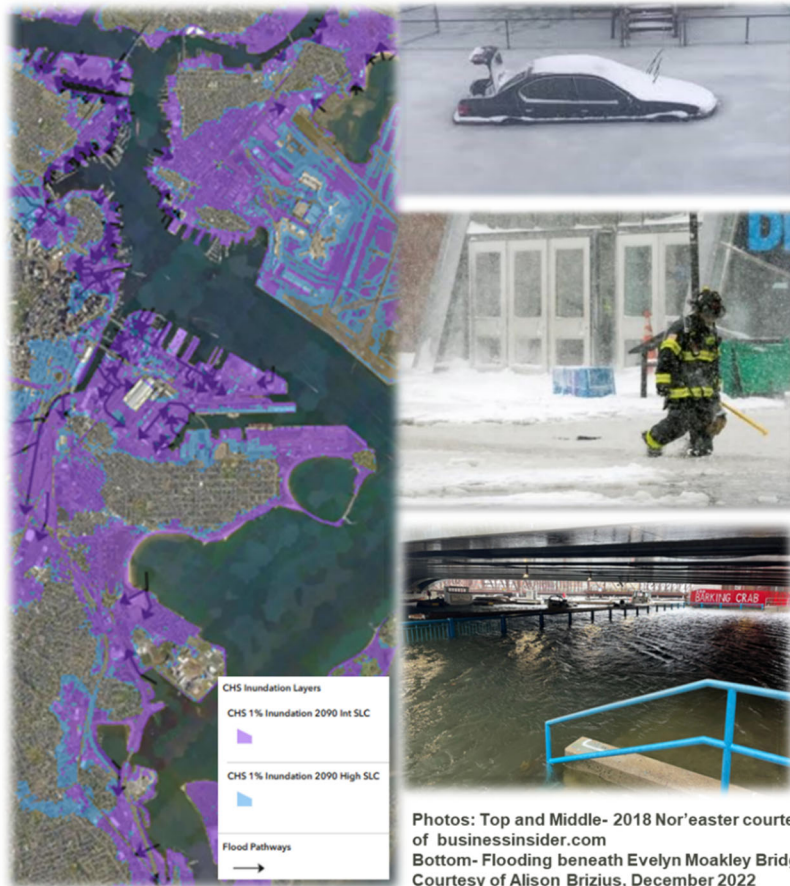


Boston Coastal Storm Risk Management Study

Draft Integrated Feasibility Report and Programmatic Environmental Assessment



NEPA ID: PEAX-202-00-E6R-1776854417

USACE New England District | City of Boston



**Attachment M-1: Recommended Plan First Actions
Alternatives Pricing Breakdown First Cost FY28**

**Early Action Alternative Pricing First Cost FY28
(Moakley Park summary report with 50% & 80%
contingency)**

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary				
DOR1 - Moakley Park (80% Confidence Level)		31,467,152	55,146,184	86,613,336
Levee (3')		1,003,808	1,759,174	2,762,982
Levee (6')		8,622,546	15,111,012	23,733,559
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>		17,764,289	31,131,916	48,896,205
Remove & Replace - Site (no OT)		1,767,832	3,098,125	4,865,956
Closure Gates		2,026,939	3,552,210	5,579,149
Util's		281,739	493,747	775,486

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary				
DOR1 - Moakley Park (50% Confidence Level - 105.15%)		31,467,152	33,086,861	64,554,013
Levee (3')		1,003,808	1,055,477	2,059,285
Levee (6')		8,622,546	9,066,375	17,688,921
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>		17,764,289	18,678,670	36,442,959
Remove & Replace - Site (no OT)		1,767,832	1,858,827	3,626,659
Closure Gates		2,026,939	2,131,271	4,158,210
Util's		281,739	296,241	577,980

**Attachment M-2: Comprehensive System Plan
Abbreviated Risk Assessment Report**

Abbreviated Risk Analysis

Boston CSRM Alternative Formulation

Meeting Date: 9-Mar-26

PDT Members

Note: PDT involvement is commensurate with project size and involvement.

Represents	Name
Project Management:	
Project Management:	Jeff Herzog
Planner:	Jeff Herzog
Study Manager:	Jeff Herzog
Contracting:	Sheila Winstonvincuilla
Real Estate:	Nicole Dapcic
Relocations:	NAME
Geologist	Stephen Potts
Engineering & Design:	
Technical Lead:	Lisa Winter
Geotech:	Matthew Fleming
HH&C	Lisa Winter
Civil:	Kate Mueller
Structural:	Mike Andryuk
Mechanical:	NAME
Electrical:	NAME
Cost Engineering:	Dan Palmer
Construction:	Rich Doughty
Operations:	NAME
Environmental:	Todd Randall & Christine San Antonio
VE	NAME
DOT & PF Sponsor	NAME
DOT & PF Sponsor	NAME
COB/NFS	Kate Roosa
OTHER:	NAME
OTHER:	NAME
	NAME

Abbreviated Risk Analysis

Project (less than \$40M):
Project Development Stage/Alternative:
Risk Category:

Boston CSRM
Alternative Formulation
Moderate Risk: Typical Project Construction Type

Alternative: **Base**

Meeting Date: **3/9/2026**

Total Estimated Construction Contract Cost = \$ **2,412,045,928** \$ 2,412,045,928 0.00 check

	CWWBS	Feature of Work	Estimated Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0%	\$ -	\$ -
1	11 LEVEES AND FLOODWALLS	Demo & Civil	\$ 103,002,382	84%	\$ 86,866,740	\$ 189,869,122
2	11 LEVEES AND FLOODWALLS	Util's	\$ 63,770,892	277%	\$ 176,625,420	\$ 240,396,312
3	11 LEVEES AND FLOODWALLS	LAND - Earthwork, Piles and Conc	\$ 589,662,243	84%	\$ 493,844,507	\$ 1,083,506,749
4	11 LEVEES AND FLOODWALLS	WATER - Earthwork, Piles and Conc	\$ 315,176,617	114%	\$ 357,886,499	\$ 673,063,115
5	11 LEVEES AND FLOODWALLS	HR - LAND - Earthwork, Piles and Conc	\$ 172,988,385	277%	\$ 479,123,708	\$ 652,112,093
6	11 LEVEES AND FLOODWALLS	HR - WATER - Earthwork, Piles and Conc	\$ 647,115,613	277%	\$ 1,792,307,797	\$ 2,439,423,411
7	11 LEVEES AND FLOODWALLS	Closure Structures	\$ 17,471,873	102%	\$ 17,848,994	\$ 35,320,867
8	11 LEVEES AND FLOODWALLS	Harbor Walk	\$ 23,885,932	85%	\$ 20,232,960	\$ 44,118,892
9	11 LEVEES AND FLOODWALLS	Levee's & Armored Levee's	\$ 49,267,243	88%	\$ 43,522,153	\$ 92,789,396
10	11 LEVEES AND FLOODWALLS	Surge Barrier	\$ 319,000,000	217%	\$ 692,520,056	\$ 1,011,520,056
11	11 LEVEES AND FLOODWALLS	Dry Dock Caisson	\$ 34,500,000	70%	\$ 24,312,909	\$ 58,812,909
12	All Other	Cultural Resources and Fish & Wildlife	\$ 76,204,748	3.3%	\$ 41,912,611	\$ 118,117,359
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 289,445,511	12%	\$ 98,779,214	\$ 388,224,726
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 270,149,144	10%	\$ 92,193,933	\$ 362,343,077
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	

Totals					
	Real Estate	\$ -	0%	\$ -	\$ -
	Total Construction Estimate	\$ 2,412,045,928	175.25%	\$ 4,227,004,354	\$ 6,639,050,282
	Total Planning, Engineering & Design	\$ 289,445,511	34.1270%	\$ 98,779,214	\$ 388,224,726
	Total Construction Management	\$ 270,149,144	34.1270%	\$ 92,193,933	\$ 362,343,077
	Total Excluding Real Estate	\$ 2,971,640,583	148.67%	\$ 4,417,977,502	\$ 7,389,618,085
	Confidence Level Range Estimate (\$000's)	Base	50%	80%	
		\$2,971,641k	\$5,622,427k	\$7,389,618k	

Boston CSRM Base

Alternative Formulation

Abbreviated Risk Analysis

Meeting Date: 9-Mar-26

Risk Register

BOSTON CSRM						
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Management & Scope Growth			Maximum Project Growth			75%
PS-1	Demo & Civil	potential scope growth for cultural implications, real estate and access	impact is likely marginal since there will be legally binding agreements pre-award, but it is likely that there will be scope growth	Marginal	Likely	2
PS-2	Util's	real estate and util relocations, haz mat mat'l. considering the variety of utils and multiple stakeholders this is likely to be very complicated. Current estimate does not factor any elec or comm work since there is no way to ID scope. SD and sewer is considering but at a very high level. No water line SOW is ID's	we know that util's exist, but we don't know where, we don't how impactful the particular is (ie. Big power or little power), can we work around or does it have to be moved. Eg. the Norfolk CSRM easement foundation design. Information for existing utils is ongoing, and eg. Eversource has started providing useful information and the goal is to gather as much existing condition information as possible	Critical	Likely	5
PS-3	LAND - Earthwork, Piles and Conc	real estate, haz mat mat'l, EV (human remains), cultural/historical, potential for obstructions	excavation and subsurface always create risk considering the majority of locations are fill. potential is there for obstructions, the estimate does account for use of a downhole hammer in areas where obstructions may be more likely (eg. Navy Yard), and reduced production for having to drill through obstructions. pile productions do vary based on location to account for sub-surface potential. Over 50% of the cost is in mat'l, OT is included, and considering the production factors including the DHH and varying production rates depending on location still would result in a	Moderate	Possible	2
PS-4	WATER - Earthwork, Piles and Conc	real estate, haz mat mat'l, EV (human remains), cultural/historical, potential for obstructions. There is a concern that the water side wall will require more steadfast engineering than the typical detail	assumption generally is that waterside pile install should encounter less obstructions. Productivity is decreased from 85% typical to 70% due to working on the water, to account for delays, movement of barges etc and OT is already included. Due to concerns with typical detail, changes to the design (eg. a 3rd pile) would be significant and possible. Water side perimeter solutions may require structural changes to piers, wharfs & adjacent	Significant	Likely	4
PS-5	HR - LAND - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	it is expected that in the areas of High Risk that the typical will not work and that major design changes (Tech Design and Qty's below) but construction challenges and scope growth is very likely and the impact will be significant.	Significant	Very LIKELY	5
PS-6	HR - WATER - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	it is expected that in the areas of High Risk that the typical will not work and that major design changes (Tech Design and Qty's below) but construction challenges and scope growth is very likely and the impact will be significant. Due to concerns with typical detail, changes to the design (eg. a 3rd pile). Water side perimeter solutions may require structural changes to piers, wharfs & adjacent	Significant	Very LIKELY	5
PS-7	Closure Structures	potential for scope growth based on existing conditions relative to a typ design.	based on existing conditions and specific location may create potential for scope growth (subsurface concerns) and specific challenges at RR locations, it is likely that scope growth can occur	Moderate	Likely	3
PS-8	Harbor Walk	potential for scope growth based on existing conditions relative to a typ design. additional scope for mitigating section 106 (national historic preservation act)	not considered a risk - the typ detail priced may be different (to be handled under Tech Design & Qty's below - the ultimate design and qtys will be straight forward so would not expect any scope growth	Negligible	Unlikely	0

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
PS-9	Levee's & Armored Levee's	potential for scope growth based on subsurface conditions requiring stabilization or additional removal of subgrade material	current design accounts for a mirror image of the levee to be excavated and replaced with suitable engineered fill - so the risk that additional fill or a more robust stabilization is required based on geotechnical info is moderate, but considering there is already a decent understanding that the current fill replacement is conservative in some places it is unlikely across the whole	Moderate	Possible	2
PS-10	Surge Barrier	this will be a very specific and complex project	pricing is based on class IV ROM for conceptual barriers. It is currently unknown what the surge barrier requirements actually are. Although the PM is typical, albeit for a complex project, the potential for scope growth and added features (eg. a pump station) is very likely and significant. DO WE KNOW THAT WE DEFINITELY ARE INCLUDING THE SB - not a lift gate? WILL WE ALSO NEED TO REMOVE IT?	Significant	Very LIKELY	5
PS-11	Dry Dock Caisson	this will be a very specific and provided by highly specialized fabricators and installers that may be limited.	considering we have a ROM quote for the new caisson from a company that specializes in this type of fabrication I would expect this price is already conservative, so any scope growth would be marginal and unlikely.	Marginal	Unlikely	0
PS-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
PS-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
Acquisition Strategy						Maximum Project Growth
AS-1	Demo & Civil	this could be pushed to small business given the scale and complexity being less, may try to separate this scope for solicitation during PED	potential for 8A could reduce the pool of bidders and increase cost, the work itself is typical and straightforward in of itself, however it is anticipated that all of this work will be part of the larger packages, so would be subject to the acquisition strategy risk associated with the project as whole	Moderate	Likely	3
AS-2	Util's	considering the variety of utils and multiple stakeholders this is likely to be very complicated, and may require Util companies vendors and contractor, and possible separate acquisitions for util relocation	certain neighborhoods have a very high concentration of utils. Complexity of the relo's will be real, and in many areas definitive complexity of type of work will be limiting and is significant and likely	Significant	Likely	4
AS-3	LAND - Earthwork, Piles and Conc	potential limited contractor pool, is there reasonable competition and limited bidder due to high volume of work	construction contract costs will not be limited by contract vehicle, but will be limited by contractor availability and time as far as how contracts are designed and solicited and executed - tier discussion - impact will be moderate and is likely to be more restrictive	Moderate	Likely	3
AS-4	WATER - Earthwork, Piles and Conc	potential limited contractor pool, is there reasonable competition and limited bidder due to high volume of work	construction contract costs will not be limited by contract vehicle, but will be limited by contractor availability and time as far as how contracts are designed and solicited and executed - tier discussion - impact will be moderate and is likely to be more restrictive	Moderate	Likely	3
AS-5	HR - LAND - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	acquisition will be sensitive given the high risk nature of the work and likely limited pool of contractors that can accommodate projects of this scale and with the correct experience - impact with limited bidders would be significant and is likely	Significant	Likely	4
AS-6	HR - WATER - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	acquisition will be sensitive given the high risk nature of the work and likely limited pool of contractors that can accommodate projects of this scale and with the correct experience - impact with limited bidders would be significant and is likely	Significant	Likely	4

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
AS-7	Closure Structures	no additional risk necessary	this SOW will most likely be included with a larger project package with the flood wall. Similar risks as the flood walls.	Moderate	Likely	3
AS-8	Harbor Walk	no additional risk necessary	Harborwalk SOW is straightforward and should be able to be performed by a wide variety of GCs. the work itself is typical and straightforward in of itself, however it is anticipated that all of this work will be part of the larger packages, so would be subject to the acquisition strategy risk associated with the project as whole.	Moderate	Likely	3
AS-9	Levee's & Armored Levee's	no additional risk necessary	Levee SOW is straightforward and should be able to be performed by a wide variety of GCs. the work itself is typical and straightforward in of itself, however it is anticipated that all of this work will be part of the larger packages, so would be subject to the acquisition strategy risk associated with the project as whole.	Moderate	Likely	3
AS-10	Surge Barrier	this will be a very specific and complex project that is highly specialized. carrying the median price of Hazen Sawyers report: 2 ea. VLF \$81.65M; 4 ea. VLF \$419M; 3 ea. Axis Flap Gate \$288M; 4 ea. Axis Flap Gate \$350M	this will be a specialized project, possibly DBB, and most notable with limited bidders, high profile and most likely with experiential requirements for similar work - again, limiting potential bidders could be significant and is very likely.	Significant	Very LIKELY	5
AS-11	Dry Dock Caisson	this will be a very specific and complex project that is highly specialized with limited fabricators and installers	this SOW will most likely be included with a larger project package with the flood wall. Similar risks as the flood walls.	Moderate	Likely	3
AS-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
AS-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
Construction Elements				Maximum Project Growth		25%
CON-1	Demo & Civil	time of day/seasonal restrictions, noise abatement, higher potential for mod's & claims	ultimately this scope of work will be clearly ID'd with a wide variety of contractors that can perform the work. Anytime work is performed in this type of environment there is always the possibility of changes, but given the SOW the impact should be marginal	Marginal	Possible	1
CE-2	Util's	time of day/seasonal restrictions, noise abatement, higher potential for mod's & claims is high considering the unknown location and presence of u/g utilities	certain neighborhoods have a very high concentration of utils. Complexity of the utility relo's will be real, and in many areas definitive. High likelihood may require specific sub's and equip, HDD? High potential for claims and mod's	Significant	Very LIKELY	5
CE-3	LAND - Earthwork, Piles and Conc	time of day/seasonal restrictions, production w/re to schedule, noise abatement, higher potential for mod's & claims - overall efficiency impact and likelihood of changes.	typical design accounts for variety in production rates and typical detail are not likely to vary too much following design. Variability for design will be addressed below. Do not consider this high risk from a construction standpoint as this is work that gets performed in this area. There is always concern about schedule, and would likely impact this SOW considerably. The impact to schedule is typically specific to L&E - the significant cost is the pile mat! - eg. L&E represents approx 31% of the Land Flood Wall direct cost. Impact would be moderate and it is possible	Moderate	Possible	2

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
CE-4	WATER - Earthwork, Piles and Conc	time of day/seasonal restrictions, production w/re to schedule, noise abatement, higher potential for mod's & claims - overall efficiency impact and likelihood of changes.	typical design accounts for variety in production rates and typical detail are not likely to vary too much following design. Variability for design will be addressed below. Do not consider this high risk from a construction standpoint as this is work that gets performed in this area. There is always concern about schedule, and would likely impact this SOW considerably. The impact to schedule is typically specific to L&E - the significant cost is the pile mat'l - eg. L&E represents approx 31% of the Land Flood Wall direct cost. Impact would be moderate and it is possible	Moderate	Possible	2
CE-5	HR - LAND - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction.	Critical	Very LIKELY	5
CE-6	HR - WATER - Earthwork, Piles and Conc	in many areas where we know the typical wall detail will cross or run along tunnels or HV elec distribution the design may be completely different with high likelihood of scope growth and added features not currently factored in. Or in the case of the HV elec - relocation of the utility. We recognize that this is a known unknown and that the typ details and SOW will be much different	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction.	Critical	Very LIKELY	5
CE-7	Closure Structures	Current pricing is based on the New Haven CSRM typical detail scaled for height. This project is likely to require much more specialized closures that may need to swing, are longer and are located in more urban areas	Actual installation may be more complicated for various reasons (swinging, exist conditions etc), potential for more complicated construction other than a fabricated sliding gate is likely, though the impact is moderate	Moderate	Likely	3
CE-8	Harbor Walk	no additional risk necessary	Harborwalk SOW is straightforward and should be able to be performed by a wide variety of GCs	Negligible	Unlikely	0
CE-9	Levee's & Armored Levee's	no additional risk necessary	Levee SOW is straightforward and should be able to be performed by a wide variety of GCs	Negligible	Unlikely	0
CE-10	Surge Barrier	this will be a very specific and complex project	pricing is based on class IV ROM for conceptual barriers. It is currently unknown what the surge barrier requirements actually are. A completely different type of SB is possible - considering the median price carried account for some variability in what the SB will actually be, final SB type could be smaller/cheaper, but i would expect it is likely and significant compared to what is currently carried. Effectively all elements of the factor are	Significant	Likely	4
CE-11	Dry Dock Caisson	this will be a very specific and provided by highly specialized fabricators and installers that may be limited.	this is specialized but not likely risky compared to the ROM price rec'd. Also addressed below in Special Construction and Fab. Any schedule or risk for complex structure construction would be moderate but it is unlikely	Moderate	Unlikely	1
CE-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
CE-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
CE-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
Specialty Construction or Fabrication				Maximum Project Growth		65%
SC-1	Demo & Civil	not applicable	risk was considered, and determined to be negligible or factored under other categories	Marginal	Possible	1
SC-2	Util's	specialty construction is possible for the utility work. Atypical construction elements and confidence in constructability is a concern	attention to particular util special details and likely stringent spec and details would present significant installation risk. Utility pricing is heavy with respect to materials so would expect a significant impact. Potential for HDD en	Significant	Likely	4

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
SC-3	LAND - Earthwork, Piles and Conc	no special construction or fabrication is expected for the Floodwall typ details and SOW	the typical details do not represent an unusual type of floodwall construction and would be considered low risk for construction in terms of specialty construction or fabrication	Negligible	Unlikely	0
SC-4	WATER - Earthwork, Piles and Conc	no special construction or fabrication is expected for the Floodwall typ details and SOW	the typical details do not represent an unusual type of floodwall construction and would be considered low risk for construction in terms of specialty construction or fabrication	Negligible	Unlikely	0
SC-5	HR - LAND - Earthwork, Piles and Conc	The high risk areas general cross or are along the tunnels. We fully expect that the typical details will not work and that special construction will be required. This could be either with specialty subsurface construction of special fabrication of various types of different flood wall details	specialty construction and fabrication may be necessary for constructing flood wall in the vicinity of the tunnels. The impact would certainly be significant and it is likely	Significant	Likely	4
SC-6	HR - WATER - Earthwork, Piles and Conc	The high risk areas general cross or are along the tunnels. We fully expect that the typical details will not work and that special construction will be required. This could be either with specialty subsurface construction of special fabrication of various types of different flood wall details	specialty construction and fabrication may be necessary for constructing flood wall in the vicinity of the tunnels. The impact would certainly be significant and it is likely	Significant	Likely	4
SC-7	Closure Structures	Current pricing is based on the New Haven CSRM typical detail scaled for height. This project is likely to require much more specialized closures that may need to swing, are longer and are located in more urban areas	actual fabrication and installation may be more complicated for various reasons (RR, swinging, exist conditions etc) the impact is moderate and possible	Moderate	Possible	2
SC-8	Harbor Walk	not applicable	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
SC-9	Levee's & Armored Levee's	where is the low perm soil coming from? It may not be local	you could alter the design if you had to use something more permeable with a clay core, or use s'pile cut off through full ht of levee. Generally the price of the low perm soil is insignificant, but likely it is not local	Negligible	Likely	1
SC-10	Surge Barrier	this is already known as a specialty construction and fabrication. The Hazen report ROM pricing would already account for this by using industry pricing for similar structures	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
SC-11	Dry Dock Caisson	this will be a very specific and provided by highly specialized fabricators and installers that may be limited.	the ROM price provided was from an industry fabricator that constructs and installs these. It would be expected that their ROM is already conservative and no additional risk req'd	Negligible	Unlikely	0
SC-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
SC-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
SC-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
Technical Design & Quantities				Maximum Project Growth		30%
T-1	Demo & Civil	Lack of great existing intel could lead to more scope, new trees potential to replace having to remove existing, in some places (Navy Yard) the extent of large demo is high	it is probable that the qty's could vary however the alignment path is narrow, and SOW account for various road construction, rip rap removal and replacement. I would consider ancillary and unknown impacts (additional qty's outside of the actual wall footprint eg) to be the real risk. Qty's outside what has been factored is likely and the impact would be marginal	Marginal	Likely	2
T-2	Util's	currently there are no utility designs. Qty's are figured for SD and sewer relo's and SD, sewer and gas crossings. Actual locations of actual existing conditions is very limited	Currently there is no consideration for water lines, valves FH's etc, or any electrical or comm SOW. This results in an is an extreme risk for utility costs	Critical	Very LIKELY	5
T-3	LAND - Earthwork, Piles and Conc	if typical detail is not typical and if alignment varies much differently	there is reasonable confidence in the land side design. Obvious subsurface issues can affect the design and potentially the qty. It would be a moderate impact that is possible	Moderate	Possible	2
T-4	WATER - Earthwork, Piles and Conc	if typical detail is not typical and if alignment varies much differently	current typ design is tricky due to unknown subsurface conditions and depth of water. Due to concerns with typical detail, changes to the design (eg. a 3rd pile) would be significant and possible.	Significant	Possible	3

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
T-5	HR - LAND - Earthwork, Piles and Conc	we know the typical detail is not typical for the areas where there are tunnel crossing or location that run along the tunnels, also areas where there are complications with proximity to buildings, and along HV elec distribution	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction	Significant	Very LIKELY	5
T-6	HR - WATER - Earthwork, Piles and Conc	we know the typical detail is not typical for the areas where there are tunnel crossing or location that run along the tunnels, also areas where there are complications with proximity to buildings, and along HV elec distribution	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction	Significant	Very LIKELY	5
T-7	Closure Structures	Current pricing is based on the New Haven CSRM typical detail scaled for height. This project is likely to require much more specialized closures that may need to swing - are longer and are located in more urban areas	actual design and installation may be more complicated for various reasons (swinging, exist conditions etc) the impact is moderate and possible	Moderate	Possible	2
T-8	Harbor Walk	a typical detail was considered, but currently there is no real design. Qty's are likely to vary as the wall alignment is finalized. additional scope for mitigating section 106 (national historic preservation act). ADA compliant, chapter 91 access and permitting	the design will likely vary and additional qty is likely. This has to be weighed against the sponsor requirements (?). Presently no architectural features are considered. Since actual designs are likely to vary, and require some sort of aesthetic feature the cost impact is probably moderate and likely	Moderate	Likely	3
T-9	Levee's & Armored Levee's	At Pope John Paul park eg., location of alignment pushes towards the water and encroaches on the embankment - and if we do get closer to the slope are there stability issues w/re to the typical levee design - relative to existing grade what is the qty - likely that the sheetpile cut-off will need to be longer <- how oversimplified relative to a buried toe and having to excavate any existing mat'l, vs currently placing on existing grade with no excavation other than say grading of existing. Certain locations will be susceptible to induced flooding.	current detail accounts for replacing subsurface material equivalent to the volume of the levee. risk would be that additional subsurface stabilization would be necessary. it is assumed that the alignments are fairly straightforward and additional qty is not at risk. overall additional subsurface stabilization is possible and would be a moderate impact. what length of Levee is subject to the slope encroachment and potential for stability issues is limited <- what if you had to dig out the toe, it is not really a revetment but more of an erosion protection of the levee. Simply adding over the existing to match the new slope of the levee. Induced flooding will create certain	Significant	Possible	3
T-10	Surge Barrier	there is no design, however the current pricing does account for a class IV estimate of industry provided pricing. The risk to me is if we anticipate a much more significant or complicated SB.	Current estimate does not include a pump station. There is also a potential that without the pump station the surge barrier does not reach the whole width. Adding additional reach or the pump station would be significant and likely	Significant	Likely	4
T-11	Dry Dock Caisson	this will be a very specific and provided by highly specialized fabricators and installers that may be limited.	the ROM price provided was from an industry fabricator that constructs and installs these. It would be expected that their ROM is already conservative and no additional risk req'd	Negligible	Unlikely	0
T-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
T-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
T-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
Cost Estimate Assumptions						Maximum Project Growth
EST-1	Demo & Civil	more scope for hard & soft work, more stripping, some grading and prep for levee install eg.		Marginal	Possible	1
EST-2	Util's	currently there are no utility designs. Qty's are figured for SD and sewer rel'o's and SD, sewer and gas crossings. Actual locations of actual existing conditions is very limited	Currently there is no consideration for water lines, valves FH's etc, or any electrical or comm SOW. This results in an is an extreme risk for utility costs. Very few real assumptions are made	Critical	Very LIKELY	5

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
EST-3	LAND - Earthwork, Piles and Conc	generally the typical design is considered CONSERVATIVE and considering the cost of the material represents a significant amount (50%) of the total price. Risk would be if pile design is in-adequate or if subsurface stabilization is req'd. Further, would be if existing soil is contaminated as well as cost estimate structure	Overall subject to assuming conservativeness of typical detail impact (which is factored under the tech design) would be marginal and possible. Productivities are generally conservative. All worked is considered subcontracted through a GC. Overall assumptions are considered reasonable, so any impact would be marginal but possible	Marginal	Possible	1
EST-4	WATER - Earthwork, Piles and Conc	existing conditions behind the waterside wall w/respect to depth and width is not ID'd very well. Assumptions were based on some depth of water information from the Navy Yard carried throughout. The qty of b'fill behind the wall for all water side flood walls is not ID'd very well. generally the typical design is considered CONSERVATIVE and considering the cost of the material represents a significant amount (42%) of the total price.	risk for additional qty of b'fill is possible but it only accounts for approx 5% of the cost so the impact is marginal. Overall subject to assuming conservativeness of typical detail impact (which is factored under the tech design) would be marginal and possible. Productivities are generally conservative. All worked is considered subcontracted through a GC. Overall assumptions are considered reasonable, so any impact would be marginal but	Marginal	Possible	1
EST-5	HR - LAND - Earthwork, Piles and Conc	we know the typical detail is not typical for the areas where there are tunnel crossing or location that run along the tunnels, also areas where there are complications with proximity to buildings, and along HV elec distribution	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction	Significant	Very LIKELY	5
EST-6	HR - WATER - Earthwork, Piles and Conc	we know the typical detail is not typical for the areas where there are tunnel crossing or location that run along the tunnels, also areas where there are complications with proximity to buildings, and along HV elec distribution	this SOW is considered high risk because we know the typical details and SOW is not represented well. Area at and along the tunnels and HV elec will require significant changes to the current SOW, and could require very specific and specialized design and construction	Significant	Very LIKELY	5
EST-7	Closure Structures	Current pricing is based on the New Haven CSRM typical detail scaled for height. This project is likely to require much more specialized closures that may need to swing, are longer and are located in more urban areas	actual design and installation may be more complicated for various reasons (swinging, exist conditions etc) the impact is moderate and possible	Moderate	Possible	2
EST-8	Harbor Walk	a typical detail was considered, but currently there is no real design. Qty's are likely to vary as the wall alignment is finalized.	the design will likely vary and additional qty is likely. This has to be weighed against the sponsor requirements (?). Presently no architectural features are considered. Since actual designs are likely to vary, and require some sort of aesthetic feature the cost impact is probably moderate and likely	Moderate	Likely	3
EST-9	Levee's & Armored Levee's	location of alignment pushes towards the water and the encroaches on the embankment - and if we do get closer to the slope are there stability issues w/re to the typical levee design - relative to existing grade what is the qty - likely that the sheetpile cut-off will need to be longer <- how oversimplified relative to a buried toe and having to excavate any existing mat'l, vs currently placing on existing grade with no excavation other than say grading of existing. if I do not need, or assume no rock, but rock or something other than grass is needed it could impact NEPA	current detail accounts for replacing subsurface material equivalent to the volume of the levee. risk would be that additional subsurface stabilization would be necessary. it is assume that the alignments are fairly straightforward and additional qty is not at risk. isolated location may need rock for bank stabilization. overall additional surface & subsurface stabilization is possible and would be a moderate impact. what length of Levee is subject to the slope encroachment and potential for stability issues <- what if you had to dig out the toe, it is not really a revetment but more of an erosion protection of the levee. Simply adding over the existing to match the new	Moderate	Possible	2
EST-10	Surge Barrier	there is no design, however the current pricing does account for a class IV estimate of industry provided pricing. The risk to me is if we anticipate a much more significant or complicated SB.	cost estimate was from Hazen & Sawyer report - estimate was a class IV estimate developed based on take-offs, parametric estimates and engineering judgement., the estimate utilized one of 3 sources for unit pricing: current or updated prices from projects with similar scope and complexity, historical costs adjusted for regional variations or material and installation costs from BOSTON	Negligible	Unlikely	0
EST-11	Dry Dock Caisson	this will be a very specific and provided by highly specialized fabricators and installers that may be limited.	the ROM price provided was from an industry fabricator that constructs and installs these. It would be expected that their ROM is already conservative and no additional risk req'd	Negligible	Unlikely	0
EST-12	Cultural Resources and Fish & Wildlife	Risk element External Project Risks is rated as significant and very likely. Between that particular risk category, along with the overall general ARA risk being applied to Cultural Resources and Fish & Wildlife at the Mii & TPCS levels - no additional risk is being figured.	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0

		BOSTON CSRM				
Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
EST-13	Planning, Engineering, & Design	currently carrying 12%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
EST-14	Construction Management	currently carrying 10%. Regardless of design vehicle this is likely conservative already	risk was considered, and determined to be negligible or factored under other categories	Negligible	Unlikely	0
External Project Risks						Maximum Project Growth
						40%
EX-1	Demo & Civil	Political influences, lack of support, obstacles? ,Unanticipated inflations in fuel, key materials?, Potential for market volatility impacting competition, pricing? Funding Constraints. any and all delays and potential for termination and re-solicitation due to potential natural disaster, and federal and local political implication, utility cooperation, permitting, environmental & wildlife mitigation. The amount of data available after the Hazen modeling and NAE Hydraulics analyses is inconclusive for a takings appraisal, as well as OC determination on the takings.	The entire project is at high risk as a result of all of the risk elements. It is very likely that project delays, funding, environmental issues/remedies and politics will affect all aspects of the project, and the impact would be significant. a lot can happen (funding streams, policy & law, public, util & private development (Norfolk), schedule & delays. Additionally, as a result of the analyses for a takings appraisal,	Significant	Very LIKELY	5
EX-2	Util's	"	"	Significant	Very LIKELY	5
EX-3	LAND - Earthwork, Piles and Conc	"	"	Significant	Very LIKELY	5
EX-4	WATER - Earthwork, Piles and Conc	"	"	Significant	Very LIKELY	5
EX-5	HR - LAND - Earthwork, Piles and Conc	"	"	Significant	Very LIKELY	5
EX-6	HR - WATER - Earthwork, Piles and Conc	"	"	Significant	Very LIKELY	5
EX-7	Closure Structures	"	"	Significant	Very LIKELY	5
EX-8	Harbor Walk	"	"	Significant	Very LIKELY	5
EX-9	Levee's & Armored Levee's	"	"	Significant	Very LIKELY	5
EX-10	Surge Barrier	"	"	Significant	Very LIKELY	5
EX-11	Dry Dock Caisson	"	"	Significant	Very LIKELY	5
EX-12	Cultural Resources and Fish & Wildlife	"	"	Significant	Very LIKELY	5
EX-13	Planning, Engineering, & Design	Dorchester Bay City has app'd development permits for an area that will impact our alignment. Morrissey Blvd Commission to improve the roadway - Beades Bridge (aka Castle Island Draw Bridge) is schedule to be replaced w/in 5 years	resource and time issues. The impact will be moderate, but delays, funding etc. is very likely	Moderate	Very LIKELY	4
EX-14	Construction Management	currently carrying 10%.	carrying risk comparable due to potential for long term delays in schedule	Moderate	Very LIKELY	4

Boston CSRM Base
Alternative Formulation
Abbreviated Risk Analysis

Risk Evaluation

<u>WBS</u>	<u>Potential Risk Areas</u>	Project Management & Scope Growth	Acquisition Strategy	Construction Elements	Specialty Construction or Fabrication	Technical Design & Quantities	Cost Estimate Assumptions	External Project Risks	Cost in Thousands
01 LANDS AND DAMAGES	Real Estate								\$0
11 LEVEES AND FLOODWALLS	Demo & Civil	2	3	1	1	2	1	5	\$103,002
11 LEVEES AND FLOODWALLS	Util's	5	4	5	4	5	5	5	\$63,771
11 LEVEES AND FLOODWALLS	LAND - Earthwork, Piles and Conc	2	3	2	0	2	1	5	\$589,662
11 LEVEES AND FLOODWALLS	WATER - Earthwork, Piles and Conc	4	3	2	0	3	1	5	\$315,177
11 LEVEES AND FLOODWALLS	HR - LAND - Earthwork, Piles and Conc	5	4	5	4	5	5	5	\$172,988
11 LEVEES AND FLOODWALLS	HR - WATER - Earthwork, Piles and Conc	5	4	5	4	5	5	5	\$647,116
11 LEVEES AND FLOODWALLS	Closure Structures	3	3	3	2	2	2	5	\$17,472
11 LEVEES AND FLOODWALLS	Harbor Walk	0	3	0	0	3	3	5	\$23,886
11 LEVEES AND FLOODWALLS	Levee's & Armored Levee's	2	3	0	1	3	2	5	\$49,267
11 LEVEES AND FLOODWALLS	Surge Barrier	5	5	4	0	4	0	5	\$319,000
11 LEVEES AND FLOODWALLS	Dry Dock Caisson	0	3	1	0	0	0	5	\$34,500
All Other	Cultural Resources and Fish & Wildlife	0	0	0	0	0	0	5	\$76,205
30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	0	0	0	0	0	0	4	\$289,446
31 CONSTRUCTION MANAGEMENT	Construction Management	0	0	0	0	0	0	4	\$270,149
									\$2,971,641
Risk		\$ 1,045,889	\$ 743,997	\$ 596,639	\$ 253,737	\$ 371,202	\$ 334,661	\$ 1,071,852	\$4,417,978
Fixed Dollar Risk Allocation		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$0
Risk		\$ 1,045,889	\$ 743,997	\$ 596,639	\$ 253,737	\$ 371,202	\$ 334,661	\$ 1,071,852	\$4,417,978
Total									\$7,389,618

**Attachment M- 3: Array of Alternatives
Cost Summary**

Spreadsheet First Cost

									Schedule Duration (mos)	
ALIGNMENT	Construction Contract \$\$\$ Incl ARA Risk	PED % + ARA Risk %	S&A % + ARA Risk %	F&W / Env	Cult Res w/their risk only	TOTAL	Escalate to First Cost Oct FY28	Project First Cost	Constr Only *	PED + Constr **
		12.0% PED 34.1270% ARA Risk (80% Conf Lvl)	10.0% S&A				6.52% ***	Pgm Year 2028		
		20.4762% ARA Risk (50% Conf Lvl)								
CHARLESTOWN										
Navy Yard	584,150,157	94,020,370	78,350,308	995,862	5,650,000	763,166,697	49,721,800	812,888,497	103	189
Chelsea Street	46,330,143	7,456,948	6,214,123	-	-	60,001,214	3,909,196	63,910,410	19	43
Little Mystic	192,803,000	31,032,106	25,860,088	363,595	3,200,000	253,258,788	16,500,305	269,759,093	38	75
Schraffts	131,418,050	21,152,051	17,626,709	-	2,637,500	172,834,309	11,260,493	184,094,802	30	54
Ryan Playground	16,219,325	2,610,539	2,175,449	-	-	21,005,314	1,368,537	22,373,851	12	36
Charlestown Community Ctr NSWP	2,970,469	478,104	398,420			3,846,993	250,639	4,097,632	12	24
DORCHESTER										
Neponset River	74,282,020	11,955,869	9,963,224	117,874	2,137,500	98,456,487	6,414,632	104,871,120	17	41
Tenean Beach	25,954,379	4,177,420	3,481,183	-	2,137,500	35,750,482	2,329,214	38,079,695	15	39
Victory Road	1,277,182	205,566	171,305	-	-	1,654,052	107,765	1,761,817	10	34
Morrissey Blvd	64,936,606	10,451,703	8,709,752	-	1,762,500	85,860,561	5,593,983	91,454,544	14	38
Pattens Cove	52,265,960	8,412,332	7,010,276	-	2,543,750	70,232,318	4,575,773	74,808,091	13	37
Harbor Point	103,620,661	16,677,994	13,898,328	1,136,932	-	135,333,916	8,817,269	144,151,185	18	42
Moakley Park (80% Confidence Level)	86,613,336	13,940,624	11,617,187	-	1,752,450	113,923,597	7,422,345	121,345,942	14	38
Moakley Park (50% Confidence Level)	64,554,013	9,332,669	7,777,224	-	1,752,450	83,416,356	5,434,738	88,851,095	14	38
EAST BOSTON										
Waterfront West	458,607,177	73,813,926	61,511,605	179,134	3,387,500	597,499,341	38,928,249	636,427,590	72	144
Waterfront West Alt	407,715,287	65,622,754	54,685,628	179,134	3,387,500	531,590,303	34,634,146	566,224,449	61	123
Marginal Street	440,308	70,869	59,057	-	-	570,234	37,152	607,386	12	36
Summer Street to Airport	44,116,218	7,100,611	5,917,176	-	2,700,000	59,834,005	3,898,302	63,732,307	13	37
Wood Island	18,320,590	2,948,743	2,457,286	-	1,218,750	24,945,369	1,625,239	26,570,608	12	36
Constitution Beach	130,050,195	20,931,891	17,443,243	-	2,356,250	170,781,579	11,126,753	181,908,332	12	36
Rail Yard	174,649,070	28,110,187	23,425,156	-	1,137,500	227,321,913	14,810,466	242,132,379	23	47
Chelsea Creek (Route 1A)	128,095,195	20,617,229	17,181,024	-	3,387,500	169,280,948	11,028,984	180,309,933	25	49
Middle of 1A	71,503,592	11,508,675	9,590,562	-	3,387,500	95,990,329	6,253,957	102,244,286	21	45
SOUTH BOSTON										
Fan Pier Park to Seaport Blvd	486,889,647	78,366,057	65,305,048	1,033,283	-	631,594,035	41,149,585	672,743,619	63	138
Seaport Blvd (west of Alt)	34,458,578	5,546,191	4,621,826	-	-	44,626,595	2,907,510	47,534,104	14	38
Seaport Blvd (east of Alt thru Marine Term	705,106,492	113,488,582	94,573,818	-	-	913,168,893	59,494,736	972,663,629	81	180
Dry Dock	94,961,250	15,284,241	12,736,868	-	-	122,982,359	8,012,541	130,994,899	36	48
Pappas Way	186,456,391	30,010,604	25,008,836	-	2,940,013	244,415,843	15,924,169	260,340,013	30	54
Surge Barrier	878,047,500	141,323,852	117,769,877	1,983,450	2,814,888	1,141,939,567	74,399,592	1,216,339,159	60	84
Parapet Wall & Closure Gate	3,299,853	531,119	442,599	-	-	4,273,572	278,432	4,552,003	9	33
D Street	45,476,715	7,319,586	6,099,655	-	-	58,895,957	3,837,187	62,733,143	14	38
Haul Street	27,879,741	4,487,311	3,739,426	-	-	36,106,478	2,352,408	38,458,886	14	38
Summer Street to Pappas	56,590,856	9,108,434	7,590,362	-	-	73,289,652	4,774,964	78,064,616	14	38
DOWNTOWN										
Waterside	1,624,287,581	261,432,984	217,860,820	11,914,282	13,231,250	2,128,726,918	138,690,715	2,267,417,633	148	281
Commercial Street	27,110,199	4,363,452	3,636,210	-	-	35,109,860	2,287,476	37,397,336	14	38
Lovejoy Wharf	55,531,168	8,937,875	7,448,229	609,561	10,325,000	82,851,833	5,397,959	88,249,792	15	39
Paul Revere Park	528,369	85,042	70,869	-	2,762,500	3,446,780	224,564	3,671,344	9	33
Landside	471,004,655	75,809,330	63,174,441	-	13,231,250	623,219,676	40,603,979	663,823,655	70	144
Hybrid, Waterside north to Fleet St	1,230,865,100	198,110,692	165,092,243	8,552,958	13,231,250	1,615,852,243	105,275,929	1,721,128,171	154	286

ALIGNMENT	Construction Contract \$\$\$ Incl ARA Risk	PED % + ARA Risk %	S&A % + ARA Risk %	F&W / Env	Cult Res w/their risk only	TOTAL	Escalate to First Cost Oct FY28	Project First Cost	Schedule Duration (mos)	
									Constr Only *	PED + Constr **
		12.0% PED 34.1270% ARA Risk (80% Conf Lvl)	10.0% S&A				6.52% ***	Pgm Year 2028		
		20.4762% ARA Risk (50% Conf Lvl)								

* Assumes multiple contract awards per alignment - each award cal'd to ~< \$100M typically. Construction duration assumes each award starts at the MPC of the previous award - see below FYI. Any single alignment total <\$100M assumes 1 contract award (see orange key below). Large value alignments where <\$100M awards would push the duration out past 15 years were adjusted to larger than \$100M awards in order to make the total duration less than 15 years (see blue key below).

Construction Duration Column Color Key

Neighborhood is considered a single contract award > \$100M

Neighborhood is broken into multiple awards > \$100M in order to force total duration < 15 yrs

** Total construction and PED duration. All contract awards include 24 mos PED preceding the award.

	Alignment	Contract		Constr Duration	Total Constr
East Boston	Total Const \$	Awards	\$ / Award	per Award	Duration
Waterfront West	\$ 458.6 M	5	\$ 91.7 M	24.0 mos	72.1 mos
	72.1 mos - Total				
Contract 1	24 mos				
Contract 2		24 mos			
Contract 3			24 mos		
Contract 4				24 mos	
Contract 5					24 mos
Waterfront West (Alt Align)	\$ 407.7 M	4	\$ 101.9 M	24.6 mos	61.4 mos
	61.4 mos - Total				
Contract 1	24.6 mos				
Contract 2		24.6 mos			
Contract 3			24.6 mos		
Contract 4				24.6 mos	
Contract 5					

*** Escalation to 2028Q1 First Cost

WBS Code 11 - Levees & Floodwalls	CWCCIS Index		
2026Q1	1,212.55	Effective Price Level Date	
2028Q1	1,291.55	Program Year	
	6.52%		

ALTERNATIVE	Alignments	Project First Cost	Schedule Duration (mos)		
			Constr Only *	PED + Constr **	
		Pgm Year 2028			yrs
CHARLESTOWN					
CH1	Ryan Playground	22,373,851	42	90	7.5
CH2	Little Mystic + Chelsea Street + Charlestown Community Ctr NSWP	337,767,135	57	118	9.8
CH3	Little Mystic + Navy Yard + Charlestown Community Ctr NSWP	1,086,745,222	141	264	22.0
DORCHESTER					
DOR1	Moakley Park (80% ARA Confidence Level)	121,345,942	14	38	3.2
DOR1	Moakley Park (50% ARA Confidence Level)	88,851,095	14	38	3.2
DOR2	Moakley Park (80%) + Harbor Point + Pattens Cove	340,305,218	45	117	9.8
DOR3	Tenean Beach	38,079,695	15	39	3.3
DOR4	Tenean Beach + Victory Road + Morrissey Blvd	131,296,056	39	111	9.3
DOR5	Removed from analysis				
DOR6	Neponset River	104,871,120	17	41	3.4
EAST BOSTON					
EB1	Rail Yard	242,132,379	23	47	3.9
EB2	Constitution Beach + Rail Yard + Chelsea Creek (Route 1A)	604,350,644	60	132	11.0
EB2A	Constitution Beach + Rail Yard + Middle of Route 1A	526,284,997	56	128	10.7
EB3A	Waterfront West Alt + Marginal Street + Summer Street to Airport + Wood Island	657,134,751	98	232	19.3
SOUTH BOSTON					
SB1	Raise Parapet Wall w/Closure Gate	4,552,003	9	33	2.8
SB2	SB1 + Surge Barrier + Fan Pier Park to Seaport + Seaport Blvd West of Alt + D St & Haul St + Summer St.	2,120,425,531	218	461	38.4
SB3	SB1 + Surge Barrier + Dry Dock + Fan Pier Park + Seaport Blvd thru Marine Terminal +Pappas Way	3,305,167,428	284	542	45.2
DOWNTOWN					
DT1	Lovejoy Wharf + Paul Revere Park + Commercial Street	129,318,472	38	110	9.2
DT3	In-Water Perimeter Wall	2,267,417,633	70	144	12.0
DT3A	Hybrid, Waterside north to Fleet St	1,721,128,171	154	286	23.8

**Attachment M-4: Draft Report Cost
Summary**

**Comprehensive System Plan – Cost Breakdowns for
Each Neighborhood for Action Plan 2**

Description	ContractCost	Contingency	ProjectCost
EB2A - Constitution Beach + Rail Yard + Middle of Route 1A	136,676,787	239,526,070	376,202,857
Constitution Beach (what does it take to push this to 35%)	47,248,027	82,802,167	130,050,195
Levee (3') ok	526,808	923,230	1,450,038
Levee (6') ok	905,730	1,587,291	2,493,021
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok	11,743,870	20,581,133	32,325,003
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok	26,482,320	46,410,266	72,892,586
Closure Gates (ok)	1,199,258	2,101,699	3,300,956
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	1,209,800	2,120,175	3,329,975
Util's (ok)	4,641,735	8,134,640	12,776,375
O'Hd Pedestrian Crossing	538,507	943,734	1,482,241
Rail Yard (advance to 35% - no pre-design info, MBTA wants it)	63,451,070	111,198,000	174,649,070
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok	1,499,217	2,627,379	4,126,596
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok	57,485,284	100,742,960	158,228,244
Closure Gates (ok)	469,586	822,949	1,292,535
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	84,201	147,562	231,762
Util's (ok)	58,756	102,969	161,725
Temp Shoring Around Wetlands	3,854,027	6,754,182	10,608,209
Alt Align - Route 1A in Middle	25,977,690	45,525,902	71,503,592
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok	6,783,959	11,888,888	18,672,847
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok	16,411,579	28,761,292	45,172,870
Util's (ok)	117,511	205,938	323,449
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	2,664,641	4,669,784	7,334,426

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Project Cost Summary Page 1

Description	ContractCost	Contingency	ProjectCost
Project Cost Summary	170,969,084	299,623,319	470,592,403
EB3A - Waterfront West Alt + Marginal Street + Summer Street to A'Port + Wood Island	170,969,084	299,623,319	470,592,403
Alt Align - Waterfront West	148,125,445	259,589,842	407,715,287
Base Alignment (less Alt Run)	133,797,306	234,479,778	368,277,083
Border Street	7,599,440	13,318,018	20,917,458
New & Summer Street	6,728,699	11,792,046	18,520,745
Marginal Street	159,967	280,341	440,308
Raise Road	159,967	280,341	440,308
Summer Street to Airport	16,027,691	28,088,528	44,116,218
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok	3,248,305	5,692,654	8,940,958
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok	8,056,593	14,119,179	22,175,773
Harborwalk - WATER - 6' Stick-up Wall - Conc edge wall, composite framing & 5'-wide deck ok	449,593	787,911	1,237,504
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	2,717,292	4,762,055	7,479,347
Util's (ok)	1,555,908	2,726,729	4,282,637
Wood Island	6,655,982	11,664,608	18,320,590
Levee (3') ok	1,448,242	2,538,044	3,986,286
Levee (6') ok	3,622,919	6,349,165	9,972,083
Levee (9') ok	1,021,526	1,790,224	2,811,750
Top Soil & Seed - Levee ok	192,528	337,405	529,933
Top Soil & Seed - Replace Stripped ok	155,446	272,419	427,864
Strip/Clear & Grub	39,055	68,444	107,499
Util's (ok)	176,267	308,907	485,174

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Project Cost Summary Page 1

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary		148,125,445	259,589,842	407,715,287
Alt Align - Waterfront West		148,125,445	259,589,842	407,715,287
Base Alignment (less Alt Run)		133,797,306	234,479,778	368,277,083
Demo Pier from Land (Prod 85% from land)		2,921,395	5,119,745	8,041,141
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok		6,496,609	11,385,307	17,881,916
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok		55,799,367	97,788,391	153,587,759
LAND Piles & Wall <9' Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok		45,555,497	79,836,008	125,391,504
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, 70% w/OT) ok		38,777,442	67,957,467	106,734,909
Closure Gates (ok)		1,794,005	3,143,994	4,938,000
Harborwalk		1,522,788	2,668,686	4,191,475
Remove & Replace - Site		6,602,218	11,570,388	18,172,606
Util's (ok)		7,145,456	12,522,412	19,667,868
Negative from Base		-32,817,473	-57,512,621	-90,330,094
Border Street		7,599,440	13,318,018	20,917,458
LAND Piles & Wall <9' Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok		6,230,503	10,918,957	17,149,460
Closure		1,071,382	1,877,597	2,948,979
Remove & Replace - Site		209,422	367,012	576,433
Util's (ok)		88,133	154,454	242,587
New & Summer Street		6,728,699	11,792,046	18,520,745
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok		3,953,698	6,928,857	10,882,555
Closure		579,125	1,014,917	1,594,042
Remove & Replace - Site		147,886	259,170	407,056
Util's (ok)		2,047,990	3,589,102	5,637,092

	Description	ContractCost	Contingency	ProjectCost
Project Cost Summary		5,892,579	10,326,745	16,219,325
CH1 - Ryan Playground		5,892,579	10,326,745	16,219,325
Ryan Playground (COB priority)		5,892,579	10,326,745	16,219,325
Levee (3') ok		1,599,580	2,803,263	4,402,843
LAND Piles & Flood Wall (3' wall, - 4 piles/day, 33' avg L, OT, 85% prod, no DHH) ok		1,874,022	3,284,223	5,158,245
Closure Gates (ok)		346,782	607,735	954,516
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)		144,056	252,458	396,515
Util's (ok)		1,928,140	3,379,066	5,307,206

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Project Cost Summary Page 1

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary		283,351,000	496,572,627	779,923,627
CH3 - Little Mystic + Navy Yard (MGH/Spaulding) + NS FP at CCC		283,351,000	496,572,627	779,923,627
Little Mystic		70,046,503	122,756,497	192,803,000
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)		462,160	809,935	1,272,095
Util's (ok)		2,364,491	4,143,770	6,508,261
LAND Piles & Flood Walls		24,090,011	42,217,744	66,307,755
WATER Piles & Flood Wall		41,842,123	73,328,321	115,170,444
Harbor Walk (no OT) (ok)		1,287,719	2,256,727	3,544,446
Navy Yard		212,225,307	371,924,850	584,150,157
Remove & Replace Marina (ok)		7,946,740	13,926,661	21,873,401
Demo - Heavy (ok)		10,788,969	18,907,668	29,696,637
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)		4,945,514	8,667,014	13,612,528
Util's (ok)		6,077,603	10,651,000	16,728,603
Closure Gates (ok)		2,732,639	4,788,950	7,521,589
Piles - WATER from LAND (ok)		7,343,527	12,869,531	20,213,058
LAND Piles & Flood Wall		44,801,046	78,513,833	123,314,879
WATER Piles & Flood Wall		123,605,475	216,618,595	340,224,070
Harbor Walk (no OT) (ok)		3,983,794	6,981,598	10,965,392
NS FP Charlestown Community Center		1,079,190	1,891,280	2,970,469
R&R s/w		73,217	128,314	201,531
Wall Footing - by Cubic Yard		183,618	321,790	505,407
Brick Veneer		182,476	319,790	502,267
Doors		509,835	893,486	1,403,321
R&R / FP Utils		130,043	227,901	357,944

	Description	ContractCost	Contingency	ProjectCost
Project Cost Summary		30,216,071	52,953,665	83,169,736
DT1 - Lovejoy Wharf + Paul Revere Park + Commercial St		30,216,071	52,953,665	83,169,736
Lovejoy Wharf		20,174,811	35,356,357	55,531,168
	LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH> ok	2,348,499	4,115,745	6,464,244
	WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, no b'fill, 70% w/OT) ok	11,972,365	20,981,570	32,953,935
	Backfill Behind Water Side Flood Wall (production 70% from water) (ok)	5,319,455	9,322,344	14,641,799
	Closure Gates (ok)	361,953	634,323	996,277
	Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	113,783	199,406	313,189
	Util's (ok)	58,756	102,969	161,725
Paul Revere Park		191,960	336,410	528,369
Raise Road		191,960	336,410	528,369
Commercial Street		9,849,300	17,260,899	27,110,199
	LAND Piles & Flood Wall (3' wall, - 1 pile/day, 33' avg L, OT, 85% prod, no DHH) ok	7,471,970	13,094,628	20,566,598
	Closure Gates (ok)	260,086	455,801	715,887
	Remove & Replace - Site (no OT) (ALL qty's linked) (ok)	617,832	1,082,751	1,700,584
	Util's (ok)	1,499,411	2,627,718	4,127,129

		Description	ContractCost	Contingency	ProjectCost
Project Cost Summary			590,113,563	1,034,174,019	1,624,287,581
DT3 - In-Water Perimeter Wall			590,113,563	1,034,174,019	1,624,287,581
Waterside			590,113,563	1,034,174,019	1,624,287,581
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, std b'fill, 70% w/OT) ok			198,292,942	347,508,381	545,801,323
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, no b'fill, 70% w/OT) ok			267,839,868	469,389,368	737,229,236
Backfill Behind Water Side Flood Wall (production 70% from water) (ok)			86,119,792	150,924,935	237,044,726
Remove Dock & Ramps & Put Back			24,520,374	42,971,955	67,492,329
Remove Marina Slips & Put Back			2,828,002	4,956,074	7,784,076
Harborwalk			10,424,452	18,268,852	28,693,304
Util's (ok)			88,133	154,454	242,587

Project Cost Summary		ContractCost	Contingency	ProjectCost
DT3A - Hybrid, Waterside north to Fleet St		447,180,781	783,684,319	1,230,865,100
Alt Align - Waterside north to Fleet St		447,180,781	783,684,319	1,230,865,100
LAND Piles & Flood Wall (3' wall, - 1 pile/day, 33' avg L, OT, 85% prod, no DHH) ok		2,041,522	3,577,767	5,619,289
LAND Piles & Wall <6.53 Wall - 1.5 piles/day, 33' avg L, 30% OT> ok		14,452,254	25,327,575	39,779,828
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, std b'fill, 70% w/OT) ok		148,186,473	259,696,794	407,883,267
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, no b'fill, 70% w/OT) ok		188,681,800	330,664,854	519,346,654
Backfill Behind Water Side Flood Wall (production 70% from water) (ok)		56,727,169	99,414,364	156,141,533
Closure Gates (ok)		1,505,032	2,637,569	4,142,601
Remove Dock & Ramps & Put Back		22,954,469	40,227,707	63,182,175
Remove Marina Slips & Put Back		2,563,203	4,492,013	7,055,216
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)		2,334,444	4,091,114	6,425,558
Harborwalk		7,528,771	13,194,171	20,722,942
Util's (ok)		205,644	360,392	566,036

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Project Cost Summary Page 1

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary		88,101,710	154,398,247	242,499,957
DOR2 - DOR1 + Patten Cove + Harbor Pt		88,101,710	154,398,247	242,499,957
Moakley Park (80% Confidence Level)		31,467,152	55,146,184	86,613,336
Levee (3') ok		1,003,808	1,759,174	2,762,982
Levee (6') ok		8,622,546	15,111,012	23,733,559
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH> ok		17,764,289	31,131,916	48,896,205
Remove & Replace - Site (no OT) (ALL qty's linked) (ok)		1,767,832	3,098,125	4,865,956
Closure Gates (ok)		2,026,939	3,552,210	5,579,149
Util's (ok)		281,739	493,747	775,486
Pattens Cove		18,988,541	33,277,418	52,265,960
Strip/Clear & Grub		48,665	85,285	133,950
Topsoil & Seed on Levee		307,104	538,200	845,305
Util's (ok)		1,268,262	2,222,629	3,490,890
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>		11,943,222	20,930,497	32,873,720
Levee (6')		3,822,368	6,698,700	10,521,068
Raise Road		1,598,920	2,802,107	4,401,028
Harbor Point		37,646,017	65,974,644	103,620,661
Topsoil & Seed on Levee		479,903	841,030	1,320,933
Util's (ok)		1,927,496	3,377,936	5,305,431
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>		14,111,068	24,729,646	38,840,714
Levee (6')		9,037,118	15,837,549	24,874,666
Coastal Levee - Armor		11,260,895	19,734,718	30,995,613
Harborwalk		829,538	1,453,766	2,283,304

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Project Cost Summary Page 1

Description		ContractCost	Contingency	ProjectCost
Project Cost Summary		33,485,256	58,682,911	92,168,167
DOR4 - Tenean Beach + Victory Rd + Morrissey Blvd		33,485,256	58,682,911	92,168,167
Tenean Beach - dp		9,429,384	16,524,995	25,954,379
At RR		5,377,288	9,423,697	14,800,985
Beach		4,052,096	7,101,298	11,153,394
Victory Road - dp		464,008	813,174	1,277,182
Strip/Clear & Grub		1,475	2,585	4,060
Utils		29,378	51,485	80,862
Levee/Narrow Berm (4')		348,369	610,517	958,886
Top Soil & Seed - Levee		10,691	18,735	29,426
Top Soil & Seed - Replace Stripped		3,800	6,659	10,459
Raise P'Lot		70,296	123,193	193,489
Morrissey Blvd (pile length = 60') dp		23,591,864	41,344,742	64,936,606
East		9,407,669	16,486,939	25,894,608
West		14,184,195	24,857,802	39,041,998

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Project Cost Summary Page 1

	Description	ContractCost	Contingency	ProjectCost
Project Cost Summary		9,429,384	16,524,995	25,954,379
Tenean Beach - dp		9,429,384	16,524,995	25,954,379
At RR		5,377,288	9,423,697	14,800,985
Remove & Replace - Site		8,085	14,169	22,255
LAND Piles & Flood Wall (3' wall, - 1 pile/day, 33' avg L, OT, 85% prod, no DHH)		5,369,203	9,409,528	14,778,730
Beach		4,052,096	7,101,298	11,153,394
Strip/Clear & Grub		10,861	19,034	29,896
Levee (6')		1,412,938	2,476,174	3,889,113
Levee (9')		1,382,064	2,422,068	3,804,132
Top Soil & Seed - Levee		84,695	148,428	233,122
Top Soil & Seed - Replace Stripped		27,980	49,035	77,016
Raise Road		1,133,557	1,986,559	3,120,116

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Project Cost Summary Page 1

		Description	ContractCost	Contingency	ProjectCost
Project Cost Summary			23,591,864	41,344,742	64,936,606
Morrisey Blvd (pile length = 60') dp			23,591,864	41,344,742	64,936,606
East			9,407,669	16,486,939	25,894,608
Remove & Replace - Site			144,875	253,894	398,769
Util's (ok)			29,378	51,485	80,862
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>			9,233,416	16,181,561	25,414,976
West			14,184,195	24,857,802	39,041,998
Remove & Replace - Site			7,214	12,642	19,856
Util's (ok)			1,671,725	2,929,699	4,601,424
LAND Piles & Wall <6.53 Wall - 60 lf piles - 3 piles/day, 30% OT, no DHH>			12,505,256	21,915,462	34,420,718

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Project Cost Summary Page 1

	Description	ContractCost	Contingency	ProjectCost
Project Cost Summary		26,987,110	47,294,910	74,282,020
DOR6 - Neponset River		26,987,110	47,294,910	74,282,020
Neponset River - dp		26,987,110	47,294,910	74,282,020
Remove & Replace - Site		735,642	1,289,212	2,024,854
Levee (3')		680,061	1,191,807	1,871,867
Levee (6')		2,572,272	4,507,907	7,080,179
Util's (ok)		2,794,792	4,897,873	7,692,665
LAND Piles & Wall <6.53 Wall - 4 piles/day, 33' avg L, 30% OT, no DHH> ok		3,953,698	6,928,857	10,882,555
WATER Piles & Flood Wall (~6', 2 piles/day, 57' avg L, 70% w/OT) ok		9,440,856	16,545,100	25,985,956
WATER Piles & Flood Wall (6',1 pile/day, 57' avg L, 70% w/OT) (Under bridge at Planet Fitness)		6,244,316	10,943,163	17,187,479
Harborwalk		565,473	990,991	1,556,464