DPS | Montgomery County Department of Permitting Services

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Floodplain Delineation Study (FPDS)

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

Floodplain Delineation Study: _____ _____

SWM Concept No.: _____ **Assigned/Phone No.** _____

Legend:

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

Submittal Date	*Review Date*	*Initial*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

_____
Study Acceptable *Date*

These checklists have been designed to provide specific instructions 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. 50.3.4.K.2.b. iv.*

*____ ____ ____ One (1) copy of the 100-year Floodplain Delineation Study Plan and the Floodplain Analysis Report.

____ ____ ____ One copy of or an excerpt from the construction 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, conveyance systems, and structures. Bridges and culverts construction plans must show supports, low cord, road elevation, railings/fences, or other elements that could impede the flow of the floodplain.

Revised 04/2023

____ ____ ____ An Approximate Floodplain Determination Study using simplified hydrologic and/or simplified hydraulic methods may be acceptable in areas when the limits of Floodplain Delineation are not required to demonstrate that the Floodplain its form and function are protected and that no neighboring property's 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 the proposed development would have a de minimis effect on the floodplain.

____ ____ ____ Exemptions from permit may be 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 reviews 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 the closeness of hydraulic performance of the 100yr flow, if the floodplain immediately upstream and downstream contains only unimproved property and a rating curve for replacement structure indications no more than 0.5' increase in water surface elevation or 0.1' increase when an improved property in the immediate vicinity. MC DPS does require a hydrologic analysis of the 100-year event to determine the quantity of flow used with the 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 a designated flood easement, or addressed by other means acceptable to DPS. *Maryland 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 included in the delineation plan. A summary table must be provided on a plan sheet 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.

____ ____ ____ The *100-year flood is defined as a 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 are provided for information purposes but are not necessarily required for Floodplain Delineation Study approval.

____ ____ ____ Floodplain Certification of Quantities placed on first plan sheet.

____ ____ ____ Table of "Properties Identified Within 100yr Floodplain" on the 1st sheet indicating all properties Identified with a 100yr floodplain within the limits of this delineation. The study may be approvable without affected properties being purchased, placed in designated flood easement, or a 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 the plan view.

____ ____ ____ Sealed by Maryland Registered PE on each plan page and report cover, with date and signature. The date of plans, reports, and submitted shapefiles must all match.

____ ____ ____ All plan sheets of the final package are 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 and label all existing Floodplains. FEMA must be labeled Panel Number, MNCPPC labeled stream name and date of the study, and MC DPS studies labeled by floodplain delineation study number. MC DPS studies can't re-map existing floodplains approved by FEMA; a separate Letter of Map Amendment to FEMA may be required. Previous Floodplain Delineation Studies issued by DPS & MNCPPC will be re-mapped and may be shown and labeled existing studies re-mapped per this study.

____ ____ ____ Plan showing 100-year Water Surface Elevations (WSEL) for preconstruction (Existing) and post-construction (Proposed) conditions, numerically indicated on each cross-section and each delineation plotted on the plan view. The WSEL below the 30-acre drainage threshold is to be labeled as *Existing / Proposed 100yr FP Floodplain*. Additionally, a 25' Floodplain Buffer from the most restrictive floodplain must be shown & labeled on the plan. The plan must also indicate the point of convergence of existing and proposed floodplains.

____ ____ ____ Stream centerline with station numbers labeled. Existing & Proposed crosssections labeled.

____ ____ ____ Show BFE lines on the floodplain delineation study plan view as represented per *FEMA December 2020 Guidance for Flood Risk Analysis and Mapping, Mapping Base Flood Elevations on Flood Insurance Rate Maps*. BFE lines must be shown for areas where a detailed study has been completed as a number on top of a black wavy line that bisects the floodplain. *These BFEs may be shown as whole-foot rounded values or to a tenth of a foot (decimal), depending on stream slope and map scale.* If the slope of the floodplain cannot be interpolated from BFE lines or BFE lines begin to clutter the plan, then a floodplain 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 are required at each significant change in slope, width, or roughness coefficient, and with a maximum spacing of 500 feet. Field run cross-sections must be taken at each structural crossing or when the agency-approved As-built plans are available.

____ ____ ____ Culverts and bridges require a minimum of six (6) modeling cross-sections. Upstream and downstream sections must be placed at each end of the bridge/culvert, within 5-10 ft of both ends and where the flow is 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.

____ ____ ____ 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 the floodplain must be indicated on the plan.

____ ____ ____ Show and label existing and proposed improvements (utilities, streets, buildings, etc.) on plan view.

____ ____ ____ 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. 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 the 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, or 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, the area between the 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 the 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 the 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 in Addition to Plan Sheets in Drawing Folder (Not Required for Approximate Floodplain Delineations)

____ ____ ____ Digital copies of the floodplain delineation study are required prior to the release of the floodplain delineation approval letter. The plans and comps are not stamped approved, but the approval letter references the date that the engineer signed and seal the approved plans and computations. The date the engineers sign the digital plan set will be the date of the Floodplain Study.***

____ ____ ____ Floodplain Delineation Study Plan. Send the floodplain delineation plan set as a single multipage pdf with pdf sheets set to the 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 multiple pdf files per major report sections.**. The PDF files should be named with FPDS Number & "Report" as the file name, e.g. FP_Report_*01*-Narrative.pdf, FP_Report_*02*-Boundary Conditions.pdf, FP_Report_*03*-Hydrologic Analsis.pdf, etc…

____ ____ ____ Copy of the or an excerpt from the grading/site plans that clearly show the existing and proposed construction in the Floodplain and Buffer. Provide the Grading/Site Plan Set as a single multipage pdf loaded into the Support Drawings Folder with pdf sheets set to the paper size. The PDF file should be named with FPDS Number & "_Proposed_Improvements" as the file name, e.g. *275075_Clarksburg_Village_Proposes_ Improvements.pdf*

____ ____ ____ All HEC RAS Input and Output files place in a single zip file named 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 the study
"DATE" Date Field = date of floodplain study in MM/DD/YYYY format. ***

____ ____ ____ Limits of the delineated post-construction 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 the 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 crosses the stream centerline and where it intersects the flood delineation limits. Each BFE polyline should contain the following attributes:

"DPS_STUDY" Text Field = DPS Floodplain Study Number.
"ENGINEER" Text Field = Name of the Engineering Company completing the 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 completed construction and the Sediment Control permit closed, will the Floodplain Delineation including its Buffer and Base Flood Elevations be considered a Montgomery County Regulated Floodplain.

ADMINISTRATIVE FLOODPLAIN DELINEATION STUDY CHECKLIST

For DPS use only

____ Scanned Plans & Reports match approved plans

____ GIS limits of Floodplain, Buffer, and Base Flood Elevations match approved plans.

____ Draft Floodplain Delineation Study Approval Letter

____ Approval Letter signed by Water Resources Section Manager

Fees Tab:

____ Application & Fee correctly reference Delineation Study and not Permit.

____ Review fee for Floodplain Delineation Study paid.

Conditions Tab:

____ Permit Condition Released

Related Records:

____ Linked to Sediment Control Permit.

____ Linked to Floodplain District Permit

Results Tab:

____ Start Review Date

____ End Review Date

____ Status – Approved

____ Comments – Document Waiver Information (If waived, and why).

Plan Tracking:

____ Plan Track out to CUST

Log Tab:

____ Log – Document Rejections, Request for Information, and Approval

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 incerease 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 recieves 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.