

TITLE 16

STREETS AND SIDEWALKS, ETC¹

CHAPTER

1. MISCELLANEOUS.
2. STREET, SIDEWALK AND DRAINAGE DESIGN STANDARDS.

CHAPTER 1

MISCELLANEOUS

SECTION

- 16-101. Obstructing streets, alleys, or sidewalks prohibited.
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16-101. Obstructing streets, alleys, or sidewalks prohibited. No person shall use or occupy any portion of any public street, alley, sidewalk, or right of way for the purpose of storing, selling, or exhibiting any goods, wares, merchandise, or materials.

No person shall park any motor vehicle licensed and/or primarily used for commercial purposes and having a gross vehicular weight in excess of 8,000 pounds on a public street within a residential or commercial zoning district, for any period longer than when actively engaged in the loading or unloading of goods, wares, or merchandise. Excluded from this provision are emergency service vehicles, vehicles used for the transportation of passengers, and construction vehicles when lawfully permitted by the City of White House Police Department.

¹Municipal code reference

Related motor vehicle and traffic regulations: title 15.

No person shall park any truck or motor vehicle of more than 18,000 pounds gross weight, or any trailer, semi-trailer, or motor coach, whether or whether not attached to a tractor, on any street from 6:00 P.M. to 6:00 A.M.; except this section shall not apply to trucks, trailers or semi trailers so parked while actually engaged in loading or unloading, or in performing a service, including moving vans and vehicles needed for construction purposes at the adjoining property. (1979 Code, § 12-101, as amended by Ord. #04-13, Sept. 2004)

16-102. Trees projecting over streets, etc., regulated. It shall be unlawful for any property owner or occupant to allow any limbs of trees on his property to project out over any street or alley at a height of less than fourteen (14) feet or over any sidewalk at a height of less than eight (8) feet. (1979 Code, § 12-102)

16-103. Trees, etc., obstructing view at intersections prohibited. It shall be unlawful for any property owner or occupant to have or maintain on his property any tree, shrub, sign, or other obstruction which prevents persons driving vehicles on public streets or alleys from obtaining a clear view of traffic when approaching an intersection. (1979 Code, § 12-103)

16-104. Projecting signs and awnings, etc., restricted. Signs, awnings, or other structures which project over any street or other public way shall be erected subject to the requirements of the building code.¹ (1979 Code, § 12-104)

16-105. Banners and signs across streets and alleys restricted. It shall be unlawful for any person to place or have placed any banner or sign across any public street or alley except when expressly authorized by the board of mayor and aldermen after a finding that no hazard will be created by such banner or sign. (1979 Code, § 12-105)

16-106. Gates or doors opening over streets, alleys, or sidewalks prohibited. It shall be unlawful for any person owning or occupying property to allow any gate or door to swing open upon or over any street, alley, or sidewalk except when required by law. (1979 Code, § 12-106)

16-107. Littering streets, alleys, or sidewalks prohibited. It shall be unlawful for any person to litter, place, throw, track, or allow to fall on any street, alley, or sidewalk any refuse, glass, tacks, mud, or other objects or materials which are unsightly or which obstruct or tend to limit or interfere

¹Municipal code reference

Building code: title 12, chapter 1.

with the use of such public ways and places for their intended purposes. (1979 Code, § 12-107)

16-108. Obstruction of drainage ditches. It shall be unlawful for any person to permit or cause the obstruction of any drainage ditch in any public right of way. (1979 Code, § 12-108)

16-109. Abutting occupants to keep sidewalks clean, etc. The occupants of property abutting on a sidewalk are required to keep the sidewalk clean. Also, immediately after a snow or sleet, such occupants are required to remove all accumulated snow and ice from the abutting sidewalk. (1979 Code, § 12-109)

16-110. Parades, etc., regulated. It shall be unlawful for any person, club, organization, or other group to hold any meeting, parade, demonstration, or exhibition on the public streets without some responsible representative first securing a permit from the recorder. No permit shall be issued by the recorder unless such activity will not unreasonably interfere with traffic and unless such representative shall agree to see to the immediate cleaning up of all litter which shall be left on the streets as a result of the activity. Furthermore, it shall be unlawful for any person obtaining such a permit to fail to carry out his agreement to clean up the resulting litter immediately. (1979 Code, § 12-110)

16-111. Animals and vehicles on sidewalks. It shall be unlawful for any person to ride, lead, or tie any animal, or ride, push, pull, or place any vehicle across or upon any sidewalk in such manner as unreasonably interferes with or inconveniences pedestrians using the sidewalk. It shall also be unlawful for any person knowingly to allow any minor under his control to violate this section. (1979 Code, § 12-111)

16-112. Fires in streets, etc. It shall be unlawful for any person to set or contribute to any fire in any public street, alley, or sidewalk. (1979 Code, § 12-112)

16-113. Roadblocks for solicitations. It shall be unlawful for any person and/or organization, to use, occupy, or obstruct any portion of any public street, street-right-of-way, alley, or sidewalk in order to slow or stop vehicular traffic for the purpose of soliciting donations or contributions, or selling merchandise, or any other similar purpose. The police department is hereby empowered to enforce this provision. (1979 Code, § 12-113, as amended by Ord. #97-13, Oct. 1997)

16-114. Deleted. (1979 Code, § 12-114, as amended by Ord. #07-01, Feb. 2007 *Chang18_12-19-19*, and deleted by Ord. #18-28, Oct. 2018 *Ch18_12-19-19*)

CHAPTER 2**STREET, SIDEWALK AND DRAINAGE DESIGN STANDARDS****SECTION**

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16-201. Purpose. This document describes transportation design requirements that present a comprehensive approach to designing new, and modified, streets within the City of White House (hereinafter referred to as "city"). These requirements will provide better streets throughout the city, reflecting best practices and providing more capacity with safe and comfortable travel for motorists, pedestrians, bicyclists, and transit riders. However, many streets have also come to symbolize the growing pains that can accompany growth and prosperity, with increased congestion in some portions of the city. Therefore, these street design guidelines have been developed in response to three (3) basic issues:

- (1) The city needs to plan for continued growth and development
- (2) The people that reside in the city want quality streets with good traffic flow.
- (3) The city recognizes the connection between land use and street design. (1979 Code, § 12-201, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-202. Applicability. These specifications shall apply to any person, developer, firm, business, or entity interested in, constructing additional streets, extending existing streets, or to do any other type of right-of-way (R-O-W) construction; such as curb cuts, that may affect the public and private streets within the city. These specifications are intended to apply to new streets within new development areas, and generally shall apply to existing streets, which is to include remedial work such as widening or rehabilitation of the existing streets as required. Design of streets, structures and associated elements such as traffic signals, signing, and lighting shall be sensitive to the character of the surrounding area and the impacts on historic resources. By adhering to the principles set forth in this document, negative impact from growth and development will be reduced, thus preserving the community's quality of life, health, safety and welfare. (1979 Code, § 12-202, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-203. Jurisdiction/regulations. Except as may otherwise be required by law, these rules and regulations govern the construction of streets and all associated improvements and appurtenances that shall be installed

within the street system of the City of White House, Robertson County and Sumner County, Tennessee, and shall apply to all areas within the jurisdiction of the city. (1979 Code, § 12-203, as replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-204. General. The City of White House Public Services Department will approve all plans for construction and the upgrading of streets or roads in the city street index which shall include:

- (1) New construction;
- (2) Staged development of roadways (overlays);
- (3) Roadway widening;
- (4) Appurtenant roadway improvements such as storm drains and curb and gutter;
- (5) Encroachments.

To be eligible for acceptance into the city street index, a street or road must be designed and constructed in accordance with these standards and approved by the public services director. (1979 Code, § 12-204, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-205. Standards, specifications, and resources. This document is the result of cooperation of many departments within the city. The following publications will be referred to in these specifications.

- (1) "ADA Standards for Accessible Design," latest edition;
- (2) "A Policy on Geometric Design of Highways and Streets," American Association of State Highway and Transportation Officials (AASHTO);
- (3) "American Society for Testing and Materials Standards (ASTM), D2321 & D2774," latest edition;
- (4) "AWWA Standards," latest edition, American Water Works Association.
- (5) "Bridge Standards Manual," AASHTO;
- (6) "Erosion and Sediment Control Handbook," latest edition, Tennessee Department of Environment and Conservation (TDEC);
- (7) "Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT \leq 400)" AASHTO;
- (8) "Guidelines for Urban Major Street Design, a Recommended Practice," Institute of Transportation Engineers (ITE);
- (9) "International Municipal Signal Association (IMSA) Wire and Cable Specifications Manual," latest edition; "International Building Code," latest edition; International Code Council (ICC);
- (10) International Code Council (ICC);
- (11) "Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways," latest edition;
- (12) U.S. Department of Transportation, Federal Highway Administration (FHWA);
- (13) "National Electric Code," (NFPA 70), latest edition;

(14) The Tennessee Department of Transportation (TOOT), "Standard Specifications for Road and Bridge Construction," latest edition, technical specifications only, shall apply and become a part of these specifications whenever these specifications do not adequately cover the work to be done. In the event of a conflict between these and TDOT specifications, the City of White House Public Services specifications shall govern, unless the construction is on a state route.

(15) "The Tennessee Department of Transportation; Survey Manual";

(16) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (AASHTO-LT).

In the event of a conflict between this document and the aforementioned referenced specifications, the specifications contained in this document shall govern. (1979 Code, § 12-205, as replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-206. Definitions. (1) "AASHTO." American Association of State Highway and Transportation Officials.

(2) "Approach." The portion of an intersection leg which is used by traffic approaching the intersection.

(3) "Army Corps of Engineers." Provides engineering services as a government agency as it relates to civil engineering projects.

(4) "ASTM." American Society for Testing and Materials.

(5) "Average Daily Traffic (ADT)." The total bi-directional volume of traffic passing through a given point during a given time period (in whole days), divided by the number of days in that time period.

(6) "AWWA." American Water Works Association.

(7) "Board of mayor and alderman." Elected board of local citizens responsible for decision making related to growth and development within the city.

(8) "Capacity." The maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform segment of a lane or roadway during a given time period under prevailing traffic, roadway and control conditions.

(9) "CEMC." Cumberland Electric Membership Corporation.

(10) "City." The City of White House, Tennessee.

(11) "City administrator." City official appointed by the board of mayor and alderman and responsible for overseeing all administrative tasks necessary for city operations.

(12) "City standards and specifications." Those standards prescribed for the construction of streets, sidewalks, driveway access points, curb and gutter set out in the subdivision regulations.

(13) Crosswalk. (a) That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a

sidewalk on one (1) side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the centerline;

(b) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other marking on the surface. (MUTCD)

(14) "Cycle length." The time required for one complete sequence of signal indications. (MUTCD)

(15) "Detector." A sensing device used for determining the presence or passage of vehicles or pedestrians. (MUTCD)

(16) "Developer." A site planner or sub-divider.

(17) "Development or development plan." Any site plan or subdivision.

(18) "Director of public services." City official responsible for directing and overseeing construction, maintenance, traffic control and storm water implementation for improvements of city streets.

(19) "Engineer." A licensed professional engineer employed by the city or a duly authorized representative serving to direct and oversee engineering design, coordination and implementation of private and city capital improvements as well as public safety and welfare.

(20) "FHWA." Federal Highway Administration.

(21) "Flow line." The transition point between the gutter and the face of the curb. For a valley curb it is the center of the pan. Where no curb exists, the flow line will be considered the edge of the traveled way.

(22) "IMSA." International Municipal Signal Association, Inc.

(23) "Intersection." (a) The area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two (2) highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways that join at any other angle may come into conflict;

(b) The junction of an alley or driveway with a roadway or highway shall not constitute an intersection. (MUTCD)

(24) "ITE." Institute of Traffic Engineers.

(25) "Land disturbance permit." Permit issued by the City of White House Public Services Department that allows the contractor to begin grading work.

(26) "Major street." A street normally carrying the higher volume of vehicular traffic. (MUTCD)

(27) "NFPA." National Fire Protection Agency.

(28) "NCHRP." National Cooperative Highway Research Program.

(29) "Pavement markings." All lines, words or symbols, except signs officially placed within the roadway or parking area to regulate, warn or guide traffic.

(30) "Peak-hour volume." Hourly traffic volume used for roadway design and capacity analysis, usually occurring during one (1) or more peak travel hours during a twenty-four (24) hour period.

(31) "Pedestrian." People who travel on foot or who use assistive devices, such as wheelchairs, for mobility.

(32) "Planning and codes director. City official responsible for directing the enforcement and interpretations of the provisions of national and local building codes.

(33) "Prescriptive easement." An easement claimed by the city upon an owner's real property by continuous, uninterrupted, open, visible, and exclusive use of the land for a period of twenty (20) years or more with the true owner's knowledge and acquiescence.

(34) "R-O-W, (ROW)." An interest in land to the city which provides for the perpetual right and privilege of the city and its agents, franchise holders, successors, and assigns to construct, install, improve, repair, maintain, and use a public street, including related and customary uses of street R-O-W such as sidewalk, bike path, landscaping, traffic control devices and signage, sanitary sewer, storm water drainage devices, water supply, cable television, electric power, gas, and telephone transmission and related purposes in, upon, over, below, and across the R-O-W. The city is authorized to remove, and keep removed from the R-O-W all trees, vegetation, and other obstructions as is determined to be necessary by the city to maintain, repair, and protect facilities located in the R-O-W.

(35) "Roadway." See definition of street.

(36) "Sidewalk." Any public or private pedestrian or bicycle walkway or path.

(37) "Signal phasing." The right-of-way, yellow change, and red clearance intervals in a cycle that are assigned to an independent traffic movement or combination of movements. (MUTCD)

(38) "Signal timing." The amount of time allocated for the display of a signal indication. (MUTCD)

(39) "Signal warrant." A threshold condition that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control signal or other improvement is justified. (MUTCD)

(40) "State route." An arterial highway designated and signed with a route number, which is primarily funded for construction and administered by TDOT. Improvements and maintenance of state routes is under the jurisdiction of TDOT.

(41) "Storm water permit." If approaches to handling storm water are not standard or specified in the storm water ordinance, a storm water permit may need to be applied for by the contractor/developer.

(42) "Street." A public or private roadway, but is not considered a driveway access point.

(43) "Subdivision regulations." Documents initiated by the City of White House to establish guidelines for subdivision plans.

(44) "TIA." Traffic Impact Analysis.

(45) "Tennessee Department of Environment and Conservation (TDEC). A regulatory board that monitors pollution.

(46) "Traffic control signal (traffic signal)." Any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed. (MUTCD)

(47) "Traffic sign." A device mounted on a fixed or movable support conveying a message or symbol to regulate, warn or guide traffic.

(48) "Volume." The number of vehicles passing a given point during a specified period of time.

In the event of a conflict between this document and the aforementioned referenced specifications, the specifications contained in this document shall govern. (1979 Code, § 12-206, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-207. Permits. Prior to beginning any construction, the developer and/or contractor, shall obtain all necessary permits as required by law. Such permits may include, but are not limited to, those required by State of Tennessee, Robertson County, Sumner County, and other City of White House agencies. The Developer shall obtain a "land disturbance permit," "stormwater management permit," "sewer fees receipt" and landscape plan approval (when necessary) from the city prior to beginning any construction activities. The "land disturbance permit" is issued by the City of White House Public Services Department upon presentation of proof of required approvals of drawings and specifications and upon payment of required fees. (1979 Code, § 12-207, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-208. Notification of construction. In addition to any other notices required by law (e.g., TN One Call, notices to non-participating utilities), before commencing any street construction operations, a ten (10) day notice must be given during regular business hours to the public services department. This advance notice is required for all street construction projects to ensure proper inspection staff scheduling. Demolition permits, if required for the project, shall be obtained from the planning and codes office. (1979 Code, § 12-208, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-209. Utility coordination. Locating and coordination for the relocation of existing utilities within the city's right-of-way is the responsibility of the contractor. Tennessee's One-Call and the City of White House utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be

responsible for costs due to damage caused to any utility lines. (1979 Code, § 12-209, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-210. Quality control testing. Construction materials, including asphalt, concrete, and roadway subgrades shall be fully tested in accordance with the designations and requirements within the referenced "TDOT Standard Specifications" sections. Unless otherwise noted within the "standard specifications" section, the type and number of tests called for by the referenced standards shall be performed.

Testing shall be done by an independent testing laboratory whose qualifications are approved by the city. Testing results will be submitted to and approved by the director of public services. The city reserves the right to require industry standard certifications of testing and inspections by the testing laboratory, mills, shops, and factories. Such certifications required shall be submitted in duplicate.

The developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by city officials at no cost to the city. Test reports of field testing if applicable shall be submitted directly to the director of public services. Defects disclosed by tests shall be rectified at no cost to the city. The developer is required to have the design engineer or a certified quality control inspector present during all phases of construction. A daily log of work performed should be kept by this individual and submitted to the city upon request. (1979 Code, § 12-210, as amended by Ord. #07-01, Feb. 2007, and replaced by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-211. Inspection. All projects shall be subject to inspection during and upon completion of construction by an authorized representative of the city. Presence or absence of an inspector during construction does not relieve the developer and/or contractor from adherence to approved plans and material contained in these specifications or from liability. Materials and/or workmanship found not meeting requirements of approved plans and specifications shall be immediately brought into conformity with said plans and specifications.

An authorized representative of the city shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the engineer responsible for the project shall certify in writing to the public services director that the work has been completed in accordance with approved plans and specifications.

The cost for inspection during construction is covered by the "sewer fee schedule" fee. Additional inspection fees will be required only when an inspection requiring city approval fails and requires subsequent re-inspections. The inspection fee (current prices may be requested from the public services

department) shall be paid to the city before issuance of the "land disturbance permit." (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-212. Revision of plans. Should, during construction, necessary changes be anticipated that would in the opinion of the city staff constitute significant revision of the plans already approved by the city, said plans shall be revised with said changes shown and resubmitted as required by the city, along with a letter stating why such changes are believed necessary. Changes deemed to be minor in nature by the public services director may be made during construction with the changes noted for inclusion in the "as-built" drawings to be submitted to the city prior to final acceptance.

The public services director shall have the right to re-review the entire set of plans should a revision of the plans be required. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-213. Acceptance of facilities. After construction has been completed, a final inspection will take place by the city. A certificate of acceptance shall be issued once all contractual agreements have been met and construction meets the extents considered satisfactory under these specifications and deemed as such by the city. Acceptance of facilities will only be issued after as-built plans that adhere to requirements listed in § 16-215 have been submitted and approved by the public services director. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-214. Modifications. Occasions may arise where the minimum standards are either inappropriate or cannot be justified economically. Modifications from the standards in this ordinance will be considered by the public services director on a case-by-case basis using the following criteria:

- (1) Whether the modification requested complies with acceptable engineering standards;
- (2) Whether the modification requested does not present a danger to the general health, safety or welfare to the traveling public or pedestrians; and;
- (3) Whether the modification is necessary and meets or exceeds the standard using acceptable alternative design or methods.

If the developer, contractor, or utility responsible to the city for public improvements desires to design and construct such improvements in modification to these standards, such modification(s) should be identified in a written attachment to the initial submittal of plans. A request for modification shall be denied if the following information is not provided:

- (a) Identification of the standard provision to be modified.
- (b) Identification of the alternative design or construction standards proposed.
- (c) A thorough justification of the modification request including impact on short- and long-term capital and maintenance requirements and cost.

(d) Request shall be prepared and sealed by a professional civil engineer licensed to practice in the State of Tennessee. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-215. As-built plan submittal. Final as-built plans should be submitted immediately following completion of construction activities. If the project is developed in phases, as-built plans for each phase shall be submitted once the work is complete in that phase. Acceptance of facilities will not be issued until satisfactory as-built plans have been approved by the public services director.

All aspects of the project that have been affected by construction should be verified and appear on the as-built plans. This would include, but is not limited to the following items:

- (1) All property lines and easements;
- (2) Existing structures (include patio covers, decks, trellises, sheds, pools, fences, poles, etc.);
- (3) Location of all "as-built" work with station and offsets;
- (4) Height and location of all fences, walls, screens, trees, and hedges over forty-two inches (42") tall;
- (5) All commercial driveways, paved areas, and required parking spaces;
- (6) All concealed components with station and offsets (include known buried cables, utilities, drainage structures, etc.);
- (7) CCTV documentation of storm drainage and/or sewer systems installed;
- (8) Storm water BMPs (detention/retention ponds, bio-retention areas, etc.).

Concealed components will require documented proof to be submitted with the as-built plans in the form of a certified construction log that has been generated by the design engineer or a certified quality control inspector.

As-built plans are required to be endorsed by a Tennessee registered professional engineer and/or a registered land surveyor. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-216. Revisions to these specifications. These specifications will be adopted, in ordinance form, by the city's board of mayor and alderman, and shall be revised by ordinance. However, forms and administrative procedures or regulations to effectuate the intent of these specifications are subject to change as deemed necessary by the public services director with thirty (30) days' notice from posting on the city's website or advertising in a publication of general circulation within Robertson and Sumner County and placed on file at the city hall for public inspection and written comment. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-217. Pavement design overview. The contractor/developer shall provide all plant, labor, material and equipment to furnish and construct the bituminous concrete pavements in reasonable close conformity with the lines, grades, thickness and typical cross sections shown on the standard drawings and specified herein, or as called for on the approved plans and specifications. The specifications referenced for each material shall fully apply and no deviations from said specifications limits or quality will be permitted unless specifically stated otherwise in this section. The failure of any component of a product to comply with the referenced specifications shall constitute failure of the whole product.

The contractor/developer shall obtain approval of the subgrade and stone base from the public services director prior to commencing with the paving operations.

For all paving operations, the contractor/developer will be required to provide testing from an independent geotechnical firm pre-approved by the city. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-218. Requirements. (1) Design standards. The design criteria and procedures presented follow the TDOT Standard Specifications for Road and Bridge Construction, sections 307 (Bituminous Plant Mix Base (Hot Mix)), 407 (Bituminous Plant Mix Pavements (General)), 411 (Asphaltic Concrete Surface (Hot Mix)), and 907 (Concrete Reinforcement), dated January 1, 2015 and AASHTO 1993 Guide for the Design of Pavement Structures.

(a) ADT and Equivalent Daily Load Applications (EDLA): Loading values can be calculated using TDOT approved ADT numbers or Equivalent Daily Load Applications (EDLA) and Equivalent Single Axle Loads (ESAL) units if available. AASHTO's "A Policy on Geometric Design of Highways and Streets" and/or "Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT :5 400)," whichever design method is appropriate, should be used if ADT, EDLA, or ESAL units are available.

(b) Minimum pavement section: The standard drawings in the subdivision regulations appendix provide the default acceptable pavement sections for each street classification based on assumed subgrade support and traffic values. These pavement thicknesses may be used for preliminary planning purposes, cost estimates, or final pavement designs when approved by the public services director. All pavement thickness designs must be based on actual subgrade support test results and traffic projections for the specific project. In specifying layer thickness, the designer shall consider how the pavement section will be physically constructed (e.g. specify how to construct two feet (2') of treated subgrade.)

(2) Pavement type. Streets are to be constructed of asphaltic concrete pavement, base course material, or subbase material (where required), placed on compacted subgrade. Non-standard design coefficients may be used, only if

approved in advance by the public services director. In addition, design values must be verified by pre-design mix test data and supported by daily construction tests.

(3) Treated subgrade. The use of treated subgrade, treated base, and/or full depth asphalt pavement may be acceptable when designed and submitted by the designer, and approved by the public services director in accordance with these standards as well as the TDOT Standard Specifications for Road and Bridge Construction, sections 302 (Subgrade Treatment), 304 (Soil-Cement Base) and 306 (Portland Cement Concrete Base).

(4) Approval. A pavement design report shall be submitted with final construction plans. The pavement design report must include the pavement design calculations, methodology, typical sections selected, and basis for assumptions. The public services director shall review and approve the pavement design report prior to construction. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-219. Rehabilitating/repairing existing streets. On paved surfaces, within public R-O-W, do not use or operate excavators, tractors, bulldozers, off-road trucks or other power-operated equipment, the treads or wheels of which are so shaped as to cut or otherwise damage such surfaces. Damaged roadways shall be repaired to the city's satisfaction by the contractor/developer. Placing of mats or using other methods of protection may be allowed subject to the approval of the public services director.

Any roadway surface damaged shall be promptly restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations. Suitable materials and methods shall be used for such restoration, with an emphasis on using the infra-red process for making repairs. All dirt and mud tracked on existing roadways shall be removed promptly. Prior to overlaying existing asphalt, the public services director may require nondestructive testing to determine the amount of overlay necessary to bring the street to current standards. The method of nondestructive testing and the data obtained must be in a form compatible with the pavement management system for the public services director.

All "pot-holes," utility trench settlement, cracking, and any similar imperfections shall be repaired to the public services director satisfaction prior to overlaying. The following should serve as a guideline for the rehabilitation and repairing of existing asphalt streets in the city:

(1) General. The contractor is to provide the necessary labor materials and equipment to restore and maintain the various street and driveway surfaces of all types, pavement and driveway bases, curbs, curbs and gutters, and sidewalks disturbed, damaged, or demolished during the performance of the work.

(2) Permits/fees. Before starting any work, secure the necessary permits to work within the city or state R-O-W and easements when surface materials will be disturbed or demolished. Separate street excavation permits

for street cutting and road subsurface boring/jacking operations are issued at a cost of one thousand dollars (\$1,000.00) each and expire after three (3) months from the date of issue. Additionally, all public utilities shall be required to maintain, on file with the public services department, an annual bond in the amount of ten thousand dollars (\$10,000.00) for utility cuts and/or directional bores located within city's R-O-W.

(3) Materials. The quality of materials used in the restoration of existing streets, parking areas and driveways shall produce a finish surface equal to or better than the condition before work began. Compacted crushed stone backfill shall be in conformance with the TDOT Standard Specifications for Road and Bridge Construction.

(4) Execution. Where trenches have been opened in any roadway or street that is a part of the State of Tennessee highway system, restore surfaces in accordance with the requirements of TDOT. All other restorations shall be done in accordance with the city standards and these specifications and the city's standard details.

Before trenching in paved areas, the contractor shall saw-cut the pavement in a straight line along the sides of the proposed trench to allow for pavement removal and trench excavation without damage to adjacent pavement. During construction, suitable precautions shall be taken to protect the pavement edges and surfaces and to minimize damage.

Upon completion of the utility installation, the cut shall be full trench backfilled with #67 stone, twelve inches (12") of pug/crusher run, four inches (4") of BMOD binder and two inches (2") of 411E topping. The damaged asphalt will be straight cut, with no castle cuts allowed, regardless of how much asphalt is required to be removed to attain a straight edge cut.

Contractor may fill the top twelve inches (12") of the trench with crusher run and temporary pavement patch until such time that the permanent pavement patch will be constructed. The temporary patch shall be placed the same day or within twenty-four (24) hours. The temporary pavement patch shall consist of at least twelve inches (12") of compacted stone base brought to within six inches (6") of the surface of the existing permanent pavement.

A four inch (4") layer of cold mix asphaltic concrete shall then be applied to protect the base, prevent "pot holes" or "chuck holes." and provide a reasonably smooth pavement surface until the permanent patch is made. The temporary pavement patch shall be placed within twenty-four (24) hours of the completion of the utility installation. Permanent hot mix patching shall only be applied after the cold mix patch has been completely removed and adequate subbase is installed.

When installing the permanent repair, the contractor must use the infra-red method to ensure the joints are sealed properly. An inspector from the public services department must be onsite during the infra-red process. The finished patch must be a smooth transition from the existing asphalt to the infra-red repaired asphalt.

Concrete curbs, gutters and sidewalks shall be restored as required to match existing construction. Replace damaged sections with completely new sections or squares. Patching of damaged sections will not be permitted.

When a manhole or valve box frame and cover, or other utility casting, requires adjustment to an elevation one inch (1") or more above the existing pavement grade and is exposed to traffic before final paving is completed, a temporary ramp shall be constructed by feathering a cold mix for three hundred sixty degrees (360°) around the casting. A taper slope of not less than two feet (2') per one inch (1") shall be used. During the final paving operation, the temporary ramp shall be removed from around the casting to allow for the permanent paving installation. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-220. Pavement structure components. (1) Sub-base. The layer(s) of specified or selected material of designed thickness placed on a subgrade to support a base course, surface course, or both. A minimum of one (1) boring shall be obtained for any roadway segment. The distance between borings shall not exceed two hundred fifty feet (250'). A second boring shall be required in the trench of any installed utilities. Therefore, where utility trenches exist, the contractor shall be required to do two (2) borings per locations, one boring in the trench and one in compacted subgrade. Multiple samples shall be taken alternately among lanes and shall be evenly spaced. The public services director may require more frequent testing to ensure that the subbase meets the adequacies presented in the design report.

However, if borings have already been completed by the underground utility contractor, then additional utility borings shall not be required.

(2) Sub-base proof-roll. Prior to scheduling a sub grade proof-roll, the public services department must be in receipt of all density testing data required to be completed at this stage of construction (sub grade should have been tested every two hundred fifty feet (250'), alternating lanes testing to be completed on cut or fill). It is the responsibility of the contractor to provide independent density verification prior to proof-rolling, and at no cost to the city.

After fine grading of sub grade, but prior to placing base material, the sub grade must be proof rolled with a loaded tandem axle dump truck or pan. The contractor shall schedule this inspection. The geotechnical engineer, public services department and contractor shall be represented. The public services department reserves the right to conduct or require additional testing at any time. The minimum acceptable sub grade density is ninety-five percent (95%) of maximum proctor density.

No base course material or curbs should be placed prior to written approval of the sub grade from the public service's department office.

NOTE: Any completed and approved sub grade left exposed for over two (2) weeks or damaged by inclement weather must be re-inspected and approved by the public service's department.

This may include another proof roll if necessary in the judgment of the public service's department.

Any excavation within a tested and city approved sub grade shall be treated as new excavation and complete density testing and proof-rolling requirements must be met.

(3) Base course. The mineral aggregate base (stone base) shall be crushed stone as manufactured by local quarries in accordance with TDOT Standard Specifications.

The composite gradation of aggregate for the mineral aggregate base and for surface courses shall be Class A, Grading D, Pug Mill Mix, as specified in the TDOT Standard Specifications for Road and Bridge Construction.

Placement of base course material is only permitted on a city approved sub grade. All base course materials are to be density tested every two hundred fifty feet (250') in alternating lanes with a minimum of two (2) tests on any road no matter the length. Thickness of base course material must be verified at each density test location.

The following compaction requirements must be met: Graded aggregate base course (ninety-eight percent (98%) of modified proctor density).

It is the responsibility of the contractor to provide independent density verification at no cost to the city.

(4) Base course proof-roll. Prior to scheduling a base course proof-roll the city must be in receipt of all base course density testing and thickness verification reports. If the average base course thickness is found to be deficient by more than one half inch (1/2") or any individual measurement deficient by more than 1 inch, the deficiency will be corrected by scarifying, adding base material, re-compacting and density testing.

Upon completion of the curbing and base course, the contractor shall schedule an inspection to proof-roll the base with a loaded tandem axle dumptruck. The geotechnical engineer, public services director and contractor shall be represented. The contractor will provide proctor and gradation information on the base material from an independent testing firm as well as verification that all applicable compaction and depth requirements have been satisfied.

(5) Graded aggregate base course. If the base course is eight inches (8") or thicker, than it shall be placed and compacted in equal lifts (eight inches (8")), compact and test at four inches and eight inches (4" and 8"), if the base course is less than twelve inches (12") it can be tested as one (1) lift. If base course is twelve inches (12") or greater it must be placed compacted and density tested in equal lifts (twelve inches (12")), compact and test at six inches and twelve inches (6" and 12")).

NOTE: Any completed and approved stone base left exposed for over one (1) week or damage by inclement weather must be re-inspected and approved by the public service's department. This may include another proof roll if necessary in the judgment of the public service's department.

(6) Bituminous prime coat. A bituminous prime coat shall be applied uniformly over the surface of the crushed stone base by means of a pressure distributor at an approved uniform rate. The contractor shall maintain the prime coat and the surface intact until it has been covered by the following stage of construction. The prime coat shall be Emulsified Asphalt RS-2 AE-P (TDOT Standard Specifications, subsection 904.03), applied at the rate of three-tenths (0.3) gallon per square yard, and shall be maintained at an application temperature between sixty and 104 degrees Fahrenheit (60° and 140° F). No succeeding stage of construction shall be placed upon the prime coat until it has properly cured.

The use of prime coat on base course material shall be done solely at the discretion of the public services director.

(7) Binder course. The binder course shall be installed to the compacted thicknesses shown on the plans or in the standard drawings. Bituminous mixtures shall be delivered and spread on the roadway in ample time to secure thorough compaction during daylight hours. The bituminous plant mix shall be placed upon the approved stone base or asphalt course, spread and struck off to established line, grade and elevation by means of an approved asphalt paving machine. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture shall be taken from the hopper of the spreading machine and shall be distributed into place by means of shovels and spread with rakes and lutes in a uniformly loose layer of such depth as will result in a completed course having the required thickness.

(8) Surface course. One (1) or more layers of a pavement structure designed to accommodate the traffic load; the top layer of which resists skidding, traffic abrasion and the disintegrating effects of climate. For asphalt pavement the top layer is sometimes called the "wearing course." Asphalt thicknesses for surface courses are typically one and one-half to two inches (1 1/2" to 2") thick. For asphalt overlay projects, the total thickness of asphalt should be no more than four inches (4"). See § 16-221(1) for material specifications.

Prior to installing the surface course of asphalt, a bituminous trackless tack coat shall be applied uniformly to the binder course by means of a pressure distributor at a uniform rate. The minimum rate of application for tack on a new binder course shall be a 0.05 gallons/square yard. The tacked surface shall be allowed to dry until it is in a proper condition to receive the next course. The trackless tack coat shall only be applied as far in advance of the paving operations as is necessary to obtain the proper condition of tackiness. The contractor shall protect the tack coat from damage until the next course is placed. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-221. Asphaltic concrete pavement design. (1) Material. All pavement designs shall adhere to the specifications set forth in the TDOT Standard Specifications for Road and Bridge Construction. Aggregate for the plant mix surface course shall be sized, graded and combined in such

proportions that the resulting composite blend meets the requirements of TDOT 903.05. Aggregate for Mineral Aggregate Base and Surface Courses, of the Standard Specifications, together with the stipulations pertaining to the constituents of the blend hereinafter specified in the TDOT Standard Specifications for Road and Bridge Construction.

Unless another type has been approved in advance by the public service's department for a specific project, hot mix asphalt pavements will be:

Binder type BM2 ACS mix (PG64-22) (TDOT Standard Specifications, section 307-01.08). Wearing Surface Grading 411E ACS mix (PG70-22) (TDOT Standard Specifications, section 411-02.11), or, 411D ACS mix (PG64-22) (TDOT Standard Specifications, section 411-01.10).

A prime coat is a sprayed application of a cutback asphalt or Asphalt Emulsion (AE) applied to the surface of untreated subgrade or base layers. The prime coat serves several purposes:

- (a) Fills the surface voids and protects the base from weather;
- (b) Stabilizes the fines and preserves the base material integrity, and;
- (c) Promotes bonding to the subsequent pavement layers.

The project plans shall specify the rate at which the prime coat is applied. A prime coat is a sprayed application of an Asphalt Emulsion (AE) applied to the surface of untreated subgrade or base layers. Generally, however, prime coat is applied at a rate between 0.30 to 0.50 gallons/sq. yd.

Trackless tack shall be used on all paving projects, new or overlay. For an overlay project, the initial tack volume is surface dependent. For scarified or heavily alligator cracked roads, the tack is to be put down at an application rate of 0.11 gallons/sq. yd. For smoothed surfaces, recently paved roads or on leveling courses, the trackless tack application rate is 0.05 gallons/sq. yd.

(2) Coordination. After approval of the base or subgrade, there shall be coordination between the paving contractor and the public services department with regard to the schedule for paving. A city inspector is required to be present during paving operations.

- (a) Asphalt is only to be placed on a city approved base.
- (b) A prime coat shall be used on base rock material, and shall be applied twenty-four (24) hours prior to paving.
- (c) If more than one (1) week passes or there is one fourth (1/4") or more rain prior to paving an approved base, the base must be re-inspected by the city visually, and possibly proof-rolled at the discretion of the city.
- (d) Minimum asphalt thickness for initial/first lift is two inches (2") inches for residential streets.

(e) Asphaltic concrete surface course may not be placed during the months of December, January, and February except with the written permission of the director of public services. Placement of hot mix asphalt

will not be authorized when surface, and ambient, temperatures are less than fifty-two degrees Fahrenheit (52° F).

(f) Public services department to visually inspect pavement and review asphalt core test data at all phases of paving, binder, intermediate and surface course.

(g) Asphalt trackless tack coat to be placed between binder, or leveling, course and wearing course, with no exceptions.

(3) Final surface course. An existing asphalt concrete binder or base course, must be inspected and approved prior to placement of the asphalt surface (wearing) course. Verification of in-place density and thickness of the binder or base course must be provided as a prerequisite to this approval. Failure to obtain this approval will make the street ineligible for final approval and acceptance by the city.

(4) Asphalt acceptance requirements. The contractor shall be responsible for providing verification of the asphalt type, asphalt binder content, gradation and the average laboratory Bulk Specific Gravity (BSG) for all asphalt mixes used on city projects, as well as the in-place asphalt density and thickness. The asphalt contractor must have an asphalt laboratory certified by TDOT.

For each day's production, the contractor's asphalt lab must provide:

- (a) Average laboratory BSG
- (b) Asphalt binder content
- (c) Gradation
- (d) Mix type

The in-place density and thickness determination of asphalt surface and binder courses will be based on the core data for each day's production. Cores will be obtained every two hundred fifty feet (250') in alternating lanes with a minimum of one (1) core on any road no matter the length, immediately after completion and the holes patched with hot asphalt from the same day's production.

The cores will be taken and evaluated by either the asphalt contractor or an independent materials testing firm certified by the TDOT for state highway projects. The pavement will be rejected, removed and replaced if the average in-place core density is less than ninety-six percent (96%) of the average laboratory BSG with all cores exceeding ninety-five percent (95%).

The average pavement thickness must be equal to or greater than the plan thickness with no individual core thin by more than one fourth inch (0.25"). Pavements that are deficient with regard to thickness will either be removed and replaced or overlaid at the discretion of the public services director. Documentation of the asphalt verification testing must be provided prior to requesting a final inspection.

The public service's department reserves the right to conduct, or require additional, verification testing at any time.

(5) Proof-roll of road easement. Easements should be properly graded and compacted according to plans. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-222. Installation. The mineral aggregate base shall be constructed in one (1) or more layers with the compacted thickness being that as shown on the approved plans or the construction standards. Prior to the spreading of any mineral aggregate, the sub grade shall be proof rolled with a fully loaded tandem dump truck of crusher run (or other approved equipment). Any areas which pump will require undercutting, backfill and compaction to specified limits. Additional proof rolling shall be required for all repaired areas.

Hauling over material already placed will not be permitted until it has been spread, shaped and compacted to the required density.

If the required compacted depth of the mineral aggregate base course exceeds six inches (6"), the base shall be constructed in two (2) or more layers of approximate equal thickness. For total base thickness of eight inches (8"), lifts shall be placed and compacted in four inch (4") thicknesses. For ten inch (10") base thickness, lifts shall not exceed five inches (5").

Except where mechanical aggregate spreading equipment is used to place the mineral aggregate base material, final shaping of each layer prior to compaction shall be accomplished by motor grader. In the event that mechanical spreading equipment fails to shape the base material properly, final shaping shall be done by motor grader or other approved means.

Immediately following spreading, the mineral aggregate base material shall be shaped to the required degree of uniformity and smoothness and compacted to the required density prior to any appreciable evaporation of surface moisture. Compaction of each layer shall be continuous until the minimum density requirement is achieved. Compacting equipment shall be smooth drum steel wheel vibratory rollers.

For density testing purposes, each completed layer is to be divided into lots of approximately ten thousand (10,000) square yards. Five (5) density tests are to be performed on each lot and the results averaged. Smaller lots may be considered when directed or approved by the public services director.

The average dry density of each lot shall be not less than one hundred percent (100%) of theoretical density based upon eighty-three percent (83%) of a solid volume, unless otherwise specified. Further, no individual test shall be less than ninety-seven percent (97%) of theoretical. The theoretical density of aggregates shall be based on bulk specific gravity AASHTO T-99. The theoretical density of all other aggregates shall be based on bulk specific gravity AASHTO T-85 AND T-99.

When mineral aggregate base is used to widen an existing pavement, to construct shoulders for resurfacing projects, base placed on bituminous asphalt mix, or base used for structure backfill, the average density of each lot shall be not less than ninety-five percent (95%) if maximum density determine in accordance with AASHTO T-99, Method D, unless otherwise specified. Further, no individual test shall be less than ninety-two percent (92%) of maximum density.

The thickness of the completed mineral aggregate base shall be in reasonably close conformity to the thickness shown on the approved plans or as

called for by the construction standards. The thickness shall be measured at such frequency as established by the public services director by means of test holes, borings, or other approved methods.

The surface of the finished mineral aggregate base shall be in reasonably close conformity to the lines, grades and cross sections as shown on the approved plans or construction standards and shall have a satisfactorily smooth riding quality.

Upon completion of the mineral aggregate base, it shall be maintained. under traffic, if required. smooth and uniform until covered by the following stage of construction.

The mineral aggregate base. prepared as outlined herein, shall be sprinkled lightly with water to settle any loose dust. The bituminous prime coat shall then be applied uniformly over the surface of the base by the use of an approved bituminous distributor. Any areas containing an excess or deficiency of priming material shall be corrected by the addition of blotter material or bituminous material. as directed by the public services director.

The contractor shall protect all structures and concrete surfaces from the bituminous material during construction. If after the bituminous prime coat has been applied. it fails to penetrate before traffic has to be turned back to the road, or paving is interrupted overnight, a dry cover material shall be spread at a rate of ten (10) pounds per square yard to prevent damage to the primed surface. An excess of cover material shall be avoided. The cover material shall be applied with suitable spreading devices to prevent the tires of the trucks from running over the fresh bituminous prime coat.

The asphaltic concrete base course or surface course, bituminous plant mix (hot mix), may be placed on properly constructed and accepted subgrade or previously applied layers provided the following conditions are met:

- The subgrade or the surface upon which the hot mix is to be placed shall be free of excessive moisture.
- The hot mix shall be placed in accordance with the temperature limitations specified on TDOT Table 407.09-1 of the Standard Specifications, and only when weather conditions otherwise permit the pavement to be properly placed, compacted and finished.
- See TDOT 407.09. Weather Limitations, of the Standard Specifications for additional seasonal weather requirements.
- The contractor may request a variance from the above required temperature and seasonal limitations to pave at lower temperatures if there is a benefit to the public. Submit such requests in writing at least one (1) week before the anticipated need, and include a paving and compaction plan for cold weather that meets the department's procedure. The plan shall identify what practices and precautions the contractor intends to use to ensure the mixture is placed and compacted to meet the specifications.

- Bituminous trackless tack coat shall be placed between binder or leveling course and wear surface.
- (1) New subdivision asphalt application process. Subdivisions that are building new roads to be turned over (accepted) by the city, shall be required to do the following:
- (a) Install approved sub-grade of at least eight inches (8"), or the minimum required thickness per street type detail specification, of Grading D Pug Mill Mix;
 - (b) Prime coat (Type RS-2) the surface of the pug at least twenty-four (24) hours prior to installing the binder;
 - (c) Install at least two inches (2") asphaltic concrete base (B-Modified), or the minimum required thickness, per street type detailed specification;
 - (d) Apply tack coat using trackless tack to binder layer prior to installing wearing course;
 - (e) Install two inches (2") asphaltic concrete surface mix (411E), or the minimum required thickness per street type detailed specification.
- (2) Asphaltic concrete installation procedure. (a) The asphaltic concrete binder course, and wearing course, shall be installed at the beginning of the development project, not in stages, or phase completion;
- (b) Prior to the formal acceptance by the city, the developer shall provide a project performance bond, or Letter of Credit (LOC), provided to the city and shall include a percentage dedicated to the repair and/or replacement of the installed layers of asphaltic concrete. The city shall require a maintenance bond of an amount equal to ten percent (10%) of the public services department's original calculated construction costs for street surfacing prior to the formal acceptance by the city.
 - (c) The street maintenance bond shall stay active for one (1) year after final acceptance by the city.
 - (d) Streets shall not be accepted by the city until at least seventy-five percent (75%) of the lots in the development are completed and has been issued a certificate of occupancy.
 - (e) The city may review and approve the acceptance by individual phases of the development when the street does not provide construction access to an additional phase of the project. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-223. Testing. All pavement installations and repairs will require the contractor to submit material testing certifications to the director of public services. Materials should meet the requirements found in the TDOT Standard Specifications for Road and Bridge Construction. The following shall be required for the submittal:

- (1) Liquid asphalt. Certification is needed to show specification compliance including the performance grade of the material.

(2) Aggregate. A completed mix design along with aggregate stockpile results with percent passing each sieve.

(3) Completed mix. Complete mix gradation should be documented by tests using one (1) of the following methods: Hot bins, vacuum extraction or burnout oven testing.

(4) Compaction. Density results shall be compliant with the TDOT Standard Specification section 40 and field verified. The percent voids in the total mix and the theoretical gravity of the mix should be documented as bare minimum.

The public services director reserves the right to request any additional tests deemed necessary for acceptance. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-224. Concrete overview. This section includes all fabricated, installed and erected structures and appurtenances related to street construction including pipes, culverts, headwalls, box culverts, box and slab-bridge. Unless modified by these specifications, all structure materials and construction requirements shall conform to the "Standard Specifications for Road and Bridge Construction" published by the TDOT (latest edition), hereinafter referred to as the "standard specifications." (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

2-225. Reference specifications. Unless modified by these specifications, all concrete materials and construction requirements shall conform to the "Standard Specifications for Road and Bridge Construction" published by the Tennessee Department of Transportation's (TDOT) (latest edition), hereafter referred to as the "standard specifications."

Where project plans and specifications refer to particular items, materials, equipment and construction requirements, the appropriate section of the standard specifications shall apply. Standard specification sections regarding compensation shall not apply unless directed by the engineer. The absence of a description or specification for any item of work shall automatically refer to the appropriate section of the standard specifications.

TDOT Specification section 604 shall apply for all structural concrete to be used in load carrying structures including box and slab culverts, foundations including drilled caissons, traffic signal and overhead sign foundations, retaining walls and girder bridge members. Section 604 also specifies the requirements of concrete used in structures as well as other miscellaneous or incidental items.

Miscellaneous concrete items such as sidewalks, curbing and gutters, rigid street pavement, medians, driveways, paved ditches and roadside sign foundations, shall meet the requirements of TDOT Specification sections 700 through 703.

All precast concrete including precast drainage structures, headwalls, box culverts, pipe, temporary barriers, noise and retaining walls, and bridge

members shall meet the requirements of TDOT's Standard Operating Procedure 5-3 regarding the "Manufacture and Acceptance of Precast Concrete Drainage Structures, Noise Wall Panels, and Earth Retaining Wall Products." This document requires that all producers of precast concrete products be certified in accordance with national quality standards developed by the National Precast Concrete Association (NPCA), the American Concrete Pipe Association (ACPA) and/or the Prestressed Concrete Institute (PCI). Certified producers must submit a copy of their certifications and documentation that have successfully completed the annual inspections. The engineer may waive the requirements of precast concrete producer certification on a case-by-case basis. This waiver must be supplied by the city in writing and retained by the contractor. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-226. Submittals. Where required in the project plans, technical performance and/or quality certification of concrete materials proposed for the work shall be submitted to the Public services director for approval. Such submittals may include the following:

(1) Concrete mix designs. Concrete mix designs are required for load carrying structures such as bridges, box culverts, large junction boxes within the roadway and retaining walls. Mix designs shall be prepared and certified by approved materials testing company, or alternately, an existing TDOT approved design may be submitted provided the design is approved within the calendar year. Mix designs shall certify all admixtures and cement replacement such as fly ash proposed for the project concrete.

(2) Reinforcing steel: Certifications for reinforcing steel used in load carrying structures shall be submitted to the public services director. Letter of certification shall bear the signature of the supplier's representative and shall certify that the reinforcing meets the requirements of the standard specifications.

(3) Miscellaneous items. Items included in concrete work such as handrails, anchors, joint materials, curing materials and other items may require submittals and/or representative samples at the discretion of the public services director. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-227. Concrete classification. Use of the following classes of concrete per the TDOT Standard Specifications:

Application	Class	Min. 28-3ay Strength
Sidewalks and Bikeways	A	3000 psi
Curb and Gutters, Drainage Structures	D	4000 psi

Bridge Substructures, Box Culverts, Retaining Walls	D	4000 psi
Light and Traffic Signal Pole Foundations	A	3000 psi
Bridge Deck Slabs	D or L	4000 psi
Underwater Foundations Seals	S	3000 psi
Leveling Concrete	A	3000 psi
Flowable Fill (backfill)	Excav. EFF	30 psi (140 psi** @98days)
Rigid Concrete Pavement	CP**	3000 psi

** See section 204 (Structure Excavation Foundation Preparation, and Backfill), and section 501 (Portland Cement Concrete Pavement) of the TDOT Standard Specifications. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-228 Curbing and sidewalks. (1) Residential sidewalks. All residential street sidewalks within the city shall be constructed within the street right-of-way and shall meet all current city zoning district requirements and Standard Drawing RP-4. It is the contractor's responsibility to ensure safety and maintain access for pedestrians when sidewalks are under construction and to protect the in-place work from damage or vandalism. Traffic control devices including cones, barrels and signs may be required on high volume streets to warn vehicular traffic in advance and adjacent to the area of construction.

The sidewalk forms and base material shall be inspected prior to concrete construction. Contractor shall refer to the City of White House detail specification SD-211 for construction requirements.

(a) All concrete sidewalks shall be a minimum uniform thickness of four inches (4") using Class 'A' Concrete, minimum twenty-eight (28) day compressive strength of three thousand pounds per square inch (3,000 psi).

(b) Sidewalks shall be constructed on a minimum of four inches (4") of compacted, granular aggregate based stone (TDOT size #57, #67, or Class A, Grade D Base Stone). The base stone shall be mechanically compacted to a firm, even surface in reasonably close conformity with the grade and cross section required.

(c) Subgrade soil, which in the opinion of the public services director, is soft or subject to large volume changes, shall be excavated and replaced with suitable material. The depth of removal will be based on the quality and depth of the unsuitable soil, as field verified, or as

determined by geotechnical investigation, and is subject to approval by the project engineer.

(d) Where driveway and alley approaches cross the sidewalk, the minimum concrete thickness of the approach slab, and sidewalk, shall be six inch (6") uniform thickness. See standard drawings for details. Granular base material for driveways shall be compacted base stone material conforming to Class A, Grading D of TDOT section 303.02 (Aggregate). A two and one quarter inch (2.25") lowered curb height above the gutter line shall also be maintained at the front edge of the driveway approach, TDOT Standard Drawing RP-NMC-10.

(e) Side flares for a residential driveway shall be a minimum of three foot six inches (3'-6") on both sides of the driveway.

(f) Reinforcement of residential sidewalks is required and shall consist of fiber mesh, or wire.

(g) Sidewalk cross slope shall be a maximum of two percent (2%) sloping toward the curb. Longitudinal sidewalk grades within the right-of-way shall not exceed the grade established for the adjacent roadway. Where pedestrian facilities are not contained within a right-of-way, the longitudinal ramp grade shall not exceed five percent (5%).

(h) A median strip of grassed or landscaped area at least four feet (4') wide shall separate all sidewalks from adjacent curbs. All sidewalks shall be a minimum of five feet (5') wide. The difference in elevation between the top of sidewalk and the top of curb at any adjacent location shall not exceed the grade difference produced by a maximum 4:1 slope.

(i) Sidewalk surface is to receive a light broom finish, to achieve a sandy texture with texture lines perpendicular to traffic. Exposed aggregate sidewalk finishes are not acceptable within the street right-of-way.

(j) All exposed concrete edges shall be rounded to a one-half inch (1/2") radius.

(k) Final longitudinal surface variations shall not exceed one-fourth inch (1/4") under a twelve foot (12') straight edge and transverse variation shall not exceed one-eighth inch (1/8") in five feet (5'). Low spots which allow water to pond will not be acceptable.

(l) Transverse control joints shall be spaced every five feet (5') and shall be placed at right angles to traffic. Joints shall also be placed to intersect all inside or re-entrant corners. Joints shall be formed with a grooving trowel to a depth of one inch (1"). The top edges of the grooves shall be rounded to one-fourth inch (1/4") radius.

(m) Longitudinal control joints are required for sidewalk widths greater than six feet (6') and less than ten feet (10'). Two (2) longitudinal joints are required for sidewalks greater than ten feet (10'). Longitudinal joints shall be centered in the width of the sidewalk. Joints shall be

formed with a grooving trowel to a depth of one inch (1") inch. The top edges of the grooves shall be rounded to one-fourth inch (1/4") radius.

(n) Expansion joints shall be constructed with one half inch (1/2") thick pre-molded rubberized or felt expansion joint filler. Bituminous fiberboard shall not be used. Expansion joint material shall extend the full width of the sidewalk and the depth shall extend to within one inch (1") of the top surface. Space expansion joints at twenty-five feet (25') maximum spacing and at each driveway and at any cold joint. Expansion joints are also required at the back edge of driveway approaches between the approach and the private drive and at each side interface with the sidewalk.

(n) One inch (1") thick pre-molded expansion joints are required when sidewalks are adjacent to curved sections of the street curb and when curb is placed adjacent to buildings and/or retaining walls. Use one-half inch (1/2") isolation joints around other fixed objects like utility poles and hydrants. Use one-half inch (1/2") expansion joints between the curb and sidewalks where constructed adjacent to each other.

(o) Sidewalks and bikeways shall not be opened to pedestrian or bicycle traffic for at least twenty-four (24) hours after placement. The contractor shall provide and maintain measures to restrict use during the curing period.

(p) Concrete driveway aprons shall should not be opened to vehicular traffic for at least seven (7) days after placement or until test cylinder breaks indicate an attained compressive strength of two thousand five hundred pounds per square inch (2,500 psi).

(q) Backfill sidewalks flush with the surface of the walk and the surrounding ground line with soil. For detached sidewalks, backfill the area between the curb and the sidewalk on the straight line from the top of walk to the top of curb, but not to exceed a 4:1 slope.

(2) Commercial sidewalks. All commercial street sidewalks within the city shall be constructed within the street right-of-way and shall meet all current city zoning district requirements.

The sidewalk forms and base material shall be inspected prior to concrete construction. Contractor shall refer to the City of White House detail specification SD-211 for construction requirements.

In addition to, and including, the above requirements for residential street sidewalks, commercial sidewalks within the city shall be constructed to the following requirements:

(a) Driveway and alley approaches crossing the commercial sidewalks shall be a minimum width of fourteen feet (14') and the minimum concrete thickness of the approach slab shall be six inches (6"). See standard drawings for details. Granular base material for driveways shall be compacted base stone material conforming to Class A, Grading D of TDOT section 303.02 (Aggregate). A two and one-fourth inch (2.25") lowered curb height above the gutter line shall also be maintained at the

front edge of the driveway approach, TDOT Standard Drawing RP-NMC-10.

(b) Side flares for a commercial driveway shall be a minimum of seven feet, zero inches (7'-0"), on both sides of the driveway.

(c) Isolation joints are required around penetrations in the sidewalk such as fire hydrants, utility poles, manholes, and adjacent to any fixed structure such as a building or retaining wall. Use one inch (1") thick joints against buildings and retaining walls and one half inch (1/2") thick pre-molded non-bituminous expansion joint material shall be used in all other locations.

(d) All valve boxes, manhole covers and other castings in the sidewalk area shall be adjusted to the grade of the sidewalk.

(e) Commercial sidewalk widths shall be specifically reserved for pedestrian travel. Furniture, planters, newspaper stands and other protruding obstacles shall be kept clear of a minimum required width of four feet (4'), or as required by current city zoning district requirements. Obstacles in the pedestrian path shall be eliminated or a widened pathway around the obstacle will be required.

(3) Handicapped ramps. All sidewalks within the city shall include handicapped access ramps compliant with the latest edition of the ADA Standards for Accessible Design at all intersections, crosswalks and commercial driveways. Handicapped ramps shall be constructed in accordance with the TDOT Standard Drawings.

(a) Concrete for ramps to be Class A and shall be finished by light broom finish texturing.

(b) Install a one-half inch (1/2") pre-molded, felt expansion joint between the ramp section and the sidewalk and between the ramp section and the curb.

(c) Truncated dome detectable warning areas shall be installed using yellow detectable warning panels or approved equivalent.

(d) Minimum concrete thickness for a handicapped ramp shall be six inches (6").

(4) Curb and gutter sections. All concrete curb and gutter sections shall be constructed in accordance with details shown in the city's subdivision regulations standard detailed drawings and the project plans. Curb openings will be located as shown on the approved plans and will be evaluated based on acceptable access control requirements by the city.

(a) Class "A" concrete shall be used for all curb and gutter sections and the concrete mix shall be air entrained.

(b) Curb and gutter sections shall be constructed on the compacted stone aggregate base for residential and commercial streets.

(c) Curb and gutter sections shall be reinforced with fiber filament mesh reinforcing.

(d) Control joints for curb and gutter sections shall be spaced at a maximum of ten feet (10'). Joints shall be formed with a grooving trowel

to a depth of one inch (1"). The top edges of the grooves shall be rounded to one-fourth inch (1/4") radius.

(e) Expansion joints are required at all tangent points in curved sections, between curbs and sidewalks and between curbs and other rigid objects such as buildings, catch basins and driveway aprons.

(f) Where curbs are attached to the sidewalk, expansion joint spacing shall match the spacing of expansion joints in the sidewalk, which is every twenty-five feet (25').

(g) Maximum expansion joint spacing for detached curbs shall be one hundred feet (100').

(h) Curbs and gutters shall be constructed to follow the geometry of the roadway unless noted otherwise on the plans. Curved sections of curb shall conform to the roadway curve geometry with smooth continuous curves with no chorded portions.

(I) Flow lines of gutters shall be true to line and grade with no areas of ponding water. Final longitudinal surface variations shall not exceed one-fourth inch (1/4") under a twelve foot (12') straight edge.

(j) Concrete finish for curb and gutter sections shall be a light broom finish with finish lines parallel to the flow of water.

(k) Curb and gutter sections aprons shall not be opened to vehicular traffic for at least seven (7) days after placement or until test cylinder breaks indicate an attained compressive strength of two thousand five hundred pounds per square inch (2,500 psi). (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-229. Concrete reinforcement. Where indicated on the approved drawings, concrete for load carrying structures such as box and slab culverts, bridges and retaining walls shall be reinforced with steel bar reinforcement, welded wire fabric and pre-stressing strands. Sidewalks, curbs, combined curb and gutters and concrete pavement areas shall be reinforced with synthetic fiber reinforcement.

All steel reinforcing materials required for load carrying structures shall meet the requirements of the TDOT Standard Specifications unless noted. Sizes, spacing, gauges, locations and arrangements shall be as shown on the approved plans. Where project plans do not depict reinforcing placement plans or schedules, the contractor shall develop and submit reinforcing steel shop drawing to the public services director for approval. All hooked bars shall conform to Concrete Reinforcing Steel Institute (CRSI) standard book details. In the case of bridge decks, top slabs of box and slab culverts used as riding surfaces, concrete barrier rails and bridge sidewalks, all reinforcing steel shall be epoxy coated per the standard specifications. In addition, the dowel bars projecting from the footing into the back face (backfill side) of the wall stem in retaining walls shall be epoxy coated.

(1) Reinforcing materials. Use the reinforcing materials below where indicated on the approved plans:

- (a) Steel reinforcing shall be deformed steel bars conforming to ASTM A 615, Grade 60.
- (b) Steel reinforcement for bridge decks and top slab of box bridges when used as the riding surface shall be epoxy coated. All concrete bridge railing shall also require epoxy coated reinforcement.
- (c) Smooth steel dowel bars shall conform to ASTM A615.
- (d) Plain- steel welded wire fabric: ASTM A185, fabricated from as-drawn steel wire into flat sheets.
- (e) Pre-stressing steel shall be in accordance with ASTM A416.
- (f) Synthetic fibers (fiber reinforced concrete): Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, one-half to one and one-half inches (1/2" to 1 1/2") long. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-230. Concrete placement. All formwork shall be constructed using pre-manufactured metal forms or dressed form lumber and plywood. Formwork shall be adequately braced, mortar tight and true to line and grade. Provisions shall be made during placement of concrete to minimize aggregate separation and ensure proper consolidation throughout the pour. To highlight a few key requirements of standard specifications in particular, the contractor shall ensure the following placement operations are observed:

- (1) Elapsed time from truck loading to delivery and placement shall be limited to ninety (90) minutes when the air temperature is ninety degrees (90°) degrees or less. When the air temperature exceeds ninety degrees (90°), this time is reduced to sixty (60) minutes.
- (2) Concrete that does not meet the specified limits regarding slump, air content, temperature, and delivery time shall not be used unless approved by the engineer.
- (3) Concrete shall be compacted with suitable vibrators operating within the concrete unless otherwise directed by the public services director.
- (4) Concrete may not be placed from a chute discharge height greater than five feet (5').
- (5) No concrete other than foundation seals shall be placed underwater.
- (6) Do not add water to concrete during delivery. at project site, or during placement unless the concrete delivery ticket indicates that mix water was withheld at the plant. In such cases only the amount withheld per cubic yard may be added at the jobsite.
- (7) Concrete shall be placed in cold weather only when the air temperature is forty degrees (40°) and rising.
- (8) Protect newly placed concrete from air temperatures below forty degrees (40°) degrees with insulation blankets to maintain the concrete temperature at not less than forty-five degrees (45°) degrees for a period of one

hundred twenty (120) hours after placement. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-231. Concrete inspection and laboratory testing. It is the contractor's responsibility to ensure quality concrete meeting section 604, Concrete Structures, of the TDOT Standard Specifications is delivered and placed on the project. All quality testing of the concrete shall be performed by an independent testing company pre-approved by the city in accordance with section 1 of these specifications. All quality testing performed by the testing agency is subject to monitoring and review by the public services director to ensure established procedures are followed. Reports of testing shall be certified and submitted to the city within ten (10) days of actual testing to document the quality control before final acceptance of the project. The contractor may pursue additional testing per 604.15, Compressive Strength Tests of Concrete, of the TDOT Standard Specifications if concrete compression tests fail to meet the required strengths noted in § 16-227 above. The contractor will be responsible for the costs associated with all testing and also re-testing due to failed acceptance tests.

Required tests for concrete construction to be performed by the testing agency include:

- Slump
- Yield
- Entrained air content
- Mix Temperature
- Representative test cylinders

(1) Testing frequency. One (1) composite sample (four (4) test cylinders) for each day's pour of each concrete mix exceeding five (5) cubic yards but less than twenty-five (25) cubic yards plus one (1) set for each additional fifty (50) cubic yards or fraction thereof.

Concrete placement operations shall be inspected by an on-site superintendent to ensure placement of the concrete meets requirements of the standard specifications. On-site inspection is required to be documented by the contractor and recorded in a field book subject to review by the public services director. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-232. Stormwater overview. This section includes all fabricated, installed and erected structures and appurtenances related to street construction including pipes, culverts, headwalls, box culverts, box and slab bridges, and sign, signal and lighting supports. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-233. Storm water reference specifications. Unless modified by these specifications, all structure materials and construction requirements shall conform to the "Standard Specifications for Road and Bridge Construction"

published by TDOT (latest edition), hereinafter referred to as the "standard specifications." (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-234. Pipe, culverts, and storm sewers. Pipe used for cross drains under the street and within the city's R-O-W may be HDPE or polypropylene pipe and must meet AASHTO Standards or shall be Reinforced Concrete Pipe (RCP). Side drains under driveways, or within the interior of the development, may be RCP or HDPE plastic pipe. Driveway culverts and interior development piping shall be the responsibility of the property owner or the HOA.

(1) Concrete pipe. Concrete pipe shall be reinforced Class III rigid pipe and shall be round, oval or flat based as shown on the approved plans or special provisions, so long as these meet or exceed specification of this section. All precast concrete pipe shall be manufactured in accordance with the "TDOT Procedures for Manufacture and Acceptance of Precast Drainage Structures, Noise Wall Panels and Retaining Walls."

(2) Plastic and polyethylene corrugated pipe. This pipe shall be dual wall HDPE, or, HP storm high-performance Polypropylene Pipe (PP) corrugated outside with smooth finish inside wall. (Referenced in TDOT Spec 914.10 and 914.12): High Density Polyethylene (HDPE) pipe shall conform to AASHTO M294, Type S [Type S is smooth-walled interior, corrugated exterior] and Polypropylene (PP) pipe shall conform to AASHTO M330. Installation (Referenced in TDOT Spec 607); Joint Performance: (TDOT Spec 607.07): HDPE, PP pipe shall be joined in accordance with ASTM D3212 and meet performance requirements for water-tight joints; Fill heights (Table 6A-1): HDPE, PP pipe shall be utilized in applications that are in accordance with TDOT Table 6A-1 (all roadways with up to sixteen feet (16') of fill height - with the exception of interstate systems and any arterial with full access control); Bedding and Backfill (referenced in TDOT Spec 204.04, 204.11.B): Bedding for pipe culverts shall conform to the requirements of Class A, B, or C bedding, whichever is shown on the plans or in the special provisions; Trench detail (reference in standard detail D-PB-2/Flexible pipe): Specifies Class "B" bedding material, six inch (6") structural backfill over the crown of the flexible pipe, as well as a trench width eighteen inches (18") on either side of the pipe OD. This pipe may be used for site drainage, and may be used under streets at the discretion of the public services director or his/her designee. Plastic pipe may exit from the back side of a street drainage structure and extend off the city R-O-W. The development HOA shall be responsible for the maintenance of the HDPE or PP plastic pipe outside of the R-O-W. Plastic and polyethylene corrugated pipe shall meet TDOT specifications for pipe material, bedding material, installation, and backfill.

(3) Pipe materials and requirements. All storm sewer drainage pipes located within the roadway right-of-way shall be reinforced concrete pipe (RCP). The minimum size diameter for storm water culvert, is fifteen inches (15"). The minimum slope shall be one-half percent (0.5%) or that necessary to create a full-flow velocity of two feet per second (2 fps).

(4) Pipe bedding. Pipe bedding for concrete pipe shall be #57 or #67 stone, requiring a minimum of six inches (6") inches of stone below the pipe and shaped by a template to fit the lower part of the pipe exterior for at least ten percent (10%) of its overall height. The depth of bedding material is predicated on soil conditions.

(5) Pipe sizes. Normal pipe sizes readily available from suppliers may be used to satisfy drainage requirements. Minimum pipe size for culverts, drains and storm sewers shall be one- and one-half inch (1.5") diameter.

(6) Pipe backfill. Pipe backfill shall be #57 or #67 stone placed to the springline of the pipe in layers not to exceed six inches (6"). For pipe installed in solid rock cut, backfill shall be no less than twelve inches (12") above the top of the pipe. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*, and amended by Ord. #22-11, July 2022 *Ch20_08-17-23*)

16-235. Storm water end walls and inlets. Pipe culvert end wall treatments may be precast or cast-in-place concrete and are required for all pipe locations within the street right-of-way. (1) End walls for pipe diameters greater than twenty-four inches (24") shall be concrete construction in accordance with the appropriate safety end wall standard drawing (TDOT D-PE series), and shall be fitted with a steel bar safety grate.

(2) End walls for pipe diameters twenty-four inches (24") or smaller shall be concrete construction in accordance with the straight end wall details as shown in the standard drawings. Type U head walls may be used for pipe diameters of twenty-four inches (24") inches or less if approved by the public services director or his or her designee.

(3) To improve the aesthetics of pipe headwalls, textured concrete finishes simulating stacked stone may be used. Additionally, veneers of stone or brick may be applied to exposed surfaces to enhance the appearance from the street. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*, and amended by Ord. #22-11, July 2022 *Ch20_08-17-23*)

16-236. Storm drainage structures. Storm drainage structures consist of junction boxes, drop inlets, catch basins and manholes which may be constructed as precast concrete sections. Cast-in-place concrete may be used with approval by the public services director. Inlet and outlet pipes shall extend through the walls of structures a sufficient distance to make connections, but shall be cut flush with the inside surfaces of the box structure.

(1) Catch basin castings Catch basin castings that are damaged during construction will be rejected. Castings shall be set true to line and grade. Standard catch basins shall meet the requirements of the standard drawings.

(2) Concrete catch basins. Standard catch basins are precast concrete or cast-in-place where directed by the public services director. Catch basins shall meet the requirements of the standard drawings.

(3) Junction boxes. Standard junction boxes for pipes where required may utilize single and double catch basin standard drawings by omitting the

casting entrance in the top surface. Triple catch basins and specialty junction boxes may be used for unusual conditions. Details for these structures may be designed and detailed on the plans or may be referenced to the standard drawings. In either case, these special structures shall be submitted to the public services director for approval.

(4) Additional pipe openings. All boxes, existing or new installation, requiring additional pipe openings shall be neatly cored by means of mechanically core drilling through the wall of structure. Any damages caused to the structure may require replacement. This will be determined by the public services director. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-237. Concrete box and slab culverts and bridges. Box and slab culverts are required when design flows exceed the hydraulic capacity of dual pipe structures or when a clear waterway opening is required. All precast concrete structures must meet the requirements of TDOT Standard Specifications for, Concrete Structures and Non-Metallic Pipe. All cast-in-place concrete structures must meet the TDOT requirements for concrete structures, and concrete reinforcement.

(1) Box culverts. Typically span eighteen feet (18') or less over water with a single or double barrel box structure.

(2) Box bridges. Box bridges are defined as a box culvert type structure with a single box or multiple boxes, but having a total horizontal distance measure parallel to the street centerline of twenty feet (20') or more between inside faces of the outside walls.

(3) Slab culverts and slab bridges. Slab culverts and bridges are differentiated the same as box culverts and box bridges, but are constructed without a bottom slab. Slab culverts and bridges are typically used when bedrock is within three feet (3') or less from the streambed elevation.

(4) Bottom slab placement. Box culverts and bridges are supported on a bottom slab foundation and may be founded on the natural gravel or sand streambeds. The top surface of the bottom slab of box structures shall be located a minimum of two feet (2') below the natural streambed to allow for future streambed degradation.

(5) Precast bridge units. Box and slab culverts and bridges may be precast or cast in place. Precast units speed construction times since only the foundations are required to be formed and poured in place and the units are set quickly on the foundations. Where aesthetics is to be considered, precast modular arch type units such as "con/span" are available and often provide greater clear spans than precast box type structures. Both precast box and arch units may be used in multiple span arrangements to convey larger flows.

(6) Riding surface. Where practical, the top surface of the box culvert or bridge should be used as the riding surface of the street. The absence of fill material or asphalt placed on the top slab eliminates the detrimental effects of trapped moisture and extends the life of the concrete slab. Additional concrete thickness must be supplied to provide a clear concrete cover of two and one-half

inches (2 1/2") inches over the top mat of reinforcing steel. When the top slab is used as the riding surface, the exterior curb portions of the standard box bridge designs should be omitted to allow surface water to rain off the slab. A bridge railing system of metal beam guardrail shall be thru-bolted to the top slab and extended off each end of the bridge. See TDOT standard drawings S-GRS-2, S-GRC-1, and SGRC-2 for details of the guardrail attachment. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-238. Drainage requirements. Storm water drainage systems constructed to drain streets accepted into the city street index are eligible for acceptance by the city if designed and constructed in accordance with the City of White House Storm Water Ordinance. Only those storm water structures, appurtenances, and piping located within the city R-O-W of street index roads are eligible for acceptance by the city. As it relates to roadways, the objective of surface drainage is to remove storm water from the traveled roadway as rapidly as possible so that traffic may move safely and efficiently. This is accomplished through careful roadway engineering practices such as using proper cross slopes, longitudinal grades, and cross drainage structures.

In the case of private development design, the planning and design of the overall drainage system should be done simultaneously with the road or street layout and gradient planning and design. Where positive lot drainage is proposed, coordination of the road or street grades and the finished lot elevations must be achieved.

All public and private roadways within the city shall be constructed at least one foot (1') above the 100-year base flood elevation established by FEMA. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-239. Drainage/hydrology calculations. Drainage design requirements are set forth in title 18 and shall be followed accordingly. Drainage/hydrology calculations are required as part of the construction plan submittal per the requirements set forth in chapter 2 of these specifications. These calculations are required to be endorsed by a Tennessee registered professional engineer.

The maximum allowable headwater to depth ratio shall be 1.5
Calculations should include the following as a minimum for submittal:

(1) Drainage area calculations include area in acres, runoff coefficients, a description of runoff calculation methods used, including rainfall intensity, and runoff (Q) used in calculations.

(2) Culvert cross sections clearly showing invert and outlet elevations, culvert lengths, roadway elevation and lengths.

(3) Energy dissipation design calculations (HY8 dissipater analysis reports will be accepted).

(4) Computer analysis report output. Preferred computer programs are as follows: HY8 (FHWA Culvert Analysis), Hydro-flow Hydrographs, Hydro-flow Storm Sewers, HEC-RAS for bridges and large culverts.

(5) Force effects (including earth pressure, dead load, and vehicular dynamic loading) on buried drainage structures if requested by the engineer.

(6) Summary of high water elevations if open channel flow is present. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-240. Plans. Complete construction plans and specifications together with all appropriate design calculations are to be submitted and approved prior to the commencement of construction. Plans are to be provided in digital format on computer disc as well as on twenty-four inch by thirty six inch (24" x 36") sheets. Plans are to be on state plane coordinates in accordance with the City of White House's submission standard and to contain the following information:

- (1) Plan.
- (2) Profile.
- (3) Horizontal curve data.
- (4) Vertical curve data.
- (5) Grades.
- (6) Stations of all PJs, PCs, PTs and intersections.
- (7) Existing and proposed grades at half station.
- (8) Typical cross section.
- (9) Drainage structures.
- (10) Utilities - all known or proposed (gas, phone, cable, electric, sewer and water).
- (11) Signing plan.
- (12) Pavement marking plan.
- (13) Length of proposed roadways rounded to 0.01 mile. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-241. Record drawings. Record drawings on computer disc are to be provided before final approval will be issued. Record drawings will consist of three (3) sets of drawings and digital copies in PDF, DWG, and Shapefile formats. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-242. Dedication. Roadways designed and constructed in accordance with these standards and approved by the public services director and public services director in accordance with the street acceptance policy may be dedicated to the City of White House for maintenance. This is accomplished through the submittal and acceptance of a recorded deed for the R-O-W. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-243. Constructions zones. Within the city easements/R-O-Ws:

(1) Structural zones. Any area that will or may receive an additional loading of weight or energy. To include all roads, road easements, detention or retention ponds.

(2) Non-structural zones. Landscaped storm drain easements. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-244. Inspection. All elements of roadway and storm drain system construction, in both structural and non-structural zones must be inspected and approved by the public services department as a prerequisite for acceptance by the City of White House. This will include:

- (1) Sub grade surface.
- (2) Storm drain system and all elevated structures.
- (3) Detention/retention ponds.
- (4) Embankments.
- (5) Utilities within the structural zone.
- (6) Utilities in landscaped zones.
- (7) Sub grade for roads.
- (8) Finished grade of road easement/R-O-W.
- (9) Sub base.
- (10) Base course.
- (11) Asphalt paving.

It is the contractor's responsibility to insure the public services department is notified upon completion of each phase of construction and has the opportunity to make their inspections before proceeding to the next phase.

It should be understood that the inspections conducted by the public services department are for the protection of the City of White House only. They are not intended to certify the contractor's satisfactory discharge of his contractual obligation to the owner, nor do they relieve the project engineer from any of his responsibilities with regard to inspection and contract administration. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-245. General instructions to contractors. The following procedures for implementation of the city's inspections and final approval shall be followed. It is recommended that these instructions be included in the contract documents for the construction contract.

(1) Applicability. As a prerequisite to city approval and acceptance of new streets, all phases of construction must be inspected and approved by the public services department.

(2) Specifications. All construction and materials shall comply with the latest edition of the City of White House Standard Specifications for Roadway Construction unless specifically noted otherwise herein. These requirements and city specifications shall supersede the public services department specifications in the event of a discrepancy.

(3) Testing. The contractor is responsible for providing all geotechnical and materials testing and the accompanying documentation at no cost to the city. All testing is to be performed by a licensed certified agency and signed off on by the engineer. All testing is to be identified on forms as to the exact location (SD numbers, street name, station numbers, and elevation in regards to finished grade.) The city will be responsible for providing its own quality assurance testing. Unless otherwise stated herein, the proctor densities required under these procedures are standard proctor densities.

(4) Notification. After receiving approval of street, storm drainage and sediment and erosion control plans, the contractor or engineer must contact the public services department with a start date for construction at least forty-eight (48) hours in advance. Upon completion of site clearing and grubbing and erosion control installation a mandatory site meeting will be held. Meeting is to be arranged by the contractor or project engineer. Meeting shall be attended by project engineer, contractor, developer, geotechnical engineer, director of public services, and any utilities that will or may encroach on/into a structural zone. (Attendee must be a responsible representative, meeting should be timely planned and the city notified at least forty-eight (48) hours in advance.)

(5) Erosion control. Before starting any grading work, install sediment and erosion control measures per the approved plans to protect any downstream water bodies. The contractor is responsible for implementation and weekly or bi-weekly monitoring of the sediment and erosion control plan in accordance with the City of White House MS4 and TDEC Regulations, insuring inspection logs are available on site at all times, and for insuring that silt and sediment do not leave the site.

(6) Inspections. Requests for any inspection must be arranged with the public services department twenty-four (24) hours in advance.

(7) Other regulations. The developer and contractor are also responsible for compliance with all applicable regulations administered by other agencies such as:

- (a) TDEC.
- (b) Corps of Engineers.
- (c) TDOT.
- (d) City planning and codes.

The public services department may withhold approval at any stage of construction, including final approval, for failure to comply with these regulations. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-246. Required geotechnical testing and city inspections. Mandatory initial sub grade surface inspection: After clearing and rough grading of streets but prior to placement of any storm drain or fill for road way embankments, a mandatory sub grade surface inspection is required.

The developer, contractor, project engineer, geotechnical engineer, any utilities that may be working within a structural zone and the public services department should be present. This inspection shall be set up by the contractor or the project engineer. A rubber-tired backhoe or motor grader are needed for this inspection in order to confirm that all stumps, roots and unacceptable soils have been removed. A proof-roll may be conducted during this inspection at the discretion of the public services department or geotechnical engineer. Underdrain requirements may also be identified at this point. All deficiencies identified during this inspection must be corrected by the contractor before the next inspection is requested. The consulting engineer or geotechnical engineer

as well as the public services department and contractor should be represented. This inspection shall be set up by the contractor or the consulting engineer.

(1) Trenching and backfilling. Storm drain trench bedding and backfill must be a TDOT approved material, be visually inspected, and signed off on by the geotechnical inspector and a copy of the inspection must be sent to the city. The contractor shall notify the public services department when backfilling of storm drainage or utility excavations within a structural zone is to take place. Backfill in these excavations shall be compacted at the proper moisture content in lifts not exceeding six inches (6"). The contractor shall provide geotechnical testing and documentation, at no cost to the city, confirming that all backfill has been compacted to at least ninety-five percent (95%) of maximum proctor density.

(2) Trenches in the structural zone. Such trenches are to have density testing every two hundred feet (200') or any portion of that, testing to be performed after final elevation of the subgrade is in place.

(3) Trenches in a non-structural zone. Such trenches are to have a density testing beginning at pipe haunches both sides every two hundred feet (200'), or any portion of that, testing to be performed after final elevation of the subgrade is in place.

Density requirement in a non-structural zone to be ninety-five percent (95%) of maximum proctor density within the pipe zone and eighty-five percent (85%) from top of pipe zone to finished grade. The public services director is to be copied on all testing. If not properly notified, or if the test results are unsatisfactory, the public services department may require excavation and recompaction of the backfill. No proof-roll of the sub grade will be scheduled until the backfill compaction has been documented.

(4) Erosion control. Install sediment and erosion control measures in accordance with the approved storm water pollution prevention plan.

(5) Storm drain boxes/basins. (a) Boxes inside a structural zone - fill around boxes to have one (1) density test of fill placed. Density test must meet ninety-five percent (95%) of maximum proctor density.

(a) Boxes inside a non-structural zone - fill around boxes to have one (1) density test of fill placed. Density test must meet eighty-five percent (85%) of maximum proctor density. Public services director is to be copied on all testing.

(6) Embankments. All stumps and large roots must be removed from the roadbed prior to placement of fill for embankments regardless of fill height. All roadway embankment and embankment fill must be approved by and signed off on by the geotechnical engineer. Roadway embankments fill to be placed and compacted in lifts not exceeding eight inches (8").

The contractor is responsible for providing geotechnical testing and documentation that the embankment material has been compacted to ninety-five percent (95%) of maximum proctor density.

Density testing of embankment fills to be performed every two hundred fifty feet (250') alternating lanes with a minimum of two (2) tests per road, per one foot (1') of fill. The public services department is to be copied on all testing. No proof roll of the sub grade will be scheduled until the compaction has been documented.

(7) Curb and gutter proof-roll. Curb and gutter must be placed on compacted and approved sub grade or base material. Prior to scheduling a curb and gutter proof-roll the public service's department office must be in receipt of all density testing data required to be completed at this stage of construction. The geotechnical inspector, contractor, project engineer and public services director, or his/her designee, shall be present for this proof-roll.

(a) NOTE: Upon completion of a passing curb and gutter proof-roll, absolutely no excavation or trenching is to be done in a Structural Zone (roadway or roadway easement) without the approval of the public service's department office.

No base course material or curbs should be placed prior to written approval of the sub grade from the public service's department office.

(b) NOTE: Any completed and approved sub grade left exposed for over two (2) weeks or damaged by inclement weather must be re-inspected and approved by the public service's department. This may include another proof-roll if necessary in the judgment of the public service's department.

Any excavation within a tested and city approved sub grade shall be treated as new excavation and complete density testing and proof-rolling requirements must be met.

(8) Catch basins. The location and orientation of the catch basins relative to the curb and gutter, as well as the roadway width, should be confirmed at this time. Catch basins improperly placed must be relocated and/or reconstructed. All catch basins must have a temporary drain by which standing water can be drained from the surface of the sub grade and base during construction. These drains must be properly plugged before the final inspection is requested. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-247. Signs. Traffic control signs and name signs on new streets are to be installed by the developer in accordance with an approved signing plan as a prerequisite for acceptance by city. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-248. Final approval. Final approval and acceptance shall comply with the city street acceptance policy. The planning commission shall review and provide recommendation to the board of mayor and aldermen, after which the board of mayor and aldermen must formally approve public acceptance before a maintenance bond is allowed to be submitted.

(1) Final inspection. After the paving is completed and all utility, storm drainage and associated work is complete, a final inspection can be

scheduled. The following items should all be completed before a final inspection is requested:

- (a) Permanent grass on road shoulders; cut and fill slopes and easements.
 - (b) Street name signs (city standard or an approved alternate)
 - (c) Traffic control signs (per TN MUTCD).
 - (d) Pavement marking (thermoplastic unless otherwise directed by the public services department).
 - (e) As-built drawings.
- (2) Documentation. As a prerequisite to conducting the final inspection, the following must be provided:
- (a) Digital submission of as-built plans.
 - (b) Twenty-four inch by thirty-six inch (24"x36") hard copy of as-built plans.
 - (c) Recorded R-O-W deeds and/or final subdivision plat showing recorded R-O-W for roads and drainage system.
 - (d) One (1) year warranty bond for road and drainage systems
 - (e) Documentation of asphalt verification testing.
- (3) Punch list. A written punch list of deficiencies found during the final inspection will be provided. All items should be completed before requesting a re-inspection. Failure to comply with any of the above listed requirements could render the streets and storm drainage systems ineligible for acceptance by city. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)

16-249. Encroachment permits. An encroachment permit, approved by the public service's department, is required for all construction, undertaken by parties other than the public services department or its authorized contractor, within or affecting the R-O-W of any city maintained road. This requirement applies, but is not be limited, to:

- (1) Driveway connections involving a curb cut or pipe installation.
- (2) Curb cuts.
- (3) Utility taps.
- (4) Utility crossing.
- (5) Storm drainage installation.
- (6) Storm drainage discharge.
- (7) Subdivision entrance signs or gateways.

The permittee is required to indemnify the city for any liability incurred or damages sustained as a result of the encroachment.

The permittee is responsible for:

- (8) Notifying the public service's department when construction begins on an encroachment.
- (9) Ensuring that a copy of the encroachment permit is on the construction site.
- (10) Ensuring that the construction and the restoration of the roadway have been approved by the public services department office.

(11) All construction.

The encroachment permit application form may be obtained from the public service's department. (as added by Ord. #19-02, April 2019 *Ch18_12-19-19*)