

APPROVED  
BY ORANGE COUNTY BOARD  
OF COUNTY COMMISSIONERS  
SEP 23 2014 MAS/KH

# RESOLUTION

*of the*  
**ORANGE COUNTY BOARD OF COUNTY COMMISSIONERS**

*regarding*  
**AMENDING RESOLUTION NO. 2000-M-14, AS  
AMENDED BY RESOLUTION NO. 2010-M-21,  
RELATING TO ORANGE COUNTY ROAD  
CONSTRUCTION SPECIFICATIONS; AND  
PROVIDING AN EFFECTIVE DATE**

**Resolution No. 2014-M-59**

WHEREAS, on April 11, 2000, the Board of County Commissioners of Orange County ("Board"), in response to recommendations from the County Engineer and the Orange County Road Construction Advisory Board concerning specifications and standards for road and highway construction, adopted Orange County Road Construction Specifications pursuant to Resolution No. 2000-M-14;

WHEREAS, on April 6, 2010, the Board, in response to recommendations from the Director of the Orange County Public Works Department and the Orange County Public Works Advisory Board, adopted an amendment to the Orange County Road Construction Specifications pursuant to Resolution No. 2010-M-21;

WHEREAS, recycle concrete suppliers have been producing and developers and contractors have been utilizing reclaimed concrete aggregate base course materials in the pavements of private developments and roadways in other jurisdictions;

WHEREAS, the State of Florida Department of Transportation ("FDOT") has allowed the use and been utilizing reclaimed concrete aggregate base course materials since 2010;

**WHEREAS**, developers and contractors have requested to use reclaimed concrete aggregate base course materials in the pavements of roadways to be dedicated to the County as an option to soil cement or limerock base course materials;

**WHEREAS**, the local suppliers of reclaimed concrete aggregate base course material have requested a regional uniform specification to reduce the cost of and time to produce reclaimed concrete aggregate base course materials to different specifications from multiple jurisdictions;

**WHEREAS**, Articles 8 and 9 of the Orange County Road Construction Specifications deal with and address soil cement and limerock base course materials, respectively;

**WHEREAS**, the Orange County Public Works Department together with the Orange County Public Works Advisory Board, staff from City of Orlando, FDOT, local geotechnical consultants and local suppliers of reclaimed concrete aggregate base course material, have developed reclaimed concrete aggregate base course material specifications that meet Orange County's needs;

**WHEREAS**, the Orange County Public Works Advisory Board has reviewed and approved those reclaimed concrete aggregate base course material specifications for capital improvement and land development projects; and

**WHEREAS**, upon recommendation from the Director of the Orange County Public Works Department, the Board finds that it is now desirable, appropriate and necessary to adopt a new Article 9 of the Orange County Road Construction Specifications for the specifications of reclaimed concrete aggregate base course materials.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ORANGE COUNTY:**

*Section 1. Amendment of Resolution No. 2000-M-14, as Amended by Resolution No. 2010-M-21.* Resolution No. 2000-M-14, which adopted the Orange County Road Construction Specifications, as amended by Resolution 2010-M-21, is hereby amended by repealing Article 9 of those Orange County Road Construction Specifications, and by adopting in its place a new Article 9 with the specifications for reclaimed concrete aggregate base course materials, and revising the Table of Contents as necessary. A copy of the newly adopted Article 9 is attached hereto and incorporated herein as **Appendix "A."**

*Section 2. Effective date.* This Resolution shall take effect on the date of its adoption.

ADOPTED this \_\_\_ day of SEP 23 2014, 2014



ORANGE COUNTY, FLORIDA  
By: Board of County Commissioners

By: *[Signature]*  
Leresa Jacobs  
Orange County Mayor

ATTEST: Martha O. Haynie, County Comptroller  
As Clerk of the Board of County Commissioners

By: *[Signature]*  
Deputy Clerk  
Print Name: Katie Smith

## ARTICLE 9

### OPTIONAL BASE COURSES

#### 9.0 - GENERAL

Construct a roadway base course composed of limerock or graded crushed concrete aggregate properly produced and laid upon a prepared and accepted subbase in accordance with these specifications and in conformity with the lines, grades, thickness and cross sections shown on the approved plans. Other approved processed products may be considered as an equal to soil cement, limerock or graded crushed concrete aggregate.

#### 9.1 - LIMEROCK BASE

##### 9.1.01 - Description

The work specified in this section consists of the construction of a base course composed on limerock. 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. Where so shown on the plans, the base shall be constructed in two courses. Where the plans do not specify double course base, the base may be constructed in one or two courses.

##### 9.1.02 - Materials

The material shall conform with the requirements as specified in the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction ("Standard Specifications").

##### 9.1.03 - Equipment

This work may be performed with any machine, combination of machines or equipment that will produce the specified results.

##### 9.1.04 - Transporting Limerock

The limerock shall be transported to the point where it is to be used, over rock previously placed and dumped on the end of the preceding spread. In no case, shall rock be dumped directly on the subgrade.

##### 9.1.05 - Spreading Limerock

The limerock shall be spread uniformly. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.

For double course base, the rock shall be spread in two courses and the thickness of the first course shall be approximately one-half of the total thickness of the finished base, or enough additional rock to bear the weight of the construction equipment without disturbing the subgrade.

#### **9.1.06 – Compacting and Finishing**

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. No other finishing of this course is required.

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 sufficiently to penetrate slightly the surface of the first course.

Proper moisture condition shall be maintained uniformly throughout the material during the compaction operation. The material shall be compacted to a minimum density of ninety-five (95) percent of the maximum dry density obtainable under AASHTO T-180. Where the base is being constructed in one course and the specified thickness is more than six (6) 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 pime material. The materials planed from the base shall be removed from the base area.

If, at any time, the subgrade material should become mixed with 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.

#### **9.1.07 – Prime Curing**

When limerock has been finished as specified herein, it shall be protected by the application of a bituminous coating. The bituminous material shall be applied as soon as possible after the completion of finishing operations. Prime curing material shall be in accordance with Article 10 of these Specifications.

#### **9.1.08 – Testing Surface**

The finish surface of the base course shall be checked with a template cut to the required cross section and with a fifteen (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 additional rock, as may be required, after which the entire area shall be recompacted as specified here in.

#### **9.1.09 – Tests**

At least one of each of the following tests shall be made on every project by the Geotechnical Engineer:

- a. Modified (AASHTO T-180) Proctor Maximum Density Determination Tests
- b. Field In-place Density Tests
- c. Thickness

Tests for the subbase, LBR or FBV, thickness and compaction shall be spaced at a maximum of three hundred (300) feet apart and shall be staggered to the left, to the right, and on the centerline of the roadway. The County Engineer may direct additional tests when, in his opinion, conditions warrant additional testing to assure compliance with specifications. All tests shall be the responsibility of the owner/developer, and performed by a Geotechnical Engineer. A minimum of two (2) tests shall be required per street and/or cul-de-sac.

#### **9.1.10 – Deficiencies**

If a deficiency in the density occurs, the base shall be reworked and recompacted until the density tests (AASHTO T-180) conform to these specifications.

Any deficiency in thickness greater than 1/4 inch shall be completely reworked to conform to the original line and grade and specifications as shown on the original plans.

### **9.2 - GRADED CRUSHED CONCRETE AGGREGATE BASE**

#### **9.2.1 - Description**

Construct a roadway base course composed of graded crushed concrete aggregate properly produced and laid upon a prepared and accepted subbase in accordance with these specifications and in conformity with the lines, grades, thickness and cross sections shown on the approved plans.

#### **9.2.2 - Material**

Graded crushed concrete aggregate hereinafter will be referred to as "reclaimed concrete aggregate". Use only Orange County approved aggregate material of uniform quality throughout that is free of deleterious materials, such as wood, roots or other organic matter, trash, shale, bricks, clay, metal, plastic and hazardous materials.

The County Engineer will have the right to disapprove any material or process that does not conform to these specifications.

At least 30 days prior to the start the installation of the reclaimed concrete aggregate base, the material source provider shall submit to the County Engineer, for review and approval, a mix design of the reclaimed concrete aggregate base material to be used on the project that is certified by a qualified Professional Engineer registered in the State of Florida.

All reclaimed concrete aggregate base material mix designs shall be pre-approved by the County Engineer within the last six (6) months or as directed by the County Engineer.

**9.2.2.1 Approved Sources:** Use reclaimed concrete aggregate base material that meets all of the requirements of these Specifications after crushing and processing, that was either produced from a source approved by the Florida Department of Transportation (FDOT) under Rule 14-103, Florida Administrative Code (FAC) or produced by a source approved by the County Engineer. The reclaimed concrete aggregate base material shall consist of crushed concrete material derived from the crushing of hard Portland cement concrete. The reclaimed concrete aggregate base material shall be produced by an Orange County approved source meeting all the requirements of these Specifications.

Approved sources are those that maintain an effective quality control program and have provided the County with independent test results and a certification that the material they produce meets all of the requirements of these specifications. The Contractor shall only use aggregate from one supplier on a specific project, unless approved by the County Engineer in writing and the material has been properly tested for compliance with these specifications.

**9.2.2.1.1 Reclaimed Concrete Aggregate Process Control Plan:** Suppliers that do not have FDOT approval for the reclaimed concrete aggregate materials shall submit a process control plan, herein referred to as the “Plan”, the County Engineer for review and acceptance. The Plan shall consist of the following:

- 1) Proposed locations and methods for constructing, sampling and testing of the stock piles.
- 2) Proposed measures to prevent contamination and segregation of the stock piles.
- 3) Method for sampling, testing and reporting test results. Include the frequency of testing for initial acceptance and quality control of each production stockpile:
  - a) Gradation, LBR and deleterious materials.
  - b) Asbestos, lead, and
  - c) Any additional testing required by the County Engineer.
- 4) Collect and test a minimum of three (3) samples from each new material stockpile of 1000 cubic yards or less.
- 5) Collect and test a minimum of one (1) sample per 1000 cubic yards or other quantity approved by the County Engineer from the approved production stockpiled material.

**9.2.2.1.2 Certification by the Reclaimed Concrete Aggregate Supplier:** Submit a Notarized Certification of Specification Compliance letter by an officer of the company who is in responsible charge of reclaimed concrete crushing operations. The letter shall be submitted on company letterhead to the Engineer and shall state that all material produced and placed on the project was in substantial compliance with the Specifications.

The reclaimed concrete aggregate base material source provider shall provide the following mix design certification:

“This is to certify that the graded reclaimed concrete aggregate base material for the \_\_\_\_\_ Road, extending from station \_\_\_\_\_ to station \_\_\_\_\_ meets the requirements of the Orange County for reclaimed concrete aggregate base materials, is asbestos free and substantially free from lead, heavy metals and other deleterious materials which are not classified as solid waste or hazardous materials.”

Or

“This is to certify that the graded reclaimed concrete aggregate base material for the roadways in the \_\_\_\_\_ subdivision meets the requirements of the Orange County for reclaimed concrete aggregate base materials, is asbestos free and substantially free from lead, heavy metals and other deleterious materials which are not classified as solid waste or hazardous materials.”

**9.2.2.2 Gradation:** Reclaimed concrete aggregate base material shall meet the following gradation:

Sieve Size	Percent by Weight Passing
2 inch [50 mm]	100
1- 1/2 inch [38 mm]	90 to 100
3/4 inch [19 mm]	65 to 90
3/8 inch [9.5 mm]	40 to 80
No. 4 [4.75 mm]	30 to 65
No. 10 [2.00 mm]	20 to 50
No. 50 [300 μm]	5 to 30
No. 200 [75 μm]	0 to 10

**9.2.2.3 Plasticity:** Reclaimed concrete aggregate base shall not contain plastic soils such that the minus 0.425 mm (No. 40) sieve material shall be non-plastic.

**9.2.2.4 Limerock Bearing Ratio:** The aggregate base material shall have a minimum limerock bearing ratio (LBR) of **160**.



**9.2.2.5 Deleterious Substances:** Reclaimed concrete aggregate base shall be free of all materials that fall under the category of solid waste or hazardous materials as defined by the state and local jurisdiction. Reclaimed concrete aggregate base shall meet all Florida Department of Environmental Protection permit requirements which pertain to construction, demolition and recycling of these materials. Reclaimed concrete aggregate base shall be substantially free from other deleterious materials which are not classified as solid waste or hazardous materials. Reclaimed concrete aggregate base shall be asbestos free. The following limits shall not be exceeded unless otherwise specifically approved in writing by the County Engineer:

Bituminous Concrete .....	1% by weight
Bricks .....	1% by weight
Wood and other organic substances .....	0.1% by weight
Heavy Metals (except Lead) .....	0.1% by weight
Lead .....	5 parts per million (ppm)
Reinforcing Steel and Welded Wire Fabric .....	0.1% by weight
Plaster and gypsum board .....	0.1% by weight

**9.2.3 Transporting Aggregate**

Transport the aggregate to its point of use, over previously placed base, if practicable, and dump it on the end of the preceding spread. Hauling and dumping on the subgrade will be permitted only when, in the Engineer's opinion, these operations will not be detrimental to the subgrade.

**9.2.4 Aggregate Spreading Equipment**

Use a mechanical spreader, equipped with a device that strikes off the aggregate uniformly to the proper laying thickness, capable of producing even distribution. For crossovers, intersections, ramp areas, narrow crowned roadways or any other areas where the use of a mechanical spreader is not practicable, the Contractor may spread the rock using a bulldozer or blade grader.

**9.2.5 Spreading Aggregate**

Spread the aggregate uniformly. Remove all segregated areas of fine or coarse aggregate and replace with properly graded aggregate or mix in place to achieve an even distribution of sizes.

When the specified compacted thickness of the base is greater than 6 inches, construct the base in multiple courses of equal thickness. Individual courses shall not be less than 3 inches. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.

If the Contractor can demonstrate that the compaction equipment can achieve the required density (at least 98% of maximum density per AASHTO T-180 modified) for the full depth of a thicker lift and, if approved by the Engineer, the base may be constructed in successive courses of up to 8 inches compacted thickness.

The Engineer's approval will be based on results of a test section constructed using the Contractor's proposed compactive effort. Approval requires the compactive effort pass a minimum of five density tests with no failing tests. Construct a full width test section of at least 300 feet in length. At each test site, the bottom 6 inches must be tested and pass. Remove the material above the bottom 6 inches at no expense to the County. *The minimum density required for the thicker lift shall be the average of the five results obtained on the thick lift in the passing test section. Maintain the exposed surface as close to undisturbed as possible; no further compaction will be permitted during the test preparation.* If unable to achieve the required density, remove and replace or repair the test section to comply with the specifications at no additional expense to the County.

Once approved, a change in the source of base material will require the construction of a new test section. The compactive effort will not be allowed to change once the test section is approved. The Engineer will periodically verify the density of the bottom 6 inches during thick lift operations.

The County may terminate the use of thick lift construction and have Contractor revert to the 6 inch maximum lift thickness, if satisfactory results are not being achieved.

#### **9.2.6 Compacting and Finishing Aggregate Base Material**

**9.2.6.1 Single Course Base:** After spreading, shape the base material to produce the required thickness, grade and cross-section after compaction.

**9.2.6.2 Multiple Course Base:** Clean the first course of foreign material, then blade and bring it to a surface cross-section approximately parallel to the finished base and scarify the base prior to spreading more material. Before scarifying and spreading any material for the upper courses, allow the Engineer to make density tests for the lower courses in order to determine that the required compaction has been obtained. After spreading the material for the top course, shape its surface to produce the required overall thickness, grade and cross-section that is free of scabs and laminations after compaction.

**9.2.6.3 Moisture Content:** When the material does not have the proper moisture content to ensure the required density, wet or dry it as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate the entire width and depth of the course that is being compacted.

**9.2.6.4 Density Requirements:** After attaining the proper moisture conditions, uniformly compact the material to a density of not less than **98%** of the maximum density as determined by AASHTO T-180 modified.

The Engineer will perform at least three density tests on each day's final compaction operations on each course, and at more frequent intervals, if deemed necessary. During final compaction operations, blade and proof roll any areas necessary to obtain the proper grade and cross-section before requesting the Engineer to order the density tests on the finished base.

### **9.2.6.5 Correction of Defects:**

**9.2.6.5.1 Contamination of Base Material:** If, at any time, the subgrade material becomes mixed with the base course material, dig out and remove the mixture, and reshape and compact the subgrade. Then replace the materials removed with clean base material, and shape and compact as specified above. Perform this corrective work at no expense to the County.

**9.2.6.5.2 Cracks and Checks:** If cracks or checks appear in the base, either before or after priming, which in the opinion of the Engineer, would impair the structural value of the base, remove the cracks or checks by scarifying, reshaping, adding base material where necessary, and recompacting.

**9.2.6.6 Compaction of Widening Strips:** Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compact the base using vibratory compactors, trench rollers or other special equipment which will achieve the density requirements specified herein. When multiple course base construction is required, compact each course prior to spreading material for the overlaying course.

**9.2.6.7 Dust Abatement:** Minimize the dispersion of dust from the base material during construction and maintenance operations by applying water or other dust control materials.

### **9.2.7 Finished Surface Testing**

Check the finished surface of the base course with a template cut to the required crown and with a 15-foot straightedge laid parallel to the centerline of the road. Correct all irregularities greater than 1/4 inch to the satisfaction of the Engineer by scarifying and removing or adding rock as required, and recompact the entire area as specified hereinbefore.

Tests for the subbase, base, LBR or FBV, thickness and compaction shall be spaced at a maximum of three hundred (300) feet apart and shall be staggered to the left, to the right and on the centerline of the roadway. The County Engineer may direct additional tests when, in his/her opinion, conditions warrant additional testing to assure compliance with specifications. A minimum of two tests will be required for per street and/or cul-de-sac.

### **9.2.8 Priming and Maintaining**

**9.2.8.1 Priming:** Apply the prime coat only when the base meets the specified density requirements and when the moisture content in the top half of the base does not exceed the optimum moisture content for the base material. At the time of priming, ensure that the base is firm, unyielding and in such condition that no distortion will occur from the priming operation.

**9.2.8.2 Maintaining:** Maintain the true crown and grade, with no rutting or other distortion, while applying the asphalt or brick surface course.

### **9.2.9 Thickness Requirements**

Meet or exceed the thickness requirements shown on the drawings. Additional thickness shall be allowed without additional payment, as long as the finished pavement elevation is obtained without compromising the required asphalt thickness.

The Engineer shall select the coring locations and make the acceptance measurements. Contractor's representative shall be present during the entire coring operation for acceptance purposes. The Engineer shall measure the thickness of the base through holes, at least 6 inches in diameter, bored at random points on the cross-section and along the roadway. The Engineer will locate each hole to represent a section of roadway no longer than 300 feet in length.

### **9.2.10 Correction of Deficient Areas**

Correct all areas of the completed base having a deficiency in thickness in excess of 1/4 inch by scarifying and adding additional base material. As an exception, if authorized by the Engineer, such areas may be left in place without correction and with a significant credit or reduction of payment.