



BRAZOS COUNTY
ROAD AND BRIDGE DEPARTMENT
Fred Paine, P.E., Operations Manager

Duane Peters, Brazos County Judge

Steve Aldrich, County Commissioner Pct. 1
Russ Ford, County Commissioner Pct. 2

Nancy Berry, County Commissioner Pct. 3
Irma Cauley, County Commissioner Pct. 4

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Brazos County is currently going through a vetting process for the current Brazos County Engineering Design Guidelines (BCEDG). As such, an internal evaluation is occurring and the current BCEDG will be suspended.

In lieu of the suspended BCEDG, Article VIII. Construction Standards of the 2000 Subdivision and Development Regulations, together with additional revisions indicated in red text and accompanying this document, will be in effective immediately to govern subdivision construction within proposed County right-of-way.

All currently approved subdivisions, associated plans, specifications and construction are to continue to meet the requirements that were in effect when originally approved for construction.

Fred Paine, P.E.
Operations Manager
Brazos County

Prarthana Banerji, P.E., C.F.M.
County Engineer
Brazos County

ARTICLE VIII.

CONSTRUCTION STANDARDS

A. Compliance with the Law. All design and construction of streets, alleys, drainage facilities, and utilities must conform with current standards and specifications and sound engineering principles, for the type of subdivision contemplated under these regulations. All trees and underbrush shall be removed from entire width of right-of-way.

The Owner shall be responsible for compliance with all applicable statutes and regulations of the State and United States respecting construction and installation of roads and roadways at their crossing or intersections with utilities, including but not limited to railroads, pipelines, electrical transmission lines, water lines and natural gas lines.

B. Surface Drainage. Generally, it is desired that surface drainage from private property be taken to streets, alleys, or drainage courses as quickly as possible and that drainage water from streets and alleys be taken to defined drainage courses as quickly as possible. The practice of using streets and alleys as major drainage courses will not be accepted.

The Subdivider will seed or sod all bar ditches to establish a permanent vegetation.

C. Street Grades and Elevations. Minimum grades of streets from the center of the crown to the edge of the road normally shall be three-tenths of one percent (0.30%) and shall not be so steep that destructive velocities may occur, unless provision is made to prevent erosion of earthen ditches, or damage to pavements.

Profiles of streets shall be furnished, showing existing centerline elevations, both right-of-way line elevations and proposed centerline grade.

At creek or other drainage crossings where consideration must be given to the proper handling of stormwater, a profile of the flow line of such creek or other drain extending sufficient distance both upstream and downstream to determine proper street grade and size of drainage structure at such crossing will be required.

These must be shown on plat with elevations in reference to roadway, street, or alley.

D. Drainage Structures. Drainage structures of a permanent type shall be provided at crossings of drainage courses with streets where prescribed by the County Commissioners Court or the County Engineer in order that a minimum of inconvenience and hazard to the traveling public will occur, and in order to minimize damage to, and excessive maintenance of public property. Such drainage structures shall have a minimum of twenty-eight (28) feet clear roadway and shall be of sufficient size to insure the capacity to carry anticipated drainage waters. (A 25 year storm for non-trapped conditions and 100 year storm for trapped conditions.) For sites in a 100 year flood plain, calculations to support or justify size of pipes to be used must be provided.

E. Open Channels and Ditches. Open channels and ditches shall be constructed to proper cross-section, grade and alignment so as to function properly, and without permitting destructive velocities.

F. Unpaved Permitted Streets. If a Permitted Street satisfies the requirements of **Article 7. Minimum Standards of Design, of the Brazos County Subdivision Regulations**, the installation of a Quality Gravel Road shall be permitted.

G. Subgrade, Base and Surface Treatment of Streets Without Curbs. Where a street section (without curbs) is constructed, the flexible base shall have a minimum thickness of six inches (6") after compaction, and a minimum of **thirty (30)** feet wide from shoulder line to shoulder line and **"shoulder up" the edges with Flexible Base.** The wearing surface shall be a minimum width of twenty-four (24) feet. All road building materials shall be approved by the County Engineer prior to construction.

The subgrade, flexible base, and surface treatment of such streets shall be as described below:

1. Subgrade.

a. Description. Subgrade shall consist of existing subgrade material or an approved material, furnished by the contractor, containing sufficient fines (soil binder) to form a firm subgrade which can be shaped and trimmed to true subgrade level.

b. Materials. Existing subgrade material may be used if its moisture content (determined by standard laboratory methods AASHTO Designation 146-49) is below the material's plastic limit. Existing subgrade material at or above its plastic limit must be stabilized according to the direction of the Engineer.

Test results of material samples proposed for use shall be submitted to the Engineer for approval of the source prior to the delivery of any such material to the job. If at any time the material delivered show too great a variation from the approved sample, the Engineer may reject the delivery and order the material removed from the work.

Lime stabilization of subgrade material will be required on all Arterial streets. Lime stabilization of subgrade material will be required on Collector or Local streets if the plasticity index (PI) of the material exceeds 18, as established by testing according to TXDOT Test Method Tex 106-E. Lime stabilization will be conducted in accordance with TXDOT, Standard Specifications No. 260.

Cement stabilization of subgrade material will be required on any street if the plasticity index (PI) of the material is less than 4, as established by testing according to TXDOT Test Method Tex 106-E. Cement stabilized will be conducted in accordance with TXDOT, Standard Specification Item No. 275.

c. Compaction. Subgrade material hauled to job site shall be spread uniformly and compacted to required thickness by means of approved compaction equipment. Existing subgrade material (in place or stabilized) and material hauled to the job site shall be compacted to ninety-five (95) percent of the TXDOT Test Method Tex-113-E Density and within +/- two (2) percent of optimum moisture content.

d. Fees. Cost of testing and inspection will be paid by the developer.

2. Flexible Base.

a. Description. This item shall consist of a foundation course for surface course or for other base courses; shall be composed of crusher-run broken stone; and shall be constructed as herein specified in one or more courses in conformity with the typical sections shown on Plans and to the lines and grades as established by the Engineer.

b. Materials. The material shall be obtained from approved sources, shall be crushed, and shall consist of durable particles of stone mixed with approved binding materials. Testing of flexible base materials shall be in accordance with the following TXDOT standard laboratory test procedures:

1) Preparation for Soil Constants and Sieve Analysis.....	Tex-101-E
2) Liquid Limit.....	Tex-104-E
3) Plastic Limit.....	Tex-105-E
4) Plasticity Index.....	Tex-106-E
5) Sieve Analysis.....	Tex-110-E
6) Wet Ball Mill.....	Tex-116-E
7) Triaxial Test.....	Tex-117-E

Unless otherwise specified on the plans, job-control samples for testing the materials for Soil Constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.

Unless otherwise specified on the plans, all base material will be stockpiled after crushing; tested by the testing agency designated by the

County Engineer; and approved by the County Engineer prior to being hauled to the project site.

The material shall be well graded and when properly tested, shall meet **TXDOT Specification Item 247 Flexible Base, Type A Grade 1-2 or as approved by the County Engineer**

Minimum compressive strength when subjected to the triaxial test: 35 psi at 0 psi lateral pressure and 175 psi at 15 psi lateral pressure, unless otherwise designated on the plans. The maximum increase in material passing the number 40 sieve resulting from the Wet Ball Mill Test shall not exceed 20, unless otherwise shown on plans.

c. Material Sources. The material shall be secured from sources approved by the Engineer. The pits as utilized shall be opened up in such manner as to immediately expose the vertical faces of all of the various strata of acceptable material, and unless otherwise directed, the material shall be secured in successive vertical cuts extending through all of the exposed strata.

d. Construction Methods.

1. Preparation of Subgrade: The roadbed shall be excavated and shaped in conformity with the typical sections shown on Plans and to the lines and grades as established by the Engineer. All unstable or otherwise objectionable materials shall be removed from the subgrade and replaced with approved material. All holes, ruts and depressions shall be filled with approved material, and if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on Plans, and any deviation in excess of 0.04 feet in cross-section and in a length of sixteen (16) feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and compacting by sprinkling and rolling. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed of as directed, and any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on Plans or designated by the Engineer.

Lime stabilization of subgrade material will be required on all Arterial streets. Lime stabilization of subgrade material will be

required on all Collector and Local streets if the plasticity index (PI) of the material exceeds 18, as established by testing according to TXDOT Test Method Tex-106-E. Lime stabilization will be conducted in accordance with the TXDOT, Standard Specification No. 260.

Cement stabilization of subgrade material will be required on any street if the plasticity index (PI) is less than 4, as established by testing according to TXDOT Test Method Tex 106-E. Cement stabilization will be conducted in accordance with TXDOT, Standard Specification No. 275.

2. First Course. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.

The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the Contractor that the required amount of specified material shall be delivered in each one hundred (100) foot station. Material deposited upon the subgrade shall be spread and shaped the same day. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first twenty-four (24) hour period, the material shall be scarified and spread as directed by the Engineer. The material shall be sprinkled, if directed, and shall then be bladed, dragged, and shaped to conform to typical sections as shown on Plans. All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replace with well graded material, as directed by the Engineer. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and applied in the amount directed by the Engineer.

Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming, or by other approved methods. The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading and the surface upon completion shall be smooth and in conformity with the typical sections shown on Plans and to the established lines and grades. In that area on which pavement is to be place, any deviation in excess of 0.04 feet in cross-section and in a length of sixteen (16) feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by

sprinkling and rolling.

The utilization of traffic to compact and bind the base course or courses is an essential part of the contract and is of prime importance to the satisfactory completion of the work. As directed by the Engineer, each course shall be opened to traffic, and the Contractor shall direct and distribute the traffic uniformly over the entire width of the course. During the period traffic is being directed over the course, the surface shall be satisfactorily maintained by the use of a sufficient number of approved blades, drags, and such other equipment as is required, and these operations shall continue until the base course is sufficiently compacted to **ninety-eight (98)** percent of the TXDOT Test Method Tex-113-E Density within plus or minus two (2) percent of optimum moisture content.

3. Succeeding Courses. Construction methods shall be the same as prescribed for the first course.

e. Measurement. Crushed stone will be measured by the square yard, complete in place, by the cubic yard, loose vehicle measurement, or by the cubic yard, complete in place as indicated in the proposal.

f. Payment. This item will be paid for at the contract unit price bid for "Flexible Base" which price shall be full compensation for all work herein specified, including the furnishing, hauling, and placing of all materials, for all water required, and for all equipment, tools, labor, and incidentals necessary to complete the work.

The cost of testing and inspection will be paid by the developer.

3. Two Course Surface Treatment.

Rural roads, as defined in the Brazos County Subdivision Regulations, may use a two-course surface treatment.

In general, this item will be in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways (**Current Edition**). See Item 316. Some specifics are as follows:

a. Description - This section shall consist of a wearing surface composed of two applications of asphaltic material, each covered with aggregate and constructed on the prepared base course or surface in accordance with these Specifications.

Two course surface treatment shall not be applied when the air

temperature is below 50E F. and falling and it may be applied when the air temperature is above 40E F. and rising, the temperature being taken in the open shade and away from artificial heat. Asphaltic material shall not be placed when in the opinion of the Engineer, general weather conditions are not suitable. The second application of asphaltic material should not be applied until eighty percent (80%) of the subdivision has been built out or the minimum two year developer's maintenance has been completed.

b. Materials.

1. Asphaltic Materials: The asphaltic materials used shall be one or more of the materials prescribed in the Texas Department of Transportation, Standard Specifications for Street Construction, Item No. 300, "Asphalts, Oil and Emulsions Requirements".

2. Aggregate: The aggregate used shall consist of clean, tough, durable fragments of crushed limestone or gravel of uniform quality throughout, free from dirt, organic or other injurious matter occurring either freely in material or as a coating on aggregate. Percent of wear, when tested by AASHTO Designation T-96-70, shall not exceed thirty-five (35). Gradation shall be as specified below:

Sieve Size	Percent Retained
3/4 - inch sieve	0
5/8 - inch sieve	0-2
1/2 - inch sieve	20-35
3/8 - inch sieve	85-100
1/4 - inch sieve	95-100
No. 10 sieve	98-100

c. Construction Methods. (First and Second Course)

1. Base Preparation. Apply asphalt only when temperature is above 55E F. and is rising. Take temperature in shade and away from artificial heat. Place no asphalt when general weather conditions, in opinion of Engineer, are not suitable. Clean base surface of dirt, dust, or other deleterious matter by sweeping with rotary broom or other acceptable means. If necessary, sprinkle lightly with water just prior to application of asphalt.

2. Heating Asphalt. Keep clean and in good operating condition at all times all storage tanks, piping, retorts, booster tank, and distributors used in storing or handling asphalt. Operate all

equipment in such manner as to prevent contamination of asphalt with foreign material. Do not heat asphalt above 400E F at any time, and apply at temperature of not less than 275E F. and not more than 375E F. All asphalt material heated above 400E F. will be rejected.

3. Asphalt Application Rate. Apply to clean base at rate of approximately 0.33 gallon of asphalt per square yard. Minimum application rate of 0.25 gallon per square yard and maximum of 0.40 gallon per square yard.

4. Applying Asphalt. Apply on clean surface with approved type of self-propelled pressure distributor, operated as to distribute material in quantity specified, evenly and smoothly, under pressure for proper distribution. Provide all necessary facilities for determining temperature of asphalt and for securing uniformity at junction of two distributor loads. Apply full width of surface in one application.

5. Aggregate Application Rate. Not less than one cubic yard of aggregate per one hundred square yards of surface. Not more than one cubic yard of aggregate per eighty square yards of surface.

6. Applying Aggregate. Cover asphalt with aggregate in amount specified and blade with wire dragbroom maintainer or other approved leveling device. After applying aggregate, broom and roll entire surface with self-propelled, three-wheeled roller, weighing between three and eight tons. Pneumatic roller may be used if size and type meet approval of Engineer. Repeat brooming and rolling on two successive working days after application of aggregate for each application.

d. Measurement. Asphaltic materials will be measured in gallons at the applied temperature at the point of application on the road.

Aggregate will be measured by the cubic yard in vehicles as applied on the road.

e. Payment. The work performed and materials furnished as prescribed by this section and measured as above provided will be paid for at the Unit Price bid for "Two-Course Surface Treatment", which prices shall each be full compensation for cleaning and sprinkling the base, for furnishing, preparing, hauling, rolling, and placing all materials, and for all manipulations, labor, tools, equipment, and incidentals, necessary to complete the work.

The cost for testing and inspection will be paid by the developer and certified by a licensed professional engineer.

4. Hot Mix Asphaltic Concrete Pavement

Subdivision roads may utilize a two (2) inch wearing surface of Type D HMA. The material specifications, laying, rolling, measurement, etc., will be in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways (Current Edition) Item 340.

H. Water Service (Domestic and Fire). All extensions of water mains shall be designed and constructed in accordance with the Bryan/College Station Unified Design Guidelines, Bryan/College Station Unified Technical Specifications, Bryan/College Station Unified Construction Details and all other applicable local, state, and federal requirements. In the case, where the certificated water provider is a Special Utility District all water mains shall be constructed in accordance with their design guidelines. Where there is a conflict of standards, the more stringent standard shall apply, as determined by the County Engineer. All designs must be prepared by a Licensed Professional Engineer in the State of Texas.

I. Utility and Culvert Trenches. All utility trenches crossing the right of way shall be backfilled with structural embedment and backfill in accordance with manufacturer's requirements, the Bryan/College Station Unified Design Guidelines, Bryan/College Station Unified Technical Specifications, Bryan/College Station Unified Construction Details and all other applicable local, state, and federal requirements.

J. Alternate Designs. Any alternate design requested must be supported with an engineering analysis and accompanied by a signed and sealed letter from a Licensed Professional Engineer licensed in the state of Texas.

K. Construction Testing. Construction testing shall be in accordance with the Brazos County Subdivision Regulations, TXDOT requirements referenced in this document and the Bryan/College Station Unified documents referred to above.

L. Control of Work.

1. Authority and Duties of Design Engineer. The Design Engineer is to provide necessary oversight of the construction to ensure that construction is completed in general compliance with the Design Engineer's plans, specifications and any authorized revisions. Upon completion of the work, the Design Engineer shall issue a letter of certification acknowledging that the project was constructed in accordance with the County approved plans, specifications, and any authorized revisions.

2. Authority of Road & Bridge Department. The Road & Bridge Department representative will decide all questions which may arise as to the quality or acceptability of materials furnished and work performed, the manner of performance, the interpretation of the County's construction requirements, and the acceptable fulfillment of the Developer/Contractor's obligations.

3. Authority and Duties of County Inspector. County inspectors will be authorized to inspect the work done and all materials furnished. A County Inspector will be assigned to the work by the Road & Bridge Department and will report to the Road & Bridge Department as to the progress of the work and the manner in which it is being performed, also to report whenever it appears that the material furnished and the work performed by the Developer/Contractor fail to fulfill the requirements of the specifications and to call attention of the Contractor to any such failure or other infringement. Such inspection will not relieve the Developer/Contractor from any obligations to perform the work in accordance with the requirements of the specifications. In case of any dispute arising between the Developer/Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector will refer the matter to the Road and Bridge Department. If necessary, a meeting with Developer, Design Engineer, and Contractor will be scheduled by the Road and Bridge Department to discuss a solution. The Inspector will not be authorized to approve or accept any portion of work. He will in no case act as foreman or perform other duties for the Developer/Contractor.