Appendix 12C-2 Tidal Bridge Scour Data and Worksheet

VIRGINIA DEPARTMENT OF TRANSPORTATION
TIDAL BRIDGE SCOUR DATA & WORKSHEET

Hydraulic Engineer:_________
Date:_________

I. BRIDGE LOCATION

BRIDGE No. _________ Route: _________ County No. _________
Length: _________ Ft. River: _____________________

TIDAL BRIDGE CATEGORY: Islands Semi-Enclosed Bays & Inlets Estuary

II. CHANNEL CROSS SECTION

Channel Width (U/S 100 ft) W_u = ______Ft. Channel Width (at Bridge) W_o ______Ft.
Width (between abutment) W_d = ______Ft.
Average Water Depth (below MSL/MLW/MTL) D= _________Ft.
Clearance (from MSL/MLW/MTL to Lower Chord) C= _________Ft.
Note: Mean sea level (MSL), mean low water (MLW), mean tide level (MTL)
Skew Angle (Centerline of Bridge with Channel) Phi (ϕ) = _________° (Degrees)

II. DRAINAGE AREA CHARACTERISTICS

(Information per USGS Report 94-4148 for Virginia Department of Transportation dated 1995)
Drainage Area: ___Sq. Mi.; Forest: F = ____%; Average basin elevation: EL=_____Ft.
Main Channel Slope: SI=_____Ft/Mi; Main Channel length: L=_____Mi.
Peak Discharge Region Used:______________________________

Compute from USGS Regression Equation:
Q_{r100} = _________________CFS; $Q_{r500} = 1.7\ (Q_{r100})$ = _________________CFS

III. STORM TIDES

100-year High Tide: H_{100} = _________Ft. Period: T_{100} = _________Hrs.
500-year High Tide: H_{500} = _________Ft. Period: T_{500} = _________Hrs.
Surface Area of Tidal basin at MSL: As = _________Sq. Mi.
at _____Ft.: As = _________Sq. Mi.
at _____Ft.: As = _________Sq. Mi.

Compute Tidal Flows:
Q_{t100} = _________________CFS; $Q_{t500} = 1.7\ (Q_{r100})$ = _________________CFS

IV. FLOW VELOCITY

a) Based on Cross Sectional Area at MSL/MLW
Cross Sectional Area, $A_1 = W_oD$ = _________________Ft^2
$V_{r100} = Q_{r100}/A_1$ = _________Ft/S $V_{r500} = Q_{r500}/A_1$ = _________Ft/S

b) Based on Cross Sectional Area at Midtide Elevation
$V_{t100} = (Q_{t100} + Q_{t100}) / (A_1 + W_oH_{100}/2)$ = _________ Ft/S
$V_{t500} = (Q_{t500} + Q_{t500}) / (A_1 + W_oH_{500}/2)$ = _________ Ft/S

c) Based on Manning Equation (n = 0.025; s = 0.0005)
$V_{t100} = 1.2\ ((Q_{r100} = Q_{t100}) / W_o)^{0.4}$ = _________ Ft/S
$V_{t500} = 1.2\ ((Q_{r500} = Q_{t500}) / W_o)^{0.4}$ = _________ Ft/S

Attach a Sketch of Cross-Section at Upstream (U/S) Side of Bridge