

**FLATHEAD COUNTY PLANNING & ZONING OFFICE
FLOODPLAIN DEVELOPMENT VARIANCE: #FDV-13-01
MONTANA DEPARTMENT OF TRANSPORTATION:
HIGHWAY 2 WEST - ASHLEY CREEK BRIDGE HEIGHT
JANUARY 21, 2013**

This report to the Flathead County Board of Adjustment regarding a request for a variance from the requirements of Section 5.03(C)(2) of the Flathead County Floodplain and Floodway Management Regulations (FCFR). Section 5.03(C)(2) FCFR requires bottom of bridge spans for highway stream crossings to have freeboard of at least 2-feet above the Base Flood Elevation (BFE). The Montana Department of Transportation (MDT) is proposing to replace a US Highway 2 West bridge over Ashley Creek and due to certain constraints the bridge has been designed to have freeboard less than 2-feet above the BFE. The Flathead County Planning & Zoning Office is reviewing the request under the provisions of the Flathead County Floodplain and Floodway Management Regulations (FCFR), effective January 1, 2013.

BACKGROUND

A. Project Personnel

i. Applicant/Owner

Montana Department of Transportation
P.O. Box 201001
2701 Prospect Avenue
Helena, MT 59620-1001

ii. Technical Representative/Contractor

TBD - Contractor will be acquired through bid letting process

B. Location and Legal Description:

The proposed project would occur in an area mapped as Flood Zone A, according to FIRM Panel 30029C1800G. The project site is located 100 feet north of the intersection of Highway 2 and Managhan Lane and the subject property is legally described by the Flathead County Assessor's Office as a tract labeled USHWY2 in Section 29, Township 28 North, Range 22 West, P.M.M., Flathead County, Montana.

Figure 1- Project location circled blue, Zone A 100-yr floodplain marked yellow

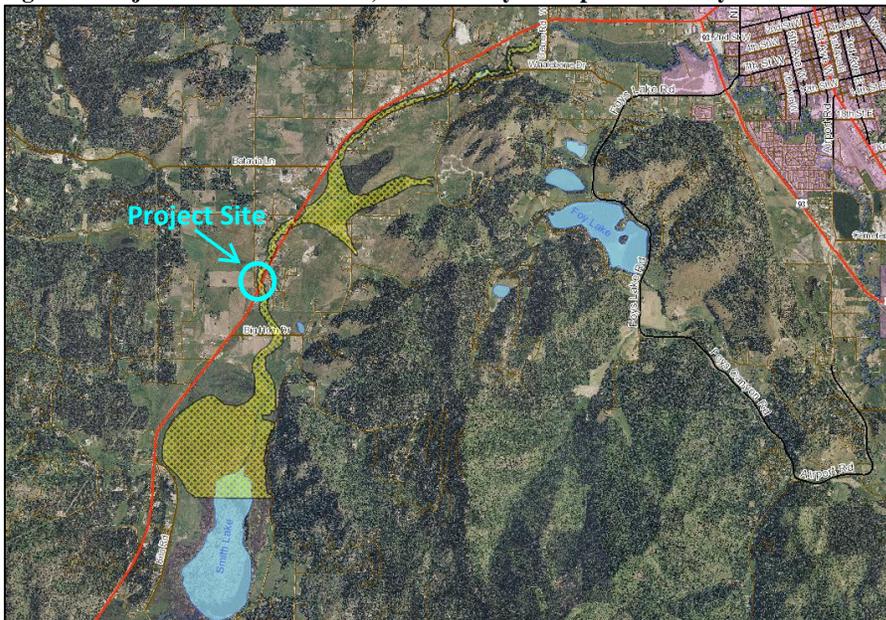


Figure 2- Project location circled blue



C. Existing Land Use:

The site is currently developed with a bridge over Ashley Creek which accommodates two-lane US Highway 2. The bridge was apparently installed in 1933 and has been determined by MDT to be functionally obsolete and deteriorated.

D. Applicable Zoning:

The proposal site occurs in an area zoned 'Scenic Corridor' which pertains only to off-premises advertising and placement of cellular communications facilities, and therefore the zoning regulations applicable at the project location have no bearing on the project.

E. Nature of Request:

The applicant is requesting a variance from Section 5.03(C)(2) of the Flathead County Floodplain and Floodway Management Regulations (FCFR) which, for highway and road stream crossings, requires bottom of bridge spans to have a 'freeboard' of at least two (2) feet above the 'Base Flood Elevation' (BFE).

'Freeboard' is defined in Chapter 8 FCFR as "A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed."

A Floodplain Development Permit (FDP-12-04) was issued for the proposed project on November 21, 2013, and in the review and issuance of the permit it was perceived that the designed 'freeboard' of the bridge was 2-feet based on the schematic shown on page 4 of the submitted Hydraulics Report. Subsequent to issuance of FDP-12-04, the applicant requested the variance from Section 5.03(C)(2) FCFR because the proposed bridge would not actually have 2-feet of 'freeboard' if constructed as designed, and would therefore be non-compliant with Condition # 6 of the issued Floodplain Development Permit FDP-12-04 Conditions of Approval. Apparently the Hec-Ras hydraulic modeling program used in the design of the

bridge indicates the BFE at the upstream face of the bridge is 3152.1 feet and the low beam of the bridge would vary from 1.6-feet to 1.9-feet above the BFE, a deviation from the required 2-feet of 'freeboard' which is not readily discernable in the submitted schematic due to scale.

F. Procedure for Consideration of the Variance:

Variance application procedure, requirements, and evaluation criteria are established in Section 1.11 FCFR which indicates an approved variance would permit construction in a manner otherwise as required or prohibited by the regulations. In the event the requested variance is granted, the previously issued Floodplain Development Permit FDP-12-04 would be amended to reflect the allowances granted by the approved variance.

EVALUATION OF VARIANCE APPLICATION

1. A variance shall only be issued upon a determination that the variance is the minimum allowance necessary, considering the flood hazard, to afford relief from these regulations and provided all of the findings are met:
 - a. **There is a good and sufficient cause;**

The application indicates the project has been under design and preparation for quite some time, with bid letting for construction planned for April 2014. The non-conformance with the 'freeboard' requirement wasn't identified until after Floodplain Development Permit FDP-12-04 was issued and while the specific bridge design is intended to have a full channel opening wider and deeper than the current existing bridge, a design modification at this point in time would be problematic due to horizontal right-of-way constraints which would necessitate a re-design to include less preferable vertical mid-channel support structures.
 - b. **Failure to grant the variance would result in exceptional hardship to the applicant;**

The application indicates the proposed beam elevation is based on a complex combination of constraints including roadway vertical alignment, available right of way, geotechnical considerations, avoidance of an existing neighboring drainfield, and project objective to provide a clear span bridge opening with no piers. Apparently, redesigning the vertical alignment would compromise one or all of those constraints.
 - c. **There are no basements nor residential dwelling that has the lowest floor elevation below the Base Flood Elevation;**

This criterion is not applicable to the proposed project for a highway stream crossing in the flood fringe for which a Floodplain Development Permit is required pursuant to standards outlined in Section 5.03(C) FCFR.
 - d. **Crawl spaces are no more than two (2) feet below the exterior lowest adjacent grade and must have an inside dimension from interior ground to the bottom of the living floor of less than five (5) feet. The crawl spaces must meet the dry flood proofing requirements in Section 5.03(M)(3);**

This criterion is not applicable to the proposed project for a highway stream crossing in the flood fringe for which a Floodplain Development Permit is required pursuant to standards outlined in Section 5.03(C) FCFR.

- e. Granting of a variance will not result in increased flood heights to existing insurable buildings, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with other existing local laws or ordinances;**

The application indicates the proposed project would not increase flood heights, and that increasing the height of the low beam elevation would not change flood heights. It is not anticipated that the proposed bridge would result in a threat to public safety as the conveyance through the proposed larger bridge opening would be improved. Based on submitted information and applicable provisions of the Flathead County Floodplain and Floodway Management Regulations, it is not anticipated the project would create an extraordinary public expense, cause fraud on or victimization of the public, or conflict with other existing local laws or ordinances.

- f. The proposed use is adequately flood proofed;**

Pursuant to Chapter 8 FCFR 'Flood Proofing' is defined as "*any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.*" It appears reasonable to consider the proposed bridge to be adequately flood proofed due to its design by a registered professional engineer which is intended to withstand forces exerted by a flood event of a 500-year magnitude.

- g. The variance is the minimum necessary, considering the flood hazard, to afford relief;**

The application indicates the proposed variance is the minimum necessary. This is supported by submitted information indicating the vertical deviation from the required 2-foot 'freeboard' would be at maximum 0.4 feet while the new bridge low beam would be 0.9 feet higher than the existing bridge's low beam.

- h. Reasonable alternative locations are not available;**

There are no reasonable alternative locations because the bridge is critical public infrastructure for U.S. Highway 2 and the proposed replacement is due to the fact the existing bridge has been found to be functionally obsolete and deteriorated.

- i. There is no danger to life and property by water that may be backed up or diverted by the obstruction or use;**

The application indicates there are no recognized flooding issues associated with the bridge, and the proposed design would result in 0.04 feet less backwater on the upstream side than the existing bridge. As the proposed bridge would have a wider and taller opening than the current existing bridge, the proposal would improve conveyance of water in comparison with the current existing bridge which was constructed in 1933.

- j. There is no danger that the obstruction or use will be swept downstream to the injury of others;**

The application indicates the bridge has been designed by a registered professional engineer to withstand forces exerted by a flood event of a 500-year magnitude, and the bridge beams would be connected to the bridge abutments and therefore cannot be swept downstream.

k. Incorporates measures in the construction or alteration of the obstruction or use that lessens the danger;

The application indicates the proposed bridge would lessen danger related to potential flooding because it would provide a much larger opening than the existing bridge.

l. The permanence of the obstruction or use;

The application indicates the bridge has a design life of 75 years during which it would be used by the traveling public.

m. There is no adverse effect to anticipated development in the foreseeable future of the area that may be affected by the obstruction or use;

The proposed work is not anticipated to adversely affect any future plans for area properties and the nature of the project is compatible with the character of the surrounding area as it will provide the essential continued use of US Highway 2 West. Implementation of the proposed work would not affect the ability of neighboring properties to undergo development or re-development.

n. There is no adverse effect to existing properties or structures;

The application indicates there would be no adverse effect to existing properties or structures as the BFE would not be increased by the project. Potential for adverse backwater effects would be reduced through design of a larger bridge opening, therefore improving safety to upstream properties and structures.

o. Any increase to the Base Flood Elevation in a Floodway has been approved by FEMA for flood insurance purposes and any increase to the Base Flood Elevation in the Floodway or Flood Fringe of more than 0.5 feet is an alteration of the Regulated Flood Hazard Area has been duly amended pursuant to Section 1.13;

This criterion is not specifically applicable to the proposed project for a highway stream crossing in the flood fringe as the project site is not located in the regulatory *floodway*, however submitted information indicates the proposed bridge would include a wider opening than the existing bridge resulting in a slightly lower BFE at the upstream face of the bridge in comparison with the existing bridge.

p. That the Montana Department of Natural Resources and Conservation (DNRC) has considered and provided comments, based on technical review.

The Montana DNRC has provided written comment on the proposed bridge indicating “the applicant has provided reasonable design and hydraulic analysis that provides documentation that complies with the Flathead County Floodplain Regulations. The design engineer of record has provided reasonable and credible evidence that the BFE will not be raised in the approximate A Zone floodplain.”

2. Special considerations for variance approval:

a. If the new construction or substantial improvements on a lot of one-half acres or less is contiguous to and surrounded by lots of existing structures constructed below the Base Flood Elevation, a variance may be approved. However, as lot sizes increase beyond one-half acre additional technical justification may be required;

b. Historic Structures – variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation

will not preclude the structure's continued designation as a historic structure and the variance is the minimum relief necessary to preserve the historic character and design of the structure.

The special considerations listed above are not applicable to the proposed project for a highway stream crossing in the flood fringe for which a Floodplain Development Permit is required pursuant to standards outlined in Section 5.03(C) FCFR. There is no indication the existing bridge has been designated a 'historic structure'.

FINDINGS OF FACT

Finding #1

Failure to grant the variance would result in exceptional hardship to the applicant because the proposed low beam design and its 'free board' of 1.9 feet above the calculated BFE is based on a complex combination of constraints including roadway vertical alignment, available right of way, geotechnical considerations, avoidance of an existing neighboring drainfield, and the project objective to provide a clear span bridge opening with no piers, one or all of which may be compromised if re-design of the vertical alignment was necessary.

Finding #2

The request substantially complies with the established variance criteria a-f because the requested variance has a good and sufficient cause, the hardship is based on a combination of constraints which the applicant has little or no control over, re-design of the bridge would necessitate a less preferable bridge opening, and the bridge is sufficiently flood-proofed as its designed to withstand a 500-year flood event.

Finding #3

The requested variance is the minimum necessary to afford relief from strict compliance with the applicable regulations because the vertical deviation from the required 2-foot 'freeboard' would be at maximum 0.4 feet while the new bridge low beam would be 0.9 feet higher than the existing bridge's low beam.

Finding #4

The request substantially complies with the established variance criteria g-l because the requested variance is the minimum necessary to develop an improved and satisfactory bridge within the physical constraints presented at the location where the existing bridge has been found to be functionally obsolete and deteriorated, the proposed design would result in 0.04 feet less backwater on the upstream side than the existing bridge, the bridge beams would be connected to the bridge abutments and therefore cannot be swept downstream to the injury of others, and the proposed bridge with a 75 year design life would lessen danger related to potential flooding because it would provide a much larger opening than the existing bridge.

Finding #5

The request substantially complies with the established variance criteria m-p because the proposed project is compatible with the character of the surrounding area as it would facilitate essential continued use of US Highway 2 and would not affect the ability of neighboring properties to undergo development or re-development, would not adversely effect existing properties or structures because the BFE would not be increased, and the Montana DNRC commented the applicant has provided reasonable design and hydraulic analysis indicating the BFE will not be raised in the approximate A Zone floodplain and that the proposal complies with the Flathead County Floodplain Regulations.

CONCLUSION

Section 1.1(C)(1) of the Flathead County Floodplain and Floodway Management Regulations (FCFR) indicates a variance shall only be issued upon a determination that the variance is the minimum allowance necessary, considering the flood hazard, to afford relief from these regulations and provided all applicable criteria are met.

Based upon the five findings of fact resulting from evaluation of the application, the variance request appears to meet all applicable criteria for review. Should the Flathead County Board of Adjustment determine to approve the requested variance the Board should adopt staff report #FDV-13-01 as findings of fact and approve the variance to Section 5.03(C)(2) FCFR to permit the proposed bridge to have a 'free board' less than 2-feet the following conditions:

- 1. The proposed project shall conform to the drawings and specifications submitted in the Floodplain Development Permit application.**
- 2. All fill material must be compacted, well graded, pervious, generally unaffected by water and frost, and appropriate for the purpose of supporting the intended use.**
- 3. All fill material placed for this project shall be free of organic materials such as tree limbs, sawdust, grass, garbage, and trash. Acceptable fill material may include clean rock. The use of broken asphalt and or concrete for fill is prohibited.**
- 4. The contractor awarded the project shall obtain a 318 Authorization from the Montana Department of Environmental Quality and implement its requirements prior to commencement of any construction activity in Flood Zone A.**
- 5. Site development must comply with applicable conditions of the SPA 124 permit and 318 Authorization issued for the project.**
- 6. The lowest span of the described project bridge at station 20+89 shall be at least 1.6 feet above the modeled Base Flood Elevation for the bridge as described in the submitted Hydraulic Report and application materials (BFE at upstream face of bridge 3152.1 feet NAVD88).**
- 7. All excess material shall be located outside of the 100-year floodplain.**
- 8. All disturbed areas shall be re-vegetated/reseeded with vegetation species similar to existing species. This is to minimize erosion and soil loss in the event of flooding/high water.**
- 9. This permit is issued under the authority of the Flathead County Floodplain & Floodway Regulations.**
- 10. This permit is valid for one year from date of issuance unless an extension is requested and granted pursuant to the provisions outlined in Section 3.02(D) FCFR . Notification of completion shall be submitted to the Flathead County Planning & Zoning Office (751-8200) when the work is completed.**
- 11. A Floodplain Permit Compliance Certification shall be submitted to the Flathead County Planning and Zoning Office within 10 days of project completion.**