COMPREHENSIVE DEVELOPMENT REGULATIONS

FLOWOOD, MISSISSIPPI

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NOW THEREFORE, BE IT ORDAINED BY THE MAYOR AND BOARD OF ALDERMEN OF THE CITY OF FLOWOOD, MISSISSIPPI AS FOLLOWS:

ARTICLE I

GENERAL PROVISIONS

SECTION 100 TITLE

100.1 These regulations shall be known as the "Comprehensive Development Regulations for the City of Flowood" and may be so cited. However, the regulations contained herein apply to all streets and land that is to be subdivided or developed within the City. See City of Flowood Commercial Site Development Ordinance for more information and requirements for private commercial site development.

SECTION 101 DEFINITIONS

101.1 As used in these regulations, words in the present tense include the future; words in the singular include the plural and words in the plural include the singular; the word "building" includes the word "structure"; and the word "shall" is mandatory and not directory.

101.2 For the purpose of these regulations certain words and phrases used herein are defined as follows:

a. *A.A.S.H.T.O.*: American Association of State Highway and Transportation Officials.

b. *AWWA*: American Water Works Association.

c. *Block*: The area of subdivided land between two (2) streets intersecting a third street adjacent to the subdivided land.

d. *City*: The term city means the City of Flowood, Mississippi or, when appropriate to the context, its duly authorized representative.

e. *City Engineer/Director of Engineering*: The term City Engineer/Director of Engineering means the engineer or other City Designee employed by the City for the purpose of reviewing the plans, plats, and data required by these regulations and making decision or determinations as to what is acceptable to the City.

f. *City Public Works Director*: This term means the City Officer or other City Designee charged with the duty to plan plats and data required by these regulations and to enforce same.

g. *Comprehensive Plan*: A plan including drawings illustrating short- and long-term improvements to subdivided land including streets, water distribution and sanitary sewer collection system improvements, landscaping and related information.

h. *Construction Plans*: The term Construction Plans means the drawings of work to be constructed and includes the specifications and standards and such other information as necessary to adequately describe the work, methods, the materials, and the desired results.

i. *Detention Basin (Pond)*: A facility to provide stormwater flow control by temporarily storing stormwater and releasing it at a calculated flow rate. The basin may be excavated, an underground system, or created with an embankment and shall remain dry when not storing storm water.

j. *Developer*: The term Developer means any person, individual, firm, partnership, association, corporation, estate or trust, or any other group or combination acting as a unit, dividing or proposing to develop a property commercially or divide land so as to constitute a subdivision as herein defined, and includes any agent of the Subdivider, or any person who constructs a street within Flowood. This term shall be interchangeable with Subdivider for the purposes of this ordinance.

k. *Development Permit*: Permit required anytime the activity involves the act of building structures or installing site improvements including clearing and grubbing, grading, earthwork, ditching, utilities, paving and other related activities. The City requires the following types of permits: Site Development Permit, Residential Site Development Permit, Commercial Site Development Permit, Flood Plain Development Permit, and a Right-of-Way Permit.

l. *Double Frontage*: This situation occurs when a particular lot is fronted on two (2) sides by a street. This may occur when a lot exists on a comer or when a street extends along the front and back sides of a lot. Setback along both streets shall meet (or exceed) the front setback requirement.

m. *Drainage Plan*: A plan consisting of drawings and calculations describing the proposed drainage improvements. The drawings shall include all drainage structures, watercourses, existing and proposed contours, and necessary drainage easements.

n. *Engineer*: The term Engineer means a registered Professional Engineer licensed to practice in the State of Mississippi.

o. *Final Inspection*: An on-site review held at completion of the subdivision improvements and attended by the City Engineer, and/or other City Representatives, Developers and/or his duly appointed representative, and the Developer's Engineer.

p. *Final Recording Plat*: Drawing of any lot, tract, or parcel of land requested to be recorded in the Office of the Chancery Clerk.

q. *Geotechnical Investigation Report*: A report on existing soil conditions at a development site prepared by a registered Professional Engineer qualified to make such recommendations.

r. *Governing Authority*: The term Governing Authority means the Mayor and Board of

Aldermen of the City. Reference to State/Federal agencies would include MS. Department of Environmental Quality, MS. Department of Health, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and others.

s. *Lot*: The term Lot means a parcel of land, or portion of a subdivision intended for lease, transfer of ownership, or development.

t. *Manual on Uniform Traffic Control Devices*: The standard for all traffic control devic.es including signs, pavement moldings, traffic signals and related devises published by the Federal Highway Administration.

u. *Owner*: Property owner. May be in reference to the Developer or Subdivider in certain cases.

v. *Phase I Environmental Assessment*: A search of past uses of a particular property including a title search to determine the possibility of hazardous substances existing on the property.

w. *Preliminary Plat*: A drawing provided by the subdivider of a proposed subdivision illustrating proposed street layout, lot layout and other items deemed necessary by the City to determine if the project meets the City's Ordinances. A Master Plan containing the elements required for a Preliminary Plat may function as a Preliminary Plat for the purposes of project approval unless otherwise required by the City.

x. *Private Street*: A street and right-of-way not dedicated to the City for public use. Private streets must be constructed to the same requirements as a public street of same category. Private streets shall not be maintained by the City.

y. *Public Street*: A street and right-of-way that is open to public travel and falls under the jurisdiction of the City and is intended to be maintained by the City once completed.

z. *Retention Basin (Pond)*: A facility to provide stormwater flow control by temporarily storing stormwater and releasing it at a calculated flow rate. The basin may be excavated or created with an embankment and shall have a permanent pool of water or always remain wet. Detention is provided in such a structure above the permanent pool elevation.

aa. *Reverse Frontage*: Frontage on the back side of a lot.

bb. *Site Plan*: Preliminary sketch on a commercial site showing proposed buildings, proposed infrastructure improvements, general layout of streets, parking lots and other improvements to open discussions with the City regarding required improvements. The Site Plan is submitted to the City for review prior to preparation of a set of construction drawings.

cc. *Site Plan Projects*: Site Plan Projects is in reference to a commercial or industrial developed property that will go through the Site Plan submittal and review procedure in lieu of the Subdivision submittal and review procedure. In such context, the term

Site Plan Project is intended to mean that the proposed development will have privately owned driveways, parking lots, utility infrastructure and the maintenance of such improvements shall be the responsibility of the property owner in perpetuity.

dd. *Specifications For Construction*: Written documentation describing in detail the scope of work, all materials that are to be used, the methods of installation of such materials and the quality of workmanship required per the plans. May also be referred to as: "Specs", Construction Specifications", "Technical Construction Specifications", or similar terminology in this ordinance or other City documentation. These documents shall be provided by the Subdivider's Engineer.

ee. *Street*: The term Street means a way for vehicular traffic, whether designated as a street, highway, thoroughfare, parkway, throughway, road, avenue, boulevard, lane, place, alley, or however otherwise designated.

1. Arterial streets and highways are those which are used primarily for fast or heavy traffic, and which provide a means to either bypass the City or be routed expeditiously through the City.

2. Collector streets are those which carry traffic from local streets to arterial streets in the residential and business areas and may include the principal entrance streets of a residential or commercial development.

3. Local streets are those that are used primarily for access to the abutting properties.

4. Marginal access streets are those which are parallel to and adjacent to arterial streets and highways and which provide access to abutting properties and protection from through traffic.

5. Alleys are minor ways, which are used primarily for vehicular service access to the back or side of properties otherwise abutting on a street.

ff. *Street Jog*: A situation that exists when a street intersects a cross street at two (2) separate locations.

gg. *Street Plat*: The term Street Plat shall mean a plat of any Street (Public or Private) and utilities to be constructed in a commercial or industrial zoned property in the City but not located within a platted subdivision upon the commencement of construction. Property in such cases shall be subdivided at some future time via metes and bounds property description(s).

hh. *Subdivider*: The term Subdivider means any person, individual, firm, partnership, association, corporation, estate or trust, or any other group or combination acting as a unit, dividing, or proposing to divide land so as to constitute a subdivision as herein defined, and includes any agent of the Subdivider, or any person who constructs a street within Flowood. This term shall be interchangeable with Developer for the purposes of this ordinance.

Subdivision: The term Subdivision means the division of a parcel of land into two or more lots or parcels, for the purpose, immediate or future, of sale, lease, or building development or, if a new street is involved, any division of a parcel of land constitutes a Subdivision but, the division of land for agricultural purposes into lots of five acres or more in size where no new street is created does not constitute a subdivision. The term includes re- subdivision and, when appropriate to the context, shall relate to the process of subdividing or to the land subdivided.

ii. *Technical Specifications*: A document consisting of descriptions of materials and workmanship required for the planned infrastructure improvements in a subdivision.

jj. *Thoroughfare Plan*: The plan of existing and proposed streets, thoroughfares and routes and related transportation improvements adopted by the Mayor and Board of Aldermen.

kk. *Tree, Large*: A tree 12 inches in caliper or larger.

ll. *Tree, Small*: A tree less than 12 inches in caliper.

mm. *Water System Analysis*: An analysis of the water distribution system improvements required to serve a development approved by the Public Works Director.

SECTION 102 PURPOSE

102.1 It is hereby found and declared that, to promote orderly, efficient, and coordinated growth and development within the City and its environs and to promote the health, safety, morals and general welfare of the residents of the City and its environs, there exists a need for setting forth certain procedures and standards to be followed in the development and redevelopment of land in the City and its environs.

102.2 These regulations seek to attain these objectives through the application of the procedures, standards, and requirements herein established. Specifically, these regulations are:

a. To secure equitable handling of development plans by providing uniform procedures and standards for the observance of both the developer and the City.

b. To ensure conformance of development plans with the public improvement plans of the City.

c. To establish minimum standards governing streets, drainage, utilities, and other developmental improvements.

d. To establish procedures and minimum standards governing the preparation, filing and approval of subdivision plats and data.

e. To fix penalties for the violation of the provisions of these regulations.

f. To provide that the Governing Authority may vary these regulations in certain cases or

under certain conditions.

SECTION 103 AUTHORITY

103.1 The provisions of this code are adopted pursuant to the authority granted by Sections 17-1-3, 17-1-23, 17-1-25 and 21-19-63 of the Mississippi Code of 1972, recompiled, as amended.

SECTION 104 SCOPE

104.1 The provisions of this ordinance apply to all subdivisions as defined herein and apply to all property located within the City even if property is excluded from the definition of a subdivision.

104.2 In addition to any other remedy provided herein by law, the provisions of this Ordinance may be enforced by injunction from the Chancery Court of Rankin County, Mississippi.

SECTION 105 APPLICATION AND GENERAL REQUIREMENTS

105.1 It is intended that the information provided herein applies to all properties and developments within the territorial jurisdiction of the City which involves the subdivision of land, development of a commercial or industrial property requiring site plan approval and for all new infrastructure which may be installed for public or private use. It shall also apply to any property development outside the City limits which seeks water and/or sewer service(s) to be provided by the City.

105.2 Any property owner proposing improvements to a commercial or industrial property within the territorial jurisdiction of the City shall submit to the City a Site Plan along with construction plans for the proposed improvements and other such information as may be required according to these regulations. The property shall understand that all water, sewer, and storm drainage located within the property boundary shall not be maintained by the City but shall be designed in accordance with the requirements of this document.

105.3 Any subdivider of land within the territorial jurisdiction of the City shall submit to the City subdivision plats along with construction plans for the proposed improvements meeting the requirements set forth herein and such other information as may be required according to these regulations.

105.4 In consideration of the acceptance by the City and the assumption of the responsibility for maintaining the utilities and streets constructed in a subdivision or property, the Subdivider shall cause to be constructed, at no expense to the City, the improvements required by this Ordinance according to the current City practices and the specifications set forth in this Ordinance.

105.5 All improvements required in this Ordinance shall be designed by, certified by and constructed under the supervision of a qualified Professional Engineer registered in the

State of Mississippi and employed by the subdivider/developer.

105.6 In considering the approval of Subdivision Plats or Street Plats, the City shall observe and enforce the requirements and procedures set forth herein, as well as the City Landscape Ordinance.

105.7 All Contractors must be licensed and bonded as required by state law and provide proof of commercial liability insurance issued by an insurance company admitted to write such insurance in the State of Mississippi and having the minimum limits as follows: General Liability - $1,000,000 per occurrence and $2,000,000 General Aggregate.

105.8 No subdivider shall proceed with any construction work on lots or parcels in a proposed subdivision or convey or lease same on any Street for which a Street Plat must be approved without first having obtained the Final Recording Plat or Street Plat Approval as prescribed herein. All streets and utilities that, prior to construction, the City agrees to maintain must be dedicated to the City upon acceptance.

ARTICLE II

PROCEDURE AND INFORMATIONAL REQUIREMENTS FOR SUBDIVISION & SITE DEVELOPMENT

SECTION 200 PRELIMINARY DEVELOPMENT LAYOUT PROCEDURE FOR SUBMITTAL

200.1 For property that is being subdivided or commercially developed (Site Plan Projects), the Subdivider/Property Owner shall request a meeting with the City to discuss the proposed project. The meeting will be held with the Subdivider/Property Owner (and his representatives) and representatives of the City to discuss the project and other pertinent items such as, but not limited to: the current zoning of property and the requirements of the zoning, the City's requirements for streets, parking lots, water and sanitary sewer infrastructure, lot sizes, setback requirements, existing utility capacities and other information pertinent to the planned subdivision or development before any construction is commenced.

200.2 The subdivider shall bring a Preliminary Development Layout\Site Plan to the meeting for discussion. The Preliminary Development Layout\Site Plan shall be provided in accordance with Section 201.1.

200.3 After discussion of the preliminary development layout\Site Plan with the applicant, the City Engineer will advise the applicant within fifteen (15) days in writing of approval or disapproval of the preliminary development layout along with any changes that will be required as a prerequisite to the conditional approval of the preliminary plat to be submitted subsequently. This shall constitute conditional approval of the preliminary development layout.

200.4 If the project is a Site Plan Project (by definition), has been through the Preliminary

Development Layout Procedure is zoned properly and received City Comments, the Owner shall at that time refer to Section 204 of these regulations and comply with the requirements of such as the project moves forward.

200.5 Any proposed project that does not meet the current zoning regulations or is subject to a variance from the zoning ordinance shall be required to go through the re-zoning or variance process with the City Building Department and obtain the Mayor and Board of Aldermen's approval at a public board meeting prior to moving to the next steps.

SECTION 201 PRELIMINARY DEVELOPMENT LAYOUT REQUIRED DATA FOR REVIEW/APPROVAL

201.1 The Preliminary Development Layout\Site Plan shall include in simple form a sketch plan at a scale of approximately one-inch equals one hundred feet (1" = 100') showing the following:

a. For Subdivisions: Proposed layout of streets, lots, park area set aside (green space) and other features in relation to existing conditions of the area to be subdivided.

b. For Site Plan Projects: Proposed layout of the parking lot, driveways, building location and other features in relation to existing conditions of the area to be subdivided.

c. The layout should include sufficient data to permit a reasonable evaluation of the physical factors of the plan. A location map should accompany the preliminary layout to show the relationship of the proposed subdivision/development to existing community facilities which serve or influence it. Such factors as main traffic arteries, rail lines, shopping centers, schools, parks and playgrounds, types of land use adjacent to the site, scale, north arrow, and date of map preparation are suggested.

201.2 While the supplementary information will vary because of physical characteristics of the site, type of land use proposed, etc., the general data supplied should include total number of lots proposed, available or proposed utilities, current or proposed zoning, etc. A very generalized narrative or tabular description of the proposed subdivision will suffice for the initial review and additional information may be requested as may be determined in the informal conference.

SECTION 202 PRELIMINARY PLAT OR STREET PLAT PROCEDURE FOR SUBMITTAL

202.1 On reaching conclusions informally, as recommended in Section 201 above, the Subdivider shall cause to be prepared in accordance with Section 202 herein a Preliminary Plat or Street Plat; for the required improvements as specified in Article IV. All requirements in section 202 & 203 shall apply to Preliminary Plats and Street Plats whether specifically mentioned or not.

202.2 Two (2) hard copies or an electronic copy of the Preliminary Plat or Street Plat, for the required improvements and the supplementary material specified, including covenants,

shall be submitted initially to the City with written application for approval. This submission shall be at least 10 working days prior to the regularly scheduled meeting of the Governing Authority at which the submission is to be considered.

202.3 Any required fees shall be paid upon submission of the Preliminary Plat or Street Plat for approval.

202.4 Following (a) review of the Preliminary Plat or Street Plat, and other material submitted for conformity to these regulations by the City, and (b) negotiations with the Subdivider on changes deemed advisable and the kind and extent of improvements to be made in the proposed subdivision, the Plat (Preliminary or Street) will be presented to the City at the regularly scheduled mayor and board of alderman meeting for consideration to approve or deny the proposed project. At this meeting the City shall express informal approval, conditional approval and shall state the conditions of such approval, if any, or if disapproved shall express disapproval and the reasons therefor.

202.5 The action of the City and any conditions thereof, shall be noted on copies of the Preliminary Plat or Street Plat. One (1) copy of each shall be returned to the Subdivider and the others retained by the City.

202.6 Approval of a Preliminary Plat by the Mayor and Board of Aldermen shall only signify that the project as presented conforms to the regulations and lot size requirements of the City's zoning Ordinance and has met additional conditions, if any, requested by the City or it's Mayor and Board. It is not a final approval of the lot count, detention size, lot or street layout or any other elements that will be designed (and may need to be revised) during the preparation of the Construction Plans to meet the City's regulations and applicable ordinances.

202.7 Should significant changes be required of the lot and street layout, lot sizes or other elements after the Preliminary Plat has been approved by the Mayor and Board, the Subdivider shall provide the new layout to the City Engineer who shall determine if the changes are significant enough to require the project to go back through the Preliminary Plat Process.

202.8 Approval of a Preliminary Plat or Street Plat shall also not constitute approval of the Final Recording Plat. It shall be deemed only an expression of approval of the general nature of the required improvements and the layout of the Preliminary Plat which may be used as a guide in the preparation of the Construction Plans and Final Plat to be submitted for approval of the City Authority and for recording upon fulfillment of the requirements of these regulations.

SECTION 203 PRELIMINARY PLAT OR STREET PLAT REQUIRED DATA FOR REVIEW/APPROVAL

203.1 Preliminary plats shall be at a scale of not more than 200 feet to one inch unless otherwise specified by the City on a 24" x 36" sheet, and submitted to the Director of Engineering via email to include the following information:

a. Project title, with names and addresses of owners of record, the Engineer preparing the plat, notation stating acreage, and Zone District Classification, floodplain classification, graphic bar scale, north arrow, etc.

b. Location of the tract by legal description, exact boundary lines of the tract indicated by a heavy line giving dimensions, and at least one bearing course.

c. Vicinity map showing the location of the tract and indicating significant features.

d. Contour intervals to mean sea level datum of not more than two feet referenced to a United States Geological Survey benchmark or monument based on the North American Datum of 1983 (NAD).

e. Existing cultural and infrastructure features on and adjacent to the tract including:

    1. Easements: Location, width, purpose.
    2. Structures: Location and use.
    3. Streets: Location, name, right-of-way width, width and type of paving, public or private streets, walks, curbs, gutters, inlets, etc.
    4. Utilities: The location of existing utilities is not required. It is however the responsibility of the developer to connect the proposed development to the nearest city water and sewer lines.

f. FEMA flood zone boundaries (flood zone lines, floodways, and flood zone designations, base flood elevations) per the latest available FEMA Flood Insurance Rate Maps (FIRMs). All development in the regulatory flood plain shall conform to the City of Flowood's Floodplain Ordinance.

g. Owners of adjacent un-platted land as shown on latest Tax Assessor's records.

h. The preliminary plat shall comply with current revisions of the Erosion & Sediment Control/Grading Ordinance, Flood Damage Prevention Ordinance, Landscape Ordinance, Potable Water Usage Ordinance, Sign Ordinance, Subdivision Regulations, Zoning Ordinance, and any other applicable ordinance.

i. Streets: names, rights-of-way, and roadway widths; similar data for alleys, if any.

j. Other rights-of-way or easements: locations, width, and purpose.

k. The location of the proposed water distribution system, sanitary wastewater system and stormwater system, and relationships to existing or proposed utility systems.

l. Lot lines and lot numbers.

m. Sites, if any, to be reserved or dedicated for parks, playgrounds, or other public use.

n. Sites, if any, for multi-family dwellings, shopping centers, churches, industry or other

non-public uses exclusive of single-family dwellings.

o. Minimum building setback lines.

p. Existing and proposed covenants and restrictions (upon the City's request).

q. Such other data, if any, as shall be required by statutes of the State of Mississippi for Plats.

r. Boundary lines of the tract with bearings and distances along the boundary, and total acreage.

203.2 Other preliminary plans and data: When required by the City, the Preliminary Plat shall be accompanied by such other plans and data as it deems necessary for adequate consideration of the proposed development.

SECTION 204 PROCEDURE FOR SITE PLAN PROJECTS CONSTRUCTION PLAN PREPARATION AND SUBMITTALS

204.1 This section is intended to apply specifically to Site Plan Projects. See section 205 for subdivisions and street development projects.

204.2 After a Site Plan Project has been through the procedures described in Section 200, the Owner may move forward with construction plan preparation for the site work (grading, drainage, pavement, curb, site utilities, detention, etc.) and begin preparing the building plans.

204.3 Driveway locations in reference to existing streets shall be in accordance with Section 301, Figure 1.

204.4 Proposed driveways shall line up with existing driveways across the street in such scenarios unless otherwise directed by the City.

204.5 The parking lot and driveways shall be laid out in accordance with the parking lot configurations shown in Section 301, Figure 2.

204.6 The Owner or his representative shall submit an updated version of the site plan to the City for a cursory review prior to moving to construction plan preparation.

204.7 The construction plans shall generally consist of the plan assembly listed in 205.2.

204.8 Supplementary information (205.3), as applicable or required by the City, shall be included with the construction plan submittal. The City may require additional information as the City deems it necessary to perform a thorough review of the project submittals.

204.9 Landscaping requirements shall be as required in the City of Flowood's Landscape Ordinance.

204.10 Paved areas, grading, utilities, etc. shall be designed and constructed per the requirements of Articles III and IV of this Ordinance.

204.11 Site Plan Projects shall also be required to meet the requirements and be subject to the regulations mentioned in Articles V, VI, VII, VIII & IX.

204.12 Site Plan Projects shall be required to meet the requirements of all applicable City Ordinance's including but not limited to the Zoning Ordinance, Sewer Use Ordinance and Grease Interceptor Ordinance.

204.13 Site Plan Projects shall be submitted to the City as required in Section 205.4 along with an Application for Site Development Permit provided by the City.

204.14 Procedures prior to and during construction shall be as required in Section 206.

204.15 Plans for buildings or other vertical structures shall, at a minimum, meet the City's adopted building code and shall be submitted to the Building Department\Building Official as required by the City.

SECTION 205 PROCEDURE FOR CONSTRUCTION PLAN PREPARATION, SUPPLEMENTARY INFORMATION AND SUBMITTAL

205.1 This section is intended to apply specifically to residential and commercial subdivisions and street development projects.

205.2 For projects that are the subdivision of land along existing road frontage and require no roadways or new water or sewer mains, the next step would be for the Subdivider/Owner to have a Final Recording Plat prepared and submitted. See Section 208 for the procedure and requirements for this process.

205.3 After receiving written notification for the City of preliminary plat approval, the developer or his designated agent(s) may move to the next phase of the development process "Construction Plans".

a. For projects that require roadways and utilities (beyond the extent of water and sewer service lines) to be constructed, the Subdivider/Owner shall have Construction Plans prepared and submitted to the City as required by this Ordinance.

b. See Article IV for more detailed design requirements and considerations for roadways, water distribution systems, sanitary sewer systems, storm drainage systems, erosion control requirements, etc.

205.4 Construction Plan Basic Requirements

The basic requirements on construction plans for water, sanitary wastewater, street and drainage improvements shall be as follows:

a. Construction plans shall be prepared on standard twenty-four by thirty-six inch (24" x

36") reproducible layout and plan/profile sheets.

b. The plan assembly shall generally consist of the following:

1. Front (Cover) Sheet: Vicinity map of the area comprising the subdivision; name of subdivision; city and county; name of Professional Engineer and registration number; and name of developer.

2. Index To Drawings: May be on front sheet or other sheet within the first two pages of the plans.

3. Typical Roadway Cross Section Sheet: Sheet shall show the details and construction requirements of the typical roadway section for all proposed roadways associated with the project. This includes but is not limited to right of way width, width of roadway/travel lanes, materials proposed to be constructed as part of the roadway and any other items necessary to describe the typical roadway section.

4. Geometric Layout: Minimum scale one-inch equals one hundred feet (1" = 100'), north arrow, layout plan of the proposed streets and lots. Right-of-ways shall be labeled, and street names shown, lot dimensions, lot numbers, lot areas in square feet if less than 1 acre, building setback lines, existing easements, proposed easements, acreage being developed, and adjacent property owners shall all be shown on layout plan.

5. Water and Sanitary Wastewater Layout Plan: Minimum scale one-inch equals one hundred feet (1" = 100'), north arrow, layout of water and sanitary wastewater system showing existing and proposed water main and services lines and sizes of such, sanitary wastewater mains and service lines and sizes of such, manholes, valves, fire hydrants and other appurtenances.

6. Drainage Layout Plan: Minimum scale one-inch equals one hundred feet (1" = 100'), north arrow, contour map, minimum two foot (2') elevation intervals of the area comprising the subdivision and sufficient additional area to include all water sheds which might be a factor in the design of the storm water drainage system. Layout plan of storm water system showing location, sizes and inverts of existing and proposed drainage structures.

7. Grading Plan: Grading plan(s) for the phase of the Site Plan Project or Subdivision development for which the construction plans pertain shall include existing and proposed contours to one-foot intervals showing the intended finished grades once the requirements of the construction plans have been installed. On subdivisions, if it is not the intent of the Subdivider and the construction plans to grade and shape a "house pad" on each lot, an additional grading plan shall be required to be submitted depicting a house pad on each lot. This plan may be a separate document and is not required to be included in the construction plans but shall be included with the

construction plan submittal package. The intent of this plan shall be to serve as an overall grading plan for the property that the City can use to enforce the proposed finished grades and drainage patterns on individual lot owners during the building permit and construction process. Lots shall be graded to drain towards the street and away from other lots where feasible, and the use of swales and or storm drain systems along back lot lines shall be avoided, wherever possible.

8. Erosion Control Plan: Minimum scale one-inch equals one hundred feet (1" = 100'), north arrow, contour map, minimum two foot (2') intervals of the area comprising the subdivision and sufficient additional area to include all water sheds which might be a factor in the design of the storm water drainage erosion control plan as required in Article VI. The plan shall conform to the documents and Storm Water Pollution Prevention Plan submitted to MDEQ.

9. Standard Plan/Profile Sheets: Scale as required to adequately show proposed improvements (typically one-inch equals fifty feet (1" = 50') horizontal, one inch equals five feet (1" = 5') vertical is acceptable). A profile along the centerline and each property line based on mean sea level datum (United States Geological Survey). Proposed sanitary wastewater mains and manholes, storm water pipes and inlet structures and ditch drainage system grades.

10. Standard Storm Water, Sanitary Wastewater Mains and Water Improvement Details: City of Flowood's "Water Detail Standard Sheet; City of Flowood's "Sanitary and Storm Water Detail Standard Sheet as provided by the City. References to how items are to be paid for on the details and in specifications may be marked through if it does not match the Engineer of Records typical requirements.

11. Special Details: Special design drainage structures, pump stations, etc. Design computations shall be submitted with construction plans if requested by the City Engineer.

205.5 Supplementary Information

The information below represents typical information that should be provided in conjunction with the Construction Plans when submitted to the City for review. More detailed requirements of these item are found throughout this document:

a. Construction Specifications: Construction specifications covering all proposed improvements shall be submitted by the developer and approved by the City. Engineer shall use City provided specifications for certain work as required by the City.

b. Geotechnical Investigation: A geotechnical investigation shall be performed, and a report provided for all streets within the development. The investigation shall be conducted and sealed by a professional engineer (PE) registered in the State of Mississippi. At a minimum, the investigation should include soil borings along the

centerline of the proposed streets at 250' intervals. Depth of borings shall be a minimum of five feet, or four feet below finished grade, whichever is greater.

c. Pavement Design: The pavement design shall be based on the pavement design procedure utilized by the Mississippi Department of Transportation based on the number of equivalent axle loadings and projected vehicular traffic expected to use the proposed street during a twenty (20) year period. More information on pavement design and requirements is provided in Article IV, Section 402.

d. Drainage Calculations: Drainage calculations used to determine the sizes of any proposed drainage improvements including culverts, open ditches, curb inlet spacing, grate inlets, detention/retention ponds, etc. shall accompany the Construction Plans. The calculations shall be based on the design parameters as outlined in Article IV & V of these regulations and submitted in the required format with the required information.

e. Water System Analysis: The City may request a Water System Analysis (hydraulic analysis) for proposed water system improvements to accompany the construction plans.

f. Engineer's Certification: The plan, specs, hydraulic calculations, etc. shall be accompanied by a transmittal letter which contains the following statement:

> *I hereby state that the reports, calculations, and plans prepared for "Name of Development" were prepared under my direct supervision and the best of my knowledge believe they are in accordance with the provisions of the City of Flowood Comprehensive Development Regulations.*
>
> Registered Professional Engineer
> State of Mississippi
> Registration Number

g. Other Utilities**:** Subdivider shall provide the City with drawings detailing the plans for gas, electric, communications.

205.6 Construction Plan Submittal Procedure

a. An electronic copy of the Construction Plans and Technical Construction Specifications prepared by the Subdivider's Engineer pursuant to the design requirements of Article IV & V herein shall be submitted to the City Department of Public Works or Engineering Department for review.

b. An electronic copy of the supplemental data mentioned above along with any other documents which may assist the City in their review of the Construction Plan submittal.

c. Subdivider shall provide hard copies of the Construction Plans or data mentioned in 205.6.a and 205.6.b upon request.

205.7 Construction Plan Review & Approval Procedure

a. Once the construction plans are received, the City will review and provide the Subdivider or his representative with written comments via email, a letter or written directly on the plans or approve the plans as submitted.

b. The subdivider shall revise the plans per the City's comments and re-submit following the same procedure outlined above. Supplementary information that did not change does not have to be re-submitted.

c. The procedure outlined in 205.5.a and 205.5.b will continue until such time as the City is satisfied with the submitted documents and have approved them For Construction.

SECTION 206 PROCEDURES FOR PRE-CONSTRUCTION & DURING CONSTRUCTION

206.1 Prior to Beginning Construction

a. Once the Subdivider/Owner has hired a contractor and is ready to move forward with the construction improvements required in the approved Construction Plans, the City shall hold a pre-construction meeting with the Subdivider/Owner, City Representatives, Engineer of Record, and the Owner employed Testing Agency to review many of the requirements included herein, discuss construction start dates, inspections and other items as deemed necessary by the City. The date and time of this meeting will be based on the availability of attendees but will be held at the City's Engineering Office Building or other location as determined by the City.

b. See Section 211 for information on required inspections and the Subdivider/Owner's responsibility during construction.

206.2 Permits

a. The Subdivider/Owner or their Contractor shall obtain any permits required of this ordinance prior to beginning construction.

b. If improvements are to be constructed in a 100-year frequency floodplain, a Flood Plain Development Permit must be obtained prior to initiation of construction activities.

206.3 During Construction

a. The construction shall be performed in strict accordance with the approved plans and specifications and under the supervision of the subdivider/developer's engineer and testing agency.

b. Any changes to the approved construction plans shall be approved in writing by the City Engineer prior to construction.

c. All Contractors must be licensed and bonded as required by state law and provide proof of commercial liability insurance issued by an insurance company admitted to write such insurance in the State of Mississippi and having the minimum limits as follows:

General Liability - $1,000,000 per occurrence and $2,000,000 General Aggregate.

d. The Owner shall employ a testing agency to test and monitor earthwork operations as required in Section 211.

e. The Owner shall employ a field inspector acceptable to the City Engineer who shall periodically inspect the work during all phases of the construction of sanitary wastewater mains, water distribution systems, underground storm water system and street pavements. The City Engineer may require that any inspector who appears incompetent or otherwise unsatisfactory shall be replaced by a satisfactory inspector.

f. The work shall be subject to inspection by the city engineer and his department at all times. However, in no way shall this relieve the developer and his engineer of close field supervision and final compliance with the approved plans and specifications.

g. Any work that is deemed unsatisfactory by the testing agency, field inspector, or City shall be rejected, removed and replaced at no cost to the City.

h. Additionally, the City shall not accept any construction work which is in such condition that it will require immediate and excessive maintenance by the City.

i. It shall be the responsibility of the Subdivider\Owner and his Engineer to ensure that installation of the streets, water, sewer and storm drain utilities are installed in strict accordance with the construction plans and specifications.

j. It shall be the responsibility of the Subdivider\Owner to coordinate with the utility provider and pay the utility provider for the installation of additional public utilities including but not limited to natural gas, telephone, electricity, and internet communications.

SECTION 207 FINAL CONSTRUCTION PLANS "AS-BUILTS" AND SUBDIVIDERS RESPONSIBILITY

207.1 As-built Drawings

a. When construction is complete, substantially in accordance with the approved plans and specifications and complies with the provisions of these regulations, the engineer of record shall provide the city a set of as-built plans in PDF format.

b. As-built drawings shall include the following information:

1. Surveyed location and elevation of sanitary sewer manhole tops and inverts.
2. Surveyed location and elevation of sanitary sewer lift stations.
3. Surveyed location of sanitary sewer service lines.
4. Surveyed location of fire hydrants, gate valves and other water structures.
5. Surveyed location of water service lines.

6. Surveyed location and elevation of drainage structure (curb inlets, junction boxes, grate inlets, etc.) tops and inverts.
7. Pipe sizes and materials for water, sewer and storm drain lines.
8. Surveyed location and elevation of storm drain culvert inverts.
9. A dimension from each front lot corner to water and sewer service line location.
10. Easement lines, purpose, and owner of easement.
11. Water, sewer, and storm drain lines and structures in format dictated by the City for incorporation into the City's GIS utility map.
12. Other information as deemed necessary by the City.

c. If the "as-built" plans include a detention basin and outlet structure, the "as-built" elevations must confirm that the pond and structure was installed in accordance with the approved plans. If, however, the "as-built" elevations do not agree with the original plans, the engineer shall be required to re-run the calculations in the "as-built" condition and submit them to the City for approval. Based on the findings of the re-submittal, the City may require the developer to correct the changes to agree with the plans.

d. The location of each water and/or sanitary wastewater service line shall be clearly and accurately shown on the "As-built" Drawings.

207.2 For a period of twelve (12) months after acceptance of the work by the City Engineer, the subdivider shall warranty all improvements and keep all filled trenches, pipes, manholes, structures, paved or unpaved surfaces, etc. which have been constructed by him in good condition making repairs to such defects in materials or workmanship which may develop or be discovered to the satisfaction of the City. If wastewater treatment plants and/or pumping stations are constructed, the subdivider shall guarantee materials and workmanship of these facilities for a period of twelve (12) months from the date of acceptance in accordance with standard warranty conditions of the equipment manufacturer.

207.3 In subdivisions, the location of water and sewer service mains shall be scored in the face of the curb of street by use of the symbol's "W" for water and "Y" for sewer respectively.

SECTION 208 PROCEDURE FOR APPROVAL OF FINAL RECORDING PLAT

208.1 The Final Recording Plat (as used herein "Final Recording Plat", includes Final Street Plat) shall conform substantially to the Preliminary Plat as approved and Section 202 herein, and, if desired by the Subdivider, may constitute only that portion of the approved Preliminary Plat which he proposes to record and develop at the time provided, however, that such portion conforms to all requirements of these regulations.

208.2 To be considered for approval, a Final Recording Plat shall meet the requirements of Section 209.1 and supplementary information as described in Section 209.2 shall be

provided to the City at least 15 days prior to the meeting in which the Final Plat is to be considered for acceptance by the Governing Authority.

208.3 Upon receiving the Final Plat and supplementary information, the City shall review the submittal and either provide comments to the Subdivider for plat revisions and/or the need for more supplementary information or the plat will be recommended for approval by the Mayor and Board of Aldermen. Upon receipt of written comments from the City Engineer or City Public Works Director regarding the Final Recording Plat and/or supplementary information, the Subdivider shall re-submit electronically until such time that all City comments have been addressed and the City Engineer will submit to the Mayor and Board along with the following documents at least ten (10) working days prior to consideration for acceptance by the Governing Authority at a regularly scheduled meeting.

208.4 The Subdivider shall have prepared and submitted to the City's Attorney for approval prior to consideration by the Governing Authority, a Certificate of Title of the land embraced in such subdivision before the Final Recording Plat is finally accepted by the City.

208.5 Approval of the Final Recording Plat shall not be granted until the Subdivision or Streets meet the requirements contained in these regulations, subject to any waivers or exceptions having been granted.

208.6 In the event the Mayor and Board should approve the Final Recording Plat, Subdivider shall provide the City with hard copies of the approved Final Recording Plat as required By the Rankin County Clerk's Office to be recorded for the Mayor's signature. This plat shall be signed by the Subdivider and his Engineer/Surveyor prior to delivering to the City for the Mayor's signature.

SECTION 209 FINAL RECORDING PLAT REQUIRED DATA FOR REVIEW/APPROVAL

209.1 A Final Recording Plat shall be prepared as required by the statutes of Mississippi relating to city plats. Where necessary, the Plat may be on several sheets accompanied by an index sheet showing the entire subdivision. For large subdivisions, the Final Plat may be submitted for approval progressively in continuous sections satisfactory to the Governing Authority. The Final Plat shall show the following:

a. Name of subdivision: name, seal and registration number of the Land Surveyor preparing the plat; owners of record, giving date record book and page number; date of drawing, north point and graphic scale; location of tract by legal description, giving acreage; vicinity map; key map when more than one sheet is required to present the plat.

b. True courses and distances to the nearest established section comers, or other recognized permanent monuments which shall accurately locate the property described in the Plat.

c. Exact boundary lines of the tract indicated by a heavy line, or other acceptable control traverse, giving dimensions to the nearest one-one hundredth (1/100) foot, and angles

to the nearest second, which shall be balanced and closed with an error of closure not to exceed the minimum standards for land surveying established by the Mississippi State Board of Registration for Professional Engineers and Land Surveyors. Documentation of survey closure shall be submitted with the Final Plat.

d. Street and alley and other right-of-way lines with locations and width, with street names indicated.

e. Lot lines with dimensions to the nearest one-one hundredth (1/100) foot, necessary internal angles, arcs and chords and radii of rounded comer; building lines with dimensions.

f. Lot numbers and lot area (square feet or acres).

g. Easements giving dimensions, location, and purpose; accurate outlines and description of any areas to be dedicated or reserved for public use or acquisition with the purposes indicated thereon; and of any areas to be reserved by deed covenant for common uses of all property owners.

h. Final Recording Plat shall clearly show what entity (City, HOA, etc.) shall take ownership of any easements once the plat is recorded. Taking ownership of said easements shall constitute ownership and maintenance of any water, sewer or storm drain infrastructure located within the easement. Fiber optic, gas lines, electric lines and other types of communication lines or utilities for the public's benefit may be installed in said easements with easement owner's permission, however, ownership and maintenance of such utilities shall be the responsibility of the utility provider.

i. FEMA flood zone boundaries (flood zone lines, floodways, and flood zone designations, base flood elevations) per the latest available FEMA Flood Insurance Rate Maps (FIRMs) via FEMA's website.

j. Minimum finished floor elevations for houses that fall within the boundaries of FEMA's flood zone limits or below the base flood elevation (even if outside the limits of FEMA's designated flood zone limits).

k. Accurate location and description of all monuments.

l. Certificate of Engineer; Certificate of Owner; Certificate of Final Approval; Clerk's Certificate and Restrictive Covenants.

m. Reference to recorded subdivision plats of adjoining platted land by record name, book and page numbers.

n. Any other requirement of the statutes of Mississippi relating to plats. In case of any conflict between these regulations and a statue of Mississippi, the statue shall control.

o. Other data such as certificates, affidavits, or endorsements may be required by the Governing Authority in the enforcement of these regulations.

p. The names of record owners of adjoining un-platted land and protective covenants, if any, in form for recording shall also be provided along with the plat.

209.2 The following supplementary information shall be presented with the final plat:

a. A statement from the engineer that all required improvements have been completed.

b. That the minimum standards approved by the Director of Engineering have been complied with, freed, and cleared of any encumbrance or lien.

c. Letters of final approval of water supply and sanitary sewage collection systems from the appropriate agency.

d. A good quality reproducible and an electronic copy of the "as-built" construction plans depicting the exact location of all required improvements as proposed on the approved construction plans. Such plans shall constitute a certified statement by the Registered Professional Engineer employed by the subdivider attesting that the final field survey was conducted and that the "as-built" plans resulted from said survey and are true and correct to the best of the engineer's knowledge.

e. An agreement dedicating the required improvements to the City of Flowood, Mississippi for the Mayor and Board of Aldermen to approve shall be required in addition to the Owner's Certificate on the Final Plat.

f. Protective covenants for the subdivision in the form of a recording, if any.

g. An irrevocable, automatically renewable letter-of-credit, a certified check, or a certificate of deposit in an amount equal to 200 percent of the total estimated cost (contract unit bid costs) of all required improvements remaining at the time of the request to guarantee installation and completion of said improvements. This shall include but not be limited to sidewalks in common areas, final lift of surface course, street signs, landscaping items and other items deemed necessary by the City. The subdivider/owner shall provide the City with the calculations and breakdown for review and approval prior to submission of the letter of credit.

    1. The letter-of-credit, certified check or certificate of deposit shall be subject to the condition that the improvements will be completed within three years after the approval of the final plat or at such time as structures have been completed on 85 percent of the lots in a subdivision.

    2. All improvements must be completed within a maximum of three years from the date of approval of the final plat, and in accordance with the ordinance of the city of Flowood.

    3. If three years after the approval of the final plat, the City of Flowood elects not to call the irrevocable letter of credit or to access funds placed on deposit, either by certified check or certificate of deposit, the developer shall be required to do one of the following, as requested by the City of Flowood, to

reflect any estimated increase in the cost of completion of the required improvements, including sidewalks, the street surface course, and the cost to perform any repairs to the sidewalks and the base course of any streets:

a) renew the irrevocable letter of credit.

b) provide additional funds by certified check.

c) increase the certificate of deposit.

d) provide an additional certificate of deposit.

4. If such repairs are not performed by the subdivider as and when requested by the City of Flowood, the duties and obligations of the subdivider herein apply to and are binding upon the subdivider and its successors and/or assigns in all respects.

SECTION 210 FINAL STREET PLAT REQUIRED DATA FOR REVIEW/APPROVAL

210.1 A Final Street Plat shall be prepared as required by the statutes of Mississippi relating to city plats. Where necessary, the Plat may be on several sheets accompanied by an index sheet showing the entire subdivision. For large developments, the Street Plat may be submitted for approval progressively in continuous sections satisfactory to the Governing Authority. The Street Plat shall show the following:

a. Name of Development: name, seal and registration number of the Land Surveyor preparing the plat; owners of record, giving date record book and page number; date of drawing, north point and graphic scale; location of tract by legal description, giving acreage; vicinity map; key map when more than one sheet is required to present the plat.

b. True courses and distances to the nearest established section comers, or other recognized permanent monuments which shall accurately locate the property described in the Plat.

c. Exact boundary lines of the tract indicated by a heavy line, or other acceptable control traverse, giving dimensions to the nearest one-one hundredth (1/100) foot, and angles to the nearest second, which shall be balanced and closed with an error of closure not to exceed the minimum standards for land surveying established by the Mississippi State Board of Registration for Professional Engineers and Land Surveyors. Documentation of survey closure shall be submitted with the Final Plat.

d. Street and alley and other right-of-way lines with locations and width, with street names indicated.

e. Easements giving dimensions, location, and purpose; accurate outlines and description of any areas to be dedicated or reserved for public use or acquisition with the purposes indicated thereon; and of any areas to be reserved by deed covenant for common uses of all property owners.

f. Final Recording Street Plat shall clearly show what entity (City, HOA, etc.) shall take ownership of any easements once the plat is recorded. Taking ownership of said easements shall constitute ownership and maintenance of any water, sewer or storm drain infrastructure located within the easement. Fiber optic, gas lines, electric lines and other types of communication lines or utilities for the public's benefit may be installed in said easements with easement owner's permission, however, ownership and maintenance of such utilities shall be the responsibility of the utility provider.

g. FEMA flood zone boundaries (flood zone lines, floodways, and flood zone designations, base flood elevations) per the latest available FEMA Flood Insurance Rate Maps (FIRMs) via FEMA's website.

h. Accurate location and description of all monuments.

i. Certificate of Engineer; Certificate of Owner; Certificate of Final Approval; Clerk's Certificate and Restrictive Covenants.

j. Reference to recorded subdivision plats of adjoining platted land by record name, book and page numbers.

k. Any other requirement of the statutes of Mississippi relating to plats. In case of any conflict between these regulations and a statue of Mississippi, the statue shall control.

l. Other data such as certificates, affidavits, or endorsements may be required by the Governing Authority in the enforcement of these regulations.

m. The names of record owners of adjoining un-platted land and protective covenants, if any, in form for recording shall also be provided along with the plat.

210.2 The following supplementary information shall be presented with the final plat:

a. A statement from the engineer that all required improvements have been completed.

b. That the minimum standards approved by the Director of Engineering or City's Designee have been complied with, freed, and cleared of any encumbrance or lien.

c. Letters of final approval of water supply and sanitary sewage collection systems from the appropriate agency.

d. A good quality reproducible and an electronic copy of the "as-built" construction plans depicting the exact location of all required improvements as proposed on the approved construction plans. Such plans shall constitute a certified statement by the Registered Professional Engineer employed by the subdivider attesting that the final field survey was conducted and that the "as-built" plans resulted from said survey and are true and correct to the best of the engineer's knowledge.

e. An agreement dedicating the required improvements to the City of Flowood, Mississippi for the Mayor and Board of Aldermen to approve shall be required in

addition to the Owner's Certificate on the Final Plat.

f. Protective covenants for the subdivision in the form of a recording, if any.

g. A transmittal letter by the developer's Engineer stating that the "Name of Development" has been constructed to the City of Flowood Ordinances to the best of his knowledge.

h. A letter of credit, a certified check, or a certificate of deposit in accordance with Section 209 of these regulations.

SECTION 211 REQUIRED INSPECTIONS

211.1 Prior to starting construction and at the expense of the Subdivider/Owner, the Subdivider/Owner shall make arrangements to engage a licensed testing agency with MDOT approved testing laboratory to observe and perform testing on earthwork operations and perform materials testing all in accordance with Article III of these regulations for earthwork, concrete and pavement materials to ensure that the materials used and installation of such complies with these regulations and the project specifications. Records of such tests and inspections shall be provided to the Subdivider/Owner's representative for keeping until such time as the City requests the reports.

211.2 Erosion and sediment control measures must be installed, inspected, and maintained in accordance with the City of Flowood's permits, ordinances, these regulations and MDEQ's requirements. The owner or his designee shall perform additional inspections as required by all governing state and federal agencies and shall be responsible for keeping their site in compliance. See Article VI of these regulations for more information on City requirements and procedures.

211.3 Additionally, the Subdivider/Owner shall employ a registered Professional Engineer to perform periodic inspections of the utility and street improvements as they are installed. This Engineer shall then certify to the City Engineer, City Public Works Director or other City Designee that each improvement has been construction in substantial accordance with the approved plat, construction plans and specifications, and requirements of this Ordinance.

211.4 Once all improvements have been completed in accordance with approved plans and specifications and notification of such by the Developer's Engineer of Record, the City Engineer, and or other City Designee shall make a Final Inspection of the improvements required by this Ordinance, and any other improvements to be accepted by the City. Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause found to exist prior to final acceptance of the work, shall be noted by the City and punch list shall be provided to the Subdivider/Owner for removal and replacement in an acceptable manner to the City's satisfaction at no cost to the City. The City Designee, acting as the duly authorized representative of the City and subject to the rules and regulations contained herein, shall decide all questions that may arise as to quality or acceptability of materials furnished or work performed. Such decisions may be appealed to the Mayor and Board of Aldermen

and acceptance of each phase shall be binding upon the City subject to correction by the Developer and his contractor of any damage that might occur during subsequent work on other required improvements.

211.5 If the City Engineer, and or other City Designee has verified that the contracted improvements are complete and free from defect, then upon receipt of the Final Recording Plat, and any other statements and certificates and/or agreements, the Mayor and Board of Aldermen shall vote to accept the dedication of any portion of the required improvements, provided that all statements and agreements specified above have been received for that portion of the improvements.

SECTION 212 MONUMENTS

212.1 All subdivision boundary corners and all changes in direction on the boundary of previously unsubdivided tracts shall be marked with permanent concrete monuments, Each monument shall consist of a minimum four inch (4") by four inch square or four inch (4") diameter concrete post a minimum of thirty inches (30") below the ground line and shall be reinforced with a single one-half inch (1/2") steel rod imbedded in the center flush with the top. Should conditions prohibit the placing of monuments on line, off-set marking will be permitted provided, however, exact off-set courses and distances are shown on the final subdivision plat.

212.2 Permanent steel markers shall be placed at all lot corners, single points, changes in lot boundary alignment and points of curve in street right-of-way lines. These markers shall consist of a solid one-half inch (1/2") steel stake a minimum of twenty-four inches (24") in length and shall be driven flush with the finished grade.

212.3 Monuments and steel markers shall not be placed until the major portion of the grading and utility installations have been completed.

212.4 Before acceptance of the final plat by the Mayor and Board of Aldermen, all permanent concrete monuments and steel markers shall be in place.

212.5 A permanent benchmark shall be accessibly placed, and its elevation shall be based on mean sea level datum as determined by the U.S. Geological Survey, the U.S. Corps of Engineer or the Mississippi State Highway Department. Permanent benchmarks shall meet at least third order accuracy and shall be accurately noted on the subdivision plat.

SECTION 213 PLAT CERTIFICATES

213.1 Each Plat submitted to the Governing Authority shall carry the following certificates thereon:

a. CERTIFICATE OF SURVEYOR: I, _____, hereby certify that this plat correctly represents a survey and a plat made by me or under my supervision; that all monuments shown hereon actually exist and their locations are correctly shown.

_____ _____

Date of Execution

(signed)
Professional Land Surveyor
No. _____, Mississippi

b. CERTIFICATE OF OWNER: I (we), the undersigned, owner(s) of the real estate shown and described in the foregoing certificate of _____ Professional Land Surveyor , and that I (we) have caused the same to be subdivided and platted as shown hereon, and have designated the same as (Name of subdivision), and in conjunction therewith hereby dedicate the roads, streets, rights-of-way, easements, sanitary sewer, storm drainage, and water systems to the City of Flowood, Mississippi as shown hereon for public use forever.

_____ _____
Date of Execution (signed)

Address: _____
_____

I, _____, Notary Public in and for the county of _____, and State of Mississippi, hereby certify that _____, to be personally known as the owner(s) of the above real estate, appeared before me on the day of _____, 20__, and made the above oath.

_____ _____
Date (signed)
Notary Public

My Commission expires: _____

CERTIFICATE OF FINAL APPROVAL: Pursuant to the Official Subdivision Regulations of the City of Flowood, Mississippi, this document was given approval by the Mayor and Board of Aldermen at a meeting held _____, 20___.

_____ _____
City Clerk Mayor

c. CLERK'S CERTIFICATE: I, _____ Clerk of the Chancery Court of Rankin County, Mississippi, do hereby certify that I have this day, examined the original plat of (Subdivision) as certified by the owner and the engineer, and this plat is a true and exact copy and a duplicate of the original map and contains the executed certificates of the owner and the engineer, and the same is hereby filed and placed on record on this day in Plat Cabinet No. ____ at page ___ in my office. This day of _____,20___.

_____
Clerk of the Chancery Court

of Rankin County, Mississippi

d. RESTRICTIVE COVENANTS: The property located in (subdivision)_____ as shown on this plat is subject to restrictive covenants which are out in an instrument recorded in Book _____ at Page _____ of the deed of records of Rankin County, Mississippi.

_____
Clerk of the Chancery Court
of Rankin County, Mississippi

ARTICLE III

GEOMETRIC LAYOUT OF SUBDIVISIONS AND ROADWAYS

SECTION 300 ROADWAY LAYOUT

300.1 The design of streets shall conform to the minimum criteria set forth hereinbelow and shall be considered in its relation to existing and planned streets, topographic conditions, public convenience, public safety, and appropriate relation to the proposed uses of the land to be served by such streets. The location and width of all streets shall substantially comply with the character and intent of the major thoroughfare plan of the City of Flowood.

The arrangement of streets in a subdivision or on other property shall either:

a. Provide for the continuation of existing streets in surrounding areas or appropriate projection of existing principal streets in surrounding areas; or

b. Conform to a plan for area development adopted by the City and approved by the Mayor and Board of Aldermen to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical; or

c. Conform to the City's adopted Thoroughfare's Plan

300.2 Any connections of roadways or driveways to roadways owned/maintained by the Mississippi Department of Transportation or other governmental agency besides the City of Flowood shall require a permit or approval from said entity for the planned connection.

300.3 The street pattern shall provide ease of circulation within the subdivision as well as convenient access to adjoining streets, thoroughfares or unsubdivided land which may be required by the City. Minor residential streets should be planned to discourage their use by non-local traffic. Where a street will eventually be extended beyond the plat but is temporarily dead ended, an interim turnaround approved by the City Engineer will be required.

a. Right-of-Way (ROW): The minimum widths of road rights-of-way (measured from lot

line to lot line) shall be as shown on the major thoroughfare plan or, if not shown on such plan, shall be not less than the following:

Type of Street	*Minimum Right-of-Way Width (Ft)*
Arterial Highway	100
Commercial and Industrial Center	80
Collector	60
Residential, Minor or Local	50
Alley, Commercial, Industrial	20
Cross walkways	10

1. In cases where topography or other physical conditions make a street ROW of the required minimum width impractical, the City Engineer may modify the above requirements. Through proposed neighborhood business areas, the street widths specified above shall be increased ten feet (10') on each side to facilitate the convenient movement of vehicles into and out of necessary off-street parking areas without causing any interference to the flow of traffic.

2. Subdivisions adjoining existing streets shall dedicate additional rights-of-way to meet the above minimum street ROW width requirements. The entire right-of-way shall be provided where any part of the subdivision is located on both sides of the existing street. However, when the subdivision is located on only one (1) side of the existing street, one-half (1/2) the required right-of-way (measured from the centerline of the existing roadway) shall be provided.

3. All cul-de-sacs shall terminate in a circular area with a minimum right-of-way diameter of one hundred feet (100').

4. Cul-de-sacs shall not be longer than six hundred feet (600') unless necessitated by topography, the property boundary not being conducive to such, or other circumstances beyond the subdivider's control. All cul-de-sacs shall be approved by the City Engineer.

5. Right of way at intersections shall be rounded with a minimum radius of 10' or by triangular flare with minimum sides of 15'.

b. Horizontal Alignment - Minimum Standards: When there are changes in the horizontal alignment of streets the following shall apply:

1. For design speeds less than 20 mph on local or minor streets the minimum radius of curvature shall be 125' with no super-elevation required. For speed limits above 20 mph or on collectors or arterials, the minimum radius of curvature permitted on a horizontal curve shall depend upon design speed and corresponding friction coefficients developed by the American Association of State Highway and Transportation Officials (AASHTO), unless approved otherwise by the City Engineer.

2. The City may allow a minimum horizontal curve radius of 75' on minor or local streets where the property to be subdivided makes a corner. This will be reviewed on a case-by-case basis, and should it not be allowed, the horizontal curve shall meet requirement above.

3. Street jogs should be avoided, when possible, but will be considered in accordance with sound traffic engineering principals as determined by the City.

c. Intersection Design:

1. Streets shall be designed to intersect at approximately right angles. Skewed intersections shall be avoided. In no case shall the angle of intersection be less than seventy-five degrees (75%).

2. Two (2) streets intersecting the same street (T intersection) shall be offset a minimum of one-hundred fifty feet (150') (centerline offset).

3. Turning lanes shall be provided at heavily travelled intersections as determined by a traffic study or required by the City Engineer.

4. Improvements to existing streets paid for by the developer may be required by the City for new developments. The extents of the improvements shall be determined by the City and a traffic study prepared by a licensed engineer on behalf of and paid for by the developer (if required by City). The City may require additional improvements above what the traffic study recommends if the City deems the recommended improvements to be unsatisfactory.

5. When possible, intersections in sharp horizontal curves or near the vertex of crest vertical curves shall be avoided or may not be allowed in the City deems the intersection to be hazardous to the public.

6. Horizontal sight distance shall be a minimum of 200' for 20 MPH posted speed limits and a minimum of 335' for over 20 MPH posted speed limits. Developer shall provide sight distance diagram and calculations per AASHTO requirements upon request by the City.

7. See Figure 1 for requirements for allowable driveway access geometry in relation to intersections for Site Plan Projects.

SECTION 301 DRIVEWAY AND PARKING LOT LAYOUT REQUIREMENTS FOR SITE PLAN PROJECTS

301.1 Driveway locations shall meet or exceed the requirements as shown in the "Commercial Driveway Spacing Requirements" (Figure 1).

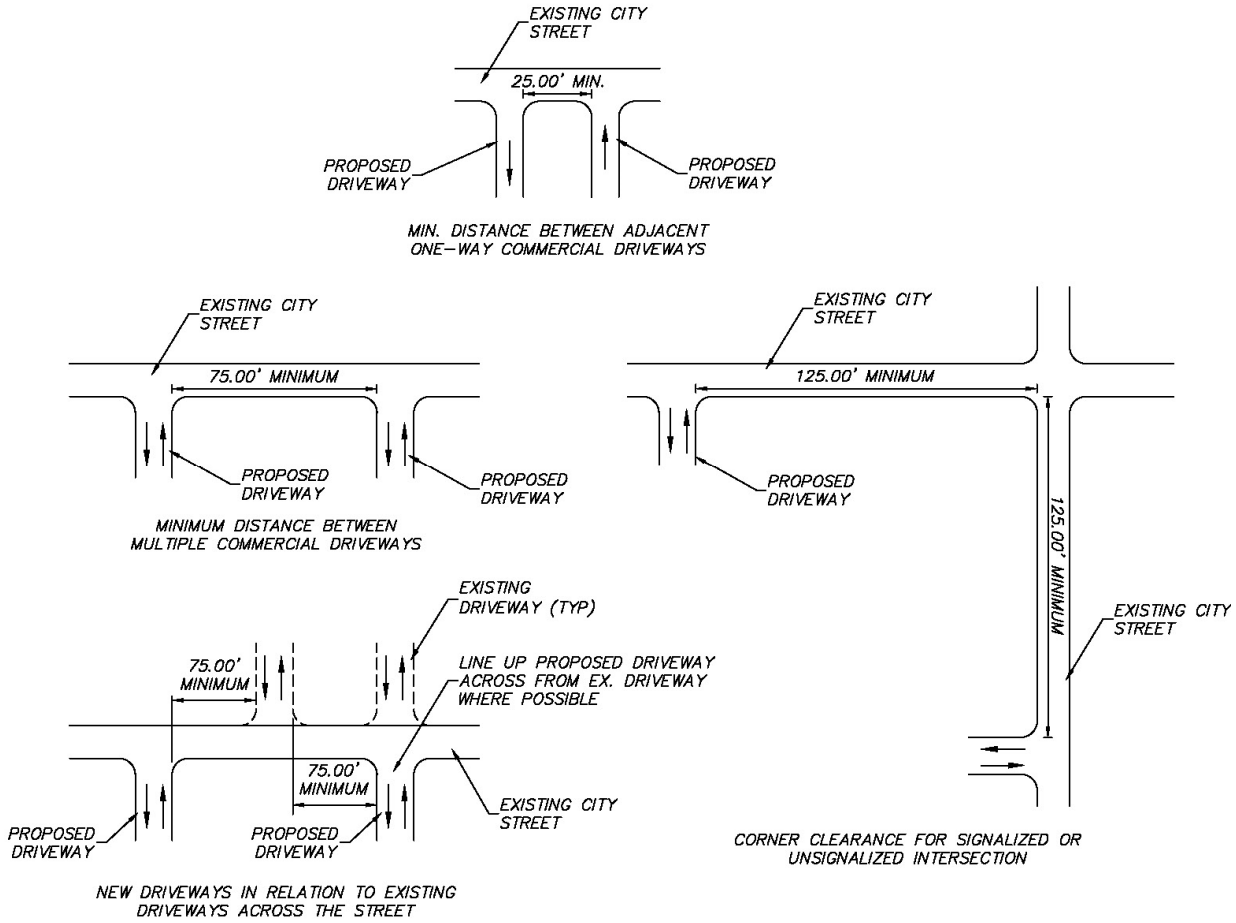
301.2 Driveway and Parking lot geometry and parking spaces shall meet or exceed the requirements as shown in the "Parking Layout Dimension Guidelines" (Figure 2).

301.3 The off-street parking space count shall meet the requirements of Section 205 of the City's Zoning Ordinance.

301.4 Parking lots shall also be designed in accordance with the requirements of the City's Landscape Ordinance, "Section 5 – Landscape Requirements For Parking Lots And Vehicular Use Areas".

301.5 Driveways and parking lots shall be designed and constructed per the requirements of Articles III and IV of this Ordinance.

Figure 1 – Commercial Driveway Spacing Requirements



Notes:

1. *The city may require a traffic study be paid for and provided by the owner showing the traffic impact of the driveway connections to the existing street and surrounding intersections and areas.*
2. *Unless an exception is granted by the city engineer, the minimum corner clearance for driveways will be established by an intersection queuing analysis (provided by the owner) or 125 feet, whichever is larger.*
3. *Driveways shall require an MDOT permit when connecting to a MDOT maintained road.*
4. *Proposed driveways shall be lined up with existing driveways across the street when possible. If there are factors that do not safely allow this, the proposed driveways shall be placed a minimum of 75' away from the existing driveway unless otherwise approved by the city.*
5. *Access to a city street that is deemed to be a "major intersection" is subject to more rigorous design and spacing requirements than other access connections. A major intersection is defined as a public road or private driveway intersection with a state highway that exhibits one or more of the following characteristics: 1) traffic volumes meeting or exceeding MUTCD warrants for signalization; 2) access approach volumes exceeding (or projected to exceed within 5 years) 3000 AADT or 300 peak hour trips; or 3) designation by the city engineer (or his designee) as a major intersection based on other factors - e.g., land use area (urban, suburban/urban, rural), anticipated safety issues, future growth forecasts, relationship to other planned improvement projects (public or private).*

Figure 2 – Parking Layout & Dimension Guidelines

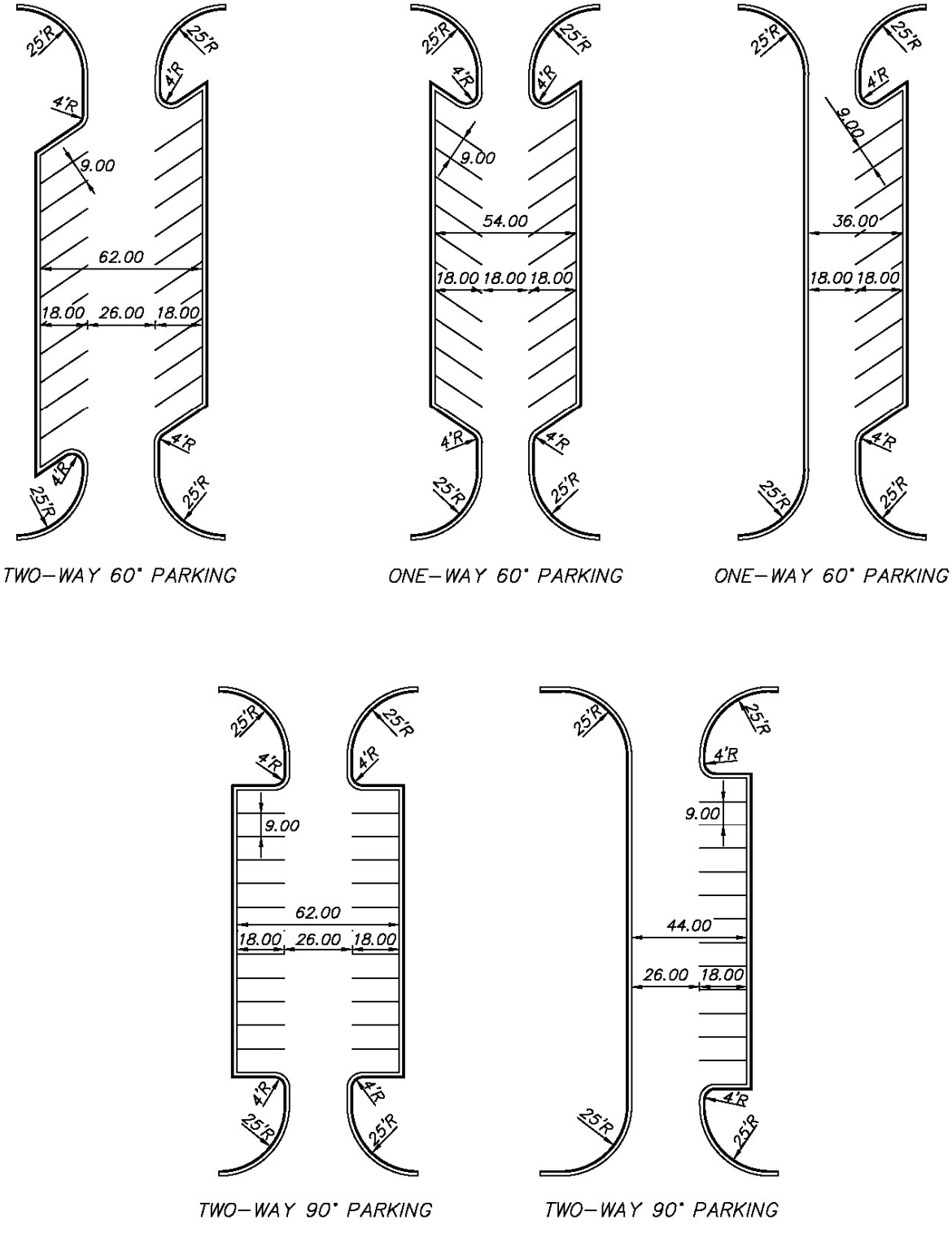
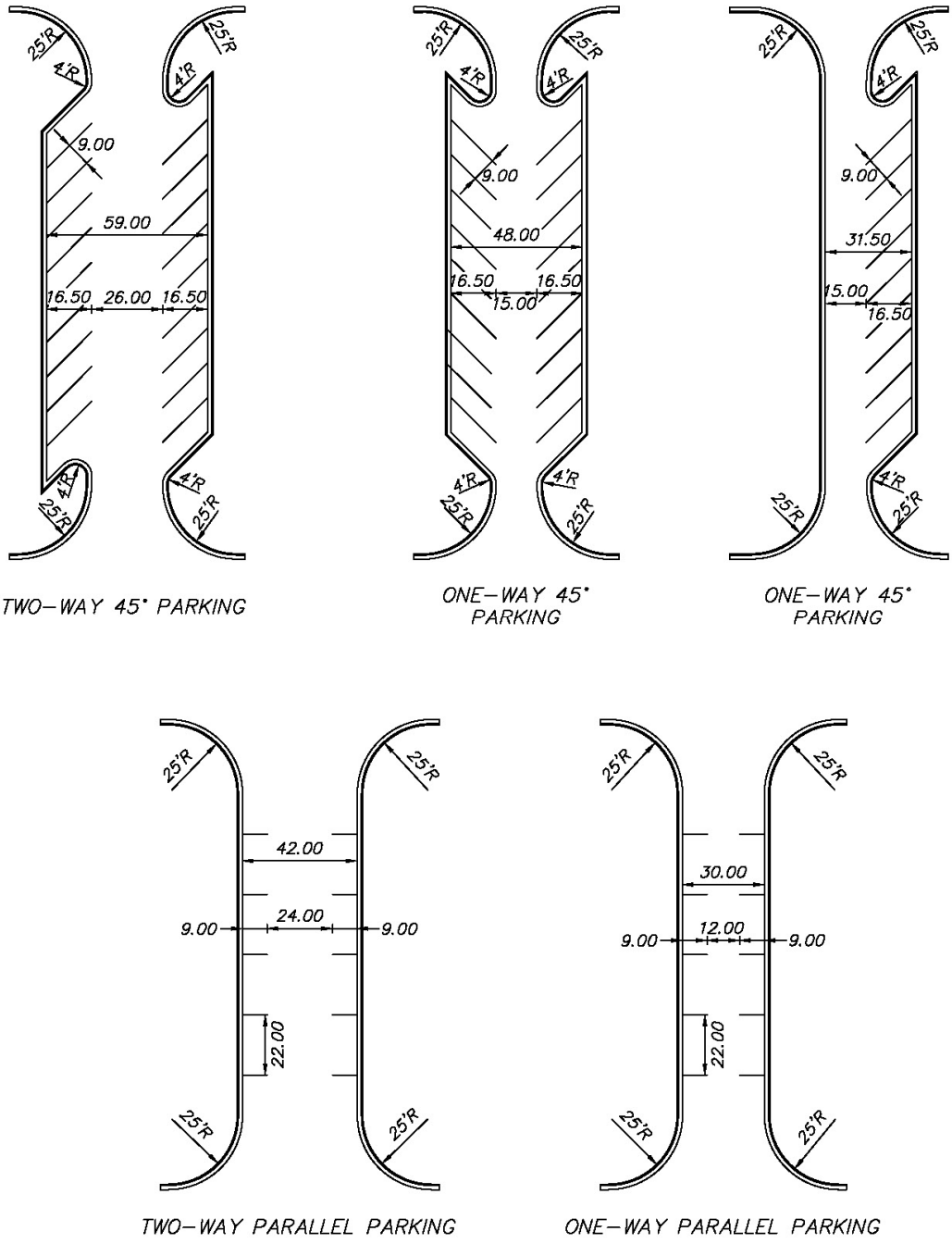


Figure 3 – Parking Lot Layout & Dimension Guidelines (Cont'd)



Notes:

1. *Parking space and driveway measurements shown are to the edge of pavement.*
2. *Radial dimensions are to the back of curb.*
3. *Dimensions shown shall be the minimum allowable and not recommendations. Project designer shall determine if the minimum's meet the requirements of projected traffic flow and adjust as required for ease of traffic flow.*

SECTION 302 LOTS

302.1 The lot size, width, depth, shape and orientation and the minimum building setback lines shall be appropriate for the location of the subdivision and for the type of development and use contemplated as prescribed by the requirements of the Official Zoning Ordinance of the City of Flowood, Mississippi.

302.2 The subdividing of land shall be such as to provide (by means of a dedicated public street) each lot with satisfactory access to an existing dedicated public street.

302.3 Corner lots shall be a minimum of 20' wider than the required minimum interior lot with a setback equal to the front setback off of the side street.

302.4 Double frontage and reverse frontage lots should be avoided except where essential to provide separation of residential development from traffic arteries or to overcome specific disadvantages of topography and orientation. A planting screen easement of at least ten feet (10') shall be provided along the line of lots abutting such a traffic artery or other disadvantageous use.

302.5 Side-lot lines shall be substantially at right angles or radial to street right-of-way lines. Each lot must front for the minimum distance required by the Official Zoning Ordinance of the City of Flowood, Mississippi on a public dedicated or approved parking lot.

302.6 Minimum lot sizes shall be exclusive of open ditches.

SECTION 303 BLOCKS

303.1 As usual practice, blocks should be no less than four hundred feet (400') nor more than one thousand six hundred (1,600') in length, except where it is necessary to secure an efficient use of land or desired features of the street pattern such as may apply to institutional, commercial, or industrial areas; where exceptions or variances in the length, shape and width of blocks may be granted by the City Engineer.

303.2 When a block exceeds six hundred feet (600') in length, the developer may be required to provide a pedestrian crosswalk not less than ten feet (10') wide to provide circulation or access to schools, playgrounds, shopping centers, transportation, and other community facilities.

303.3 The lengths, widths, and shape of blocks in Subdivision or along streets shall be determined with due regard to:

a. Provision of adequate building sites suitable to the special needs of the type of use contemplated.

b. Zoning requirements as to lot sizes and dimensions.

c. Needs for convenient access, circulation, control, and safety of street traffic.

d. Limitations and opportunities of topography.

SECTION 304 PARK AREA SET ASIDE

304.1 The Subdivider of every residential subdivision which is to contain more than twenty (20) lots shall set aside and convey to a homeowner's association a green space area for the use and benefit of all property owners in the Subdivision.

304.2 The green space shall be equal to or greater in size than one (1) typical size lot within the Subdivision and there shall be one (1) green space for each 50 lots.

304.3 The green space area shall be improved by the Subdivider with the landscaping consistent with the adopted Landscape Ordinance and park benches or related equipment selected by the Subdivider and approved by the City.

SECTION 305 PERMANENT EASEMENTS

305.1 Easements across lots or centered on rear or side-lot lines shall be provided for public utilities. Such easements shall be to the width necessary for the City to have access and the room needed to provide maintenance. This shall be determined based on the type of and depth of the utility and shall be at least a minimum of ten foot (10') in width.

305.2 Utility easements at least ten feet (10') in width shall be provided outside, adjacent to and parallel to the street right-of-way for the purpose of accommodating water, sewer, storm drain, electrical lines, cable lines, communication lines, telephone lines, gas lines and other public utilities or infrastructure in residential, commercial, and industrial areas.

305.3 Where easements intersect or sharp changes in alignment are necessary, corners shall be sufficiently cutoff to permit equipment access subject to the approval of the City Engineer.

305.4 No buildings, fences or structures shall be permitted within easements unless specifically approved by the City Engineer. If so constructed (with or without City approval), any removal necessary for the City to replace, repair or otherwise use its easement shall be at the expense of the owner of the property at the time of the repair, replacement or other use.

305.5 Any overhanging limbs, shrubbery or other vegetation which form an obstruction may be moved from within the limits of a utility easement at the discretion of the maintenance personnel of the utilities installed or to be installed in or above the easements.

305.6 Every easement shall terminate at both ends upon a street, alley, or another easement except where necessary dead-end easements will be permitted upon review by the City Engineer. The City and/or utility company shall be held harmless of any claims against them for replacement of obstructions removed during maintenance or construction activities on such utility. The City of Flowood shall have the right to utilize any platted or dedicated easement for public use regardless of the designation of the easement.

305.7 Where a subdivision or property is traversed by a water course, drainage way, channel or stream, there shall be provided a storm water easement or drainage right-of-way conforming substantially with the lines of such water course or an accepted canal or drainage course, and such further width or construction, or both, as will be necessary for equipment access.

SECTION 306 SUITABILITY OF THE LAND

306.1 The subdivision of land affected by conditions undesirable to urban development shall not be approved until satisfactory evidence has been provided by a Registered Professional Engineer outlining the steps to be taken to overcome these conditions.

306.2 The City of Flowood Flood Damage Prevention Ordinance shall be always adhered to.

306.3 City may require documentation from a licensed engineer showing there is no net rise when developing in a flood zone or area that are known to experience localized flooding (even if not in a FEMA designated flood zone). The city reserves the right to require FEMA review and concurrence of documentation. Subdivider shall be responsible for providing all such documentation and all costs incurred in the hydrologic and hydraulic studies and document preparation. For more information on developing in the flood zone or flood prone areas, see the City of Flowood's Flood Damage Prevention Ordinance (Separate Document).

306.4 All utilities and facilities, such as water, sewer, gas, and electrical systems shall be located, elevated, and constructed to eliminate or minimize flood damage. Adequate drainage shall be provided to reduce exposure to flood hazards.

ARTICLE IV

REQUIREMENTS FOR IMPROVEMENTS

SECTION 400 GENERAL POLICY REQUIREMENTS

400.1 Where no City standard exists governing the design or construction of required improvements, the City Engineer or City Public Works Director shall determine the requirements for design and/or construction predicated on the following:

a. Streets: Latest edition of *A Policy on Geometric Design of Roadways and Streets* (AASHTO); the latest edition of the *Mississippi Department of Transportation Standard Design Specifications for Road and Bridge Construction*; and the Mississippi Department of Transportation Standard Detail Drawings.

b. Water: American Water Works Association Standards and the Mississippi Department of Health Standards.

c. Sanitary Sewers: Mississippi Department of Environmental Quality Standards and the Ten States Standards.

d. Storm Drainage: Latest edition of the *Mississippi Department of Transportation Standard Design Specifications for Road and Bridge Construction*.

e. Street Signage, Pavement Markings & Traffic Control: Latest edition of the Manual on Uniform Traffic Control Devices.

400.2 In consideration of the acceptance by the City of Flowood and the assumption of the responsibility of maintaining the dedicated streets constructed therein, the owner or owners of the development shall cause to be designed and constructed (at no expense to the City of Flowood) all improvements made within such development to the specifications set forth in this Ordinance and in accordance with any applicable standards, ordinances or drawings adopted by the City of Flowood, Mississippi.

These expenses shall include but not be limited to the following:

a. Cost of boundary survey, topographic survey, preliminary plat, final plat and related items which have been prepared by a Professional Engineer or land surveyor who is registered in the State of Mississippi.

b. Cost of earthwork required to prepare a sub-grade per requirements and specifications and to establish grades prescribed by the approved Construction Plans for streets, alleys, sidewalks and surrounding areas.

c. Cost for construction of sanitary wastewater facilities (whether on or off-site) to adequately serve the development, subdivision, commercial site(s), commercial building(s), industrial facility, etc.

d. Cost for construction of water facilities (whether on or off-site) to adequately serve the development, subdivision, commercial site(s), commercial building(s), industrial facility, etc.

e. Cost for construction of curb and gutter, storm drainage and street paving and/or retention/detention facility and calculations for the development, subdivision, commercial site(s), commercial building(s), industrial facility, etc.

f. Cost for preparation of all maps, plans and specifications for all above improvements. These maps, plans and specifications shall be prepared by a Professional Engineer who is registered in the State of Mississippi.

400.3 The following information is not intended to take the place of the construction specifications provided by the Owner's Engineer. The information is intended to provide information on requirements that must be met at a minimum.

400.4 Should there be a discrepancy between the requirements set forth herein for construction and the project specifications, the requirements set forth herein shall govern.

SECTION 401 GENERAL GRADING

401.1 Grading and centerline gradients shall be in accordance with the construction plans and profiles provided in the construction plans and approved by the City.

401.2 Construction plans shall include an overall grading and drainage plan for the development. This plan shall show the existing contours and proposed contours depicting the final grade once the requirements of the construction plans are complete.

401.3 If it is not the intent of the Subdivider and the construction plans to grade and shape a house pad on each lot, an additional grading plan shall be required to be submitted depicting a house pad on each lot. This plan may be a separate document and is not required to be included in the construction plans but shall be included with the construction plan submittal package. The intent of this plan shall be to serve as an overall grading plan for the property that the City can use to enforce the proposed finished grades and drainage patterns on individual lot owners during the building permit and construction process.

401.4 Finished floor elevations in all developments shall be a minimum of 6" above the elevation of the top (rim) of the nearest sanitary sewer manhole or as directed by the City.

401.5 Areas to be graded by cutting or filling shall be rough graded to within two-tenths (0.2) of a foot of the accepted elevation after necessary allowance has been made for the thickness of topsoil, paved areas, and other installations.

401.6 Areas that are to be grassed or landscaped shall be shaped/graded to achieve positive drainage to ensure the area will drain dry and allow for routine maintenance and upkeep by the owner. Such areas shall have a minimum slope of 1.00% and shall be graded to drain to a paved surface or a swale/channel to convey the runoff through the site to planned locations. The swale/channel for conveyance shall have either:

a. A 1.00% minimum slope, or

b. A minimum 4' wide, 4" minimum thickness, V-shaped, concrete channel (or series of channels) along the drainage paths.

401.7 Final cross-sections and profiles of streets and other installations shall conform to grades approved by the City Engineer. Elevations shall be based on mean sea level (U.S. Geological Survey).

401.8 All timber, logs, trees, brush, vegetative matter, and other rubbish shall be removed or otherwise disposed of in accordance with the rules and regulations of the Mississippi Department of Environmental Quality and applicable Clean Air Act rules and regulations to leave disturbed areas with a neat and finished appearance. Debris shall not be buried on-site without approval from the City.

401.9 After grading has been completed and approved and before any base is applied, all underground work (water mains, gas mains, sewer mains, storm sewers, etc.) and all service connections shall be completely installed and approved throughout the length of the roads.

401.10 For Street Plats and where utility mains are not located under the pavement, the developer may elect to omit the installation of service connections, provided that when these service connections are needed, they are extended across the street without breaking or weakening the existing pavement. In business sections where there are no grass plots, utility mains shall be installed under the sidewalks wherever possible.

SECTION 402 ROADWAY DESIGN & CONSTRUCTION REQUIREMENTS

402.1 Geometric Standards

a. The minimum curb radius permitted at intersections shall be as follows:

Type of Street	*Minimum Edge Of Pvm't. (Ft)*
Arterial Highway	42
Commercial and Industrial Center	37
Residential, Collector	27
Residential, Minor or Local	22

b. Cul-de-sacs shall have a minimum radius of forty feet (40') to the edge of pavement unless the City Engineer approves a variation of turning facility.

c. All streets shall be constructed with twenty-four inch (24") wide curb and gutter meeting City standards, except for streets constructed in industrial areas, which may be constructed with 8' minimum wide, clay gravel shoulders in lieu of curb and gutter.

d. The typical cross-section for two-lane streets shall conform to minimum standards as follows:

Type of Street	*Pavement Width (Ft)***
Arterial Highway	Variable
Commercial and Industrial Center	24
Residential, Collector	24
Residential, Minor or Local	23
Cul-de-sacs and Dead-End*	23

** Not to exceed six hundred feet (600') unless conditions warrant and approved by the City Engineer.*

*** Wider street section for larger scale developments may be required by Traffic Study or City*

e. Residential streets in planned unit developments (if dedicated to the City) may have the street width and pavement width reduced based on submission of a design and with the approval of the City Engineer.

402.2 Vertical Alignments Standards

a. All changes in street grades shall be made with vertical curves and in accordance with formulas developed by AASHTO that provide minimum sight distance of not less than the following:

Type of Street	*Minimum Feet*
Arterial Highway	500
Commercial and Industrial Center	300
Residential, Collector	275
Residential, Minor or Local	200

b. Street intersections and approaches shall be designed on as flat a grade as possible. Street gradients within one hundred feet (100') of intersections shall not exceed four percent (4%) unless otherwise approved by City Engineer due to extenuating circumstances. Every reasonable effort shall be made to keep the gradient below two percent (2%).

c. Every change in grade shall be connected by a vertical curve constructed to afford a minimum sight distance from an eyelevel height of three and seventy-five hundredths' feet (3.75') to the height of object measured at five-tenths foot (0.5').

d. The maximum street gradient shall not exceed eight percent (8%) except where steeper grades are mandatory due to unusual topographic conditions and approval is granted by the City Engineer. The minimum grade shall be such as to allow for adequate drainage without undue spread of storm water over the travel lane but shall be not less than four-tenths percent (0.5%).

402.3 Pavement Design & Typical Sections

a. Street pavement designs shall be designed by a licensed engineer and be based on consideration of the anticipated traffic volumes by weight, the subgrade soil, surface drainage, ground water and climatic conditions. The pavement thickness shall be a function of the load supporting value of the subgrade soil beneath the pavement and of the load distribution characteristics of the proposed pavement structure. Set forth below are the minimum acceptable thicknesses for pavement structures.

b. Streets shall be designed with a 2% cross-slope.

c. All street improvements, base, subbase, curb and gutter and appurtenances shall be constructed in accordance with the "Mississippi Standard Specifications for Road and Bridge Construction", Latest Edition.

d. The street surface course required pursuant to this section shall be placed no sooner than one year from the date of approval of the final plat, or until such time as structures have been completed on 85 percent of the lots in the subdivision. In no event shall the date of application of the street surface course be more than three years from the date of approval of the final plat. Prior to placement of surface course, Owner shall submit a request to the City for an inspection of the roadways to be paved. The owner shall be

responsible to make repairs resulting from said inspection prior to placing final surface course.

402.4 Subgrade Construction

a. All roadway subgrade preparation shall extend to 2' beyond the back of curb or edge of pavement if there is not curb proposed.

b. Site preparation: As an initial step of site preparation, trees located within the pavement area shall be removed, including stumps and roots. Stripping shall be performed to a sufficient depth throughout the construction area to remove organic-laden surficial soils, vegetation, debris, brush and roots. Excavation shall be performed to remove weak soils. The lateral and vertical extent of excavation required to remove weak soils must be determined in the field during earthwork construction. Excavation to remove weak soils shall extend laterally not less than three feet beyond pavement edges or back of curb.

c. Rough Grade: Once the roadway area has been stripped, the roadway shall be cut to reach the planned rough grade of the roadway. No fill may be placed within the roadway at this time without a visual inspection of the area by the City and written approval to place fill. The City may require testing of these areas as they deem necessary (at the Subdivider's expense) to determine if the in-situ soil is suitable as a sub-base for placing fill materials.

d. Scarification and Compaction: The soils exposed after stripping and excavation as required to get to the rough grade of the roadway shall be scarified to a minimum depth of 12 inches and compacted to not less than 96 percent of standard Proctor maximum dry density (ASTM D 698) with stability present. Stability is defined as the absence of significant pumping or yielding of soils during compaction or proof rolling. If stability is not evident in some areas due to unsuitable soils, these soils shall be undercut to provide the required buffer and replaced with select material. If the soil classification meets select fill requirements but stability is not evident due to moisture content or some other reason, either additional excavation or treatment of the in-situ soils with an admixture, or a combination of these approaches, will be required to achieve stable conditions. Scarification/compaction and/or proof-rolling of the in-situ soils is not required in areas where bridging is to be conducted.

e. Bridging: Bridging over weak soils may be allowed. Excavation shall be performed to a sufficient depth to allow placement of an adequate bridging lift and not less than three feet of compacted select fill materials to directly underlie the pavement structure. Bridging materials shall consist of either clean sands (SP) or slightly silty sands (SP-SM) with less than ten percent fines passing the No. 200 sieve. The bridging lift shall not be more than 18-inches thick. The bridging materials shall be spread and compacted by repeated passes of a dozer not larger than a D4. A geotextile shall be utilized beneath the bridging materials to initiate compaction with stability. The geotextile utilized for this purpose shall be Type V geotextile as specified in the Mississippi Standard Specifications for Road and Bridge Construction (1990 Edition).

f. Undercutting: Undercutting shall be performed to remove expansive clays (CH) as required to allow for the placement of compacted select low permeability soils to create a non-expansive soil buffer that shall extend not less than three feet below the subgrade level for pavements. Undercutting will be needed within areas where existing on-site silty clays (CL), silts (ML) and sandy clays (CL) by themselves or in combination with select fill do not provide the recommended buffer thickness. The lateral extent of undercutting required to remove expansive clays (CH) must be determined in the field by the City during earthwork construction.

   Undercutting shall extend laterally not less than three feet beyond pavement edges or back of curb. Further undercutting will be required in areas of storm drainpipe where the storm drainpipe is lower than the 3' of buffer as discussed above.

g. Pumping Soils: On-site natural silty clays (CL), clayey silts (ML) and silts (ML) exposed after stripping and excavation are susceptible to pumping under wet conditions. The construction techniques and types of equipment utilized, and site drainage provided during construction will have a great effect on the performance of these soils throughout the project. The routing of heavy rubber-tired equipment shall be controlled to minimize, as much as possible, traffic over the site. All traffic shall be discouraged during periods of inclement weather. If pumping is initiated in subgrade soils (CL or ML), as a construction expedient the pumping can be counteracted by treating these materials with hydrated lime. It is estimated that about four to six percent hydrated lime by dry weight of soil will be required. The actual lime percentage needed to hydrate moisture and eliminate pumping shall be determined during construction by laboratory testing conducted on representative samples of the pumping soils. Lime treatment shall be performed in conformance with Section 307 of the Mississippi Standard Specifications for Road and Bridge Construction (2004 Edition). On-site natural soils treated with lime shall be compacted to not less than 96 percent of standard Proctor maximum dry density (ASTM D 698). Class C lime treatment which requires spreading the lime, mixing, compacting and finishing shall be used.

h. Fill Placement: Fill materials shall be placed to achieve planned grades. Excavated onsite silty clays (CL) and sandy clays (CL) that are free of organic matter can be utilized as select fill. Imported fill soils shall consist of select, non-organic and debris-free silty clays (CL) or sandy clays (CL) having a plasticity index (PI) within the range of ten to 24 and a liquid limit less than 45, or clayey sands (SC) or silty sands (SM) with a plasticity index of four to 15 and a liquid limit less than 35. To be classified as silty clays (CL) or sandy clays (CL), the fill materials must have more than 50 percent fines passing the No. 200 sieve. Sands (SC or SM) shall not be used as backfill placed in undercut areas over expansive clays (CH). Select fill materials placed along the roadway shall be compacted from maximum nine-inch-thick loose lifts to not less than 96 percent of standard Proctor maximum dry density (ASTM D 698) at moisture contents within three percentage points of optimum.

i. Proof-Rolling: Proof-rolling shall mean the Contractor providing a fully loaded dump truck or other approved vehicle having an axle weight of at least 20,000lbs (10 tons) and said vehicle being driven across the site as directed by the City and under the

supervision of the City's representative.

1. The intent of the proof roll is to determine the strength of the soil (existing or placed fill) and identify locations of soft or unsuitable soil materials or conditions if they exist so that additional earthwork measures may be performed to stabilize these locations.

2. Proof rolling of the sub-grade shall be performed at the following intervals (unless otherwise required by the City):

    a. Once the roadway area has been cleared, stripped.

    b. Once the roadway is to rough grade.

    c. Prior to placing hydrated lime.

    d. Once the roadway is finished grade and ready for curb but prior to placing curb. This shall be a proof roll for the curb only.

    e. Once the roadway is finished grade and ready for asphalt but prior to placing asphalt.

3. If it rains after a passing proof-roll but before material has been placed (i.e. curb, asphalt, select fill, etc.), the City may require another passing proof-roll prior to the placement of such material.

4. The Subdivider's Contractor shall perform their own passing proof-rolls with the Subdivider's Engineer or Representative prior to requesting a proof roll with the City.

5. The City shall be notified at least 48 hours prior to performing a proof roll.

6. Stability must be evident during the compaction of each lift before any subsequent lifts of fill material are added.

j. Lime Stabilization:

1. If lime treatment is utilized as part of the pavement structure, sub-grade soils must meet that of select material and must be treated with six percent hydrated lime by dry weight of soil to a minimum depth as required in the minimum requirements described in the following sections.

2. Lime treatment shall be performed in conformance with Section 307 of the Mississippi Standard Specifications for Road and Bridge Construction (2004 Edition).

3. Class C lime treatment which requires mixing with a pulver mixer shall be used. The lime treated subgrade soils shall be compacted to not less than 96 percent of standard Proctor maximum dry density (ASTM D 698) at moisture contents within three percentage points of optimum moisture content.

4. If lime treatment is utilized as a stabilization measure due to wet conditions during construction or to achieve optimum moisture, then it shall be not be considered as a structural component of the pavement structure.

402.5 Hot Mix Asphalt Specifications

a. The hot mix asphalt (HMA) mixtures shall meet the following production requirements:

1. At least ten days prior to the start of work the contractor shall submit for approval by the City Engineer a proposed job-mix formula (JMF) signed by a MDOT certified mixture design technician meeting the requirements listed herein.

2. The bituminous base course and asphalt surface course materials conforms with all applicable specifications for BB-1 and SC-1 presented in the Mississippi Standard Specifications for Road and Bridge Construction (1990 Edition) plus requirements listed in the following tables:

Hot Mix Asphalt Gradations Master Design Requirements

Sieve Size	*Base Course*	*Surface Course*
1½ inch	100	—
1 inch	83-100	—
½ inch	56-95	100
3/8 inch	—	87-100
No. 4	29-70	54-80
No. 8	19-54	32-63
No. 30	8-30	12-33
No. 50	4-20	6-20
No. 200	2-10	2-10

Hot Mix Asphalt Mixture Design Requirements Marshall Compaction – 75 blows (MT-35)

Mixture Requirements	*Base Course*		*Wearing Course*	
	BB-1A	*BB-1B*	*SC-1A*	*SC-1B*
Stability (lbs.)	1400	1400 (min)	1500	1500 (min)
Total air voids (%)	3.0-5.0	3.0-5.0	3.0-5.0	3.0-5.0
VMA (%)	12.0	12.0	15.0	15.0
Tensile strength ratio (%)	85	75	85	75
Hydrated lime (%)	1.0	0	1.0	0
Minimum asphalt content (%)	4.0	4.0	4.0	4.0
Crushed limestone content (%)	0	0	20-30	0
Fractured faces - + No. 4 sieve (%)	70	0	90	90
Natural sand content (%) max	20	20	20	20
RAP material (%) max	30	30	15	15

402.6 Concrete Pavement Specifications

a. Concrete pavement materials, installation and testing shall comply with the applicable provisions and recommendations of the American Concrete Institute and the *Mississippi Department of Transportation Standard Specifications For Road & Bridge Construction* but at a minimum shall meet the following.

b. Minimum compressive strength of 4,000psi.

c. Portland Cement: ASTM C 150, Type 2.

d. Aggregates: ASTM C33, size Nos. 57 or 67.

e. Reinforcing Bars: ASTM A 615, Grade 60.

f. Welded Wire Fabric: ASTM A 185 & ASTM A 82 (flat sheets, not rolls).

g. Expansion, isolation, contraction joint spacing, configuration and sealing as required by the American Concrete Institute.

402.7 Testing Requirements

a. All test reports shall be held by the Owner's representative and shall be able to be provided to the City once prepared.

b. Any materials or installation of such that do not pass testing requirements or meet project specifications shall be rejected by the City and replaced by the Subdivider.

c. Subgrade: Testing requirements include, at a minimum, classification of subgrade soils, determination of Atterberg limits, percent passing No. 200 sieve, optimum moisture content, maximum dry density and in- place field moisture density. Soil classification tests and laboratory moisture-density relationship (Proctor) tests shall be conducted at the beginning of earthwork construction and for every 1,000 cubic yards placed. As a minimum, one moisture/density test shall be taken per lift for each 300 ft. of roadway or each 2,500 square feet of parking area. These quality control tests shall be run by an MDOT certified soil technician. Laboratory tests shall be conducted by a certified laboratory.

d. Asphalt: Testing requirements include, at a minimum, determination of HMA mixture gradation, total voids, VMA, asphalt content, maximum specific gravity of the HMA mixture, Marshall stability and roadway density tests. These test samples shall be randomly taken at the HMA production plant or at the placement site during production. These quality control tests shall be run by an MDOT certified asphalt technician 1. At least one quality control sample shall be obtained and tested for each 500 tons produced (minimum one per day) or at intervals determined by the City of Flowood. The contractor shall report all quality control tests upon request by the City. While the contractor is responsible for production quality control of the HMA, the city may obtain and test HMA samples on a random basis during production. A minimum of five

roadway density tests shall be conducted for each day's production. For each day's production found not to meet the density requirement of 92.0 percent of maximum density may remain in place if approved by the City Engineer.

Any day's production or portion thereof with density of less than 90.0 percent maximum density shall be removed and replaced at no additional cost to the City of Flowood.

e. Concrete: Testing requirements include, at a minimum, evaluating the quality of the concrete for every 50 cubic yards or fraction there of concrete placed each day. The slump, air content and temperature of the concrete mixture shall be evaluated. Compressive strength specimens shall be molded to determine seven and 28-day strengths. These quality control field tests shall be run by an ACI/MDOT certified field technician. Compressive strength tests shall be conducted by a certified laboratory. Concrete that does not meet the required 28-day compressive strength shall be removed and replaced at no cost to the City of Flowood.

Material Submittals and Job Control Sampling and Testing

Layer	*Tests*	*Frequency*
Subgrade	Classification	1,000 C. Y.
	Proctor	1,000 C. Y.
	Density	300-500 ft. per layer
	Subgrade profile	200-500 ft. intervals
	Proof rolling	Final layer
	Material submittal	5 days prior to construction
Lime treated Subgrade	Proctor	1,000 C. Y.
	Proof rolling	Final layer
	Density	300-500 ft. per layer
Granular base	Classification	1,000 C. Y.
	Proctor	1,000 C. Y.
	Proof rolling	Final layer
	Density	300-500 ft. per layer
	Material submittal	5 days prior to construction
Hot mix asphalt	Mix tests	1 per 500 tons
	Density	5 per day
	TSR	1 per 10 days of production
	Mix design	10 days prior to construction
Concrete	Compressive strength	50 C. Y.
	Air content	50 C. Y.
	Slump	50 C. Y.
	Temperature	50 C. Y.
	Mix design	10 days prior to construction

402.8 Pavement Thickness Requirements

a. Pavement thickness shall be prepared by a licensed engineer using the AASHTO method or alternative method approved by the City.

b. Pavement thickness shall be based on the soil's classifications, subgrade, class of the street, anticipated traffic loads, and other relevant items as is typical or required by the City. For local streets, a required minimum is set below.

c. For asphalt streets classified as "local", the minimum allowable pavement thickness shall be 3" of hot bituminous base course (BB-1, Type 6) and 3" of hot bituminous surface course (SC-1, Type 8).

d. For concrete streets classified as "local", the minimum allowable pavement thickness shall be 6" of reinforced concrete pavement.

e. All pavement thicknesses shall be verified for actual expected traffic volumes and loadings using appropriate design parameters for subgrade soils and pavement structure materials. Pavement sections for heavy traffic streets shall be designed according to anticipated heavy truck volumes to insure adequate structural capacity.

SECTION 403 WATER SUPPLY SYSTEM

403.1 Water mains properly connected with the City of Flowood's water supply system shall be provided through a system of appropriate piping and valves and shall be designed and constructed in such a manner to adequately serve all lots shown on the subdivision plat for both domestic and fire protection purposes and will adhere to the minimum requirements set forth hereinbelow:

a. Water distribution systems shall be designed using the Hardy-Cross Analysis. The Hazen-Williams formula shall be used in computing head loss.

b. Water distribution systems shall be designed for the peak hour flow or the maximum day flow plus fire flow whichever is greater.

c. The water distribution system shall be designed such that the following range of dynamic pressures are provided: fifty psi to eighty psi (50-80 psi) for average daily flows; twenty psi to forty psi (20-40 psi) for peak hour flows; twenty psi to thirty psi (20-30 psi) for maximum day flow plus fire flow. The minimum dynamic pressure at any point shall be twenty (20) psi.

d. The maximum design velocity in distribution mains shall not exceed five (5) fps.

e. Water distribution mains shall be laid out on a grid system with cross-connections at cross-streets. Dead-end pipes shall be avoided whenever possible.

f. Valves shall be installed at each intersection or change in pipe size and shall be placed such that no single case of pipe breakage shall require shut-off from service of an artery of more than five-hundred feet (500') of pipe in high value districts, more than eight-

hundred feet (800') of pipe in any area, or more than twelve lots in a subdivision.

g. The distribution and spacing of hydrants shall ultimately be determined by the City fire department on a project-by-project basis. At a minimum, the spacing of fire hydrants in the residential areas shall be such that no lot will be in excess of 400 feet from a fire hydrant with the measurement being made along the streets. In commercial districts, fire hydrants shall be spaced a minimum of 300'. All fire hydrants shall include a separate valve.

h. Main pipe size for water mains shall be a minimum of six inches where the line length is 600' or less and is tied to or loops back into a larger diameter line or a minimum of eight inches beyond those conditions.

i. For Site Plan Projects, the minimum pipe size shall be as determined by the Owner's design team.

j. Water lines shall be gridded or looped with more than one source of supply for properties that are to be subdivided unless otherwise approved by the City.

k. Service lines for residential houses shall be a minimum of 1". Water service line locations shall be marked with a "W" on the curb face. Services lines shall be CTS high density polyethylene tubing (CTS) pipe SDR 9 for use in potable water applications.

l. All commercial service lines and residential sprinkler lines must be equipped with an appropriate backflow preventer as approved by the Mississippi State Department of Health.

m. A 12-gauge copper clad steel tracer wire shall be installed along all water mains and service lines. The tracer wire shall have HDPE insulation intended for direct bury, color coated per APWA standards for the water utility and have connectors rated for direct bury. All tracer wire shall be installed as a complete system, complete with connectors, magnesium anode ground rods, and terminal stations at each fire hydrant, water valve, and termination locations. All tracer wire installations shall undergo a location test by the city prior to acceptance. Any areas not able to be located using typical low frequency line tracing equipment shall be repaired by the Subdivider. Tracer wire shall be equal to Copperhead 1230-HS or approved equal and all accessories shall be Copperhead Industries or approved equal.

n. The water main pipe shall be PVC as described below unless otherwise directed by the City.

403.2 PVC Water Main Pipe

a. All PVC pipe and fittings four (4) inches to twelve (12) inches in diameter shall conform to the latest edition of AWWA C-900 and shall be made from Class 12454-A or B materials per the latest edition of ASTM D-1784. Pipe shall be a minimum of SDR 18 unless otherwise specified, for a minimum working pressure rating of 235 PSI. All pipes shall conform to the outside diameter (OD) dimensions of ductile iron pipe to facilitate

use of DIP fittings, standard cast iron valves and specials. All joints shall be elastomeric sealed conforming to the latest edition of ASTM F-477. Gasketed joint assembly shall meet the requirements of ASTM D 3139. All pipe that is noted to have nitrile gasket shall be clearly marked to ensure pipe can be easily identified for installation in the proper location.

b. All PVC pipe (3) inches and smaller in diameter shall conform to the latest edition of ASTM D-2241 and shall be made from Type 1120 material. Pipe shall be a minimum of SDR 26 unless otherwise specified, for a working pressure of 150 PSI. All joints shall be solvent welded in accordance with the latest edition of ASTM D-2855 with the solvent cement conforming to the latest edition of ASTM D-2564.

c. Pipes 12" in diameter or greater shall be of material as required by the City.

d. All jointing shall be made in accordance with the manufacturer's recommendations.

e. Al pipes shall bear the National Sanitation Foundation (NSF) seal of approval.

f. Fittings for PVC pipe water mains 6" and larger shall be ductile iron as per the following section.

403.3 Ductile Cast Iron Pipe & Fittings

a. Ductile iron pipe shall be water pipe manufactured in accordance with AWWA C 151 (ANSI A21.51).

b. Fittings can be either AWWA C110 (full size fittings) or AWWA C153 (compact fittings).

c. All fittings shall be ductile iron and shall conform to the latest edition of AWWA specifications for ductile iron fittings.

d. All ductile iron pipe and fittings shall be factory-coated on the outside with coal tar enamel conforming to the latest edition of AWWA C105 (ANSI A21.5) and lined inside with a minimum of 1/16 inch cement-mortar lining in accordance with the latest edition of AWWA C104 (ANSI A21.4).

e. All pipe and fittings shall be tested for minimum 150 PSI water working pressure, laying conditions Type 2, flat bottom trench without blocking, tamped, backfilled and under five (5) feet of cover.

f. All pipe and fittings shall be encased with an 8-mil thick loose polyethylene encasement in accordance with the latest edition of AWWA C-105 (ANSI A21.5).

g. Joints for ductile cast iron pipe shall be slip-on type unless otherwise specified. Slip-on joint shall conform to the latest edition of AWWA C 111 (ANSI A21.11) except that the joints shall be made with a special gasket seal Super-Bel Tite as manufactured by the Clow Corporation or approved equal. Lubricants shall be non-toxic, odorless,

tasteless and shall not support bacteria and shall be specifically manufactured for the pipe utilized.

h. Mechanical joint pipes shall conform to the latest edition of AWWA C 111 (ANSI A21.11).

i. All joints for fittings, valves and specials shall be mechanical joints unless otherwise specified. Meg-a-lug or approved equal required on all fittings.

j. If flexible joint or river crossing pipe is required and/or indicated in the project plans or specifications the joint shall be designed for a maximum deflection of 15 degrees, and a maximum working pressure rating of 250 psi. The type shall be the USIFLEX joint as manufactured by U.S. Pipe or an approved equal.

k. All fittings shall be cast from ductile iron in accordance with ANSI/AWWA C153/A21.53. Fittings shall be listed by an approved certifying agency as conforming to the requirements of ANSI/NSF 61. The working pressure rating shall be 350 psi.

403.4 The minimum requirements set forth apply to single family residential detached developments and small-scale commercial developments (scale as determined by the City) and may be increased for higher density residential or commercial developments should conditions warrant.

403.5 All elements of any distribution system connected to the municipal water distribution system shall be installed in accordance with the recommendations of and approval of the Mississippi State Department of Health. The physical connection between the system installed by the subdivider and the municipal system shall not be made until the system being installed has been sterilized and a clearance report has been obtained from the Mississippi State Department of Health.

403.6 The City shall be notified twenty-four (24) hours in advance prior to the connection of any water main to the City of Flowood's system. The City of Flowood shall make all physical connections and shall be reimbursed by the developer per the City of Flowood Fee Schedule unless otherwise directed by the City.

403.7 Water Line Testing: The following tests shall be required on all new water lines installed that are intended to be maintained by the City.

a. Hydrostatic Test:

1. A hydrostatic test(s) shall be performed on the newly laid water system by the Contractor with a hydrostatic pressure of one-hundred fifty (150) psi. This test shall last for a minimum of four (4) hours unless a variance for unusual conditions is approved by the City Engineer.

2. The test shall be performed so that all 4 hours of the test are during normal work hours for the City of Flowood.

3. The line shall be slowly filled with water and all air expelled from the line prior to performing pressure test.

4. Test pressure shall not vary by more than plus/minus 5psi during the duration of the test.

5. All exposed items such as pipes, fittings, valves, hydrants, etc. shall be carefully examined by the Contractor during the test. Any cracked or defective items shall be removed and replaced by the Contractor and then the test shall be repeated.

b. Leakage Test:

1. A leakage test shall be conducted by the Contractor along with the pressure test. The duration of each leakage test shall be 4 hours. During the test, the main shall be subjected to a pressure of 150 psi unless shown to be different in piping schedule. This test can be performed at the same time as the pressure test.

2. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereto to maintain the specified leakage test pressure after the air in the pipe has been expelled and the pipe is filled with water.

3. No pipe installation will be accepted if the leakage is greater than that determined by the formula "L=(SD(P^0.5))/148,000". Where "L" is the allowable leakage in gallons per hour, "S" is the length of pipe tested in feet, and "D" is the nominal diameter of the pipe measured in inches and P is the average test pressure during the hydrostatic test, in pounds per square inch.

c. If, in the opinion of the City Engineer, additional testing is required, such additional testing shall be performed by the developer at his own expense. All water mains, hydrants, valves, service laterals and appurtenances shall be constructed in accordance with the approved construction plans and any standard drawings and specifications adopted by the City of Flowood, Mississippi.

SECTION 404 SANITARY WASTEWATER COLLECTION SYSTEM

404.1 A means of collecting and transporting sanitary wastewater from each lot to a main in the interceptor wastewater system maintained by the City of Flowood shall be provided through a system of appropriate wastewater mains and appurtenances beginning at the nearest municipal main and terminating at the front lot (street) property line unless topography makes service at some other location on the lot necessary. Within developments other than subdivisions, the sanitary wastewater main shall terminate as determined by the City Engineer. All service lines shall terminate above ground and marked with a metal T-post painted green.

404.2 All wastewater mains shall connect into the City of Flowood's wastewater collection and transport system in a manner to commensurate with future need and shall be designed to provide any additional capability necessary to serve other properties located upstream in the sanitary basin served by the wastewater main.

404.3 All elements of any wastewater collection and transport system connected into the City of Flowood's wastewater system shall be installed in accordance with the recommendations of and approval of the Mississippi Department of Environmental Quality and the City of Flowood.

404.4 Minimum Design Standards: The minimum design standards of the sanitary wastewater collection system for each subdivision shall conform to the following:

a. Minimum main line pipe size: eight inches (8")

b. Minimum pipe slope: four tenths percent (0.400%) for eight inch (8") pipe, (Manning Formula)

c. Minimum velocity: two feet (2') per second

d. Maximum velocity: nine feet (9') per second

e. Maximum depth of flow:

Collection	***Sub-interceptor***	***Interceptor***
8"	10",12",15"	18" UP
1/2 Full	3/4 Full	Full

f. Service line pipe size: four inches (4") for single service, 6" for dual/split. Service line locations shall be marked with a "Y" on the curb.

g. Waste per load person: one hundred (100) gallons per day including base infiltration.

h. People per house: 2.8

i. Peak Factor: P.F. = $(18+(P)^{0.5})/(4+(P)^{0.5})$ where P = in thousands (minimum of 3)

j. Maximum manhole separation: four hundred feet (400') with manholes required at each grade change and horizontal alignment change.

k. Minimum cover: four feet (4')

l. Top manhole elevation: ground elevation, minimum. In flood prone areas eighteen inches (18") above 100-year flood elevation or known high water mark in areas that are prone to flood but are either not in a flood zone or where no base flood elevation is set. In non-developed areas, a minimum of twenty-four inches above natural ground elevation.

404.5 Gravity Collection Lines

a. PVC sewer pipe and fittings smaller than 18” shall be unplasticized polyvinyl chloride meeting the minimum of SDR 26 of the requirements of ASTM Specification D 3034 and with a minimum "pipe stiffness" (F/Y = 115 psi at 5% deflection - maximum allowable for installed pipe for SDR 26) when tested in accordance with ASTM D 2412. All pipe and fittings shall be joined by means of an integral wall bell and spigot joint and sealed with a rubber ring conforming to ASTM D 3212. The pipe and fittings shall be shipped to the job with a solid cross-section rubber sealing ring securely locked in place in the bell.

b. PVC sewer pipe and fittings greater than 18” shall be unplasticized polyvinyl chloride meeting the minimum of SDR 26 of the requirements of ASTM Specification F 679 and with a minimum "pipe stiffness" (F/Y = 115 psi at 5% deflection - maximum allowable for installed pipe for SDR 26) when tested in accordance with ASTM D 2412. All pipe and fittings shall be joined by means of an integral wall bell and spigot joint and sealed with a rubber ring conforming to ASTM D 3212. The pipe and fittings shall be shipped to the job with a solid cross section rubber sealing ring securely locked in place in the bell

c. All wastewater collection mains, laterals and appurtenances shall be constructed in accordance with the approved construction plans, standard drawings, and approved specifications.

d. All jointing shall be made in accordance with the manufacturer’s recommendations.

e. All pipes shall bear the National Sanitation Foundation (NSF) seal of approval.

f. Ductile iron piping shall be allowed in certain conditions with City approval. Pipe requirements in such cases shall be provided to the Developer by the City.

404.6 Sanitary Sewer Manholes

a. Manhole cover shall be set flush when located in pavement, to 0.10’ above adjacent finished grade in grassed areas that are to be maintained and to elevations required in Section 404.4.l. In areas prone to flood, requirements of Section 404.4.l shall govern.

b. Areas around manholes shall be graded to drain away from manhole cover.

c. All commercial or residential finished floor elevations must be a minimum 6” above the elevation of the top (rim) of the nearest manhole in the sewer network or as directed by the City.

d. Minimum manhole diameter shall be forty-eight inches (48”) and shall be increased as required to 60” dia. Or 72” dia. due to pipe sizes and angles in/out as required by the City.

e. Sanitary sewer manholes shall be precast concrete with reinforced riser sections, and

eccentric cone or flat slab top section and a base section. The riser section shall conform to the latest edition of ASTM Standard Specification C 478.

f. Precast manhole bases shall be of sufficient strength to withstand the loads being imposed upon them.

g. The interior surfaces of all manholes shall be coated with 24 mills coal tar epoxy in strict accordance with the coating manufacturers recommendations and precast with a crystalline waterproofing agent.

h. Butyl rubber or hydrocarbon resin material to be used at all manhole riser joints.

i. Rubber gaskets shall be O-ring type conforming to the requirements of the latest ASTM Standard Specification A 443.

j. Frames and covers for manholes shall have a minimum opening of 24" and shall manufactured and tested in accordance with AASHTO M-306-07, ASTM standard A 48/A 48M, Standard Specification for Gray Iron Castings. Castings shall be manufactured to the sizes and shapes as illustrated on the Construction Drawings or as specified by the manufacture's model number. Frames shall be furnished with a lip protruding onto and fastened to the reinforced concrete cone.

404.7 Lift Stations & Wet wells

The use of wastewater lift stations should be minimized. However, when lift or pump stations cannot be avoided, they should be designed for easy maintenance, maximum operating life and adequate pumping capacity. The design calculations must show flow rates and velocities for the lift or pump station and force main. Some requirements for lift or pump station include but are not limited to the following:

a. Wet-well tops shall be a minimum of 18" above the Base Flood Elevation or known high water mark in areas that are prone to flood but are either not in a flood zone or where no base flood elevation is set.

b. All commercial or residential finished floor elevations must be a minimum 6" above the elevation of the top (rim) of the wet-well in the sewer network or as directed by the City.

c. Wet wells shall precast concrete and shall be manufactured and installed in the same manner as precast concrete manholes.

d. Wet-well, manhole where force main is connecting and a minimum of 1 manhole upstream of wet-well shall be coated with 100% solids epoxy coating.

e. Wet wells shall be of adequate size for pump removal but, at a minimum, 60" diameter.

f. Minimum of two (2) pumps. Each pump to have capacity to handle the expected peak load.

g. Adequate controls with overload and lightning protection and alternators.

h. Adequate pump housing and heaters to prevent freezing.

i. Adequate capacity for not more than seventy-five percent (75%) duty cycle under peak flow conditions. The minimum wet-well diameter size shall be 60” for subdivisions.

j. Necessary access roads and security chain link fencing with double gate. Access roads shall be 12 feet wide with 5-inch-thick crushed limestone base over filter fabric.

k. Velocities in the force main shall be between 2.5 and 8 fps.

l. Adequate vented wet-well.

m. Valves on discharge lines located outside of wet-well in a separate valve pit structure. The structure shall be capable of the underground housing of the discharge piping manifold arrangement to include all valves and to be of sufficient size to allow for ease of maintenance.

n. Non-corrosive side rails with stainless steel lifting chains on submersible pumps.

o. Each wet-well and discharge piping valve pit shall have aluminum access hatches. The frame shall be encased in a concrete cover. Minimum hatch openings shall be 36" x 36" for wet-wells and 30" x 30" for valve pits or larger as required for proper access to the equipment and potential removal of such. Hatches shall be equal to Haliday Series H except when subject to traffic, an H-20 loading design is required.

404.8 Force Main Sewer Lines

a. Force main lines shall be connected to an existing City of Flowood manhole with a drop connection as directed by the City.

b. Force main pipes shall be sized as required for the development. The City may require the force main to be a larger size to allow the force main to service additional areas and allow for future capacity. The cost for the larger pipe shall be the responsibility of the Subdivider. Pumps shall be sized to efficiently function with the selected or required force main size.

c. Tracer wire is required along all force main lines. Lines shall be marked with marker posts with connection terminals along the length of pipe spaced out as required for proper connectivity.

d. The force main pipe shall be constructed of either:

    1. PVC pipe, pressure rated at 200 with a standard dimension ratio (SDR) of 25 for both barrel and joint dimensions. The joints shall be the factory installed heavy-duty type elastomeric gaskets in conformance with the requirements of ASTM F-477, or

2. High Density Polyethylene Pipe (HDPE) listed be the Plastic Pipe Institute (PPI) with a designation of PE 3408/3608 and have a minimum cell classification of 345434C, D or E as described in ASTM D3350. The pipe material shall meet the requirements for Type III, Class B or C, Category 5, Grade P34 material as described in ASTM D1248. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. Pipe (excluding black colored pipe) stored outside shall not be recycled. Pipe and fittings shall be made in conformance with ASTM F714 and ASTM D3261 as modified for the specified material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. It shall be uniform in density and other physical properties. All HDPE piping shall be designed with an adequate wall thickness to withstand loading, and under no conditions shall the SDR measurements of the pipe be greater than 11. Fittings shall also be SDR 11 maximum unless otherwise specified. Pipe ends shall be connected using butt fusion per ASTM D2657 or using stainless steel couplings of a design approved by the Engineer. The pipe shall be provided with a lightly pigmented interior coating to aid in pipeline inspection.

e. Air release vacuum valves shall be installed at all high points on force mains. Valves shall be placed in a concrete pit as per City's Standard Details.

404.9 Gravity Sewer Testing

a. Air Pressure Testing:

1. The sewer line shall be tested between manholes. The line shall be sealed at both ends. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice at one end of the line. the air supply line will contain an on-off gas valve and a pressure gauge having a range of zero to 15 psi. The gauge shall have minimum divisions of .10 psi and shall have an accuracy of ± .04 psi. Pressuring equipment should include a regulator or relief valve to avoid over- pressuring and damaging an otherwise acceptable line.

2. The pipeline under test shall be pressurized to 4 PSIG for a period of no less than 5 minutes. If necessary, air should be added to the line to maintain the pressure above 3.5 PSIG. After stabilization period, the gas valve shall be closed. When the line pressure drops to 3.5 PSIG, commence timing with a stopwatch. The stopwatch should be allowed to run until time as line pressure drops to 2.5 PSIG. Then the watch should be stopped, and the time lapse compared with the allowable time lapse in the following table and for pipe size and leakage allowance specified by the engineer. If the time lapse is greater than that specified, the section undergoing testing shall have passed, and the test may be discontinued at that time. If the time is less than that specified, the line has not passed the test and the contractor will be required

to find the leak(s), repair them and retest until the section passes at his own expense.

Line Pressure Air Test Using Low-Pressure Air Specification

Time Required for a 1.0 PSIG Pressure Drop for Size and Length of Pipe Indicated

Pipe Diameter (in)	*Minimum Time (min)*	*Length for Min. Time (ft)*	*Time for Longer Length (sec)*	*Specification Time for Length (L) Shown, Min.'s*							
				100′	**150′**	**200′**	**250′**	**300′**	**350′**	**400′**	**450′**
4	3:46	597	.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

b. Deflection Testing: 100% of the PVC gravity sewer main (not including laterals) shall be tested in the following method:

1. Use a "go, no go" mandrel which is sized to such dimensions that it will not "go" when encountering a deflection greater than 5%. The instructions for its use are as follows.

2. Test shall be conducted after final backfill has been placed at least 30 days.

3. No pipe shall exceed a deflection of five percent.

4. Mandrel shall have a diameter equal to 95% of the inside diameter of the pipe being tested.

5. Test shall be performed without mechanical pulling devices.

6. Completely flush the line making sure the pipe is clean of any mud and debris that would hinder the passage of the mandrel.

7. During the final flushing of the line, attach a floating block or ball to the end of the mandrel, pull rope and float the rope through the line. (A nylon ski rope is recommended.)

8. After the rope is threaded through the line, connect the pull rope to the

mandrel and place the mandrel in the entrance of the pipe.

9. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

10. By hand, remove all the slack in the pull rope and place a tape marker on the top at the end of the pipe where the mandrel will exit, determining the location of the mandrel in the line.

11. By hand, draw mandrel through the sewer line. If any irregularities or obstructions are encountered in the line, they shall be corrected by the contractor.

12. If a section with excessive deflection is found, locate it; dig down and uncover the pipe; inspect the pipe; if any damage is found, replace it; if pipe is not damaged, replace the thoroughly tramp haunching and initial backfill; replace remainder of backfill.

13. Retest this section for deflection and air tightness.

c. Infiltration Testing: In instances where a sanitary sewer line is installed below the groundwater table or in instances where water infiltration is observed during construction or dewatering is necessary during construction, the sewer line shall also be tested by the infiltration test. The testing shall be conducted by the CONTRACTOR in the presence of the City Engineer. The Engineer shall be given at least 24-hour notice before tests are to be conducted. The infiltration test shall be conducted between adjacent manholes. The outlet pipe on the downstream manhole shall be plugged and tested for water tightness to the satisfaction of the City Engineer. The accumulated depth of water in the downstream manhole shall be read at 12-hour intervals for two days and the infiltration rate calculated from the data obtained. Any section exceeding an infiltration rate of 200 gallons/day/inch/diameter/mile shall be re-laid. If the leakage in any reach exceeds the allowable maximum, the reach shall be re-tested after the leaks are repaired. This means that the Contractor shall locate and repair leaks as necessary to pass the infiltration test.

404.10 Force Main Testing

a. Hydrostatic Test for Force Main Sewer Lines:

1. After the pipe has been laid and partially backfilled, all newly laid pipes, or any valved section thereof, shall be subjected to a hydrostatic pressure of 150 psi. The duration of each pressure test shall be at least two (2) hours. Pressure shall not vary by more than ± 5 psi for the duration of the test.

2. Each valved section of pipe shall be slowly filled with water and the specified test pressure, based on the elevation of the lowest point on the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The Contractor shall furnish all necessary assistance for

conducting the test.

3. Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all air has been expelled, the corporation cocks shall be closed, and the test pressure applied.

b. Leakage Test for Force Main Sewer Lines:

1. A leakage test shall be conducted by the Contractor at his expense and in the presence of the Engineer or his representative for installed force main line. The duration of each leakage test shall be 12 hours. During the test, the main shall be subjected to a pressure of not less than 150 psi measured at the average elevation of the pipe to be tested. The leakage test shall be conducted by the Contractor after the pressure test has been satisfactorily completed.

2. Leakage shall be defined as the quantity of water that must be supplied in the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure, within 5 psi, after the air in the pipe has been expelled and pipe has been filled with water.

3. No pipe installation will be accepted if the leakage is greater than that determined by the formula $L=(SD\sqrt{P})/133,200$ where L is the allowable leakage in gallons per hour, S is the length of pipe tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test in psi gauge.

4. If any test of pipe laid discloses leakage greater than that specified, the Contractor shall at his own expense locate and repair the defective joints until the leakage is within the specified allowance. All visible leaks shall be repaired regardless of the amount of leakage.

SECTION 405 GREASE AND GRIT TRAPS

405.1 Discharge from Fats Oils and Greases (FOG) are governed by the Flowood Grease Interceptor Ordinance. The purpose of this ordinance is to:

a. Prevent the introduction of wastewater containing oil and grease and/or solids in amounts which may cause stoppages or obstruction of flow, or in any other way prevent or inhibit operation of the sanitary sewer collection system.

b. Protect the environment, and the health, safety, and welfare of the public and the City of Flowood.

c. Set forth basic requirements for the application of grease traps, grit traps, interceptors, and separators.

405.2 General Requirements:

a. Commercial establishments that generate grease and/or grit will be required to have traps, interceptors and/or separators.

b. Grease or grit trap/interceptor must be sized in accordance to plumbing code or engineer design and the minimum shall be 750 gallons, whichever is greater.

c. Secondary interceptors for car washes with a pressure washer must be sized in accordance to plumbing code or engineer design and the minimum shall be 750 gallons, whichever is greater.

d. Secondary interceptors for carwashes without a pressure washer must be sized in accordance to plumbing code or engineer design and the minimum shall be 500 gallons, whichever is greater.

e. Primary and/or secondary traps shall be interceptor style, such as rectangular with a baffling system. No septic tank configuration or round tanks will be allowed.

f. Traps shall be designed and constructed to prevent fats, oils, or grease from entering the sanitary sewer in concentrations greater than 100 mg/l (or as local limits are amended).

g. Traps shall be easily accessible for cleaning, maintenance, and inspection.

h. Sample port/well will be required for al200l grease and grit traps/interceptors on the discharge side and be accessible for sampling.

i. Plumbing plan must show how the interior building lines will be routed to the grease trap/interceptor.

j. Sanitary sewer/Utility plan must show how grease or grit trap/interceptor will connect to the existing sanitary sewer system.

k. Details of grease and grit trap/interceptor must be shown on plans, provide model type and size.

l. Detail of sample port/well must be shown on plans.

m. Commercial/industrial establishments that generate wastewater from processes to be discharged to sanitary sewer will require prior approval and possible pretreatment.

n. Listed above are just a portion of the requirements of grease and grit traps that are to be installed in the City. For additional and more detailed information, see the Flowood Grease Interceptor Ordinance. Should there be a discrepancy between the information shown herein and the Grease Interceptor Ordinance, the Grease Interceptor Ordinance shall govern.

SECTION 406 STORM DRAINAGE SYSTEM

406.1 General Requirements:

a. The information in the following sections in relation to storm drainage system design, requirements, materials, installation, inspection, etc. shall apply to storm drainage systems installed in all proposed public or private ROWs and on private commercial or industrial properties (Site Plan Projects) being developed.

b. The subdivider shall be responsible for the construction of all drainage facilities.

c. The design of storm water drainage systems shall insure adequate control of storm water runoff using properly sized and positioned drainage structures including but not limited to curb and gutter, curb and grate inlets, storm water sewer pipe, box culverts, intersectional drains, open ditches, and bridges.

d. Drainage facilities shall be designed to prevent excessive runoff onto adjacent properties.

e. A before and after development stormwater runoff analysis shall be provided to the city engineer for evaluation as to the significance of offsite impact. The design criteria for comparison shall be the appropriate frequency event as established below.

f. Storm water detention shall be provided as required by Article V, Discharge Management. See said article for more detailed information.

g. Cross drains shall be provided to accommodate all-natural water flow and shall be of sufficient length to permit construction of a full width roadway including side slopes. Headwalls or flared end sections, aprons, channel bottom and slope protection shall be provided at the upstream and discharge end of the cross-drain as required by the City Engineer.

h. No individual, partnership or corporation shall deepen, widen, fill, reroute or change the location of any existing ditch, stream, or drainage canal without first submitting plans and obtaining written permission from the City Engineer.

i. The Subdivider may be required to install drainage structures in excess of those required to adequately serve the Subdivision or property in the best interest of the City as a condition precedent to approval of the Subdivision or area to be served by any street and contiguous downstream areas.

406.2 Sizing Storm Drain Culverts, Side Drains and Open-Ditch Design:

a. The minimum allowable culvert size in City maintained storm drain systems shall be 15” diameter. This includes public or private streets.

b. Pipe sizes on commercial Site Plan Projects that are outside public or private ROW may be 12” diameter provided the design calculations indicate it is capable of conveying the

design storm.

c. Storm drain culverts and open ditches for flows that generate within the boundary of the proposed project shall be designed to accommodate a 25-year event. This includes driveway culverts in an open ditch development.

d. Storm drain culverts and open ditches conveying runoff from outside the limits of the property (major streams) shall be designed to accommodate a 100-year event.

e. Curb inlets and grate inlets shall be designed to not surcharge during the 25-year event.

f. Curb inlet and storm drain culverts that outlet into a detention/retention basin or large channel shall be modeled and designed to not surcharge when considering the tailwater elevation at the outlet for the 25-yr event.

g. Open ditches shall have 1' of freeboard above the high-water mark for the design storm.

h. Open ditches that outlet into a detention/retention basin or large channel shall be modeled and designed to not surcharge when considering the tailwater elevation at the outlet for the 25-yr event.

i. At each location where a storm drain system exits the property, the system shall be modeled with a 100-year tailwater elevation. The information provided from this model shall be used by the designer to prepare a plan for secondary drainage paths and to grade the site and set finished floor elevations that would not be inundated during such an event.

j. Open ditches between lots or behind lots in a proposed development is not desired but shall be considered by the City in certain, extenuating conditions.

k. Open ditches with a velocity greater than 5 feet per second shall be lined with solid sod, riprap, concrete or turf reinforcement mat (TRM) designed for the anticipated peak velocities. Ditches with significant changes in direction or containing areas where excessive flows are likely shall be armored with riprap or TRM on the outside radius.

l. Side-slopes in open ditches are desired to be 4:1 or flatter but shall not be more than 3:1 unless the channel is lined with riprap, grid pavers, concrete paving, gabions or retaining walls.

m. Calculations for detention and other requirements addressed in Article V, Discharge Management shall be included in this report.

n. Calculation of design flows: All pipes, side-drains and open ditches shall be designed using the rational method and the applicable intensity-duration-frequency curve as shown below.

RATIONAL FORMULA: Q (cfs) = CiA

Symbol	*Unit*	*Description*
Q	cfs	Discharge Computed by Rational Method
C*	--	Coefficient of Runoff
i	in/hr	Intensity of Rainfall
A	Acres	Area of Drainage Basin

**The Runoff Coefficient "C" is obtained from criteria provided in Table A.*

Rainfall Intensity, "i", in inches per hour, shall be estimated for a given design storm using the following formula and the variables provided in Table B:

RAINFALL INTENSITY (in/hr): $i = B/(T_c + D)^E$

where T_c = time of concentration, the time required for an entire watershed to contribute to runoff at the point of interest for hydraulic design

Note: For drainage basins that are larger than 100 acres, designer shall use the SCS method to determine peak flow rates.

See charts on following page for Rational Method Runoff Coefficients which shall be based on the hydrologic soil group of the drainage basins and IDF curve variables.

Table A: Rational Runoff Coefficients, C, As A Function Of Hydrologic Soil Group

	Hydrologic Soil Group			
	A	**B**	**C**	**D**
Cultivated Land	0.49	0.67	0.81	0.88
Pasture or Range Land				
Fair Condition (50% < Grass Cover <75%)	0.38	0.63	0.78	0.84
Good Condition (Grass Cover > 75%)	N/A	0.25	0.51	0.65
Meadow: Good Condition	N/A	N/A	0.44	0.61
Wood or Forest Land				
Thin stand, poor cover, no mulch	N/A	N/A	0.59	0.79
Good Cover	N/A	N/A	0.45	0.59
Open Spaces, Lawns, Parks, Golf Courses, Cemeteries, etc.				
Fair Condition (50% < Grass Cover <75%)	N/A	0.45	0.63	0.65
Good Condition (Grass Cover > 75%)	N/A	0.25	0.51	0.74
Commercial and Business Areas (85% Impervious)	0.84	0.90	0.93	0.96
Industrial Districts (72% Impervious)	0.67	0.81	0.88	0.92
Residential				
1/8 acre or less (Town House)	0.59	0.76	0.86	0.90
1/4 acre	0.25	0.55	0.70	0.80
1/3 acre	N/A	0.49	0.67	0.78
1/2 acre	N/A	0.45	0.65	0.76
1 acre	N/A	0.41	0.63	0.74
Paved Parking Lots, Roofs, Driveways, etc.	0.99	0.99	0.99	0.99
Streets and Roads				
Paved with curb and storm sewer	0.99	0.99	0.99	0.99
Gravel	0.57	0.76	0.84	0.88
Dirt	0.49	0.69	0.80	0.84

Table B: Rainfall Intensity (i) Equation Variables (Rational Method)

Storm Event	***B***	***D***	***E***
1-year	26.5204	4.70	0.6603
2-year	30.5583	4.90	0.6619
5-year	33.4660	4.40	0.6398
10-year	34.6039	3.80	0.6165
25-year	36.9640	3.30	0.5945
50-year	37.9787	2.80	0.5752
100-year	39.2528	2.40	0.5599

SECTION 407 CURB AND GUTTER DESIGN, INLET DESIGN IN RELATION TO STREET LAYOUT AND GRADES

407.1 The horizontal and vertical alignment of streets shall be compatible with the storm water runoff system and drainage design.

407.2 Street grades shall be coordinated with lot drainage as proposed in the grading plan. Street grades shall be a minimum of 6" above the 100-year frequency flood level.

407.3 The hydraulic capacity of the curb and gutter shall be determined by generally accepted engineering procedures taking into consideration roughness and street cross-slope.

407.4 The hydraulic capacity of curb inlets shall be determined by generally accepted engineering procedures taking into consideration inlet geometry and characteristics of the gutter flow.

407.5 Curb inlets shall be spaced to limit the spread of water to not more than one quarter (1/4) of the street width during a design storm of five (5) year return period and fifteen (15) minute duration.

407.6 Inlets shall also be placed at all low points in the gutter grade, at intersections where necessary to prevent gutter flow from crossing traffic lanes of an intersecting street or at points of special concern designated by the City Engineer.

407.7 Drainage structures shall not be placed in the curb radius at intersections to prevent damage from heavy trucks and vehicles. Structures shall be placed no closer than the end of the intersection radii or beginning of the tangent. Grades through radius shall force storm water to drain to inlets.

407.8 The requirements mentioned above shall apply to the placement of drainage structures in relation to the layout and hydraulic design of streets, curb and gutter and inlets.

SECTION 408 HYDRAULIC SUBMITTALS FOR STORM DRAIN NETWORKS

408.1 A hydraulic report shall be submitted with the construction plans providing the City with information used to prepare the design. This report shall include but not be limited to the following:

a. Map showing delineated drainage basins used for sizing each inlet, pipe, or open ditch.

b. Information on individual drainage basins such as: drainage area, hydraulic length, hydraulic slope, runoff coefficient, Intensity, and Q_{25}

c. Hydraulic analysis of the storm drain network showing the pipe flow rate, pipe capacity, flow velocity, hydraulic grade line (HGL), inlet or pipe invert, inlet top, etc.

d. Individual inlet spread calculations shall be included in the hydraulic report. See 407.5 for inlet spread design requirements.

SECTION 409 STORM DRAIN CULVERT MATERIALS & CONSTRUCTION GENERAL INFORMATION

409.1 The structural design of all box culverts or bridges shall conform to the design standards of the Mississippi State Highway Department for a load capacity of twenty (20) tons minimum.

409.2 Bridges shall be constructed of either reinforced concrete or structural steel with a reinforced concrete deck. No mud sills or timber grills will be permitted for bridge foundations. All bridges shall be provided with substantial guard rails and sidewalks.

409.3 All culverts, cross-drainage and storm sewers shall be constructed in accordance with any Standard Specifications and Standard Drawings adopted by the City of Flowood, Mississippi and the Mississippi Standard Specification for Road and Bridge Construction (Latest Edition).

409.4 All culverts, cross drainpipes, and storm drainpipes shall be reinforced concrete pipe (R.C.P.), Class III or High-Performance polypropylene pipe, dual wall with a smooth interior and shall be installed per the manufacturer's recommendation for the proposed purpose and location. See Section 410 for more requirements.

409.5 Dual wall corrugated pipes (C.P.P.) may be used for minor roof or yard drains in lieu of HP for site plan projects and pipe that is on private property that will not be maintained by the City.

409.6 Open ends of all culverts (upstream and/or downstream openings) shall have a flared end section.

409.7 Other materials may be approved by the City of Flowood Public Works Department for non-new construction sites.

409.8 All pipe shall be installed in accordance with the latest edition of the Mississippi Standard Specifications for Road and Bridge Construction or per the manufacturer's recommendation, whichever is more stringent, and as directed by this section.

409.9 The city shall be contacted a minimum of 24 hours prior to the installation of any underground storm drainage pipe so the City may inspect the installation and the connection of any storm drainpipe to drainage structures prior to the commencement of backfill operations. The city may require any pipes that are not inspected prior to backfilling to be re-exposed so that inspection can be performed. Any costs associated with this would not be the responsibility of the City.

SECTION 410 CULVERT MATERIALS & INSTALLATION

410.1 Concrete pipe materials

a. All concrete pipes shall conform to ASTM C-76 and be Class III minimum, standard

strength, bell and spigot or tongue and groove.

b. All Portland cement shall conform to ASTM C150, Type 1.

c. All sand shall conform to ASTM C-33.

d. All mortar shall consist of one part cement, two parts sand, and 15 percent lime (weight of cement).

e. Rubber gaskets shall be used on all round concrete pipes and conform to the requirements of ASTM C- 443.

f. Filter fabric shall be laid around all RCP pipe joints and the joints located at all drainage structure/pipe connections.

g. Geotextile fabric shall be Type V as specified in the Mississippi Standard Specifications for Road and Bridge Construction, Latest Edition.

410.2 Concrete pipe installation

a. Any materials delivered to a job site defective, damaged, or not meeting code, shall be rejected by the city, and shall not be used for construction, and shall be removed from the job site at once. If installed prior to detecting substandard material, it shall be removed, and approved material installed at the developer's expense.

b. All concrete pipe, catch basins, curb inlets and headwalls shall be installed in strict accordance with the manufacturer's recommendations and/or all applicable provisions of the Mississippi Standard Specifications for Road and Bridge Construction, Latest Edition.

c. All pipes shall be laid to alignment and grade with the use of a laser.

d. No more trenches shall be opened than can effectively utilized in a day. Excavations to be left open during non-working hours shall be kept to a minimum. Such openings shall be adequately protected or marked to prevent injury.

e. All lifting holes shall be plugged with and approved manufactured lifting hold plug and covered with Type V Geotextile Fabric.

f. Rubber gaskets shall be used on all round concrete pipe joints and conform to the requirements of ASTM C-443. All joints are to be wrapped in a Type V Geotextile Fabric, 24-inch, minimum in width.

g. Filter fabric shall be laid around all RCP pipe joints and the joints located at all drainage structure/pipe connections.

h. Mortar for connections to other drainage structures shall be composed of one part of volume of Portland Cement and two parts to mortar sand. Just enough clean, potable

water will be added to make the mix of such consistency that it can be easily handled and spread with a trowel. Any mortar that is not used within 45 minutes after water has been added will be wasted. Retempering of mortar will not be permitted.

i. Backfilling shall be as follows:

1. The contractor shall do trench bracing, sheathing or shoring as necessary to perform and protect the excavation and shall remove such materials as backfill progresses. The backfill material shall be as approved by the engineer.

2. Great care shall be used to obtain thorough compaction under the haunches and along the sides and to the top of the pipe.

3. In areas under streets, walks, parking lots, or curbs, the backfill shall be placed in loose lifts, not exceeding eight inches in depth and compacted to 98 percent standard Proctor density by ASTM D-698 using mechanical devices designed for that purpose.

4. In all other areas the backfill may be placed in 12-inch; loose lifts compacted to 90 percent standard Proctor density by ASTM D-698.

410.3 High-Performance polypropylene pipe materials

a. Twelve through 30-inch (300 to 750 mm) pipe shall have a smooth interior and annular exterior corrugations and meet or exceed ASTM F2736 and AASHTO M330.

b. Thirty-six through 60-inch (900 to 1,500 mm) pipe shall have a smooth interior and annular exterior corrugations and meet or exceed ASTM F2881 and AASHTO M330.

c. Pipe shall be joined with a gasketed integral bell & spigot joint meeting the requirements of ASTM F2736 or F2881, for the respective diameters.

d. Twelve through 60-inch (300 to 1,500 mm) shall be watertight according to the requirements of ASTM D3212. Spigots shall have gaskets meeting the requirements of ASTM F477. The gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.

e. Fittings shall conform to ASTM F2736, ASTM F2881 and AASHTO M330, for the respective diameters. Bell & spigot connections shall utilize a spun-on, welded or integral bell and spigot with gaskets meeting ASTM F477. Bell & spigot fittings joint shall meet the watertight joint performance requirements of ASTM D3212. Corrugated couplings shall be split collar, engaging at least two full corrugations.

f. Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2736, Section 4, ASTM F2881, Section 5 and AASHTO M330, Section 6.1, for the respective diameters.

410.4 High-Performance polypropylene pipe installation

a. Any materials delivered to a job site defective, damaged, or not meeting code, shall be rejected by the city, and shall not be used for construction, and shall be removed from the job site at once. If installed prior to detecting substandard material, it shall be removed, and approved material installed at the developer's expense.

b. All pipes shall be laid to alignment and grade with the use of a laser.

c. No more trenches shall be opened than can effectively utilized in a day. Excavations to be left open during non-working hours shall be kept to a minimum. Such openings shall be adequately protected or marked to prevent injury.

d. Installation shall be in accordance with ASTM D2321, and manufacturer recommended installation guidelines, with the exception that minimum cover in all areas for 12- through 48-inch (300 to 1200 mm) diameters shall be one foot. (0.3 m) and for 60-inch (1500 mm) diameters, the minimum cover shall be two feet. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90 percent SPD) or Class 3 (minimum 95 percent) material as defined in ASTM D2321.

e. Class IV material as defined by ASTM D2321 will not be allowed as bedding or initial backfill material.

f. Note: If any conflicts arise between these specifications and the manufacturer's recommendations or ASTM D2321, the more stringent requirements shall govern.

410.5 Storm Drain Structures (Curb, Grate Inlets, Junction Boxes, etc.)

a. All storm drain structures shall be installed per the City’s standard details and the latest edition of the MDOT Standard Specifications

b. Storm drain structures located in public or private ROW in a development shall be precast or poured in place.

c. Storm drain structures that are located outside the street ROW on private commercial or industrial lots may be Nyloplast PVC inlets or equal product rated for the proposed application. In such cases, these structures shall be maintained by the owner in perpetuity.

d. Junction boxes shall be placed at all changes in pipe size, alignment, and grade except where storm inlets or catch basins may be beneficial.

e. All drainage structures shall allow for access to the storm drainage system with a grate or manhole ring and cover capable of being removed. The cover shall be flush with the final grade and provide sufficient opening for cleaning, maintenance and inspection.

f. Storm drain culverts shall be cut flush with the walls of the drainage structure.

410.6 Precast Structures

a. Concrete shall have compressive strength of 4,000 psi at 28 days.

b. Precast structures shall conform to the City's standard details and shall meet the requirements of ASTM C 913 and MDOT Standards Specifications.

410.7 Poured in place Structures

a. Concrete materials shall be as required in the latest edition of the MDOT Standard Specifications.

b. Form material shall be as required in the latest edition of the MDOT Standard Specifications.

c. Provide ¾" chamfer on all exposed corners.

d. Reinforcing bars shall conform to ASTM A 615, Grade 60

e. Welded wire fabric shall conform to ASTM A 185 & ASTM A 82. All joints shall be sealed with flexible plastic gaskets for joint conduit, AASHTO Specification M-198 or MDOT Specifications.

f. All joints shall be sealed with non-shrink grout on the inside and outside of the structure.

g. The construction of poured in place structures shall be in compliance with the City's standard details and MDOT Standard Specifications.

410.8 Storm drain castings

a. Storm Drain Castings shall conform to the City's standard details and shall have a minimum opening of 24" and shall manufactured and tested in accordance with AASHTO M-306-07, ASTM standard A 48/A 48M, Standard Specification for Gray Iron Castings.

b. Storm drain castings shall read "DUMP NO WASTE – DRAINS TO RIVER" or similar.

SECTION 411 FINAL INSPECTION AND ACCEPTANCE

411.1 After all underground utilities are installed and prior to acceptance by the city, the City reserves the right to require a CCTV video inspection by an approved CCTV inspection company at the expense of the Owner.

411.2 Any construction debris found shall be removed, and any separated joints, misaligned pipe, or any other defects which may be found shall be corrected by the contractor prior to formal

acceptance by the city.

411.3 If required, the inspection firm shall furnish the city with two full versions of a detailed report of the inspection. The reports shall include two printed and bound color copies of the report and an electronic copy in .pdf format as well.

411.4 If any defects are found, a post correction inspection will be required as well. The report format and variance classifications shall follow NASSCO PACP (Pipeline Assessment Certification Program) standards.

411.5 The city shall also be contacted a minimum of 24 hours prior to the installation of any underground storm drainage pipe to allow the City time to perform an inspection. The city shall inspect any storm drainpipe and the connection of any storm drainpipe to drainage structures prior to the commencement of backfill operations. The City may require any pipes or structures not inspected by the City prior to backfilling to be uncovered by the Contractor so that an inspection may be performed.

SECTION 412 OTHER UTILITY SERVICES

412.1 All utilities such as gas, electrical, communications, etc. shall be installed underground and placed in easements dedicated for said utility installation unless specifically authorized by the mayor and board of aldermen. Utilities placed in any location shall require approval from the City.

412.2 When placed in streets, all types of underground utilities shall be installed prior to construction of the base course of the street. If the base course is already in place, the utilities shall be placed in a private easement or between the back of curb and the right-of-way line if no conflict exists with water and sewer locations. Street crossings shall be installed by either a dry boring or an aqua-gel drilling mud process in a manner that does not damage the street or base course.

412.3 An accurate "as-built" map showing the exact location and approximate depth of all utilities by private utility companies shall be furnished to the City of Flowood.

412.4 No pole or support shall be erected at any location which will create a hazard to moving vehicular traffic.

SECTION 413 ADDITIONAL IMPROVEMENTS

413.1 Sidewalks: For the safety of pedestrians, the developer shall construct or require lot owners to construct concrete sidewalks four inches (4”) in thickness along the roadway, 2’ behind the back of curb and sloped toward the roadway at 1.5% maximum slope. Sidewalks shall be built according to the following dimensions:

a. Minor residential streets – four feet (4’) wide

b. Collector streets or neighborhood commercial streets – five feet (5’) wide

c. Other commercial streets – eight feet (8') wide

413.2 Traffic Signs and Striping: The subdivider/developer and any other person or entity required to erect and/or erecting any traffic signs within the city shall erect and place such traffic signs and/or signals as required by the construction plans or the city and in accordance with the MUTCD, latest edition. Stop signs and street name signs shall be placed on posts and frames designated by the city. Stop bars shall be required when deemed necessary by the city and any such striping shall comply with the requirements of the MUTCD, latest edition.

413.3 Electrical Power: All electrical power shall be provided through underground conduit and wiring. Electrical boxes and streetlights shall not be set in front of or within five (5') of a fire hydrant or located within the street right-of-way unless approved by the City.

413.4 Streetlights: A plan for street lighting shall be submitted by the developer to the city in advance of installation of same for all developments. The street light plan shall reflect recommendations of the appropriate utility company providing electrical power service to the development to adequately light the development for public safety and shall be coordinated with other utilities in the development to ensure avoidance of conflicts. Design /installation of the street light plan and payment for such shall be the responsibility of the developer for private subdivisions or commercial developments. In private subdivisions or commercial developments, the Owner of the commercial development or right-of-way will be responsible for maintenance and payment of the monthly electrical service, not the City. In public subdivisions the developer shall be responsible for all costs allowed by Electrical Provider that would reduce the on-going, monthly payments by the City. This shall include but shall not be limited to conduit or conductor. Streetlights shall be photoelectric cell for automatic operation and of the type required by the City.

413.5 Traffic Signals or Existing Roadway Improvements: The City may require the Subdivider to provide the City with a traffic study of the area, existing traffic and projected traffic due to the development to determine if a traffic signal or improvements such as widening for turns lanes or other types of improvements to the existing roadways will be warranted. Any improvements that are warranted via the study shall be the responsibility of the Subdivider. Should the warranted improvements be required at a later phase of the development, it shall be up the City's discretion as to whether the improvements shall be required initially, as the project develops, or require the Subdivider to put up an auto-renewing, irrevocable letter of credit (200%) for the improvements. Traffic signals shall be single or double mast arms installed per MDOT Standard Specifications & Drawings and to match the City of Flowood standards.

413.6 Erosion Control: Erosion control means and methods meeting MDEQ requirements shall be required in all types of construction including residential home construction.

a. Erosion control means, methods and permitting for all types of construction including residential home construction shall meet the requirements of Article VI of this document titled *Erosion and Sediment Control/Grading Ordinance*.

b. Subdivider shall transfer storm water lot coverage to the new lot owner with each lot closing and send these forms to MDEQ and the City once completed and signed by all applicable parties.

c. Erosion and Sediment Control Plans meeting requirements of Article VI shall be submitted and approved by the City Engineer prior to site clearing work is performed.

SECTION 414 WARRANTY OF WORK

414.1 Warranty for Utilities: Prior to final acceptance by the City of Flowood of the dedicated utilities, the owner/developer must provide a notarized warranty statement on forms furnished by the city for all work performed. The warranty defined herein will begin on the date the final recording plat is approved by the Mayor and board of Aldermen. Prior to the end of the warranty period, an inspection will be performed by the owner, city and city engineer to identify any deficiencies requiring correction under the warranty. All deficiencies so identified must be corrected within 30 days of the initial inspection after which a follow-up inspection will be performed by the owner and director of planning and development. Failure by the owner to correct all noted deficiencies within 30 days of the initial inspection by the city will result in an extension of the owner's warranty until such time as all deficiencies are corrected in a manner satisfactory to the city. The warranty period shall be a period of 12 months.

414.2 Maintenance of Roadway & Warranty Final Wearing Surface: Maintenance of all roadways and curb installed by the Subdivider shall remain the responsibility of the Subdivider until 1 year after the final lift of surface course has been placed. Prior to installation of the final lift of surface course (final wearing surface), an inspection will be performed by the owner, city and city engineer to identify any curb or pavement areas that have failed and need to be replaced prior to placing final lift. All deficiencies so identified must be corrected after which a follow-up inspection will be performed by the owner and director of planning and development. A final lift may be placed once the City has signed off on any repairs that were made. The warranty period for the final wearing course and curb shall be for a period of 12 months from the date of the completed installation of the final lift of surface course.

414.3 At the end of the warranty period for the Final Wearing Surface, the developer shall have his engineer survey and verify that the capacity of the detention/retention pond complies with the design specifications. Any deficiencies shall be corrected prior to the release of the detention/retention pond to the HOA, and prior to the acceptance of the work and release of the warranty by the City of Flowood.

ARTICLE V

STORM WATER DETENTION & DISCHARGE MANAGEMENT

SECTION 500 GENERAL STANDARDS

500.1 Applicability and Exceptions: This ordinance shall be applicable within the City of Flowood' s jurisdictional area and shall apply to property that is being subdivided or Site Plan Projects. These regulations are not intended to apply to individual residential lot owners. Please refer to City Building Regulations for individual lot developments.

500.2 Cutting of Trees

a. The cutting of trees shall be governed by the requirements of Article VI, Erosion and Sediment Control Ordinance.

b. Trees shall not be cut down from a development without provisions to address storm water runoff. Detention shall be required on properties where the trees have been cut until such time as the property has a 90% vegetative cover.

SECTION 501 RATE OF STORM WATER DISCHARGE

501.1 Drainage facilities and site grading shall be designed and provided to prevent excessive runoff onto adjacent properties.

501.2 Rate and velocity of discharge shall be determined at each point where post-development storm water leaves the property being developed in its pre-development state.

501.3 The storm water management system shall be designed so that there are no adverse effects downstream and the peak flow rate and velocity at any discharge point in the post-development state shall be less than or equal to the peak flow rate and velocity for the discharge point in the pre-developed state for the 2- year, 5-year, 10-year, 25-year, 50-year and 100-year 24-hour storm events. This shall be achieved using detention/retention basins, swales, pipe networks, grading, etc.

501.4 A developer/engineer may elect to detain only part of the proposed site; however, the total post-development flow must still be less than the pre-development flow at each point where storm water leaves the property being developed.

501.5 Pre-existing flow patterns, distributions, and exit locations should be mimicked in the developed conditions (aka Post or Post Developed).

501.6 Over-detaining a portion of the site will not be allowable if it results in increased direct-discharge flows leaving the property in other locations.

SECTION 502 REGIMES OF FLOW

502.1 For the purpose of this ordinance, there will be two regimes of flow considered: sheet flow and concentrated flow.

502.2 Sheet flow shall be defined as any flow for which there is no defined channel in the ground at the exit point from the property. Any flow designated as either "sheet flow" or "shallow concentrated" flow for the purpose of SCS TR-55 flow calculations will fall into the category of sheet flow for the purpose of this portion of the ordinance.

502.3 Concentrated flow shall be defined as any flow for which there is a defined channel or culvert in the ground at the exit point from the property.

502.4 Flow must exit the property in the post-developed condition in the same regime as it exited the property in the pre-developed condition unless improvements or provisions are made to accommodate for the change in flow regime.

502.5 Flow regime structures may be required to meet the flow regime requirements. In such cases, these structures shall be constructed in a permanent nature.

502.6 Flow will be considered to have been returned from concentrated flow to sheet flow when the flow width has been increased to five (5) times the concentrated flow width (top of bank to top of bank) or 40 feet, whichever is greater.

SECTION 503 BYPASS OF UPSTREAM FLOWS

503.1 If it is desired by the developer of a piece of property to pass upstream flows through the property through means of a drainage way physically separated from the storm water management system of the development, this an acceptable practice.

503.2 The bypass drainage way must be designed to pass the 100-year 24-hour storm event without overtopping and without severe erosion problems.

503.3 The bypass drainage way must exit the property in the post-developed condition at the same location as the drainage from that upstream basin exited the property in the pre-developed state.

503.4 The bypass drainage way must have approximately the same flow exiting the property as it did entering the property or must be included in the calculations for the overall storm water management system for the development.

SECTION 504 DETENTION BASINS/RETENTION BASINS

504.1 General

a. As defined in Article 1, detention basins and retention basins are for temporary storage of storm water runoff. Detention basins are dry and retention basins have a permanent pool of water. Detention in a retention basin shall be the surface volume above the permanent pool. The term “Basin” shall refer to both Detention and Retention Basins unless specifically mentioned in the information below.

b. Basins shall be utilized as part of the overall storm water management system for the development to meet the requirements for pre & post development runoff herein unless

submitted calculations provided by and stamped by a professional engineer prove to the City there is a benefit to the downstream area otherwise. In such cases, the City will review the information provided and provide an opinion on whether storm water detention is required in such cases as part of the overall storm water management system.

c. Detention basins may be underground structures if desired by the Owner. See Section 504.9 for more information.

d. The City reserves the right to require aeration in any wet pond at the expense of the developer. If the developer questions such a requirement, he must provide justification that the pond will not become a nuisance during any month of the year.

e. The City reserves the right to require a basin to be enclosed with fencing depending on the design and location inside the development.

f. Maintenance of basins shall be the responsibility of the Owner of the basin whether that be an HOA, individual, corporation or other entity. The City has no maintenance responsibility but does have the authority to require the Owner to provide maintenance as required to protect public safety and downstream properties.

g. The detention basin shall be delivered to the City with the full storage volume intact and concrete flume (if present) visible and cleaned out. Any sediment that has collected in the pond shall be removed and legally disposed of off-site.

504.2 Design Methodology, Storage Volumes & Calculation of Design Flow Rates

a. Peak flow rates, storage volumes and other design criteria shall be based on Technical Release 55, Urban Hydrology For Small Watershed aka "SCS Method".

b. The volume of storage to be provided in detention basins, together with such storage as may be authorized in other detention facilities, shall be sufficient to control the increased runoff from the 2-year, 10-year, 25-year, 50-year, and 100-year, 24-hour storms.

c. To estimate the storm water runoff, SCS uses the runoff curve number (CN) method. Designers shall use the following chart (Table B) to determine curve numbers based on the hydrologic soil group (HSG) of the material within the drainage basin:

Table B: SCS Curve Numbers, CN, as a function of Hydrologic Soil Group

		Hydrologic Soil Group			
		A	**B**	**C**	**D**
FULLY DEVELOPED URBAN AREAS (Vegetation Established)					
Open Space (Lawns, Parks, Golf Course, Cemeteries, Etc.)	Poor Condition (Grass Cover < 50%)	68			
	Fair Condition (50% < Grass Cover < 75%)	49			
	Good Condition (Grass Cover > 75%)	39			
Impervious Areas	Open Water Bodies: Lakes, Ponds Wetlands, Etc.	100	100	100	100
	Paved Parking Lots, Roofs, Driveways,	98	98	98	98

	Etc. (Excluding ROW)				
Table B, continued from previous page		**Hydrologic Soil Group**			
		A	**B**	**C**	**D**
Streets & Roads	Paved; Curbs and Storm Sewers (Excluding ROW)				
	Paved; Open Ditches (Including ROW)				
	Gravel (Including ROW)				
	Dirt (Including ROW)				
Urban Districts	Commercial and Business				
	Industrial				
Residential Districts	1/8 acre or less (Town House)	77	85	90	92
	1/4 acre	61	75	83	87
	1/3 acre	57	72	81	86
	1/2 acre	54	70	80	85
	1 acre	51	68	79	84
	2 Acres	46	65	77	82
DEVELOPING URBAN AREAS					
Newly Graded Areas (Pervious Areas Only, No Vegetation)		77	86	91	94
Pasture, Grassland or Range – Continuous Forage for Grazing[1]	Poor Condition (0% < Grass Cover <50%)	68	79	86	89
	Fair Condition (50% < Grass Cover <75%)	49	69	79	84
	Good Condition (Grass Cover > 75%)	39	61	74	80
Meadow – Continuous Grass Protected From Grazing, Generally Mowed For Hay		30	58	71	78
Brush, Brush-Weeds-Grass Mixture w/ Brush The Major Element[2]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Porous Pavers & Permeable Interlocking Concrete (Ass. 85% Impervious)	Good Condition (Grass Cover > 75%)	95	96	97	97
	Gravel (Including ROW)	76	85	89	91
	Dirt (Including ROW)	72	82	87	89
Woods-Grass Combination (Orchard or Tree Farm)[3]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods[4]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads – Buildings, Lanes, Driveways & Surrounding Lots		59	74	82	86

1. *Poor*: <50% ground cover or heavily grazed with no mulch
   Fair: 50% to 75% ground cover and not heavily grazed
   Good: >75% ground cover and lightly or only occasionally grazed
2. *Poor*: <50% ground cover
   Fair: 50% to 75% ground cover
   Good: >75% ground cover
3. CN's shown were computed for areas with 50% wood and 50% grass cover. Other combinations may be computed from the CN's for Woods and Pasture
4. *Poor*: Forest litter, small trees and brush are destroyed by heavy grazing or burning
   Fair: Woods are grazed but not burned and some forest litter covers the soil

Good: Woods are protected from grazing and littler and brush adequately covers the soil

504.3 Detention in Flood Zones

a. In the event that detention is to be provided within the 100-year floodplain or in areas that are known to be prone to local flooding, no storage will be considered below the flood elevation for the respective design storm event (2-year, 5-year, 10-year, 25-year, 50-year or 100-year 24-hour storm event) unless calculations provided by a professional engineer prove to the City there are no adverse impacts to downstream areas or there is is a benefit to the downstream area otherwise.

b. If the base flood elevation is unknown or undetermined, it shall be the responsibility of the subdivider and their engineer to determine and provide the Base Flood Elevation as well as its extents through the subject site.

504.4 Surcharge

a. No surcharge shall be allowed for any storm sewer, storm inlet, connected to the detention/retention pond, or other stormwater structure for any event less than or equal to the 25-year, 24-hour storm event.

b. For flows from the 100-year, 24-hour event, conveyance should be provided to the stormwater management facilities through designed overland systems (including but not limited to depressions, swales, curb and gutter, flumes, etc.) that do not cause flooding to any properties, private or public. These drainage ways shall remain free from obstruction once developed and any houses located along these areas shall be set a finished grades that would not be inundated if such an event occurred.

c. Conveyance systems that are also utilized for detention shall not surcharge for any storm event less than or equal to the 100-year, 24-hour storm event.

504.5 Embankment, Side-Slopes & Basin Bottom

a. Embankments for detention/retention basins shall be constructed with materials and construction procedures that meet industry standards for the intended purpose.

b. Side slopes of the wet side of a detention basin dam shall be 4:1 or flatter. Side slopes of the dry side of a detention basin dam shall be 3:1 or flatter. These criteria are maximum slopes and are not intended to be design guidelines. The developer's engineer shall use geotechnical expertise and sound engineering judgment in the determination of appropriate slopes.

c. Retaining walls are allowed for retention ponds; approach slopes tying into the retaining walls shall be 5:1 or flatter. Retention ponds with retaining walls shall have a safety ledge 2 feet wide provided at every 30 inches of elevation gained. When vertical interior walls are used, they shall have emergency egress steps or ladders provided.

d. All embankments and bottom areas shall be fully vegetated with seed or sod. Owner shall be responsible for having basin fully vegetated prior to deeding to HOA or other

entity.

e. Detention basin bottoms shall have a 4' wide, 4" minimum thickness, V-shaped, concrete channel (or series of channels) running from the outlet structure through the approximate middle of the bottom of the basin and connecting to all pipes entering the pond. The channel shall have a minimum drop of 3" from the center to the edge. The pond bottom shall be graded to drain to the flume at a minimum of 1% from the toe of the embankment to the edge of the channel. The intent of the concrete channel is to promote positive drainage in the bottom of the pond to allow for routine mowing and maintenance by the pond owner. Multiple channels may be required in large ponds.

504.6 Minimum\Maximum Depths

a. Retention basins shall have a minimum permanent depth of water of 4'. For deeper ponds, a shelf or safety bench three feet in width may be required by the City.

b. Basins shall be designed to provide a maximum storage depth of 4'. The City may allow deeper depths in certain cases but reserves the right to require additional improvements to be installed such as perimeter fencing, landscaping, or other items as deemed necessary by the City to protect public safety.

504.7 Outlet Control Structures

a. Outlet control structures shall be designed as simply as possible and shall operate automatically.

b. Outlet control structures shall consist of a culvert or multiple culverts through the embankment that is connected to a concrete weir structure on the upstream side when required to meet detention flow requirements. If the detention flow requirements can be achieved with pipes only, a weir structure would not be required.

c. No orifice in a weir structure shall be smaller than 6 inches in diameter.

d. Slotted weirs must be at a minimum, 4 inches in width unless approved by the City Engineer.

e. V-notch weirs are preferred for reduced maintenance requirements.

f. Outlet control structures shall be designed to limit discharges into existing or planned downstream channels or conduits so as not to exceed predetermined safe capacities, and not in excess of flows or velocities which would have occurred with the land in its pre-development condition.

g. Basins and outlet control structures shall be designed to provide a minimum of 12" of freeboard above the peak flow elevation for the 100-year storm event.

504.8 Emergency Spillways

a. Basins shall have an emergency spillway or an outlet control structure that is designed

to pass the 100-year event without overtopping the basins embankment in the event that the primary outlet structure is non-functioning or clogged.

b. Emergency spillways should be constructed in cut conditions whenever possible and shall be placed to minimize runoff flowing down the embankment.

c. Emergency spillways shall be designed and protected as required to handle the velocity without eroding.

d. The basin embankment shall be protected from erosion if it is not possible to the emergency spillway allows runoff to flow down the embankment.

504.9 Underground Detention Basins

a. Underground detention shall be an acceptable means of providing storm water detention as required by these regulations.

b. Facilities shall conform to the following standards:

1. At a minimum, all underground detention facilities shall be provided with manway access to inflow and outflow ends, any junctions or changes in direction, and control structure junctions as necessary to provide to allow for inspections and cleaning of the system.
2. No underground detention facility shall have any permanent structure of any type, other than pavement or recreational amenities (e.g. playground equipment), erected above the system.
3. Underground detention facilities shall be designed to completely drain between storm events.
4. Underground detention facility bottoms shall have a minimum of 0.2% slope in the direction of flow.
5. Facilities shall be visually inspected a minimum of twice per year and cleaned out a minimum of once per year by the property owner.

504.10 Detention\Retention Basin Maintenance

Detention/retention basin maintenance shall consist of routine maintenance and emergency maintenance, and it shall be the responsibility of the basin Owner to provide both. Routine inspections (once per month) shall be performed by the Owner or his representative to determine what maintenance, if any, is needed and the severity of the maintenance. Should emergency maintenance be deemed necessary, Owner shall contact the City immediately and a plan from a licensed engineer for the proposed repairs may be required (at the expense of the Owner).

a. Routine Maintenance: Routine maintenance is any procedure performed on a regular basis to maintain the proper working order of stormwater control. Tasks associated with routine maintenance shall include, but are not limited to, the following:

1. Periodic mowing or trimming as needed to keep vegetation under control.

2. Removal of undesirable plant species.
3. Removal of trash and debris.
4. Stabilization of slopes in cases of washing and repair.

b. Emergency Maintenance: Emergency maintenance is a non-routine repair performed to correct a problem and restore stormwater control to its proper working order. Tasks associated with emergency maintenance include, but are not limited to:

1. Sediment removal as required to maintain the storage volume to the design amount by removing excess sediment from basin that may build up over time.
2. Repairs to the outlet control structure to ensure that it is fully functional as intended and structurally sound.
3. Embankment seepage repairs

SECTION 505 EXISTING DOWNSTREAM EROSION AND FLOODING PROBLEMS

505.1 When the situation presents itself, developers are strongly encouraged to provide assistance with downstream drainage problems by means of decreasing rates of flow to substantially less than their pre-development conditions or slowing flow velocities to substantially less than their pre-development state.

505.2 In the event that such an opportunity exists, the City Engineer will make the possibility known to the developer at the earliest opportunity.

SECTION 506 DETENTION\RETENTION SUBMITTAL REQUIREMENTS

506.1 Construction Plans shall at a minimum include the following information:

a. Finished grade contours on the grading and drainage plan sheets showing the geometry and vertical information of the basins for above ground basins.

b. For underground detention, the system layout shall be shown on the grading and drainage plan sheets.

c. A typical cross section of detention\retention basins showing the side-slopes and width of the embankment top.

d. Detail of any outlet structure(s).

e. Details of emergency spillway.

f. For underground detention, typical cross sections shall be provided along with other detailed information necessary to construct the detention system to meet the manufacturer's specifications. Cross sections, details and elevation information shall be site specific and not generic in nature.

506.2 Hydraulic calculations including the following information shall be provided in an easy-

to-follow format to the City with the submittal of the construction plans:

a. Map or maps as required to depict the pre-development drainage basins and areas of each basin in acres.

b. Map or maps as required to depict the post-development drainage basins and areas of each basin in acres.

c. Information on each individual drainage basin such as: drainage area, hydraulic length, hydraulic slope, CN, weighted CN, and any other input assumptions.

d. Map depicting the Pre & Post Flow rate at each major drainage exit point for the 2-yr, 25-yr & 100-year events.

e. Calculations (preferably in table format) shall be provided which show the pre-development rate of run-off at each of the exit points for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year 24-hour storm events.

f. Calculations (preferably in table format) shall be provided which show the post-development rate of run-off at each of the exit points for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year 24-hour storm events.

g. Stage-Storage-Discharge curves for the detention\retention basins.

h. Inflow hydrographs for the 2, 5, 10, 25, 50, and 100-year 24-hour storm events.

i. Outflow hydrographs for the 2, 5, 10, 25, 50, and 100-year 24-hour storm events.

j. Post-development hydrograph routing the 100-year event through the basin with only the emergency spillway active.

k. Backwater elevations for the flood elevations for 2, 5, 10, 25, 50, and 100-year 24-hour storm events and any impacts on the storage volume.

l. The FEMA 100-year flood elevation at the location of the proposed detention basin and any impacts on the storage volume.

SECTION 507 ENGINEER'S STATEMENT

507.1 The above maps and calculations shall be accompanied by a transmittal letter which contains the following statement:

I hereby state that the reports, calculations, and plans for the storm water management design of Name of Development were prepared under my direct supervision and the best of my knowledge and belief they are in accordance with the provisions of the City of Flowood Comprehensive Development Regulations.

Registered Professional Engineer

State of Mississippi
Registration Number

ARTICLE VI

EROSION AND SEDIMENT CONTROL/GRADING ORDINANCE

SECTION 600 GENERAL PURPOSE

600.1 During the construction process, soil is the most vulnerable to erosion by wind and water. This eroded soil endangers water resources by reducing water quality and causing the siltation of aquatic habitat for fish and other desirable species. Eroded soil also necessitates repair of sewers and ditches, and the dredging of lakes. In addition, clearing and grading during construction causes the loss of native vegetation necessary for terrestrial and aquatic habitat, and to provide a healthy living environment for citizens of City of Flowood.

600.2 As a result, the purpose of this article is to safeguard persons, protect property, prevent damage to the environment and promote the public welfare by guiding, regulating, and controlling the design, construction, use, and maintenance of any development or other activity which disturbs or breaks the topsoil or results in the movement of earth on land in City of Flowood.

SECTION 601 DEFINITIONS

601.1 *Best Management Practice*: Any technique generally accepted to minimize or prevent erosion in a particular application or site condition, often shortened to BMP.

601.2 *Certified Contractor*: An individual who has received training and is licensed by the Mississippi Department of Environmental Quality to inspect and maintain erosion and sediment control practices.

601.3 *Channel Stabilization*: Stabilizing a channel, either natural or artificial, in which water flows with a free surface to establish a non-erosive channel.

601.4 *Clearing*: Any activity which removes the vegetative surface cover.

601.5 *Construction Site Operator*: Any contractor who is responsible for any clearing, grading, or site development, or responsible for any subcontractor performing these actions.

601.6 *Drainage Way*: Any channel that conveys surface runoff throughout the site.

601.7 *Erosion Control*: Measures that prevent erosion.

601.8 *Erosion and Sediment Control Plan*: A set of plans prepared by or under the direction of a licensed professional engineer indicating the specific measures and sequencing to be used in controlling sediment and erosion on a development site both before, during, and after construction.

601.9 *Grading*: Excavation, relocation, or fill of material

601.10 *MDEQ Design Manual*: Mississippi Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas

601.11 *Perimeter Control*: Any barrier that prevents sediment from leaving a site either by filtering sediment-laden runoff or diverting it to a sediment trap or basin.

601.12 *Phasing*: Clearing of an area of land in distinct phases, with the stabilization of each phase occurring before the clearing of the next.

601.13 *Sediment Control*: Measures to prevent eroded sediment from leaving the site.

601.14 *Site*: Any parcel of land, or contiguous combination thereof, where grading work is performed as a single, unified operation.

601.15 *Site Development Permit*: A permit issued by the City of Flowood for construction or alteration of ground improvements, as well as structures for the control of erosion, sediment, and runoff.

601.16 *Stabilization*: The use of practices that prevent exposed soil from eroding.

601.17 *Start of Construction*: The first land-disturbing activity associated with construction activity, including, but not limited to, land preparation such as clearing, grading, and filling.

601.18 *Watercourse*: Any body of water, including but not limited to lakes, ponds, rivers, streams, or bodies of water which are delineated by the City of Flowood.

601.19 *Waterway*: A channel that directs surface runoff to a watercourse or public storm drain.

SECTION 602 PERMITS

602.1 Requirements: Every site which will have any clearing or grading and not specifically exempted in this section shall have an associated Erosion and Sediment Control plan submitted to and approved by the City of Flowood's designated representative. MDEQ approval for storm water shall also be required for sites 5 acres or larger.

602.2 Exempted Activities: No site development is required for the following activities:

a. Any emergency activity, which is immediately necessary for the protection of life, property, or natural resources.

b. Existing nursery and agricultural operations conducted as a permitted main or accessory use.

c. Residential single family home builders that submit a plan sheet showing erosion and sediment controls planned to be used. The plan sheet is not required to be prepared or certified by a design professional.

602.3 Application and Fees: The application for the development permit shall be completed in its entirety and submitted with a filing and review fee in an amount not to exceed $100.00.

602.4 Contractor Statement: Each application shall include a statement that any land clearing, construction, or development involving the movement of earth shall be in accordance with the Erosion and Sediment Control Plan, and that a Certified Contractor shall be on site on all days where construction or grading activity takes place.

602.5 Bonds and Letters of Credit: The applicant will be required to file with City of Flowood a faithful performance bond or bonds, letter of credit, or other improvement security in an amount deemed sufficient by City of Flowood to cover all costs of improvements, landscaping, and maintenance of improvements for such period as specified by City of Flowood and engineering and inspection costs to cover the cost of failure or repair of improvements installed on the site.

602.6 Other Agency Permits:

a. Every site developer shall submit all permits and/or approvals obtained from the Army Corps of Engineers and/or the Mississippi Department of Environmental Quality/Permit Board for the subject site as required for the proposed construction activities by such agencies.

b. It is not the City's responsibility to determine if other permits from State or Federal agencies may be necessary. This responsibility shall fall on the Subdivider\Owner.

SECTION 603 REVIEW AND APPROVAL

603.1 The City of Flowood will review each application for a site development permit to determine its conformance with the provisions of this local regulation, as well as any impacts to water quality. Within thirty (30) days after receiving an application, the City of Flowood shall, in writing, provide one of the following responses, accordingly:

a. Approve the permit application, or;

b. Approve the permit application subject to such reasonable conditions as may be necessary to secure substantially the objectives of this regulation, and issue the permit subject to these conditions, or;

c. Disapprove the permit application, indicating the deficiencies and the procedure for submitting a revised application and/or submission.

SECTION 604 EROSION AND SEDIMENT CONTROL PLAN

604.1 Plan Requirements: The Erosion and Sediment Control Plan shall include:

a. A natural resources map identifying soils, forest cover, and resources protected under other chapters of this code. This map should be at a scale no smaller than 1" = 100'.

b. A sequence of construction of the development site, including stripping and clearing, rough grading, construction of utilities, infrastructure, and buildings, and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, and the sequence of clearing, installation of temporary erosion and sediment measures, and establishment of permanent vegetation.

c. All erosion and sediment control measures necessary to meet the objectives of this local regulation throughout all phases of construction and permanently, after completion of development of the site. Depending upon the complexity of the project, the drafting of intermediate plans may be required at the close of each season.

d. Seeding mixtures and rates, types of sod, method of seedbed preparation, expected seeding dates, type and rate of lime and fertilizer application, and kind and quantity of mulching for both temporary and permanent vegetative control measures.

e. Provisions for maintenance of control facilities, including easements.

604.2 Modification of the Plan

a. Major amendments to the erosion and sediment control plan, either before or during construction, shall be submitted to the City of Flowood and shall be processed and approved, or disapproved, in the same manner as the original plans.

b. Field modifications of a minor nature during construction may be authorized by the City of Flowood by written authorization to the permittee.

SECTION 605 DESIGN REQUIREMENTS

605.1 Grading erosion control practices, sediment control practices, and waterway crossings shall meet the design criteria set forth in the most recent version of City of Flowood's Erosion and Sediment Control/Grading Ordinance, the requirements of MDEQ, and shall be adequate to prevent transportation of sediment from the site to the satisfaction of City of Flowood.

605.2 Clearing and Grading

a. Clearing and grading of natural resources, such as forest and wetlands, shall not be permitted, except when in compliance with all other chapters of these regulations.

b. Clearing techniques that retain natural vegetation and retain natural drainage patterns, as described in the MDEQ Design Manual, shall be used to the satisfaction of the City of Flowood.

c. Phasing of construction activities shall be required on all sites disturbing greater than thirty (30) acres, with the size of each phase to be established during plan review and as approved by City of Flowood.

d. Clearing (including logging operations), except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

e. Cut and fill slopes shall be no greater than 3:1, except as approved by City of Flowood to meet other community or environmental objectives.

f. At a minimum, all silt fences shall be installed using metal T-posts at 6' spacing. No silt fences may be installed using wood posts.

g. See City standard details for details on installation requirements for certain erosion control BMP's.

605.3 Erosion Control

a. Soil must be permanently stabilized within seven (7) days of clearing or inactivity in construction.

b. If vegetative erosion control methods, such as seeding, have not become established within two (2) weeks, the City of Flowood may require that the site be reseeded, or that a non-vegetative option be employed.

c. On steep slopes or in drainage ways, special techniques such as hydroseeding or erosion control blankets that meet the design criteria outlined in the MDEQ Design Manual shall be used to ensure stabilization.

d. Soil stockpiles must be stabilized with sediment barriers or covered at the end of each workday.

e. Whenever construction is planned to be inactive for 30 days or more, the entire site must be stabilized, using heavy mulch layer, or another method that does not require germination to control erosion.

f. Techniques such as chemical erosion control shall be employed to prevent the blowing of dust or sediment from the site.

g. Techniques that divert upland runoff past disturbed slopes shall be employed.

605.4 Sediment Controls

a. Sediment controls, per MDEQ requirements, shall be provided in the form of settling basins or sediment traps or tanks, and perimeter controls.

b. Where possible, settling basins shall be designed in a manner that allows adaptation to provide long-term stormwater management.

c. Adjacent properties shall be protected using a temporary vegetated buffer strip, in combination with perimeter controls. Refer to the MDEQ Design Manual for recommended width and plant categories.

605.5 Waterways and Watercourses

a. When a wet watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided, and an approval obtained from the appropriate governmental agency. A temporary stream crossing can be a low water crossing, a culvert crossing, or a bridge with or without embankment approaches.

b. When in-channel work is conducted, the channel shall be stabilized before, during and after work.

c. Areas where erosion, scouring or the loss of materials in a ditch or channel is likely over time (such as bends, steeply sloped sections, etc.) shall be protected from by riprap, turf reinforcement matting, paving, or some other City approved measure.

d. All on-site storm water conveyance channels shall be designed according to the criteria outlined in the MDEQ Design Manual.

e. Stabilization adequate to prevent erosion must be provided at the outlets of all pipes and paved channels.

605.6 Construction Site Access

a. A temporary access road shall be provided at all sites. The construction access road meeting the requirements of the MDEQ Design Manual shall be provided to the site at all times during construction.

b. Other measures may be required at the discretion of the City of Flowood to ensure that sediment is not tracked onto public streets by construction vehicles or washed into storm drains.

c. It shall be the responsibility of the developer to ensure that construction siltation is cleaned from the public road access at the end of each workday. If the developer or his contractor does not maintain a clean access drive, he shall be issued a stop work order until such clean-up is complete.

SECTION 606 CONSTRUCTION SITE OPERATOR EDUCATION

606.1 Requirement for Training: No site development permit shall be issued without the appropriate construction site operator first being trained by the City of Flowood in proper erosion and sediment control techniques.

606.2 Contents of Training: The City shall provide training to each contractor working in the City of Flowood on any site that requires a site development permit. The training will take place on City of Flowood premises at a location to be determined by the Public Works Director, the City Engineer, or the City's other designee, and will consist of, at a minimum:

a. Various BMPs for controlling erosion during construction and their proper installation and maintenance, as outlined in the MDEQ Design Manual.

b. Various BMPs for proper permanent stabilization of a site to transition to a post-construction site as outlined in the MDEQ Design Manual.

c. BMP inspection and documentation requirements.

d. Techniques and timelines for remedying failed erosion control measures.

e. Penalties for failing to conform to the requirements of this ordinance.

SECTION 607 INSPECTION

607.1 Notifications: City of Flowood or designated agent shall make inspections as hereinafter required and shall either approve that portion of the work completed or shall notify the permittee where the work fails to comply with the erosion and sediment control plan as approved. Plans for grading, stripping, excavating, and filling work bearing the stamp of approval of City of Flowood shall be maintained at the site during the progress of the work. To obtain inspections, the permittee shall notify City of Flowood at least two (2) working days before the following:

a. Start of Construction.

b. Erosion and sediment control measures are in place and stabilized.

c. Site Clearing has been completed.

d. Rough Grading has been completed.

e. Utility installation has been completed.

f. Final Grading has been completed.

g. Final vegetation or landscaping.

607.2 Construction Site Operator Inspections: The permittee or his/her agent shall make regular inspections of all control measures in accordance with the inspection schedule outlined on the approved erosion and sediment control plan(s). Inspections should be performed after each rainfall event that causes a discharge from the site. If no rainfall event occurs during a week, at least one inspection is required for that week. The purpose of such inspections will be to determine the overall effectiveness of the control plan, and the need for additional control measures. All inspections shall be documented in written form and submitted to the City of Flowood at the appropriate time interval.

607.3 City of Flowood Access: City of Flowood or its designated agent shall be allowed by the applicant to enter the property of the applicant as the City deems it necessary to make regular inspections to ensure the validity of the reports.

SECTION 608 ENFORCEMENT OF THE PROVISIONS OF THIS ARTICLE

608.1 Stop-Work Order; Revocation of Permit: In the event that any person holding a site development permit pursuant to this ordinance violates the terms of the permit or implements site development in such a manner as to materially adversely affect the health, welfare, or safety of persons residing or working in the neighborhood or development site so as to be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood, City of Flowood may suspend or revoke the site development permit.

608.2 Violation and Penalties: No person shall construct, enlarge, alter, repair, or maintain any grading, excavation, or fill, or cause the same to be done, contrary to or in violation of any terms of this ordinance. Any person violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and each day during which any violation of any of the provisions of this ordinance is committed, continued, or permitted, shall constitute a separate offense. Upon conviction of any such violation, such person, partnership, or corporation shall be punished by a fine of not less than $100 (one hundred dollars) and not more than $1000 (one thousand dollars), or by imprisonment for not more than six months, or both, for each separate offense. In addition to any other penalty authorized by this section, any person, partnership, or corporation convicted of violating any of the provisions of this ordinance shall be required to bear the expense of such restoration.

ARTICLE VII

ILLICIT DISCHARGE AND CONNECTION

SECTION 700 PURPOSE/INTENT

700.1 The purpose of this Article VII is to provide for the health, safety, and general welfare of the citizens of the City of Flowood through the regulation of non-storm water discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the Municipal Separate Storm Sewer System (MS4) to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

The objectives of this ordinance are:

a. To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) or open ditches located in the City Limits by storm water discharges by any user.

b. To prohibit illicit connections and discharges to the municipal separate storm sewer system.

c. To establish legal authority to carry out all inspecting, surveillance, and monitoring procedures necessary to ensure compliance with this ordinance.

SECTION 701 DEFINITIONS

701.1 *Authorized Enforcement Agency*: employees or designees of the director of the municipal

agency designated to enforce this ordinance.

701.2 *Best Management Practices (BMPs)*: schedules of activities, prohibitions of practices, general good house-keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

701.3 *Clean Water Act*: The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) and any subsequent amendments thereto.

701.4 *Construction Activity*: Activities subject to NPDES Construction Permits. These include construction projects resulting in land disturbance of 1 acre or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

701.5 *Hazardous Materials*: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

701.6 *Illegal Discharge*: Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section 706.1(a) of this ordinance.

701.7 *Illicit Connections*: An illicit connection is defined as either of the following:

a. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or,

b. Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

701.8 *Industrial Activity*: Stormwater discharge associated with industrial activity that is subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26(b)(14) in part as "discharge from any conveyance that is used for collecting and conveying storm water and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant." Further details of the code can be found on the Code of Federal Regulations website at www.ecfr.gov.

701.9 *National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge*

Permit: A permit issued by EPA (or by a State under authority delegated pursuant to 33 USC § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

701.10 *Non-Storm Water Discharge*: Any discharge to the storm drain system that is not composed entirely of storm water.

701.11 *Person*: Any individual, association, organization, partnership, firm, corporation, or other entity recognized by law and acting as either the owner or as the owner's agent.

701.12 *Pollutant*: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: plants, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid waste and yard wastes; refuse, rubbish, garbage, litter, or other discharged or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metal; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

701.13 *Premises*: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

701.14 *Storm Drainage System*: Publicly owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-make or altered drainage channels, reservoirs, and other drainage structures.

701.15 *Storm Water*: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

701.16 *Storm Water Pollution Prevention Plan*: A document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to storm water, storm water conveyance systems, and/or receiving waters to the maximum extent practicable.

701.17 *Wastewater*: Any water or other liquid, other than uncontaminated storm water, discharged from a facility.

SECTION 702 APPLICABILITY

702.1 This article shall apply to all water entering the storm drain system, consisting of pipe or open ditches, generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency.

SECTION 703 RESPONSIBILITY FOR ADMINISTRATION

703.1 The City of Flowood shall administer, implement, and enforce the provisions of this article. Any powers granted or duties imposed upon the authorized enforcement agency may be delegated in writing by the Director of the authorized enforcement agency to persons or entities acting in the beneficial interest of or in the employ of the agency.

SECTION 704 ULTIMATE RESPONSIBILITY

704.1 The standards set forth herein and promulgated pursuant to this ordinance are minimum standards; therefore, this ordinance does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

SECTION 705 DISCHARGE PROHIBITIONS

705.1 Prohibition of Illegal Discharges: No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

a. The following discharges are exempt from discharge prohibitions established by this ordinance:

1. water line flushing or other potable water sources.
2. landscape irrigation or lawn watering.
3. diverted stream flows.
4. rising ground water.
5. ground water infiltration to storm drains.
6. uncontaminated pumped ground water.
7. foundation or footing drains (not including active groundwater dewatering systems).
8. crawl space pumps.
9. air conditioning condensation.
10. Springs.
11. non-commercial washing of vehicles.
12. natural riparian habitat or wet-land flows.
13. swimming pools (if dechlorinated-typically less than one PPM chlorine).
14. firefighting activities.
15. any other water source not containing pollutants.

b. Discharges specified in writing by the authorized enforcement agency as being

necessary to protect public health and safety.

c. Dye testing in an allowable discharge but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

d. The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

705.2 Prohibition of Illicit Connections

a. The construction, use, maintenance, or continued existence of illicit connections to the storm drain system is prohibited.

b. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

c. A person is considered to be in violation of this ordinance if the person collects a line conveying sewage to the MS4 or allows such a connection to continue.

SECTION 706 SUSPENSION OF MS4 ACCESS

706.1 Suspension Due to Illicit Discharges in Emergency Situations: The City of Flowood may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or Waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or Waters of the United States, or to minimize danger to persons.

706.2 Suspension Due to the Detection of Illicit Discharge: Any person discharging to the MS4 in violation of this ordinance may have their MS4 access terminated if such termination would abate or reduce an illicit discharge. The authorized enforcement agency will notify a violator of the proposed termination of its MS4 access. The violator may petition the authorized enforcement agency for a reconsideration and hearing.

A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the authorized enforcement agency.

SECTION 707 INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

707.1 Any person subject to an industrial or construction activity NPDES storm water discharge

permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the City of Flowood prior to the allowing of discharges to the MS4.

SECTION 708 MONITORING OF DISCHARGES

708.1 Applicability: This section applies to all facilities that have storm water discharges associated with industrial activity, including construction activity.

708.2 Access to Facilities:

a. The City of Flowood shall be permitted to enter and inspect facilities subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance. If a discharger has security measures in force, which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.

b. Facility operators shall allow the City of Flowood ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES pennit to discharge storm water, and the performance of any additional duties as defined by state and federal law.

c. The City of Flowood shall have the right to set up on any pem1itted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's storm water discharge.

d. The City of Flowood has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be always maintained in a safe and proper operating condition by the discharger at its own expense. All devices used to measure storm water flow and quality shall be calibrated to ensure their accuracy.

e. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the City of Flowood and shall not be replaced. The costs of clearing such access shall be borne by the operator.

f. Unreasonable delays in allowing the City of Flowood access to a permitted facility is a violation of a storm water discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge storm water associated with industrial activity commits an offense if the person denies the authorized enforcement agency reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.

g. If the City of Flowood has been refused access to any part of the premises from which storm water is discharged, and he/she is able to demonstrate probable cause to believe that there may be a violation of this ordinance, or that there is a need to inspect and/or

sample as part of a routine inspection and sampling program designed to verify compliance with this ordinance or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the authorized enforcement agency may seek issuance of a search warrant from any court of competent jurisdiction.

SECTION 709 REQUIREMENT TO PREVENT, CONTROL, AND REDUCE STORM WATER POLLUTANTS BY THE USE OF BEST MANAGEMENT PRACTICES

709.1 The City of Flowood will adopt requirements identifying Best Management Practices for any activity, operation, or facility that may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the U.S. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, a reasonable storm drainage system or watercourses using these structural and non-structural BMPs. Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of storm water associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section. These BMPs shall be part of a storm water pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

SECTION 710 WATERCOURSE PROTECTION

710.1 Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

SECTION 711 NOTIFICATION OF SPILLS

711.1 Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials, the said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the authorized enforcement agency in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the City of Flowood within three business days of the phone notice. If the discharge of prohibited materials

emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 712 ENFORCEMENT OF THE PROVISIONS OF THIS ARTICLE

712.1 Notice of Violation: Whenever the City of Flowood finds that a person has violated a prohibition or failed to meet a requirement of this ordinance, the authorized enforcement agency may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

a. The performance of monitoring, analyses, and reporting;

b. The elimination of illicit connections or discharges;

c. The violating discharges, practices, or operations shall cease and desist;

d. The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property;

e. Payment of a fine to cover administrative and remediation costs; and

f. The implementation of source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency, or a contractor and the expense thereof shall be charged to the violator.

712.2 Appeal of Notice of Violation: Any person receiving a Notice of Violation may appeal to the determination of the authorized enforcement agency. The notice of appeal must be received within 30 days of the date of the Notice of Violation. Hearing on the appeal before the appropriate authority or his/her designee shall take place within 15 days from the date of receipt of the notice of appeal. The decision of the municipal authority or their designee shall be final.

712.3 Enforcement Measures After Appeal**:** If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or, in the event of an appeal, within 30 days of the decision of the municipal authority upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

712.4 Cost of Abatement of the Violation**:** Within 15 days after abatement of the violation, the

owner of the property will be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment within 15 days. If the amount due is not paid within a timely manner as determined by the decision of the municipal authority or by the expiration of the time in which to file an appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the assessment.

Any person violating any of the provisions of this article shall become liable to the city by reason of such violation. The liability shall be paid in not more than 12 equal payments. Interest at the rate of 8 percent per annum shall be assessed on the balance beginning on the 31st day following discovery of the violation.

712.5 Injunctive Relief: It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this article. If a person has violated or continues to violate the provisions of this article, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abate or remediation of the violation.

712.6 Compensatory Action: In lieu of enforcement proceedings, penalties, and remedies authorized by this article, the authorized enforcement agency may impose upon a violator alternative compensatory action, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

712.7 Violations Deemed a Public Nuisance: In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this article is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

712.8 Recovery of Professional Expenses: The authorized enforcement agency may recover all attorney's fees, court costs and other expenses associated with enforcement of this article, including sampling and monitoring expenses.

712.9 Remedies Not Exclusive: The remedies listed in this article are not exclusive of any other remedies available under any applicable federal, state, or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

ARTICLE VIII

VARIATIONS AND MODIFICATIONS

SECTION 800 HARDSHIP VARIANCE

800.1 Where the Governing Authority finds that extraordinary hardships may result from strict

compliance with the regulations, it may vary the regulations so that substantial justice may be done and the public interest secured, provided that such variation will not have the effect on nullifying the intent and purpose of these regulations. No variance will be granted unless it is found that:

a. Literal interpretation of the provisions of this Ordinance would deprive the Owner of reasonable use of their land; and

b. Granting of the variance would be in harmony with the general purpose and intent of this Ordinance and will not be injurious to the neighborhood or otherwise detrimental to the public welfare.

c. Any other reason which the Mayor and Board of Aldermen determine utilizes the variance.

800.2 All requests for variances shall be made in writing to the City Public Works Department and specifically state the provision from which a variance is requested.

SECTION 801 PLANNED UNIT DEVELOPMENT

801.1 The standards and requirements of these regulations may be modified by the Governing Authority in the case of a plan and program for a new village, a complete community, or a neighborhood unit, which in the judgment of the Governing Authority provides adequate public spaces and improvements for the circulation, recreation, light, air and service needs of the tract when fully developed and populated and which also provide such covenants or other legal provisions as will assure conformity to and achievement of the Comprehensive Plan or these regulations.

SECTION 802 CONDITIONS

802.1 In granting variances and modifications, the Governing Authority may require such conditions as will secure substantially the objectives of the standards or requirements so varied or modified.

ARTICLE IX

ADMINISTRATION

SECTION 900 ADMINISTRATION

900.1 Final approval of plats and other data shall be the responsibility of the Governing Authority as described by law.

900.2 It shall be the duty of the City Engineer to:

a. Consult with the Subdivider at the preapplication conference to provide technical knowledge and professional experience.

b. Review all Subdivision or street maps, plats, construction plans and supplementary data for conformance with the requirements of these regulations and to inform the appropriate City agency or Governing Authority, as required, of his findings.

c. Determine requirements governing the design or construction of required improvements in cases where no City standard exists.

d. Inform the Governing Authority when said Authority is considering Final Plat approval whether the subdivision is in substantial conformance with these regulations.

900.3 The Governing Authority may, from time to time, issue instructions and operating procedures to be followed in the administration of these regulations to the end that the public may be informed, and that approval of plats be expedited.

900.4 No building permits shall be issued by the City for any structure on a lot for which the Final Plat has not been approved and recorded in the manner prescribed herein.

900.5 No building permit shall be issued by the City for any structure on a lot which does not front on a legally established public street, or approved private street, which street must have a right of-way width of not less than fifty (50) feet except in private streets or public streets in existence on the date of this Order.

900.6 No building permit shall be issued by the City for any structure on a lot for which there is not a City approved Lot Grading Plan which conforms to the Subdivision Grading and Drainage Plans.

SECTION 901 FEES

901.1 The City reserves the right for the Board of Alderman to adopt a reasonable fee schedule for the review of preliminary plats, construction plans, as-builts, final recording plats or any other development within the City.

SECTION 902 ONE YEAR WARRANTY

902.1 Prior to the final acceptance by the City of the dedicated utilities and streets, a one-year warranty as required in previous Articles of these regulations shall be submitted by all prime contractors for their phase of the work and by the owner for all the work performed.

SECTION 903 AMENDMENTS

903.1 The Governing Authority may from time to time adopt amendments that will tend to increase the effectiveness of these regulations. The regulations may be revised or amended by the Governing Authority as required by law.

SECTION 904 PENALTIES

904.1 In addition to any other enforcement provisions or penalties set forth in this ordinance, any person, firm, or corporation using an unapproved and unrecorded plat in the sale of

subdivided land or violating any of the terms or provisions of these regulations shall be guilty of a misdemeanor and, upon conviction, shall be punished by fine of not more than $100. Each violation and each day of failure to comply with the provisions of these regulations shall constitute a separate violation.

SECTION 905 SEVERABILITY

905.1 If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance should be declared invalid for any reason whatsoever, such decision shall not affect the remaining portion of this ordinance, which shall remain in full force and effect, and to this end the provisions of this ordinance are hereby declared severable.

SECTION 906 CONFLICT

906.1 All ordinances or parts of ordinances in conflict herewith are hereby repealed.

SECTION 907 EFFECTIVE DATE

907.1 This document shall be in full force and effect from and after its passage and publication as provided by law.

SO ORDERED, this 16th day of January 2024.

_____
Gary Rhoads, Mayor

SEAL

Attest:

_____
Josh Carlisle, City Clerk