

APPENDIX A

STANDARD TRANSPORTATION CONSTRUCTION SPECIFICATIONS*

* **Editors Note:** Printed herein are the city Standard Transportation Construction Specifications, as adopted by ordinance number 92-18 on August 27, 1992. Amendments to the specifications are indicated by parenthetical history notes following amended provisions. The absence of a history note indicates that the provision remains unchanged from the original ordinance. Obvious misspellings and punctuation errors have been corrected without notation. For stylistic purposes, headings and catchlines have been made uniform and the same system of capitalization, citation to state statutes, and expression of numbers in text as appears in the Code of Ordinances has been used. Additions made for clarity are indicated by brackets.

Section 1. Basic Information

Sec. 1.1. Authority.
Sec. 1.2. General.

Section 2. Site Preparation

Section 3. Earthwork

Sec. 3.1. General.
Sec. 3.2. Excavation.
Sec. 3.3. Disposal of excess material.
Sec. 3.4. Placing embankment.
Sec. 3.5. Shoulders, ditches and slopes.
Sec. 3.6. Dust and stormwater runoff controls.
Sec. 3.7. Private property.

Section 4. Subbase

Sec. 4.1. Description.
Sec. 4.2. Subbase requirements.
Sec. 4.3. Stabilization.
Sec. 4.4. Construction.
Sec. 4.5. Testing.

Section 5. Base Course

Sec. 5.1. General.
Sec. 5.2. Materials.
Sec. 5.3. Spreading limerock or soil cement.
Sec. 5.4. Compacting and finishing base.
Sec. 5.5. Prime/curing.
Sec. 5.6. Testing surface.
Sec. 5.7. Tests.

Section 6. Soil Cement

Sec. 6.1. Description.
Sec. 6.2. Testing.
Sec. 6.3. Materials.
Sec. 6.4. Construction.
Sec. 6.5. Opening to traffic.
Sec. 6.6. Maintenance.
Sec. 6.7. Inspection.

Section 7. Prime and Tack Coats for Base Courses

Sec. 7.1. General.
Sec. 7.2. Materials.

- Sec. 7.3. Cleaning the base.
- Sec. 7.4. Weather limitations.
- Sec. 7.5. Application of prime coat.
- Sec. 7.6. Application of tack coat.

Section 8. Asphaltic Concrete Surface Course

- Sec. 8.1. General.
- Sec. 8.2. Asphaltic concrete mixes.
- Sec. 8.3. Construction methods.
- Sec. 8.4. Finished surface requirements.
- Sec. 8.5. Tests.

Section 9. Sidewalks/Bikepaths/Concrete Curb/Driveway

- Sec. 9.1. General.
 - Sec. 9.1.1. Design considerations.
- Sec. 9.2. Materials.
- Sec. 9.3. Construction methods.
- Sec. 9.4. Joints.
- Sec. 9.5. Finishing.
- Sec. 9.6. Curing.
- Sec. 9.7. Backfilling and compaction.
- Sec. 9.8. Requirements for machine-laying.
- Sec. 9.9. Handicap ramps.
- Sec. 9.10. Stormwater inlet structure.

Section 10. Grassing and Mulching

- Sec. 10.1. General.
- Sec. 10.2. Materials.
- Sec. 10.3. Construction methods.
- Sec. 10.4. Sodding.
- Sec. 10.5. Cleanup.

Section 11. Pavement Markings

- Sec. 11.1. General.
- Sec. 11.2. Materials.
- Sec. 11.3. Installation.

Section 12. Traffic Signs and Signals

- Sec. 12.1. General.
- Sec. 12.2. Materials.
- Sec. 12.3. Construction.

Section 13. Illustrations and Drawings

PREFACE

The specifications set forth herein provide minimum standards for the construction of transportation facilities which meet the following conditions:

1. Facilities to be constructed within the City of Eustis rights-of-way.
2. Facilities to be turned over to the City of Eustis for maintenance.
3. Facilities to become a permanent part of City of Eustis public works system.

These specifications describe the minimum acceptable standards of construction and to promote

uniformity where practical. It is felt that adherence to the standards presented in this booklet will benefit both the citizens of Eustis and the operators of the facilities.

The transportation system shall be in general accordance with the city's adopted planning documents and the city's growth management comprehensive plan.

Should any design be submitted which varies appreciably from the standards set herein or uses materials other than those recommended, it should be accompanied by appropriate supporting documentation or engineering studies.

All plans submitted for review shall be in conformance with all federal, state, county, and city regulations and codes. In no case shall minimum standards be less than those established by recognized private and governmental agencies, unless stated otherwise in these specifications.

Construction specifications for stormwater management and water and sewer are listed in Appendix B and C, respectively.

SECTION 1.

BASIC INFORMATION

Sec. 1.1. Authority.

1.11. *Approval.* These design standards are accepted and approved by the city commission.

1.12. *Scope and intent.* The intent of these development procedures is to establish minimum engineering requirements for projects submitted to the city. The development procedures will apply to all development and construction projects, both public and private, within the jurisdiction of the City of Eustis.

1.13. *Variances.* Under extreme conditions with specific applications, the following procedures and policies may be altered to meet certain conditions which are beyond the control of the developer provided that such deviations or alterations are acceptable to the city. Final decisions concerning such alterations shall be made by the city manager or his designee.

1.14. *Changes to these standards.* Changes to these standards may be made by resolution adopted by the city commission.

Sec. 1.2. General.

The developer and his engineer shall bear all construction, testing, and inspection costs of the project.

1.21. *Predesign conference.* It is strongly recommended that a predesign conference between the owner, his engineer and the city be held.

1.22. *Plans.*

- A) *Submission.*
 - 1) All construction plans submitted to the city for review and approval shall bear the seal and signature of the Florida Registered Professional Engineer responsible for the project. The address and telephone number of this person shall be shown along with the signature.
 - 2) Ten sets of plans and specifications shall be submitted for approval to the city.
- B) *Assembly.*
 - 1) *Sheet size.* The standard size sheet for construction plans submitted to the city for approval shall be 24" × 36". Worksheets and data sheets used in preliminary design work and reviews are not limited to any size, except that which is convenient to handle.
 - 2) *Items of construction required.* The developer shall provide as appropriate all necessary improvements in accordance with city specifications, standards and policies.
- C) *Utility coordination.* It shall be up to the developer to coordinate all utilities within his development.
- D) *City standards and specifications.* Copies of city standards and specifications may be obtained from the city for the cost of reproduction.

1.23. *Permits.* The developer and his engineers are responsible for obtaining and submitting the required design and construction permits and certification of completion from Florida Department of Transportation, Lake County Public Works, St. Johns River Water Management District, and other regulatory agencies with jurisdiction on the project, to the city.

1.24. *Construction.*

- A) *Start.*
 - 1) *Notification.* The city shall be notified in writing of the proposed date of the beginning of construction of the project. Any time that work is to stop for a period of time in excess of two working days, the city shall be notified of such interruption.
 - 2) *Preconstruction conference.* A preconstruction conference shall be held at least two days before the commencement of construction. A 100 percent payment and performance bond shall also be provided. The developer shall be responsible for arranging this conference with the city.
- B) *Completion.*
 - 1) *As-built drawings.* Within two weeks following final inspection, the developer shall submit one mylar set and ten white-background prints of as-built drawings to the city. These drawings shall be signed by a registered engineer attesting that the accuracy of the

facilities shown on the drawings are, in fact, correct.

- 2) *Certificates of compliance.* Certificates of compliance with the specifications furnished by the material supplier shall be submitted on all materials used in the completion of this work.
- C) *Off-site pollution protection.* It will be the developer's responsibility to provide downstream siltation protection during construction. In the event such protection is inadequate, it will be the developer's responsibility to remove any downstream siltation prior to the time of final inspection.

1.25. *Inspection.*

- A) *Periodic.* The city will periodically visit the project site to make a visual inspection of the progress of the work and methods of construction.

Upon observation of work not done in accordance with the plans and specifications, the city will notify the developer's contractor and request that necessary corrections be made or tests performed to assure compliance with the specifications, at no cost to the city.

- B) *Final.* The city shall be notified in writing when the project is complete. Upon receiving a written request for final inspection of the completed work, the representatives of the city, together with the representatives of other interested agencies, shall perform the final inspection within two weeks of the receipt of the request.

1.26. *Maintenance.* All items or systems must be designed in such a manner to minimize future maintenance. A two-year maintenance bond (20 percent) of approved construction cost shall be furnished to the city at the time of final acceptance along with all warranties and manufacturers' manuals for all items to be maintained by the city. All disturbed earthen areas shall be grassed and mulched or sodded prior to acceptance.

1.27. *Transfer of private ownership.* When transfer of private facilities to public ownership takes place, all such private facilities shall be brought up to the current city standards at no cost to the city insofar as construction and maintenance are concerned, before the city will accept such facilities. Proof of satisfactory completion of the project, and submission of quick claim [quit claim] deeds, bills of sale, prior and current permits, warranties, and a 20 percent two-year maintenance bond shall be furnished to the city prior to acceptance.

1.28. *Property ownership.* All facilities to be owned or maintained by the city shall be located on city property, within city right-of-way or on easements dedicated to the city for the uses intended.

1.29. *Time period of approved plans.* Plans shall be valid for construction for a period of one year from the date of city approval only. All items not under construction within one year of the approval date shall require a new approval prior to the commencement of construction.

SECTION 2.

SITE PREPARATION

The work covered by this section consists of clearing, grubbing, and stripping of the construction site to remove debris within the areas of the rights-of-way, easements, retainage areas, and all other construction areas. Dust control is mandatory. Existing trees and other vegetation that are designated to remain shall be protected in accordance with the city's park and tree protection ordinance.

Clearing: Remove and dispose of shrubs, brush, limbs, and other vegetative growth. Remove and dispose of trash piles and rubbish. Protect trees, shrubs, vegetative growth, and fencing which are not designated for removal. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others.

Grubbing: Grubbing shall consist of the complete removal of all stumps, roots larger than 1 1/2 inches in diameter, matted roots, brush, timber, logs, and any other organic or metallic debris remaining after clearing not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

Stripping: Remove and dispose of all organics and sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped. Grass and grass roots in areas to be excavated or filled upon shall be stripped to a depth of four inches. In areas so designated, topsoil shall be stockpiled. Topsoils so stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place, shall be disposed of by the contractor unless directed otherwise by the engineer.

All excavation and embankment areas associated with new structures, slabs, and roadways shall be cleared and grubbed to the following depths:

1.	Roadway and paved area:	2 feet below excavated surface.
2.	Building site areas:	2 feet below existing grade and replaced with compacted backfill.
3.	All other areas:	1 foot below completed surface.

SECTION 3.

EARTHWORK

Sec. 3.1. General.

The work covered by this section consists of excavation and embankment required for roadway, ditches, channel changes and other works.

Unless otherwise provided, this section shall include all excavation, shaping, filling, sloping and finishing necessary for the construction, preparation, and completion of all embankments, subgrades, shoulders, ditches, slopes, gutters, intersections, approaches, private entrances, and other works all in accordance with the required alignment, grade, and cross sections shown on the plans. Street grades shall not exceed eight percent or be less than 0.4 percent. All streets shall be graded to the full width of the proposed roadway.

Sec. 3.2. Excavation.

All topsoil within the construction areas shall be stripped to an appropriate depth. All areas designated to receive structural fill shall be compacted with inorganic soil to a minimum 95 percent modified Proctor density.

While the excavation is being done and until the work is finally accepted, the contractor shall take the necessary steps to protect the work to prevent loss of material from the construction area due to the action of wind or water. During construction, the area shall be maintained in such condition that it will not constitute a hazard and will be well drained at all times.

Sec. 3.3. Disposal of excess material.

Excess material shall be disposed of in accordance with current city, county, State of Florida, and federal regulations.

Sec. 3.4. Placing embankment.

Embankments shall be constructed of suitable materials placed in successive level layers not more than 12 inches in thickness, loose measure, for the full width of the embankment, for the full length of the embankment, and compacted to a minimum density of 95 percent of the maximum density value as determined by A.A.S.H.T.O. T-180.

Sec. 3.5. Shoulders, ditches and slopes.

When the work includes surfacing or paving, the earthwork, including the slopes, and all drainage structures shall have been substantially completed prior to the construction of the base course and pavements.

Before final acceptance by the city, the earth shoulders, slopes, and side ditches shall be completed and shaped to a surface which is within 0.1 foot above or below the true surface shown on the plans. Shoulders shall have a minimum depth of six inches and compacted to 95 percent of A.A.S.H.T.O. T-180 with a minimum Florida Bearing Value of 50 psi and a minimum cross-slope of one-half inch/foot.

Sec. 3.6. Dust and stormwater runoff controls.

All stripped areas which are bare must be seeded and mulched and watered periodically to prevent dust problems. The contractor shall also install temporary retention ponds, swales and berms to prevent stormwater runoff discharge from the site during construction. The contractor shall provide downstream siltation protection during construction.

Sec. 3.7. Private property.

All private and public property affected by the construction shall be restored to a condition equal to or better than original conditions. The locations of all existing utilities shall be determined and marked at site prior to the commencement of work.

SECTION 4.

SUBBASE

Sec. 4.1. Description.

Subbase shall be defined as that portion of the roadbed immediately below the base course including below the curb and gutter, the limits of which will ordinarily include those portions of the roadbed shown in the plans. The limits of the subbase shall extend outward to 12 inches each side beyond the base. On roadways where curbs are utilized, the subbase shall extend to six inches beyond the back of curb.

Sec. 4.2. Subbase requirements.

The subbase shall be stabilized to a minimum depth of 12 inches and compacted to 98 percent of A.A.S.H.T.O. T-180 FBV 50 psi.

Sec. 4.3. Stabilization.

The stabilizing material shall be high bearing value soil, sand-clay, limerock, shell, or other material approved by the city and shall meet the physical requirements of F.D.O.T. Standard Specifications section 914-2.

Sec. 4.4. Construction.

The surface of the subbase shall conform to the lines and grades as defined on the construction plans to a tolerance of 0.05 feet [foot]. If pumping occurs during compaction, the existing wet material shall be removed and replaced by dry material. The method of aeration may be used if permitted by the city.

Sec. 4.5. Testing.

Tests for the subbase bearing capacity thickness and compaction shall be spaced at a maximum of 300 feet apart and shall be staggered to the left, right, and on the centerline of the roadway. The city may direct additional tests when in its opinion conditions warrant additional testing to assure compliance with specifications. All tests shall be the responsibility of the developer/owner for nonpublic improvements. All tests on public improvements shall be performed by a geotechnical/soils engineer.

SECTION 5.

BASE COURSE

Sec. 5.1. General.

The work specified in this section consists of the construction of a base course composed of limerock or soil cement. It shall be constructed on the prepared subgrade in accordance with these specifications and in conformity with the lines, grades, notes, and typical cross sections shown on the plans.

Sec. 5.2. Materials.

The material used shall conform with the requirements as specified in the Florida Department of Transportation Standard Specifications. Soil cement base shall have a seven-day design compressive strength in accordance with section 6 of these specifications.

Sec. 5.3. Spreading limerock or soil cement.

The limerock or soil cement shall be spread uniformly and extend six inches on each side from the finished surface.

Sec. 5.4. Compacting and finishing base.

For double-course base, the first course shall be bladed if necessary to secure a uniform surface, and shall be compacted to the density specified below, immediately prior to spreading the second course. The base shall have a minimum compacted depth of six inches. Heavy-duty roads shall have a base with a minimum compacted depth of eight inches placed in two lifts.

After spreading is completed, the entire surface shall be scarified and shaped so as to produce the exact grade and cross section after compaction. For double-course bases, this scarifying shall extend to a depth sufficient to penetrate slightly the surface of the first course.

Proper moisture condition shall be maintained uniformly throughout the material during the compaction operation. The limerock material shall be compacted to a minimum density of 98 percent of the maximum density obtainable under A.A.S.H.T.O. Method T-180. Where the base is being constructed in a double course and the specified thickness is more than six inches, the density specified above shall be obtained in both the bottom half and top half of the base. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density determinations on the finished base.

The surface shall be "hard-planed" with a grader immediately prior to the application of the prime coat to remove the thin-glazed or cemented surface, leaving a granular or porous condition that will allow free penetration of the prime material.

If, at any time, the subgrade material should become mixed with the base course material, the contractor shall excavate and remove the mixture, reshape and compact the subgrade, and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

Sec. 5.5. Prime/curing.

Base course shall be protected by the application of a bituminous coating in accordance with section 7 of

these specifications. The bituminous material shall be applied and sand sealed immediately after the completion of the bituminous application.

Sec. 5.6. Testing surface.

The finished surface of the base course shall be checked with a template cut to the required cross section and with a 15-foot straight edge laid parallel to the centerline of the road or other approved testing devices. All irregularities greater than + 1/4 inch shall be corrected by scarifying and removing or adding rock, as may be required, after which the entire areas shall be recompactd as specified herein.

Sec. 5.7. Tests.

At least one of each of the following tests shall be made on every project by the Geotechnical/Soils Engineer and submitted to the city:

- A) Modified Proctor maximum density determination tests.
- B) Field in-place density tests.
- C) Thickness.

Tests will be required at intervals not to exceed 300 feet. All tests on public improvements shall be performed by a geotechnical/soils engineer.

SECTION 6.

SOIL CEMENT

Sec. 6.1. Description.

The work specified in this section shall consist of the construction of a soil-cement base course composed of soil and Portland cement uniformly mixed, moistened, compacted, finished and cured in accordance with these specifications, and shall conform to the lines, grades thicknesses and typical cross sections shown on the plans. The base shall be designed to have a minimum in-situ strength of 300 psi. Seven-day laboratory design compressive-strength shall be a minimum of 400 psi for mixed in-place and 350 psi for plant mixed, unless statistical data for the materials used justifies a lesser laboratory strength.

Sec. 6.2. Testing.

Construction of the soil cement base shall not proceed without 24-hour notice to the city. The following is the minimum information/test data required to be obtained during construction:

- A) Area and date of construction.
- B) Average cement spread.

- C) Uniformity of mix.
- D) Moisture content at time of compaction based on standard Proctor density test (A.A.S.H.T.O. T-134).
- E) Percent compaction.
- F) Compacted thickness.
- G) Seven-day compressive strength tests.

In addition to the above data, the contractor shall perform a detailed engineering inspection of the hardened soil-cement base prior to approval for paving to assure that the soil cement base has set up satisfactorily and that no soft areas or surface scabs exist which may need repair. All deficiencies shall be corrected and approved by the city prior to paving.

Sec. 6.3. Materials.

- A) *Portland cement.* Portland cement shall be type I or type I-P and shall comply with the Standard Specifications for Portland Cement ASTM C-145. Cement which is partially set, lumpy or caked shall not be used. One cubic foot of Portland cement shall be considered to weight 94 pounds.
- B) *Water.* Water shall be clean and free from substance deleterious to the hardening of the soil cement.
- C) *Soil.* The soil for the base course shall be free of organic matter and shall not contain gravel or stone retained on a two-inch sieve or more than 45 percent retained on a No. 4 sieve.

Sec. 6.4. Construction.

- A) *Responsibility.* The contractor is responsible for completing the project in accordance with plans and specifications.
- B) *Preparation.* Before construction operations are begun, the area to be paved shall be graded and shaped as required to construct the soil cement base in conformance with the grades, lines, thicknesses and typical cross section shown on the plans. Additional soil needed, if any, shall be placed as directed. Unsuitable soil or material shall be removed and replaced with acceptable soil.
- C) *Pulverization.* The soil shall be so pulverized that, at the completion of moist-mixing, 100 percent by dry weight passes a one-inch sieve, and a minimum of 80 percent passes a No. 4 sieve, exclusive of gravel or stone retained on these sieves.
- D) *Application of cement.* The specified quantity of Portland cement required for full depth treatment shall be applied uniformly on the soil. When bulk cement is used, equipment suitable for handling, measuring and spreading the cement shall be used. The percentage of moisture in the soil, at the time of cement application, shall not exceed the quantity that will permit a uniform and intimate mixture of soil and cement

during mixing operations and shall not exceed the specified optimum moisture content by more than two percent for the soil cement mixture. No equipment, except that used to spread and mix the soil cement, will be allowed to pass over the freshly spread cement until it is mixed with the soil. The application of cement to finishing, inclusive, shall be continuous and surface finishing shall be completed as soon as possible. Spread cement that has been displaced shall be replaced before mixing is started. No cement shall be applied when the soil or subgrade is frozen. The air temperature shall be at least 40 degrees Fahrenheit in the shade and rising.

E) *Mixing.* After the cement has been applied, it shall be thoroughly mixed with the soil. Mixing shall continue until the cement has been thoroughly blended with the soil in order to prevent the formation of cement balls when water is applied. Any soil and cement mixture that has not been compacted and finished shall not remain undisturbed for more than 30 minutes.

F) *Application of water and moist mixing.* Immediately after and/or during the mixing of soil and cement, and before beginning the compaction, the moisture content of the soil cement mixture shall be determined by the laboratory and, if required, water shall be applied uniformly in quantities required to obtain proper moisture content. After the final application of water, mixing shall be continued until the water is distributed uniformly through the full depth of the mixture. When water application and mixing has been completed, the percentage of moisture in the mixture and in unpulverized soil lumps, based on oven-dry weights, shall not be more than two percentage points above the specified optimum moisture content, and shall not be less than that quantity which will cause the soil cement mixture to become unstable during compaction and finishing. The moisture and density requirements shall be determined by the methods prescribed in A.A.S.H.T.O. T-134.

G) *Compaction.* Prior to beginning of compaction, the mixture shall be in a loose condition for its full depth. The loose mixture shall then be uniformly compacted until the entire depth of the mixture is compacted to at least 95 percent of the maximum density prescribed in A.A.S.H.T.O. T-134 as determined in the field on representative samples of soil cement mixture obtained from the roadway at the time compaction begins. During the compaction operations, shaping may be required to obtain the required grades and cross section. The maximum time allowed between the last moist mixing and compaction shall be 60 minutes.

H) *Finishing.* After the mixture has been initially compacted, the surface of the soil cement shall be shaped to the required lines, grades and cross section. During the shaping operations, the surface shall be lightly scarified to loosen any imprints left by the compacting or shaping equipment, when deemed necessary. The resulting surface shall then be compacted to the specified density with a pneumatic tire roller. Rolling shall be supplemented by broom-dragging, if required. The moisture content of the surface material must be maintained at not less than its specified optimum moisture content during finishing operations. Surface compaction and finishing shall be done in such a manner as to produce a smooth, dense surface, free of surface compaction planes, cracks, ridges or loose material. Surface-finishing methods may be varied, provided a smooth, dense surface, free of surface compaction planes, is produced.

I) *Surface requirements (scalping or hard-planing).* After compaction and finishing have been completed, and not later than the beginning of the next calendar day after the construction of any section of the base, the surface shall be tested with a template cut to the required crown and/or with a 15-foot straight-edge laid parallel to the centerline, and all irregularities greater than one-fourth inch shall be immediately corrected with a blade adjusted to the lightest cut, which will ensure a surface that does not contain depressions greater than one-fourth inch under the template or the straight-edge. The material removed shall be wasted. Additional

wetting during and after this final shaping operation will be required to keep the base continuously moist.

J) *Prime curing.* The curing material shall be applied as soon as possible after the completion of finishing operations. The finished soil cement shall be kept continuously wet until the curing material is placed. After the soil cement has been finished as specified herein, it shall be protected against drying for seven days by the application of bituminous coating. Prime and curing materials shall conform to section 7 of these specifications.

K) *Construction joints.* Prior to the beginning of each day's construction, a straight transverse construction joint shall be formed by cutting back into the completed work to form a vertical face.

L) *Thickness.* During various stages of construction, test holes or trenches shall be dug in the mixture to determine the thickness. After the base is completed, test holes shall be dug or drilled at intervals of not more than 300 feet, or at closer intervals, if necessary, and the thickness of the base shall be determined from measurements made in these test holes. Where the base is deficient in thickness by more than one-half inch, the area of deficient base shall be removed and replaced by base of the required thickness, at the contractor's expense, except that, at the city engineer's option, such deficient thickness base may be left in place provided the deficiency is not more than one inch. This deficiency may be made up in asphaltic concrete and the grade control can be met.

Sec. 6.5. Opening to traffic.

The contractor will not be permitted to drive heavy equipment over the completed sections, but light weight pneumatic-tired equipment may be permitted after the surface has hardened sufficiently to prevent the equipment marking the surface and provided the protection and curing specified are not impaired. Completed section may be opened to light traffic after 24 hours protection provided the surface has hardened sufficiently to prevent marking by traffic and has been inspected by the city. An application of sand shall be done prior to opening to construction traffic.

Sec. 6.6. Maintenance.

The contractor shall maintain the base to a true and satisfactory surface until the wearing surface is constructed. Should any repairs or patching be necessary, they shall extend to the full depth of the base and shall be made in a manner that will assure restoration of a uniform base course conforming to the requirements of these specifications. The bituminous curing coating shall be maintained until the wearing surface is constructed.

Sec. 6.7. Inspection.

After a minimum of seven days have elapsed and prior to applying the asphalt wearing surface, an inspection of the base shall be performed by the city, the geotechnical/soils engineer, and the contractor. Prior to commencing paving operations, all deficiencies shall be corrected and approved by the geotechnical/soils engineer, prior to approval by the city.

SECTION 7.

PRIME AND TACK COATS FOR BASE COURSES

Sec. 7.1. General.

The work specified in this section consists of the application of bituminous material, on a previously prepared base, in accordance with these specifications and in conformity with the lines, grades, dimensions, and notes shown on the plans.

Sec. 7.2. Materials.

The materials used shall be as follows:

A) *Prime coat.*

- a. Cutback asphalt, grade 7RC-SS-1, SS-1H, special MS-emulsion, diluted at the ratio of six parts emulsified asphalt to four parts water.
- b. Cutback asphalt, grade RC-70.

B) *Tack coat.*

- a. Asphalt cement, viscosity grades AC-20 or AC-30.
- b. Emulsified asphalt, grade RS-2, SS-1, SS-1H, special MS-emulsion, diluted at the ratio of six parts emulsified asphalt to four parts water.

For the prime and tack coat, any one of the specified bituminous materials may be used at the option of the contractor, unless a specific type and grade is called for on the plans.

Sec. 7.3. Cleaning the base.

Before any bituminous material is applied, all loose material, dust, and foreign material which might prevent proper bond with existing surface shall be removed for the full width of the application. Particular care shall be taken to clean the outer edges of the strip to be treated in order to insure that the prime or tack coat will adhere. Where the prime or tack coat is applied adjacent to curb and gutter or valley gutter, such concrete surfaces are to be protected and kept free of bituminous materials.

Sec. 7.4. Weather limitations.

No bituminous material shall be applied when the temperature of the air is less than 40 degrees Fahrenheit in the shade, or when the weather conditions or the condition of the existing surface is unsuitable.

Sec. 7.5. Application of prime coat.

The surface to be primed shall be clean and free of standing water. For limerock bases, the glazed finish shall have been removed leaving a granular or porous condition that will allow free penetration of bituminous

material. The temperature of the prime material shall be between 100 degrees Fahrenheit and 150 degrees Fahrenheit. The actual temperature will be that which will insure uniform distribution. The material shall be applied by means of a pressure distributor. The amount of bituminous material applied shall be not less than 0.10 gallon per square yard for limerock base and not less than 0.15 gallon per square yard for sand clay, soil cement, or shell base. The amount to be applied will be dependent on the character of the surface and shall be sufficient to coat the surface thoroughly and uniformly, with no excess. Where asphaltic pavement abuts concrete curbing, the vertical abutting edge shall receive a uniform coating of tack applied so as to avoid puddles, etc.

A light uniform application of clean sand shall be applied prior to opening the primed base to traffic, in which case the sand shall be rolled with a traffic roller. If warranted by traffic conditions, the application shall be made only on one-half of the width of the base at one time, care being taken to secure the correct amount of bituminous materials at the joint.

The base shall be sufficiently moist in order to obtain maximum penetration of the asphalt.

Sec. 7.6. Application of tack coat.

Where a bituminous surface is to be laid and a tack coat is required, it shall be applied as herein specified. On newly constructed base courses, the application of the tack coat shall follow the application of the prime coat, immediately prior to placing the wearing surface, when the tack coat is required. In general, a tack coat will not be required on primed bases, except in areas which have become excessively dirty and cannot be cleaned in areas where the prime has cured and lost bonding effect, or where the prime coat has worn away.

The tack coat is to be applied with a pressure distributor. The bituminous material shall be heated to a suitable consistency as designed or as stated in section 7.5. The bituminous material shall be applied at the rate between 0.02 gallon and 0.08 gallon per square yard. The tack coat shall be applied sufficiently in advance of the laying of the wearing surface to permit drying but shall not be applied so far in advance or over such an area as to lose its adhesiveness as a result of being covered with dust or other foreign material and shall be kept free from traffic until the wearing surface is laid.

SECTION 8.

ASPHALTIC CONCRETE SURFACE COURSE

Sec. 8.1. General.

The work specified in this section consists of the application of asphaltic concrete surface course composed of a mixture of aggregates and, if necessary, mineral filler and asphalt cement to produce the desired stability hereinafter described, properly laid upon a prepared base in accordance with these specifications and in conformity with the lines, grade, thickness and typical cross section shown on the plans. This work shall include the conditioning of the existing surface or base. Skid-resistant surfaces shall be installed as required by the city. Road surface shall be graded with a minimum cross-slope of one-fourth inch/foot.

Sec. 8.2. Asphaltic concrete mixes.

Asphaltic concrete mixes shall meet the following specifications when called for in the plans and specifications:

Type	Job Mix Specification	Min./Avg. Compacted () Max Lift	Minimum Marshall Stability	Application
Type S-1	Current FDOT Specification	1 1/2" (2")	1,000 lb.	Wearing Course
Type S-3	Current FDOT Specification	1 1/4" (2")	1,000 lb.	Wearing Course
Type III	Current FDOT Specification	1" (2")	1,000 lb.	Wearing Course
Type II	Current FDOT Specification	-- (2")	500 lb.	Leveling Course
Type FC-1	Current FDOT Specification	3/4" (1")	500 lb.	Friction Course
Type FC-2	Current FDOT Specification	3/8" (5/8")	N/A	Friction Course
Type FC-3	Current FDOT Specification	3/8" (5/8")	N/A	Friction Course
Type	Current FDOT Specification	5/8" (1")	500 lb.	Friction Course

The minimum thickness of the pavement is 1 1/4 inches with type S-3 asphaltic concrete. Heavy-duty roads shall have a wearing surface consisting of 1 1/2 inches of S-1 asphaltic concrete overlaid with a one-inch friction course. The thickness of the pavement shall be determined from the length of core, at least two inches in diameter, taken at random points on the cross section and along the roadway. Each core shall represent a section not longer than 300 feet.

If the city believes that the number of cores taken is insufficient to properly indicate the thickness of the pavement, it may request additional core at locations designed by the city. All additional costs shall be born by the contractor.

When the deficiency in thickness is in excess of one-fourth inch, the contractor shall correct the deficiency either by replacing the full thickness for a length extending at least 50 feet from each end of the deficient area, or (when permitted by the city) by overlaying. Normally an overlay will not be permitted in a concrete curb section.

Sec. 8.3. Construction methods.

The mixture shall be spread on the surface designated only when the surface previously prepared is intact, firm, properly cured and dried; and only when the air temperature in the shade and away from artificial heat is above 40 degrees Fahrenheit and rising.

The mixture shall be delivered on the road in ample time to permit the spreading, rolling and surface testing during daylight hours. The temperature of the mixture at the time of spreading shall be between 260 and 310 degrees Fahrenheit and shall not exceed 340 degrees Fahrenheit at the plant.

Material shall be delivered to the job site with sufficient frequency that the paving operation can continue without interruption.

Depressions which may develop after the initial rolling shall be remedied by removing the mixture laid, and adding new material to bring such depressions to a true surface. Such portions of the completed course that are defective in surface planeness, compaction or composition, or that do not comply with the requirements of these specifications, shall be removed and replaced with suitable mixture properly laid in accordance with these specifications.

Vertical construction joints shall be constructed prior to the commencement of the ongoing paving operation. All cold joints will be prepared according to the Florida Department of Transportation Specifications. The vertical surface of all existing asphaltic concrete mixes at cold joints shall be mopped with an approved liquid bitumen material so as to provide a watertight joint at the interface of the two mixes.

Sec. 8.4. Finished surface requirements.

For the purpose of testing the finished surface, the contractor shall provide a 15-foot rolling straight edge and standard template cut to the true cross section of the road. These shall be available at all times during construction so that the city may check the finished surface. The contractor shall provide and designate an employee whose duty it is to use the straight edge and template in checking all rolled surface under the direction of the city. Vertical measurement from a string line between curbs to determined crown may be accepted as an alternate. The finished surface shall be such that it will not vary more than one-fourth inch from the 15-foot rolling straight edge applied parallel to the centerline of the pavement and shall be of uniform texture and compaction. The lip of the asphalt shall be higher than the gutter by one-fourth to one-half inch. The surface shall have no pulled, torn or loosened portions and shall be free from segregation, sand streaks, sand spots, or ripples. Irregularities of the surface exceeding the above requirements shall be corrected by the contractor who has the option of selecting one of the following methods:

- A) *Removing and replacing.* If correction is made by removing and replacing the pavement, the removal must be for the full depth of the course and extend at least 50 feet on either side of the defective area, for the full width of the paving lane.
- B) *Overlaying.* If correction is made by overlaying, the overlay shall cover the length of the defective area and taper uniformly to a feather-edge thickness at a minimum distance of 50 feet on either side of the defective area. The overlay shall extend full width of the roadway. Care shall be taken to maintain the specified cross slope. The mix used for the overlay may be adjusted as necessary for this purpose by the city. Overlaying will not be permitted when the finished pavement surface is a friction course or abuts concrete curbs.
- C) *Other methods.* For courses which will not be the final pavement surface, correction of minor straight-edge deficiencies by methods other than specified above may be approved by the city.

Sec. 8.5. Tests.

During construction of the asphaltic concrete wearing surface, the following tests must be completed and reports submitted to the city before acceptance can be given:

- A) *Density and depth checks.* One test per 300 lineal feet of roadway (minimum two tests per street). Minimum acceptable density for each course of asphaltic concrete material shall be 93 percent of the design unit weight in the job mix formula.

All tests and job mix formulas shall be made by an independent testing engineer as approved by the city and all reports shall be signed and sealed by a registered professional engineer for the State of Florida.

SECTION 9.

SIDEWALKS/BIKEPATHS/CONCRETE CURB/DRIVEWAY

Sec. 9.1. General.

The work specified in this section consists of the construction of curb, curb and gutter, driveway, or sidewalks/bikepaths of Portland cement concrete. Such works shall be constructed in accordance with these specifications and in conformity with the lines, grades, dimensions, and notes shown on the plans. Should the contractor so elect, he may use a curb machine. All concrete shall be finished as recommended by the P.C.A. Sidewalks/bikepaths shall have a minimum of one-quarter inch per foot positive slope from the top of curb or edge of pavement, unless otherwise specifically approved by the city.

- A) *Sidewalks.* Sidewalks shall be four-inch thick concrete and six-inch thick at driveways with 10-10×6"×6" mesh laid on a compacted subgrade.
- B) *Bicycle paths.* Bicycle paths shall be four-inch thick concrete reinforced with 10-10×6"×6" mesh laid on a compacted subgrade. Bicycle paths shall be marked with paint. Bicycle paths constructed with asphaltic concrete shall be in accordance with section 8.
- C) *Driveways.* Driveways shall be six-inch thick concrete reinforced with 10-10×6"×6" mesh laid on a compacted subgrade from the property to the edge of the pavement. Driveways constructed with asphaltic concrete shall be in accordance with section 8. A typical driveway apron design is shown in Drawing No. 1 [see appendix].
- D) *Curb and gutter.* The curb and gutter shall be a minimum of 24 inches wide of FDOT Type F (standard curb and gutter) or Miami curb. The curb and gutter flow line grades shall run parallel to the road centerline grade. The minimum allowable flow line grade shall be 0.3 percent, except in intersections where flatter grades are needed. All curbing and valley gutter shall be constructed of concrete in accordance with FDOT standards.

Sec. 9.1.1. Design considerations.

(a) The choice of the proper location for access facilities (driveways) must involve consideration of the amount of conflict which can be expected both within the parking area and on the abutting streets. One primary concept which shall be followed is to reduce the number of connections to a practical minimum, thus providing fewer locations where conflicts may occur.

(b) The area to which the driveway provides access shall be of sufficient size to allow all necessary functions for loading, unloading, and parking maneuvers to be carried out on private property and completely off the street right-of-way.

(c) Driveways shall be constructed to conform to the existing paved street grade or grade approved by [the] city manager or his designee for nonpaved streets.

(d) Parking areas shall be so designed and marked as to provide for orderly and safe movement and storage of vehicles:

(1) Backout parking on a public street and/or highway shall not be permitted.

(2) The minimum distance from the street right-of-way line at any ingress or egress driveway to any interior service drive or parking space with direct access to such driveway shall be 20 feet.

(3) The minimum distance from the street right-of-way line on any major ingress or egress driveway to any interior service drive or parking space having direct access to such driveway shall be 100 feet (a major driveway is defined as the main ingress or egress point to a public street or highway from a site or a major development such as a shopping center, multiple-family development, industrial park, etc.).

(Code 1959, § 19-13.05)

Sec. 9.2. Materials.

Unless otherwise shown on the plans, concrete shall be class I, 3,000 p.s.i.

Sec. 9.3. Construction methods.

Excavation shall be made to the required depth and the subgrade or base shall be compacted.

The concrete shall be placed in the forms to the depth specified and tamped and spaded until mortar entirely covers its surface. The top of the curb or gutter shall be floated smooth and the edges rounded to the radius shown on the plans.

Sec. 9.4. Joints.

Joint sections may be formed by the use of dummy joints (either formed or sawed) or by the use of sheet metal templates. If sheet metal templates are used, they shall be of the dimensions and shall be set to the lines shown on the plans. The templates shall be held firmly during the placing of the concrete and shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place. Dummy joints shall be spaced at ten-foot intervals for curb and five-foot intervals for sidewalks/bikepaths.

The joints shall be one-fourth the depth of the concrete. Expansion joints shall be placed in sidewalks/bikepaths at a maximum of 20 feet, at driveways, sidewalk/bikepath intersections, etc. A half-inch expansion joint shall be installed between all curbs and any abutting structures.

Sec. 9.5. Finishing.

A) *Surface requirements.* The gutter or flow-line section or curb shall be tested with a ten-foot straight edge laid parallel to the centerline of the roadway, and while the concrete is still plastic. Irregularities in excess of one-fourth inch shall be immediately removed.

B) *Repair of minor defects.* The forms shall be removed within 24 hours after the concrete has been placed, and minor defects then filled with mortar composed of one part Portland cement and two parts fine aggregate. Plastering will not be permitted on the face of the curb, and any rejected curb, curb and gutter, or valley gutter shall be removed and replaced.

C) *Final finish.* The top of the curb, and the face from the top to eight inches below, shall be given a surface finish while the concrete is still green. In general, only a brush finish will be required.

Sec. 9.6. Curing.

All curbs shall be covered with suitable material and kept moist for a period of three days, or longer if necessary, and shall be protected in a satisfactory manner from damage until acceptance of the work. If curing compound is used, moistening is not required.

Sec. 9.7. Backfilling and compaction.

After the concrete has set sufficiently but not later than three days after pouring, the spaces in front and back of the curb shall be refilled to the required elevation with suitable material, which shall be placed and thoroughly compacted in layers not thicker than six inches.

Where bases are to be constructed adjacent to the curb, the concrete shall be properly backfilled and shall set for a period of not less than three days before any base material is placed against it.

Sec. 9.8. Requirements for machine-laying.

As a specific requirement for machine-laid curb and gutter, contraction joints shall be sawed unless an alternate method of construction is approved in advance. Joints on curbs shall be provided at intervals of ten feet, except where shorter intervals are required for closure, but no joints shall be sawed or constructed at intervals of less than five feet. Sidewalks may also be machine laid.

Sec. 9.9. Handicap ramps.

Ramps shall be required at all intersections and as prescribed by law. At each intersection, there must be a sufficient number of handicap ramps to facilitate ingress and egress from both sides of the roadway. The slope of the ramp shall not exceed a ratio of 12 horizontal to 1 vertical.

Sec. 9.10. Stormwater inlet structure.

Stormwater runoff inlet structure along the pavement edge shall be FDOT index 210, type 3 curb inlet.

Inlet structures with top grating are strictly prohibited due to frequent clogging and maintenance problems.

SECTION 10.

GRASSING AND MULCHING

Sec. 10.1. General.

The work specified in this section shall consist of all grassing efforts on road shoulders, embankments, and other areas left barren by construction in order to establish a dense stand of grass.

Sec. 10.2. Materials.

The grass seed shall be common Bermuda and Bahia, as a minimum. The mulch shall consist of thoroughly shredded straw or hay. All seed shall meet the requirements of the state department of agriculture and consumer services. The chemical composition of the fertilizer shall be 8-8-8 or other chemical composition specified in the plans.

Sec. 10.3. Construction methods.

Construction methods shall be in accordance with section 570 of the Florida D.O.T. standard specifications for road and bridge construction.

Seed will be applied at not less than the following rate:

Bermuda	30 pounds per acre
Bahia (Argentina)	120 pounds per acre

Fertilizer shall be applied at the rate of 1,000 pounds per acre.

Sec. 10.4. Sodding.

Sodding shall be in accordance with section 575 of the Florida D.O.T. standard specifications. Sod destroyed or damaged by construction will be replaced with the same existing type of grass in place.

Sec. 10.5. Cleanup.

All materials after each day's work shall be removed from all sidewalks and roadways used by the general public.

SECTION 11.

PAVEMENT MARKINGS

Sec. 11.1. General.

The work specified in this section shall consist of the design and installation of pavement markings as shown on the plans in accordance with these specifications and as approved by the city. Temporary markings shall be used as required by the city.

Sec. 11.2. Materials.

- A) *Paint.* All paint used for pavement markings shall conform to section 971.13 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B) *Thermoplastic compounds.* All thermoplastic compounds used for pavement markings shall conform to section 711-2 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. Only alkyd materials shall be used.
- C) *Reflective pavement markers.* All reflective pavement markers shall conform to section 706 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- D) *Glass spheres.* All glass spheres for reflective traffic paint shall conform to section 971-14 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

Sec. 11.3. Installation.

- A) *Surfaces.* All surfaces shall be cleaned prior to the start of installation.
- B) *Painted markings.* Painted traffic markings shall be installed in accordance with section 710 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction and the Manual on Uniform Traffic Control Devices (FHWA). Paint may be used only on private development improvements or as temporary markings.
- C) *Thermoplastic traffic markings.* Thermoplastic traffic markings shall be installed in accordance with section 711 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction and the Manual on Uniform Traffic Control Devices (FHWA). Alkyd materials may be applied immediately after final compaction of asphaltic concrete.
- D) *Reflective pavement markers.* All reflective pavement markers shall be installed in conformance with section 706 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

SECTION 12.

TRAFFIC SIGNS AND SIGNALS

Sec. 12.1. General.

The work specified in this section consists of the design and installation of traffic signs and signals as shown on the plans in accordance with these specifications and as approved by the city. All materials and installation shall be in accordance with the specifications of the Manual on Uniform Traffic Control Devices for

Streets and Highways.

Sec. 12.2. Materials.

A) *Sign panel.* Sign panels shall be aluminum or galvanized steel.

B) *Sign supports.* Roadside sign supports shall be aluminum for frangible supports and aluminum or galvanized steel for breakaway supports and overhead sign supports. All sign supports shall be installed in concrete footing.

C) *Painting.* Painting panels for nonreflectorized backgrounds shall be one spray coat of primer and two finish coats of baked enamel. Painting and sheathing for reflectorized signs shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways.

Sec. 12.3. Construction.

Stop signs for local streets shall be 30 inches and 36 inches for all others. All stop signs shall be placed on round, aluminum posts.

Road name signs shall be six inches high with a length of 24 inches minimum to 36 inches maximum.

All signs shall not be less than six feet from the edge of a paved shoulder, or, if none, 12 feet from the edge of the traveled way. A lesser clearance may be acceptable to the city if such measure is justifiable by the developer.

Signs shall be mounted approximately at right angles to the direction of, and facing the traffic that they are intended to serve. Signs shall be mounted a minimum height of seven feet, measured from the bottom of the sign and level with the roadway edge.

If, at any time prior to final acceptance, an unforeseen need becomes apparent for signing that was not shown on the approved plans, the city may require additional sign(s) in the interest of public safety and as a condition of city acceptance.

SECTION 13.

ILLUSTRATIONS AND DRAWINGS

The illustrative drawings that may be required in this section are on file with the city engineer.