

FLOODPLAIN Factor Sheet

06-12-2019

Wisconsin Department of Transportation

Alternative:	Preferred: ☐ Yes ☐ No ☐ None identified	Project ID:
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When completed this Factor Sheet along with the Environmental Document acts as the Location Study consistent with 23 CFR 650.111.

A separate Factor Sheet must be completed for each floodplain impacted by an alternative being carried forward for detailed analysis. If multiple alternatives have identical impacts they can be discussed on a single Factor Sheet

Development in a floodplain is prohibited in the floodway and restricted based on fill in the flood fringe.

As indicated in the DOT/DNR Cooperative Agreement and its 1988 attachment related to Waterway Crossings and other Floodplain Encroachments, WisDOT will evaluate impacts from all proposed construction affecting mapped floodplains and will carry out appropriate coordination with the local floodplain zoning authority.

Consult with the Region Environmental Coordinator (REC) for help determining environmental coordination necessary for your specific project. It may vary some depending on the scale and type of encroachment.

Contact a Bureau of Structures Hydraulic Engineer and/or the Statewide Drainage Engineers in the Bureau of Project Development Roadway Standards Unit to determine appropriate Hydrology and Hydraulic Analysis for your project. Impacts from roadways, non-number culverts (no B or C number) are to be coordinated with the Statewide Drainage Engineers.

When applicable, the information on this Factor Sheet should be consistent with what is included on the Environmental Document Template, the Community Factor Sheet, Wetlands Factor Sheet, Surface Water Factor Sheet, Erosion Control Factor Sheet, Stormwater Factor Sheet, Threatened and Endangered Factor Sheet or any other relevant Factor Sheet. If there is discussion of indirect or cumulative impacts on this Factor Sheet, be sure they are also reflected in the indirect impacts and cumulative impacts discussion in the environmental document.

See helpful links at the bottom of this Factor Sheet for additional in-depth information and context if needed.

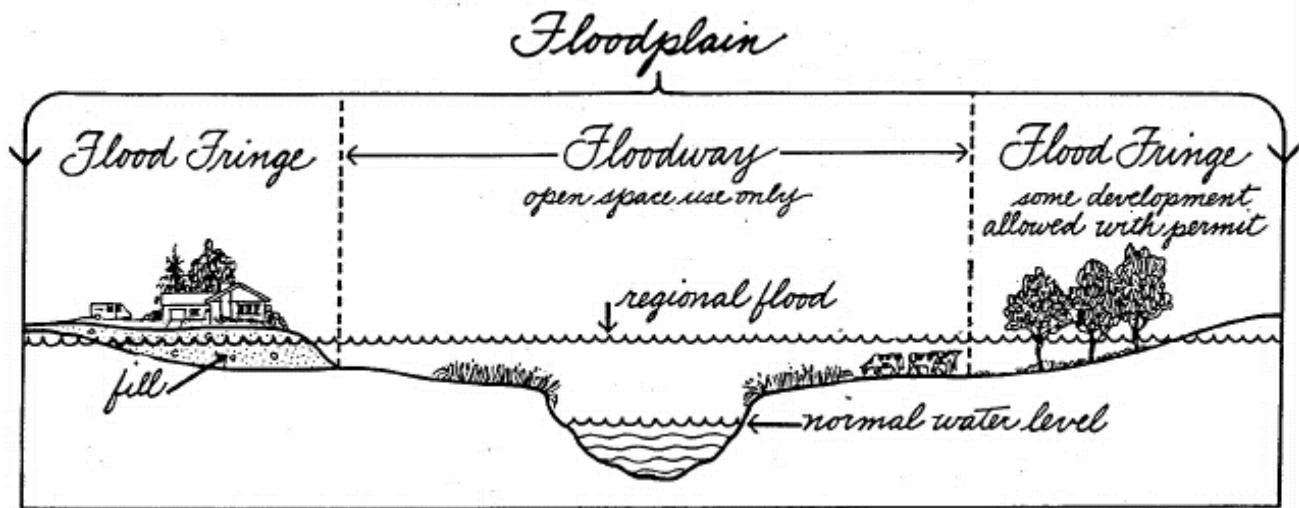
- 1. Name the floodplain watershed (and floodplain zoning authority), where your project is located and encroaching. Encroaching includes modification or repair of existing transportation facilities already in a floodplain. Confirm if the community participates in the Federal Emergency Management Administration (FEMA) voluntary National Flood Insurance Program (NFIP):**

An encroachment is an action within the limits of the floodplain. An action is any highway construction, reconstruction, rehabilitation, repair, or improvement undertaken with Federal or Federal-aid highway funds or FHWA approval per federal regulations (23 CFR 650.105 definitions).

DNR defines an encroachment as any fill, structure, equipment, use or development in the floodway. And a floodway is the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge. The flood fringe is that portion of the floodplain outside of the floodway which is covered by floodwaters during the regional flood and associated with standing water rather than flowing water. The flood fringe can be filled or modified without affecting the floodway

A floodplain is land which has been or may be covered by flood water during the regional flood. It includes the floodway and the flood fringe and may include other designated floodplain areas for regulatory purposes.

The regional flood is a flood determined to be representative of large floods with a one percent chance of being equaled or exceeded in any given year (also known as the 100-year flood or FEMA base flood).



A. Floodplain:

Name floodplain based on waterbody descriptions relevant (e.g., Fox River floodplain, Turtle Creek, etc.).

B. Watershed: Size: (square miles)

Name and list the local watersheds appropriate to scale, context and intensity of encroachment.

DNR defines watershed as the entire region contributing runoff or surface water to a particular watercourse or body of water. FEMA defines watershed as the area of land where all precipitation drains to a common waterway.

Identify the most relevant watershed based on the scale, context and intensity of your project.

<https://dnr.wi.gov/topic/watersheds/> - DNR Watersheds and Basins

<https://water.usgs.gov/wsc/index.html> - Locate Your Watershed by Hydrologic Unit Code (HUC)

https://www.usgs.gov/core-science-systems/ngp/national-hydrography/watershed-boundary-dataset?qt-science_support_page_related_con=4#qt-science_support_page_related_con - Watershed Boundary Dataset

<https://www.epa.gov/hwp/basic-information-and-answers-frequent-questions#what>

C. Municipality:

Name and list municipalities appropriate to the scale and context of your project location or encroachment. If not within a municipality indicate none.

D. NFIP Applicability: ☐ Yes ☐ No, status date:

Note, some communities get suspended or withdraw from NFIP through time, so check website for current list and provide the date when you reviewed website.

<https://www.fema.gov/national-flood-insurance-program-community-status-book> - Community Status Book.

E. Attach map illustrating watershed, floodplain, and project limits. Map location:

2. Indicate watershed characteristics:

- ☐ Rural Watershed
- ☐ Rapidly Urbanizing Watershed - NR 116.03 (40)
- ☐ Urban Watershed
- ☐ Priority watershed – NR 120.02 (30)

Provide additional description of the upstream and downstream flow characteristics and potential floodwater receptors based on the context and intensity of the alternative within the watershed:

Rapidly urbanizing watershed means a watershed where more than 20% of the land area of the watershed has been developed for residential, commercial or industrial uses or where development of the watershed is projected to grow at a rate of 10% or more in the next 10-year period.

Priority watershed means a watershed or lake area which the department has identified through the continuing planning process under s. 283.83, Stats., and which has been designated by the land and water conservation board under s. 281.65 (3m) (a), Stats., as a watershed where the need for nonpoint source water pollution abatement is most critical. Priority watersheds may be easily identified using DNR's Surface Water Data viewer:
<https://dnrmaps.wi.gov/H5/?Viewer=SWDV>

3. Indicate key regulatory zones the alternative encroaches upon, per Wisconsin Department of Natural Resources (DNR) Floodplain Management definitions and confirm mapping status for your location in E below:

A. ☐ Floodplain

Land which has been or may be covered by flood water during the regional flood. It includes the floodway and flood fringe and may include other designated floodplain areas for regulatory purposes.

B. ☐ Floodway

The channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge. Development is strictly regulated in the floodway and most new structures are not allowed. Fill may be allowed if it is shown after engineering analysis that it causes no obstruction to flow and no increase in flood elevations.

C. ☐ Flood Fringe

That portion of the floodplain outside of the floodway which is covered by floodwaters during the regional flood and associated with standing water rather than flowing water. This area is primarily a floodwater storage area, so fill and elevated structures can be placed in this area. However, compensatory storage may be required. Most development activities are allowed if structures are elevated above the regulatory flood protection elevation.

D. ☐ Flood Storage

Those floodplain areas where storage of floodwaters has been considered during analysis in reducing the regional flood discharge. Impacts to flood storage may require compensatory storage elsewhere.

Floodway and flood fringe areas are designated only after engineering studies whereas the general floodplains (areas labeled as unnumbered A Zone or Zone A are approximate.

<https://dnr.wi.gov/topic/surfacewater/swdv/> - DNR Surface Water Data Viewer (see floodplains).

<https://dnr.wi.gov/topic/FloodPlains/history.html#Definitions> – DNR definitions.

If the regional flood profile has not been determined, maps based upon historical floods, flood prone area maps, flood hazard boundary maps, aerial photos or detailed soils maps may initially serve as a basis for floodplain delineation, provided that the associated text of the zoning ordinance provides for a procedure similar to ss. NR 116.20 (2) and 116.21 (3) to ascertain the effects of all development upon flood flows and the regional flood elevation.

E. ☐ Confirmed DNR approved mapping status on this date:

1. ☐ Mapped Floodplain

2. ☐ Unmapped Floodplain

4. Indicate zones your alternative encroaches upon, per Floodplain Zoning Authority Zoning Map:

☐ Municipal Floodplain Zoning Map approved, map date: _____ or not applicable ☐.

Map location:

Floodplain zoning authorities are required to delineate the entire floodplain on their floodplain zoning maps. Official floodplain zoning maps used for regulatory purposes are approved by the DNR and then adopted by the municipality. The DOT funded DNR Transportation Liaisons can help confirm status or the DNR Floodplain Management program contacts:

<https://dnr.wi.gov/topic/Sectors/Transportation.html>

https://dnr.wi.gov/topic/FloodPlains/staff_flood.html

- A. ☐ Floodway district
- B. ☐ Flood fringe district
- C. ☐ Regional flood elevation

Regional flood means a flood determined to be representative of large floods known to have occurred in Wisconsin or which may be expected to occur on a lake, river or stream once in every 100 years. The regional flood is based upon a statistical analysis of lake level or streamflow records available for the watershed or an analysis of rainfall and runoff characteristics in the watershed or both. In any given year, there is a 1% chance that the regional flood may occur or be exceeded. During a typical 30-year mortgage period, the regional flood has a 26% chance of occurring.

- D. ☐ Shallow depth flooding district

Shallow depth flooding areas means those areas where the maximum depth of flooding does not exceed one foot in depth nor 6 hours in duration during the regional flood.

- E. ☐ Flood storage district
- F. ☐ Coastal floodplain district

Coastal floodplain means an area along the coast of Lake Michigan or Lake Superior which is inundated by the regional flood and which is also subject to additional hazards due to wave runup.

- G. ☐ Floodplain Island

Floodplain island means a natural geologic land formation within the floodplain that is surrounded, but not covered, by flood water during the regional flood.

5. Indicate floodplain zone(s) your alternative encroaches per FEMA NFIP Flood Insurance Rate Map (FIRM) risk identification map legend definitions.

- ☐ Special Flood Hazard Areas (SFHAs) in Zone:
- ☐ Floodway Areas in Zone AE
- ☐ The project footprint is outside the SFHA and Floodway Areas in Zone AE

A copy of the FIRM Map with overlay of project encroachment must be included. Map location:

<https://msc.fema.gov/portal/home> - FEMA Flood Map Service Center

The Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate Maps (FIRMs) that show areas at risk to flooding. The FIRMs are based on engineering studies called Flood Insurance Studies (FIS). The FIRMs can be changed through Letters of Maps Change (LOMCs).

Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHAs are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood, or 100-year flood.

SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.

Structures within SFHA are at risk to flooding during the 1-percent annual chance flood.

Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood.

The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).

6. Briefly describe encroachment and proposed work in, over, or adjacent to floodplain and complete questions below:

Examples of description might be: bridge replacement, new roadway alignment and embankment, new stream or floodplain crossing, new culvert extension, minor road rehabilitation, etc. Briefly describe the context and intensity of the encroachment.

A. Indicate type of encroachment:

- ☐ Structure, describe type:
- ☐ Drainage improvement, pipe culvert replacement or extension
- ☐ Roadway/embankment fill
- ☐ Temporary causeway expected
- ☐ Other (explain):

B. Indicate type/s of encroachment alignment, length and scale of overall footprint on floodplain for the alternative:

- ☐ Transverse – length ☐ ft. ☐ miles

Transverse encroachment is defined as 30 to 90-degree crossings of floodplain (e.g. perpendicular bridge crossing of river or stream) for filling out this form.

- ☐ Longitudinal - length ☐ ft. ☐ miles

Longitudinal encroachment is defined as 30-degree or less crossing of floodplain (e.g. Lengths of roadway along or beside streams, rivers, lakes, etc.).

- ☐ Combined transverse and longitudinal encroachment will occur
- ☐ Encroachment footprint: ☐ acres

C. Will this be a new footprint encroachment or a modification to existing infrastructure resulting in encroachment or possibly a reduction in historical transportation facility footprints on the floodplain?

- ☐ New footprint
- ☐ Modification to existing footprint
- ☐ No change in footprint
- ☐ Reduction in footprint

7. What are your anticipated floodplain backwater conditions from this alternative based on the DOT approved computed Hydrology and Hydraulic Analysis methodology? Reference results to DNR Floodplain Management NR 116 criteria:

- ☐ Increase in regional flood height (a calculated rise equal to or > 0.01 ft)
- ☐ No change in regional flood height
- ☐ Decrease in regional flood height

Indicate methodology used and date of analysis:

Per NR 116.03 (28), an increase in regional flood height means a calculated upward rise in the regional flood elevation, equal to or greater than 0.01 foot, resulting from a comparison of existing conditions and proposed conditions which is directly attributable to development in the floodplain but not attributable to manipulation of mathematical variables such as roughness factors, expansion and contraction coefficients and discharge.

Per NR 116.07(f), calculation of the regional flood profile means the regional flood profile and changes to that profile caused by development in the floodplain, as determined by the hydraulic model, shall be calculated to the nearest 0.01 foot.

Increases in regulatory floodplain elevations are permissible when coordinated with DNR following procedures defined in the February 11, 1988 Cooperative Agreement Implementation Memo of the DOT/DNR Cooperative Agreement, Section VII – Waterway Crossings and Other Floodplain Encroachments (March 1987). When WisDOT projects are

anticipated to result in an increase in regional flood height, consult with the Bureau of Structures, Hydraulics Unit or one of the Statewide Drainage Engineers in the Bureau of Project Development Roadway Standards Unit.

https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/environment/DOTDNRCoopagrattachbkmk_Redacted.pdf - Implementation of DOT/DNR Cooperative Agreement, Sec VII – Water Crossings and other Floodplain Encroachments

8. Indicate effects of backwater change and encroachment actions on the physical, chemical and biological integrity of the floodplain ecosystem services.

A. ☐ Physical integrity (floodway flow and flood risk to property loss and hazard to life)

☐ benefit

☐ no effect

☐ adverse effect

Describe:

B. ☐ Chemical integrity (surface water and groundwater quality)

☐ benefit

☐ no effect

☐ adverse effect

Describe:

C. ☐ Biological integrity (human environment and ecological functions and services)

☐ benefit

☐ no effect

☐ adverse effect

Describe:

9. What avoidance, minimization or compensation measures will be considered:

If the alternative discussed on this sheet includes a longitudinal encroachment, briefly discuss the practicability of alternatives to the longitudinal encroachment and reference the other sheets where those alternatives are described.

10. Are there beneficial opportunities to develop new floodplain storage or reestablish old floodplain storage to offset or mitigate impact as part of infrastructure development? Are there other feasible ecological restoration or enhancement opportunities such as wetland restoration, stream restoration, aquatic organism passage (AOP), wildlife crossings or other:

☐ yes, describe:

☐ no, describe:

11. Describe and provide the results of coordination with any regulatory agency or floodplain zoning authority, and describe any public comments related to the encroachment action:

12. Is the alternative compatible with Federal, State or Local floodplain land use plans and expectations?

☐ yes

☐ no

Describe:

Determine which land use plans and expectations exist through public and agency coordination. Describe which land use plans apply and how you determined that they apply. Describe whether the alternative will support probable incompatible development in the floodplain.

13. If this project is an FHWA action, indicate if the alternative would cause any of the following SIGNIFICANT ENCROACHMENTS per FHWA Regulations (23 CFR Subpart A 650.105(q)):(If the project is not an FHWA action skip to question 14.)

☐ Significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or a community's only evacuation route. Describe:

☐ Significant risk. Risk means the consequences associated with the probability of flooding attributable to an encroachment. It includes the potential for property loss and hazard to life during the service life of highway. Describe:

☐ Significant adverse impact on natural and beneficial floodplain values such as fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge. Describe:

If any of the boxes above are checked, a significant encroachment on a floodplain will occur, requiring FHWA to prepare an Only Practicable Alternative Finding (Finding). FHWA signature on the final environmental document indicates adoption of the Finding described below:

☐ No significant encroachment, explain:

If question 13 checkboxes 1-3, are checked above, your project may require preparation of an Environmental Impact Statement. If you think impacts to floodplains may be significant, contact your REC and BTS-EPDS liaison as soon as possible. Consult FHWA on the potential for significant impacts to arise from an anticipated significant floodplain encroachment.

If this sheet is being prepared for an alternative that is has not been identified as the preferred or selected alternative, provide the following details:

- State that this alternative is not the preferred alternative.
- Provide the name of the alternative that is the preferred or selected alternative and whether it will require a Finding.
- If a Finding is required, provide a reference to the page(s) of the environmental document where the finding is included.

If this sheet is being prepared for the preferred or selected alternative, and that alternative requires a Finding, provide a justification for the finding. The justification for the Finding must include the following (23 CFR 650.113):

- The reasons why the alternative must be located in the floodplain,
- The other alternatives considered and why they were not practicable,
- A description of efforts to avoid, minimize, and mitigate the impacts of the encroachment, and
- A statement indicating whether the alternative conforms to applicable State or local floodplain protection standards.
- Conclude with the following statement: "Based on these factors, WisDOT and FHWA have determined that the significant encroachment described above is the only practicable alternative."

If this sheet is being prepared as part of a draft ER or EA, provide a preliminary justification that includes the points above and states that the Only Practicable Alternative Finding will be finalized when the final environmental document (final ER or FONSI) is approved. If this sheet will be attached to a CEC or PCE to document project impacts to a floodplain, consult FHWA prior to the approval of the CEC to determine their involvement in the review and approval of the floodplain finding.

For additional guidance, see:

<https://www.ecfr.gov/cgi-bin/text-idx?SID=05128bd9b62e4b41742688e930392aa8&mc=true&node=pt23.1.650&rgn=div5#sp23.1.650.a> – 23 CFR 650 Subpart A

<https://wisconsin.gov/rdw/fdm/fd-20-45.pdf#fd20-45-30> – FHWA Floodplain Report

14. Indicate the timing of possible State or Federal Agency permits, approval and coordination for the floodplain encroachment and list the Agencies. In addition to DNR and FHWA, other possible Agency approvals may include: US Army Corp of Engineers (USACE), FEMA, United States Coast Guard (USCG), United States Environmental Protection Agency (EPA) and United States Fish and Wildlife Service (USFWS):

- ☐ Prior to completion of environmental document:
- ☐ Post environmental document approval and included as an environmental commitment:
- ☐ Prior to Construction Let:
- ☐ Prior to Construction:

Contact the REC for help determining timing of approvals necessary for completion of the environmental document for your specific project. It will vary depending on the scale and type of encroachment.

15. Impacts from all proposed construction affecting hydraulic characteristics of mapped floodplains have been evaluated. Implementation procedures for data sharing, landowner notifications and legal arrangements for addressing concerns associated with waterway crossings and other floodplain encroachment as identified by NR 116 (Wisconsin's Floodplain Management Program) and NR 320 (Bridges and Culverts In or Over Navigable Waterways) have been or will be addressed prior to construction pursuant to the DOT/DNR February 11, 1988 Cooperative Agreement Implementation Memo of the DOT/DNR Cooperative Agreement, Section VII – Waterway Crossings and Other Floodplain Encroachments (March 1987):

- ☐ Yes, procedure for mapped areas is complete
- ☐ Yes, procedure for unmapped areas is complete
- ☐ No, procedure for mapped areas is pending final design (add to environmental commitments), discuss:
- ☐ No, procedure for unmapped areas are pending final design (add to environmental commitments), discuss:

All environmental commitments made to avoid, minimize or compensate for impacts must be included in Question 23 of the ER and EA Template, Section 5 of the PCE Template or Question XII of the CEC Template.

Helpful Links:

https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/environment/DOTDNRCoopagrattachbkml_Redacted.pdf - Implementation of DOT/DNR Cooperative Agreement, Sec VII – Water Crossings and other Floodplain Encroachments

<https://wisconsindot.gov/rdwy/fdm/fd-05-15.pdf#fd5-15-5> – Floodplain Zoning Authority

<https://wisconsindot.gov/dtsdManuals/strct/manuals/bridge/ch8.pdf> - Bridge Manual

<https://wisconsindot.gov/rdwy/fdm/fd-13-10.pdf> - FDM Drainage

<https://wisconsindot.gov/dtsdManuals/strct/other/strmcrcs-clist.pdf> - Stream Crossing Structure Survey Report

<https://docs.legis.wisconsin.gov/statutes/statutes/87/30> - Floodplain Zoning

https://docs.legis.wisconsin.gov/code/admin_code/trans/207 - Design & Construction of Municipal Bridges in or over Navigable Streams

<https://www.fhwa.dot.gov/engineering/hydraulics/hydrology/> - FHWA Hydrology and Floodplains

<https://www.epa.gov/cwa-404/floodplain-management> - Executive Order 11988 Floodplain Management

<https://www.govinfo.gov/content/pkg/CFR-2011-title23-vol1/pdf/CFR-2011-title23-vol1-part650-subpartA.pdf>

https://www.usgs.gov/faqs/where-can-i-find-flood-maps?qt-news_science_products=0#qt-news_science_products - USGS Where Can I find Flood Maps

<https://water.usgs.gov/GIS/regions.html> - USGS Hydrologic Unit Map

<https://www.usgs.gov/centers/wisconsin-water-science-center> - USGS Wisconsin Water Science Center