

1.0 INTRODUCTION

1.1 STUDY PURPOSE

This study was conducted by the U.S Army Corps of Engineers (USACE), Baltimore District, Planning Division at the request of the Fairfax County Stormwater Planning Division, under the Floodplain Management Services Program (FPMS). Significant flooding occurred in the Huntington (also referred to as Arlington Terrace) Subdivision along Cameron Run in Fairfax County, Virginia on June 25 and June 26, 2006 (June 2006 flood event). Floodplain elevations were in excess of 2.0 feet higher than the expected county-adopted 100-year flood elevations (flood having a 1-percent chance of occurring in any given year). Factors such as the construction at the U.S. Route 1 Interchange (a component of the Woodrow Wilson Bridge Project), Lake Barcroft release rates, floodplain development, and sedimentation were thought to be potential causes of increased flood levels. The purpose of this investigation was to determine specific causes of the higher than expected flood levels experienced during the June 2006 flood event in Huntington.

1.2 STUDY AREA

The study area is the Huntington area along Cameron Run in Fairfax County, Virginia (Figure 1.1). Huntington is located on the south bank of Cameron Run, north of Huntington Avenue, east of Telegraph Road, and west of U.S. Route 1. The Huntington community consists of duplex residential structures, the majority of which were built in the late 1940s and early 1950s. Most of the structures have basements, with first floor elevations being roughly 5 feet above the lower lying roadways. Nearly 80 of the structures, or 160 homes, in Huntington are located in the 100-year floodplain per the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs).

Cameron Run drains 42.0 square miles of highly urbanized lands to its confluence with the Potomac River. The Cameron Run watershed includes areas within Fairfax County, the City of Alexandria, and the City of Falls Church. Tributaries such as Holmes Run, Backlick Run, Pike Branch, Tripps Run, and Taylor Run convey stormwater runoff to Cameron Run. Lake Barcroft (137 acres in size) and Fairview Lake (15 acres) are man-made reservoirs located within the watershed.

The Cameron Run watershed is considered highly urbanized due to suburban expansion and growth in the Washington, D.C. metropolitan area. According to *Urban Biodiversity in the Holmes Run/Cameron Run Watershed*, prepared by the Virginia Polytechnic Institute and State University (Virginia Tech), the growth of this watershed over time is well documented. The watershed saw its first subdivisions by 1920. In the 1950s, major sewer projects were completed, and residential subdivisions covered a substantial portion of the watershed by the end of the decade (including Huntington). With the lack of erosion and sediment control and stormwater mitigation measures at the time, the development caused significant overland erosion that washed large amounts of sediment into the streams during larger storms.

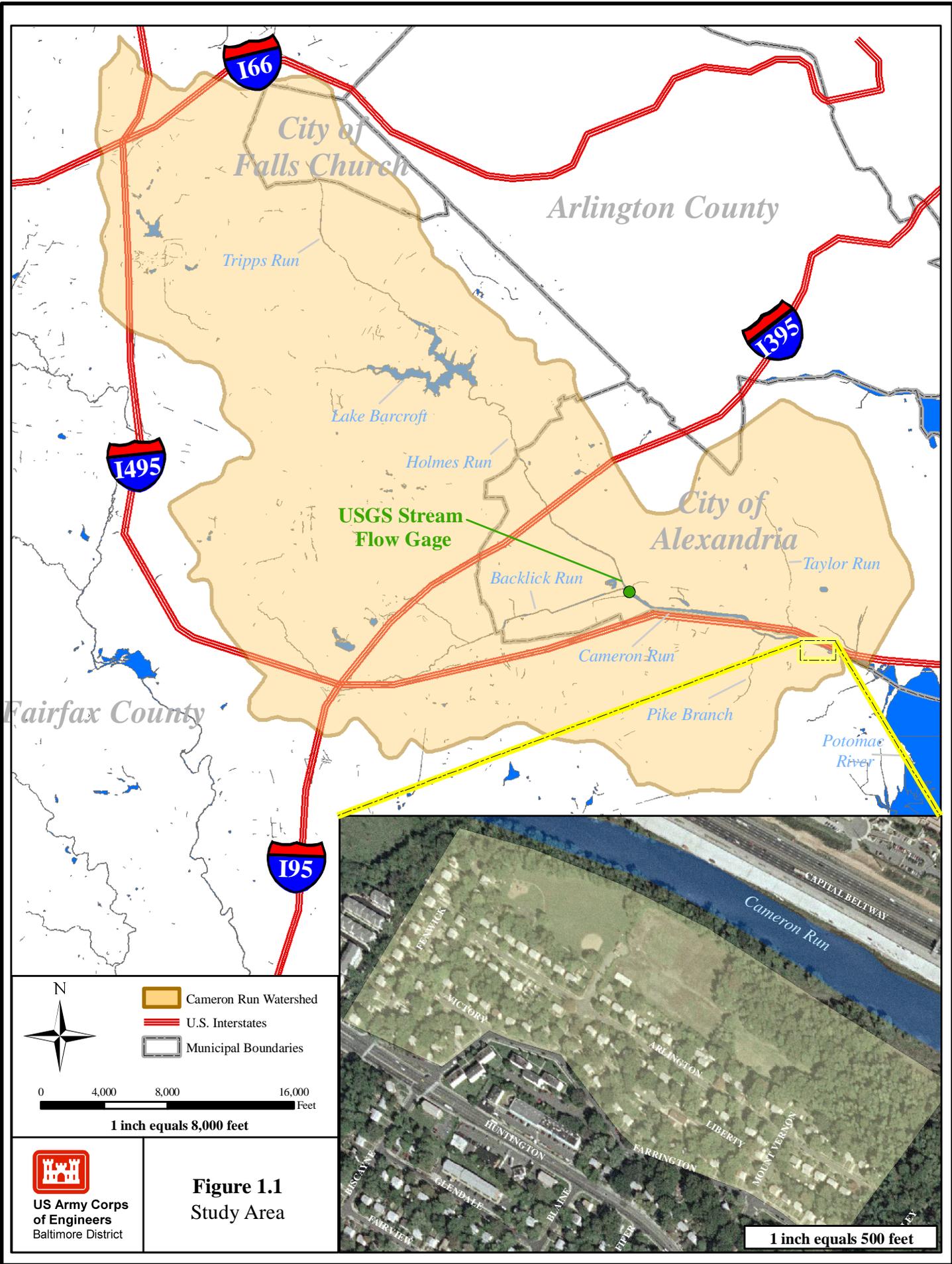


Figure 1.1
Study Area


US Army Corps of Engineers
 Baltimore District

By the 1970s, growth in the watershed continued as federal government employment and service industries expanded. Private economic growth led to unprecedented commercial growth in Fairfax County and the City of Alexandria in the 1980s. The Virginia Tech study states that in 1974, 75% of the watershed was developed; today, 95% is developed (Virginia Tech, 2003). Although erosion and sediment control and stormwater mitigation measures were in place in Virginia in the mid 1970s, the increase in development caused an increase in impervious area, which can be a major contributor to stream and channel degradation.

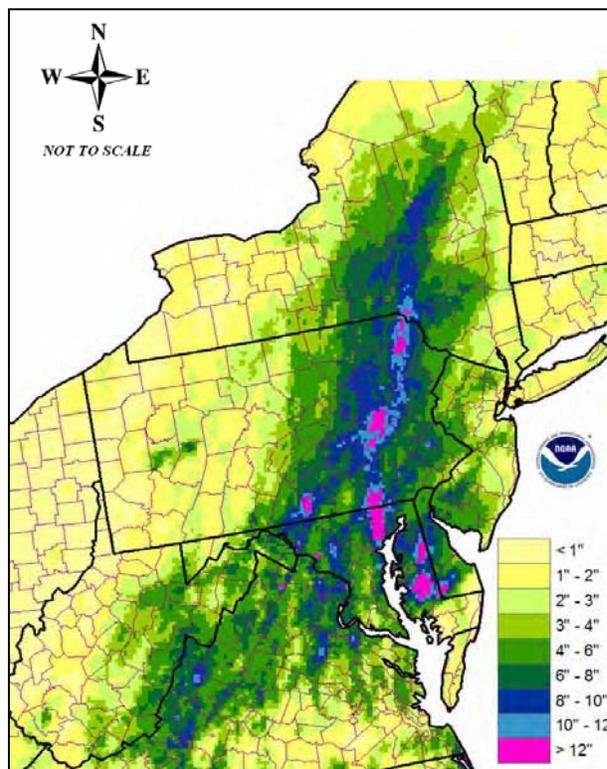
1.3 JUNE 2006 FLOOD EVENT

Across the mid-Atlantic and Northeast, exceptionally heavy rainfall occurred during June 22-28, 2006. Rain amounts exceeded 10 inches in some areas (Figure 1.2), with numerous daily and monthly rainfall records set. Flooding was widespread throughout the greater Washington, D.C. area, northward through parts of Pennsylvania and New York (National Weather Service, 2006).

In the Cameron Run Watershed, the heaviest rainfall occurred between 7:00 pm on June 25 and 1:00 am on June 26. Rainfall intensities of 1.5 to 2.0 inches per hour were recorded at the Ronald Reagan National Airport precipitation gage. Fairfax County precipitation gages recorded 1.0 to 3.5 inches per hour in some locations in or near the watershed. A United States Geological Survey (USGS) stream flow gage along Cameron Run, just downstream of the confluence of Backlick Run and Holmes Run, recorded a peak flow of 16,500 cubic feet per second (cfs), the second largest on record.

The intense runoff from the rainfall created flooding issues throughout the Cameron Run watershed. Several roadways, including Interstate 495 (Capital Beltway) and Telegraph Road were overtopped; commercial and residential structures in the City of Alexandria reported significant flooding; stormwater infrastructure was inundated with larger than design flows causing deep ponding of water on roadways; and Cameron Run, between the George Washington Memorial Highway and the Capital Beltway experienced significant flooding (Figure 1.3). Huntington is located on the southern bank of Cameron Run, and was the primary residential area in Fairfax County to receive flood damages during the June 2006 flood event. No fatalities were reported from the flooding; however, approximately 160 homes (per Fairfax County Stormwater Planning Division) suffered damages. Nearly one-third of the homes had first-floor flooding and the rest had major basement damages. News reports estimated damages at near \$10 million.

Figure 1.2. Total Precipitation in the Mid-Atlantic from June 23 through June 27, 2006 (courtesy of NOAA)



Although Huntington is mapped as being within the 100-year floodplain on FEMA's FIRMs, the flood levels were unexpectedly high. Existing county data showed 100-year flood elevations reaching an elevation of 10.8 feet (National Geodetic Vertical Datum of 1929 (NGVD29)) at the downstream end of Huntington, and 11.8 feet (NGVD29) at the upstream end. High water marks surveyed after the event showed that the June 2006 Flood Event was approximately 2.0 feet higher than the expected 100-year elevations. High water marks were recorded at 12.4 feet (NGVD29) at the downstream end of Huntington to 13.9 feet (NGVD29) at the upstream end.