

Form 517002 (01-20)

**HYDRAULIC DESIGN FOR BRIDGES (CULVERTS)**

LOCATION

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| County | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Sec. | | | | |  | | | | | | | | | | | | | | | |  | | | Twp. | | |  | | | | | | | | | Range | | | |  | | |
| Over (River, Cr., Dr. Ditch) | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Road No. | | | | | | | | |  | | | | | | |
| Project No. | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  |  | | | | | | | | | | | | | | | |  |  | | | | | | | | | | | | | |  | | | | | | | | | | |
| Assessment Prepared by | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Date | | | | | | | |  | | | |  | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | 1. HYDROLOGIC/HYDRAULIC EVALUATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | | Nearest Gaging Station available on this stream: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (None  ) | | | | | |
| B. |  | Are flood studies available on this stream: Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C. |  | Flood Data: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | Q10 | | | | |  | | | | | | | cfs | | | | | | | | | | | | | | Est. Bkwtr. | | | | | | | | | | |  | | | | | | | | ft. | | |  | Q25 | | |  | | | | | | |  | | | | | | | | | | | | | | cfs | | | | |  | | Est. Bkwtr. | | | | | |  | | ft. | | | | | | |  |
|  | | Q50 | | | | |  | | | | | | | cfs | | | | | | | | | | | | | | Est. Bkwtr. | | | | | | | | | | |  | | | | | | | | ft. | | |  | Q100 | | |  | | | | | | |  | | | | | | | | | | | | | | cfs | | | | |  | | Est. Bkwtr. | | | | | |  | | ft. | | | | | | |  |
|  | | Q500 | | | | | | |  | | | | | | | | | | | | cfs | | | | | | | | or Overtopping | | | | | | | | | | | | | | |  | | | | | | | |  | | | | | cfs (Whichever is lower) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | Drainage Area | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | Method Used to compute Q | | | | | | | | | | | | | | | | | | | | | | |  | | | |  | | | | | | | | | | | | | | | | | | | | | | |
| D. | | Q**50** Freeboard Elev. At downstream fascia of bridge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | Scour | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | |  | | | |  | | | | | | | | | | | | | | | | | | | | | | |
|  | | Design Flood | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | |  | | | | | | | Check Flood | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | |
|  | | Design Elev. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | |  | | | | | | | Check Elev. | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | |
|  | | Provide a valley cross section and a graphical representation of the drainage area. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |  | | |
|  | | Does the crossing require outside agency approval? Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | List Agencies: | | | | | | | | | | | | | |  | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | 2. PROPERTY RELATED EVALUATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | | | Damage potential: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Low | | | | | | | |  | | | | | | | | | | | | | | | Moderate | | | | | | | | | | |  | | |  | | | | | | | | | | | | | High | | | | | | | |  | | |
|  | | | List buildings in flood plain | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | Location | | | | | | |  | | | | | | |
|  | | | Floor Elevation | | | | | | | | | | | | | | | |  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | Upstream Land Use | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | |  | | | | | | | | Anticipate any Change? Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | If yes, describe anticipated change: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. | | |  | | | | | | | | Any flood zoning? (Flood Insurance Studies (FIS), etc.) Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | Type of Study | | | | | | | | | | | | | |  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | Base flood elevation (100 year) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (100 year) |
|  | | | | | | | | Regulatory floodway width | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (As noted in FIS Studies) | | | | | | | | | | | | | | | | |
|  | | | | | | | |  | | | | | Comments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | 3. ENVIRONMENTAL CONSIDERATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | | |  | | | | | | | | List commitments in environmental documents which affect hydraulic design (None  ) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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|  | | | | | | 4. HIGHWAY AND BRIDGE (CULVERT) RELATED EVALUATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | | | |  | | | | | | | | Note any outside features which might affect Stage, Discharge, or Frequency. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | |  | | | | | Levees  Aggradation / Degradation  Reservoirs  Diversions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | |  | | | | | Drainage Dist.  Navigation  Backwater from another source | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | Other | | | | |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | |  | | | | | Explanation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. | | | | Proposed Roadway Overflow Section (None  ) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Length | | | | |  | | | | | | | | Elev. | | |  |  | | | | | | | Frequency (if < 500 yr.):\_\_\_\_\_\_\_ | | | | | | | | | | | | | | | | | | | |  | |
|  | | | | Embankment: Soil Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | Type Slope Cover | | | | | | | | | | | | | | | |  | | | | | | | | | | | |
|  | | | | Comments: | | | | | | | | | | |  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 5. MISCELLANEOUS COMMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Recommend Wing Dikes if 25% or more of total Q is an overbank area? | | | | | | | | | | | | | | | | | | | | | | | | | | | | Yes  No | | | | | |
|  | Unusual scour potential? | | | | | | | | Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. | Are banks stable? Yes  No | | | | | | | | | | | | | | | | | | Protection Needed? | | | | | | | | | | Yes  No | | | | | |
| C. | Are spur dikes needed? Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D. | Does stream carry appreciable amount of ice? Yes  No | | | | | | | | | | | | | | | | | | | | | | | | Elevation of high ice | | | | | | |  | | |
| E. | Does stream carry appreciable amount of large driftwood? Yes  No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F. | Is the stream widening? | | | | | | Yes  No | | | | | | | | | | Approximate amount per year | | | | | | | | | | | | |  | | | | |
|  | Is the stream deepening or filling? | | | | | | | | | Yes  No | | | | | | | Direction, rate, and amount | | | | | | | | | | | | |  | | | | |
|  | Comments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. TRAFFIC RELATED EVALUATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Present Year |  | | | | | | | | | Traffic Count | | | | |  | | | | | | | | VPD | |  | | | % Trucks | | | |  | |
| B. | Design Year |  | | | | | | | | | Traffic Count | | | | |  | | | | | | | | VPD | |  | | | % Trucks | | | |  | |
|  | Comments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. PRESENT FACILITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Low Roadway Elevation | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. | Bridge Hydraulic Capacity at point of overtopping | | | | | | | | | | | |  | | | | | cfs | | | | Frequency (if Less than Q500) | | | | | | | | |  | | | yr |
|  | Roadway Overflow: | | Length | | | | | | |  | | | | ft. | Elevation | | | | | | | |  | | | | ft. | | | | | | | |
| C. | Is flash flooding likely? | | | | | | | | | Yes  No | | | | | | | | | | | | | | | | | | | | | | | | |
|  | Comments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. ALTERNATIVES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Recommended Design | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | Low Superstructure (Bridge) | | | | | | | | |  | | | | | | | | | | Top Opening (culvert) | | | | | | | | | |  | | | | |
|  | Low Roadway Grade | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | Bridge Waterway Opening | | | | | | |  | | | | | | | | | | | | | Culvert Opening | | | | | | |  | | | | | | |
| B. | Were other hydraulic alternates considered? | | | | | | | | | | | Yes  No | | | | | | | | | | | | | | | | | | | | | | |
|  | Discussion | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C. | Is this assessment commensurate with the risks identified? | | | | | | | | | | | | | | | | | | Yes  No | | | | | | | | | | | | | | | |
|  | or is further analysis needed? | | | | | | | | | Yes  No | | | | | | | | | | | | | | | | | | | | | | | | |
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Important Note: The information on this form must in all cases be supplemented by a complete plan and profile of the site.