**BCSA Group and USEPA Successful Influence on NJDEP National Disaster Resiliency Competition Grant Application**

**Introduction**

On September 25, 2015, the NJDEP released "The State of New Jersey National Disaster Resilience Competition Phase 2 Draft Application for Public Comment," as part of its objective to receive U.S. Housing and Urban Development grant funding for flood mitigation efforts related to the Rebuild by Design program. Throughout the draft grant application, NJDEP linked some of the flood control aspects of the proposed project to the Berry's Creek superfund site and stated how the project will have positive impacts on future remediation. Many of the benefits raised by NJDEP were not based in science nor fact and were not consistent with discussion with NJDEP prior to the release of the draft.

The BCSA Group (October 9, 2015) along with USEPA (October 8, 2015) provided comments on the draft grant application that were subsequently addressed by the revised final application (key excerpts from the BCSA Group and USEPA letters are attached). Specific issues raised in the comments were related to:

- Marsh restoration focusing on replacing *Phragmites* with *Spartina* to reduce mercury methylation rates, a claim that is inconsistent with available data and does not recognize the importance of the maintaining the stability of *Phragmites* as part of the natural flood mitigation of storm and tidal surges
- Impacts of the flood control projects on the long-term health and stability of the marshes and the need to maintain appropriate tidal flows and sediment loading to the marshes.
- The need for close collaboration between NJDEP, USEPA, and the BCSA Group to ensure that any project implemented will meet the needs of all parties without causing adverse, unintended consequences.

Below are excerpts from the draft and final applications illustrating the changes that were made to address the BCSA Group and USEPA comments.

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| Draft Application | Final Application |
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| **Executive Summary** - Bergen County was identified by HUD as a most-impacted and distressed (MID) area after Sandy. This target area contains more than 12,900 housing units, 6,500 businesses, critical infrastructure such as the Teterboro Airport and Bergen County Utilities Authority, and sensitive environmental or superfund areas including Berry's Creek.<br>…<br>In addition, along with creating parks and bike trails as well as wetlands restoration, a water control structure is proposed at the mouth of Berry's Creek along the southern border of East Rutherford. The ability to manipulate water levels has the potential to enhance ongoing environmental remediation efforts and, in time, facilitate the replacement of invasive *phragmites* with native plant species including *spartina*, which in addition to providing a better environment for native species has been shown to open the possibility to biological remedial options for Berry's Creek (NDRC Request: $236 million) | **Executive Summary** - Along with creating parks and bike trails as well as wetlands restoration, a water control structure at the Route 3 crossing of Berry's Creek could amplify the net benefits of flood control and remedial alternatives at the Berry's Creek Study Area Superfund Site.<br>…<br>***Restore*** the natural ecosystem and be compatible with efforts to address long standing environmental contamination caused by adjacent superfund sites; |
| **B.8 – Resilience Incorporated**<br>These investments will significantly benefit natural resources in the area. Reduction in flooding with decrease runoff of contaminants and may facilitate the cleanup at the Berry's Creek Superfund site. Additionally, investing in a water control structure at the mouth of the creek not only will protect against storm surge events, but also provides options which may facilitate the ongoing EPA clean-up efforts and could facilitate the replacement of invasive *phragmites* with *spartina*, which in addition to providing a better environment for native species also has been shown, under the right conditions to demethylate mercury found in sediment. Less mercury in local fish and bird populations would provide considerable health benefits for the region and enhancing its resilience. | **B.5 – Resilience Incorporated**<br>Storm surge protection is achieved though the proposed flood barrier (i.e., wall or berm) and the use of water control structures where watercourses flow through the flood barrier. The water control structures allow management of water levels and can be closed during unusually high tide events and storm surge situations. Rainwater flooding will be addressed through the use of pump stations and green infrastructure, such as porous impervious cover, bioswales and wetlands enhancements. Pump stations will remove the runoff from rain events and the green infrastructure will increase absorption of rainwater, thus decreasing the amount of water runoff.<br>…<br>Storm surge protection is achieved though the proposed flood barrier (i.e., wall or berm) and the use of water control structures where watercourses flow through the flood barrier. The water control structures allow management of water levels and can be closed |

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| | during unusually high tide events and storm surge situations. Rainwater flooding will be addressed through the use of pump stations and green infrastructure, such as porous impervious cover, bioswales and wetlands enhancements. Pump stations will remove the runoff from rain events and the green infrastructure will increase absorption of rainwater, thus decreasing the amount of water runoff.<br>…<br>Further, environmental benefits – innovatively enhancing remediation efforts at superfund sites, reducing runoff and vehicle emissions, increasing wetlands, developing parks and improving native habitats – will have region-wide health and aesthetic benefits for the target areas, making the areas more economically vibrant, cleaner and resilient. |
| **B.11 – Tie Back**<br>***Meadowlands Resilience Revitalization Project:*** The berm, pumping stations and storm water management project components will address storm damage that occurred in the Meadowlands District when Sandy's storm surge caused water to breach tide gates, berms and levees severely impacting the region. The restoration of the wetlands will improve flood storage capacity and enhanced wildlife habitats will provide economic revitalization through recreational amenities. | **B.8 – Tie Back**<br>***Meadowlands Regional Resilience Pilot Project:*** The layered flood protection component's berm, water control structures, and stormwater management components will address storm damage that occurred in the Meadowlands District when Sandy's storm surge caused water to breach tide gates, berms and levees severely impacting the region. The proposed layered flood protection, had it been in place at the time of Sandy, would have prevented or significantly reduced damage incurred to the infrastructure represented by the current unmet need in the project service area. Restoration of the wetlands will improve flood storage capacity and enhancing habitats will provide economic revitalization through recreational amenities. |
| **D.1.2 – Unmet Needs in Project Area – Meadowlands Resilience Revitalization Project**<br>No specific reference to BCSA. | **D.1.1 – Unmet Recovery Needs in Project Area**<br>The target area also faces related environmental hurdles from repetitive flooding, including pollution from storm runoff and ongoing studies concerning remediation alternatives for the Berry's Creek Study Area (BCSA) Superfund Site. Runoff creates environmental and health risks to residents and visitors and threatens the habitats of native species. Importantly, while Sandy was unique in terms of the breadth and scale of its damage, the challenges that severe storms |

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| | pose on these communities is not limited to Sandy. |
| **D.1.4 – Needs in Addressed by NDR Projects**<br>***Meadowlands Resilience Revitalization Project:*** As described in detail above, repetitive flood losses and all of the attendant impacts are the foremost challenge in the target areas. But the area also faces other related hurdles to community stabilization and economic revitalization, including pollution from storm run-off and ongoing environmental clean-up at Berry's Creek. The multi-layered flood protection seeks to address these risks, and as an additional benefit should enhance property values, reduce insurance premiums and protect critical infrastructure in the target areas. The multi-purpose berm, which will incorporate public recreation space (parks, etc.) will wrap around the target areas to protect against storm surge and flooding. Wetlands will be enhanced and expanded, which also provides natural protection against flooding events and storm surge, while providing for recreation and enhancing the appearance of the landscape. Enhanced, created or restored wetlands and wetlands transition areas (buffers) also can improve the habitat for native biota. Finally, a water control structure at the mouth of Berry's Creek provides options that have the potential to enhance ongoing environmental remediation efforts and, in time, facilitate the replacement of invasive *phragmites* with *spartina* and other plant species, which in addition to providing a better environment for native species also has been shown under the right conditions to demethylate mercury found in sediment out of water. Less mercury in local fish and bird populations would provide considerable health benefits for the region and enhancing its resilience. | **D.1.2.1 – Meadowlands Regional Resilience Project**<br>Wetlands will be enhanced and expanded, which also provides natural protection against flooding events and storm surge, while providing for recreation and enhancing the appearance of the landscape. Enhanced, created or restored wetlands and wetlands transition areas (buffers) also can improve the habitat for native biota. A water control structure at the Route 3 crossing of Berry's Creek provides options that have the potential to enhance remediation alternatives. Investment in the layered flood prevention will address community stabilization and economic revitalization needs by protecting the housing, business and infrastructure sectors, enhancing local government capacity by increasing ratable bases, addressing public health needs and improving water quality and enhancing the habitat of native species. |
| **D.3 – Appropriate Approaches**<br>***Revitalization through Regional Resilience*** is not a mere flood protection project; rather, it is an innovative way to view resilience investment more broadly by recognizing the numerous additional benefits such projects produce. Using the different sectors of the National Disaster Recovery Framework to strategically address all critical sectors of a region maximizes the value of investment and | **D.3 – Appropriate Approaches**<br><br>No specific BCSA reference. |

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| more likely achieve community stabilization and economic revitalization. Although the project starts with the Meadowlands Resilience Revitalization Project component, that will mitigate the impacts of severe weather events, but accomplishes much more than that. As stated above, this investment will protect homes and businesses, increase property values, decrease insurance premiums, improve ratables and facilitate community investment which will create a cycle of revitalization. It will protect critical infrastructure, reducing the flooding threat to the electric grid (a vulnerability exposed by Sandy) and protecting drinking and wastewater, transportation and other critical assets. It will improve natural resources by reducing run-off and interconnect with the ongoing clean-up at Berry's Creek and reduce public health risks. It will increase public access to a unique urban ecosystem while enhancing biodiversity. The larger project will be further enhanced by investment in expanding public transportation services through the satellite bus garage. Connecting people to job centers will keep target areas economically vibrant and encourage tourism. There are additional health and community benefits that come from reducing congestion and vehicle emissions. Finally, upon proving the efficacy of ***Revitalization through Regional Resilience*** best practices will be incorporated into a toolkit for use by other estuarine and riverine communities facing similar challenges, not only, in New Jersey but across the country. | |
| **E.1.1 – Project Concept Summary**<br>Protection against flooding will increase property values and ultimately decrease insurance premiums, which will, in turn, increase property equity and disposable income of ***residents and businesses***. In addition to insulating ***critical infrastructure***, the project should also increase ratables which can allow ***local governments*** to provide more essential public services and/or community development investments, which in turn raise property values creating a cycle of economic revitalization through resilience. Further, along with creating parks and bike trails as well as wetlands restoration, a water | **E.1.1 – Project Concept Summary**<br>It will improve natural resources by reducing runoff and in conjunction with working with the EPA, will be designed to be compatible with EPA's selected remediation approach at Berry's Creek Superfund Site and reduce public health risks. It will increase public access to a unique urban ecosystem while enhancing biodiversity. |

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| control structure is proposed at the mouth of Berry's Creek along the southern border of East Rutherford. Controlling tides can enhance ongoing environmental remediation efforts and, in time, facilitate replacement of invasive *phragmites* with *spartina* that, in addition to ***providing a better environment*** for native species, has been shown to leech mercury out of water, providing ***health and economic benefits.*** | |
| **E.1.2 – Community Resilience & Decreased Risk to Vulnerable Populations**<br>A truly resilient project accounts for all of these components of resiliency, which is the foundation of ***Revitalization through Regional Resilience***. This is why, in in addition to proposing a direct investment to connect people to job centers (economic resilience), the proposal would integrate and enhance natural features such as wetlands and marshes and have the potential to tie in to ongoing remediation efforts in Berry's Creek (natural resources and health resilience) while redirecting water away from homes, businesses and critical infrastructure (housing, economic and infrastructure resilience). To allow public access and recreation, biodiversity and green design, the approach also considers the distinction between hard and soft structures and the characteristics of the physical project location. All efforts should enhance property values, ratables and tourism in the area. | **E.1.2 - Community Resilience & Decreased Risk to Vulnerable Populations**<br>This is why, in in addition to proposing a direct investment to connect people to job centers, the proposal would integrate and enhance natural features such as wetlands and have the potential to tie into EPA's selected remediation alternative for the Berry's Creek Superfund Site, while redirecting water away from homes, businesses and infrastructure. |
| **E.1.4 – Project/Program Description**<br>**Project 1 Meadowlands Resilience Revitalization Project** - The project is also proposed to include a large water control structure at Route 3 on Berry's Creek, which is an integral part of the flood control system. Rather than function like a typical tide gate water control structure (opening and closing during daily rising tides), however, the water control structure will be able to open and close at other beneficial times, including during storm events or to facilitate ongoing remediation efforts of Berry's Creek. Although this project component is innovative with its approach to comprehensive flood | **E.1.4 – Project/Program Description**<br>**Revitalization through Regional Resilience** is innovative in its use of flood protection mechanisms not just to mitigate flood risk during future storms, but also as a driver of community investment and a mechanism to assist ongoing environmental remediation efforts to improve the area's natural resources and tourism features while also addressing health risks. It is innovative in its use of green infrastructure to control stormwater runoff, one of the major causes of water contamination in the target areas. It is broader in scope than RBD, targeting an entire region. It reflects smart planning and building |

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| protection and public access, the centerpiece of innovation is a flood protection project that also has the potential to restore, enhance and remediate existing wetlands. USACE information indicates that Walden Marsh is approximately 120 acres and highly channelized due to mosquito ditches, and receives tidal influence from Berry's Creek. The site is predominately a common reed (*Phragmites australis*) monoculture, with highly contaminated soils. It's estimated that 20 tons of mercury exist in a stratified layer in the Walden Marsh soils.<br><br>The water control structure may also provide options that could potentially assist in the remedy for the Berry's Creek Superfund site. This water control structure would enable DEP to manipulate water levels upstream of Route 3. Control of the Berry's Creek water may be useful for several reasons. DEP's primary concept for wetland enhancement involves temporarily impounding water to kill the *Phragmites australis*. There is currently about 300 acres of *Phragmites* dominated wetland upstream of Route 3 on Berry's Creek. *Phragmites* is known as an invasive non-native plant species that tends to establish a mostly impenetrable monoculture with low ecological value. It is also known that under the right conditions that temporary flooding can kill *phragmites*. Once the *phragmites* has been killed, conditions would likely be suitable for the establishment of *Spartina alternaflora* or other beneficial native wetland plant species. *Spartina* wetland communities provide excellent habitat for wading birds, waterfowl, forage fish and juvenile fish. In addition to the services that a *Spartina* wetland will provide, it will also produce additional opportunities (locations, species and quantity) for recreational and commercial fishing. Controlled flooding may continue into Eight Day Swamp, further to the north. Eight Day Swamp is a highly contaminated wetland area on the western banks of Berry's Creek. High levels of mercury and other heavy metals are found throughout the site. An estimated 50 tons of mercury are found in a stratified layer within the marsh soils. The Eight Day Swamp is dominated by *Phragmites* and receives very little tidal | by accounting for sea level rise and other risks. It leverages flood protection investment with expansion of public transportation service to make the area more economically resilient and especially benefit LMI and vulnerable populations. In addition, it would develop a toolkit of lessons learned and promote replicability and smart planning through a comprehensive planning program.<br>…<br>***Tide Gate.*** The project proposes a large water control structure at the Route 3 crossing of Berry's Creek Superfund Site. Rather than function like a typical tide gate water control structure (opening and closing during daily rising tides), the water control structure will be able to open and close at other beneficial times, including during storms or to facilitate ongoing remediation efforts. This component is innovative with its approach to comprehensive flood protection and public access, but the centerpiece of innovation is its potential to restore, enhance and remediate existing wetlands. The water control structure may provide opportunities to explore collaboration with EPA's evaluation of remedial alternatives and potentially amplify the net benefits of both flood control and remedial alternatives at the Berry's Creek Study Area (BCSA) Superfund Site. The proposed design and construction of a flood control structure will likely result in changes to the hydrology and chemistry of the BCSA site. Integrating the proposed project with EPA's remedy selection for the BCSA site could assist in managing the hydrology and sediment in order to sustain the plant community determined to be best suited for chemical stability, low chemical bioavailability, diversified functions and values, and storm surge dampening and resiliency, as well as promoting a sustainable ecosystem into the future in response to changing sea level elevations. A tide gate to control the surge may be considered during feasibility. A "surge" gate would intercept ocean generated surges and be operated to maximize flood water storage during riverine flooding. |

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| flushing. Both Walden Marsh and the Eight Day Swamp are listed in the U.S. Fish & Wildlife Service "The Hackensack Meadowlands Initiative Primary Conservation Planning report of March 2007 (Figure 21, page 70) as being "Substantial Concern Sites." | |
| **E.1.5 – Addressing Risks**<br>***Contamination:*** There are numerous known contaminated sites in the target areas, including the Berry's Creek Superfund Site. Known and undiscovered contaminated sites pose many risks to the community. During flood events, contaminated sediments and soils can be put into suspension and leech into water sources and be taken into the biota food chain as a result of run-off. Other contamination sources (household trash, commercial waste, petroleum products, etc.) can be dispersed in the same manner. To account for the risk of contamination DEP will implement this project which will reduce the area affected by the storm surge and more effectively manage rain runoff which will minimize the contribution of new contamination into the ecosystem as well as limit resuspension of contaminated sediments. | **E.1.5 – Addressing Risks**<br>***Contamination/Runoff:*** There are numerous contaminated sites in the target areas, including the Berry's Creek Superfund Site. Known and undiscovered contaminated sites pose many risks. During flood events, contaminated sediments and soils can be put into suspension and then leach into water sources and be taken into the biota food chain as a result of runoff. Other contamination sources (household trash, commercial waste, petroleum products, etc.) can be dispersed in the same manner. To account for the risk of contamination, the project will reduce the area affected by the storm surge and more effectively manage rain runoff, which will minimize the contribution of new contamination into the ecosystem as well as limit resuspension of contaminated sediments. |
| **E.1.9 – Regional Collaboration & Consultation**<br>***Regional Collaboration:*** The State, in developing and implementing ***Revitalization through Regional Resilience***, reaffirms its commitment to the region (including surrounding states), and to engage in formulating and implementing a comprehensive approach to addressing flood control, environmental remediation, public transportation system enhancements, economic development, housing and assistance to the local municipalities. In the context of Regional Framework, the project is consistent with the overall Master Plans for the State's Consolidated Plan and the NJMRC Master Plans. All of these entities have been contacted and consulted on the project concept. In terms of the Berry's Creek Superfund Cleanup, DEP contacted EPA to make the agency aware of the design concept. The Record of Decision as to how to clean-up Berry's Creek is tentatively scheduled for 2018. This project would benefit any remedial decision for the Berry's Creek cleanup because it will greatly | **E.1.9 – Regional Collaboration & Consultation**<br><br>No specific reference to BCSA. |

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| reduce or eliminate the flooding events in the creek, thus reducing the transport of contaminated creek sediments. It will also preserve potential wetlands enhancements and prevent clean fill transport if any of these components were part of the remediation strategy. DEP is also in discussion with New York State and New York City regarding the State's proposed concept. Finally, as required by the NOFA, DEP has sought an audience with the federal Sandy Recovery Infrastructure Resilience Coordination (SRIRC) regarding the design concept. | |
| **E.6 – Planning Consistency**<br>The NDR project will increase storage capacity and address ultimate discharge to the surface water bodies draining to the Hackensack River and is consistent with NJ Stormwater Management Rules because ground water recharge is not necessary where there's a high ground water table, where the land is being re-developed, or where there are pollutants either stored on the site or within the soil. The Floodplain Management Plan (FMP) includes a recommendation on installing a water control mechanism on Berry's Creek in coordination with the USACE. The proposed project recommends a similar water control mechanism to be evaluated as part of the feasibility study. | **E.6 – Planning Consistency**<br>*EPA:* In terms of the Berry's Creek Superfund Cleanup, DEP has been in discussions with EPA to discuss the proposed design concept and discuss the Berry Creek Group's ongoing extensive study being conducted under the oversight of EPA. The EPA and the Berry's Creek Group who are conducting the study of this complex urban estuary has asked to participate in work sessions or work groups considering water management approaches that benefit the affected communities and are compatible with the management of the BCSA Superfund Site. The results of the study will inform the remediation alternatives that will be identified in the Record of Decision. The Record of Decision for BCSA Superfund Site is tentatively scheduled for 2018. |
| **G.2 – Covered Projects**<br>With sufficient funding provided for the identified service area, the following **outputs** would be achieved: (i) a 9 mile berm system that rises 13'-15' above mean sea level (20' around critical infrastructure, such as the Bergen County Treatment Plant) and connects existing high points; (ii) wetlands restoration on the inside of the berm (221 new acres; 496 improved acres); (iii) creation of These actions would result in the following specific **outcomes**: (i) reduction of expected property damages due to flooding ( $628 million avoided per year) ; (ii) ecosystem and biodiversity impacts such as improvement in water quality (Berry's creek cleanup) and environmental benefits derived from wetland habitat creation (496 improved acres and 221 new | No Section G in Final application. |

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| acres for a total annual wetlands value of $5.3 million); (iii) improved identity and social cohesion in that the project will help to give stronger identity to the area, and the berm will both provide a symbolic edge/entrance/center to both the natural system of the Meadowlands and to the communities around it, turning what are currently disjointed development areas into a unified and distinct district; (iv) increased property values: property values are expected to rise substantially along the berms because of better flood protection and adjacency to new parks ($93.9 million); and (v) creation of recreational zones that fall on the inside of the berm and provide easy recreational access to surrounding residents. Fifty-five new acres of active parks are expected to generate $41,000 in recreational benefits in total and $3.4 million in health benefits in total to existing residents per year. | |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**3. The Current Situation**<br>***Other/Contamination:*** There are numerous known contaminated sites within the Project Area, including the extensive Berry's Creek Superfund Site. Known and undiscovered contaminated sites pose many risks to the community. One example of the risks occurs during flood events when contaminated sediments and soils are suspended in the water column, relocated and deposited when flood waters slow and recede. Other contamination sources are dispersed in the same manner. These other sources include various forms of waste such as household trash, commercial wastes and petroleum products from vehicles and roadways. | **Benefit-Cost Analysis (BCA) Attachment**<br>**Section 3, Current Situation**<br>***Other/Contamination:*** There are numerous known contaminated sites within the Project Area, including the extensive Berry's Creek Superfund Site. Known and undiscovered contaminated sites pose many risks to the community. One example of the risks occurs during flood events when contaminated sediments and soils are suspended in the water column, relocated and deposited when floodwaters slow and recede. Other contamination sources are dispersed in the same manner. These other sources include various forms of waste such as household trash, commercial wastes and petroleum products from vehicles and roadways. |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**3.2 Environmental Conditions**<br>**Berry's Creek** is an approximately 6.5 mile-long tributary of the Hackensack River. Most of the creek is tidal, and tide gates regulate the extent of tidal influence in many of the upland tributaries. The creek originates in the West Riser Ditch near Teterboro Airport, meanders through the reed marshes, and then discharges into the | **Benefit-Cost Analysis (BCA) Attachment**<br>**3.2 Environmental Conditions**<br>**Berry's Creek** is an approximately 6.5 mile-long tributary of the Hackensack River. Most of the creek is tidal, and tide gates regulate the extent of tidal influence in many of the upland tributaries. The creek originates in the West Riser Ditch near Teterboro Airport, meanders through the reed marshes, and then discharges into the |

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| Hackensack River, primarily via the Berry's Creek Canal and also via the lower portion of Berry's Creek. Portions of the creek are located in the Boroughs of Teterboro, Moonachie, Wood-Ridge, Carlstadt, Rutherford, and East Rutherford.<br><br>As indicated in the U.S. EPA, Community Update on the Berry's Creek Study Area (BCSA) as of September 2014, the BCSA has historically been associated with mercury contamination originating from the Ventron/Velsicol Superfund site. The Remedial Investigation/Feasibility Study is investigating numerous contaminants within the creek from multiple sources. Two other federal Superfund sites, the Universal Oil Products site and the Scientific Chemical Processing site, as well as several NJ State listed hazardous waste sites are located in the Berry's Creek watershed. Contaminants are known to be elevated throughout the BCSA surface water and sediment and the levels warrant detailed evaluation of nature, extent and potential risks.<br><br>…<br><br>***Berry's Creek*:** This is a 6.5-mile-long creek, which includes its tributaries, the Berry's Creek canal, and adjacent wetlands. The majority of the creek is tidal, and tide gates located throughout Berry's Creek regulate the extent of tidal influence in the headwater tributaries. The area has been designated a Superfund Study Area, primarily for mercury concentrations in the sediments greater than what is considered to be protective of wildlife. The area is highly industrialized and has a low population density, but zoning is a mix of industrial, commercial, residential, recreational, redevelopment, and marshland preservation. The creek meanders through the New Jersey Meadowlands and the municipalities of Teterboro, Moonachie, Wood-Ridge, Carlstadt, Rutherford, Lyndhurst, and East Rutherford before discharging into the Hackensack River. The State has issued fish advisories on Berry's Creek. Consequently, it is prohibited to eat, | Hackensack River, primarily via the Berry's Creek Canal and also via the lower portion of Berry's Creek. Portions of the creek are located in the Boroughs of Teterboro, Moonachie, Wood-Ridge, Carlstadt, Rutherford, and East Rutherford. As indicated in the U.S. EPA, Community Update on the Berry's Creek Study Area (BCSA) as of September 2014, the BCSA has historically been associated with mercury contamination originating from the Ventron/Velsicol Superfund site. The Remedial Investigation/Feasibility Study is investigating numerous contaminants within the creek from multiple sources. Two other federal Superfund sites, the Universal Oil Products site and the Scientific Chemical Processing site, as well as several NJ State listed hazardous waste sites are located in the Berry's Creek watershed. Contaminants are known to be elevated throughout the BCSA surface water and sediment and the levels warrant detailed evaluation of nature, extent and potential risks.<br><br>…<br><br>***Berry's Creek:*** This is a 6.5-mile-long creek, which includes its tributaries, the Berry's Creek canal, and adjacent wetlands. The majority of the creek is tidal, and tide gates located throughout Berry's Creek regulate the extent of tidal influence in the headwater tributaries. The area has been designated a Superfund Study Area, primarily for mercury concentrations in the sediments greater than what is considered to be protective of wildlife. The area is highly industrialized and has a low population density, but zoning is a mix of industrial, commercial, residential, recreational, redevelopment, and marshland preservation. The creek meanders through the New Jersey Meadowlands and the municipalities of Teterboro, Moonachie, Wood-Ridge, Carlstadt, Rutherford, Lyndhurst, and East Rutherford before discharging into the Hackensack River. The State has issued fish advisories on Berry's Creek. Consequently, it is prohibited to eat, sell, or harvest blue crab in these waters. Additional advisories are in place for striped bass, bluefish, American eel, American catfish, and |

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| sell, or harvest blue crab in these waters. Additional advisories are in place for striped bass, bluefish, American eel, American catfish, and white perch. There is currently about 300 acres of *Phragmites* dominated wetlands upstream of Route 3 on Berry's Creek. *Phragmites* is known as an invasive non-native plant species that tends to establish a mostly impenetrable monoculture with low ecological value.<br><br>***Walden Marsh/Eight Day Swamp:*** Walden Marsh is approximately 120 acres, highly channelized due to mosquito ditches, and located on the West bank of Berry's Creek, adjacent to the NJ Sports and Exposition Authority Sports Complex. The marsh receives tidal influence from Berry's Creek. The site is predominately a common reed (*Phragmites australis*) monoculture, with highly contaminated soils. It's estimated that 20 tons of mercury exist in a stratified layer in the Walden Marsh soils. Both Walden Marsh and the Eight Day Swamp are listed in the U.S. Fish & Wildlife Service "The Hackensack Meadowlands Initiative Primary Conservation Planning report of March 2007 (Figure 21, page 70) as being "Substantial Concern Sites." | white perch.<br><br>***Walden Marsh/Eight Day Swamp:*** Walden Marsh is approximately 120 acres, highly channelized due to mosquito ditches, and located on the West bank of Berry's Creek, adjacent to the NJ Sports and Exposition Authority Sports Complex. The marsh receives tidal influence from Berry's Creek. The site is predominately a common reed (*Phragmites australis*) monoculture, with highly contaminated soils. It's estimated that 20 tons of mercury exist in a stratified layer in the Walden Marsh soils. Both Walden Marsh and the Eight Day Swamp are listed in the U.S. Fish & Wildlife Service "The Hackensack Meadowlands Initiative Primary Conservation Planning report of March 2007 (Figure 21, page 70) as being "Substantial Concern Sites." |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**4.1 Proposal Objectives**<br>Build flood protection measures, including berms and sea walls, taking advantage of and connecting to existing natural and infrastructure flood barriers. These measures will help to prevent future damage to area homes, businesses and public facilities, preventing the repeated, widespread community impacts seen after each of the major flooding events experienced in these inland and riverine communities. In addition, the proposed flood protection measures will restore damaged wetlands and help to remediate existing environmental contamination.<br><br>Project 1: Flood Mitigation and Wetlands Restoration<br>A large water control structure at Route 3 on Berry's Creek will be an integral part of the flood control system. This structure would not | **Benefit-Cost Analysis (BCA) Attachment**<br>**4.1 Proposal Objectives**<br>Build flood protection measures, including berms and sea walls, and take advantage of existing natural and infrastructure flood barriers. These measures will help prevent future damage to area homes, businesses and public facilities, preventing the repeated, widespread community impacts seen after each of the major flooding events experienced in these inland and riverine communities. In addition, the proposed flood protection measures will restore damaged wetlands and help to remediate existing environmental contamination.<br><br>Project 1: Meadowlands Regional Resilience Pilot<br>A large water control structure at Route 3 on Berry's Creek will be an integral part of the flood control system. Berry's Creek is a complex |

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| function as a simple tide gate which typically closes during the daily rising tides but would allow for discrete closings during storm events and at other beneficial times. Although this project will be innovative with its approach to comprehensive flood protection and public access, the centerpiece of innovation is its ability to restore, enhance and remediate existing wetlands and it is the water control structure at Route 3 on Berry's Creek that makes this possible.<br><br>The water control structure also provides options that could potentially assist in the remedy for the Berry's Creek Superfund site. Control of the Berry's Creek water will be useful for several reasons. DEP's primary concept for wetland enhancement involves temporarily impounding water to kill the *Phragmites Australis*. There is currently about 300 acres of *Phragmites* dominated wetland upstream of Route 3 on Berry's Creek. *Phragmites* is known as an invasive non-native plant species that tends to establish a mostly impenetrable monoculture with low ecological value. It is also known that under the right conditions that temporary flooding can kill *phragmites*. Once the *phragmites* has been killed, conditions would likely be suitable for the establishment of *Spartina alternaflora* or other beneficial native wetland plant species. *Spartina* wetland communities provide excellent habitat for wading birds, waterfowl, forage fish and juvenile fish. In addition to the services that a *Spartina* wetland will provide, it will also produce additional opportunities (locations, species and quantity) for recreational and commercial fishing. This water control structure may also provide options that could potentially assist in the remedy for the Berry's Creek Superfund site. USACE information indicates that the 120 acre Walden Marsh receives tidal influence from Berry's Creek. The site is predominately a common reed (*Phragmites australis*) monoculture, with highly contaminated soils. It's estimated that 20 tons of mercury exist in a stratified layer in the Walden Marsh soils. Controlled flooding may continue into Eight Day Swamp, further to the north. Eight Day Swamp is a highly contaminated wetland area on the western banks | urban estuary that is undergoing an extensive study conducted under the oversight of the USEPA, for the purposes of selection an appropriate remediation program for Berry's Creek. This structure would not function as a simple tide gate which typically closes during the daily rising tides but would allow for discrete closings during storm events and at other beneficial times. Although this project will be innovative with its approach to comprehensive flood protection and public access, the centerpiece of innovation is its ability to restore, enhance and remediate existing wetlands and it is the water control structure at Route 3 on Berry's Creek that makes this possible.<br><br>The water control structure also provides an opportunity to explore synergies with EPA's evaluation of remedial alternatives and potentially amplify the net benefits of both flood control and remedial alternatives at the Berry's Creek Study Area (BCSA) Superfund Site. Properly coordinated, the proposed design and construction of a berm and flood control structure could be made compatible with many of the remedial approaches currently being evaluated as part of the EPA study and will likely result in changes to the hydrology and chemistry of the BCSA Site. Integrating the proposed project with EPA's remedy selection for the BCSA Site could assist in managing the hydrology and sediment in order to sustain the plant community determined to be best suited for chemical stability, low chemical bioavailability, diversified functions and values, and storm surge dampening and resiliency, as well as promoting a sustainable ecosystem into the future response to changing sea level elevations. The highest net benefits would be realized through a collaborative and holistic evaluation of flood control and management alternatives that are compatible with the eventual remedy selected by EPA for the BCSA Site. Such an integrated approach is unusual but widely recognized as needed by water resource professionals. Therefore, the proposed project may establish a much needed example of an integrated management approach to complex estuary problems. |

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| of Berry's Creek. High levels of mercury and other heavy metals are found throughout the site. An estimated 50 tons of mercury are found in a stratified layer within the marsh soils. The Eight Day Swamp is dominated by *Phragmites* and receives very little tidal flushing. Both Walden Marsh and the Eight Day Swamp are listed in the U.S. Fish & Wildlife Service "The Hackensack Meadowlands Initiative Primary Conservation Planning report of March 2007 (Figure 21, page 70) as being "Substantial Concern Sites." | |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**4.3 Geographical Boundaries**<br>Towns that directly benefit from the ***Revitalization through Regional Resilience*** project include Little Ferry, Carlstadt, Moonachie, Teterboro, Wood-ridge, Hasbrouck Heights and South Hackensack, Hackensack, Rutherford and East Rutherford. The project concept presented in this application expands on the RBD project and involves construction of a substantial flood protection barrier that will protect almost 6,000 acres of land and resources, enhancing wetlands, providing more publicly accessible open space and other attributes, and potentially aiding in the remediation of the Berry's Creek Superfund site. | **Benefit-Cost Analysis (BCA) Attachment**<br>**4.3 Geographical Boundaries**<br>Towns that directly benefit from the ***Revitalization through Regional Resilience*** concept include Little Ferry, Carlstadt, Moonachie, Teterboro, Wood-Ridge, Hasbrouck Heights and South Hackensack, Hackensack, Rutherford and East Rutherford. The project concept presented in this application expands on the RBD project and involves construction of a substantial flood protection barrier that will protect almost 6,000 acres of land and resources, enhancing wetlands, providing more publicly accessible open space and other attributes, and potentially aiding in the remediation of the Berry's Creek Superfund site. |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**4.4 Proposal Components**<br>In addition to the creation of parks and bike trails and wetlands restoration, a water control structure is proposed at the mouth of Berry's Creek along the southern border of East Rutherford. Controlling tides can enhance ongoing environmental remediation efforts and, in time, facilitate the replacement of invasive *phragmites* with *spartina*. This will provide a better environment for native species that have been shown to leech mercury out of water, providing considerable health benefits. (NDR Request: $236 million) | **Benefit-Cost Analysis (BCA) Attachment**<br>**4.4 Proposal Components**<br>In addition to the creation of parks and bike trails and wetlands restoration, a water control structure is proposed at the mouth of Berry's Creek along the southern border of East Rutherford. Controlling tides can enhance ongoing environmental remediation efforts. A major project like this has numerous complexities that require coordinated evaluation in a holistic manner and a commitment to realizing mutually beneficial outcomes and avoiding potentially severe adverse outcomes. EPA and the Berry's Creek Group, who are conducting the study of this complex urban estuary, have asked to participate in work sessions or work groups considering water management approaches that benefit the affected communities and are compatible with the management of the BCSA |

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| | Superfund Site. (NDR Request: $236M) |
| **Benefit-Cost Analysis (BCA) Attachment**<br>**5. Risks if Proposal is Not Implemented**<br>**5.3 Additive Effects**<br>In addition, the natural resources in the area will continue to be denigrated. Without the additional flood prevention measures, contamination will continue from Berry's Creek Superfund site. The invasive *phragmites* will continue to prevent native species in the surrounding wetlands and release mercury in the sediment. | **Benefit-Cost Analysis (BCA) Attachment**<br>**5. Risks if Proposal is Not Implemented**<br>**5.3 Additive Impacts**<br>In addition, the natural resources in the area will continue to be denigrated. Without the additional flood prevention measures, contamination will be more difficult to remediate from Berry's Creek Superfund site. |
| N/A | **Response to Comments on Draft Proposal**<br>**Comment 6**<br>**TIDE GATE AT BERRY'S CREEK**<br>A commenter expressed concern that if the tide gate is constructed at Berry's Creek, and is then left permanently closed, it effectively becomes of dam. The commenter stated that this would improperly prohibit tidal flow at Berry's Creek. Another commenter stated that the tide gate could affect the hydrology of the Kane Mitigation Bank and the Evergreen Mitigation Bank. The commenter suggested DEP consider filling the man-made Berry's Creek canal and locating the water control structure there, and also improve tidal flow under area rail lines. Additionally, the EPA team working on the Berry's creek superfund site stated that "a water control structure has the potential to be useful in certain remedial scenarios," but added that EPA remains "several years away" from a final decision on the Berry's Creek study area. The EPA team also stated that in designing and implementing the tide gate, DEP must ensure appropriate loading of inorganic solids to avoid unintended negative impacts to area wetlands. The ELM Group -- project coordinator for the Berry's Creek Study Area under EPA oversight -- added that a tide gate could disrupt tidal flow and the movement of sediment from the Hackensack River into Berry's Creek that in turn could impact the subsidence of the marsh.<br><br>**Staff Response:** |

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| | The tide gate at Route 3 on Berry's Creek is intended to help control inflow and outflow of water, among other things to help facilitate remediation efforts at that superfund site. It is not DEP's intention to build the tide gate and leave it permanently closed. DEP agrees with the EPA team and the ELM Group that the design of the tide gate must take into account appropriate loading of inorganic solids to avoid unintended negative impacts to area wetlands and the ecosystem and that potential impacts on marsh subsidence must be understood before construction proceeds. DEP will continue its ongoing collaboration with the EPA team and the ELM Group regarding the intersection between the proposed flood protection project and the ongoing remediation effort at Berry's Creek. |

## Attachment 1: Excerpts from BCSA Group Comment Letter

**BCSA Group comments included:**

USEPA and the BCSA Group have spent tens of millions of dollars since 2007 comprehensively studying the BCSA in order to understand the system and evaluate feasible remedial alternatives for environmental contamination present in the tidal area. The waterways and marshes of the BCSA comprise a complex urban estuary containing multiple interrelated physical and ecological systems. This complexity presents numerous challenges that must be carefully evaluated in order to ensure an overall net benefit from any proposed management actions, whether they are focused on remediation, restoration, or the proposed significant public investments to control storm surges and associated floods.

Mutual benefits and possibly synergies between water management infrastructure and remediation are potentially significant. For any such benefits to be realized, however, it is essential that water management infrastructure evaluation, planning and implementation be closely coordinated with the USEPA and the BCSA Group. Without such coordination, the proposed changes to the water management infrastructure could have devastating impacts on the local hydrology and ecosystems and could greatly interfere with achievement of remediation objectives.

Based on the work conducted since 2007, the BCSA Group has identified issues presented by the proposal and associated statements in the proposal that should be revised to reflect the scientific understanding and complexities associated with the subject estuary. Foremost, the BCSA Group has identified the following problematic technical issues in the draft proposal:

- The project would completely alter the hydrology and ecosystem of the area. The proposal does not recognize or address the significant and potentially severe environmental consequences that almost certainly would result.
- For example, the project contemplates constructing berms between certain wetlands and the river. This not only impairs the beneficial operation of the wetlands in absorbing wave energy and dissipating rising flood waters, but it also may starve the wetlands of needed tidal flows and sediments, damaging or changing them into open water habitat. In addition, the placement of the berms would result in salinity changes (i.e., from brackish to fresh-water systems), causing rapid changes to all biological components of the ecosystem.
- Installing a tide control structure, even a so-called "smart" or similar actively-managed tide gate, in connection with waterfront berms will disrupt tidal flows and the movement of sediments from the Hackensack River into Berry's Creek. Current sediment deposition rates are keeping pace with sea level rise. Eliminating or reducing the deposition of fresh sediment from the waterways will result in disruption of the sediment balance and subsidence of the marsh, resulting in the potential massive loss of the marshes and the creation of extensive open water areas.

- Flooding to kill *Phragmites* as proposed to support restoration to *Spartina* will destabilize the marsh, cause subsidence of the marsh surface, and result in the loss of the continuous sediment accretion that is the basis for marsh formation and stability. The likely result of the loss of continuing sediment addition would be the permanent creation of large expanses of open water, potentially eliminating the possibility that *Spartina, Phragmites,* or any other marsh vegetation could be reestablished to a condition that could be considered restoration.
- The proposal fails to recognize the significant environmental benefits of maintaining the existing *Phragmites* marshes, as explained by Mr. Tomchuk and Dr. Brussock during conversations with NJDEP staff. Not only does *Phragmites* provide stability and protection against storm surge and help keep pace with anticipated sea level rise as discussed above, it also sequesters and buries contaminants and provides important ecological services. In this respect, the proposal is not consistent with the recent U.S. Fish and Wildlife Service (NJ Field Office) white paper that recommends "[p]reservation of wetlands that provide substantive ecological services without mobilizing contaminants."
- The conditions in middle and upper Berry's Creek that would result from implementation of the project as outlined in the proposal would not likely provide suitable habitat for *Spartina,* and lower Berry's Creek would remain marginal habitat for *Spartina* at best. The proposed actions might in fact create conditions in Upper and Middle Berry's Creek that would make them less brackish, which would be even less favorable for establishing *Spartina-dominated systems* than under current conditions. Further, achieving the correct marsh bench elevation and salinity for Spartina in an urban estuary during a prolonged period of sea level rise is challenging, as demonstrated by several failed mitigation projects in the Hackensack Meadowlands, and the proposed system would alter the current influx of sediment from the Hackensack River that maintains the marsh elevation. Together, these conditions would not support the claims about restoration benefits that are being made in the proposal.
- The potential effects of replacing *Phragmites* with *Spartina* with respect to mercury methylation are mischaracterized, as explained by Dr. Brussock during conversations with NJDEP staff. Research in the Meadowlands has concluded that *Phragmites* provides much better stability and sequestration of mercury than *Spartina.*

The BCSA Group strongly requests that the draft proposal text be revised. The existing claims that the proposal will enhance the remediation efforts should be removed. Instead, the proposal should explain that New Jersey will closely coordinate the flood control project with USEPA and the BCSA Group to accomplish the goal of protecting against damaging storm surges while enhancing remediation and restoration of the site. For example, the following statements should be added:

- Berry's Creek is a complex urban estuary that is undergoing an extensive study conducted under the oversight of the USEPA.
- The USEPA is following a process that will select an appropriate remediation program for Berry's Creek.
- The proposed flood control system can be made compatible with many of the remedial approaches currently being evaluated as part of the USEPA study, as long as there is proper coordination between the USEPA, the BCSA Group, and the agencies that will plan and enact any flood mitigation program.

- A major project like this has numerous complexities that require coordinated evaluation in a holistic manner and a commitment to realizing mutually beneficial outcomes and avoiding potentially severe adverse outcomes.
- The Berry's Creek Study Group is willing to participate in work sessions or on work groups that can develop water management approaches that are mutually beneficial to the affected communities and the management of the BCSA Superfund Site.

**Attachment 2: Excerpts from USEPA Comment Letter**

**USEPA comments:**

With respect to the Berry's Creek Superfund work, there is a statement, below, which is extracted from page 43 of the document, and is repeated or paraphrased in numerous places throughout the document:

> *...a water control structure at the mouth of Berry's Creek provides options that have the potential to enhance ongoing environmental remediation efforts and, in time, facilitate the replacement of invasive phragmites with spartina and other plant species, which in addition to providing a better environment for native species also has been shown under the right conditions to demethylate mercury found in sediment out of water. Less mercury in local fish and bird populations would provide considerable health benefits for the region and enhancing its resilience.*

My main reason for providing comment is the assertion in the document that replacing the *phragmites* marshes with spartina would be beneficial with respect to mercury remediation in Berry's Creek. The BCSA project team does not support the idea that we should be replacing the *Phragmites* with *Spartina.* My understanding of the literature, combined with project specific information is that replacing *Phragmites* with *Spartina* would likely make more mercury available in the environment.