PLAN PREPARATION GUIDE

CHAPTER 3

QUANTITY COMPUTATIONS AND INFORMATION

1. General Quantities

This chapter covers quantity computations and general quantity information that is not covered in the Highway Design Manual or that needs clarification. Quantities are covered in Section 3, Chapter 19 of the Design Manual.

2. Maintenance of Roadway and Drives During Construction

When material is needed to maintain traffic on the roadway or on driveways during construction the bid item "Maintenance Stone" given in tons will be used. The selection of a specific aggregate for maintenance stone will not be made by the Department. The Pay Item shall be 3069900 Maintenance Stone ------Ton

3. Liquid Asphalt Binder in Paving Mixture

A Quantity for Liquid Asphalt Binder shall be included for asphalt paving mixtures. Below are the values recommended computing quantities:

Type Asphalt Mix	Recommended % AC
1C Surface Cr.	5.3%
1B Surface Cr.	5.0%
1 Surface Cr.	6.2%
Type 3 Surface Cr.	6.0%
4 & 5 Surface Cr.	6.3%
Type 1 Binder Cr.	5.0%
Type 2 Binder Cr.	5.1%
Type 1 Asph. Agg. Base Cr.	4.2%
Type 2 Asph. Agg. Base Cr.	4.3%
Surface for Shoulders	6.0%
Superpave Surface Course	5.1%
Superpave Intermediate Course	4.3%

Example of Calculation:

1273 Tons of ACSC (Type 1) x 6.2% = 79 Tons Liquid Asphalt Binder

The Pay Item Shall Be:

4011004	Liquid Asphalt Binder PG 64-22 -------- Ton
4011008	Liquid Asphalt Binder PG 76-22 -------- Ton
4011010	Liquid Asphalt Binder PG 82-22 -------- Ton

"Liquid Asphalt Binder PG 64-22" will be used in all cases unless otherwise instructed.

4. Sand-Clay Base Course

The contractor shall be required to furnish all materials and incidentals required to construct Sand-Clay Base Course. No Type is to be specified.

The Pay Item Shall Be:

3031006	Sand Clay Base Course - 6" Uniform _____ S.Y.
3031008	Sand Clay Base Course - 8" Uniform _____ S.Y.
3031010	Sand Clay Base Course - 10" Uniform _____ S.Y.
3031012	Sand Clay Base Course - 12" Uniform _____ S.Y.

Example of Calculation:

Sta. 0+11.0 To Sta. 29+04.0 = 2893' x width (29') ÷9 = 9322 S.Y.
Inclusions For Dives 100 S.Y.
Total 9422 S.Y.

5. Graded Aggregate Base Courses

Graded Aggregate Base Course. When the Field Review recommends Graded Aggregate Base Course, the Contract shall not include alternate except for the following counties; Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro and Williamsburg. Coquina Shell Base will be used as an alternate in these counties.

Earthwork quantities in the plans are for Graded Aggregate Base Course. If Coquina Base is selected, the grades will be adjusted in the field to compensate for the difference in base thickness, and quantities for "Unclassified Excavation" and "Borrow Excavation" will be adjusted prior to final payment. See note to be placed on General Construction Note Sheet in Chapter 2, Page 4, concerning Coquina Shell Base.

Example of Calculation:

Sta. 0+13.0 To Sta. 55+52.0 = 5539'
5539 (Length) x 23 (Width) ÷ 9 = 14,155 SY
Inclusions For Drives = 750 SY
Total = 14,905 SY

6. Hot Mix Asphalt Base Course

The rate of application for Asphalt Aggregate Base Course shall be given on the Field Review or Pavement Design.

Sta. 0+13.0 To Sta. 55+52.0 = 5539'
5539' (Length) x 23 (Width of base) ÷ 9 = 14,155 SY
14,155 SY x 800 (Lb. per SY) ÷ 2000 = 5662 Tons

The Pay Item Shall Be:
Hot Mix Asphalt Aggregate Base Course (Type ____) _____ Ton

7. Hot Mix Asphalt Binder Course

The rate of application for Binder Course shall be given on the Field Review or pavement design.

Example of Calculations:

Sta. 0+13.0 To Sta. 55+52.0	=	5539'
5539' (Length) x 22' (Width of binder) ÷ 9	=	13,540 SY
13,540 SY x 225 (Lb. per SY) ÷ 2000	=	1,523 Tons
Binder Course For Build –Up	=	50 Tons
Additional Quantity To Cover Overruns 5%	=	79 Tons
Total		1652 Tons

The Pay Item Shall Be:

Hot Mix Asphalt Concrete Binder Course (Type _____) _____ Ton

8. Hot Mix Asphalt Surface Course

The rate of application for surface course shall be given on the Field Review or Pavement Design.

Example of Calculation:

Sta. 0+13.0 To Sta. 55+52.0	=	5539’
5539’ (length) x 22 (Width of Surface) ÷ 9	=	13,540 SY
13,540 SY x 175 (Lb. Per SY) ÷ 2000	=	1,185 Tons
Inclusions For Drives	=	66 Tons
Additional Quantity to Cover Overruns 2%	=	25 Tons
Total	=	1,276 Tons

The pay item shall be:
Hot Mix Asphalt Concrete Surface Course (Type ___) _____ Tons

9. Bituminous Surfacing

The type of Bituminous Surfacing for surface course shall be given on the Field Review or pavement Design.

Example of Calculation:

Sta. 0+11.0 To Sta. 29+04.0	=	2893’
2893’ (Length) x 28’ (Width of Surfacing) ÷ 9	=	9000 SY
inclusions For Drives	=	500 SY
Total	=	9500 SY

The pay item shall be:

Bituminous Surfacing (____ Treatment) Type ___ ____ S.Y.

10. Prime Coat

Prime coat will be required when using Graded Aggregate Base course or sand clay base course. The rate will be 0.27 gallon per square yard.

Example of Calculations
1000 S.Y. x 0.27 GAL = 270 gallons

The pay item shall be:
4010005 Prime Coat _____ GAL.

11. Riprap at Bridge Ends

Example of Calculations:

A= 529.81 + 2.0 = 531.81
B= 516. 0 - 2.0 = 514.0
C= 545.0
D= 2:1 Slope = 2

$A= (531.81 – 514.0)^2 + (531.81 – 514.0 \times 2)^2 = (17.81)^2 + (35.62)^2 =$
$317.20 + 1268.78 = 1585.98 = 39.824$

$R= \frac{[\ (531.81 – 514.0)}{2} + (545.0 – 531.81)\ ] =$
$(8.91 + 13.19) = 22.1 \times 2 = 44.2$

$\times=2\ \frac{(3.14)\ (44.2)}{4} = \frac{(6.28)\ (44.2) = 69.39}{4}$

Area Of RIPRAP = [2 (30) + 2(69.39) + 41] 39.824 =

$(60 + 138.78 + 41)\ 39.824 = 239.78 \times 39.824 =$

$\frac{9549\ S.F. \times 1}{27} = 353.7\ C.Y.$

$\frac{353.7 \times 3400}{2000} = 601\ TONS$

601×2 (No. of Approaches) * = 1202 TONS

* When both approaches are of equal height. When approaches are a different height each approach is to be figured separately.

The pay item shall be:

8041020 Hand Placed Riprap _____ TONS

Pay Items to be Used for Rip-Rap in Accordance with the Rip-Rap Classifications Found in Section 804 of the 2000 Edition of the "Standard Specifications for Highway Construction".

Pay Item No.	Description	Unit
8041010	RIP-RAP (CLASS A)	TON
8041015	RIP-RAP (CLASS A)	CY
8041020	RIP-RAP (CLASS B)	TON
8041025	RIP-RAP (CLASS B)	CY
8041030	RIP-RAP (CLASS C)	TON
8041035	RIP-RAP (CLASS C)	CY
8041040	RIP-RAP (CLASS D)	TON
8041045	RIP-RAP (CLASS D)	CY
8041050	RIP-RAP (CLASS E)	TON
8041055	RIP-RAP (CLASS E)	CY
8041060	RIP-RAP (CLASS F)	TON
8041065	RIP-RAP (CLASS F)	CY

The following criteria should be used to determine which Class of Rip-Rap should be used:

Criteria	New Pay Item Number to use
Hand Placed Rip-Rap is computed by Design Group	8041020 or 8041025
Dumped Rip-Rap is computed by Design Group	8041030 or 8041035
Rip-Rap is provided by another source	As specified by other source
Hand placed Rip-Rap is currently shown on plans	Change to 8041020 or 8041025
Foundation Rip-Rap is currently shown on plans	As specified by other source
Dumped Rip-Rap is currently shown on plans	Change to 8041030 or 8041035

All notes in the plans pertaining to rip-rap should be revised accordingly. An example is shown below:

Old Note:

"PLACE 20 TONS OF HAND PLACED RIP-RAP"

New Note:

"PLACE 20 TONS OF RIP-RAP (CLASS B)"

12. Geotextile For Erosion Control Under RipRap

Geotextile for erosion control is to be used under all Riprap. The Class should be determined by the project engineer or Hydraulics Engineer, but in most cases will be class 2. The type is to be determined by the map shown on page 3-14 . Type D is a site specific type in both class of geotextile and will be used only in critical / severe applications. More site specific information will be given in the special provisions of the proposal when type D is specified and needs to be brought to the specifications & estimates manager attention. The AOS and permittivity must be obtained either from pavement design or LAB. The Pay Item shall be:

ITEM NO. DESCRIPTION UNIT

8048100 Geotextile for Erosion Control Under Riprap (Class1) m2 (SY)

8048105 Geotextile for Erosion Control Under Riprap (Class 1) m2 (SY)

8048110 Geotextile for Erosion Control Under Riprap (Class 1) m2 (SY)

8048115 Geotextile for Erosion Control Under Riprap (Class 1) m2 (SY)

8048200 Geotextile for Erosion Control Under Riprap (Class 2) m2 (SY)

8048205 Geotextile for Erosion Control Under Riprap (Class 2) m2 (SY)

8048210 Geotextile for Erosion Control Under Riprap (Class 2) m2 (SY)

8048215 Geotextile for Erosion Control Under Riprap (Class 2) m2 (SY)

13. Borrow Excavation

When a project has 25 CY or less of borrow it will be classified as "Unclassified Excavation". When there is 26 CY or more of borrow the item of "Borrow Excavation" will be used. Computation of borrow excavation will be 200 CY per mile for secondary roads and 400 CY per mile for primary roads on resurfacing projects.

The Borrow Excavation Supplemental Specification requires the top 8” of subgrade to be modified with Portland cement at a specified rate in select counties of the state.

Counties		**Percentage of Portland cement to be used to modify the top eight inches of the subgrade.**
•Abbeville	•Fairfield	5%
•Chester	•Saluda	
•Edgefield	•Union	
•Greenville	•Newberry	6%
•Laurens	•Oconee	
•McCormick	•Pickens	
•Anderson	•Lancaster	7%
•Cherokee	•Spartanburg	
•Greenwood	•York	

The subgrade is defined as the area between lines 18" outside the area to be occupied by the pavement structure extending to the outside edge of curb and gutter and sidewalk, where applicable. Please see the Borrow Excavation Supplemental Specification (11-03-03) for more details.

When any section of the roadway is constructed with borrow excavation then the entire length of roadway subgrade will be improved with Cement Modified subbase (8"). Whenever Cement Modified subbase is specified, it will be measured and paid as described in Section 301 of the Standard Specifications. All projects are potentially affected by this specification with certain limitations.

The chart show below identifies when cement modified subbase (8") is required in those counties described above:

<table>
<tr><th>Subgrade Area</th><th>Borrow Excavation</th><th>Pavement Design</th><th>Cement Modified Subbase</th></tr>
<tr><td rowspan="4">≥ 8000 SY Subgrade</td><td rowspan="2">With borrow</td><td>Yes</td><td>Yes</td></tr>
<tr><td>No</td><td>Yes</td></tr>
<tr><td rowspan="2">Without borrow</td><td>Yes</td><td>No</td></tr>
<tr><td>No</td><td>Yes</td></tr>
<tr><td rowspan="4">< 8000 SY Subgrade</td><td rowspan="2">With borrow</td><td>Yes</td><td rowspan="4">No except where superpave is used</td></tr>
<tr><td>No</td></tr>
<tr><td rowspan="2">Without borrow</td><td>Yes</td></tr>
<tr><td>No</td></tr>
</table>

Any project that is not to have its subbase modified, but has other criteria such as high truck/industrial traffic, known poor soil conditions, special traffic control situations, etc. may warrant cement modified subbase. In these cases, the designer should consult with the Geotechnical Materials Engineer at the Office of Research and Materials.

The designer will place the pay items of Cement Modified Subbase (8" Uniform) and Portland Cement for Cement Modified Subbase on the inclusion sheet with the explanation that the quantities are due to the borrow excavation supplemental specifications. These pay items of Borrow Excavation/Cement Modified Subbase are not considered to be part of the pavement design and will not be placed on the typical section sheet. For applicable projects in the affected 18 counties, the designer will use 115 pounds per cubic foot for the weight of soil to determine the estimated quantities as described in the South Carolina Highway Design Manual.

14. Fine Grading

The item of "Fine Grading" has been placed in all plans that include pay items of "Unclassified Excavation", and/or "Borrow Excavation" where work is necessary to bring earth material into final shape. The pay unit is square yards. Calculate the plan quantities of Fine Grading for all subgrade areas including side roads. Only those drives shown on the plans will be included in the estimated quantities. The quantity of Fine Grading will be the area of subgrade extending laterally 18 inches beyond the pavement structure.

The Contractor will be paid the plan quantity unless the fine grading area is changed as discussed in the Fine Grading Supplemental Specification. Place the pay item only on the "Summary of Estimated Quantities" sheet. The "Fine Grading" pay item will not be used when the earthwork is measured and paid for as "Site Excavation" or "Station Grading". Also, "Fine Grading" will not be used on resurfacing projects where the shoulder is being brought-up to grade to match the adjacent pavement.

15. Seeding and Sodding

Seeding types, mulched or unmulched, and sodding shall be determined by the field party on the Field Review. Special types of seeding shall also be determined on the Field Review. Computation of permanent vegetation will be 3.0 MSY per mile for secondary roads and 4.7 MSY per mile for primary roads on primary projects. The permanent vegetation will replace existing seeding quantities including seeding, fertilizer, lime, and nitrogen.

There will be no separate quantity for fertilizer and lime when specifying any type of sprigging or sodding on a project. When sprigging and sodding grass are pay items, fertilizer and lime will be included in the bid price for sprigging or sodding. Fertilizer and lime for sprigging will be applied in accordance with Section 812 of the Standard Specifications. Fertilizer and lime for sodding will be applied in accordance with Section 810 of the Standard Specifications. A special provision will be included in the proposal to modify the measurement and payment sections of the Standard Specifications.

The pay items for sprigging and sodding are shown below:

8121000	Sprigging	MSY
8122000	Sprigging – Centipede Grass	SY
8122100	Sprigging – Centipede Grass	MSY
8131000	Sodding	SY
8132000	Sodding – Centipede Grass	SY
8132100	Sodding – Centipede Grass	MSY
8133000	Sodding – Zoyzia Grass	SY

16. Temporary Seeding

Projects should include a quantity for temporary seeding. This inclusion is necessary since the NPDES regulations require all disturbed areas to be seeded within seven days. The Project Managers shall determine the amount of seeding required at the time the Field Review is performed (25%, 50% of permanent seeding, etc.).

17. Mowing

Mowing will be used on all projects except bridge replacement projects. Also, other projects which have only a small quantity of seeding may not need a mowing quantity. These projects will be identified on the Field Review and a decision made whether or not to include mowing. Quantities will be determined by the amount of total seeding and / or sodding in the plans including temporary seeding

The pay item shall be: 8109900 Mowing _____ MSY

18. Removal and Disposal of Existing Asphalt Pavement

Removal and Disposal of existing asphalt pavement will be measured and paid for by the square yard. All existing asphalt pavement to be removed, 2" or greater, will be measured and paid for. Less than 2" shall be paid for as Unclassified Excavation.

The pay item shall be:

2025000 Removal & Disposal of Existing Asphalt Pavement _____ SY

19. Removal and Disposal of Existing Pavement

Removal and disposal of existing pavement shall include concrete pavement, concrete sidewalk, stone or concrete curbs, concrete curb and gutter, and brick sidewalk. For further information, see section 202.05 in the Standard Specifications for Highway Construction (2000).

The pay item shall be:

2023000 Removal & Disposal of Existing Pavement _____ SY

20. Concrete Driveway

When concrete sidewalk is called for on a project with driveways, a quantity for Concrete Driveway (6" Uniform) shall be included for all drives. See Standard Drawings 720-5 and 720-5A for details.

21. Brick Masonry-Reinforced Brick Masonry

This procedure should be used when a brick masonry wall has been selected by the Project Team. When the top of a brick masonry wall has elevation breaks, the top can be contoured to give the top of wall a pleasing contoured look at the request of the District Engineering Administrator. During the Design Field Review, the type and design of the brick wall will be selected from the Standard Drawings 718-1, 718-2 and 718-2A. Whenever a wall is desired, the Design Group will request a review of the selected design by the Roadway Structural Group. The Roadway Structural Group will verify the use of the proposed brick wall and may request the Research and Materials Lab to provide soil borings, if deemed necessary. After the Roadway Structural Group verifies the design, the Design Group will complete calculating the quantities for the selected wall. See Standard Drawings 718-1, 718-2 and 718-2A for details. If the selected wall does not meet the design conditions shown on the Standard Drawings (e.g. over 10' high or extraordinary live or dead loads), the Design Group will use a wall designed by the Roadway Structural Group.

Examples of Calculations:

BRICK WALL 400 L.F. Long
4' Height
12" Wide

Assume back slope is level ➔ Case 1

Brick Masonry

$400' \times \frac{12"}{12"} \times 4'$ = $400 \times 1 \times 4$ = 1600 CF

Total Brick Masonry = 1600 CY x $\frac{1\ CY}{27\ CF}$ = 59.26 CY

Concrete Class 3000
From table on Standard Drawing 718-1, use 3' - 2" for footing width

$400' \times 3' - 2" \times \frac{10"}{12"}$ = $400 \times 3.167 \times 0.833$ = 1055 CF

$400' \times \frac{2.75"}{12"} \times \frac{8"}{12}$ = $400 \times 0.299 \times 0.607$ = + 61 CF

Total Class 3000 Concrete = 1116 CF x $\frac{1\ CY}{27\ CF}$ = 41.34 CY

1. REINFORCED BRICK WALL
400 L.F. LONG
5' Height
12" Wide

Assume back slope is less than 4:1 ➔ Case 1

Brick Masonry (Reinforced)

$400' \times \frac{12"}{12"} \times 5'$ = 2000 CF x $\frac{1\ CY}{27\ CF}$ = 74.08 CY

Concrete Class 4000
From table on Standard Drawing 718-2, select 3' - 6" for footing width - No Key

$400' \times 3' - 6" \times \frac{12"}{12"}$ = $400 \times 3.5 \times 1$ = 1400 CF

$400' \times \frac{2.75"}{12"} \times \frac{8"}{12"}$ = $400 \times 0.229 \times 0.667$ = + 61 CF

Total Class 3000 Concrete = 1461 CF x $\frac{1\ CY}{27\ CF}$ = 54.11 CY

Grout and reinforcing steel used in the wall and foundation will be as shown on the Standard Drawings and no separate quantities calculated.

22. Erosion Control Blanket

All bridge projects, regardless of size, will have the pay item "Temporary Erosion Control Blanket" included in the estimated quantities. The quantities will be calculated to include the entire fill slopes adjacent to the bridge back to the termini of the project or to a cut section. Areas to be rip rapped will not be included in the quantity for "Temporary Erosion Control Blanket". Where the roadway grade is 2.5% or greater, a quantity of "Temporary Erosion Control Blanket" will be computed to cover the roadway ditches to a minimum width of ten feet (5' each side of the bottom of the ditch) in the cut sections within the projects limits.

The Hydraulic Engineering Section will determine when permanent ditch lining is necessary. Their determination will be based upon soil types , ditch flow velocities, ditch slopes, and sheer stress. There are 2 Specs of permanent mats.

Beginning with all projects in the August 2004 Highway Letting, the Rolled Erosion Control Products Supplemental Specifications will be in effect. Changes to pay items are as follows: (Note the changes in units)

Old Pay Item		
8151100	Permanent Erosion Control Mat – Standard	SY
8151105	Permanent Erosion Control Mat – Heavy Duty	SY
New Pay Item		
8151101	Permanent Turf Reinforcement Matting (Type 1)	MSY
8151102	Permanent Turf Reinforcement Matting (Type 2)	MSY
8151103	Permanent Turf Reinforcement Matting (Type 3)	MSY
8151104	Permanent Turf Reinforcement Matting (Type 4)	MSY
Old Pay Item		
8151110	Erosion Control Blanket	SY
New Pay Item		
8151111	Temporary Erosion Control Blanket (Class A)	MSY
8151112	Temporary Erosion Control Blanket (Class B)	MSY
8151113	Temporary Erosion Control Blanket (Class C)	MSY

23. Reinforced Concrete Box Culvert

Quantities necessary for plans for R.C box culvert are as following:
2041000 Structure Excavation for Culvert ____ C.Y.
7011500 Concrete for Structures-4000P ____C.Y.
7031100 Reinforce Steel for Structures (Roadways) ____ LBS

24. National Pollution Discharge Elimination System (NPDES)

The disturbed area on a project shall be shown in acres on the Title Sheet in a box labeled NPDES. The acreage shall be determined by multiplying the length of project by the width of the Construction Line/Right-of-way less any existing pavement to be retained. If construction slopes extend beyond the R/W line, this area will be added along with outfall ditches and drainage that extend beyond the mainline R/W. Existing dirt roadbed and dirt shoulders will not be included in the disturbed area. An example of the NPDES line is shown in Chapter 12.

Example of Calculation:

3120’ (Length of project) × 66 (R/W Width) ÷ 43,560	=	4.727 AC
Outfall Ditch 300’ (Length) 30’ (Width) ÷ 43,560	=	0.207 AC
Construction Slopes (Run with Planimeter) 360 ÷ 43,560	=	0.008 AC
S. Total	=	4.942 AC
Less Existing Pvt. 450’ × 22’ ÷ 43,560	- =	0.227 AC
Total NPDES	=	4.715 AC

25. Guardrail End Treatment

All projects that have guardrail end treatments will be identified in the plans as an “End Treatment --- Type T”. The Contractor will select a terminal listed on the “Approval Sheet” for “End Terminal ---Type T” maintained by the Research and Materials Engineer. Currently, two terminals are listed on the “Approval Sheet”. They are the ET-2000 and SKT-350.

The Pay Item Shall Be:

8052300 End Terminal ---Type T Each

26. Pavement Markings for Bridge Plans

All bridge projects that require road plans to be developed by Road Design will include pavement markings in the Estimated Quantities. Pay items will generally be those listed below. A Standard Drawing is being developed by Traffic Engineering. Unless the road is particularly complex, the pavement markings will be determined by the Design Group. If assistance is needed, please contact Traffic Engineering.

The Pay Items Shall Be:

6011010	Paint 4″ White Solid Lines (Pvt. Edge Lines)	4” Solid white lines will be determined by doubling the total length of the project
6012005	Paint 4″ Yellow Broken Lines (Gaps Exc.)	Half the total project length will be 4” broken yellow. Compute quantity by taking ½ the total approach length then divide by 4. Result divisible by 10.
6012010	Paint 4″ Yellow Solid Lines (Pvt. Edge & No Passing Zone)	Half the total project length will be double yellow on the centerline. Compute 4” solid yellow by taking ½ times the total approach length and doubling
6033005	Permanent Yellow Pavement Markers Bi-Dir, Refl. 4″ x 4″ (For Projects with D.S. over 45 MPH or if existing roadway has Pavement Marking in place at time of Field Review)	Raised pavement markers will be placed on the centerline where they are currently installed or on projects with a design speed over 45 MPH. See Standard Drawings to determine quantity

27. Paving Under Guardrail

Paving under guardrail has been authorized on Interstate and selected Primary Projects. When this is used, it must comply with Standard Drawing No. 403-2. The cost of this practice will be reviewed periodically to determine its continuance.

The Pay Items shall be:

2031000 Unclassified Excavation_____C. Y.
2033000 Borrow Excavation_____C. Y.
4037100 Hot Mix Asphalt Concrete Plant Mix Under Guardrail_____S. Y.

See page 13-1 for paving under guardrail on bridge replacement projects.

28. Quality Control by Contractor

Beginning with the May 2004 Highway Letting, the following pay items will be included in all plans that require the contractor to provide sampling and testing for earthwork construction, base, and subbase construction and/or concrete construction:

1061100	Quality Control for Earthwork	LS
1061200	Quality Control for Bases and Subbases	LS
1061300	Quality Control for Concrete	LS

The decision to use a "Quality Control" pay item will be made during the Design Field Review (DFR) by those representing the District Construction Office. A revised DFR Title Sheet has been prepared showing these items. The name of the new DFR Title Sheet is dfrts3.dgn and can be seen on page 5-7. This pay item will be placed on the "Summary of Estimated Quantities" sheet.

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

FED. RD. DIVNO.	STATE	COUNTY	FILE	PROJ.	NO.	SHEET NO.	TOTAL SHEETS
3	S.C.						

SUMMARY OF ESTIMATED QUANTITIES

SECTION	ALT.	ITEM	INCLUSION	QUANTITY	UNIT
1031000		MOBILIZATION			L.S.
1071000		TRAFFIC CONTROL			L.S.
2011000		CLEARING AND GRUBBING WITHIN RIGHT-OF-WAY			L.S.
2013000		CLEARING AND GRUBBING MATERIAL PITS			ACRE
2022000		REMOVAL AND DISPOSAL ITEM NO. ( ) - ( )			L.S.
2023000		REMOVAL AND DISPOSAL OF EXISTING PAVEMENT			S.Y.
2024100		REMOVAL AND DISPOSAL OF EXISTING CURB			L.F.
2031000		UNCLASSIFIED EXCAVATION			C.Y.
2033000		BORROW EXCAVATION			C.Y.
2034000		MUCK EXCAVATION			C.Y.
2035000		STATION GRADING			STA.
2041000		STRUCTURE EXCAVATION FOR CULVERTS			C.Y.
2061000		EMBANKMENT IN PLACE			C.Y.
2071000		OVERHAUL			CYHM
2091000		SELECT MATERIAL FOR SHOULDERS AND SLOPES			C.Y.
	ALT.	GRADED AGGREGATE BASE COURSE CHECK ALTERNATES AS APPROPRIATE			
3021000		SOIL AGGREGATE SUBBASE COURSE (AGG. NO. CR-14)			
3022000		AGGREGATE NO. CR-14			TON
3031 00		SAND CLAY BASE COURSE (TYPE)			C.Y.
3033000		SCARIFYING, MIXING, REMIXING, SHAPING, AND RESHAPING			
					M.S.Y.
3041 00		COQUINA SHELL BASE COURSE (UNIFORM)			S.Y.
3051 00		MACADAM BASE COURSE (UNIFORM)			S.Y.
					S.Y.
3061 00		STABILIZED AGGREGATE BASE COURSE - TYPE			
3063 00		FOSSILIFEROUS LIMESTONE BASE COURSE (UNIFORM)			S.Y.
3069900		MAINTENANCE STONE			TON
309		HOT LAID SAND ASPHALT BASE COURSE (TYPE)			TON
310		HOT LAID ASPHALT AGGREGATE BASE COURSE			TON
4011000		ASPHALT CEMENT IN PAVING MIXTURE			TON
40120		FULL DEPTH ASPH. PAVEMENT PATCHING (UNIFORM)			S.Y.
402		HOT LAID ASPH. CONC. BINDER COURSE (TYPE)			TON
403		HOT LAID ASPH. CONC. SURF. COURSE (TYPE)			TON
4037000		HOT LAID ASPH. SURF. COURSE FOR DITCH PAVING			TON
40 00		BITUMINOUS SURFACING (TREATMENT) TYPE			S.Y.
5011 00		PORTLAND CEMENT CONCRETE PAVEMENT (UNIFORM)			S.Y.
5012 00		PORTLAND CEM. CONC. PAVMT. FOR RAMPS (UNIFORM)			S.Y.
6051005		PERMANENT CONSTRUCTION SIGNS			S.F.
7011 00		CONCRETE FOR STRUCTURES (CLASS A)			C.Y.
7031100		REINFORCING STEEL FOR STRUCTURES (ROADWAY)			LBS.
7062100		TREATED TIMBER CUT-OFF WALLS			L.F.

SECTION	ITEM	INCLUSION	QUANTITY	UNIT
7141111	12" R.C. PIPE CULVERT - CLASS			L.F.
7141112	15" R.C. PIPE CULVERT - CLASS			L.F.
7141113	18" R.C. PIPE CULVERT - CLASS			L.F.
7141114	24" R.C. PIPE CULVERT - CLASS			L.F.
7141115	30" R.C. PIPE CULVERT - CLASS			L.F.
7141116	36" R.C. PIPE CULVERT - CLASS			L.F.
7141117	42" R.C. PIPE CULVERT - CLASS			L.F.
7141118	48" R.C. PIPE CULVERT - CLASS			L.F.
7142	X R.C. PIPE CULVERT TEE (CLASS)			EACH
7143	X R.C. PIPE CULVERT WYE			EACH
7144	R.C. PIPE CULVERT BEND ° (CLASS)			EACH
7170150	15" RELAID PIPE CULVERT			L.F.
7170180	18" RELAID PIPE CULVERT			L.F.
7170	RELAID PIPE CULVERT			L.F.
7181000	BRICK MASONRY			C.Y.
7182000	BRICK MASONRY (REINFORCED)			C.Y.
7191	CATCH BASIN - TYPE			EACH
7191	CATCH BASIN - TYPE			EACH
7191	CATCH BASIN - TYPE			EACH
7192	DROP INLET			EACH
7192105	MANHOLE			EACH
71922	JUNCTION BOX			EACH
7192300	SPRING BOX			EACH
7196000	EXTRA DEPTH OF BOX			L.F.
7197110	ADJUSTED CATCH BASIN			EACH
7197120	ADJUSTED MANHOLE			EACH
7197130	ADJUSTED DROP INLET			EACH
71981	CATCH BASIN (TYPE) CONVERTED			EACH
7198	JUNCTION BOX (CONVERTED			EACH
7201000	CONCRETE CURB (9"X 15")			L.F.
7202	CONCRETE GUTTER -TYPE			L.F.
7203	CONCRETE CURB AND GUTTER			L.F.
7204100	CONCRETE SIDEWALK (4" UNIFORM)			S.Y.
7205 0	CONCRETE DRIVEWAY (" UNIFORM)			S.Y.
7206000	CONCRETE MEDIAN			S.Y.
7211000	BITUMINOUS CURB			L.F.
7221	PRECAST CONCRETE BOX CULVERT (X)			
	AASHTO M- -FH			L.F.

SECTION	ITEM	INCLUSION	QUANTITY	UNIT
8011055	AGGREGATE UNDERDRAIN			C.Y.
8011	AGGREGATE UNDERDRAIN (AGGR. NO.)			C.Y.
80211	PIPE UNDERDRAIN			L.F.
80212	PERFORATED PIPE UNDERDRAIN			L.F.
8034	PIPE SLOPE DRAIN			L.F.
8035000	METAL INTAKE SPILLWAY ASSEMBLY			EACH
8041100	HAND PLACED RIPRAP			TON
8043100	DUMPED RIPRAP			TON
8048 00	GEOTEXTILE FABRIC FOR SLOPE PROTECTION - CLASS			S.Y.
8048200	GEOTEX./EROS. CONTROL UNDER RIPRAP (UNPROTECTED) - CL. 2			S.Y.
8051100	STEEL BEAM GUARDRAIL			L.F.
8051110	REMOVAL OF EXISTING GUARDRAIL			EACH
8051300	STEEL BEAM GUARDRAIL (THRIE)			L.F.
8051900	RESET GUARDRAIL			L.F.
8052110	END ANCHOR - TYPE A			EACH
8052210	END ANCHOR - TYPE B			EACH
8052220	END ANCHOR - TYPE B THRIE BEAM			EACH
8052500	REMOVAL OF END ANCHORS			L.F.
8052600	THRIE BEAM GUARDRAIL BRIDGE CONNECTOR			EACH
80581	CONCRETE MEDIAN BARRIER (TYPE)			L.F.
8058900	CONCRETE BARRIER EXTENSION			
8059	TEMPORARY CONCRETE BARRIER			L.F.
8061	WOVEN WIRE FENCE (TYPE)			L.F.
8062	STRAND BARBED WIRE FENCE			L.F.
8063	CHAIN LINK FENCE			L.F.
806	GATE			EACH
8071000	RESET FENCE			L.F.
8072000	RESET CHAIN LINK FENCE			L.F.
8081000	MOVING ITEMS ( ) - ( )			L.S.
8091000	RIGHT-OF-WAY MARKER			EACH
8092000	RESET RIGHT-OF-WAY MARKER			EACH
8101000	SEEDING (MULCHED)			M.S.Y.
8102100	SEEDING (UNMULCHED)			M.S.Y.
8103000	TEMPORARY SEEDING			M.S.Y.
8104100	FERTILIZER (10-10-10)			TON
8105000	LIME			TON
8106000	NITROGEN			LBS.
8131000	SODDING			S.Y.
8151000	FIBERGLASS ROVING			S.Y.
8152000	BALED STRAW			BALE
8153000	SILT FENCE			L.F.
8154000	SILT BASINS			C.Y.
8158000	TERRACING			L.F.

SUMMARY OF MILEAGE

FILE NO.								
ROUTE OR ROAD NO.								
END OF PROJECT STATION								
BEG. OF PROJECT STATION								
LENGTH IN STATION								
EQUALITIES ±								
	FEET	MILES	FEET	MILES	FEET	MILES	FEET	MILES
GROSS LENGTH OF PROJECT								
LENGTH OF EXCEPTIONS								
NET LENGTH OF PROJECT								
NET LENGTH OF BRIDGES								
NET LENGTH OF ROADWAY								

STATION TO STATION	EQUALITIES			
TOTAL VALUE				

STATION TO STATION	EXCEPTIONS (LENGTH IN FEET)			
TOTAL LENGTH				

STATION TO STATION	BRIDGES (LENGTH IN FEET)			
TOTAL LENGTH				

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUMMARY OF ESTIMATED QUANTITIES

PIN # _____ ITEM # _____ ROAD ROUTE _____

COUNTY _____

FILE NUMBER _____ F.A.P. PROJ. NO. STATE PROJ. NO. _____

FROM: _____

TO: _____

INDEX OF SHEETS

SHEET NO.	SHEET DESCRIPTION	SHEET SUBTOTAL
	TOTAL SHEETS	

TRAFFIC DATA

_____ A.D.T. _____

_____ A.D.T. _____

TRUCKS _____ %

N.P.D.E.S. _____ AC.

LONGITUDE _____

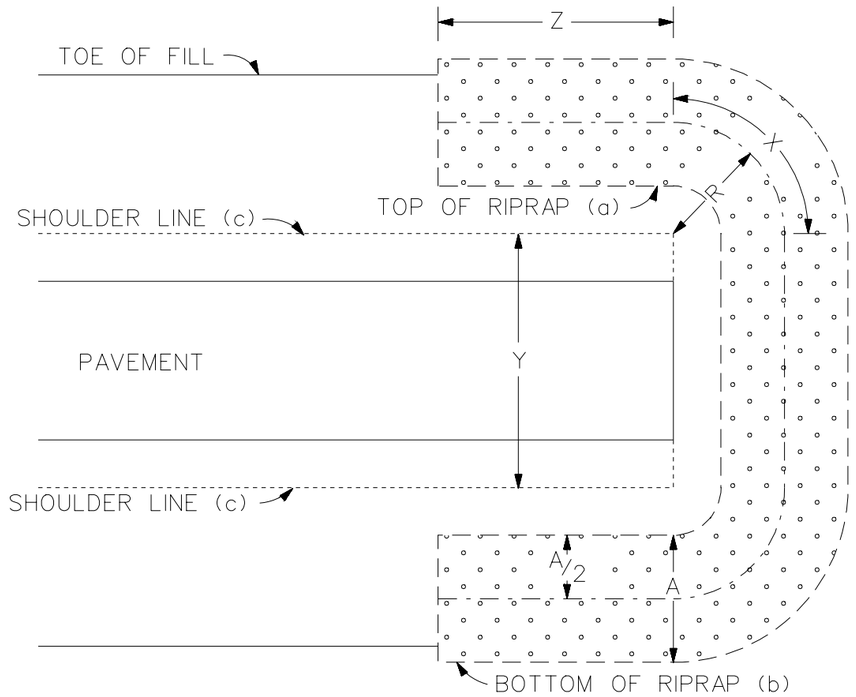
LATITUDE _____

SQUAD ___ / _____
NO. / LEADER

COMPUTED BY: _____

10. RIPRAP

METHOD OF COMPUTING RIPRAP



a = TOP OF RIPRAP = ELEV. OF HIGH WATER + 2.0 FT.
b = BOTTOM OF RIPRAP = ELEV. OF GROUND LINE - 2.0 FT.
c = ELEV. OF SHOULDER LINE
d = SLOPE OF FILL

$$X = \frac{2 \pi R}{4}$$

Y = SHOULDER TO SHOULDER WIDTH
Z = 2 TIMES HEIGHT OF FILL OR 30' MIN.

$$A = \sqrt{(a - b)^2 + (a - b \times d)^2}$$

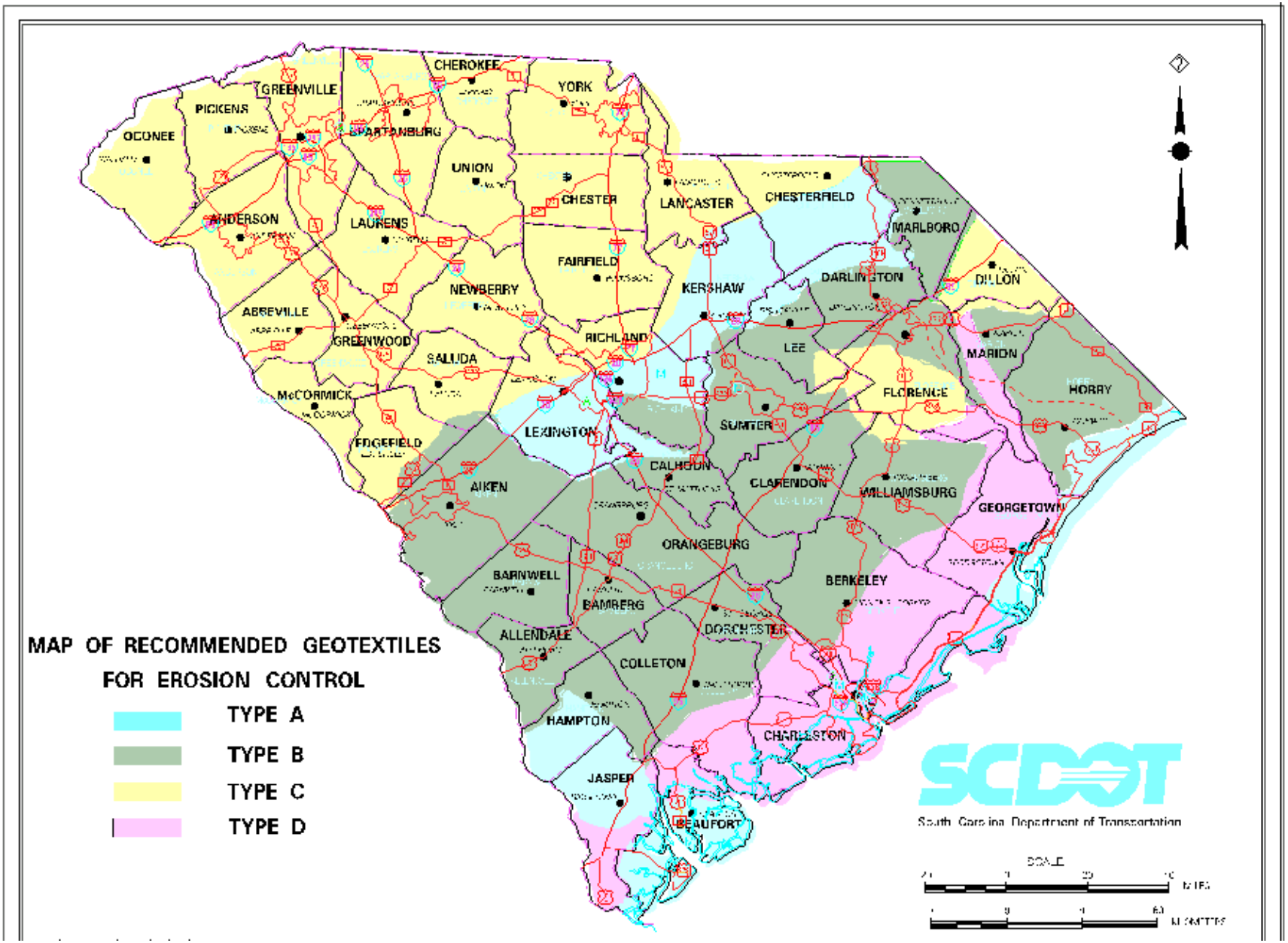
$$R = \left[\frac{(a - b)}{2} + (c - a)\right] \times d$$

AREA OF RIPRAP = (2Z + 2X + Y) x A = SQ. FT.

$$\text{C. Y. OF RIPRAP} = \frac{\text{SQ. FT. x 1' (DEPTH OF RIPRAP)}}{27}$$

$$\text{TONS OF RIPRAP} = \frac{\text{C. Y. x 2800 (LBS. PER C. Y.)}}{2000}$$

SEE FOLLOWING SHEET FOR EXAMPLE OF COMPUTING RIPRAP


MAP OF RECOMMENDED GEOTEXTILES
FOR EROSION CONTROL
TYPE A
TYPE B
TYPE C
TYPE D
CHEROKEE
YORK
GREENVILLE
PICKENS
OCONEE
SPARTANBURG
UNION
CHESTER
LANCASTER
CHESTERFIELD
MARLBORO
ANDERSON
LAURENS
FAIRFIELD
KERSHAW
DARLINGTON
DILLON
NEWBERRY
ABBEVILLE
GREENWOOD
SALUDA
RICHLAND
LEE
MARION
HORRY
McCORMICK
FLORENCE
SUMTER
EDGEFIELD
LEXINGTON
CALHOUN
CLARENDON
AIKEN
WILLIAMSBURG
GEORGETOWN
ORANGEBURG
BARNWELL
BERKELEY
BAMBERG
DORCHESTER
ALLENDALE
COLLETON
HAMPTON
CHARLESTON
JASPER
BEAUFORT
SCDOT
South Carolina Department of Transportation
SCALE