



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 14-02 Policy Advisory

February 7, 2014

TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/Crystal M. Weaver
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Bridge Division

SUBJECT: Q₅₀₀ Scour Policy

REVISES: *Indiana Design Manual Section 202-3.03*

EFFECTIVE: Immediately

Per *Indiana Design Manual* Section 203-3.03(03) Scour, it is no longer acceptable to estimate the 0.2% annual EP discharge by multiplying the 1% annual EP discharge by 1.7. Using the 1.7 multiplier results in over estimated scour depths and increased foundation costs. The INDOT Office of Hydraulics and Indiana Department of Natural Resources Division of Water have worked together to determine acceptable methods to estimate the Q₅₀₀ for scour calculations. The new Q₅₀₀ policy reiterates the need to investigate both FEMA Flood Insurance Studies and IDNR Coordinated Discharge curves. In addition to these methods, regional multipliers have been developed to estimate the Q₅₀₀ when other published sources are not available.

This policy has been added as *Indiana Design Manual* Section 202-3.03 and Figures 202-3B and 202-3C. The subsequent sections have been renumbered. The section and figures are an attachment to this memo.

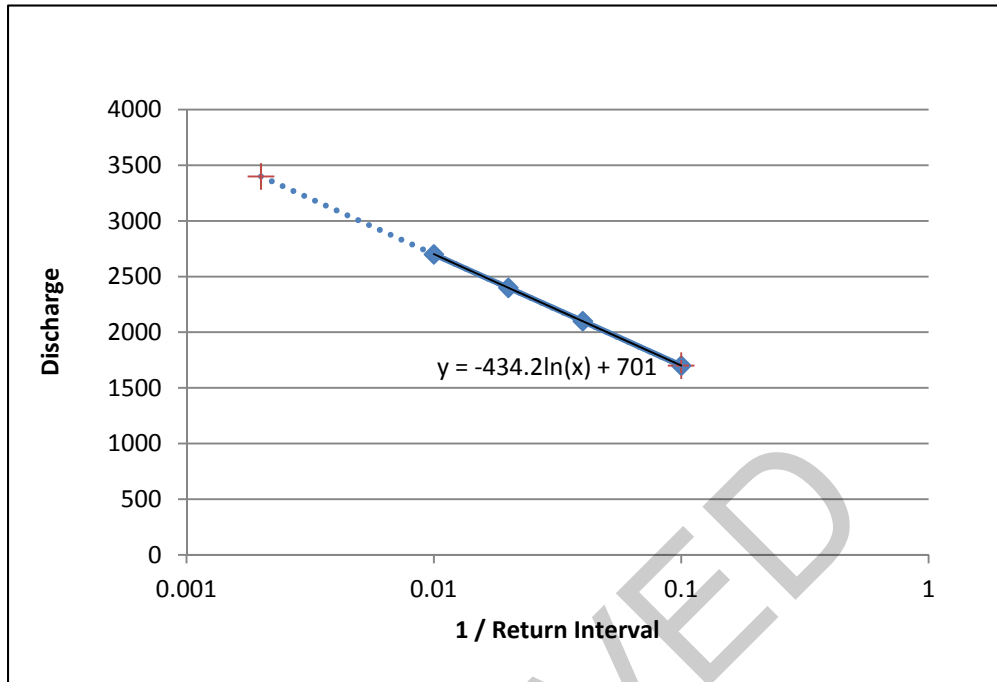
202-3.03 Q₅₀₀ Determination for Scour Calculations [Added Feb. 2014]

The following methods, listed by preference, should be used to determine the Q₅₀₀ for scour calculations.

1. Discharge published in a FEMA Flood Insurance Study (FIS). If there is a 0.2% annual EP discharge published by FEMA in a FIS, this discharge should take precedence over any other methodology.
2. Discharge derived from a coordinated discharge curve. The 0.2% annual EP discharge can be estimated by extrapolation from the Coordinated Discharge curves, using the following technique:
 - a. Find the drainage area of the stream at the site of interest, and then determine the 10, 25, 50, and 100 year peak values from the graph.
 - b. Plot these values on a semi log graph, with the peak discharge on the normal(y) axis, and the inverse of the return interval on the log (x) axis.
 - c. Fit a straight line between these points, and use the equation to derive a value at 0.002 (0.2%).

See Figure [202-3B](#) for an example.

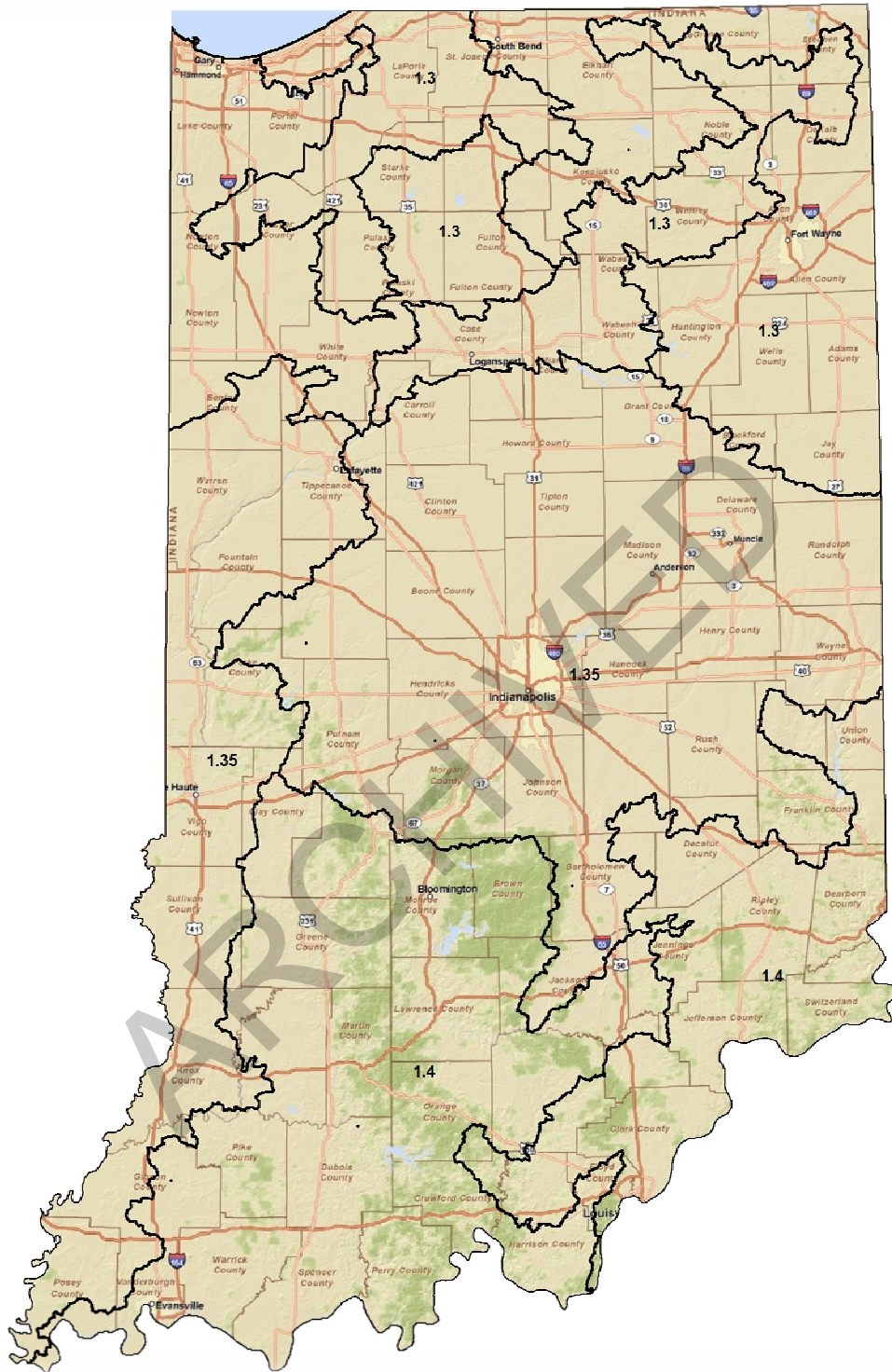
3. Use a multiplier of the 1% annual EP discharge. If there are no discharges published in the FIS or in a coordinated discharge curve, then the 0.2% annual EP discharge can be derived from the 1% annual EP discharge by use of a multiplier, which varies by region. The different regions and the relevant multiplier are shown in Figure [202-3C](#). A GIS shape file is also available for download from the Department's [Editable Documents page](#).



EXAMPLE OF GRAPHICAL METHOD FOR DETERMINING THE 0.2% EP

Figure 202-3B

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REGIONAL MULTIPLIERS FOR DETERMINATION OF 0.2% ANNUAL EP

Figure 202-3C