Modified Riverbank and Paul Dudley White (PDW) Path Options Matrix

DRAFT FOR DISCUSSION PURPOSES

Option	Criteria	Option 1: Solid Fill Modified	Option 2: Varied Shoreline Edge/Pile Supported Walkway Detached from Shoreline Modified	Option 3: Solid Fill and Fill/Pile Supported Walkway Along Shoreline Modified	Option 4: Pile Supported Walkway Along Shoreline Modified
Description		• Revised concept with all elements located on fill • PDW Path width consists of bike (12') and ped (8') paths at different elevations • Two 6' planted buffers • 6' of separation between SFR and PDW Path • Stepped shoreline to reduce wave reflection	• Combination of edge treatments (sloped shoreline and retaining walls) • PDW Path on 20' clear pile supported walkway in Charles River • Planted buffer between SFR and PDW Path varies from 8' to 10' in wall sections • Planted shoreline or hard-edge treatment • Either single pier or pile supported PDW Path • Potential to raise PDW Path	• Combination of solid fill and fill/pile supported walkway • PDW Path on 20' clear on either fill or fill/pile supported walkway attached to shoreline • 8' (fill) to 20' (walkway) wide planted buffer between PDW Path and walkway • Shoreline plantings in fill area distributed along shoreline • Potential for floating wetlands (maintained by others)	• PDW Path on 20' clear pile supported walkway attached to shoreline • 22' wide planted buffer between PDW Path and SFR • Vertical granite wall with no shoreline plantings • Potential for floating wetlands (maintained by others)
Intent	Original Design Intent for Each Alternative	• Developed to address comments about PDW Path on pile supported walkway • Addresses historic concerns • All project infrastructure located on fill • +/- 43,000 sq. ft. of total permanent impacts	• Varied shoreline treatments based on separation between SFR and Charles River • Improves parkway experience • Wall section like existing granite wall treatments elsewhere on the Charles River • Planted areas provide ecological restoration or habitat opportunities	• Shoreline treatments address DCR's concerns related to maintenance access • On-grade path provides planted shoreline treatment • Pile supported walkway limits fill impacts in Charles River • Pile supported walkway provides planted roadway buffer • Optional sheet pile toe to provide habitat structure and continuous corridor	• Reduce landscape buffer width and PDW Path on piles to minimize impacts to Charles River • Reduced landscape areas mean narrow buffer between PDW Path users and SFR vehicles • Granite retaining wall supports landscape buffer and SFR • Consistent edge treatment for throat area • Planted roadway buffer improves parkway experience
Impacts Note: All options have less than 1 acre of fill in River	1. Impacts below elevation 2 NAVD88 (WUS/OHW) 2. Land Under Water (LUW) 3. Inland Bank 4. Bordering Land Subject Flooding (BLSF) Flood Storage	OHW Permanent fill: +/- 43,000 sf Dredge: 5,000 to 10,000 cy LUW: 34,000 sf Bank: 1,600 lf BLSF: 5,100 cf	OHW Permanent fill: +/- 40,000 sf Dredge: 5,000 to 10,000 cy LUW: 33,000 sf Bank: 1,700 lf BLSF: 5,100 cf	OHW Permanent fill: +/- 41,000 sf Dredge: 5,000 to 10,000 cy LUW: 32,000 sf Bank: 1,600 lf BLSF: 5,200 cf	OHW Permanent fill: +/- 29,000 sf Dredge: 5,000 to 10,000 cy LUW: 20,000 sf Bank: 1,500 lf BLSF: 5,500 cf
Environmental Permitting Compliance	Meets regulatory requirements	(USCG Army Corps, DEP Wetland Waterways) • Meets 404 GP • No USCG required • 401 Water Quality Cert for Fill and Dredge • Ch 91 Variance for non-Water Depending Fill • (2) 6' buffers between SFR & PDW Paths available for treatment of path stormwater in bioretention areas	• Meets 404 GP • USCG Bridge Permit required • 401 Water Quality Cert Fill and Dredge • Ch 91 Variance for non-Water Depending Fill • 8' to 10' Vegetated area not suitable for stormwater treatment	• Meets 404 GP • USCG Bridge Permit required • 401 Water Quality Cert Fill and Dredge • Ch 91 Variance for non-Water Depending Fill • 8' buffer between SFR & PDW Paths available for treatment of path stormwater in bioretention area	• Meets 404 GP • USCG Bridge Permit required • 401 Water Quality Cert Fill and Dredge • Ch 91 Variance for non-Water Depending Fill • 20' buffer between SFR & PDW Path available for treatment of path stormwater in bioretention area
Section 4 (f) and Section 106 Compliance	1. Mitigates Parkland Impacts	• Improved publicly accessible parkland throughout Project Area • Net gain in overall parkland acreage	• Improved publicly accessible parkland throughout Project Area • Net gain in overall parkland acreage	• Improved publicly accessible parkland throughout Project Area • Net gain in overall parkland acreage	• Improved publicly accessible parkland throughout Project Area • Net gain in overall parkland acreage
	2. Recreates Parkway Experience	• Provides tree lined Parkway on River Side	• Provides tree lined Parkway on River Side • Planted buffer varies	• Provides tree lined Parkway on River Side	• Provides tree lined Parkway on River Side
	3. Visual Improvement	• All options remove Viaduct • Planted buffers provided in throat	• All options remove Viaduct • Planted buffers provided in throat	• All options remove Viaduct • Planted buffers provided in throat	• All options remove Viaduct • Planted buffers provided in throat
	4. Charles River Watersheet	• Does not introduce new structure in river.	• Introduces new structure in river.	• Introduces new structure in river.	• Introduces new structure in river.
	5. Vertical Walls and Planted Slopes	• Stepped Vertical Granite wall at water's edge may be inconsistent with other sections of Charles River Reservation	• Vertical granite wall consistent with other section of Charles River Reservation • Planted slope provided in some sections	• Planted slope provided in some sections • Vertical wall at water's edge shielded from view due to walkway structure (wall could be constructed with granite to remain consistent with other sections of Charles River Reservation)	• Vertical wall at water's edge shielded from view due to walkway structure (wall could be constructed with granite to remain consistent with other sections of Charles River Reservation)
Ecological Interests	1. Provides Riverbank Plantings/Habitat at River's Edge	• No riverbank plantings provided	• Provides most riverbank plantings of any alternative but hard to maintain • Ecological benefits may be temporary. • High potential for riverbank plantings to be overrun with invasives (access only from river)	• Riverbank plantings provided where practical • Potential for Floating Wetland in supported walkway sections	• Potential for Floating Wetland • No riverbank plantings

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				• Riverbank plantings are more easily maintained and could provide ecological benefits for longer periods of time	
	2. Provide upland plantings along SFR	• Upland plantings provided	• Upland plantings provided	• Upland plantings provided	• Upland plantings provided
DCR interests	1. Public Safety	• Good emergency access from walkway and SFR • Does not require vehicular turnout • Separated pedestrian and bike path allow for safety for recreational users from bikers	• Limited emergency access from SFR to Boardwalk in river • Requires turnout on SFR and connection to path midpoint • Shared use path with no separation between pedestrians and bikers could raise safety concerns for pedestrians • Will require signage and enforcement to reduce bike speeds	• Good emergency access from walkway and SFR • Does not require vehicular turnout • Shared use path with no separation between pedestrians and bikers could raise safety concerns for pedestrians • Will require signage and enforcement to reduce bike speeds	• Good emergency access from walkway and SFR • Does not require vehicular turnout • Shared use path with no separation between pedestrians and bikers could raise safety concerns for pedestrians • Will require signage and enforcement to reduce bike speeds
	2. Recreation Experience	• Planted buffer between SFR and PDW Path allows for separation from parkway • Pedestrians at lower elevation than bikers – allowing more separation and improved experience • On fill design allows for rest and refuge opportunities for river users	• Planted buffer between SFR and PDW Path allows for separation from parkway • Walkway structure disconnected from land, allows for separation between SFR and PDW Path • Limited to no opportunities for refuge/rest along shoreline for river users	• Planted buffer between SFR and PDW Path allows for separation from parkway • Shoreline fill locations allow opportunities for rest and refuge for river users	• Planted buffer between SFR and PDW Path allows for separation from parkway • Potential for floating wetlands along edge to enhance experience • Limited to no opportunities for refuge/rest along shoreline for river users
	3. Stormwater Management	• (2) 6’ buffers between SFR & PDW Paths available for treatment of path stormwater in bioretention areas	• 8’ to 10’ vegetated area between SFR and PDW Path not available for stormwater treatment of Path because it is not connected • Ability to redirect path bridge drainage to upland area may be possible	• 8’ to 20’ buffer between SFR and PDW Path available for treatment of path stormwater in bioretention area	• 20’ buffer between SFR & PDW Path available for treatment of path stormwater in bioretention area if walkway is connected to shoreline
	4. Park and Parkway Aesthetic	• Most closely maintains the look and feel of a DCR park and parkway for both path and parkway users • Separated path for pedestrians and bikers similar to other areas outside of project boundaries	• Planted buffer between SFR and PDW Path enhances parkway experience • Raised structure in water may differ from typical feel of a DCR path and parkway	• Planted buffer between SFR and PDW Path enhances parkway experience • Sections on fill closely maintain the look and feel of a DCR park and parkway • Boardwalk sections may differ from typical feel of a DCR path and parkway	• Planted buffer between SFR and PDW Path enhances parkway experience • Floating wetlands enhance experience for path users • Raised structure may differ from typical feel of a DCR path, although still connected to land
	5. Maintenance and Access	• Good maintenance access from PDW Path and SFR to path and planted strips • Easy to maintain planting with all elements located on land • No riverbank plantings	• Limited access to PDW Path located in river • Limited access to lower terraced area • Snow clearing on a structure can be challenging • River’s edge plantings hard to maintain in terraced section and planted embankment where access to planting is only from water • Potential issues with invasive species management	• Good access to PDW Path due to connectivity to shoreline • River’s edge plantings in solid fill section are easier to maintain • No riverbank planting to maintain in fill/pile supported walkway section • Need to determine how to maintain floating wetlands if implemented	• Good access to SFR buffer from PDW Path or SFR due to connectivity to shoreline • No river edge plantings to maintain • Need to determine how to maintain floating wetlands if implemented
	6. Winter/Cool Weather Considerations	• Solid fill; easy access for de-icing, will freeze later than boardwalk options	• Boardwalk will freeze quicker than solid fill	• Boardwalk section will freeze quicker than solid fill • Sections of path on fill, will freeze slower; easier access for de-icing	• Boardwalk will freeze quicker than solid fill
	7. Future Modifications	• Only option that allows future widening and/or alteration of the shoreline cross section	• Would need to be completely torn down/rebuilt to modify width or cross section	• Would need to be completely torn down/rebuilt to modify width or cross section	• Would need to be completely torn down/rebuilt to modify width or cross section
River Users Interests	1. Wave reflection from Vertical walls	• Wave reflection mitigated by stepped shoreline	• Wave reflection where Vertical walls proposed. Length of Vertical walls is limited	• Possible wave reflection where wall under fill/pile supported walkway is proposed • Potential to reduce wave reflection using floating wetlands	• Possible wave reflection where wall under fill/pile supported walkway is proposed • Wave reflection from vertical walls • Potential to reduce wave reflection using floating wetlands

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	2. Reduction in River width	• Reduction in river width • 16’ from Buoy Line	• Reduction in river width	• Reduction in river width but pile supported walkway is closer to shore so reduced encroachment) • Supported Sections 12’ & Fill Sections 4’ from Buoy Line	• Reduction in river width but pile supported walkway is closer to shore so reduced encroachment) • Walkway 10’ from Buoy Line
	3. Navigation impact from walkway in the river	• No walkway in river	• Walkway in river	• Portion of PDW Path is solid fill at grade • Portion of fill/pile supported walkway in river (walkway can be pushed closer to SFR to reduce navigation impacts)	• Walkway in river is navigation impact but located closer to shoreline than other options
	4. Egress from river to landside	• Informal egress along length of new wall • Informal egress at new parkland	• Shoreline access limited by walkway, landside egress limited by steep slopes • Informal egress at new parkland	• Two shoreline fill locations evenly distributes river user refuge areas through the Throat Area • Informal egress at new parkland	• No egress along length of new wall • Informal egress at new parkland
Stakeholder Interests	1. Separation of SFR from PDW Path	• 8 ft of separation between SFR and PDW Path (could be expanded to 16 ft but would eliminate buffer between ped and bike paths)	• +/- 24 ft of separation between SFR and PDW Path	• +/-14’ to 22’ of separation between SFR and PDW Path	• +/- 22’ of separation between SFR and PDW Path
	2. Separated Pedestrian and Bicycle Facilities	• All Options provide 20’ clear PDW Path/separated facilities consistent with NPC filing	• All options provide 20’ clear PDW Path /separated facilities consistent with NPC filing	• All options provide 20’ clear PDW Path /separated facilities consistent with NPC filing	• All options provide 20’ clear PDW Path /separated facilities consistent with NPC filing
	3. Expanding the usable/accessible parkland in the CRR.	• All Options expand usable parkland	• All Options expand usable parkland	• All Options expand usable parkland	• All Options expand usable parkland