or asphalt shall be W. R. Meadows Sealtight #164 Hot Pour Rubber Asphalt Sealer or approved equal.

ITEM 7 PAVEMENT THICKNESS MEASUREMENTS

Pavement thickness for each type street classification shall be as provided in Table 3. Streets that are subjected to exceptionally heavy truck traffic shall require a more complete detailed analysis by the subdivider's engineer and approved the Planning Commission's Engineer.

Upon completing of the base, cores shall be taken at approximately 300 foot intervals alternating lanes, to determine pavement thickness. On streets less than 600 feet in length, a minimum of three (3) pavement cores shall be taken. A deviation of the specified thickness of 0.5 inches shall be tolerable. When the pavement thickness is less than the allowable deviation, additional pavement cores shall be taken at 25 foot intervals ahead, behind and across, until the specified thickness has been measured. The depth of the total deviation shall be determined by averaging all deficient cores. The length of the deficient area shall be determined by the distance between the two farthest deficient cores plus 25 feet. The minimum deficient area shall be 25 feet in length times the lane width.

When the pavement thickness is less than the specified allowable deviation the developer shall have the following options:

1. Remove the pavement, lower the subgrade to specifications, retest the subgrade and replace the pavement to proper thickness.

2. The developer shall pay to the appropriate legislative body a portion of the contract price. The developer or design engineer shall certify to the Planning Commission's Engineer the actual contract price per square yard for the pavement.

When determining average contract price, the minimum deficient area to be used will be 25 linear feet, each lane being separate.

TABLE B-1
PAVEMENT DEFICIENCY

Deficiency in Thickness Determined by Cross (Inches)	Proportional Part of Contract Price Due to Appropriate Legislative Body
0.00" to 0.20"	0%
0.21" to 0.30"	10%
0.31" to 0.40"	20%
0.41" to 0.50"	30%
0.51" to 0.75"	40%
0.76" to 1.00"	50%

The minimum thickness allowed under this option is as follows:

Designed Depth	Minimum Thickness
7.0"	6.0"
8.0"	7.0"
9.0"	8.0"

10.0”	9.0”
11.0”	10.0”

Any pavement that has a thickness deficiency of more than 1” deviation will have to be replace, as stated in Option #1.

TABLE B-2
TABLE OF COMPOSITION LIMITS FOR BITUMINOUS CONCRETE

Percent Passing by Weight			
Sieve Size	Base	Binder	Surface
1-1/2 in.	100		
1 in.	(2)		
3/4 in.	70-98	100	
1/2 in.	--	--	100
3/8 in.	44-76	57-85	80-100
No. 4	30-58	37-68	55-80
No. 8	21-45	25-52	35-60
No. 16	14-35	15-38	22-46
No. 50	5-20	5-20	5-21
No. 100	3-10	3-10	3-14
No. 200	--	--	2-7
Asphalt Content (1)	3.5-6.5	4.0-7.0	4-8

(1) Percent by weight of the total mixture.

(2) When the specified thickness of the Base course is 2 inches or less, either 100 percent of the aggregate shall pass the 1-inch sieve or the Contractor may request in writing to use Bituminous Concrete Binder. When the Contractor elects to use bituminous concrete binder in lieu of bituminous concrete base, all requirements for thickness and compaction (or density) will apply, the same as if bituminous concrete base was used.

TABLE B-3
THICKNESS REQUIREMENTS FOR ASPHALT PAVED STREETS

PAVEMENT DESIGN					
	Total Minimum Thickness (Method 1)		Total Minimum Thickness (Method 2)		
Street Classification	Surface	Base	Surface	Base	Granular Subbase
Local Cul-de-sac	1½"	2@ 3-3/4"	1½"	3½"	9"
Sub-Collector	1½"	2@4-3/4"	1½"	4½"	10"
Collector	1½"	2@4-3/4"	1½"	5½"	11"

NOTES:
(1) Methods 1 and 2 will produce approximately the same pavement quality and strength.

(2) Selection of the method shall be at the design engineer's option.

(3) Designations pertinent to surface and binder and base courses used in this table correspond to the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction:

Surface and Binder (State Highway Designation Section 401, 402)

Base (State Highway Designation Sections 401, 403) -- Each layer of bituminous concrete base shall be constructed to a compacted thickness no less than three inches nor more than five inches, unless otherwise directed by the inspector.

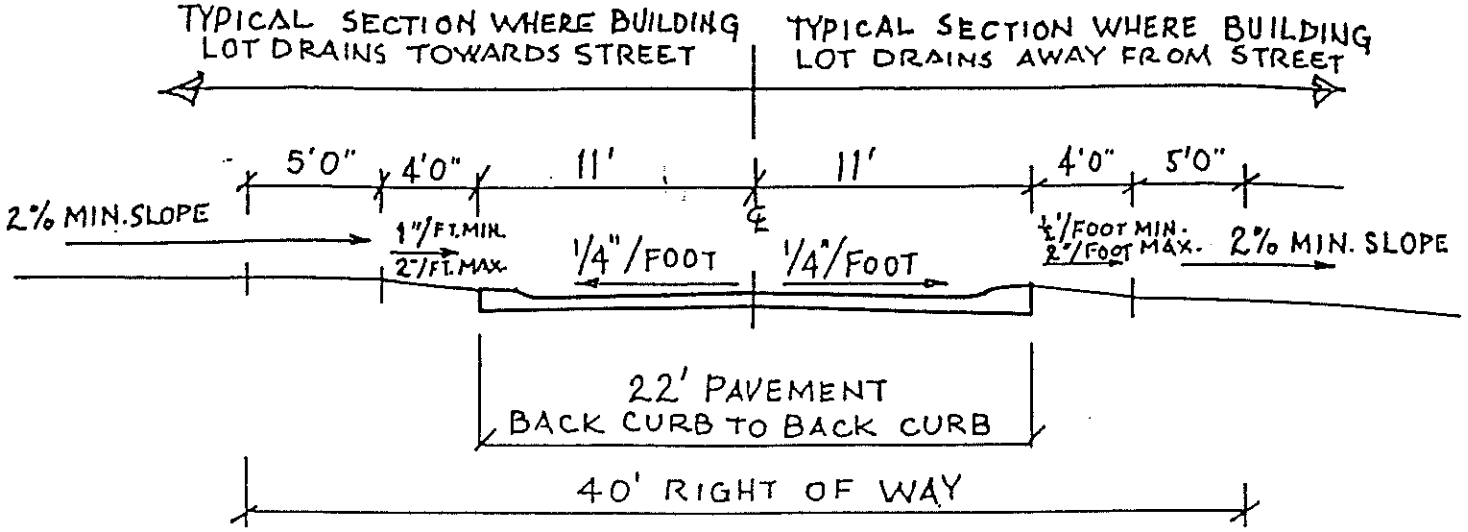
Granular base or granular subbase for Method 2 shall conform to composition limits specified in Sections 3.2.3 and 3.2.4. Each layer of granular base or sub-base shall be constructed to a compacted thickness of no less than three inches nor more than eight inches, unless otherwise directed by the inspector.

(4) Where streets are to serve industrial areas, the pavement thickness shall be a minimum of 11 inches. Streets serving commercial areas, the pavement thickness shall be a minimum of 10 inches.

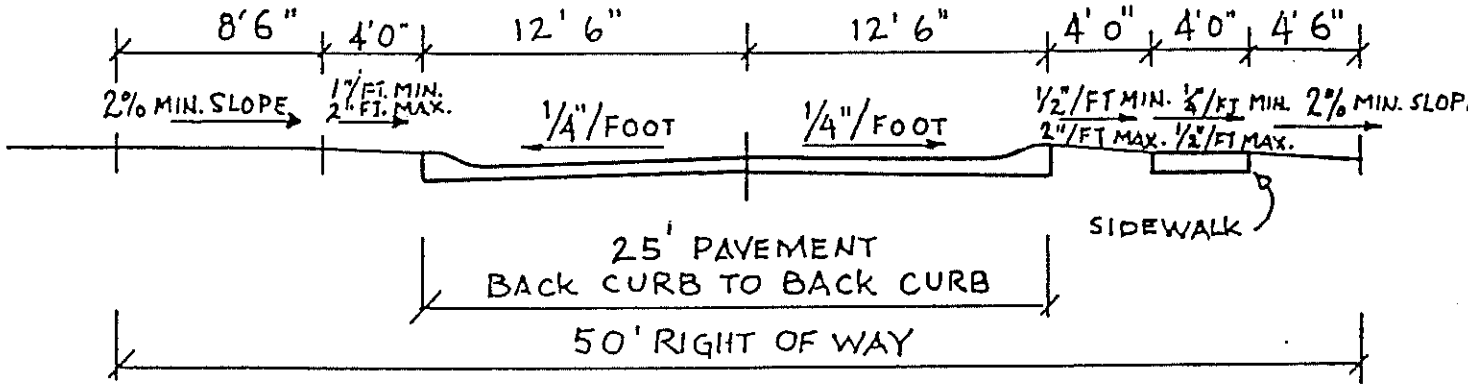
(5) Arterial streets shall be based on requirements of the Kentucky Department of Transportation.

APPENDIX "C"

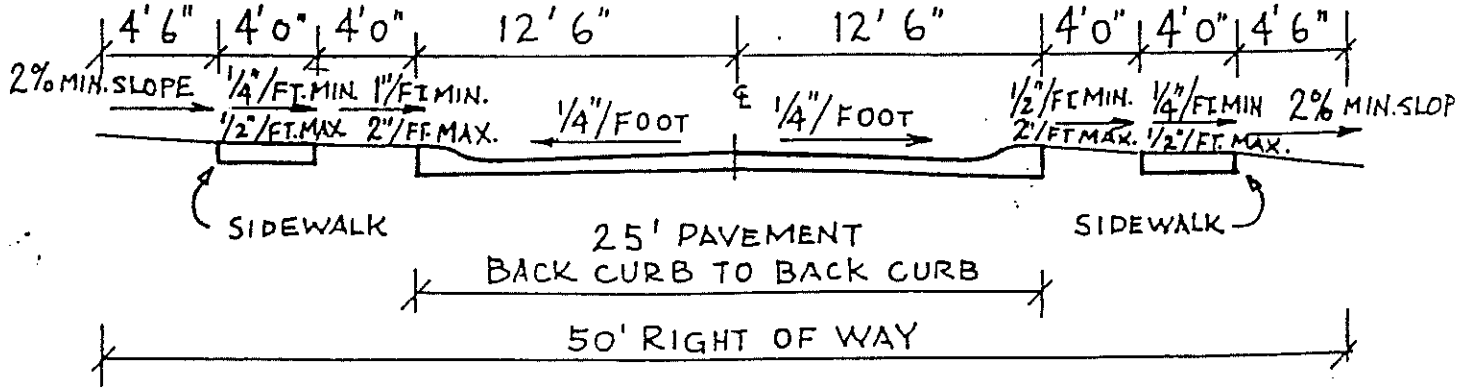
STANDARD CONSTRUCTION REQUIREMENTS AND DETAILS FOR STREETS, SIDEWALKS, DRIVEWAYS, EROSION CONTROL, AND STORM DRAINAGE SYSTEMS



TYPICAL SECTION - COURTS - DEADEND

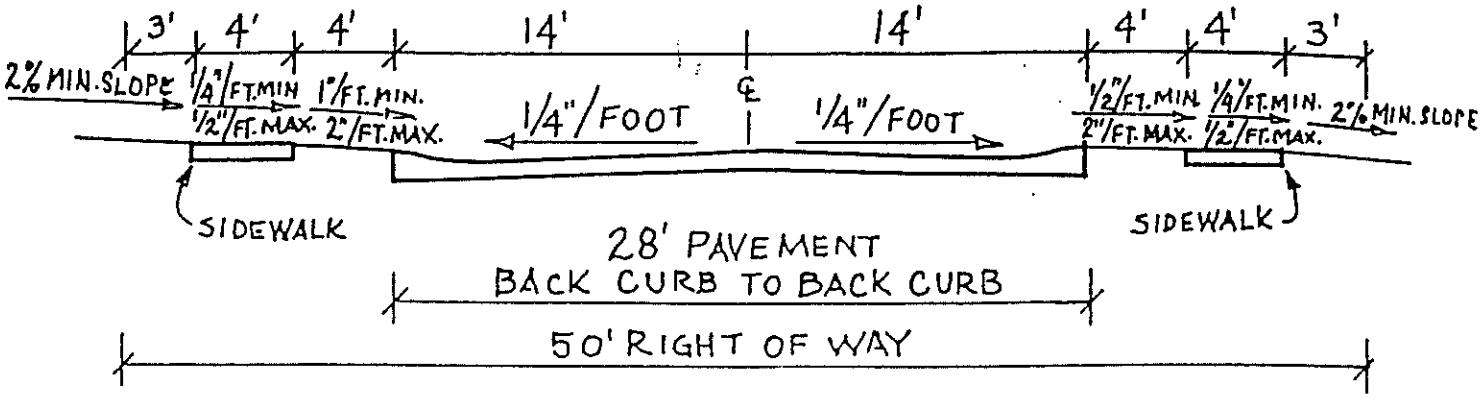


TYPICAL SECTION - CUL-DE-SACS - DEADEND

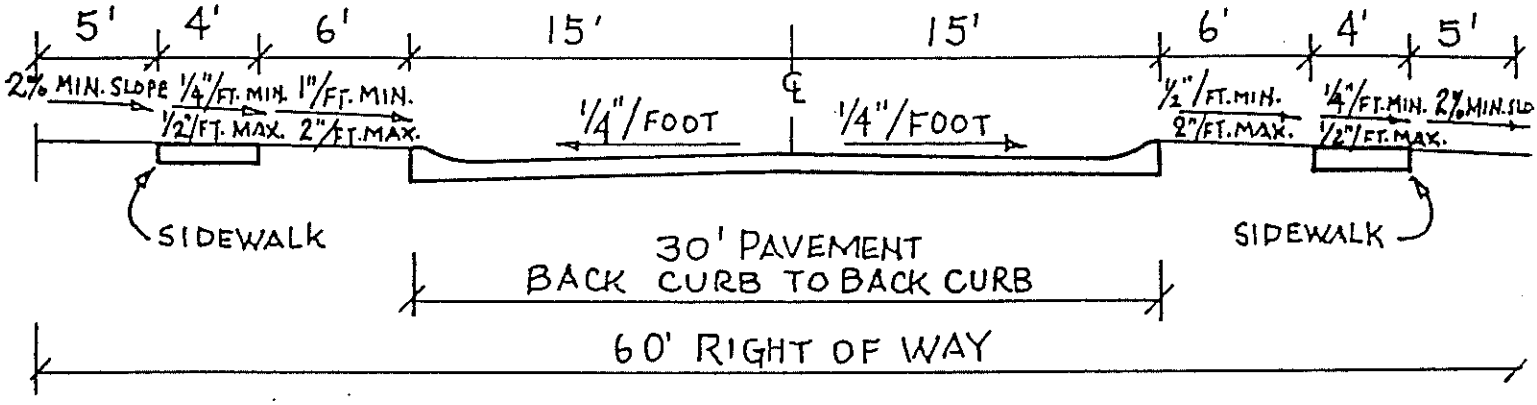


TYPICAL SECTION - LOCAL STREETS

NOTE: SLOPES OUTSIDE OF STREET PAVEMENT ARE MINIMUM STANDARD EXCEPT FOR AREAS IN TRANSITION FROM UPWARD TO DOWNWARD SLOPES ALONG SAME SIDE OF STREETS.

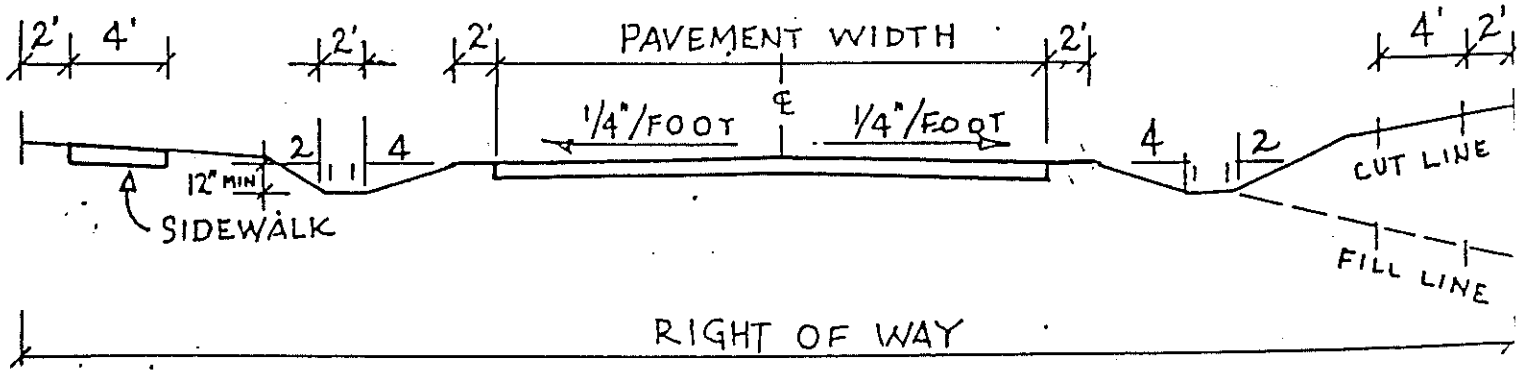


TYPICAL SECTION - SUBCOLLECTOR STREETS



TYPICAL SECTION - COLLECTOR STREETS

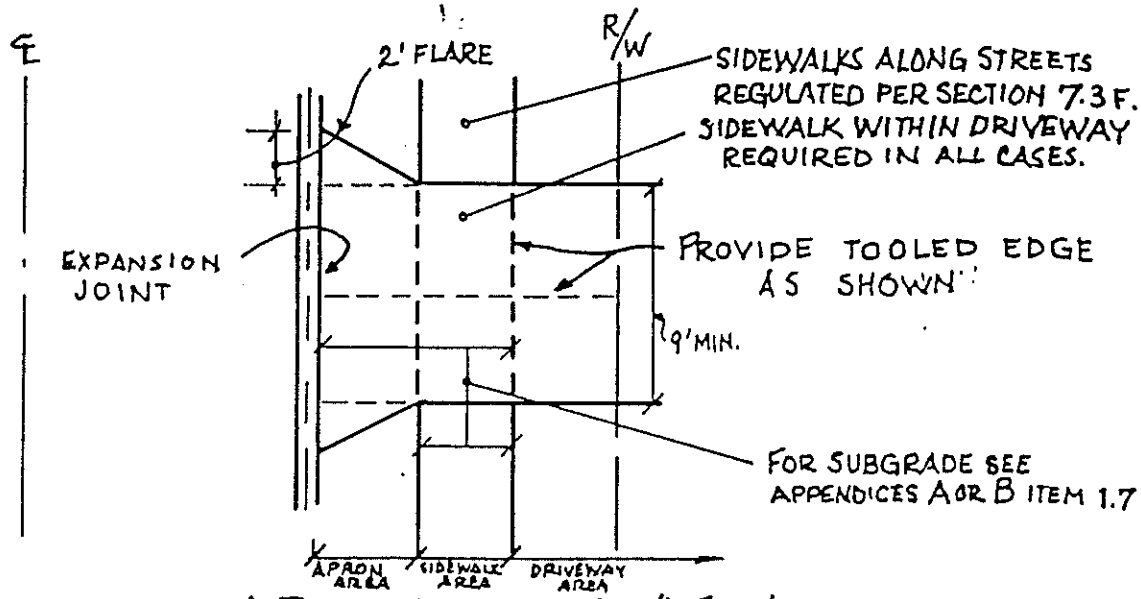
NOTE: SLOPES OUTSIDE OF STREET PAVEMENTS ARE MINIMUM STANDARD EXCEPT FOR AREAS IN TRANSITION FROM UPWARD TO DOWNWARD SLOPES SAME SIDE OF STREETS.



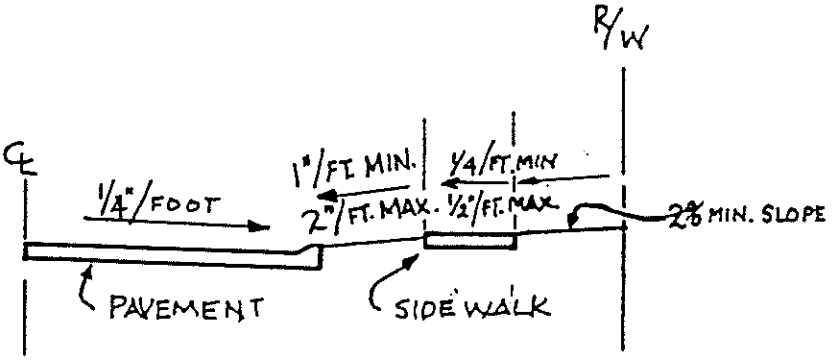
TYPICAL SHOULDER AND DITCH DETAIL

OPTION TO CURB AND GUTTER - ALL STREETS
FRONT YARD DEPTH - 50' MIN. LOT WIDTH - 100' MIN.

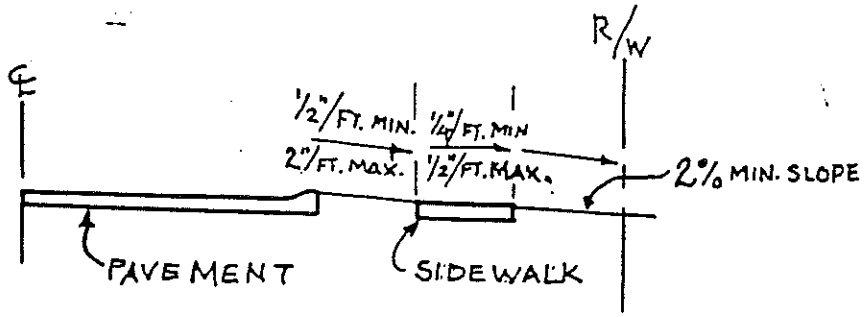
RESIDENTIAL DRIVEWAY APRON DETAILS



APRON PLAN VIEW



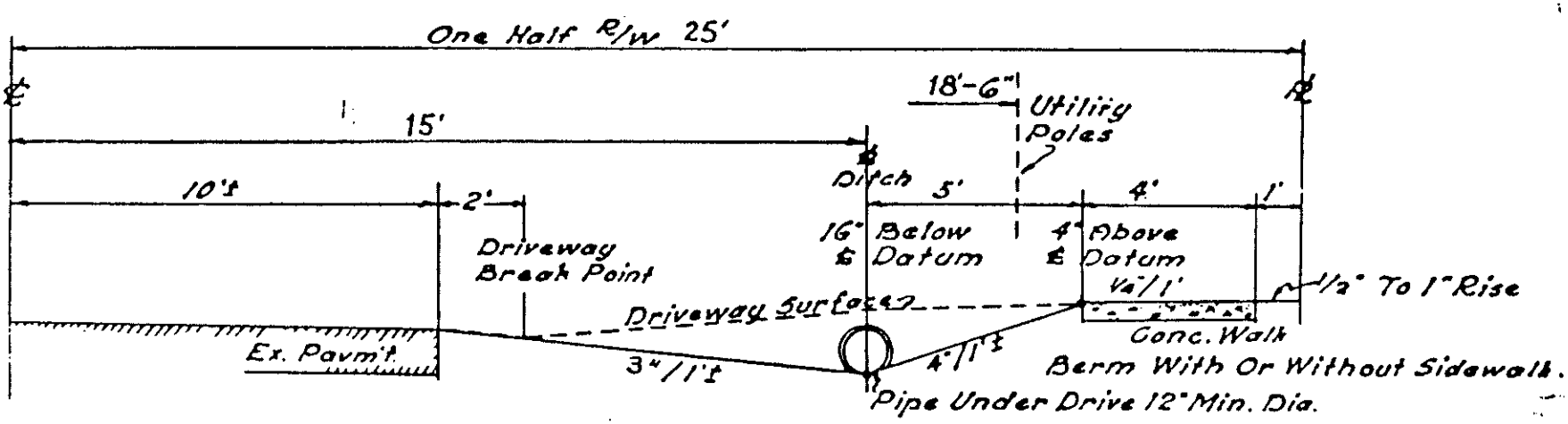
APRON GRADE WHERE LOTS DRAIN TO STREET



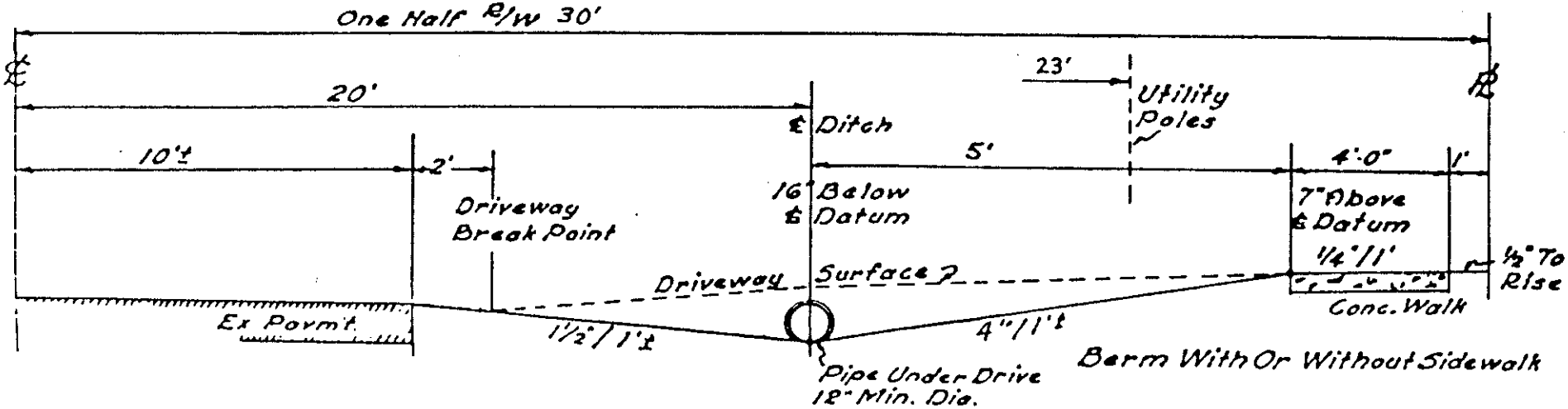
APRON GRADE WHERE LOTS DRAIN AWAY FROM STREET

NOTE: SLOPES OUTSIDE OF STREET PAVEMENTS ARE MINIMUM STANDARD EXCEPT FOR AREAS IN TRANSITION FROM UPWARD TO DOWNWARD SLOPES ON SAME SIDE OF STREETS.

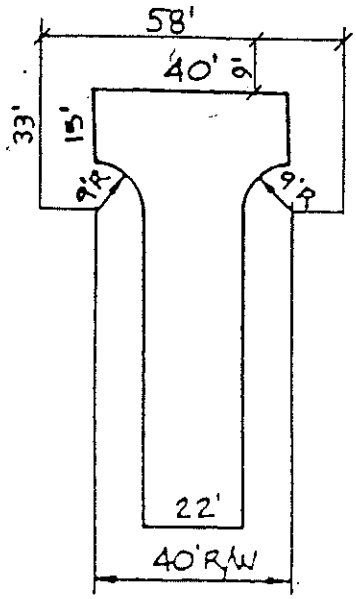
TYPICAL SECTION-SIDE DITCH DRAINAGE AT DRIVEWAY



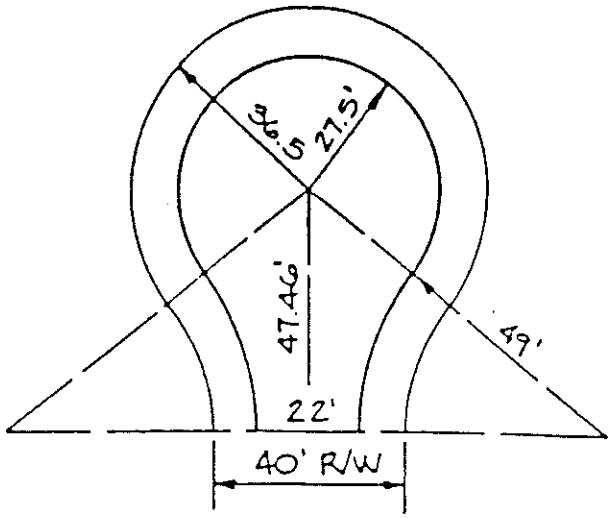
50 FOOT RIGHT OF WAYS



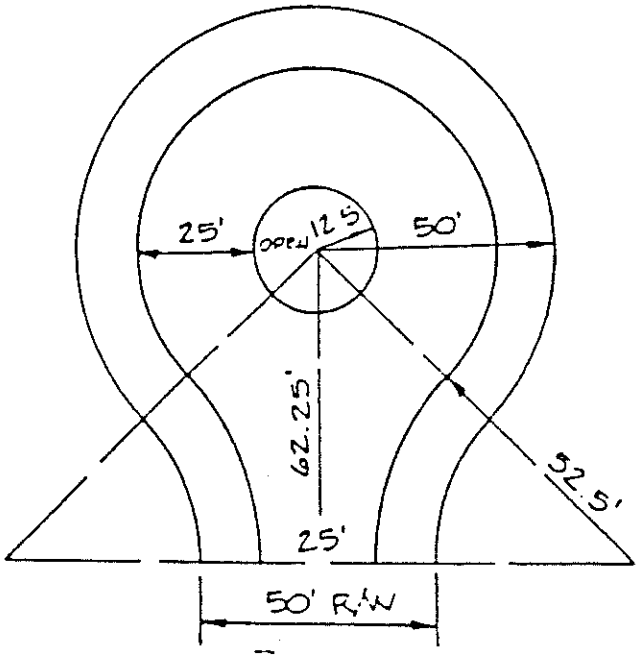
60 FOOT RIGHT OF WAYS



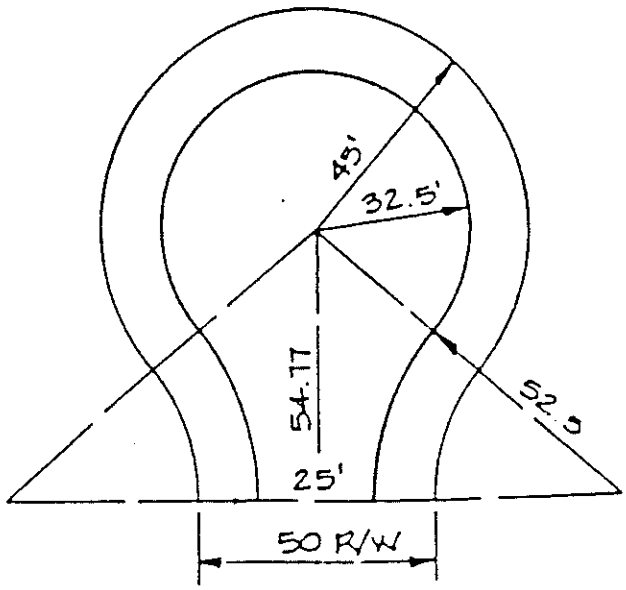
COURT
ALTERNATE T-TYPE



COURT



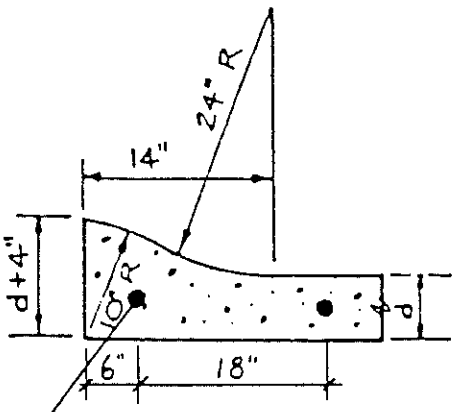
LOCAL



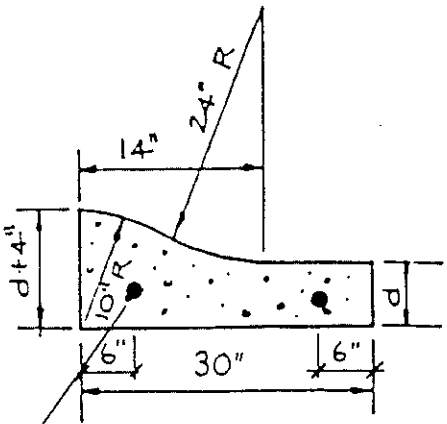
CUL-DE-SAC

TURN AROUND DETAILS
FOR DEADEND STREETS

CURB AND GUTTER DETAILS

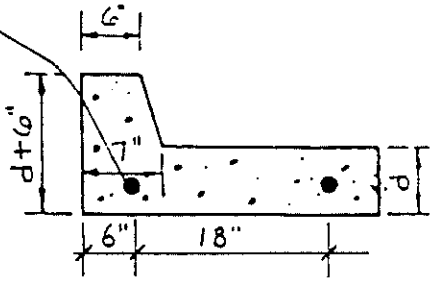


INTEGRAL CURB
CONCRETE PAVEMENT



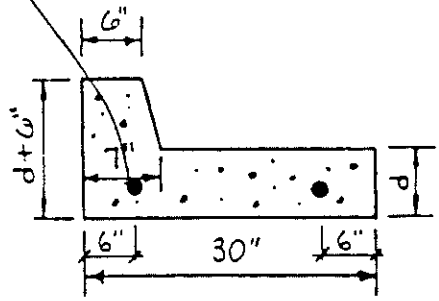
CONCRETE CURB
ASPHALT PAVEMENT

3/4" Φ DOWELS 18" LONG
18" O.C. TYPE1EXPANSION JOINT
WITH CAP.

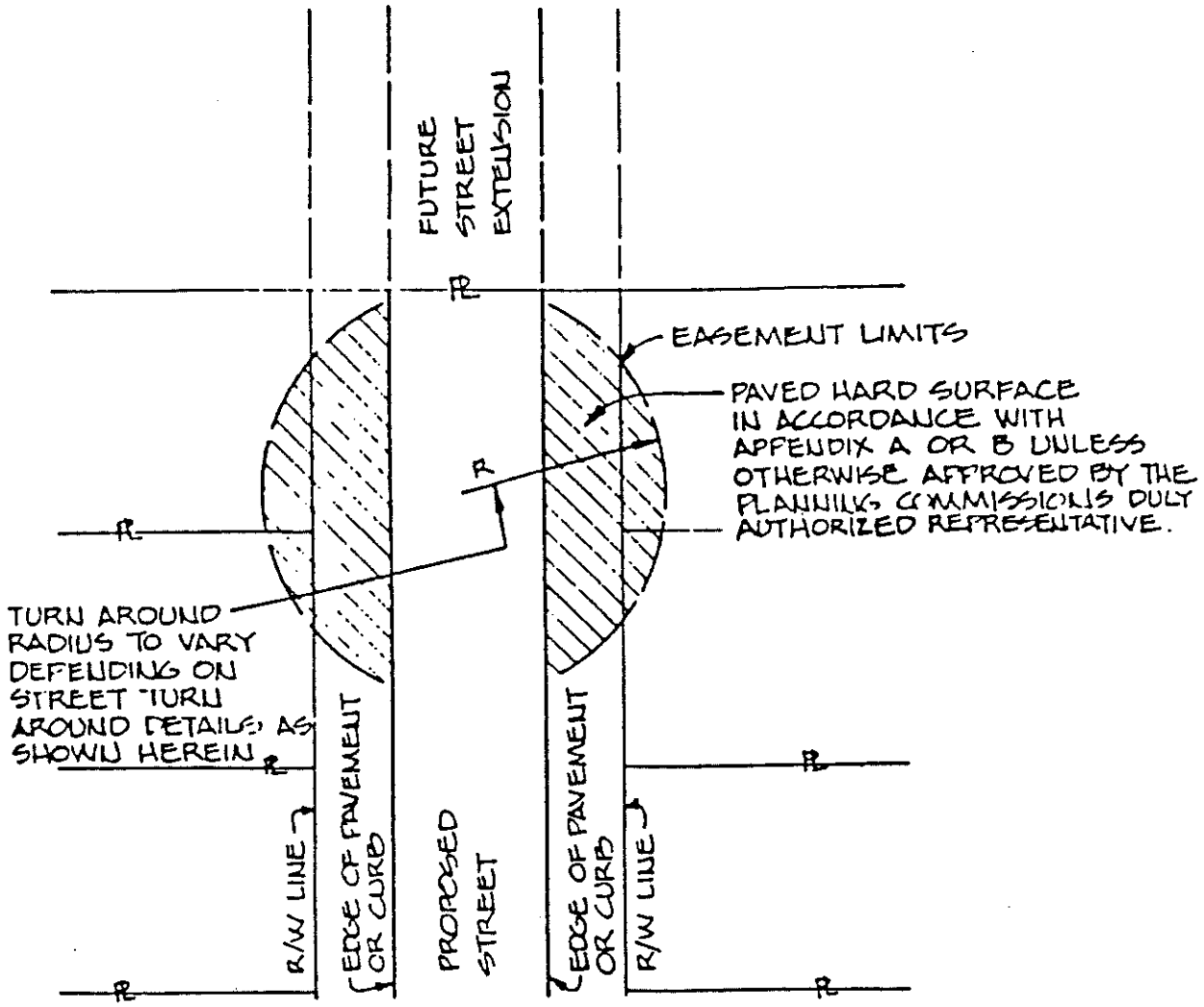


INTEGRAL CURB
CONCRETE PAVEMENT

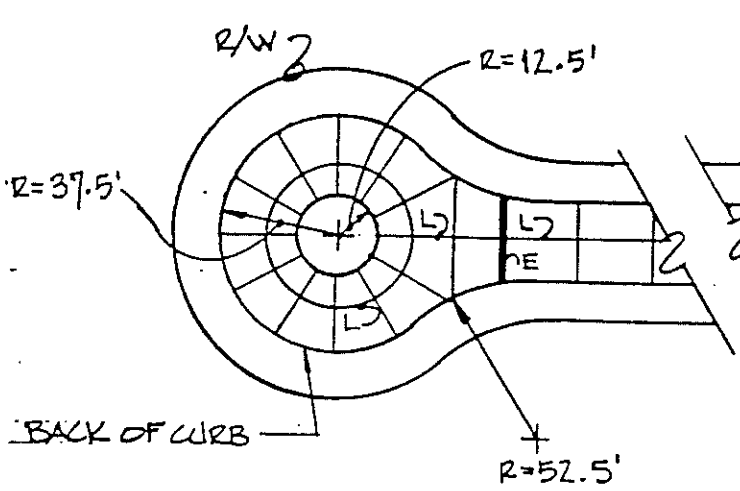
3/4" Φ DOWELS 18" LONG 18" O.C.
TYPE 1 OR TYPE 3 TO COINCIDE WITH
EXPANSION OR CONSTRUCTION JOINTS



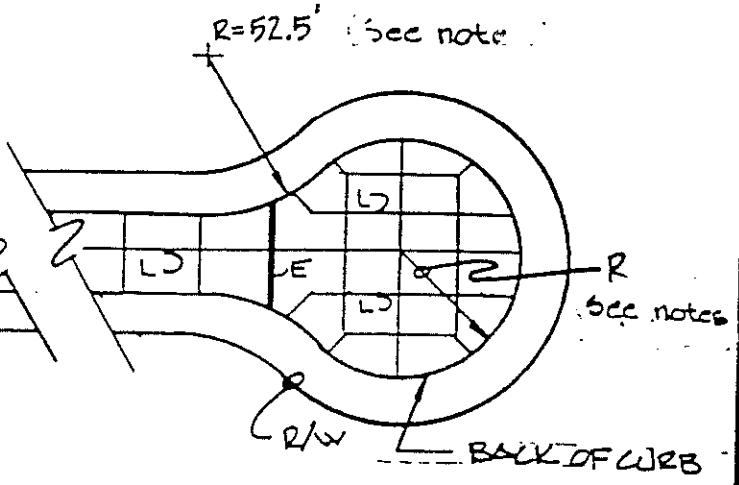
CONCRETE CURB
ASPHALT PAVEMENT



DETAIL OF TEMPORARY TURNAROUND FOR FUTURE STREET EXTENSION



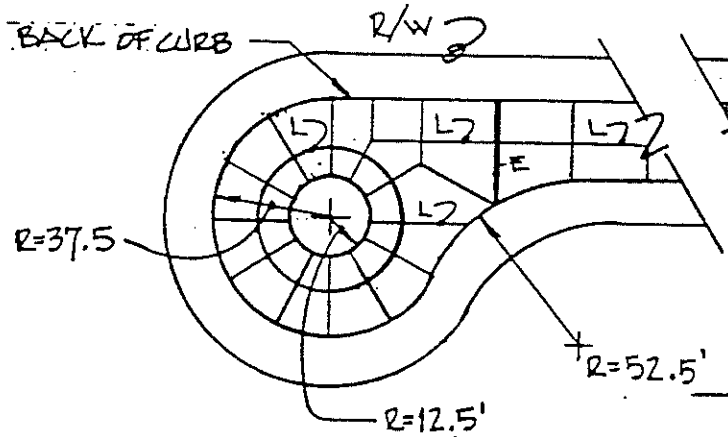
OPEN CENTER CUL DE SAC



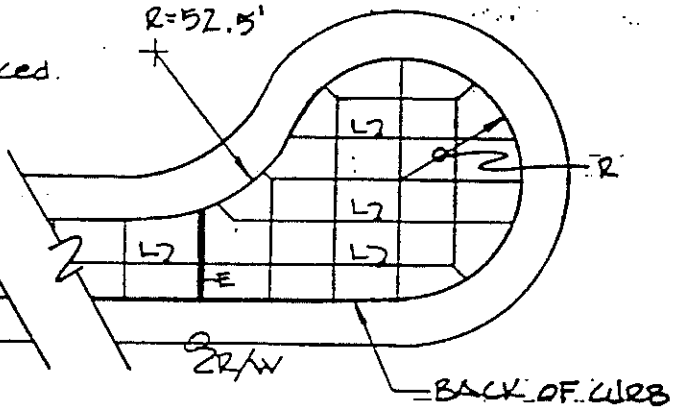
FULLY PAVED CUL DE SAC

NOTES:

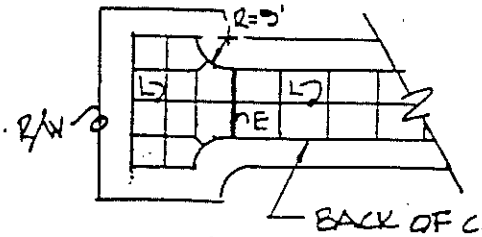
For 22' courts R = 27.5'
For 25' Cul De Sacs 'R' may be reduced to 32.5. (See sheet C-6)



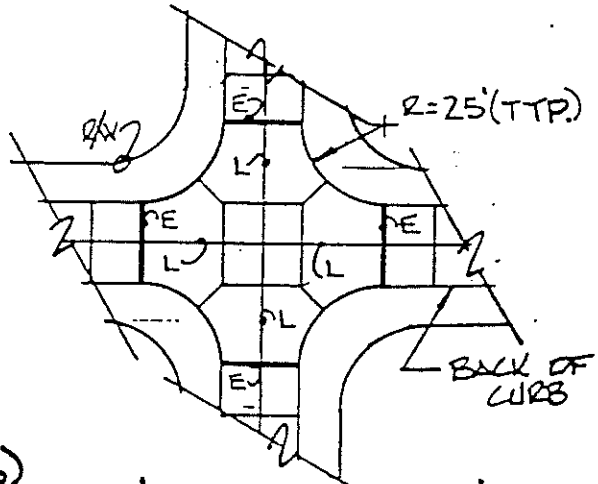
OPEN CENTER OFFSET CUL DE SAC



FULLY PAVED OFFSET CUL DE SAC



ALTERNATE T-TYPE (Courts)

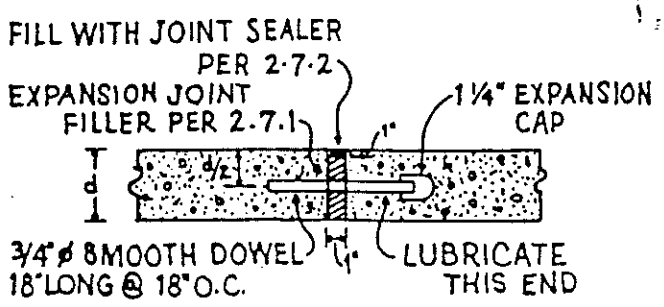


INTERSECTION

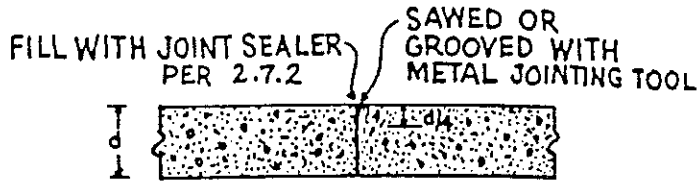
KEY:
E = Expansion Joint L = Longitudinal Joint
Unmarked joints are to be contraction joints

TYPICAL CONCRETE JOINTING PLAN

JOINT DETAILS

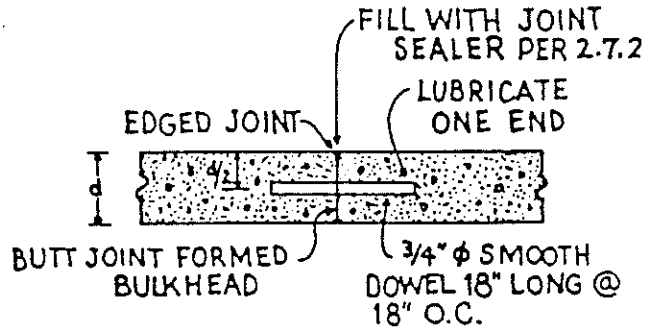


TYPE 1–Expansion Joint



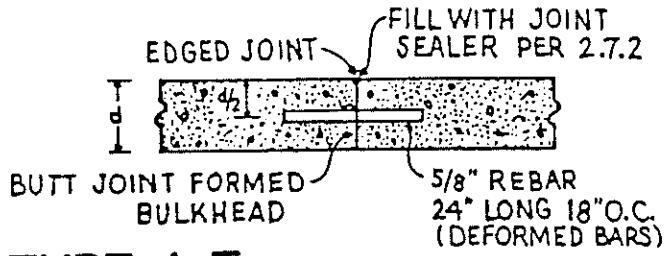
TYPE 2–Transverse Contraction Joint

(sawed or grooved joint)



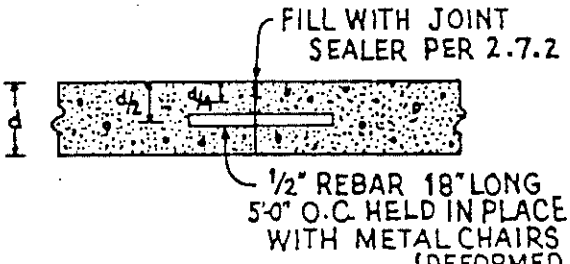
TYPE 3–Transverse Construction Joint

(planned–coincide with contraction joint)

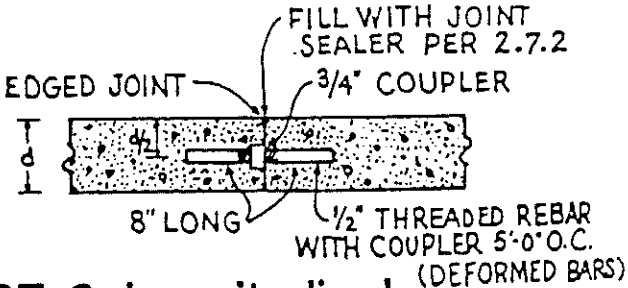


TYPE 4–Transverse Construction Joint

(emergency–not coincide with contraction joint)

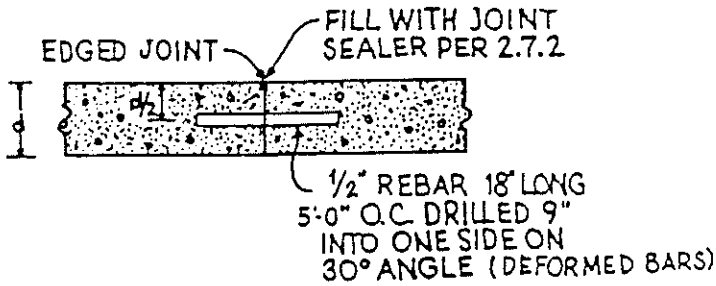


TYPE 5–Longitudinal Sawed Joint



TYPE 6–Longitudinal Construction Joint

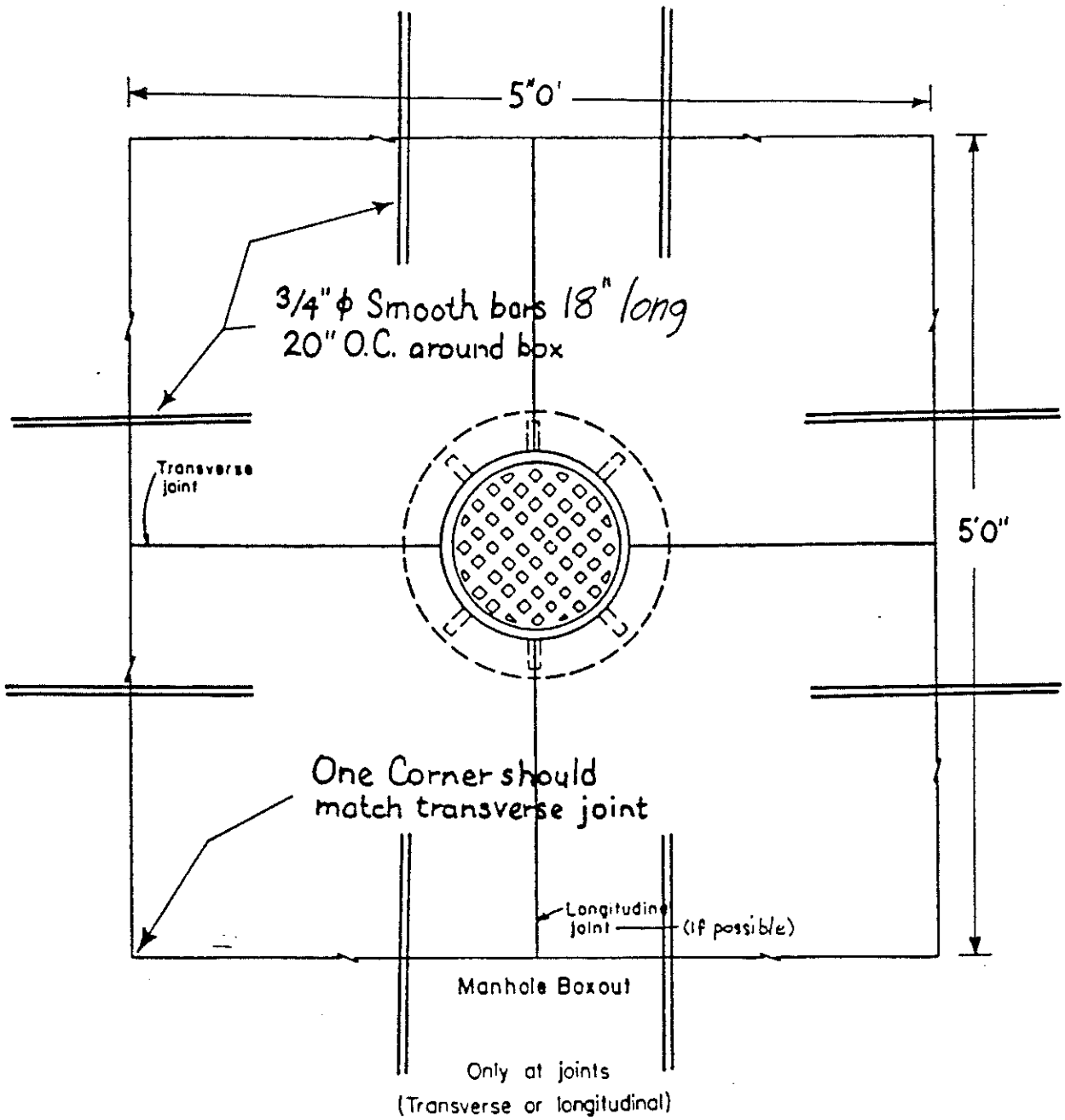
(threaded rebar)



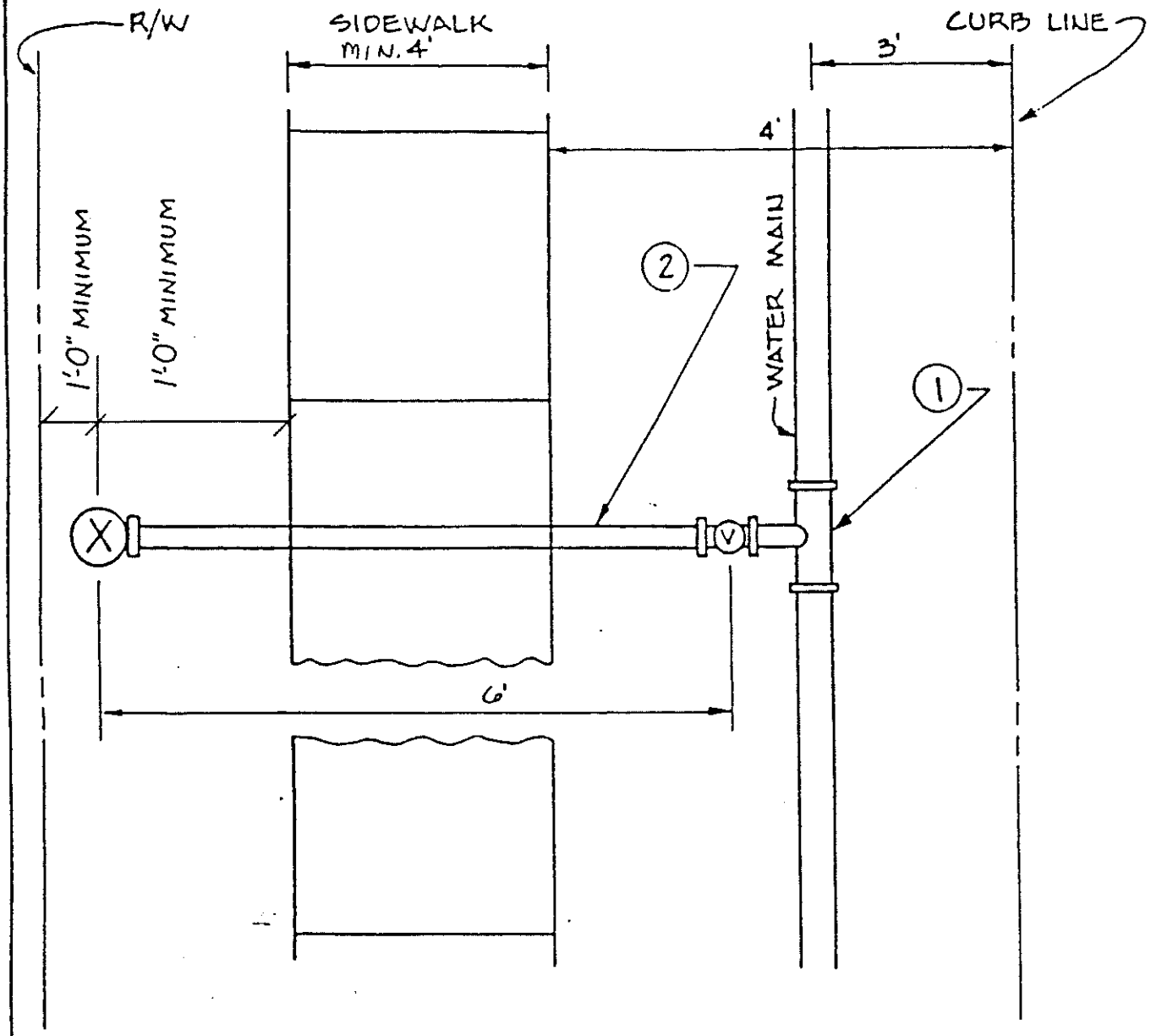
TYPE 7–Longitudinal Construction Joint Alt. (drilled)

C-1D

MANHOLE DETAIL
IN CONCRETE PAVEMENT

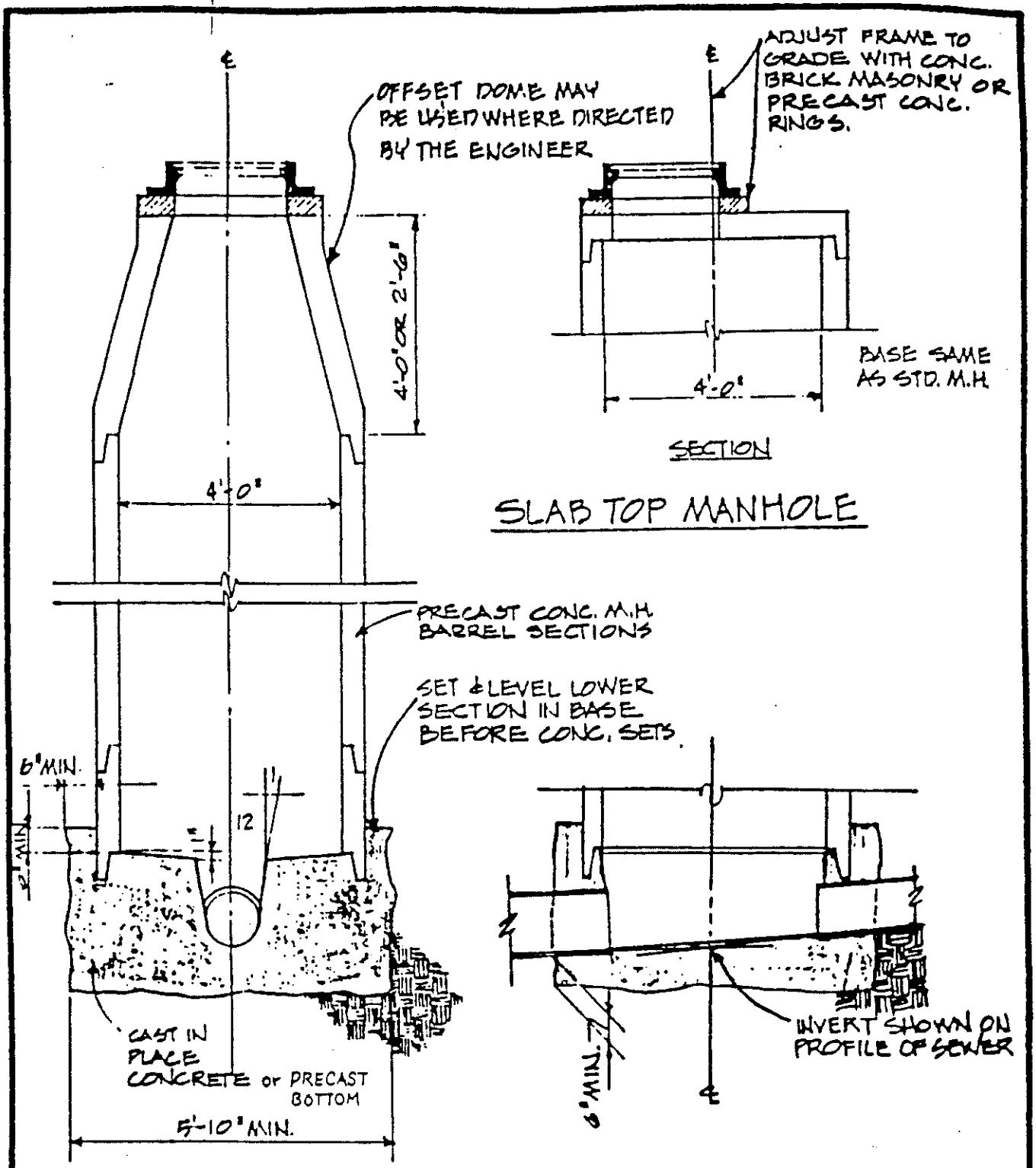


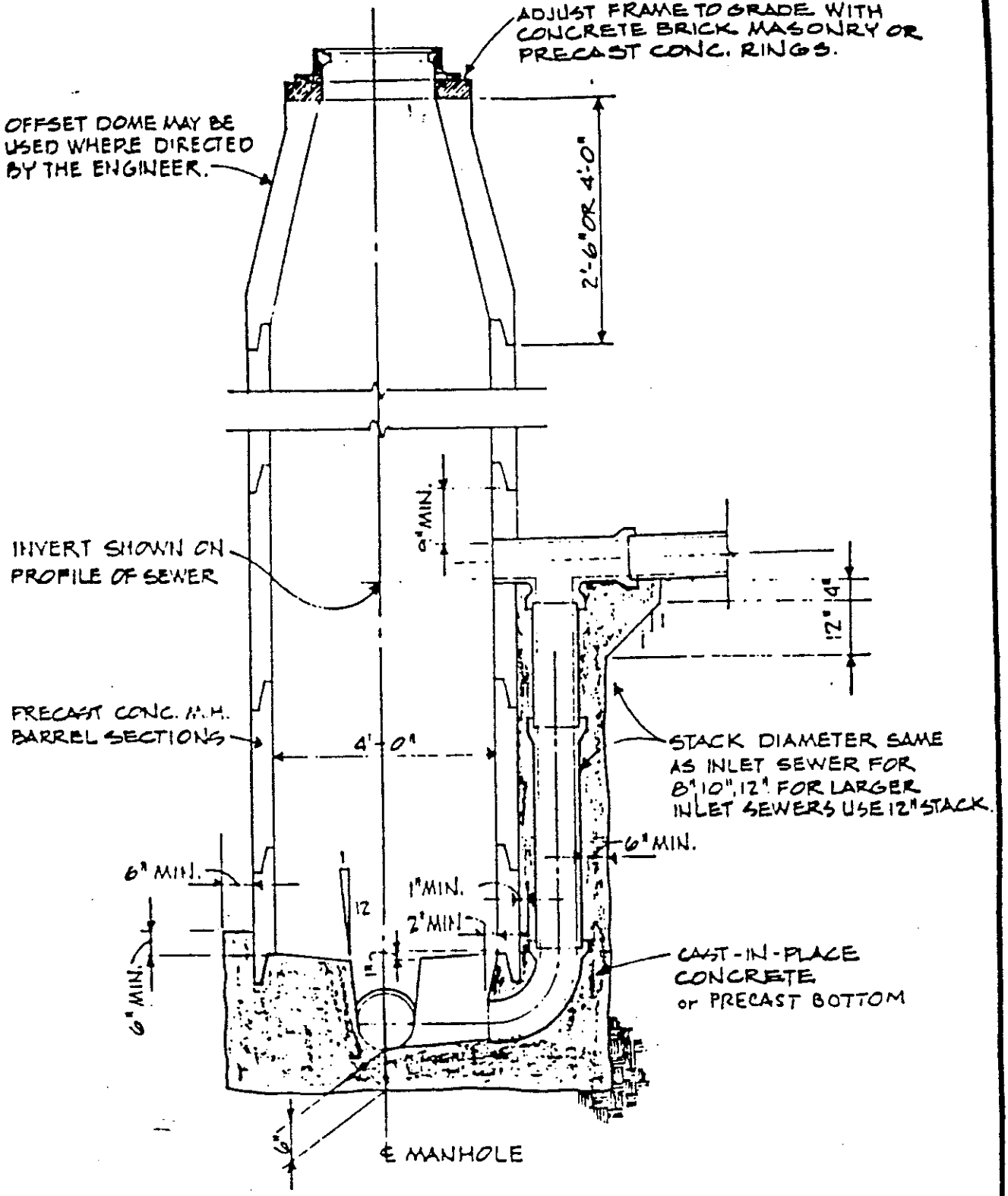
TYPICAL WATER MAIN AND FIRE HYDRANT ASSEMBLY LOCATION FOR ALL STREETS



(1) - ANCHORING TEE - CLOW PART NO. F-1217 OR APPROVED EQUAL

(2) - HYDRANT ADAPTER - WILL BE SOLID X SWIVEL CLOW PART NO. F-1211MS OR APPROVED EQUAL

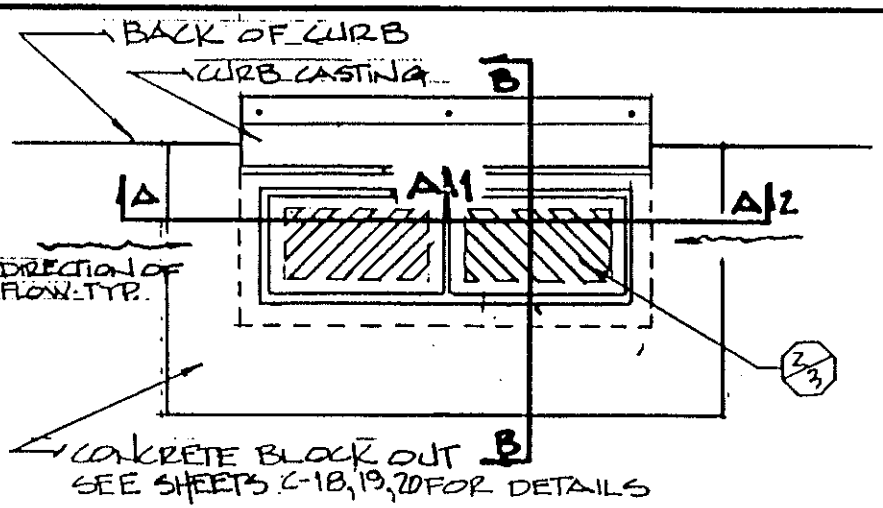

℄
OFFSET DOME MAY BE USED WHERE DIRECTED BY THE ENGINEER
4'-0" OR 2'-0"
4'-0"
PRECAST CONC. M.H. BARREL SECTIONS
SET & LEVEL LOWER SECTION IN BASE BEFORE CONC. SETS
6" MIN.
12"
12" MIN.
CAST IN PLACE CONCRETE or PRECAST BOTTOM
5'-10" MIN.
SECTION
℄
ADJUST FRAME TO GRADE WITH CONC. BRICK MASONRY OR PRECAST CONC. RINGS.
BASE SAME AS STD. M.H.
4'-0"
SECTION
SLAB TOP MANHOLE
6" MIN.
INVERT SHOWN ON PROFILE OF SEWER
SECTION
STANDARD MANHOLE



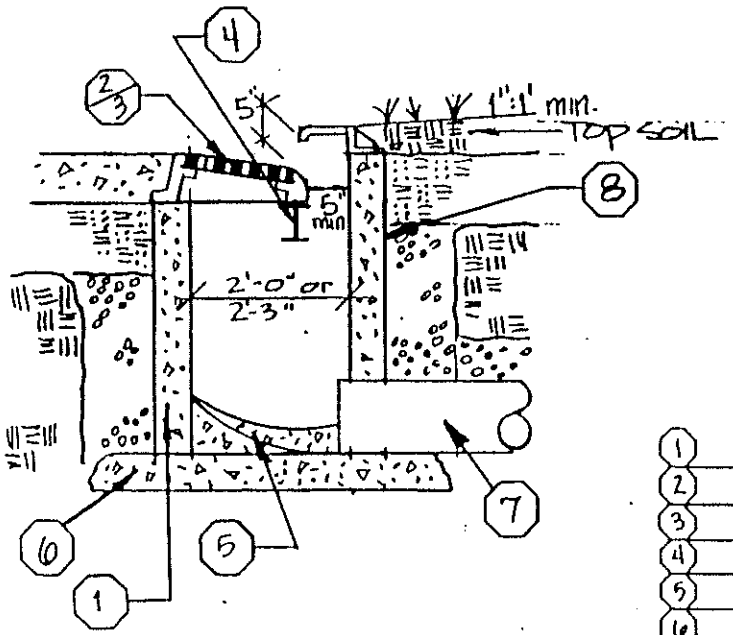
SECTION

STANDARD DROP MANHOLE

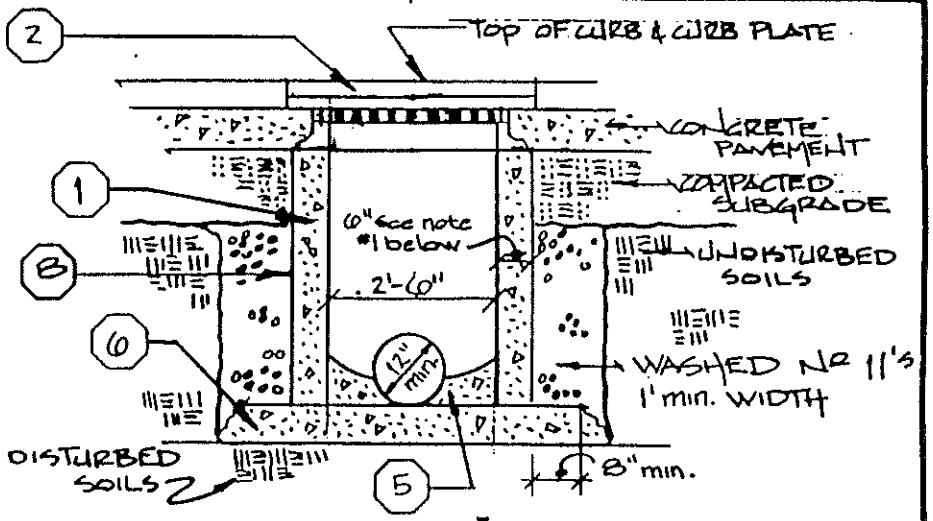
3/8" = 1'-0"



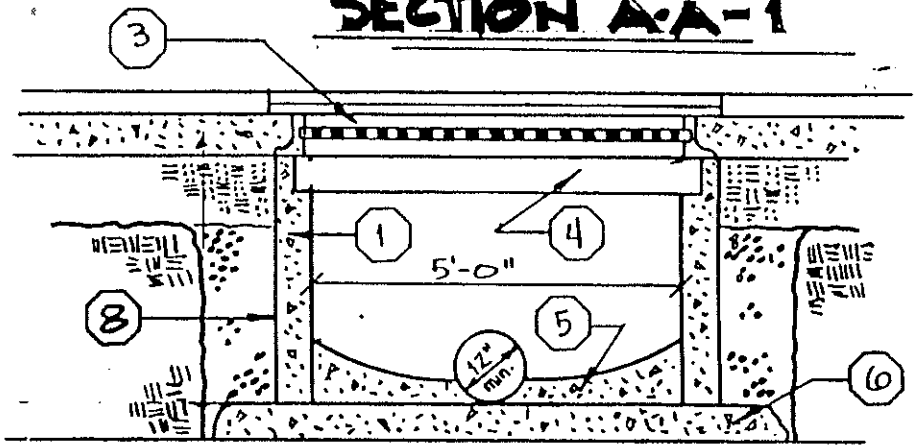
PLAN OF CATCH BASIN



SECTION B-B



SECTION A-A-1

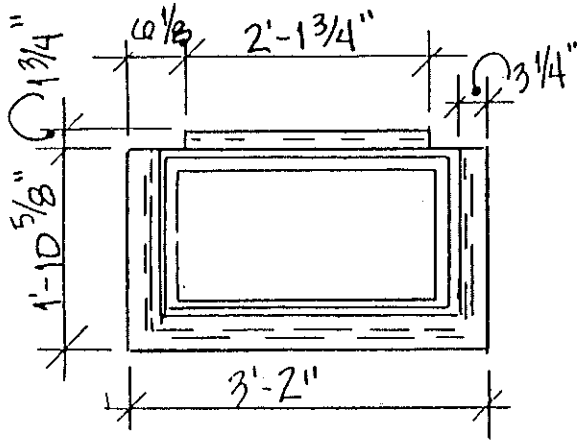


SECTION A-A-2

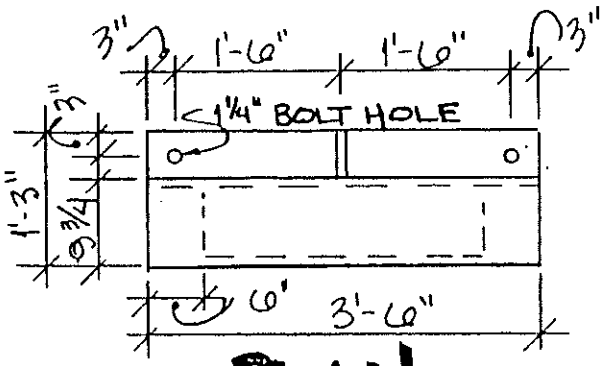
1. CONCRETE BRICK OR SLAB BLOCK MAY BE USED IN PLACE OF PRECAST OR CASTIN PLACE CONCRETE. SIDEWALLS SHALL BE 8in. NOMINAL THICKNESS W/HORIZONTAL REINFORCEMENT EVERY 12inches.
2. SINGLE INLET: FRAME, GRATE and CURB PLATE = NEENAH R-3280-C OR APPROVED EQUAL
3. DOUBLE INLET: FRAME, GRATE and CURB PLATE = NEENAH R-3280-CDEZ OR APPROVED EQUAL
4. .S=26 X 12.5 X 6' STEEL BEAM (USE WITH SEPARATE OR BOLTED INLETS)
5. 4" min. DEPTH 4000 psi AE CONCRETE WITH SCRIBED INVERT
6. 6" min. DEPTH 4000 psi AE CONCRETE EXTENDED MIN. 8" BEYOND EXTERIOR OF BOX
7. 12" min. Dia. PIPE (FOR ALL PIPE TYPES AND SIZES, SEE SECTION 7.0)
8. LIFT HOLES AND JOINTS SHALL NOT YIELD AN OPENING GREATER THAN THE SIZE OF AGGREGATE BACKFILL

CATCH BASIN - DETAILS

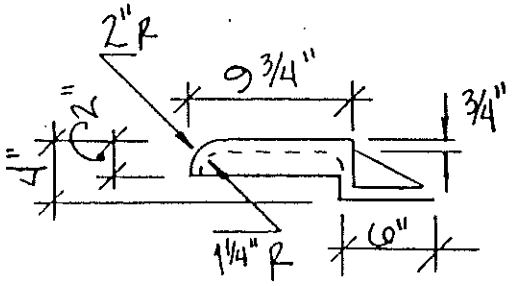
C-15



PLAN

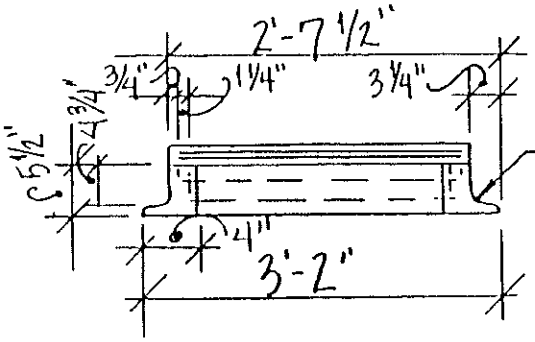


PLAN

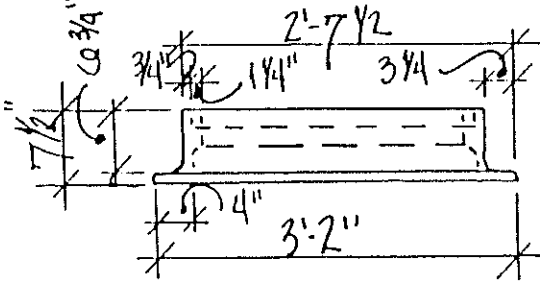


SIDE

CURB PLATE

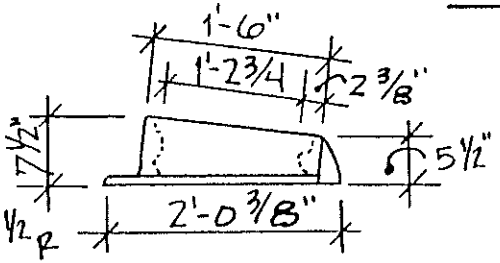


BACK VIEW



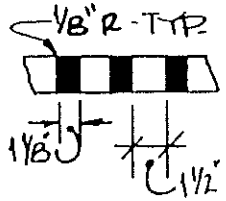
FRONT VIEW

FRAME

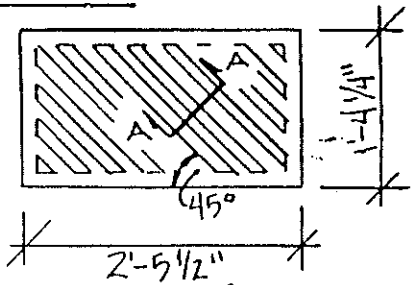


SIDE VIEW

FRAME



SECTION A-A



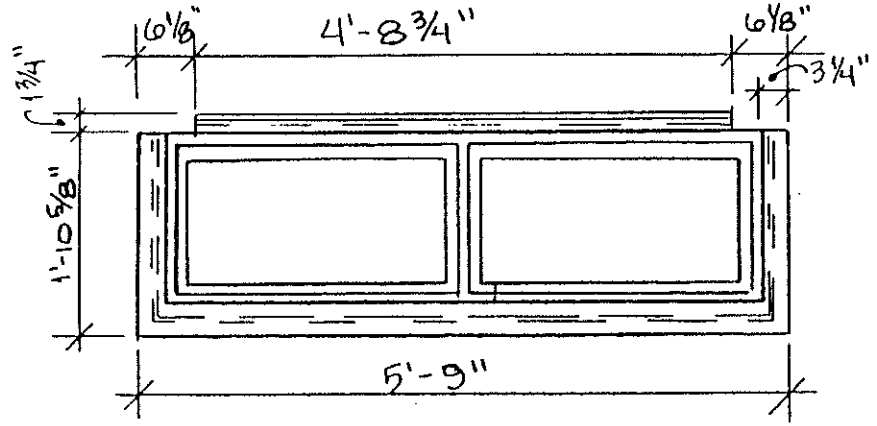
PLAN

GRATE

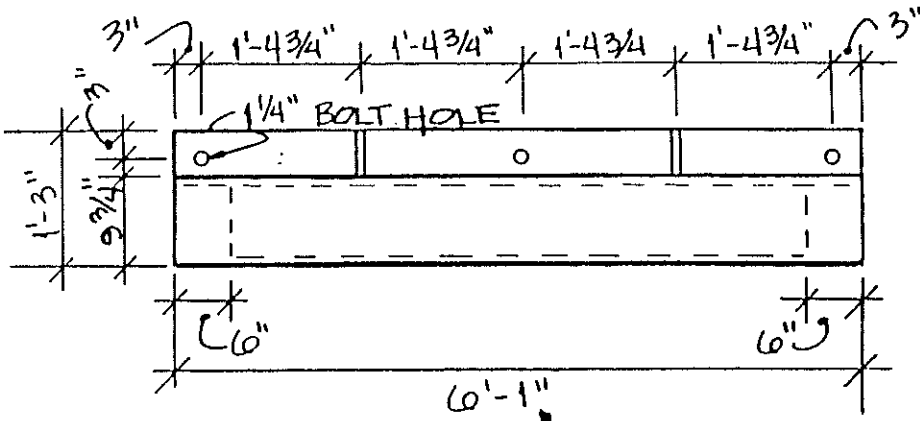
- GRATE TYPE SHALL BE AS SHOWN IN THE PLAN VIEW AND SHALL BE PLACED SO THE DIAGONAL BARS DIRECT THE DRAINAGE FLOW TOWARD THE CURB (MUST SPECIFY DL or DR)
- CASTING DESIGNS SHALL BE ESSENTIALLY THE SAME AND EQUALLY AS STRONG AS THOSE SHOWN HEREON OR INCLUDED WITH IN SHEET C-17. MINIMUM TOTAL WEIGHTS: SINGLE INLET (NEENAH R3289-C) 690 POUNDS & DOUBLE INLET (NEENAH R-3288-E2) 1325 lbs.
- BEARING AREAS OF FRAME AND GRATE SHALL BE SO FITTED AND FINISHED, WITHOUT PROJECTIONS, AS TO PROVIDE A FIRM AND EVEN SEAT FOR ALL PORTIONS OF THE GRATE IN THE FRAME WITHOUT ROCKING.
- CURB PLATE SHALL BE SECURELY FASTENED WITH 3/4 INCH STAINLESS STEEL BOLTS

CB CASTINGS DETAILS - SINGLE

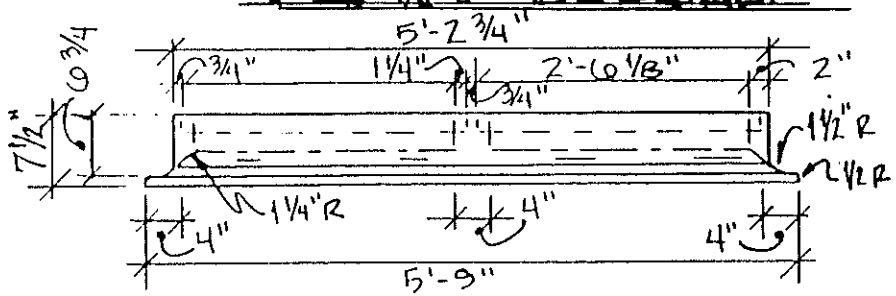
C-16



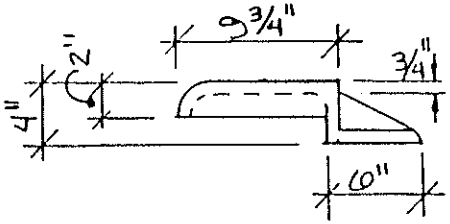
PLAN - DOUBLE



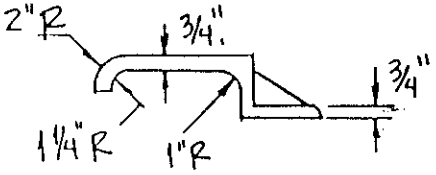
PLAN



FRAME (FRONT VIEW)

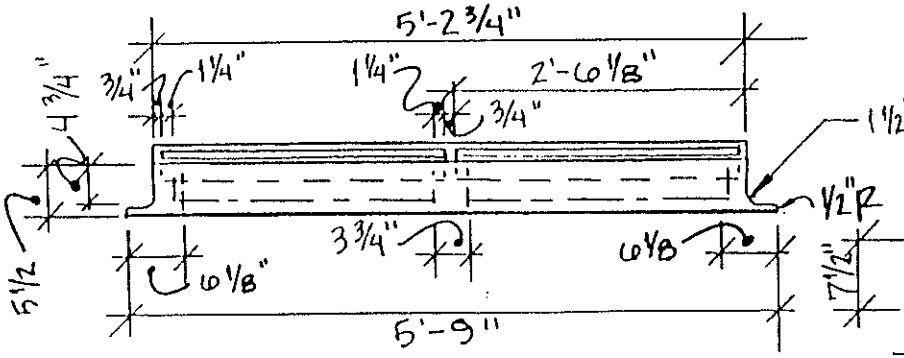


SIDE

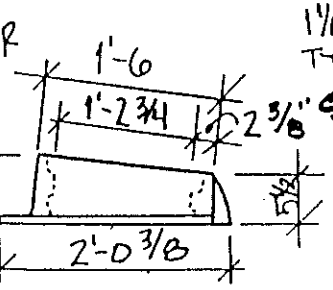


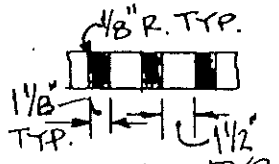
SECTION

CURB PLATE

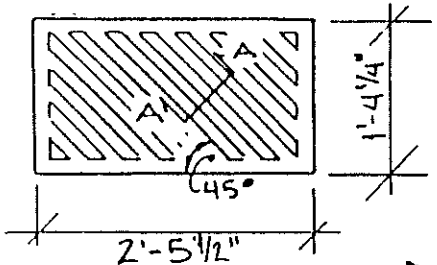


FRAME (BACK VIEW)





SECTION A-A

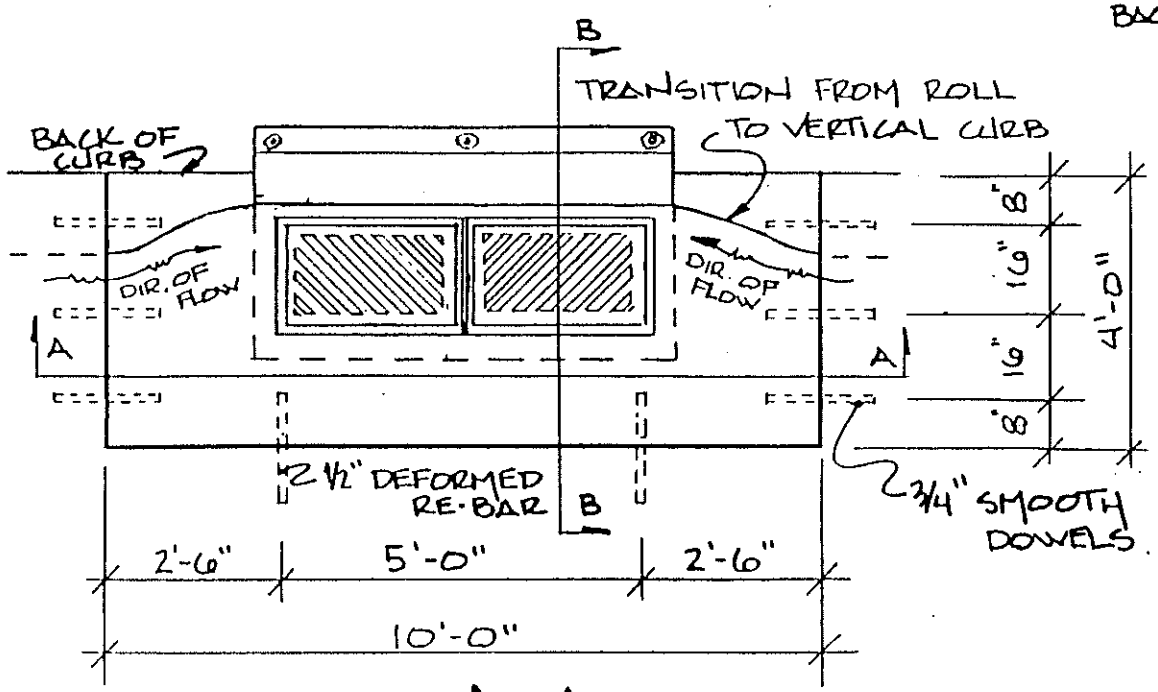


GRATE PLAN

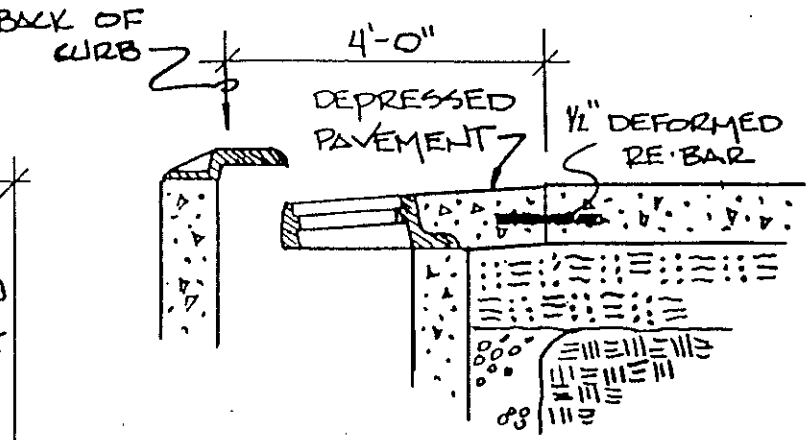
NOTE: CASTINGS ILLUSTRATED ON THIS SHEET SHALL CONFORM TO THE SPECIFICATIONS SET FORTH ON SHEET C-16

CB CASTINGS DETAILS - DOUBLE

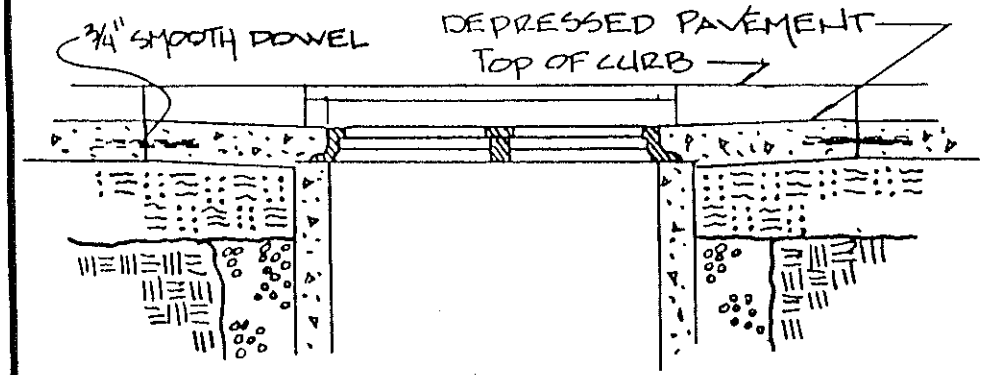
C-17



PLAN VIEW



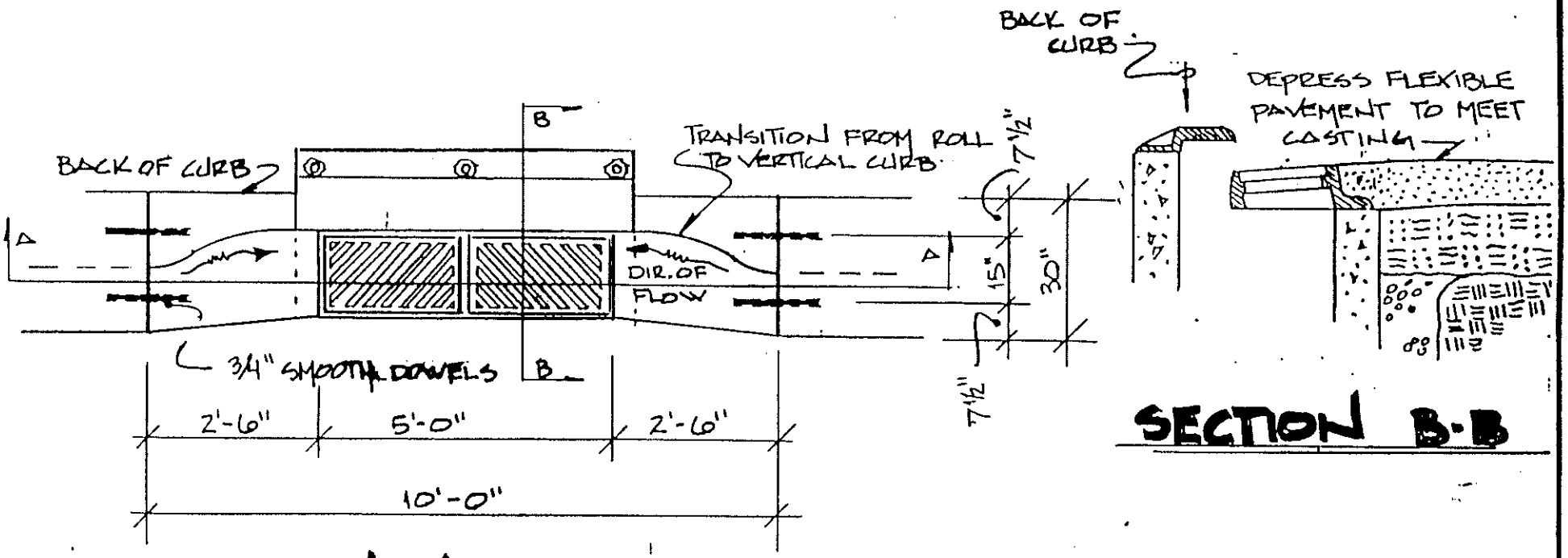
SECTION B-B



SECTION A-A

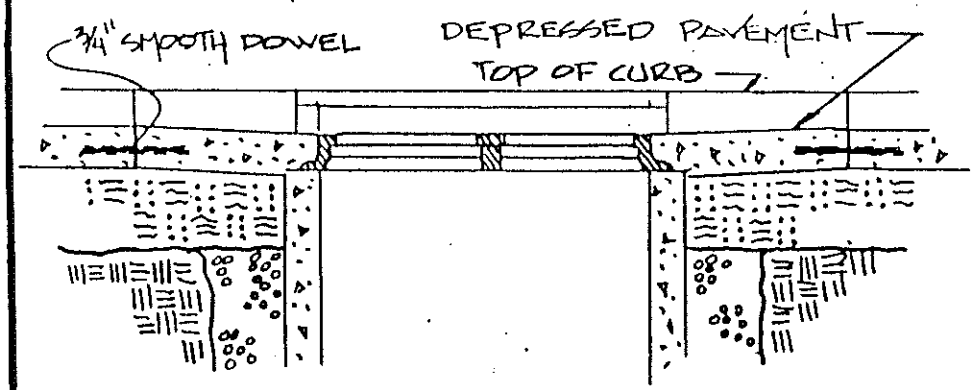
- BLOCKOUTS SHALL BE PAVED WITH 4000 psi AIR ENTRAINED PORTLAND CEMENT CONCRETE
- BLOCKOUTS FOR SINGLE INLET CATCH BASINS SHALL BEAR THE SAME DIMENSIONS AS THE DOUBLE INLET CATCH BASIN
- ¾ x 18" DOWELS ARE REQUIRED FOR CONCRETE PAVEMENT OR GUTTER BLOCKOUT - SEE SHEET C-10 FOR DOWEL DETAILS.
- TWO ½" x 18" PIECES OF DEFORMED RE-BAR ARE REQUIRED ALONG BUTT JOINT OF ISOLATION AREA
- PAVEMENT THICKNESS SHALL CONFORM TO THE RELATED STREET CLASSIFICATIONS PER SECTION 7 · TABLE 3 OF THESE REGULATIONS.

RIGID PAVEMENT BLOCKOUT DETAIL



PLAN VIEW

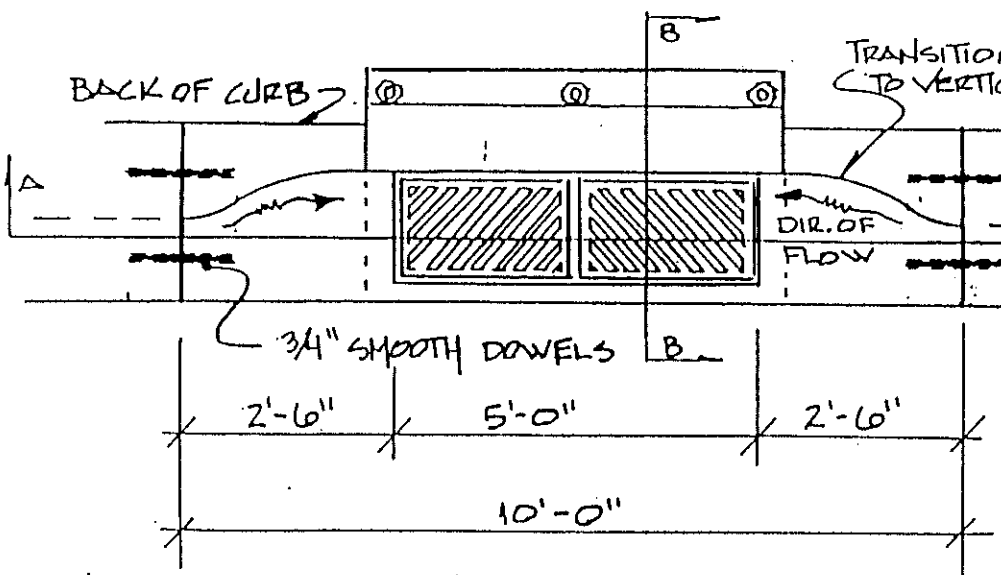
SECTION B-B



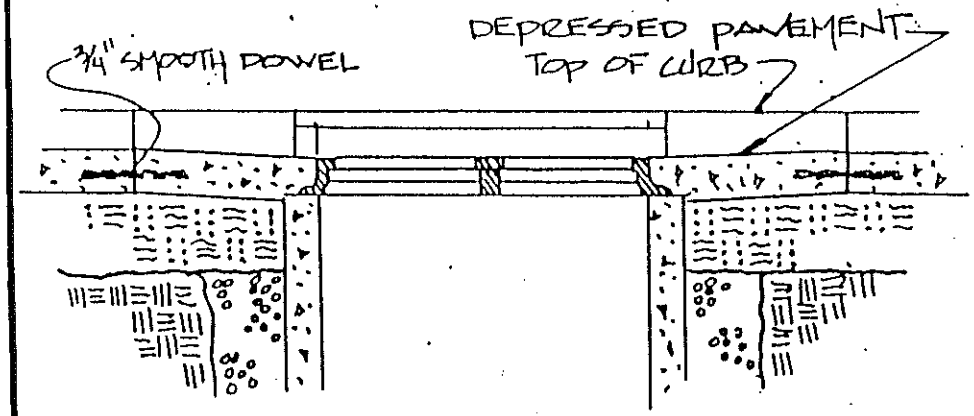
SECTION A-A

- BLOCKOUTS SHALL BE PAVED WITH 4000 PSI AIR ENTRAINED PORTLAND CEMENT CONCRETE
- BLOCKOUTS FOR SINGLE INLET CATCH BASINS SHALL BEAR THE SAME DIMENSIONS AS THE DOUBLE INLET CATCH BASIN
- 3/4 x 18" DOWELS ARE REQUIRED FOR CONCRETE PAVEMENT OR GUTTER BLOCKOUT - SEE SHEET C-10 FOR DOWEL DETAILS.
- PAVEMENT THICKNESS SHALL CONFORM TO THE RELATED STREET CLASSIFICATIONS PER SECTION 7 · TABLE 3 OF THESE REGULATIONS.

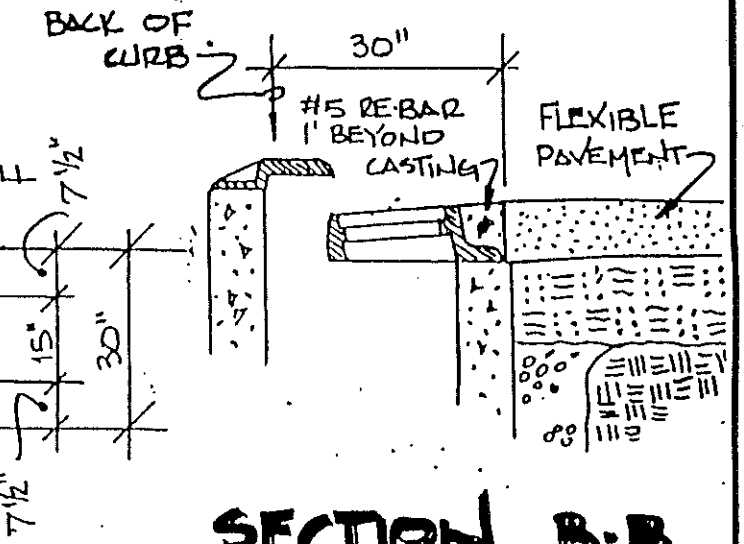
ALTERNATIVE - A
FLEXIBLE PAVEMENT BLOCKOUT DETAIL



PLAN VIEW



SECTION A-A



SECTION B-B

- BLOCKOUTS SHALL BE PAVED WITH 4000 PSI AIR ENTRAINED PORTLAND CEMENT CONCRETE
- BLOCKOUTS FOR SINGLE INLET CATCH BASINS SHALL BEAR THE SAME DIMENSIONS AS THE DOUBLE INLET CATCH BASIN
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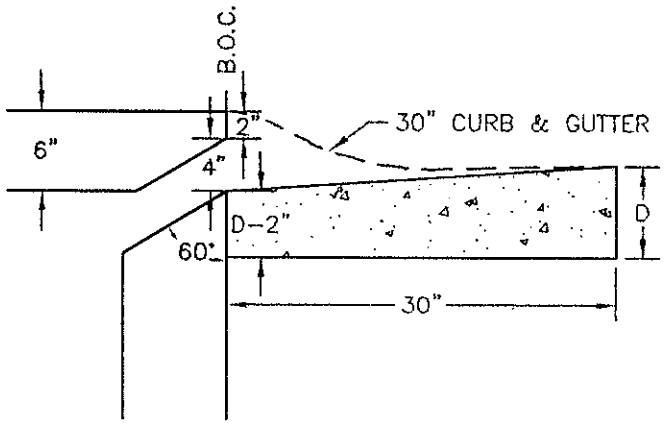
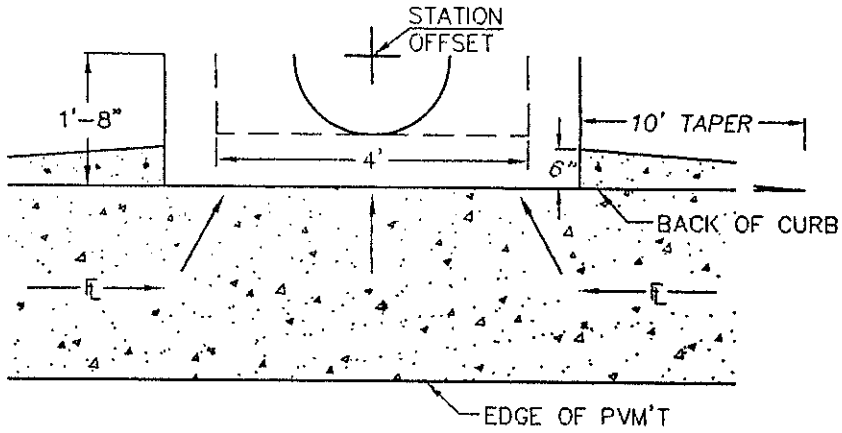
- PAVEMENT THICKNESS SHALL CONFORM TO THE RELATED STREET CLASSIFICATIONS PER SECTION 7 · TABLE 3 OF THESE REGULATIONS.

ALTERNATIVE - B



THROAT DETAIL

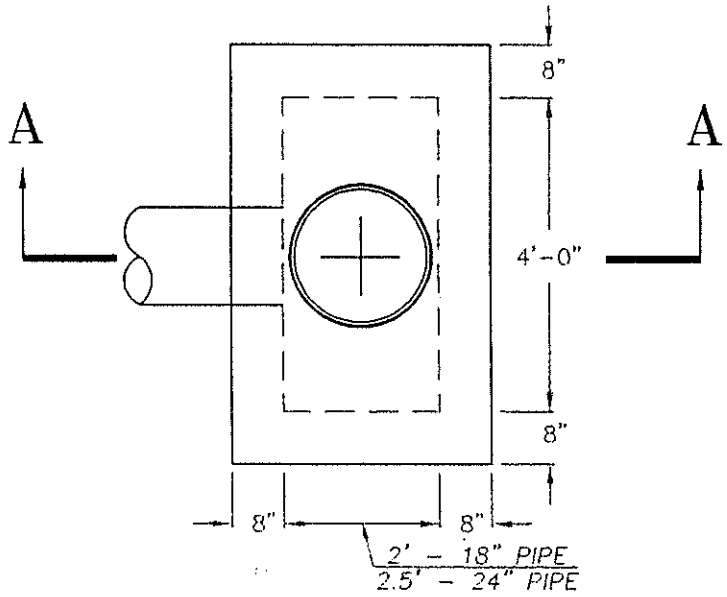
N.T.S.



CURB LAYOUT

N.T.S.

C-20A



CURB INLET DETAIL

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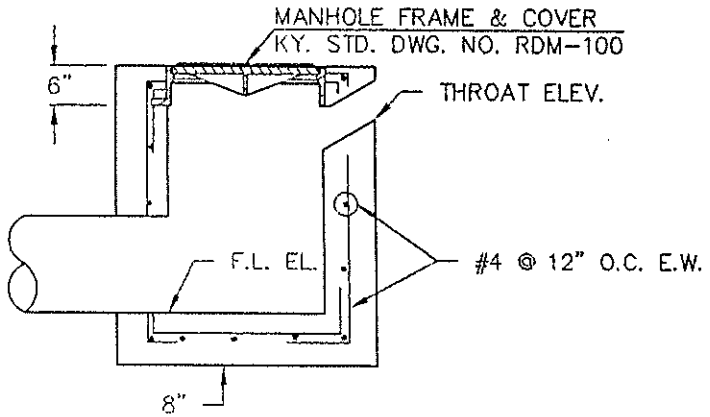
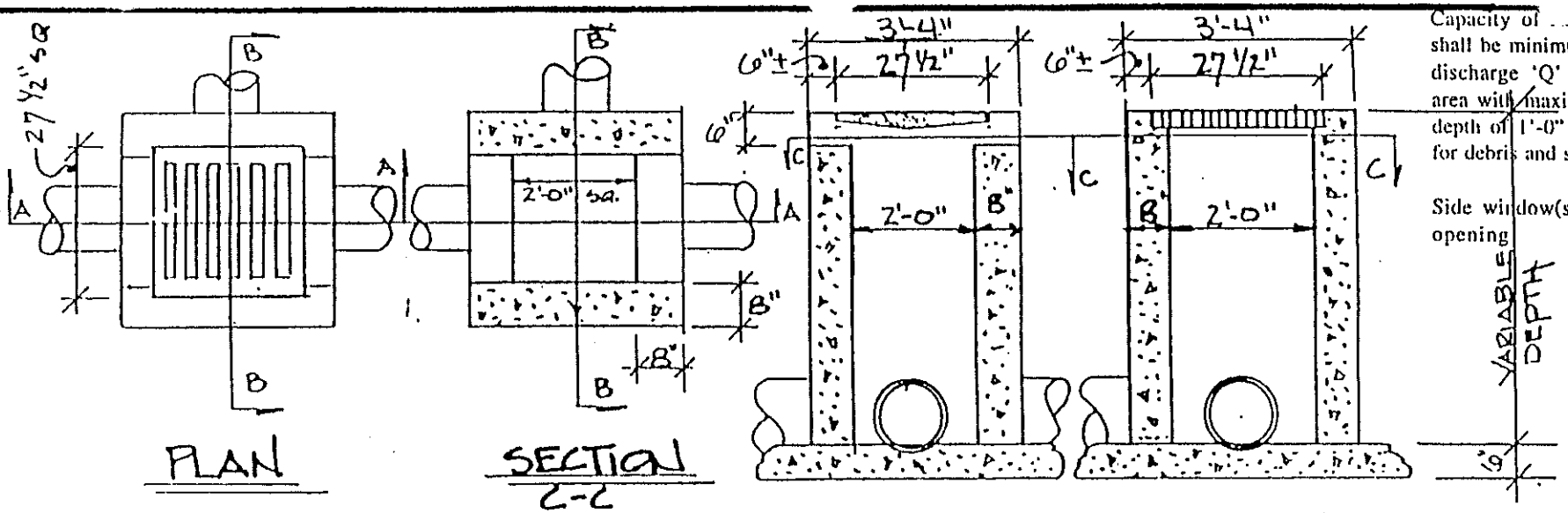


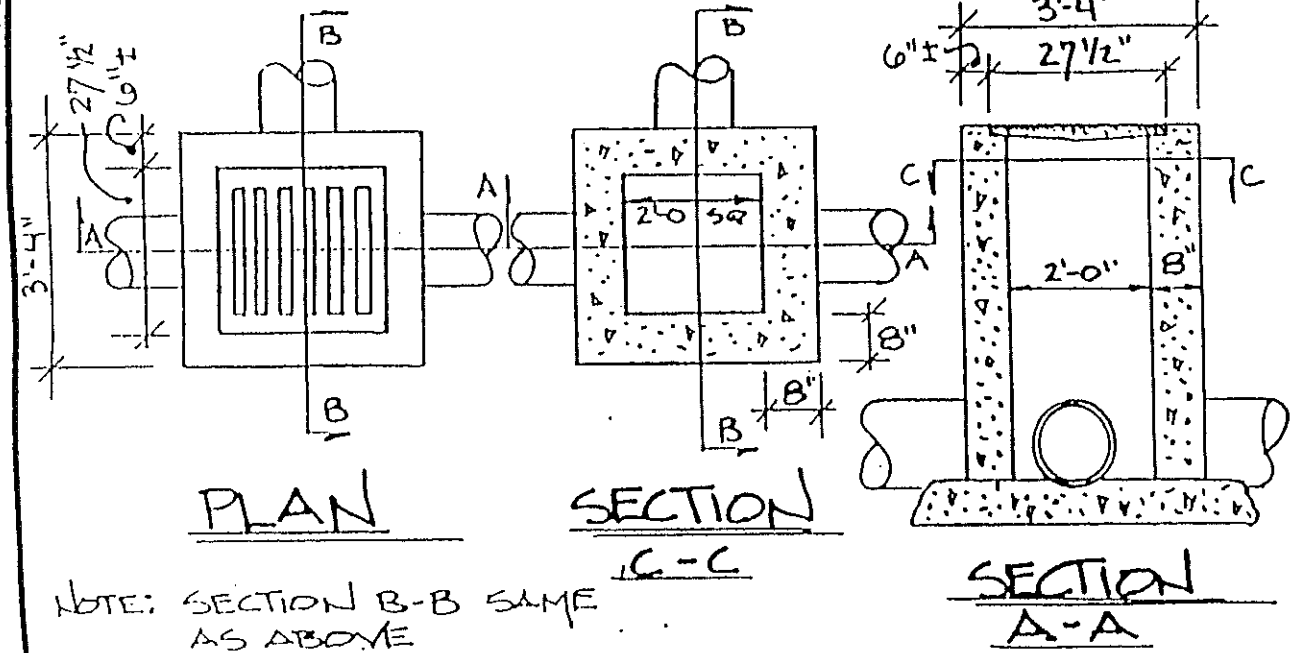
SECTION "A-A"



Capacity of ...face openings shall be minimum 2 times the discharge 'Q' from drainage area with maximum headwater depth of 1'-0" above top inlet for debris and safety.

Side window(s) maximum 6" opening

YARD DRAIN : 2x2-W



NOTE: SECTION B-B SAME AS ABOVE

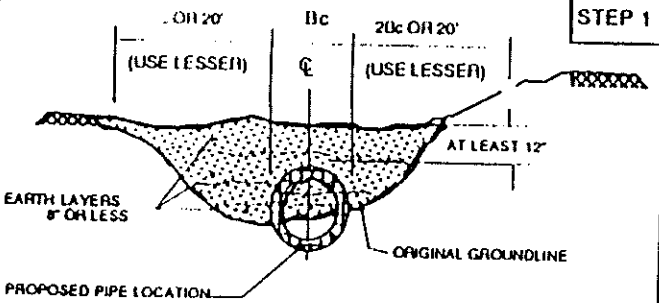
- GRATE AND FRAME SHALL BE ESSENTIALLY THE SAME AND EQUALLY AS STRONG AS SHOWN HERE ON (NEENAH R-4871 or R-4859-C OR APPROVED EQUAL)
- 2x2-W SIDE INLETS TO BE PLACED 4-6 INCHES BELOW NORMAL ELEVATION OF DITCH FLOW LINE RETURNING TO NORMAL 10 FEET EACH SIDE OF YARD DRAIN
- 2x2-W MAY HAVE SIDE INLET ON UPSTREAM SIDE ONLY WHERE DITCH HAS A CONTINUOUS DOWN GRADE PAST THE YARD DRAIN
- 2x2S GRATE ELEVATION SHALL BE PLACED 4-6 INCHES BELOW NORMAL DITCH FLOW LINE RETURNING 10 FEET EACH SIDE OF YARD DRAIN
- NOTES 1, 5, 6, 7 and 8 OF CATCH BASIN DETAILS (SHEET C-15) SHALL APPLY TO DETAILS SHOWN HEREON

Maximum Dimension of any surface Inlet/Window opening shall be such that a sphere with a diameter of 6-inches cannot pass through any opening

YARD DRAIN: 2x2-S

YARD DRAIN - DETAILS

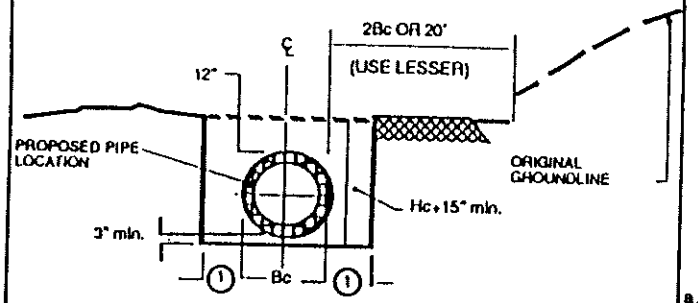
STEP 1



a. IF THE ORIGINAL GROUNDLINE IS AT LEAST 12" ABOVE TOP OF PROPOSED PIPE FOR WIDTH OF 2Bc OR 20' (WHICHEVER IS LESS) ON EACH SIDE OF THE PIPE, GO DIRECTLY TO "STEP 2".

b. IF ORIGINAL GROUNDLINE IS NOT AT LEAST 12" ABOVE TOP OF PROPOSED PIPE, COMPACT EMBANKMENT IN LAYERS 8" OR LESS TO ELEVATION AND WIDTH SHOWN. ⬚ MEET DENSITY REQUIREMENTS FOR PROPOSED EMBANKMENT

STEP 2



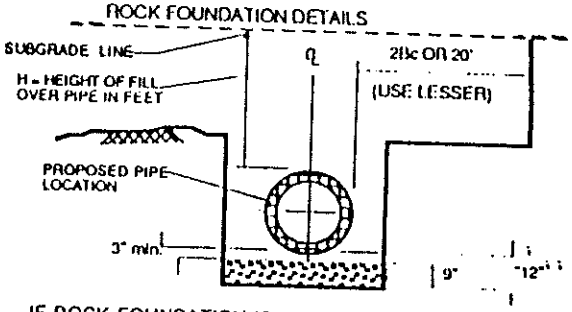
a. EXCAVATE TO WITHIN 12" ABOVE TOP OF PROPOSED PIPE A WIDTH OF 2 Bc OR 20' (USE LESSER) ON EACH SIDE OF PIPE.

b. EXCAVATE TRENCH TO WIDTH AND DEPTH SHOWN.

(1) AT LEAST 12"

STEP 3

ROCK FOUNDATION DETAILS



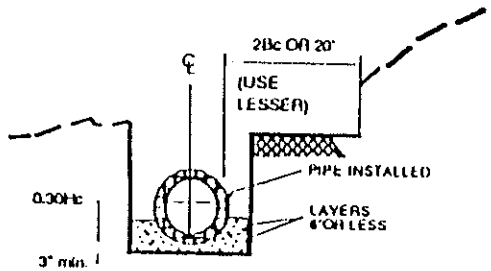
a. IF ROCK FOUNDATION IS NOT ENCOUNTERED, GO DIRECTLY TO "STEP 4"

b. IF ROCK FOUNDATION IS ENCOUNTERED, EXCAVATE TRENCH ADDITIONAL DEPTH ⬚ TO AT LEAST 9" FOR A TOTAL OF 12" FOR ALL PIPE DIAMETERS.

C. BACKFILL ADDITIONAL EXCAVATION AREA WITH EARTH CUSHION OF FIRMLY COMPACTED FINE SOILS, SAND OR NO. 10 COURSE AGGREGATE IN LAYERS 6" OR LESS.

⬚ MEET DENSITY REQUIREMENTS FOR PROPOSED EMBANKMENT

STEP 4

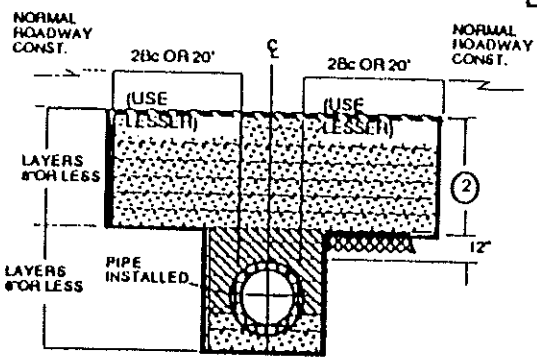


a. COMPACT SAND OR NO. 10 COURSE AGGREGATE IN TRENCH IN LAYERS 6" OR LESS TO WIDTH AND ELEVATION SHOWN. ⬚ MEET DENSITY REQUIREMENTS FOR PROPOSED EMBANKMENT

b. EXCAVATE GROOVE IN THE COMPACTED SAND OR AGGREGATE TO CONFORM TO THE OUTSIDE OF THE PIPE. AFTER EXCAVATION OF THE GROOVE, APPROXIMATELY 3" OF SAND SHOULD REMAIN BELOW THE OUTSIDE INVERT OF THE PIPE. THE CRADLE SHALL BE GAGED FOR SHAPE AND SLOPE BY STRIKING OR DRAWING A TEMPLATE THROUGH THE GROOVE IMMEDIATELY BEFORE PLACING EACH SECTION OF PIPE.

C. INSTALL PIPE AT CORRECT ALIGNMENT AND ELEVATION. RECOMPACT ANY LOOSE SAND DISTURBED DURING INSTALLATION

STEP 5

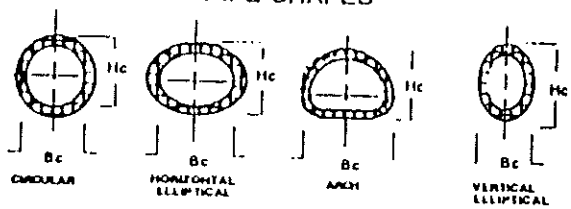


(2) 48" REQUIRED IF FILL HEIGHT PERMITS

a. COMPACT, SAND OR NO. 10 COURSE AGGREGATE IN LAYERS 6" OR LESS TO A POINT 12" ABOVE TOP OF THE PIPE. ⬚ MEET DENSITY REQUIREMENTS FOR PROPOSED EMBANKMENT COMPACT SELECTED FINE SOIL TO ELEVATION (2) ABOVE TOP OF PIPE ⬚ MEET DENSITY REQUIREMENTS FOR ADJACENT EMBANKMENTS.

b. PROCEED WITH NORMAL ROADWAY CONSTRUCTION

PIPE SHAPES



PIPE BEDDING/TRENCHING FOR CULVERTS, SEWERS, STORM DRAINS AND THEIR COMBINATION.

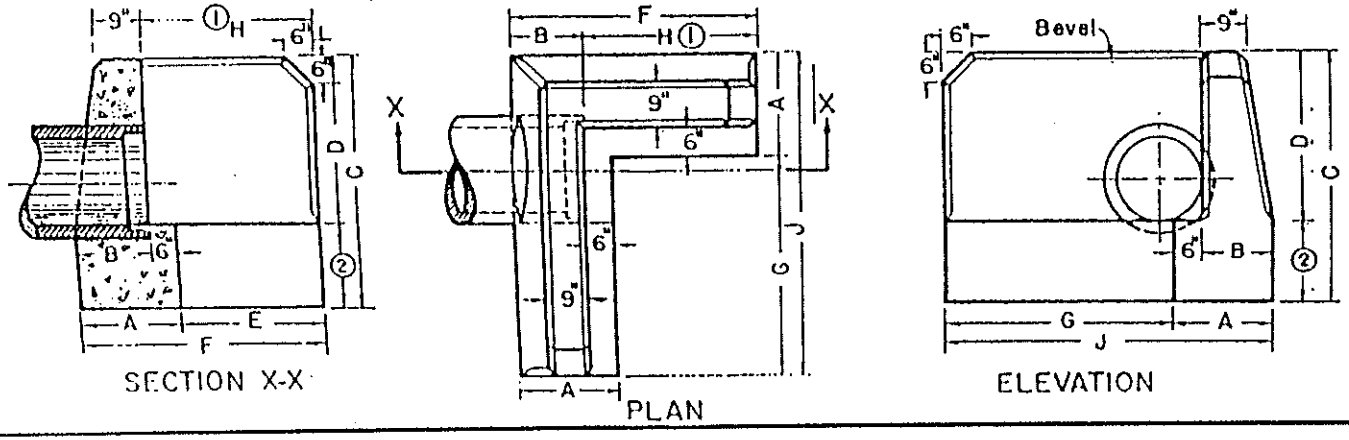
STANDARD SPECS AND CONST. DETAILS	APPENDIX C - 22	NOVEMBER 1994

Ca ity of inlet shall be 2 times pipe discharge diameter at same ma im headwater depth.

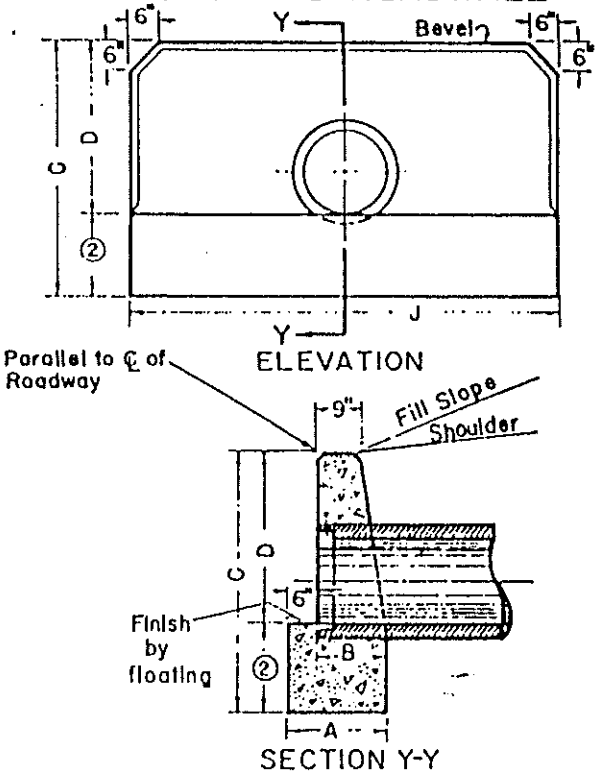
DIMENSIONS AND QUANTITIES

HEADWALL TYPE	DIAMETER OF PIPE	HEADWALL DIMENSIONS A	B	C	D	E	F	G	H ①	J	CUBIC YARDS CONCRETE FOR ONE HEADWALL ② EARTH	ROCK
STANDARD	12"	1'-8"	1'-2"	4'-0"	2'-6"	—	—	—	—	6'-0"	1.05	0.87
	15"	1'-8½"	1'-2½"	4'-3"	2'-9"	—	—	—	—	6'-9"	1.25	1.03
	18"	1'-9"	1'-3"	4'-6"	3'-0"	—	—	—	—	7'-6"	1.48	1.23
	21"	1'-9½"	1'-3½"	4'-9"	3'-3"	—	—	—	—	8'-3"	1.73	1.46
	24"	1'-10"	1'-4"	5'-0"	3'-6"	—	—	—	—	9'-0"	1.99	1.69
	27"	1'-10½"	1'-4½"	5'-3"	3'-9"	—	—	—	—	9'-9"	2.27	1.93
RAISED	12"	1'-8"	1'-2"	4'-6"	3'-0"	—	—	—	—	7'-6"	1.45	1.23
	15"	1'-8½"	1'-2½"	4'-9"	3'-3"	—	—	—	—	8'-3"	1.69	1.43
	18"	1'-9"	1'-3"	5'-0"	3'-6"	—	—	—	—	9'-0"	1.96	1.67
	21"	1'-9½"	1'-3½"	5'-3"	3'-9"	—	—	—	—	9'-9"	2.25	1.93
	24"	1'-10"	1'-4"	5'-6"	4'-0"	—	—	—	—	10'-6"	2.54	2.19
	27"	1'-10½"	1'-4½"	5'-9"	4'-3"	—	—	—	—	11'-3"	2.88	2.49
STANDARD ELL	12"	1'-8"	1'-2"	4'-0"	2'-6"	2'-0"	3'-8"	3'-0"	2'-6"	4'-8"	1.19	0.99
	15"	1'-8½"	1'-2½"	4'-3"	2'-9"	2'-3"	3'-11½"	3'-6"	2'-9"	5'-2½"	1.42	1.19
	18"	1'-9"	1'-3"	4'-6"	3'-0"	2'-6"	4'-3"	4'-0"	3'-0"	5'-9"	1.67	1.41
	21"	1'-9½"	1'-3½"	4'-9"	3'-3"	2'-9"	4'-6½"	4'-6"	3'-3"	6'-3½"	1.93	1.63
	24"	1'-10"	1'-4"	5'-0"	3'-6"	3'-0"	4'-10"	5'-0"	3'-6"	6'-10"	2.22	1.89
	27"	1'-10½"	1'-4½"	5'-3"	3'-9"	3'-3"	5'-1½"	5'-6"	3'-9"	7'-4½"	2.52	2.15
RAISED ELL	12"	1'-8"	1'-2"	4'-6"	3'-0"	2'-9"	4'-5"	3'-9"	3'-3"	5'-5"	1.62	1.37
	15"	1'-8½"	1'-2½"	4'-9"	3'-3"	3'-0"	4'-8½"	4'-3"	3'-6"	5'-11½"	1.88	1.59
	18"	1'-9"	1'-3"	5'-0"	3'-6"	3'-3"	5'-0"	4'-9"	3'-9"	6'-6"	2.16	1.85
	21"	1'-9½"	1'-3½"	5'-3"	3'-9"	3'-6"	5'-3½"	5'-3"	4'-0"	7'-0½"	2.47	2.12
	24"	1'-10"	1'-4"	5'-6"	4'-0"	3'-9"	5'-7"	5'-9"	4'-3"	7'-7"	2.79	2.41
	27"	1'-10½"	1'-4½"	5'-9"	4'-3"	4'-0"	5'-10½"	6'-3"	4'-6"	8'-1½"	3.14	2.72

CONCRETE ELL HEADWALL



CONCRETE HEADWALL



NOTES

Circular Pipe includes slightly elliptical concrete pipe with circular reinforcement.

Volume displaced by barrel of pipe has been computed using inside dimension of pipe.

① The dimension and/or the angle of intersection between the walls may be varied on construction.

② Volume based on values of 18" for earth, 12" for rock.

Straight face Headwalls for 24-inch pipe and smaller used as inlets are prohibited.

Safety Guards or Railings may be required (See Appendix C-24)

KENTUCKY BUREAU OF HIGHWAYS

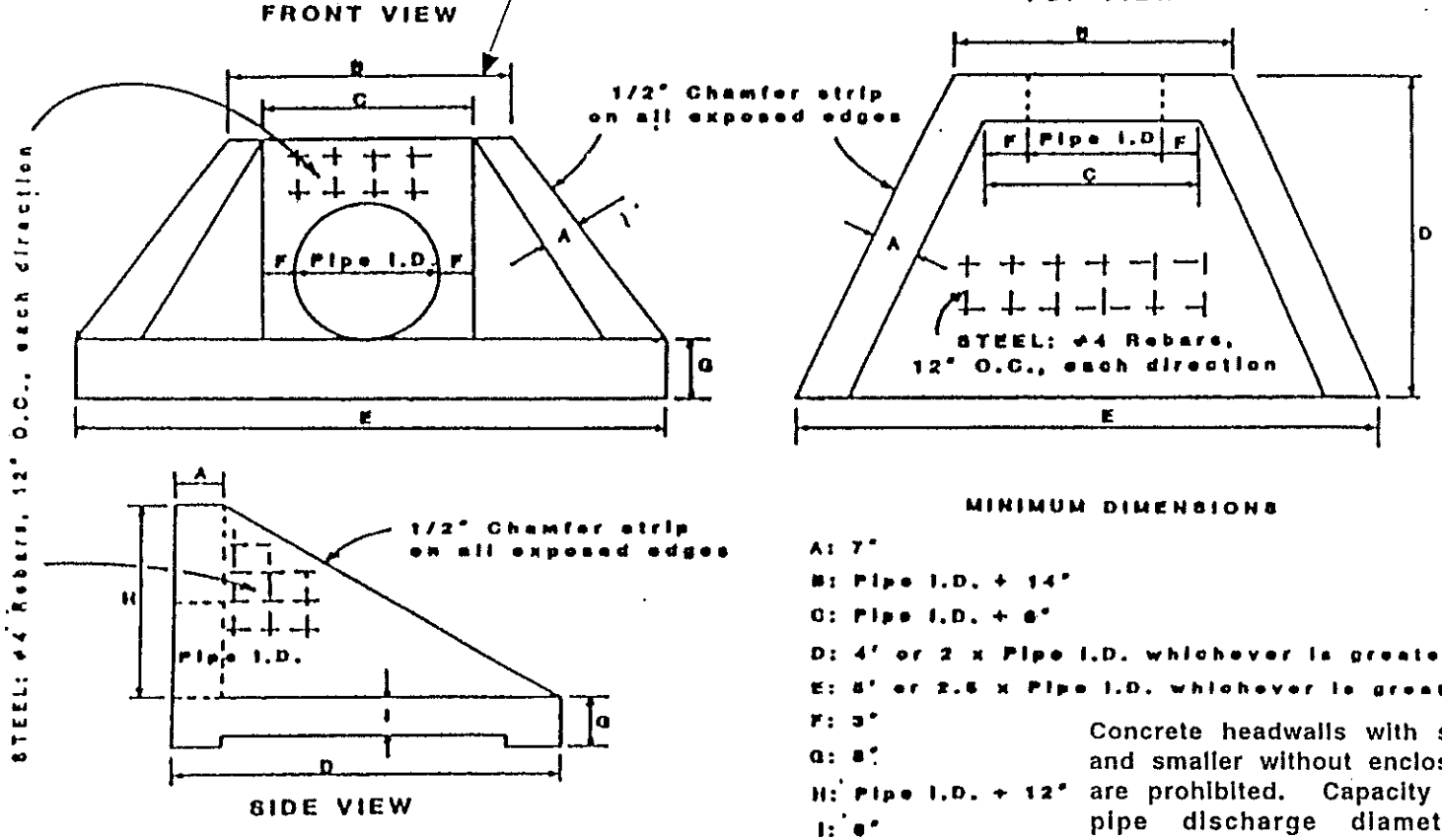
CONCRETE HEADWALLS FOR 12"–27" CIRCULAR PIPE CULVERTS

STANDARD DRAWING No. RDH-005

7-15-77

C-23

Safety Guard or Railing required for inlets and outlets having vertical drop 4'-0" or greater.
Minimum 42" high 4" maximum opening solid material nonladder type.

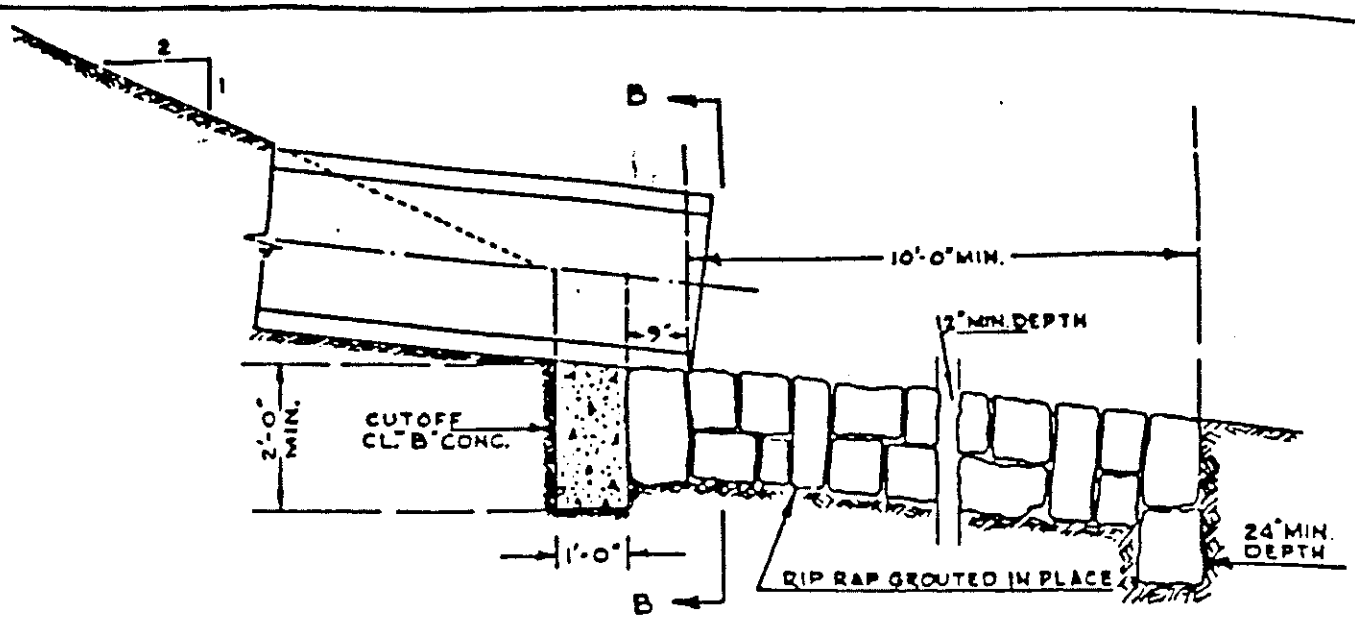


MINIMUM DIMENSIONS

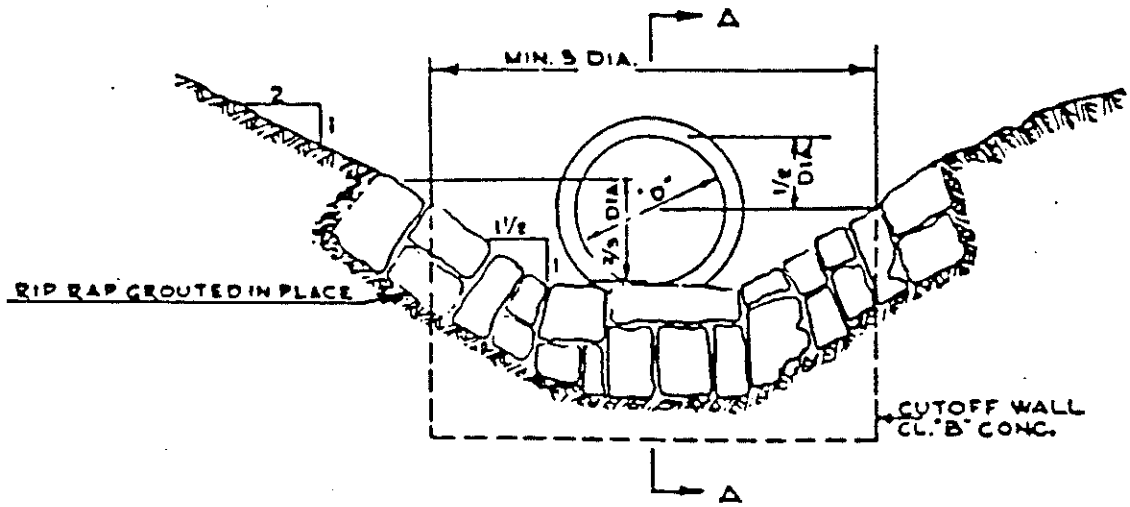
A: 7"
B: Pipe I.D. + 14"
C: Pipe I.D. + 8"
D: 4' or 2 x Pipe I.D. whichever is greater
E: 8' or 2.5 x Pipe I.D. whichever is greater
F: 3"
G: 8"
H: Pipe I.D. + 12"
I: 8"

Concrete headwalls with sidewalls for 24-inch pipe and smaller without enclosure grates used as inlets are prohibited. Capacity of inlet shall be 2 times pipe discharge diameter at same maximum headwater depth.

HEADWALL DETAIL for 12" thru 36" I.D. Pipe



SECTION A-A

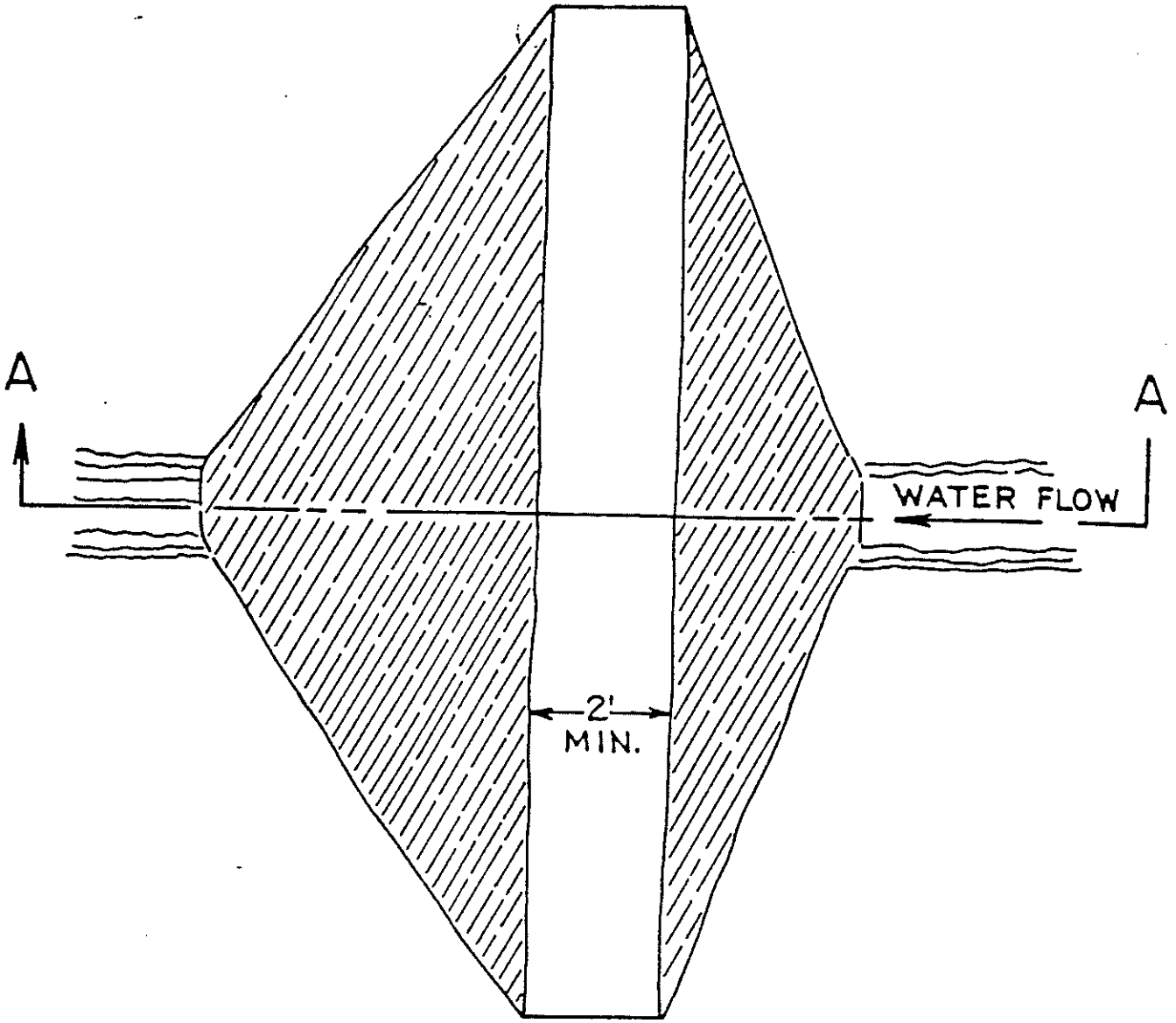


SECTION B-B

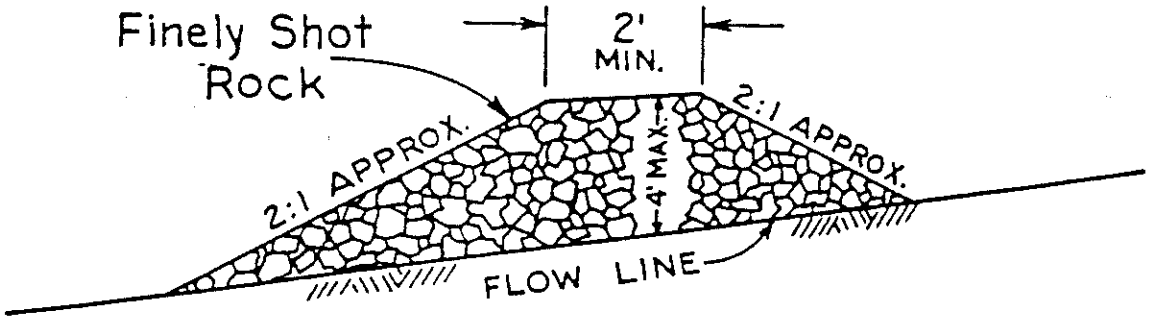
TO BE USED WHERE RIP RAP APRON IS CALLED FOR ON PLANS AND NO DETAIL IS PROVIDED.

RIP RAP APRON AND CUTOFF WALL

SILT CHECK



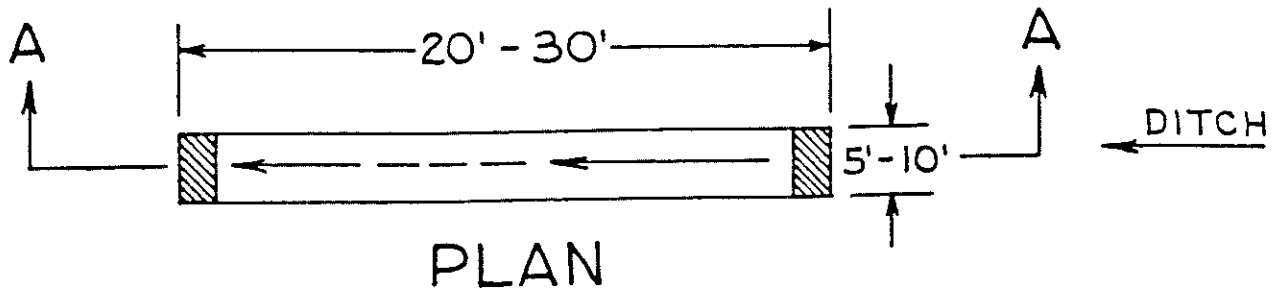
PLAN



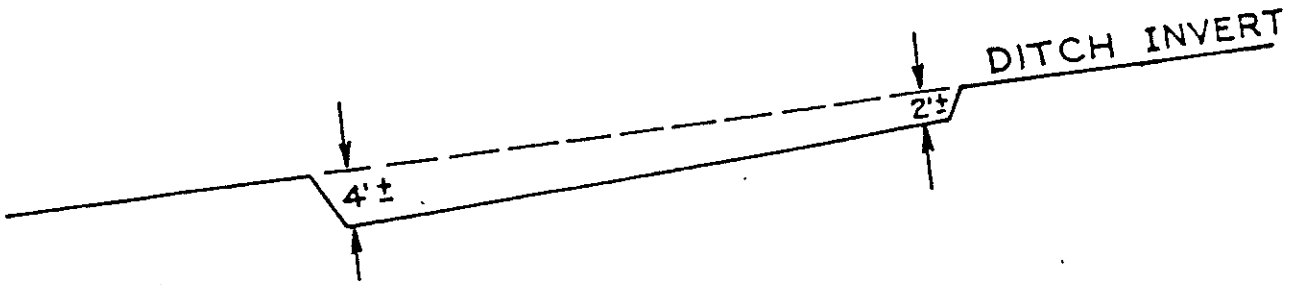
SECTION A-A

Charles L. Raymond 4/8/77	3-77	SILT CHECK	KENTUCKY BUREAU OF HIGHWAYS	6-501

SILT TRAP TYPE A



PLAN

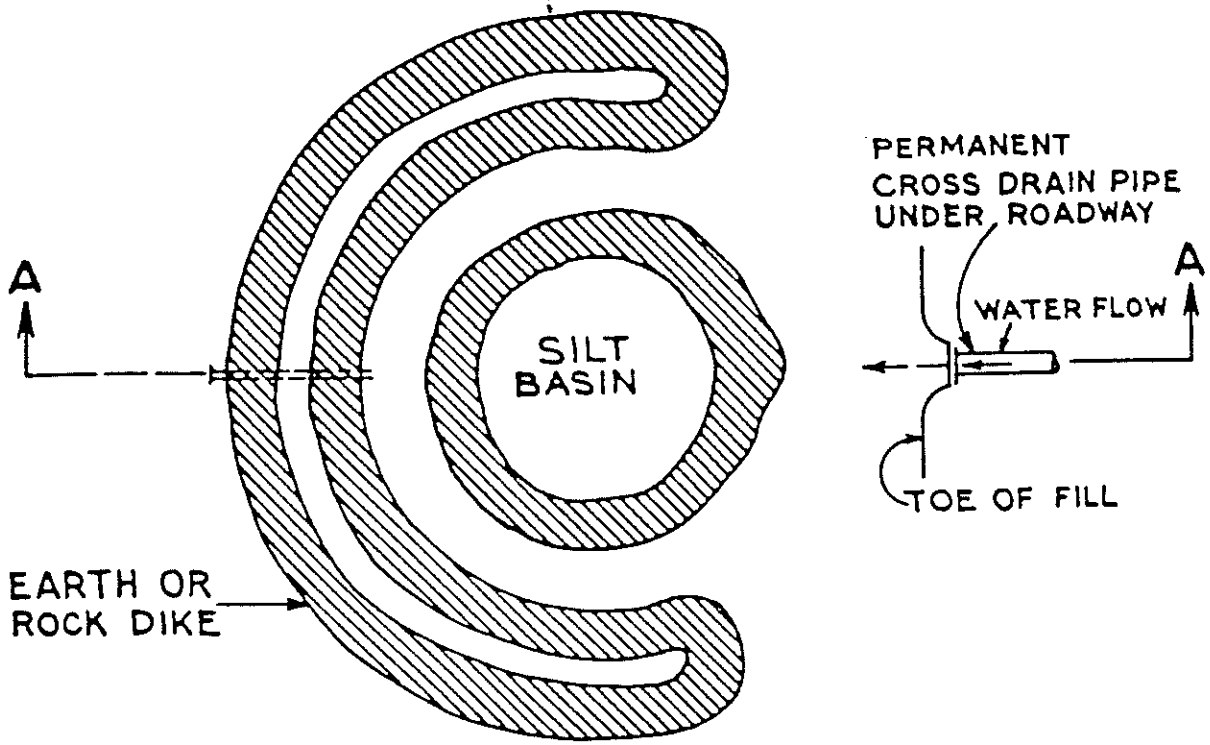


SECTION A-A

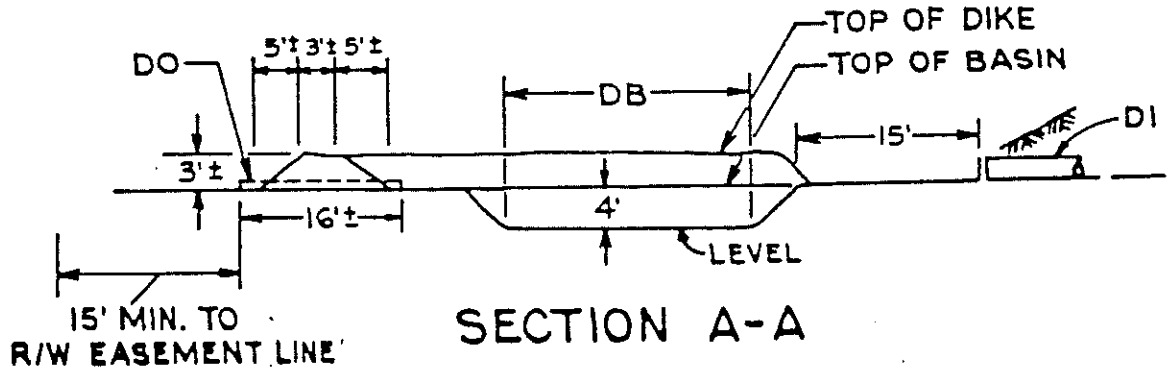
NOTE: SILT TRAP TO BE CLEANED WHEN IT IS APPROXIMATELY 50% FILLED WITH SEDIMENT. SILT TRAPS TO BE PLACED IN SURFACE DRAIN DITCHES AND SIDE DITCHES JUST BEFORE THE WATER (RUNOFF) LEAVES THE RIGHT OF WAY, ENTERS A WATER COURSE, AND AT THE END OF CUT SECTIONS, AND IMMEDIATELY PRECEDING DITCH INLETS. LOCATION OF TRAP AND SIZE (OTHER THAN AS SHOWN) TO BE AS DIRECTED BY THE ENGINEER WHO SHALL REVISE SIDE IF AND AS MAY BE REQUIRED. DIMENSIONS ARE APPROXIMATE.

Charles E. Rayon 4/18/77	3-77	SILT TRAP TYPE A	KENTUCKY BUREAU OF HIGHWAYS	6-502

SILT TRAP TYPE B



PLAN



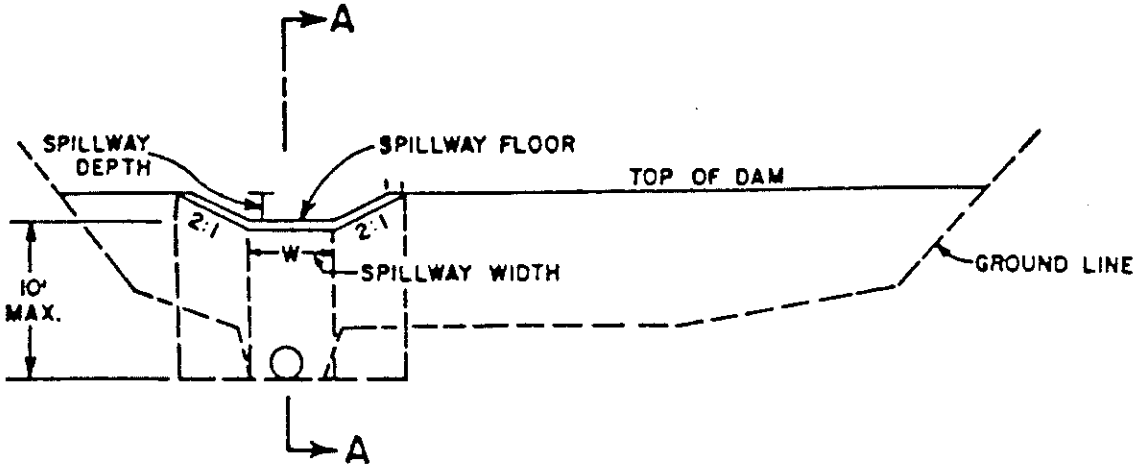
SECTION A-A

NOTE: ALL DIMENSIONS OF BASIN AND DIKE WILL NOT REQUIRE CONSTRUCTION TO NEAT LINES. THE PLAIN VIEW ABOVE INDICATES THE SILT BASIN IS ROUND, HOWEVER, IT IS DRAWIN IN THIS MANNER FOR ILLUSTRATION PURPOSES ONLY. THE BASIN MAY BE CONSTRUCTED AS LONG AS THE AREA AND DEPTH OF THE BASIN IS AT LEAST AS LARGE AS INDICATED. DIKES MAY BE CONSTRUCTED OF EARTH OR BROKEN ROCK. EARTH DIKE MUST BE CONSTRUCTED WITH A PIPE AS SHOWN, HOWEVER, BROKEN ROCK DIKES MAY NOT NEED A PIPE.

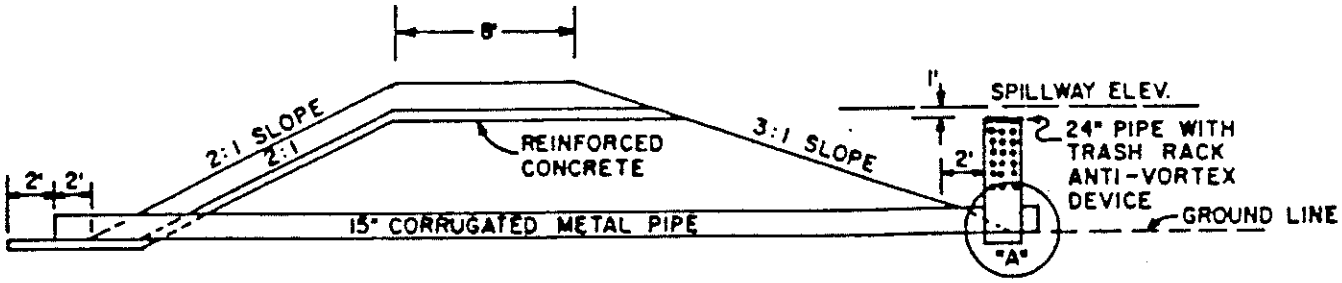
	DI	DB	DO
SDB	18"	15'	6"
SDB	24"	20'	8"

Charles Raymond 4-27-77	3-77	SILT TRAP TYPE B	KENTUCKY BUREAU OF HIGHWAYS	6-503

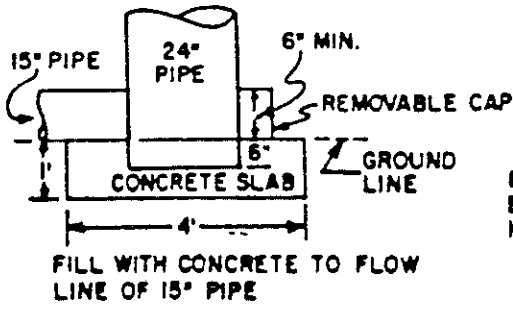
TYPICAL DETAILS FOR SEDIMENTATION BASIN



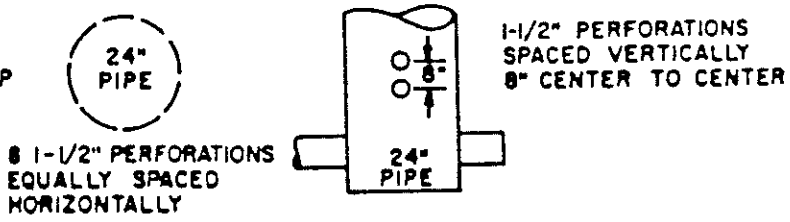
ELEVATION



SECTION A–A

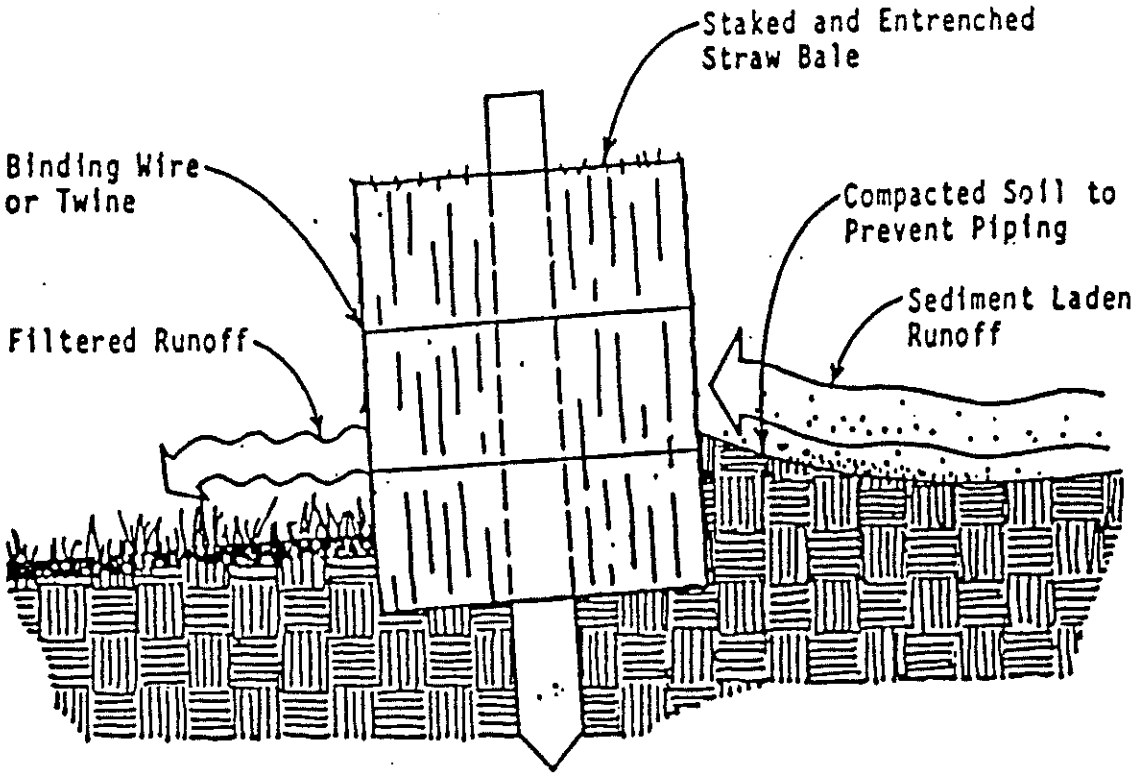


DETAIL "A"



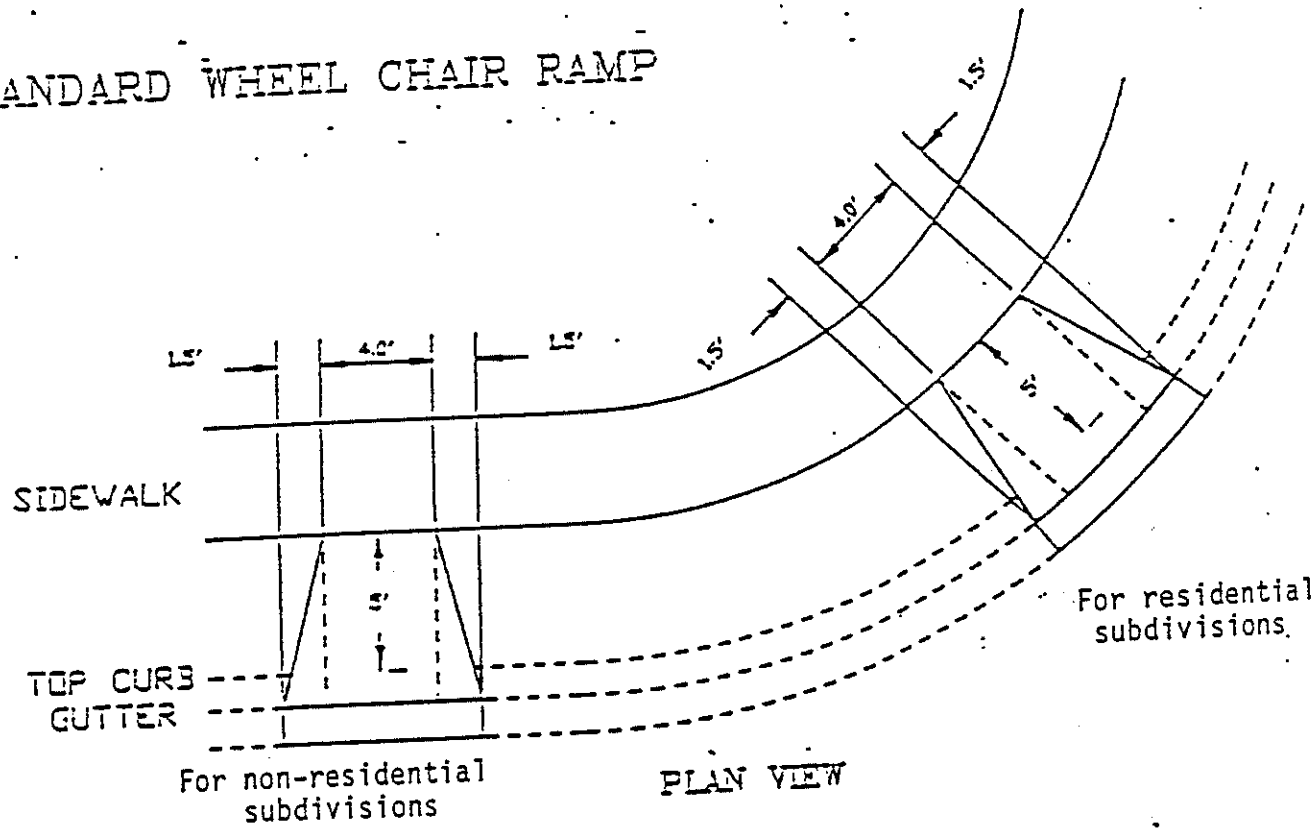
DETAIL SHOWING LOCATION OF PERFORATIONS IN 24" PIPE

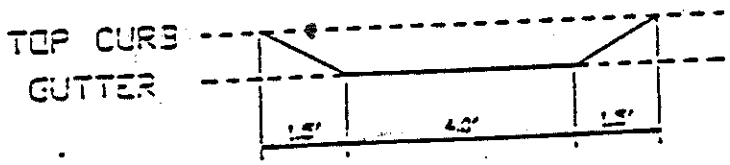
Clark J. Ryan 1/77	3-77	SEDIMENTATION BASIN	KENTUCKY BUREAU OF HIGHWAYS	6-504



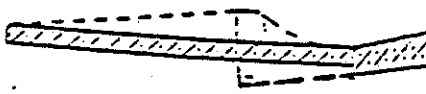
CROSS-SECTION OF A PROPERLY INSTALLED STRAW BALE

STANDARD WHEEL CHAIR RAMP





FRONT ELEVATION



SECTION THRU RAMP

APPENDIX "D"

STORM DRAINAGE SYSTEMS

The contractor shall furnish all materials, equipment, tools and labor necessary to do the work as shown on the approved Improvement Plans. The contractor shall excavate the trenches and pits to the required dimensions; sheet, brace, and support the adjoining ground or structures where necessary; handle all drainage or ground water; provide barricades, guards and warning lights, lay the pipe; backfill and consolidate the trenches and pits; remove surplus excavated materials; clean the site work and maintain other surface over the trenches as specified.

ITEM 1.0 MATERIALS

1.1 PIPE

A. Reinforced Concrete Pipe (RCP AASTO M 170, ASTM C76, and AAASHTO M 198)
KYTC Type 1 installation
(1) 12"-18"; Class V, Max. Cover 57+ feet
(2) 21"-24"; Class IV, Max. Cover 36 Feet
(3) 27" & Larger; Class III; Max. Cover 25 feet
Manning's "n" value: 0.013

B. Aluminized Type 2 Corrugated (2-2/3"x½") Pipe (AASHTO M39 Type 1, AASHTO M274)
(1) 12"- 36" 16 Gauge
(2) 42"- 54" 14 Gauge
(3) 60" 12 Gauge
(4) 66"- 72" 10 Gauge
Manning's "n" value: 0.024

C. Aluminized Type 2 Spiral Rib (3/4"x3/4"x7½") Pipe (AASHTO M36 Type 1, AASHTO M274)
(1) 18"- 36" 16 Gauge
(2) 42"- 54" 14 Gauge
(3) 60"- 72" 12 Gauge
Manning's "n" value: 0.013

D. Aluminized Spiral Rib) 3/4"x3/4"x7½") Pipe (AASHTO M196 and M197)
(1) 18"- 30" 14 Gauge Max. Cover 30 feet
(2) 36"- 48" 12 Gauge Max. Cover 30 feet
(3) 54"- 66" 10 Gauge Max. Cover 30 feet
Manning's "n" value: 0.013

E. Polyvinyl Chloride (PVC) Pipe
(1) Smooth Wall
Pipe/Fittings: ASTM D 3034; ASTM F 679; ASSHTO M 278
Material: ASTM D 1784
Joint: ASTM M 3212
Size 12" – 27" or other size available

Minimum Pipe Stiffness: 46 @ 5% deflection
Installation: ASTM D 2321
Manning's "n" value: 0.009

(2) Ribbed:
(a) Pipe/Fittings: ASTM F 794; AST< F 949; AASHTO M 304
Materials: ASTM D 1784
Joints: ASTM D 3212
Size: 12" – 48" or other size available
Minimum Pipe Stiffness: 26 @ 5% deflection
Installation: ASTM D 2321
Manning's "n" value: 0.009

(b) Pipe/Fittings: ASSHTO M 304
Materials: ASTM D 1784
Joint: ASTM D 3212
Sizes: 18"- 48" or other size available
Installation: ASTM D 2321
Manning's "n" value: 0.009

F. Polyethylene (HDPE) Pipe
Corrugated:
Pipe/Fittings: AASHTO M 294 Type S
Material: ASTM D 3350
Joint: Minimum Silt tight including: (a) Thermally molded; (b) integral bell; (c) bell and spigot; with built-in gasket coupler assemblies only
Sizes: 12"- 36" only
Minimum Pipe Stiffness: Variable @ 5% deflection
Installation: ASTM D 2321
Manning's "n" value: 0.013

G. Galvanized Steel Pipe (Private entrances only)
Material: ASTM A 929
Manning's "n" value: 0.027

1.3 STRUCTURES: All catch basins and manholes shall be precast concrete. All other structures may be precast concrete or cast in place concrete. All cast in place concrete shall conform to the requirements as set forth in Appendix "A" of these Subdivision Regulations.

ITEM 2.0 CONSTRUCTION

2.1 No pipe shall be laid until the location has been staked by the engineer.

2.2 Bedding: Pipe bedding shall be clean natural or washed sand and gravel, crushed gravel or crushed stone, free from cementitious substances and flat or flaky particles in an amount to cause caking, packing, yielding or uneven support for the pipe. All material shall be of such size that one hundred (100) percent passes the one and one half (1½) inch screen, forty (40) percent

or less passes the No. 40 sieve, and ten (10) percent or less passes the No. 200 sieve. Bedding material shall not consist of any organic soil or stone larger the one and one half (1½) inch in any dimension.

2.2 Trenches: Trench's width shall be equal to the outside diameter of the pipe plus 0.3 times the outside diameter of the pipe on each side or twelve (12) inches on each side, whichever is greater. The wall of the trench shall be as nearly vertical as possible. In case unstable foundation is encountered at the established grade, the unstable material shall be removed and replaced with suitable material to a width and depth and in a manner that will provide a uniform and firm foundation. Storm sewer pipe shall be of the diameter shown on the approved Improvement Plan.

2.3 In all operations such as placing the pipe, jointing, bedding and backfilling, care shall be exercised and it shall be the contractor's responsibility to see that the pipes are not damaged during the unloading or placement on the bedding or during compaction of the backfill. Any pipe which is not in true alignment and grade or which shows undue settlement after laying or is otherwise damaged, shall be taken up and replaced.

2.4 Storm sewer clean-outs shall be provided at a maximum of five hundred (500) foot intervals for pipes which have less than a thirty (30) inch diameter, and at a maximum of six hundred (600) foot intervals for pipes having a larger diameter. Clean-outs may be catch basins, junction boxes, manholes or headwalls.

2.5 Curb drains inlets and/or catch basins shall be provided at intervals along roadways. The maximum interval between curb drain inlet and/or catch basins shall meet the existing design standards in Article 8 of these Subdivision Regulations.

2.6 All construction shall conform to the approved Improvement Plans.

ITEM 3.0 BACKFILL AND COMPACTION

3.1 All trench backfill shall be placed as follows:

1. All backfill shall meet the requirements of Appendix "A", Item 1.4.
2. Copies of all testing reports shall be submitted to the Planning Commission's Engineer.

3.2 All structures (catch basins, manholes, etc.) located in or within three (3) feet of the pavement shall be backfilled with controlled low strength material (CLSM) (Flowable Fill).