

Flood Damage Reduction Project for the Huntington Community

Fairfax County, Virginia

May 7, 2009

Presentation Overview

- **Summarize the study's goals and results**
- **Provide an overview of the levee and pumping station design**
- **Review the project impacts and costs**

Study Area and Flood Limits

- June 2006 flood elevations ranged from 12.8-13.9 ft (shown in blue)
- 1% annual chance flood (100-year flood) elevations from a 2007 Corps study range from 14.3-15.4 ft (shown by orange line)



Project Goals and Objectives

- **Goal**

- Provide adequate flood damage reduction measures that are technically feasible and financially prudent for the safety of the Huntington Community

- **Objectives**

- Incorporate needs/desires of the Huntington Community for flood damage reduction as much as possible
- Examine a full suite of alternatives
- Minimize risk to the community
- Minimize environmental impacts
- Minimize/avoid impacts to County Resource Protection Area
- At a minimum, provide protection against the June 2006 flood event (2% annual chance flood, 50-year flood)

Summary of Study

- **3-Phase Plan Formulation Process and Public Involvement Process**
 - **Phase 1** – Looked at impact of levees and dredging on flood levels
 - **Phase 2** – Developed and evaluated preliminary concept plans for levee, dredging, buyouts, levee/dredging combination, and flood proofing
 - **Phase 3** – Developed concept plans for levee and levee/dredging combination; evaluated 3 heights of levee

Summary of Study (Cont.)

- **Economic analysis was conducted - only Corps projects with a benefit-to-cost ratio (BCR) greater than 1.0 meet the federal economic justification requirements**
- **None of the alternatives evaluated met the Corps' economic justification criteria**
- **Levee is the most cost-effective solution that would solve the flooding problem and meet the goals and objectives**
- **Fairfax County requested Corps to develop 65% design of the highest levee concept plan**

Project Design

- **Project designed to prevent flood damages to Huntington community during 1% annual chance flood event and lower events**
- **Main Project Components:**
 - **Levee (65% design completed)**
 - **Pumping Station (concept design completed)**

Levee Design: **Tasks Completed**

- **Soil borings and testing**
- **Levee geotechnical design**
 - Settlement analysis
 - Seepage analysis
 - Stability analysis
- **Levee civil design**
 - Modification of storm drain system/drainage structures
 - Modification of sanitary sewer system
 - Impacts to other utilities
- **Interior drainage analysis/pump sizing**
- **Development of drawings/cross sections**

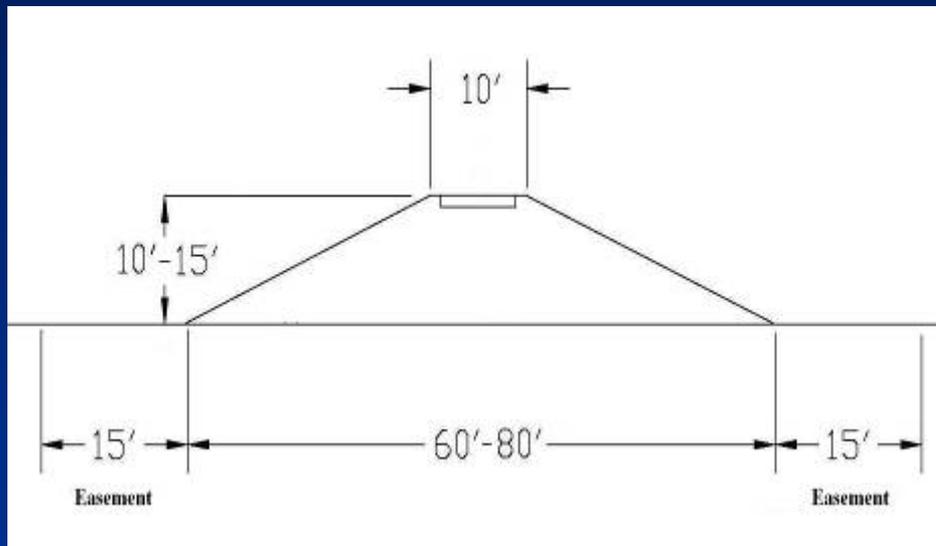
Levee Design: **Tasks Completed**

- **Rip rap analysis**
- **Risk and uncertainty (and overtopping) analysis**
- **Sea level rise analysis**
- **Real estate assessment**
- **Evaluation of environmental impacts**
- **Wetland delineation**
- **Development of a detailed cost estimate**

Project Map



Cross-Section of Levee



- **Grassed levee**
- **2,865 ft long**
- **10-15 ft above existing ground**
- **Ties into high ground at both ends**
- **10 ft wide crest**
- **Gradually sloped sides**
- **15 ft easements**

Typical Levee



Levee Design

- **8 ft wide asphalt recreational path along the top of the levee**
- **Ramps over the levee for maintenance and handicap access**
- **Stormwater will be diverted to 2 outfalls**
 - Dredge/maintain outfall channels
- **Flow diversion pipe to pump station for high water events**
- **Elevate end of Fenwick Drive**

Level of Protection

- **Top of levee elevations:**
 - 3-4 ft above 1% annual chance flood elevations to allow for risk and uncertainty and sea level rise
 - Top of levee at upstream end at elevation 19.4 ft
 - Top of levee at downstream end at elevation 17.3 ft
 - Note: many of the low openings into Huntington houses are between elevation 9-12 ft
- **99% probability that the levee will NOT be overtopped during 1% annual chance event**
- **Levee height meets FEMA certification standards, however, there are other FEMA requirements that would have to be met**

Pump Station / Interior Residual Flooding

- During high water flood events, storm drain pipes emptying into Cameron Run will be closed to prevent backing up
- Rainfall runoff will pond on landward (interior) side of levee
- **Project Design includes:**
 - Concept level design for pumping station to reduce interior flooding
 - Excavation of park area to increase ponding storage capacity

Interior Residual Drainage without Pump Station



- 100-year rainfall peak pond elevation = 10.7 ft

Pumping Station Description

- **A pumping station is needed to prevent houses from flooding from interior stormwater**
- **One building, typically 50 ft by 50 ft in size**
- **Located near center of levee**
- **Stormwater is diverted through a 4 ft by 6 ft box culvert to pump**
- **Pump capacity of 100,000 gpm**
- **Would only run during high water events**
- **During 100 year rainfall, maximum pond elevation estimated to be 8.0 ft, if park area is excavated lower**
 - There will be some ponding in roads and yards
 - Lowest low opening is elevation 9.1 ft

Interior Residual Drainage with Pumping Station



- 100-year rainfall peak pond elevation = 8 ft

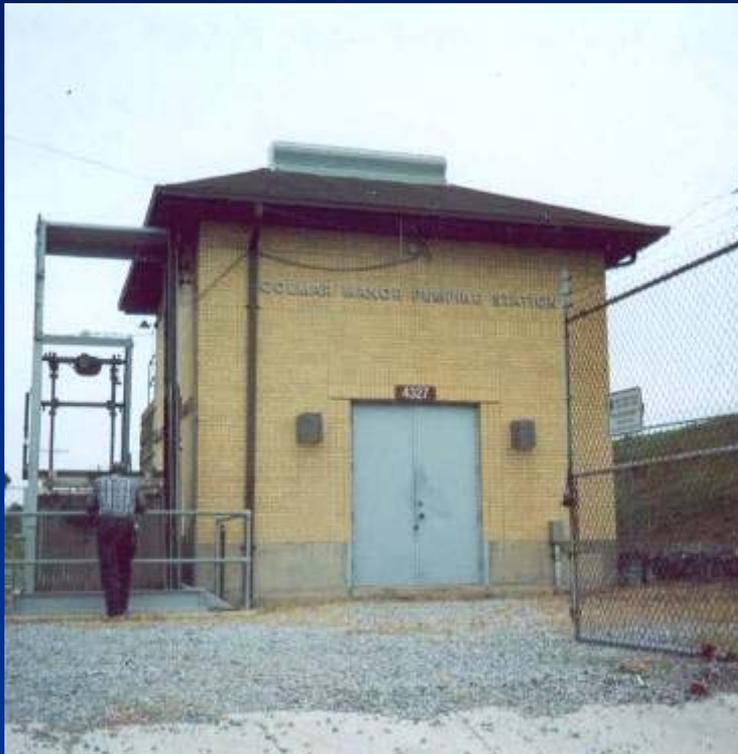
Lowering of Park Area

- Provides additional rainfall storage during flood event
- Elevation of open space/park area adjacent to levee is currently approximately 7-8 ft
- Project includes excavating 1-2 ft down to elevation 6.0 ft
- Drainage within park area will be slower after a rainfall

Project Map



Photos of Pumping Stations



Flood Level Impacts of Project

- **Levee will increase the 1% annual chance flood elevation by up to 0.6 ft upstream of the project**
- **Impacts extend to Telegraph Road**
- **Affects four structures:**
 - Two have low openings above 1% annual chance flood so the 1% annual chance flood will have no impact
 - Two others are already below 1% annual chance flood elevation and will be flooded during the 1% annual chance flood with or without the levee project

Project Environmental Impacts

- **Impacts to the environment were minimized**
 - Levee was moved away from wetlands to degree possible, only impact is at pump station outfall
- **Approximately 0.02 acres (935 sq ft) of palustrine forested wetlands would be impacted**
- **4.85 acres (231,928 sq ft) of existing flora in forest areas impacted along the levee and 15 ft. easement on either side**
- **Areas would be seeded and converted to grassy areas**
- **Impact to park; Park Authority will develop master plan; recreational uses of park area may be limited due to poor drainage**

Project Construction

- **Total Estimated Project Cost: \$20.2 million**
 - Includes final design phase, construction management, lands and easements, and escalation
- **Utilities will need to be relocated**
- **Real estate will need to be acquired**
- **Permits and approvals need to be obtained**
- **Estimated Project Construction Duration: 2 yrs**
- **Project will have to be maintained routinely by the County to perform as designed**

Next Steps

Points of Contact

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County Website

<http://www.fairfaxcounty.gov/dpwes/stormwater/floodreport.htm>