NY & NJ Harbor & Tributaries Focus Area Feasibility Study

Teach In: Hazard & Risk Assessment
AGENDA

► Contribution of hazards to risk
► Sectors at risk
► How to review a risk assessment
► Holistic risk reduction
► Future risk reduction through maintenance and adaptation
► Iteration during construction
HAZARDS
Multiple, simultaneously
CRITICAL ASSETS BY SECTOR

Resilient Communities

1. Community Partnerships
2. Infrastructure Protection
3. Resilience & Recovery
4. Transportation
5. Reliable Utilities & Communications
6. Coastal Erosion Control & Restoration

APTIM PROVIDED COMMUNITY SERVICES
Engineering & Construction
Maintenance & Operations
Environmental
Economic Standpoint
Project & Program Management
DURING THE RISK ASSESSMENT

What to verify?

► Data Collection
  ▪ Study area
    ▫ Check perimeter for critical assets
    ▫ Determine unique geography and services
  ▪ Scenarios
    ▫ Tide datum and elevation datum
    ▫ Return interval varies with data input
    ▫ Compound scenarios: sea level rise + surge
    ▫ Sea level rise projections- acceleration potential
  ▪ Modeling results
    ▫ Extracting data for points, lines and areas
    ▫ Grid size and extrapolation
  ▪ Asset Interdependencies
    ▫ Road access to utilities
    ▫ Electrical systems for flood control
DURING THE RISK ASSESSMENT

What to verify?

► **Vulnerability** (impacts and disruptions)
  - Exposure (proximity to hazard)
    - Review by sector, multiple hazards at same location, compound impacts requiring multiple adaptation strategies
  - Sensitivity (effect of hazard)
    - Sector specific asset data necessary to know sensitivity (underground assets)
    - Quantifying aged infrastructure
  - Adaptive Capacity (feasibility to accommodate threat)
    - Thresholds for emergency response, lifeline services

► **Risk**
  - Likelihood of Occurrence (probability of event)
    - Assigning probability to future sea level rise in context of current hazards
  - Consequence (effect of impacts)
    - Damages based on recent events to weight impacts
  - Risk Ranking and Prioritization (scale, criticality)
    - Varies by stakeholder interest and location
What to ask?

► What is most critical to protect?
► Where are the impacts most severe?
► Where are the stakeholder prioritized vulnerabilities?
► Where are the at risk assets concentrated?
► What are the common vulnerabilities across locations?
► What are the regional assets the community is dependent upon (electrical grid, transportation systems, water resources, housing)?
APPLICATION OF RISK ASSESSMENT

How to think holistically?

► Using this information for community asset planning/leverage current initiatives for continued success
► Affordability of property insurance
► Implications of access and supply chain risks
► Regional population growth, commerce projections and land use changes
► Sectors (energy and flood control) should coordinate to address cascading failures
► Public private partnerships
BUILDING RESILIENCE, SEEING OPPORTUNITIES

PRIVATE ADAPTATION
Owners/Associations

GOVERNMENT ADAPTATION
Regulatory/Town Owned

Continuous Tidal Barriers/Seawalls

Maintaining level of service for roads and stormwater

Floodproofing or Elevating Homes/Retail

Floodproofing public capital assets

In-Development Roads/Stormwater

Resilient Policy and Regulation

Natural Area Adaptation

Future land use

Road Harmonization

Green drainage infrastructure

Example from Town Public Works
### Iteration during Construction

#### Interim Solutions

**Bayou Chene Flood Protection Structure, Louisiana**
- **Scope:** Downstream flood control in response to new upstream structure and floodwater release
- **Iterations**
  - St. Mary Levee District constructed temporary structure to prevent 5' of flooding
  - In 2016, installed emergency structure in 15 days to hold 2' flooding
  - In 2019, emergency structure in 11 days
  - Final project of floodwall, gate and levees
  - Iteration of design standard

#### Practical Methods

**Inner Harbor Navigation Canal Surge Protection Barrier, Louisiana**
- **Scope:** 24 feet and 26 feet above water, 100-year storm surge protection for large portion of Orleans and St. Bernard Parishes
- **Iterations**
  - Closure piles design for effective seal
  - Logistical needs for over water construction

#### Operations

**Houma Navigation Lock Complex, Louisiana**
- **Scope of Work:** 800 foot long lock chamber, flood gate, 100-250 foot navigation channel, connects to existing levees
- **Iterations**
  - Phased approach to ensure federal funding is available via Restore Act
  - Coordination with stakeholders and USACE to ensure public and agency concerns are heard
  - Logistical needs for both overwater construction and maintaining flood protection during construction
FUTURE RISKS

Maintenance and Long-term Adaptation

► Evaluation of performance metrics
► Recovery planning
► Timeliness and cost sharing for maintenance
  ▫ Inclusion in cost benefit analysis
► Federal reauthorization process
► Adaptability of constructed project for future conditions
  ▫ Expected life cycle and projections for future scenarios
  ▫ Anticipated future points of failure for aged infrastructure
QUESTIONS
Expect the Extraordinary.