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Bridge Structures Hydraulics Survey

ITD 0211 (Rev. 05-21)
itd.idaho.gov

General Data

Project Key Number	Bridge Key Number (proposed)	Project Number	Date

Project Title	Local Structure Name

Station/Milepost	Latitude/Longitude	Vertical Datum (all elevations in this form)

Location	County

Roadway Identification	Crossing Type
	☐ Creek ☐ River ☐ Canal ☐ Other

Feature Crossed	A Tributary Of

Hydrologic Data

Hydrology Methods Used to Determine Design Flows

☐ USGS Stream Gage Statistics (Bulletin 17C) ☐ Flood Insurance Study ☐ USGS Regression Equations/StreamStats

☐ Canal Flows Data ☐ Other (Describe)

Description of Watershed or Canal

Drainage Basin Area ☐ mi^2 ☐ acres

Stream/Crossing Data

☐ Natural Stream ☐ Other	List Months in the Dry, If Any	Streambed Material Size, D_{50} inches

Character of Streambed

☐ Stable ☐ Aggrading ☐ Degrading ☐ Headcutting

Describe Streambed

Flow Controlled	If Controlled, Explain
☐ Upstream ☐ Downstream	

Stream Carries an Appreciable Amount of Ice	Ice Thickness	Stream Carries an Appreciable Amount of Debris
☐ No ☐ Yes	in	☐ No ☐ Yes (describe)

Located in Regulatory Floodplain (or adjacent to)	NFIP Community Name
☐ Yes ☐ No	

Flood Insurance Rate Map (FIRM) Panel Number & Date	Regulatory Floodway	If Yes, Floodway Map Panel Number
	☐ Yes ☐ No	

Existing Structure

☐ Bridge ☐ Culvert ☐ None (Describe the Bridge, Culvert or existing conditions)

General Condition	Year Constructed

Describe Any Existing Adverse Conditions

Structure Dimensions, Diameter, Etc.	Type of Bridge Piers	Number of Piers
	☐ Spread Footings ☐ Piles	

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Total Structure Clear Span Normal to Channel ft	Bridge Clearance Above Q_{Design} WSE ft	Velocity(max) Through Structure at Q_{Design} fps
Streambed Elevation at Upstream Face ft	Streambed Slope through Structure ft/ft	
Existing Structure Carried Flow Adequately (per current standards) ☐ Yes ☐ No	If No, Explain	

Design Flows & Proposed Condition Values

Flood	Discharge	Water Surface Elevation	Velocity***
Ordinary High Water [Q]*	cfs	ft	fps
Design [Q]**	cfs	ft	fps
Base [Q_{100}] (Scour Design)	cfs	ft	fps
Scour Check [Q]	cfs	ft	fps
Canal Design Flow	cfs	ft	fps
Canal Max Flow (scour check)	cfs	ft	fps

* OHW as determined by resource agency request for environmental considerations (generally $Q_{1.5}$ or $Q_{2.0}$)
** Use Q_{50} for bridges and bridge-sized culverts 10' or greater.
*** Maximum velocity through the structure.

Proposed Bridge (10' or greater)

Structure Type	Number and Length of Spans	
Skew Angle of Bridge °	Streambed Elevation at Upstream Face ft	Streambed Slope through Structure ft/ft
Total Bridge Clear Span Normal to Channel ft	Distance from Upstream Structure Face to Point Where Freeboard is Measured ft	Bottom of Superstructure Elevation (low chord) ft
Flow Angle to Pier(s) °	Q_{50} Freeboard ft	Q_{100} Freeboard ft

Scour Calculations

Maximum Scour at Abutment

Flood	General Scour	Abutment Scour (NCHRP 24-20 method includes contraction scour in abutment scour calcs)	Total Scour	Scour Elevation
Scour Design [Q_{100}]	ft	ft	ft	ft
Scour Check [Lessor of: Q_{500} or $Q_{overtopping}$]	ft	ft	ft	ft
Canal Max Flow	ft	ft	ft	ft

Maximum Scour at Pier

Flood	General Scour	Pier Scour	Contraction Scour	Total Scour	Scour Elevation
Scour Design [Q_{100}]	ft	ft	ft	ft	ft
Scour Check [Lessor of: Q_{500} or $Q_{overtopping}$]	ft	ft	ft	ft	ft
Canal Max Flow	ft	ft	ft	ft	ft

Scour Countermeasures

Countermeasure Design Flow [minimum Q_{100}] cfs	Calculated Riprap Size, D_{50} ft	Design Riprap Size, D_{50} ft
Countermeasure Filter Type		Riprap Thickness ft

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In addition to the above information, submit and check each of the following that apply.

- ☐ Hydraulic Report* (see Bridge Hydraulics Manual for format) including the following as applicable:
- ☐ Hydraulic Risk Assessment Memorandum
- ☐ A vicinity map, such as a county map, with the location of the structure clearly indicated.
- ☐ A contour map of the structure site showing 1 foot contours.
- ☐ A roadway centerline profile to the same scale as the contour map.
- ☐ A streambed profile of the entire hydraulic reach analyzed for the structure including the location of the structure.
- ☐ A typical proposed roadway section at the structure.
- ☐ Elevation view of the upstream face of proposed structure with dimensions.
- ☐ Documentation supporting hydrology methods used to develop design flows.
- ☐ Photographs of the existing structure and channel upstream and downstream from the site.
- ☐ Channel change or canal lining details (typical section, plan and profile, and limits).
- ☐ Computations for scour based on Scour Design Flood flow and Scour Check Flood flow or Maximum Canal flow.
- ☐ Letter of approval from canal company or irrigation district.
- ☐ Floodplain data including copy of map panel at the structure location (FIRMette).
- ☐ Floodplain Development Permit from the Local Floodplain Administrator if the structure is located in the 100-year floodplain.
- ☐ Preliminary Bridge Situation & Layout Plan Sheet
- ☐ Riprap details (typical section, dimensions, limits, size, toe embedment, etc.) for proposed locations.

A hydraulic report should accompany bridges and bridge-sized culverts with hydraulic openings greater than 10'.

Prepared By	Title	Engineer's Signature and Seal
Accepted by LHTAC Administrator, Bridge Engineer, or District Engineer	Signature/Date	

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