

SECTION 911

~~LIMEROCK MATERIAL FOR~~ BASE AND STABILIZED BASE *MATERIALS*

911-1 ~~General~~*Description.*

This Section governs materials to be used ~~in the~~ construction of ~~limerock~~ base and ~~limerock~~ subgrade stabilized ~~base~~ *including limerock, shell, shell-rock, cemented coquina shell, and recycled concrete aggregate (RCA).*

911-2 ~~Furnishing of~~ Materials.

~~Except as might be specifically shown otherwise, all limerock material and the sources thereof shall be furnished by the Contractor. Approval of mineral aggregate sources shall be in accordance with 6-2.3. Any limerock material occurring in State furnished borrow areas shall not be used by the Contractor in constructing the base, unless permitted by the Plans or other Contract Documents.~~

911-2.1 General:

911-2.1.1 Approval of Material: Approval of mineral aggregate sources shall be in accordance with 6-2.3.

911-2.1.2 Deleterious Substances: Materials shall not contain deleterious substances that would result in: prevention of the bituminous prime coat from adhering to the base course; a detriment to the finishing, strength, or performance of the base; or a surface which is susceptible to distortion under construction traffic. Such substances include, but are not limited to: cherty or other extremely hard pieces, lumps, balls or pockets of sand or clay size material, organic matter, loose sand, loose, free shells, corals or skeletal remain of other marine invertebrates retained on the No. 4 sieve, or water sensitive clay minerals.

911-2.3 Limerock Composition: Limerock material shall consist of unconsolidated or partly consolidated limestone of marine origin.

911-2.4 Shell Material: Composition: Shell materials shall consist of naturally occurring deposits formed essentially of broken mollusk shell, corals and the skeletal remains of other marine invertebrates. Live or steamed shell, or man-made deposits as a by-product of the shellfish industry will not be permitted.

911-2.4.1 Bank Run Shell: Shell materials meeting the requirements of this Section which are presently found as “dry land” deposits.

911-2.4.2 Dredged Shell: Shell materials meeting the requirements of this Section which are dredged from ocean, bay or lake deposits.

911-2.5 Shell-Rock Material Composition: Shell-rock materials shall consist of naturally occurring heterogeneous deposits of limestone with interbedded layers or lenses of loose and cemented shell, to include cemented sands (calcitic sandstone). This material shall be mined and processed in a manner that will result in a reasonably homogenous finished product.

911-2.6 Cemented Coquina Shell Material Composition: Cemented coquina shell materials to be used as cemented coquina base or stabilized base, shall be defined as naturally occurring deposits formed essentially of broken mollusk shell, corals and the skeletal remains of other marine invertebrates, which are presently found as “dry land” deposits and which have been cemented together by carbonates or other natural cementing agents.

911-2.7 Recycled Concrete Aggregate (RCA) Composition: RCA shall consist of concrete material derived from the crushing of hard portland cement concrete. In addition to the

deleterious materials noted in 911-2.2, RCA shall be asbestos free. The following limits shall not be exceeded:

*Bituminous Concrete.....1% by weight
Bricks1% by weight
Glass and Ceramics1% by weight
Wood and other organic substances0.1% by weight
Reinforcing steel and welded wire fabric0.1% by weight
Plaster and gypsum board0.1% by weight*

911-3 Composition Material Requirements.

*The minimum of carbonates of calcium and magnesium in the limerock material shall be 70%. The maximum percentage of water sensitive clay mineral shall be 3%. Determination shall be at the option of the Engineer. **911-3.1 Limerock Bearing Ratio (LBR):** Materials shall meet the requirements in Table 911-1 in accordance with FM 5-515:*

| <i>Table 911-1 Limerock Bearing Ratio (LBR)</i> | |
|---|--|
| <i>Material</i> | <i>Requirement</i> |
| <i>Limerock</i> | <i>Average Results per LOT - 100, minimum Individual Results - 90, minimum</i> |
| <i>Shell</i> | |
| <i>Shell-Rock</i> | |
| <i>Cemented Coquina Shell</i> | |
| <i>RCA</i> | <i>Average Results per LOT - 150, minimum</i> |

***911-3.2 Liquid Limit and Plasticity:** Materials shall meet the requirements in Table 911-2 in accordance with AASHTO T89 and AASHTO T90:*

| Table 911-2 | | | |
|-------------------------------------|-----------------|------------------|-----------------------------|
| Liquid Limit and Plastic Properties | | | |
| Material | | Liquid Limit | Plastic Properties |
| Limerock | Base | Not to exceed 35 | Non-Plastic (NP) |
| | Stabilized Base | | Plasticity not to exceed 10 |
| Shell | | - | NP |
| Shell-Rock | | | |
| Cemented Coquina Shell | | - | NP |
| RCA | | - | NP |

***911-3.3 Carbonates:** Materials shall meet the carbonate requirements in Table 911-3 in accordance with FM 5-514:*

| <i>Table 911-3 Percentage of Carbonates (Calcium and Magnesium)</i> | |
|---|----------------------|
| <i>Material</i> | <i>Requirement</i> |
| <i>Limerock</i> | <i>minimum - 70%</i> |
| <i>Shell</i> | <i>minimum - 50%</i> |

| | |
|-------------------------------|-----------------------|
| <i>Shell-Rock</i> | <i>minimum - 50%</i> |
| <i>Cemented Coquina Shell</i> | <i>minimum - 50%</i> |
| <i>RCA</i> | <i>Not Applicable</i> |

911-3.4 Gradation and Size Requirements: *Materials shall meet the gradation and size requirements in Table 911-4 in accordance with FM 1-T27 and FM 1-T11:*

| Table 911-4 ⁽¹⁾ Gradation Requirements | | |
|--|---------------------------|---|
| Material | | Requirement |
| Limerock | Base | At least 97% shall pass a 3-1/2 inch sieve ⁽²⁾ |
| | Stabilized Base | At least 97% shall pass a 1-1/2 inch sieve ⁽²⁾ |
| Shell | Dredged shell | Passing 3-1/2 inch sieve - 97% Passing No. 4 sieve - 50%, maximum Passing No. 200 sieve - maximum 7.5% (washed) |
| | Bank-run shell | Passing 3-1/2 inch sieve - 97% Passing No. 4 sieve - 80%, maximum Passing No. 200 sieve - 20%, maximum (washed) |
| Shell-Rock | | Passing 3-1/2 inch sieve - 97%, minimum Passing No. 4 sieve - 70%, maximum |
| Cemented Coquina Shell | | Passing No. 200 sieve - 20%, maximum (washed) |
| RCA | Sieve Size | |
| | Percent by Weight Passing | |
| | 2 inch | |
| | 100 | |
| | 3/4 inch | |
| | 65 to 95 | |
| | 3/8 inch | |
| | 40 to 85 | |
| No. 4 | | |
| 25 to 65 | | |
| No. 10 | | |
| 20 to 50 | | |
| No. 50 | | |
| 5 to 30 | | |
| No. 200 | | |
| 0 to 10 | | |

(1) The maximum dimension shall not exceed six inches.

(2) The material shall be well graded down to dust. The fine material shall consist entirely of dust of fracture.

911-4 ~~Liquid Limit and Plasticity Requirements~~ *Exceptions, Additions, and Restrictions.*

911-4.1 ~~Material for Limerock Base:~~ *The liquid limit shall not exceed 35 and the material shall be non-plastic.*

911-4.2 ~~Material Used in Limerock Stabilized Base:~~ *The liquid limit shall not exceed 35 and the plastic index shall not exceed 10. **Approved materials shall not be mixed with other approved or non-approved materials.***

911-5 Mechanical Requirements.

911-5.1 ~~Deleterious Material:~~ *Limerock material shall not contain cherty or other extremely hard pieces, or lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to the proper bonding, finishing, or strength of the limerock base.*

911-5.2 ~~Gradation and Size Requirements:~~

~~————— **911-5.2.1 For Limerock Base:** At least 97% (by weight) of the material shall pass a 3 1/2 inch sieve and the material shall be graded uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.~~

~~————— **911-5.2.2 For Limerock Stabilized Base:** For this use, the limerock material shall meet the requirements of 911-5.2.1 except that 97% shall pass the 1 1/2 inch sieve.~~

911-6 Limerock Bearing Ratio Requirements.

~~————— Limerock material used in construction of limerock base shall have an average LBR value of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.~~