

VIRGINIA DEPARTMENT OF TRANSPORTATION

# LOCATION AND DESIGN DIVISION

## INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: RIPRAP	NUMBER: IIM-LD-73.4
SPECIFIC SUBJECT: STONE DIMENSIONS SOIL SURVEY CONSTRUCTION PROCEDURE	DATE: DECEMBER 1, 2005
	SUPERSEDES: IIM-LD-73.3
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, P.E. State L&D Engineer Approved: December 1, 2005	

Changes are shaded.

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### CURRENT REVISION

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- Updated for current Division Administrator Approval.
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### EFFECTIVE DATE

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- This memorandum will be effective on projects scheduled for the March 1991 advertisement and all subsequent projects.
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### POLICY

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- The Road and Bridge Specifications allows Riprap that is primarily placed by the dumped method to be measured by Square Yards or Tons.
  - Unless otherwise requested by the District Administrator at field inspection, the measurement should be in Tons to comply with the suppliers method of measurement and expedite final measurement for payment by field personnel.

## DIMENSIONS AND WEIGHTS

- The following table may be used as a guide for State personnel to correspond certain rock dimensions to equivalent weights. This table is not to be used for acceptance or rejection of Riprap material

APPROXIMATE ROCK DIMENSIONS AND EQUIVALENT WEIGHTS			
WEIGHT	MEAN SPHERICAL DIAMETER	RECTANGULAR SHAPE	
		LENGTH	HT./WIDTH
25 lbs.	0.7'	1.1'	0.4'
50 lbs.	0.8'	1.4'	0.5'
75 lbs.	1.0'	1.6'	0.5'
100 lbs.	1.1'	1.75'	0.6'
150 lbs.	1.3'	2.0'	0.67'
300 lbs.	1.6'	2.6'	0.9'
500 lbs.	1.9'	3.0'	1.0'
1000 lbs.	2.2'	3.7'	1.25'
1500 lbs	2.6'	4.7'	1.5'
2000 lbs.	2.75'	5.4'	1.8'
2 tons	3.6'	6.0'	2.0'
3 tons	4.0'	6.9'	2.3'
4 tons	4.5'	7.6'	2.5'
10 tons	6.1'	10.0'	3.3'

APPROXIMATE PERCENT OF VOIDS	
%	MATERIAL
25	DRY RIPRAP CL.AI
25	DRY RIPRAP CL.I
25	DRY RIPRAP CL.II
25	DRY RIPRAP CL.III
25	DUMPED RIPRAP TY.I
25	DUMPED RIPRAP TY.II
25	EROSION CONTROL STONE
25	GROUTED RIPRAP
25	STONE RIPRAP (CLASSIFICATION SHOWN ON PLANS)

## PROCEDURES

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- A soil survey is to be conducted through areas where a channel change is proposed and through embankment areas where riprap may be required. The plans or profile rolls for the regular soil survey will show the location of channel changes and the location where Riprap will be required on the fill section.
  - Borings along the proposed channel change are to be taken at sufficient intervals to determine the type of material encountered along the slopes and in the bottom of the channel.
  - The borings made in the cut sections or in the borrow pits for construction of the fills are adequate to determine the type of material used in the fills. The test results on the material used in embankments or along channel changes where Riprap is required should include the Plastic and Liquid Limits of the minus No. 40 sieve and the grading or particle size of the total sample. This information should be submitted in the regular soil survey report.
  - The Project Inspector will visually examine the slope upon which the plans designate Riprap to be placed. If the slope material appears coarser than the bedding aggregate specified, the Project Inspector is to notify the District Material Engineer, through normal channels, for a more detailed investigation to determine the actual need for the bedding. If the slope is comprised of solid rock or closely consolidated boulders with soundness, size and weight equal to or exceeding the specifications, for the proposed Riprap, then the riprap may be deleted by the District Construction Engineer.
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## PLANS

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- The designer shall specify on the plans the type of Riprap and the dimensions (length, width and depth) for placement. The quantity shall be computed using two (2) tons per cubic yard (148 lbs. per cu. ft.) for plan estimating purposes, unless otherwise specified by the District Administrator.
- The quantities will be field adjusted, utilizing the supplier's stone weight and the applicable Percent (%) of Voids for the Type or Class of material used, to obtain the actual quantity.

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## GENERAL NOTE

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- The applicable portion of the following general note is to be copied on the plans when riprap is specified. (See IIM-LD-110, Drainage Notes D-11 & D-12)

The proposed riprap may be omitted by the Engineer if the slope upon which the plans designate riprap to be placed is found to meet the following criteria: The slope designated for placement of riprap is comprised of solid rock or closely consolidated boulders with soundness, size and weight equal to or exceed the specifications for the proposed riprap. If the slope is found to be comprised of material, which is coarser than the bedding aggregate filter blanket specified on the plans, the aggregate filter blanket may be deleted by the Engineer.

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## PAY ITEMS

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- The Road and Bridge Specifications allow Erosion Control Stone to be measured by the Square Yard or Ton and to include Bedding for Riprap and Riprap Filter Cloth in the price bid for Riprap.

<u>ITEM CODE</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
09150	Erosion Control Stone Class I, Standard EC-1	Ton
09151	Erosion Control Stone Class I, Standard EC-1	Square Yards
09152	Erosion Control Stone Class II, Standard EC-1	Ton
09153	Erosion Control Stone Class II, Standard EC-1	Square Yards