Illinois Department of Transportation

Memorandum

To:	Studies & Plans Squads	PPM 20-02
From:	C. D. Latham	Revised: Tim Brandenburg
Subject:	Riprap Design and Specification	
Date:	April 7, 1989	Revision Date: October 30, 2003

PLAN PREPARATION MEMORANDUM 20-02

BACKGROUND

Prior to the latest revision of the riprap specification, the District had an acceptable gradation for riprap material that was readily available from local sources. That specification was designed to exceed most minimum design requirements that would be encountered within the District.

The revised riprap gradations were chosen for uniform usage statewide. These gradations do not reflect the minimum Design criteria that are required and the total range of gradations are not produced within the District. A link to Riprap Design is needed to allow economical use of locally available material that satisfies the site requirements.

PROCEDURES

References to Riprap design define a riprap gradation using median rock size (d50). Riprap required on a project will be designed for a median rock side (d50) and then a standard gradation (RR3,RR4…) that meets the design requirement will be specified in the plans. General Note - 281 shall be placed in the plans for each contract containing riprap.

Chapter 10 of the Drainage Manual gives guidance on the uses of riprap for erosion control. The following references should be consulted for the design:

1. Design of Flexible Ditch Linings (HEC 15).

2. Use of Riprap for Bank Protection (HEC 11).

3. Hydraulic Design of Energy Dissipaters for Culverts and Channels (HEC 14).

Programs HEC 14 and HEC 15 are available in the Bridge and Hydraulics Units.

The Bureau of Materials and Physical Research has also established a Policy Memorandum to determine the "Required Class Designations of Stone for Erosion Protection, Sediment Control and Backfill for various construction uses".

The following listing notes the construction use with its allowable class designation(s). No other class designations shall be allowed for the specific construction uses. Class designation is defined in the Standard Specifications, Article 1005.01 or by Special Provision.

Construction Use	Class Designation
Abutment and Pier Protection	A3, A4, A5, A6, A7
Aggregate Ditch Check	B3
Aggregate Ditch Lining	B3, B4, B5
Bedding Material	A1, A2[1/]
Chute Liner	A4, A5, A6, A7
Gabion and Crib Stone	A[2/]
Outlet Protection	A3, A4, A5, A6, A7
Riffles	B[2/]
Rockfill (Material is used only to fill voids. No erosion protection is desired.)	C[3/]

[1/]When used with filter fabric: Bedding material class designations B1 and B2 may be used. Coarse aggregate gradation CA3 may be used in lieu of riprap gradation 1, and coarse aggregate gradation CA1 may be used in lieu of riprap gradation 2 as long as the allowable quality designation is met.
[2/]Gradation by Special Provision
[3/]Shot rock, primary crusher run, or other designated gradations.

Construction Use	Class Designation
Sediment Basin	C1, C2, C3, C4, C5
Slope Protection	A3, A4, A5, A6, A7
Stilling Basin	A4, A5, A6, A7
Stream Bank and Bottom Protection	A3, A4, A5, A6, A7
Wave Action Protection	A3, A4, A5, A6, A7
Wing Dam	A3, A4, A5, A6, A7