Arthur Kill Storm Surge Barrier Design Concept

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Introductions

- Lawrence J. Murphy, P.E.
  - Principal with CDM
  - 25 years experience
  - Acting Surface Transportation Market Leader

- Thomas R. Schoettle, P.E.
  - Vice President with CDM
  - Over 23 years experience
  - NYC Metro Area Manager
Needs and Objective

- NYC Susceptible to flooding from hurricanes
- Climate Change Impacts – Rising Water levels
- Provide Protection via series of barriers
Hurricane Storm Surge Zones

Map prepared by:
NYSEMO GIS
9/6/05
Design Criterion

- Develop a Concept Design for a Storm Barrier on Arthur Kill
- Protect from a Category 3 Hurricane and Associated Storm Surge
Arthur Kill

- Arthur Kill – Separates Staten Island and New Jersey
- The Arthur Kill is a commercial and recreational waterway that runs between Upper New York Bay (via Kill Van Kull) and Raritan Bay
- Tidally Influenced
Arthur Kill Storm Barrier
Arthur Kill Storm Barrier

Overview
Arthur Kill Barrier Design Goals

- Resist Category 3 hurricane
- Minimize Impacts to Community
- Provide Sustainable Elements into Design
Engineering Considerations

- Elevation of Surge Barrier
- Water Quality and Sediment
- Navigational Restrictions
- Operational Procedures
- Emergency Operations
- Structural and Geotechnical
- Wildlife Impacts
- Maintenance Issues
Barrier Elevation

- ACOE Predicted Category 3 Surge – 14.4 feet
- Wave Estimate – 8 feet
- Tide Fluctuation – 5 feet
- Storm Surge Elevation approx. 28 (NGVD 29)
Barrier Cross Section

- SWINGING FLOW CONTROL GATE
- TIDAL POWER GENERATOR
- PILES TO BEDROCK
- COLUMN @ MIDPOINT
- RIVER BOTTOM

EL = 5.5 (MHW)
EL = 0.28 (MLW)
PREDICTED STORM SURGE EL = 28.0
EL 32.0

SECTION 1
NTS
Waterway Opening Design Considerations

- Hydraulics
- Water Quality and Sediment
- Navigational Needs
- Maintenance
Arthur Kill Storm Barrier

Tidal Gates
Navigational Considerations

- Significant Marine Usage
- Barrier With Lock
  - Improved Operations at Higher Water Level
  - Provides Access During Storm Event
  - Suited for Channel Geometry
- Barrier Without Lock
  - Lower Capital Burden
  - Less Maintenance Needs
Arthur Kill Storm Barrier

Dual Locks
Arthur Kill Storm Barrier

Overview
Social Considerations

◆ Environmental Permitting
  – ACOE
  – Coast Guard
  – NYSDEP
  – US Fish and Wildlife
  – Etc., Etc., Etc.

◆ Ownership

◆ Impact of Barrier Location
Location of Barrier
Sustainability Opportunities

- Multi-Modal Linkage
- Tidal Power Generation
- Transit Oriented Development
- Recreational Enhancement
Arthur Kill Storm Barrier

Multi-Modal Linkage
Arthur Kill Storm Barrier

Tidal Power Generation
Arthur Kill Storm Barrier

Transit Oriented Development
Arthur Kill Storm Barrier

Animation
Closing

- Challenges and Opportunities
- Long Term Planning for Success
Questions?