RESILIENT NJ
RESILIENT RARITAN RIVER AND BAY COMMUNITIES

APPENDIX F:

COST ESTIMATION APPROACH

August 12, 2022

COST ESTIMATING CLASSES

As described in the AACE International's Total Cost Management Framework for cost engineering, the class designation system defines the maturity of the estimate, considering the extent and types of input information available to the estimating process. A Class 5 estimate is based upon the lowest level of project definition (feasibility study), and a Class 1 estimate is closest to a fully defined project.

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Estimate class	Name	Purpose	Project definition level
Class 5	Order of magnitude	Screening or feasibility	0% to 2%
Class 4	Intermediate	Concept study or feasibility	1% to 15%
Class 3	Preliminary	Budget, authorization, or control	10% to 40%
Class 2	Substantive	Control or bid/tender	30% to 70%
Class 1	Definitive	Check estimate or bid/tender	50% to 100%

Note: There are broad ranges of certainty within each cost estimate class. Estimates generated for this planning project are at a late class 5 to mid class 4. Costs can change dramatically as you progress along classes, as the concepts/goals/existing conditions are clarified. As such, the final costs may land outside of ranges provided through this effort.

RARITAN RIVER AND BAY COMMUNITIES

COST ESTIMATION TYPES

RRBC developed detailed costs for physical actions and relative costs for non-physical actions.

	PHYSICAL ACTIONS	NON-PHYSICAL ACTIONS
PROJECT TYPES	Site or building level adaptation measures, roadway elevation, stormwater system improvements, riparian and wetland restoration, coastal flood barriers, nature-based coastal flood protection	Additional planning, governance, zoning, policy, outreach, technical assistance, buyouts, relocation
METHODOLOGY	• Initial costs based on GIS overlay of linear length or area of proposed improvements by type • Unit costs based on recently constructed projects and engineering guidance available from USACE • Costs adjusted for the region with allowance and contingency assumptions. • Additional information about unit costs and contingency assumptions can be found in the *RRBC Cost Estimation Workbook*.	Non-physical projects were assigned relative costs based on level of coordination and timeframes required and have been informed by the project team's experience with similar projects. The following scale was applied: $ = <$2M $$ = $2-10M $$$ = $10-49M $$$$ = $50-100M $$$$$ = >$100M

COST DEVELOPMENT ASSUMPTIONS

PHYSICAL ACTIONS

Unit Costs

Element Type	Unit Cost	Unit
Beach Nourishment	$ 1,000	LF
Bioswale along Greenway*	$ 12,500	LF
Culvert*	$ 500,000	Unit
Ditch Remediation and SLR Resilience*	$ 50,000	Acre
Dry Floodproofing	$ 120	SF
Elevated Harborwalk on New Seawall	$ 9,175	LF
Flood Storage*	$ 250	SF
Floodwall Six Feet or Greater	$ 10,000	LF
Green Ash Enhancement*	$ 100,000	Acre
Living Shoreline with Coastal Shoreline Sill/Protection*	$ 1,000,000	Acre
Marsh Restoration - Herbicide Application to Phragmites to Promote Native Marsh and Preserve Elevation*	$ 100,000	Acre
Marsh Restoration - Native Marsh from Phragmites and Open Water*	$ 500,000	Acre
Perth Amboy Train Station*	$ 100,000,000	Unit
Pump Station Improvement*	$ 220,000	CFS
Pump Station Improvement - South Amboy*	$ 1,400,000	Unit
Renovation of Existing Park Space	$ 965,000	Acre
Ring Wall	$ 1,900	LF
Riparian Enhancement*	$ 100,000	Acre
Road Elevation	$ 7,000	LF
Soften Channel with Bioengineering Techniques*	$ 250,000	Acre
Underground Stormwater Conveyance*	$ 650	LF

Allowances and Contingencies**

Item	Cost Type	Percentage
Drainage	Site-Specific Allowances	15%
Public Amenity	Site-Specific Allowances	15%
Utility	Site-Specific Allowances	15%
Site Work	Site-Specific Allowances	10%
Maintenance and Protection of Traffic	Site-Specific Allowances	4%
Demolition	Site-Specific Allowances	5%
Mobilization/Demobilization	General Construction Allowances	7%
General Conditions	General Construction Allowances	15%
Contractor Overhead and Profit	General Construction Allowances	20%
Insurance and Bonding	General Construction Allowances	4%
Construction Management	Soft Cost	10%
Planning, Engineering, and Design	Soft Cost	20%
Contingency (high)	Contingency	50%

Note: Site-specific allowances, general construction allowances and soft costs are incorporated into unit costs for stormwater system improvements, restoration, and some site-specific actions.

****For additional information about how the allowances and contingencies were applied, please see the RRBC Cost Estimation Workbook.***

COST DEVELOPMENT ASSUMPTIONS

NON-PHYSICAL ACTIONS

- Costs for non-physical solutions have been estimated comparatively based on the following scale:
  - $ = <$2M
  - $$ = $2-10M
  - $$$ = $10-49M
  - $$$$ = $50-100M
  - $$$$$ = >$100M
- These costs were developed based on level of coordination and timeframes required and have been informed by the project team's experience with similar projects.

Workbook User Guide

- A companion excel workbook provides additional insight into the RRBC cost estimation process and methodology.
- The excel workbook contains six main tabs:
  - **Element Assignment** – Details which element types are assigned to each action and which actions are associated with each project
    - Each action is assigned a unique Element ID (EID) which is based on the relevant project component, or element
    - Each project is assigned a unique Project ID (PID), projects may include more than one action
  - **Allowance Percentages** – Details the allowance and contingency cost types applied to projects in this region and how they were applied to determine the appropriate allowance and contingency factor
  - **Unit Costs** – Details the unit cost for different project components, or elements, for which cost estimates have been developed
  - **(Hidden) Project Cost Pivot** – Totals costs for each project
  - **Project Definition** – Details costs, rounded to two significant figures, for each costed project in the region
  - **Potential Flood Storage Areas** – Lists every property included in calculation of potential flood storage costs
    - The project team assumed 50% of each property may be suitable for flood storage retrofit
  - **Flood Storage Totaled Costs** – Totals costs for flood storage on publicly owned lands for each municipality and within each Resilience Opportunity Area