Flood Damage Reduction Measures in Urban Areas

This document provides clarification on the ability of the U.S. Army Corps of Engineers (Corps) to participate in urban flood-damage reduction projects. It also provides criteria to distinguish between improvements to be accomplished by the Corps under its flood control authorities and storm sewer systems to be accomplished by local interests, in accordance with Engineering Regulation ER 1165-2-21.

Cheltenham Township is considered an urban area as defined as a city, town or other incorporated or unincorporated political subdivision that provides general local government for a specific population concentration and occupies an essentially continuous area of developed land, containing such structures as residences, public and commercial buildings and industrial sites.

"Flood damage reduction works in urban areas" are the adjustments in land use and the facilities (structural and non-structural) designed to reduce flood damages in urban areas from overflow or backwater due to major storms and snowmelt. They include structural and other engineering modifications to natural streams or to previously modified natural waterways. ***Flood damage reduction works are designed to modify flood behavior typified by temporary conditions of inundation of normally dry land from the overflow of rivers and streams***.

"Storm sewer systems" are the facilities in urban areas designed to collect and convey runoff from rainfall or snowmelt in the urban area to natural watercourses or to previously modified natural waterways. They include storm drains, inlets, manholes, pipes, culverts, conduits, sewers and sewer appurtenances, on-site storage and detention basins, curbs and gutters, and other small drainage-ways that remove or help to manage runoff in urban areas. ***Storm sewer systems are designed to solve storm drainage problems, which are typified by excessive accumulation of runoff in depressions; overland sheet flow resulting from rapid snowmelt or rainfall; and excessive accumulation of water at the facilities listed in this paragraph because of their limited capacity.***

In urban or urbanizing areas, provision of a basic drainage system to collect and convey the local runoff to a stream is a non-Federal responsibility. ER 1165-2-21 outlines the decision criteria below for determining if Corps participation is appropriate for certain projects. The decision criteria outlined below excludes from consideration under flood control authorities small streams and ditches with carrying capacities typical of storm sewer pipes.

Tookany Creek Feasibility Study
Cheltenham Township

Figure 1: Sub Drainage Basins used for calculations contained in Table 1

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Decision Criteria for Participation.
Urban water damage problems associated with a natural stream or modified natural waterway may be addressed under the flood control authorities downstream from the point where the flood discharge of such a stream or waterway within an urban area is greater than 800 cubic feet per second (cfs) for the 10-percent flood (one chance in ten of being equaled or exceeded in any given year). Those drainage areas which lie entirely within the urban area, and which are less than 1.5 square miles in area, shall be assumed to lack adequate discharge to meet the above hydrologic criteria. Those urban streams and waterways which receive runoff from land outside the urban area shall not be evaluated using this 1.5 square mile drainage area criterion.

There are several unnamed tributaries to Tookany Creek that will not meet the threshold of 1.5 square mile in drainage area as the drainage area is completely contained within Cheltenham Township. Other streams, which contain drainage areas outside of Cheltenham, were preliminarily evaluated using the USGS StreamStats (Regression Equations) to determine the 10-year flood discharge (Table 1).

A detailed hydrologic analysis is required to determine the actual flows based on existing conditions before a final determination can be made against the above referenced criteria. However, although not all streams initially passed the 800 cfs criteria, flood reduction measures may be located upstream of the particular point where the hydrologic criteria (and area criterion, if appropriate) are met, if economically justified by benefits derived within the stream reach which does qualify for flood control improvement. Additional the Corps may grant exceptions to the 800 cfs, 10-percent flood discharge criterion above whenever both of the following criteria are met:

(a) The discharge for the one-percent flood exceeds 1800 cfs; and
(b) The reason that the 10-percent flood discharge is less than 800 cfs is attributable to a hydrologic disparity similar to those described above.

Sub-Drainage Basin Name	Drainage Area (sq. mi)	10-year Discharge (cfs)
Glenside/Edge Hill	4.41	1560
Rock Creek	1.9	901
Mill Run Creek	2.03	955
Jenkintown Creek	1.84	863
Baeder Run	1.22	674
LaMott East Oak Lane	0.75	493
Elkins Park	0.67	458

Table 1: Drainage Areas and Discharges Calculated using USGS StreamStats from the confluence with Tookany Creek. Sub-drainage basis depicted in Figure 1

The feasibility study will consider the tributaries to Tookany Creek that do not meet the 800 cfs or 1.5 square mile criteria in making recommendations. The Tookany Creek watershed will be evaluated as a "system". The recommendation, however, may need to state that the recommended project is not considered a flood damage reduction project but rather a local storm drainage to be addressed as part of the consideration of an adequate storm sewer system.

Additional Information is located at http://140.194.76.129/publications/eng-regs/ER_1165-2-21/toc.htm or by an internet search for Engineering Regulation (ER) 1165-2-21.

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