



Department of Permitting Services
 Land Development Division
 255 Rockville Pike, 2nd Floor
 Rockville, MD 20850-4166
 Phone: 311 in Montgomery County or (240)-777-0311
 Fax (240)-777-6339
<http://www.montgomerycountymd.gov/permittingservices/>



Floodplain Delineation Study (FPDS)

Project Name: _____ **Engineer/Phone No.** _____

Floodplain Delineation Study: _____

SWM Permit No.: _____ **Assigned/Phone No.** Bill Musico / (240) 777-6340

Legend:

		<i>Submittal Date</i>	<i>Review Date</i>	<i>Initial</i>
INC	Incomplete/Incorrect			
N/A	Not Applicable			
SC	Sediment Control	_____	_____	_____
SWM	Stormwater Management	_____	_____	_____
FPDP	Floodplain District Permit	_____	_____	_____
DA	Drainage Area	_____	_____	_____
SPA	Special Protection Area			
ESD	Environmentally Sensitive Design			

_____ *Study Acceptable* _____ *Date*

These checklists have been designed to provide specific instruction to engineers. All items are expected to be addressed in the first submittal. Failure to do so will result in less than a full first review. If any items marked with an asterisk (*) are not addressed, no further review of the first submittal will be made. The plan will be returned to the engineer for completion and will have to be resubmitted for a new first review. (Review fees already paid will be credited).

TO THE ENGINEER:

Your submission for plan approval has been reviewed. The review was made per the following checklists. **Please return the checklists and plan comment sheets with your resubmittal.** If you do not address a checklist item, including comments on the Floodplain Delineation Study plan sheets, explain your reasoning in your transmittal letter or by writing directly on the returned plan next to the relevant plan review comment.

Supporting Information

- * _____ A transmittal detailing the methodology and background data must accompany the submittal package. Please include a narrative describing the proposed land disturbance or construction activities.
- _____ *All new residential development including the subdivision of land is prohibited in the 100yr floodplain per Montgomery County Regulation 19.45.01.04 A1. Where all floodplain has been placed outside individual residential lots where possible the Department of Permitting Services may recommend The Planning Board permit floodplain, or unsafe land to be platted as a part of a lot in which there is sufficient safe ground to erect a building or dwelling per Montgomery County Code Sec. 50-32(e)(2)(f)*
- * _____ One (1) copy of the 100-year Floodplain Delineation Study Plan and the Floodplain Analysis Report.
- _____ One copy of the or an excerpt from the grading/site plans that clearly show the existing and proposed development in the Floodplain and Buffer. Plans must show the existing and proposed grading, 100-year floodplain & flow paths, all structures; and conveyance systems with dimensions and inverts indicated. Sediment Control, Storm Water Management, Storm Drain, or Paving plans may be attached to submission as supporting exhibits, but should not be included in Floodplain Delineation Study Plan.



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_____ An Approximate Floodplain Determination Study using a simplified hydrologic and/or simplified hydraulic methods may be acceptable in areas when the limits of Floodplain Delineation is not required to clearly demonstrate that the Floodplain its form and function are protected and that no neighboring properties developable rights are affected COMAR 19.45.01.04B. Approximate studies are generally only acceptable when used to show a property is not in a neighboring unmapped floodplain or when the approximate floodplain is located such that proposed development would have a de minimis effect of the floodplain.

_____ Exemptions from permit maybe granted for public bridge and culvert replacement per Maryland *Department of Natural Resources, Water Resources Administration Operational Policy 93-1 for In-Kind Replacement of Bridges & Structures:*

- (1) Exact Replacement: Hydrologic & hydraulic analyses and floodplain impact review are not required.
- (2) Structurally In-Kind Replacement: Location and shape as a function of waterway size essentially unchanged and immediately upstream and downstream contains unimproved property otherwise must demonstrate replacement is Hydraulically In-Kind.
- (3) Hydraulically In-Kind: Hydraulic analysis required to demonstrate closeness of hydraulic performance of the 100yr flow, if the floodplain immediately upstream and downstream contains only unimproved property and rating curve for replacement structure indications no more than 0.5' increase in water surface elevation or 0.1' increase when improved property in immediate vicinity. MC DPS does require a hydrologic analysis of the 100-year event to determine the quantity of flow used with bridge / culvert rating table.

_____ Proposed projects which increase the risk of flooding to other property owners are prohibited, unless that area subject to additional risk of flooding is purchased, placed in designated flood easement, or addressed by other means acceptable to DPS. *Code of Maryland Regulations COMAR 26.17.04.11 B(6)*

100-year Floodplain Delineation Study Plan Requirements

- * _____ *Floodplain Delineation Study Plan* separate from supporting documentation plans.
- _____ First page note indicating floodplain study uses Maryland State Plane NAD83 Horizontal datum and National Geodetic Vertical Datum NAVD 88 as the basis for published flood elevations.
- _____ Drainage area map with major sub-watersheds, times of concentration and paths identified. A summary table must be provided on plan or in report including zoned ultimate land use, soil types, and weighted Runoff Curve Number. Soil information should list the general description of the predominant soil types on the site as described by the appropriate soil survey information available through the U.S. Soil Conservation Service.
- _____ *As the 100-year flood is defined as the flood that has a one percent chance of being equalled (sic) or exceeded in a given year (MC Code Article III Sec. 19-36).* Watersheds with less than a 24 hour time of concentration must compare the shorter duration 100yr events when modeling the 100-year flood.
- _____ Vicinity map with site outlined (1:2,000 scale) on first plan sheet.
- _____ "Related Required Permits" table completed and placed on the first FPDS plan sheet. These requirements are for Floodplain District and Sediment Control Permits. These required permits provided for information purposes, but are not required for Floodplain Delineation Study approval.
- _____ Floodplain Certification of Quantities placed on first plan sheet.
- _____ Table of "Properties Identified Within 100yr Floodplain" on 1st sheet indicating all properties affected



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by proposed construction increase of floodplain elevation. The study may be approvable without affected properties being purchased, placed in designated flood easement, or letter of consent provided, but proper authorization is required for the Floodplain District Permit of Sediment Control Permits.

- _____ _____ _____ Property lines and owner/legal description of adjacent properties. Properties that are impacted by an Increase of the 100yr Floodplain elevation must be identified on plan view.
- _____ _____ _____ Sealed by Maryland Registered PE on each plan page and report cover, with date and signature. The date of plans, report, and submitted shape files must all match.
- _____ _____ _____ All plan sheets of final package numbered consecutively with FPDS Sheet ____ of ____.
- _____ _____ _____ Composite sheet for large projects containing multiple plan sheets or sheet key for smaller studies showing schematic overview and sequence of sheets.
- _____ _____ _____ Scale (1" = 100' maximum), north arrow; impacts to individual lots must be discernable.
- _____ _____ _____ Match lines corresponding sheet to sheet.
- _____ _____ _____ Show all existing Floodplains and label by the approving authority (FEMA, MDE, MNCPPC, or MC DPS) along with approving authority reach identification. MC DPS studies cannot re-map existing floodplains as issued by FEMA or MDE; separate studies to these agencies may be required. Previous Floodplain Delineation Studies issued by DPS & MNCPPC will be re-mapped in the limits of this delineation study and must be labeled existing studies re-mapped per this study.
- _____ _____ _____ Plan showing 100 year Water Surface Elevations (WSEL) for preconstruction (Existing) and post-construction (Proposed) conditions. The WSEL below the 30 acre drainage threshold to be labeled as *Existing / Proposed 100yr FP Floodplain*. Additionally a 25' Floodplain Buffer from the most restrictive floodplain must be show & labeled on plan. Plan must indicate point of convergence of existing and proposed floodplains.
- _____ _____ _____ Stream station numbers, Cross sections labeled for both existing & proposed study.
- _____ _____ _____ *Proposed 100yr Base Flood Elevations* (BFE) lines; water surface elevation lines of the 100-year flood denoted in whole numbers by wavy lines running across the floodplain. If the 100yr floodplain elevation at any point along the plan view cannot be interpolated to the tenth of a foot (i.e. #.#) from BFE lines or if BFE lines begin to clutter the plan, then a profile of the stream showing centerline stationing, stream bed, cross sections locations, and 100yr flood elevation may also be required.
- _____ _____ _____ Cross sections must be field run or interpolated from 2' contours. Cross sections required at each significant change in slope, width, or roughness coefficient, and with maximum spacing of 500 feet. Field run cross sections must be taken at each structural crossing or when available agency approved As-built plans available.
- _____ _____ _____ Culverts and bridges require a minimum of six (6) modeling cross sections. Upstream and downstream sections must be placed at each end of bridge / culvert, within 5-10 ft of both ends, and where flow is fully expanded. The maximum length of culverts must be limited to 150 feet unless it can be demonstrated through an environmental study that any adverse impacts will be adequately mitigated. *COMAR 26.17.04.06 B(3)*.
- _____ _____ _____ The proposed development or activity showing streets; parking lots; topography; existing or proposed easements for storm drains, sewers, and other utilities; major building locations; and any proposed construction activities within the 100-year floodplain.



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- _____ Existing and proposed topography (2' contour intervals maximum) and earth disturbance to take place including the volume of material and surface area involved, and all cut and fill within floodplain must be indicated on plan.
- _____ Show and label existing and proposed improvements (utilities, streets, buildings, etc.) on plan view.
- _____ Excavated material is stockpiled outside the floodway.
- _____ Proposed floodplain encroachments, except for roadways, culverts, and bridges, shall be designed to provide a minimum of 1 foot of freeboard above the elevation of the 100-year frequency flood event. In addition, the elevation of the lowest floor of all new or substantially improved residential, commercial, or industrial structures shall also be at least 1 foot above the elevation of the 100-year frequency flood event. *COMAR 26.17.04.07 B(5)*

Delineation Methodology

- * _____ The hydrologic calculations shall be based on the ultimate development of the watershed, assuming fully developed to existing zoning (MD Code 26.17.04.04F) using TR-55, TR-20, HEC-1, or the Rational method (the use of the Rational method will be subject to prior approval by DPS). Site-specific rainfall precipitation frequency data recommended by the U.S. National Oceanic and Atmospheric Administration Atlas 14 (NOAA 14) must be used for estimating depth of rainfall. *MC DEP 04/09/91 Guidelines for 100yr Floodplain Determination*
- * _____ The hydraulics and water surface elevations for 100-year ultimate floodplain elevation must be determined using HEC-2, HEC RAS, and WSP-2. *MC DEP 04/09/91 Guidelines for 100yr Floodplain Determination*
- _____ Systems consisting of multiple sub-watersheds must provide a Simple line drawing of the TR-20 Schematic / Hydrology Input Diagram (showing all Sub-areas, Reach / Storage Routing, AddHyd, and Outlet) to aid understanding of model setup.
- _____ Report must provide X-Y Plots of each Existing and Proposed Cross-Sections and Structure Sections showing floodplain geometry, flow obstructions (e.g. bridge piers, area between low cord and high cord...), and 100yr water surface elevation. Each plot must reference the stream station number or cross section identification as shown on plan.
- _____ Water surface profiles computed using an energy balancing method, showing the invert elevation of the stream bed, water surface elevations, and water velocity, by segment, associated with the 100-year frequency flood events, for both the presently existing and proposed conditions, at each cross section. Cross sections shall be taken at appropriate intervals to a point, both downstream and upstream of the proposed project, where the presently existing and proposed water surface profiles coincide. *MD Code 26.17.04.07 A. 9c.*
- _____ For the hydraulic routing of the floodplain; storm drain inlets, curb openings, and all storm drains, shall be assumed to be clogged.
- _____ An environmental study, which identifies existing natural resources as well as proposed mitigation measures to offset the impacts of channelization, shall accompany proposed channel change. MD Code 26.17.04.07 B. 8. (Projects receiving a Joint Federal/State Permit for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland may be exempt from submitting proof of compliance as covered under Federal/State permit.)



Data Files (Not Required for Approximate Floodplain Delineations)

_____ Digital copies of the floodplain delineation study are required prior to release of floodplain delineation approval letter. The plans and comps are not stamped approved, but the approval letter references the date that the engineers signs and seals the approved plans and computations. If the latest submission of the Floodplain Delineation Study has only very minor comments, DPS may tell the engineer to submit revised signed, sealed, and dated plans along with data files. The date of the engineers signs the approved set will be the date of the Floodplain Study.***

_____ Floodplain Delineation Study Plan. Send the floodplain delineation plan set as single multipage pdf with pdf sheets set to actual paper size. The PDF file should be named with FPDS Number & Project Name & " Plan" as the file name, e.g. *275075_Clarksburg_Village_Plan.pdf*

_____ Floodplain Delineation Study Report. The Floodplain Delineation Plan Set as single multipage pdf with pdf sheets set to paper size. The PDF file should be named with FPDS Number & "Report" as the file name, i.e. *275075_Clarksburg_Village_Report.pdf*

_____ Copy of the or an excerpt from the grading/site plans that clearly show the existing and proposed construction in the Floodplain and Buffer. The Grading/Site Plan Set as single multipage pdf with pdf sheets set to paper size. The PDF file should be named with FPDS Number & "_Proposed _Improvements" as the file name, i.e. *275075_Clarksburg_Village_Proposes_Improvements.pdf*

_____ All HEC RAS Input and Output files place in a single zip file named with FPDS Permit Number & "HEC RAS Files" as the folder name, e.g. *275075_HEC_RAS_Files.zip*

The following GIS shapefiles for addition to the County Floodplain Map

_____ Limits of the delineated preconstruction 100yr Floodplain named with FPDS Number and "_Existing_100yr_FP" as the file name, e.g. *275075_Existing_100yr_FP.zip* as a GIS polygon (color=#005CE6, transparency=50%) with the following attributes:
 "DPS_STUDY" Text Field = DPS Floodplain Study Number.
 "ENGINEER" Text Field = Name of the Engineering Company completing study
 "DATE" Date Field = date of floodplain study in MM/DD/YYYY format. ***

_____ Limits of the delineated postconstruction 100yr Floodplain named with FPDS Number and "_Proposed_100yr_FP" as the file name, e.g. *275075_Proposed_100yr_FP.zip* as a GIS polygon (color=#005CE6, transparency=50%) with the following attributes:
 "DPS_STUDY" Text Field = DPS Floodplain Study Number.
 "ENGINEER" Text Field = Name of the Engineering Company completing study
 "DATE" Date Field = date of floodplain study in MM/DD/YYYY format. ***

_____ Limits of the 25' Buffer in a single zip GIS Shapefile named with FPDS Number and "_FP_Buffer", e.g. *275075_FP_Buffer.zip*, as a GIS polyline (color=#1A1A1A, transparency=0%, line width=2, pattern=solid) with the following attributes:
 "DPS_STUDY" Text Field = DPS Floodplain Study Number.
 "ENGINEER" Text Field = Name of the Engineering Company completing study
 "DATE" Date Field = date of floodplain study in MM/DD/YYYY format. ***

_____ Base Flood Elevation lines in a single zip GIS Shapefile named with FPDS Number and "_BFE", e.g. *275075_BFE.zip*. One GIS polyline (color=#E60000, transparency=0%, line width=2, pattern=solid) will be used to represent each whole number Base Flood Elevation line drawn across the entire width of the floodplain at the location where that BFE cross the stream centerline and where it intersects the flood delineation limits. Each BFE polyline should contain the following attributes:



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“DPS_STUDY” Text Field = DPS Floodplain Study Number.
“ENGINEER” Text Field = Name of the Engineering Company completing study
“DATE” Date Field = floodplain study in MM/DD/YYYY format. ***
“ELEV_FT” Numeric (Double) Field = Base Flood Elevation

_____ If the engineer is not able to submit the 3 above requested GIS shapefiles, they may submit 3 comma-delineated text files following the above mention file naming conventions. The first two columns of each file will be the Northing & Easting for each feature (row) in Maryland State Plane Coordinates. The remaining columns shall match the above mentioned attributes (i.e. DPS_STUDY, ENGINEER, DATE...)

Once the project has completely construction and the Floodplain Record Drawing Certification been accepted by the Department, will the Floodplain Delineation including its Buffer and Base Flood Elevations be considered a Montgomery County Regulated Floodplain.



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ADMINISTRATIVE FLOODPLAIN DELINEATION STUDY CHECKLIST

For DPS use only

<p>_____ Scanned Plans & Reports match approved plans</p> <p>_____ GIS limits of Floodplain, Buffer, and Base Flood Elevations match approved plans.</p> <p>_____ Draft Floodplain Delineation Study Approval Letter</p> <p>_____ Approval Letter signed by Water Resources Section Manager</p> <p><u>Fees Tab:</u></p> <p>_____ Application & Fee correctly reference Delineation Study and not Permit.</p> <p>_____ Review fee for Floodplain Delineation Study paid.</p> <p><u>Conditions Tab:</u></p> <p>_____ Permit Condition Released</p>	<p><u>Related Records:</u></p> <p>_____ Linked to Sediment Control Permit.</p> <p>_____ Linked to Floodplain District Permit</p> <p><u>Results Tab:</u></p> <p>_____ Start Review Date</p> <p>_____ End Review Date</p> <p>_____ Status – Approved</p> <p>_____ Comments – Document Waiver Information (If waived, and why).</p> <p><u>Plan Tracking:</u></p> <p>_____ Plan Track out to CUST</p> <p><u>Log Tab:</u></p> <p>_____ Log – Document Rejections, Request for Information, and Approval</p>
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PROPERTIES IDENTIFIED WITHIN 100YR FLOODPLAIN

Properties including those owned by applicant and those owned by a Federal, State, or Local Governments that are encumbered by this study's delineation 100yr floodplain must be listed in the table below. Additionally, the applicant must obtain the property owner's consent for those properties where the proposed construction results in an increase in the 100yr floodplain water surface elevation.**

No.	OWNER NAME	ADDRESS	LEGAL DESCRIPTION (SUBDIVISION NAME)	SUBDIVISION (SUBDIVISION No.)	LOT	BLOCK	PARCEL	PLAT	LIBER	FOLIO	MAX INCREASE 100YR FP (ft.)	REQUIRES OWNER'S CONSENT**
1												
2												
...												

****Per Code of Maryland Regulations COMAR 26.17.04.11 B(6) *Proposed projects which increase the risk of flooding to other property owners are prohibited, unless that area subject to additional risk of flooding is purchased, placed in designated flood easement, or addressed by other means acceptable to the Administration [MC Department of Permitting Services]. The Floodplain District and Sediment Control Permits that require owner's consent will not be issued until DPS receives written consent from all affected property owners.***

FLOODPLAIN CERTIFICATION OF THE QUANTITIES

"I hereby certify the construction associated with this floodplain delineation study will have the following effects on the capacity of the floodplain and area adjacent land place under the floodplain 100yr water surface elevation WSEL:

(+) Gross Gain of Floodplain - the increased capacity of floodplain, by CUT below 100yr WSEL
_____ cubic yards of earth removed (CUT) below the existing 100yr WSEL
_____ sq. ft. of land previously not in 100yr floodplain, but now inside the 100yr floodplain

(-) Gross Loss of Floodplain - volume of floodplain capacity loss, by
_____ cubic yards of earth added (FILL) below the existing 100yr WSEL
_____ sq. ft. of land previously within 100yr floodplain, but now not inside the 100yr floodplain.

Net Change in Floodplain (from above subtotals):
_____ cubic yards of change in Floodplain Storage gain (+) / loss (-)
_____ sq. ft. of Floodplain gain (+) / loss (-) by

All above metrics are determined from changes to existing / pre-construction 100-yr Floodplain."

Engineer Signature

Date

Printed Name and Title

MD PE License No.