

Plan of Study Port Deposit Watershed Study for Flood and Stormwater Mitigation, Cecil County, Maryland

I. BACKGROUND AND STUDY AREA

A significant flash flood occurred in the Town of Port Deposit, Cecil County, Maryland on July 25, 2021. For the purposes of this Plan of Study, “flash flood” is defined as a flood that occurs from tributaries (streams), or from the watershed area to the Susquehanna River in Port Deposit. It is not flooding directly from the Susquehanna River. The July 25, 2021 storm, after significant rainfall on the watersheds to these streams that outfall in Port Deposit, has caused significant damages to buildings, roadways, and other infrastructure in the town. In addition, significant development is underway (Bainbridge) or scheduled (Granite Cliffs), and the impact of these developments have on flash flooding in Port Deposit is unknown.

The Town of Port Deposit has requested the assistance of the U.S. Army Corps of Engineers (USACE), Baltimore District, to complete a watershed study for flash flood and stormwater mitigation to assess the impact on the town of extreme precipitation events and proposed watershed development, and to develop flash flood and stormwater mitigation measures to reduce the risk of flash flooding.

II. PROPOSED STUDY

This study will be conducted by the Planning Division of USCAE-Baltimore District, under the Floodplain Management Services Program (FPMS) which is authorized by the Flood Control Act of 1960. The FPMS program is designed to provide planning-level assistance to communities and USACE partners for floodplain related issues. The project is planning-level only. No detailed design or construction will result from this investigation. The primary objectives of this study are:

1. Determine what impact, if any, the development in the Port Deposit watersheds have had on the flash flooding in the Town of Port Deposit, especially for the July 25, 2021 flood event.
2. Understanding and planning for how extreme precipitation events and their associated stormwater runoff impacts vary across existing and future land use patterns.
3. Develop flash flood and stormwater mitigation measures within the streams or stream’s watersheds to protect natural resources and minimize or prevent future damages to the Town of Port Deposit.

III. STUDY TASKS

Task 1- Data Collection

USACE will contact the appropriate entities to collect data pertinent to this investigation. The data to be collected will include (but not limited to): Geographic Information System (GIS) base

layers (roads, buildings, parcels etc...); aerial photography (recent and historic); topographic data (Digital Elevation Model (DEM) and contours); soils data; previous flood studies; bridge data and surveys; development plans; rainfall data; zoning or land use data; geological data; and historical flood and flow data. The anticipated sources of this data include federal partners such as the United States Geological Survey (USGS), Natural Resource Conservation Service (NRCS); and National Oceanic and Atmospheric Administration (NOAA); state partners such as Maryland State Highway Administration (MSHA), and local partners such as Cecil County Government and the Town of Port Deposit.

A significant amount of the data required for this current effort will be taken from the September 2015 study “*Flood Risk Management Plan for the Town of Port Deposit, Cecil County, Maryland*”, completed by USACE for the Town of Port Deposit under the Floodplain Management Services Program (FPMS). Stormwater mapping, digital elevation data, watershed delineations, and other pertinent data has already been collected as part of the September 2015 study, and will be used for this current investigation.

USACE, in coordination the Town of Port Deposit, will conduct two public hearings on this project that will be advertised and held during a scheduled public Council meeting

Task 2- Field Surveys

The purpose of this task is to collect up-to-date data for the watersheds, streams, and bridges, to support future tasks in this investigation. The streams (tributaries to the Susquehanna River) impacting the Town of Port Deposit will be walked by USACE staff. Along the walk, USACE staff will take channel cross-sections at numerous locations, measure and survey bridges across the tributaries and stormwater outfalls into the tributaries and visit locations in the watershed to note flow patterns. Stormwater mapping along MD Route 222, MD Route 276, Granite Avenue, and Race Street outside of the Town limits, will be completed.

Task 3- Hydrologic Analysis

The most recent version of the USACE rainfall-runoff model HEC-HMS will be used to conduct a hydrologic analysis of the watersheds effecting the Town of Port Deposit. The HEC-HMS model will be used to determine peak flows for a variety of standard storm events (i.e. a 10-percent annual chance flood or a 1-percent annual chance flood) as well as historical flood events, such as the July 25, 2021 event. The model will be prepared for 3 scenarios, pre-development condition, condition during July 25, 2021 flood event, and post-development conditions. This modeling will be used to determine if watershed development (Bainbridge and Granite Cliffs) has or may impact the flash flooding in Port Deposit and to develop a baseline conditions model to compare watershed wide flash flood and stormwater mitigation measures that are developed in future tasks.

Task 4- Hydraulic Modeling and Flood Mapping

Geo-referenced hydraulic models, using the most recent version of the USACE HEC-GeoRAS and HEC-RAS programs or XPSWMM, will be developed for the streams impacting Port Deposit. One-dimensional modeling (HEC-RAS) or two-dimensional modeling (HEC-RAS or XPSWMM)

will be used for this study, with the exact modeling approach being developed after the collection and assessment of available data. The purpose of this modeling is to establish baseline hydraulic conditions to compare flash flood mitigation measures in future tasks. The modeling will be run for all storm events and scenarios outlined in Task 3. The results of the modeling will be used to produce digital floodplain mapping. Mapping will be produced for all flood events to assist in determining impacts to roadways, buildings, and other infrastructure.

Task 5- Evaluation of Flood Risk Reduction and Stormwater Measures

The purpose of this task is to evaluate measures for reducing the flash flood risk to buildings, and roadways in the Town of Port Deposit. Measures such as bridge modifications (enlargements or reductions of opening size or embankment lowering/raising), retaining walls, flood-proofing, levees/floodwalls, channelization or realignment, elevation, or a combination thereof may be considered. On a watershed wide basis, peak flow reduction techniques such as dams or regional stormwater management facilities, or flow diversions, may be considered to reduce the flash flood risk.

The measures will be planning-level only (concept level). Measures will be compared based upon effectiveness of reducing flood risk, construction cost (planning-level), environmental or social impacts, and feasibility, among others.

Task 6- Report

USACE will prepare a technical report describing the methodology used and the results of the study. The report will contain (at a minimum): an introduction to the study area; methodology for the hydrologic and hydraulic analysis; results of the analyses; hard-copy floodplain mapping; and description and planning-level drawings/diagrams for developed measures.

All data will be provided digitally on a project disc. The project disc will contain all data produced in this study, including Geographic Information Systems (GIS) or CADD data, modeling, a digital copy of the report, field notes/sheets, and photographs.

IV. SCHEDULE AND COST

It is anticipated that the study will take no more than 1 year to complete, with a total study cost of \$100,000. The Planning Assistance to States (Section 22) Program is a 50/50 cost share between USACE and the local sponsor. Thus, USACE will provide \$50,000 and the Town of Port Deposit will provide \$50,000. A breakdown of cost per task is listed below:

Task	Description	Federal Funds	Non-Federal Funds	Total
1	Data Collection	\$1,500	\$1,500	\$3,000
2	Field Surveys	\$10,000	\$10,000	\$20,000
3	Hydrologic Analyses	\$12,500	\$12,500	\$25,000

4	Hydraulic Analyses and Flood Mapping	\$10,000	\$10,000	\$20,000
5	Development of Flood Mitigation Measures	\$10,000	\$100,000	\$20,000
6	Report	\$6,000	\$6,000	\$12,000
Total		\$50,000	\$50,000	\$100,000

V. COORDINATION AND EXECUTION OF WORK

The USACE will establish and maintain very close coordination with the Town of Port Deposit. In-progress review meetings will be conducted at appropriate and agreed upon timeframes throughout the project.

It is assumed that if any of the field survey (Task 2) occurs on private property, the Town of Port Deposit will assist USACE in obtaining permissions to enter the property to collect the necessary data.