



Gowanus Canal Conservancy
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April 26, 2013

Christos Tsiamis, Project Manager
Central New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

**Re: Comments on EPA's December 2012 Proposed Remedial Action Plan
Gowanus Canal Superfund Site**

Dear Mr. Tsiamis,

As you know, the Gowanus Canal Conservancy is a 501(c)(3) community-based not-for-profit organization founded in 2006 in Brooklyn, New York. Our mission is to serve as the environmental steward for the Gowanus Canal and its watershed, overseeing its transformation into a system that is clean, green, and publicly accessible. As part of our efforts, we are working to improve water quality, preserve open space, and promote public access to the ecological, cultural, and recreational resources of the Gowanus Canal and its watershed.

The Gowanus Canal Conservancy has participated extensively in the Superfund process. We understand that the clean-up will take many years and that many technical questions remain unresolved at this time. Nevertheless, the Superfund clean-up represents a unique opportunity to conduct a long over-due comprehensive clean-up of the Gowanus Canal with the support of a broad coalition of stakeholders.

The Gowanus Canal Conservancy generally supports EPA's December 2012 Proposed Remedial Action Plan for cleaning up the Gowanus Canal. Our comments seek to bring attention to matters that are particularly important to our constituents as well as those that we believe require additional consideration by EPA.

Sincerely,

A handwritten signature in black ink, appearing to read "Hans Hesselein".

Hans Hesselein
Executive Director

A handwritten signature in black ink, appearing to read "Richard Kampf".

Richard Kampf
Board Member

Gowanus Canal Conservancy – PRAP Comments

cc:

Venetia Lannon, Regional Director, NYSDEC

Carter Strickland, Commissioner, NYCDEP

April Dubison, National Grid

Daniel Walsh, Director, New York City Office of Environmental Remediation

Hon. Marty Markowitz

Hon. Nydia M. Velazquez

Hon. Joan Millman

Hon. Sara M. Gonzalez

Hon. Brad Lander

Hon. Steve Levin

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Clean and Green

The Gowanus Canal Conservancy is working with its many public and private partners to transform the Gowanus Canal and its watershed into a functioning urban ecosystem that is clean, green, and publicly accessible. A central part of this vision is to facilitate the creation of a functional waterfront esplanade that embraces the historic industrial character of the neighborhood while providing inspiring and accessible park space. This waterfront park aims to be integrated with a network of green infrastructure consisting of wetlands, rain gardens, and other functional green spaces existing in harmony with the city's urban infrastructure. We are working to bring cleaner water, robust vegetation, and diverse wildlife habitat to Gowanus. The restored green spaces will also buffer the community from the potential impacts of climate change, including sea level rise, storm surge, and flooding.

Today, the Conservancy is leading broad-based community stewardship activities throughout the watershed. Our flagship projects include Cleaning and Greening adjacent land, developing a state-of-the-art compost facility to help manage and reduce New York City waste, and educating young people about the pleasures of the waterfront right here in the heart of Brooklyn. Last year we shared our enjoyment of the Canal and our vision for its future with thousands of community members, volunteers, donors, voters, and fundraiser attendees. The Superfund clean-up, once complete, will provide an important foundation upon which to build in order to realize our vision of a clean, green and accessible waterfront.

The Long Term

As stewards of the watershed, the Gowanus Canal Conservancy seeks to ensure that the remedy is designed properly and functions consistently with the long-term remedial objectives contained in the National Contingency Plan. We hope to have a seat at the table with key stakeholders in the process moving forward. The following comments address ways in which the Proposed Plan may be improved in order to ensure the required long-term permanence and success of the remedy.

Watershed Perspective

One of our fundamental concerns regarding the Superfund process has been that the Remedial Investigation and Feasibility Study Reports do not accurately reflect the importance of the surrounding watershed. A complete and accurate understanding of the dynamics of the watershed, as it relates to the remedy for the Canal, is fundamental to achieving a sustainable and successful clean-up. The watershed and the surface waters of the Canal are inseparably linked through the sewer conveyance system and local and regional groundwater flow. Thus, the natural and man-made systems are interdependent. Accordingly, we request that EPA utilize a watershed-based conceptual site model (CSM) as well as a framework to managing the relevant environmental systems, and the data collected there from, that is consistent with EPA's own Watershed Approach Framework.¹

EPA's remedial design studies and long-term monitoring programs should be used to continuously refine the watershed-based CSM as new information becomes available. EPA's use of a watershed-based CSM will assist the Agency in identifying and managing changes to the natural and man-made systems of the watershed and their potential impacts on the remedy and, ultimately, the water quality of the Canal.

Performance Monitoring

Given the reasonable likelihood of failure, shortcomings, and / or insufficiency of planned remedial measures for the Gowanus Canal, remedial design studies should fill existing data gaps in the watershed-based CSM and be used to identify potential contingencies for remedial measures that may not perform as planned. A robust plan for monitoring baseline conditions as well as the short- and long-term performance of the remedy is necessary to ensure the efficacy of the clean-up. Proper monitoring is vital to ensuring that the remedy is designed appropriately from the beginning and can adapt to the many

¹Office of Water, (4501F), EPA-840-S-96-001, June 1996

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potential changes to the natural or man-made systems of the watershed, as well as to human behavior. We understand that EPA will be developing a short- and long-term monitoring plan for Gowanus, and we look forward to learning more about the details. At this time, we seek greater clarity about EPA's plans to conduct baseline monitoring. The PRAP falls short on these details.

In addition, going forward, EPA should utilize an adaptive management approach consistent with the Adaptive Management Technical Guide published by the U.S. Department of Interior.² This Technical Guide describes adaptive management as an "iterative process of management, monitoring, and evaluation" that "actively engages stakeholders in all phases of a project over its timeframe, facilitating mutual learning and reinforcing the commitment to learning-based management." Adaptive management also involves "ongoing, real-time learning and knowledge creation" with the objective of achieving an "improved understanding and improved management over time." It further explains that:

"Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders."

As part of an adaptive management approach for the Gowanus Canal, any long-term performance monitoring plan should be closely linked to the watershed-based CSM so that the hypotheses and assumptions that led to the selected remedy can be tested and refined.

For example, it is reasonable to predict that climate change may result in sea level rise, increased frequency and intensity of storms, and increased storm surge levels. Such conditions may alter the water budget and raise the levels of both surface and ground water. Therefore, it is important that EPA further evaluate the volume and rate (flux) of groundwater discharge into the Canal. In addition, capping and installing sheet-pile walls in the Canal has the potential to significantly alter the flow of groundwater throughout the watershed, much of which currently discharges into the Canal. It is unclear where all of this water will go under future capped and bulkheaded conditions. The potential for flooding or short-circuiting through preferential pathways of least resistance between the cap and bulkheads or sheet pile walls should concern EPA. We believe that it is important that the remedial design studies acknowledge and address these uncertainties with appropriate monitoring and modeling efforts.

Finally, all data collection efforts must be transparent, with real-time sharing of information among all stakeholders. The Gowanus Canal Conservancy is developing a data clearinghouse to help facilitate the transfer of information relevant to the Gowanus Canal and its watershed. We look forward to working with EPA and other key stakeholders that are collecting data that may be used to refine and improve the remedy.

Watershed Monitoring Well Network

One way to ensure the adequate collection of remedy-relevant data would be to improve the existing monitoring well network within the watershed. A formerly extensive monitoring network has been rendered useless by lack of funding for the replacement of wells that have been destroyed over the past

² Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.

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several decades³. The Conservancy requests that EPA, as part of its remedial design process, improve its understanding of watershed hydrogeology in order to help ensure the efficacy of the remedy.

The United States Geological Survey (USGS) proposes to replace a number of these wells and evaluate watershed hydrology using the data it collects. Please refer to *Attachment 1* which contains the USGS Proposal. The USGS seeks to collect and evaluate data that will be used to accurately represent the present-day shallow groundwater flow system and verify groundwater-surface water interaction and related modeling efforts.

Specifically, USGS proposes to:

1. Characterize groundwater influences on increased flood potential associated with continued water-table recovery, climate change, and the proposed remedial measures;
2. More accurately estimate rates of groundwater infiltration into the groundwater system, including leakage into and out of sewers and water delivery mains;
3. More accurately estimate groundwater seepage velocities into the Gowanus Canal; and
4. More accurately estimate the direction and rate of groundwater flow as it relates to the fate and transport of dissolved phase constituents.

The field data collection objectives of the USGS proposal would be used to establish a baseline understanding of the hydrologic system of the Gowanus Canal watershed and further characterize the need for long-term monitoring. The modeling objectives would advance the understanding of the regional hydrologic processes that may affect the design of the remedy, ecological restoration, and storm water management.

The USGS proposal should be funded and implemented early in the remedial design phase. The Gowanus Canal Conservancy would be happy to help facilitate a meeting between EPA and USGS in connection with this proposal.

Improved Inter-agency Cooperation and Data Sharing

As noted above, it is extremely important to monitor baseline conditions to help evaluate the long-term effects of planned changes in order to inform future decision-making. Various parties have collected data and are preparing numerical models to simulate environmental conditions and make predictions to support future decision-making in the Gowanus watershed. These models include storm water infrastructure models prepared by NYC DEP and its consultants and hydrogeologic, hydrodynamic, and sediment transport models prepared by National Grid and its consultants. EPA should engage an independent third party to review and integrate all environmental and watershed modeling efforts that are used in refining the CSM.

The USGS has extensive experience developing, calibrating, verifying, and integrating a variety of numerical models and has the ability to help integrate these data collection and modeling efforts. The Conservancy requests that EPA consult and coordinate with USGS, or a similarly experienced entity, to utilize its expertise in reviewing and helping to integrate these models into a single, peer-reviewed, publicly available resource that would be used and refined throughout the clean-up process.

³ Groundwater monitoring efforts in the Gowanus watershed have declined significantly since the mid-20th century. During the first half of the 20th century, groundwater in Brooklyn was used for drinking water and industrial purposes. Hundreds of monitoring wells were located throughout Brooklyn, including dozens in the Gowanus watershed, to monitor water levels and water quality. Since the 1940s, when groundwater use began to decline, the monitoring well network slowly has been destroyed. Today, there is a single USGS monitoring well located in the Gowanus watershed.

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The Gowanus Community

Conservancy Activities at the Salt Lot

One aspect of the proposed clean-up affects a parcel of property located adjacent to the Canal, an underutilized road-salt storage facility at 2 Second Avenue, Brooklyn, 11215, the Salt Lot. This parcel is critical to our community and to Conservancy members and volunteers. Our vision for the Salt Lot is rooted in our strong partnership with the community, the City, and local small businesses and organizations and is consistent with the objectives of the Brownfield Opportunity Area (BOA) program. The site is currently used by the New York City Department of Sanitation (DSNY) to store road-salt.

Through a partnership with DSNY, the Gowanus Canal Conservancy has transformed a portion of the Salt Lot into the focal point for efforts of the Conservancy's robust volunteer gardening, composting, community nursery, and environmental education programs, including our highly successful volunteer neighborhood greening programs. Through this volunteer program, we enable community members to plant and maintain street trees and street side gardens installed in partnership with neighborhood property owners, businesses, and the City. The Conservancy currently maintains Canal-side gardens on the lot and a street-end rain garden at the end of Second Avenue. In 2012, the Conservancy hosted more than 700 volunteers who logged over 3500 hours of service to the community.

The Conservancy also operates a composting facility, which produces high quality compost that is used in parks, gardens, planters, and tree pits throughout the City. In 2012, about a dozen volunteers each month worked to build each windrow by hand, while 3-4 volunteers turned the piles on a weekly basis. Using this manual approach, we processed approximately 100 tons of organic material into usable compost. To date, the Conservancy's compost program has received approximately \$400K in capital funding to expand the physical facility.⁴ The expanded composting facility will be capable of processing up to 400 tons of organic matter per year, representing the largest community-based facility of its type in Brooklyn. Our volunteer participation in the composting program is projected to double. The compost we produce will be available to the community for use in local landscaping, tree planting, and green infrastructure construction projects. *Attachment 2* presents a schematic drawing of the proposed compost facility.

Our experience at the Salt Lot suggests that industrial operations and ecological improvements are compatible. Our vision for the future of the property includes transformation into a clean, green, and publicly accessible component of a contiguous waterfront park. In our vision, road de-icing and compost waste management activities will serve as points of interest to be observed and learned from by community members. These operations would be surrounded and buffered by extensive Canal-side plantings, providing beauty, habitat, stormwater retention and cleansing functions. A clean, green, and publicly accessible Salt Lot will help us to highlight the importance of industrial operations to the character and economy of the neighborhood and represent a major step toward creating a resilient and healthy watershed and publicly accessible Canal for generations to come. This public space will become a key centerpiece to a contiguous, functional, accessible waterfront park along the Canal. These characteristics have also brought the Salt Lot to the attention of New York State Department of State as well as the Brownfield Opportunity Area (BOA) program.

Proposed CSO Retention Tank at the Salt Lot

EPA, in its Proposed Remedial Action Plan, proposes to install a 4 million gallon underground CSO

⁴ The initial grant was provided by Councilmember Brad Lander's Participatory Budgeting initiative that crowd-sourced neighborhood improvement initiatives from community members. In March 2012, District 39 residents voted, as part of this process, to award \$165,000 in capital funds to expand the Conservancy's compost facility at the Salt Lot. The project was second in popularity, with 919 votes. Building on the success and popularity of the participatory budgeting initiative, City Council Members Steve Levin and Sara Gonzalez matched District 39's commitment with a combined contribution of \$131,000. Brooklyn Borough President Marty Markowitz has pledged \$100,000 in additional funding.

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retention tank at the Salt Lot. We understand that EPA also proposes to install an 8 million gallon CSO retention tank at the Thomas Greene Park. Both of these spaces are extremely valuable to the community. We understand, however, the importance of finding the appropriate strategic sites for installing these retention tanks to reduce CSOs, which include hazardous materials regulated under CERCLA as well as pathogenic bacteria, suspended solids, nutrients and other water quality impairments. Therefore, we support EPA's conceptual approach in this regard.

It is our understanding that the proposed CSO retention tank would not be constructed in the northwest corner of the Salt Lot because of the unusual shape and dimensions of this portion of the property. As such, we request that EPA consider the plans of the Conservancy and our community partners and design and construct the proposed CSO retention tank such that the Conservancy's community programming, including our composting program in particular, may be allowed to safely continue to operate during construction of the CSO tank.

Further, we request that EPA work with the Conservancy and our community partners to ensure that the Salt Lot is restored to its current use as a shared-space for the ecological and industrial activities of the Conservancy and DSNY after the proposed CSO retention tanks are installed.

Economic Benefits

Community members should be given the opportunity to participate in the economic benefits of the remedy. The clean-up is an opportunity to create blue, green, and white collar jobs in fields such as construction, engineering, and research. There are also significant environmental education opportunities for the community. We are concerned, however, that the Agency's traditional procurement process will result in the hiring of out-of-town and out-of-state firms and workers to conduct much of the work. We are hopeful that the regulatory agencies, elected officials, and PRPs will work with local economic development advocates to develop hiring criteria that will help to ensure that local firms and workers are given preference for contracts related to the clean-up.

Sediment Management

EPA has a unique opportunity to provide leadership on the management of contaminated sediments on a regional scale. We support the use of ecologically sensitive, equitable, and cost-beneficial disposal alternatives that promote local economic and workforce development. Therefore, we reiterate that EPA needs to take a closer look at all opportunities to implement sustainable regional sediment management solutions that involve using contaminated sediments as a resource rather than as a waste.

The Gowanus Canal is one of several contaminated sediment sites in the New York metropolitan region. Others include Newtown Creek, Hudson River, Passaic River, Hackensack River, and New York Harbor. These sites are expected to generate 15 – 20 million cubic yards of contaminated sediment over the next 15 to 20 years. There are potential economies of scale associated with these concurrent remediation projects. Off-site transport, processing and disposal / destruction of contaminated sediments not only is unsustainable, it is also uneconomical. Much progress has already been made in developing viable, cost-beneficial technologies to treat and beneficially re-use these sediments. Further, the opportunity to handle, treat, and re-use these sediments presents a significant economic development opportunity for Brooklyn, the City, and / or the tri-state region. Therefore, we request that EPA keep all potentially viable options for sediment decontamination and beneficial re-use on the table at this stage of the process.

Sediment Barging

Multiple bridges along several highly travelled east-west streets cross the Gowanus Canal. These bridges support significant vehicle, bicycle, and pedestrian traffic and are typically opened just a few times each year. The Gowanus community is concerned that barging sediments to a treatment facility, which will require that the bridges be opened much more frequently, will cause business disruptions and social and economic hardship throughout the community.

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The Conservancy request that EPA and National Grid re-consider the use of hydraulic pumping to move the contaminated sediment as a slurry from the point of dredging to the point of treatment. This technology has been used with great success at the Lower Passaic River Superfund Site at which contaminated sediments were hydraulically pumped approximately one mile. In Gowanus, the sediments could be pumped to a treatment facility anywhere in New York Harbor. Any additional costs related to screening out debris may be offset by the absence of any disruption to the community from the opening and closing of bridges. Further, this process may help limit complaints of noise and nuisance odors.

Noise and Odors

Our community has expressed concern about noise and nuisance odors. The community demands that odors as well as volatile organic compounds (VOCs), dust, and particulates, be carefully managed and should be given additional guidance regarding what to expect during the clean-up in this regard. The Conservancy would be happy to assist key stakeholders in the development of a Community Air Monitoring Plan as early in the process as possible.

After the Clean-Up

Clean Water

It is highly unfortunate that the Gowanus Canal has been used as part of the City's sewer system for almost 150 years. This antiquated system has resulted in unacceptable environmental health and safety conditions for the entire community. The vitality of the watershed and community depends on cessation of combined sewer discharges to the Canal and an enhanced, environmentally sustainable, stormwater / wastewater system. The Gowanus Canal Conservancy supports community efforts to achieve total elimination of combined sewer overflows (CSOs). The only practical means of achieving a remedy that is comprehensive, permanent, and sustainable is to address CSO discharge concerns within the duration of the Superfund clean-up. Therefore, we support EPA's efforts to require CSO reduction to the maximum extent allowable, consistent with its authority under CERCLA, and we believe that the CSOs and the hazardous wastes they contain are inseparable. Accordingly, we support EPA's suggested use of CSO retention tanks at the previously noted locations along the Canal to reduce CSOs from discharging at two outfalls, OH-007 and RH-034. We welcome the concomitant reduction of harmful pathogens, and other water quality impairments that are also present in these CSOs.

We understand that the City may retain flexibility in how it meets the remedial objectives specified by EPA. Should the City seek an alternative to the proposed CSO retention tanks to meet EPA's remedial objectives, we are concerned that the CSOs may not be adequately reduced as part of the Superfund clean-up. Further, NYCDEP's August 2008 Waterbody / Watershed Facility Plan for the Gowanus Canal indicates that the upgrades that are presently being made to the Gowanus Pumping Station and Flushing Tunnel will still allow the discharge of 69 million gallons of CSOs every year at outfall OH-007 and 127 million gallons every year at outfall RH-034. In total, over 250 million gallons of CSOs would still be released into the Canal every year, even after the City completes its upgrades. While this is an improvement from the baseline condition of 372 million gallons of CSOs discharging into this water body each year, much more work needs to be done. Further, according to EPA's December 2012 Feasibility Study Addendum, "the CSO reductions planned under the Facility Plan will not reduce the CSO solids that are primarily responsible for sediment accumulation and chemical contamination in the surface sediment in the upper reach of the canal." As a result, EPA states that "additional CSO reductions of 58 to 74 percent should be sufficient to achieve the PRGs [Preliminary Remediation Goals] for the PAHs and for lead, copper and PCBs. Accordingly, the Conservancy supports EPA's plan to require additional CSO reductions at outfalls OH-007 and RH-034.

Regardless of the volume of CSO reduction that is achieved by Superfund, EPA's Office of Water should provide sufficient funding to ensure proper compliance with the Clean Water Act, such that the remaining CSO discharges to the Gowanus Canal are eliminated within the duration of the Superfund clean-up. We

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encourage all stakeholders, especially our elected officials, to join us in helping New York City support the Gowanus community in its desire to meet the requirements of the 1973 Clean Water Act by 2023.

Bulkhead Reconstruction

EPA's proposed plan for "bulkhead stabilization throughout the entire canal" has the potential to impair the unique and historic character of the Gowanus Canal and reduce opportunities for ecological restoration. The Canal's shoreline is composed of a mixture of bulkhead types, including cast-in-place concrete walls, stone rip rap, wooden crib-walls, steel sheet piles and others. The wooden crib-walls are of unique historical character and should be protected and / or restored to the degree practicable. They also provide habitat to some aquatic organisms, such as mussels. In contrast, steel sheet-pile walls offer the least ecological value and aesthetic appeal of any edge condition currently in the Canal. We understand that dredging activities may cause dilapidated bulkheads to further weaken and collapse during remedy construction and that the installation of temporary sheet-pile walls during remedy construction may be unavoidable. However, the wholesale reconstruction / replacement of existing bulkheads with steel or wooden bulkheads throughout the Canal is not consistent with the Conservancy's vision for the Canal, nor is it an acceptable remedy.

Any plan to reconstruct bulkheads must consider access, aesthetics, and habitat value. As such, any temporary steel sheet-pile walls must not be allowed to become permanent except, and only to the extent required, as part of the necessary remedial measures at the three upland manufactured gas plant (MGP) sites. Accordingly, the Conservancy requests that EPA require that any permanent bulkhead reconstruction that is implemented as part of the Superfund remedy be conducted consistent with the desires of the community and design parameters set forth by the New York City Department of City Planning. The Conservancy looks forward to participating as a partner with a variety of stakeholders in the bulkhead design process, and integrating this with ecological restoration efforts, as described below.

Ecological Restoration

The Gowanus Canal is mapped by NYSDEC as a tidal wetland. The Gowanus Canal Conservancy supports a remedy that is consistent with, and does not preclude, any and all efforts to restore and enhance the ecological function of the tidal wetland system. The Conservancy strongly supports EPA's plans for dredging and restoring the First Street Turning Basin as described in its Feasibility Study Addendum. We are pleased that the final design of the First Street Turning Basin will include a 30 ft wide central channel sloping up at a 4:1 (horizontal to vertical) ratio on the sides at a 6:1 ratio on the southeastern end. We are also pleased that the Proposed Plan indicates that this approach will accommodate water habitat restoration along the shoreline and a boat launch at its southeastern end. The Conservancy looks forward to working with key stakeholders to help bring this outcome to fruition.

Nevertheless, EPA can and should do much more to support the ecological restoration of the Canal within the Superfund framework. The Gowanus Canal Conservancy is working to plan, design, and build wetlands, consistent with current and future industrial and recreational uses, throughout the Canal and its turning basins, once the remediation is complete. The remedial design process should examine ecological restoration efforts throughout the Canal and its turning basins including, at a minimum, shoreline softening, improving riparian buffers, creating and expanding wetlands, restoring habitat, re-introducing native species, and ensuring no-net loss to existing wetlands. These efforts should also consider NYC's design recommendations for softer edge conditions. Finally, the remedy should be performed in a manner that is consistent with potential future ecological restoration projects and would allow them to proceed unencumbered, and without the need for any additional clean-up activities.

The Conservancy has prepared the drawings and renderings described below to further support our vision for a clean, green, and publicly accessible Gowanus Canal.

Attachment 3 presents the Conservancy's vision for the optimal location of three different shoreline treatments, including: hard bulkheads with ecological adaptation, stepped, or terraced bulkheads, and soft shorelines. Each proposed shoreline condition supports different degrees of ecological restoration, while

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allowing for the continued human and industrial use of important commercial activity zones. The Conservancy understands that existing and future commercial use of the waterway requires that specific areas maintain navigable depths and armored bulkheads for the passage and mooring of vessels, while other areas no longer require the same degree of infrastructure and water depth to support these activities. Building on this, the 3 proposed shoreline conditions support different usages in different areas.

Attachment 4 offers the Conservancy's vision for an ecologically supportive, hard bulkhead. These bulkheads consist of a sheet-pile wall that can support barging activities, with a resilient material applied to the surface, which can support greater ecological colonization than a steel-faced sheetpile. Materials that can support ecological activity and withstand barge traffic might include specialized concrete or wood products, either of which provide significantly more habitat value than a steel-face. This bulkhead type has been proposed for locations that continue to receive water-based industrial traffic and in locations where concerns of contaminant transport through groundwater migration require the installation of sealed bulkheads (former MGP sites, for example).

Attachment 5 offers a rendering of a stepped, or terraced, bulkhead. Stepped bulkheads could accommodate tidal wetland or other native plant community and habitat restoration efforts, while offering aesthetic benefits and get-down opportunities in residential areas, especially along the future waterfront park. Terraced bulkheads are also designed to withstand wave action and barge transportation, but are not suitable for large-vessel mooring.

Attachment 6 reflects the Conservancy's vision for the creation of soft shorelines within all of the turning basins along the canal, as well as at the head of the canal, wherever practicable. Soft shorelines offer the greatest habitat value and ecological restoration potential, but should not be sited in areas where heavy shipping traffic is anticipated. The Conservancy proposes locating the soft shorelines in areas that are protected or will receive no water-based industrial traffic.

Attachment 7 identifies salt marsh and mudflat restoration opportunities throughout the Canal, specifically the 4th / 5th Street Basin, 6th Street Basin, 7th Street basin, and 11th Street (Lowe's) Turning Basins. These proposed locations should be used to offer public access and wildlife observation opportunities. The Conservancy requests that EPA modify the Proposed Remedial Action Plan to require that ecological restoration be conducted at all of the Gowanus Canal Turning Basins as well as at the head of the Canal.

In addition, we understand that the United States Army Corps of Engineers conducted a series of studies between 2003 and 2005 as part of its Gowanus Canal and Bay Ecosystem Restoration Project⁵. These studies contemplated various components of ecological restoration including restoration of water flow to enhance aquatic habitat and water quality, integration of ecosystem restoration with local plans, re-establishment of greenway and buffer areas, re-contouring of the Canal bottom to create natural creek depths, and habitat creation and restoration. The findings of these studies, including, but not limited to, its July 2004 Wetland Creation and General Investigation Report, should be considered during the remedial design process and the reports included in the Administrative Record. We look forward to seeing increased EPA coordination with the Army Corps of Engineers in this regard.

The Conservancy also requests that EPA increase its coordination with the appropriate state and federal Natural Resource Trustees for the Gowanus Canal from this point forward. If it has not already done so, we request that EPA formally notify the Trustees of potential injuries to natural resources from releases under investigation in connection with the Gowanus Canal and coordinate its assessments, investigations, and planning with the Trustees as required under CERCLA. We request that EPA's remedial design phase include studies to establish baseline ecological conditions against which to base future ecological restoration requirements. We hope that such coordination will increase the likelihood that selected response actions and settlement agreements will include measures to protect and restore

⁵ For examples of potential ecological restoration projects for the Gowanus Canal, please refer to the U.S. Army Corps of Engineers "Gowanus Canal and Bay Ecosystem Restoration Project: Wetland Creation General Investigation Report," 2004.

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the natural resources of the Canal. Finally, we hope that our request for Natural Resource Trustee coordination will result in a process that moves forward in a timely manner, is completed within a reasonable timeframe, and involves community input.

Funding

Multiple sources of funding from various levels of government will be required to fund the ecological restoration efforts that will be necessary after the Superfund cleanup has been completed. The Conservancy reiterates its request that EPA continue to work closely with New York State, New York City, our elected officials, and other stakeholders to identify opportunities and sources of funding outside the traditional Superfund PRP framework to support a comprehensive clean-up and restoration of the Gowanus Canal.

The Great Lakes Legacy Act (GLLA) and the Great Lakes Restoration Initiative (GLRI) should be considered as a model for the funding, cleanup, and restoration of the Gowanus Canal as well as other contaminated sediment sites within the New York-New Jersey Harbor Complex. The Great Lakes initiatives have resulted in the development of public-private partnerships among federal, state, and local government, communities, and industry. The Gowanus community should receive similar benefits from such cooperation and funding.

The Conservancy looks forward to working in partnership with EPA to integrate the Gowanus Canal Superfund process with other federal environmental and sustainability programs and initiatives. We also look forward to working with key stakeholders to undertake the necessary acquisition of open space that will support the development of the high quality ecological habitat that Gowanus desperately needs, as well as the installation of green infrastructure and tree planting, that will help reduce CSO and improve air quality throughout the Gowanus Canal watershed.

Concluding Remarks

The Gowanus Canal Conservancy respectfully submits these comments to EPA. A successful clean-up must take into account the function and interaction of the natural and man-made systems that exist within the Gowanus watershed. With this perspective in mind, the Conservancy supports a clean-up that not only considers EPA's nine criteria for remedy selection but that is also consistent with the goals and objectives that have been set forth in New York City's Comprehensive Waterfront Plan, the Hudson-Raritan Estuary Restoration Plan, and New York City's waterfront zoning efforts.

In summary, we request that EPA:

- Utilize a watershed-based conceptual site model,
- Ensure a robust baseline and long-term monitoring program and transparent data sharing as part of an adaptive management process,
- Coordinate with USGS regarding its proposal for data collection and evaluation and to oversee and integrate environmental modeling efforts,
- Consider all potential viable regional sediment management solutions that may utilize contaminated sediments as a resource rather than as a waste,
- Consider access, aesthetics, and habitat value of bulkheads and not allow any unnecessary installation of permanent sheet-pile walls,
- Utilize sediment pumping rather than barging,
- Engage the community regarding potential noise and nuisance odor concerns,
- Fund and enforce the Clean Water Act,

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- Explore additional opportunities for ecological restoration and ensure that the clean-up is consistent with future ecological restoration efforts,
- Coordinate with Natural Resource Trustees, and
- Assist the community in obtaining the necessary funding to support the comprehensive clean-up and restoration of the Gowanus Canal.

Finally, we ask that EPA include this letter, and any response from EPA, in the Administrative Record for the Gowanus Canal Superfund Site.

We look forward to receiving the Agency's response to these and other comments. The Conservancy reserves the right, and hopes to continue, to share information on the proposed clean-up plans with EPA and the public and to facilitate public involvement in the process.



Factors Affecting Groundwater Discharge to Gowanus Canal, Brooklyn, New York

*by Paul Misut and William Capurso
USGS New York Water Science Center, Coram N.Y.*

U.S. Geological Survey Proposal
June 2012

Introduction: The Gowanus Canal is a tidal creek located on the western end of the New York City Borough of Brooklyn, and discharges to Gowanus Bay. During the first half of the 20th century, local groundwater levels showed severe declines resulting from heavy pumping and loss of recharge. As groundwater supplies became impaired by saltwater intrusion and surface-derived contamination, pumping ceased and the water table partially recovered.

Industrial releases have resulted in significant contamination of the Gowanus Canal and its groundwater-contributing area. The Canal continues to receive contaminated groundwater, storm water, and permitted and unpermitted effluent including combined sewer overflows (CSOs) during wet weather events. Flooding is also a significant problem in parts of the watershed.

On March 4, 2010, the U.S. Environmental Protection Agency (EPA) announced that it had placed the Gowanus Canal on its Superfund National Priorities List. The Superfund remedy may include a combination of sediment dredging, capping, and source control and involve significant bulkhead repair and (or) reconstruction. The Superfund remedial measures are scheduled to be implemented beginning in 2015. In addition, a flushing tunnel that connects the inner Gowanus Canal to the Upper New York Bay is scheduled to be reactivated in spring 2013 to improve water quality of the canal. The remedial measures along with infrastructure improvements and land use planning initiatives for the Canal and its watershed may result in significant changes to the natural and engineered systems. In addition, climate change may result in accelerated sea level rise, increased frequency and intensity of storm events, and higher storm tides during coastal storms. Baseline and long-term monitoring of groundwater and surface-water levels in the Gowanus watershed is necessary to help evaluate the effects of planned and anticipated changes and inform the decision-making processes going forward.

Problem Statement: A lack of understanding and field monitoring of the hydrologic system surrounding the Gowanus Canal has prompted questions about environmental remediation and land-use planning for the area, including the following:

1. inadequate characterization of groundwater influences on increased flood potential associated with continued water-table recovery and (or) effects of climate change, and with proposed remedial measures and potential future ecological restoration projects that may include constructed wetlands and other open spaces;
2. lack of accuracy in estimates of groundwater infiltration into sewers, and leakage from sewers and water-supply mains into the groundwater system;
3. lack of accuracy of the groundwater-discharge component of surface-water hydrodynamic models; and
4. lack of accuracy in estimating fate, transport, and remediation of contaminants traveling along groundwater-flow paths.

Objective: The first objective (phase 1) is to apply standard USGS field-data collection methods to map the water table and local groundwater divides that define the source area of groundwater discharging to the Canal.

The second objective (phase 2) is to apply USGS numerical-flow simulation methods to represent the shallow groundwater-flow system, and to evaluate planned management alternatives identified in the EPA Feasibility Study dated December 2011 (U. S. Environmental Protection Agency, 2011).

Relevance and Benefits: Various parties have prepared, and will continue to refine hydrologic, hydrogeologic, surface-water, and sediment-transport models of both the natural and engineered systems. The field-data collection objective (phase 1) of this project will advance knowledge of the regional-hydrologic system. At present, knowledge of the Gowanus Canal system is limited due to lack of data. The collected data will be part of a nationally consistent unbiased data set that follows USGS techniques and procedures. This data will be used to form a baseline understanding of the hydrologic system and further characterize the need for long-term monitoring.

The modeling objective (in phase 2) of this project will advance the understanding of hydrologic processes that affect the design of constructed wetlands, tidal-flushing systems, calibration and verification of surface-water hydrodynamic models, and efforts to remediate groundwater plumes.

Approach: The USGS currently monitors two groundwater-observation wells within 2 miles of the Gowanus Canal. These wells are monitored for water levels on a monthly basis by the USGS as part of a cooperative program with New York City Environmental Protection. However, the source area of groundwater discharging to the Gowanus Canal may extend several miles inland from the Canal itself.

Thus, to help adequately define the groundwater basin, up to four additional monitoring wells will be installed and monitored monthly by the USGS at selected locations and depths to further characterize local groundwater conditions.

Additional wells within 100 ft of the Canal are currently monitored by other parties, but provide data that likely do not adhere to USGS data-collection procedures and standards. The USGS would request permission to monitor up to five of these wells for synoptic water-level measurements. Field reconnaissance and accurate well-head surveying would be necessary at these wells and the four new USGS wells.

Effects of tidal fluctuations on the local groundwater system are not known; therefore, a continuous groundwater recorder would be installed at some of the wells on a temporary basis. Data would be collected on 15-minute increments or shorter to document changes in water levels due to the tides, as well as the effects of precipitation, and leaking storm sewers and water-distribution pipes.

Water-Table Delineation (phase 1): A baseline characterization of groundwater conditions would be generated by mapping the present configuration of the water table using a 1-ft contour interval. Starting from a previously developed conceptual model of the hydrogeologic framework of the area, groundwater divides and directions and magnitudes of groundwater flow would be generated based on standard assumptions (for example, Freeze and Cherry, 1979) such as that groundwater flowpaths are orthogonal to water-table contour lines. A water budget for the groundwatershed would also be generated. Maps of the surfacewatershed and groundwatershed of the Gowanus Canal will also be developed and compared.

Groundwater Modeling (phase 2): The USGS conducts research in the development and coding of numerical groundwater-model programs and has a long history of applying models to groundwater issues on Long Island. The USGS modular groundwater-flow model MODFLOW would be applied in this approach. A previous application of MODFLOW to the Kings/Queens area (Misut and Monti, 1999) will provide a starting point. The hydrogeologic framework of the groundwater system is represented in this previous model at a coarse scale and would be refined based on analysis of new data collected since the previous model was developed (about 10 years ago), including driller's and geophysical logs. Other sources of new data include recently drilled wells and improved land-surface digital-elevation models. The well-pumping boundary conditions simulated in the model will be updated with the latest New York State Department of Environmental Conservation (NYSDEC) data on pumpage. Groundwater recharge, discharge, and storage processes would be carefully considered in the modeling effort, which would likely contribute to our understanding of the effects of groundwater on stormwater-management systems—including the proposed construction of wetlands.

Expected responses to climate-change factors including sea-level rise and increased precipitation intensity may be evaluated. A detailed water budget would be generated using the computer model and include categories for leakages associated with combined-sewer lines, direct groundwater discharge to the Canal seafloor, groundwater evapotranspiration, and movement of groundwater across deep clay layers. Finally, the USGS particle tracker MODPATH (Pollock, 1994) would be used to delineate recharge-

contributing areas to Canal reaches and the Superfund-related pump and treat operations. The MODFLOW model will be calibrated to match field-measured heads, by varying parameter values, boundary conditions, and the model discretization. Starting from a no-change condition, hypothetical scenarios will be simulated to explore questions about environmental remediation and utility of further data-collection and analysis activities.

Products: Groundwater-level data collected during the course of the investigation will be distributed online annually in the USGS Water-Data Report for Long Island, and through the USGS National Water Information System: Web Interface (NWISWeb) at <http://waterdata.usgs.gov/ny/nwis/>.

Additionally, the results of the field investigation and phase 1 delineation of the water table and surface-water and groundwatersheds would be disseminated through a short report adhering to the standards of the USGS Scientific Investigations Map (SIM) series.

The results of the modeling investigation (phase 2) would be disseminated through a final report adhering to the standards of the USGS Scientific Investigations Report (SIR) series. The report will help guide decision making. Oral presentations of interim results would also be given to interested parties.

Budget: Estimated costs for the cooperative program are shown below. All costs are estimates and assume a USGS matching contribution of 20% (based on availability of funds when the agreement is signed), and a 3-percent annual inflationary increase. During the course of the agreement, internal adjustments may be made to the funding levels assigned to each work item upon mutual agreement between the USGS and the cooperator. If matching funds are not available, or are available at a reduced level, the funding and extent of effort devoted to each work item will be evaluated and revised in consultation with the cooperator. Work for phase 1 of the proposal would begin in October 2012; phase 2 work would begin in July 2013.

Item	2012	2013
Water-Table Delineation (phase 1):		
Budget for field reconnaissance, well installation, water-level monitoring, baseline characterization of groundwater conditions (water budget), and report production.	\$30,430	\$58,230
USGS Matching Sub-total	\$6,090	\$11,650
Cooperator(s) Sub-total	\$24,340	\$46,580
Groundwater Modeling (phase 2):		
Budget for development and calibration of groundwater-flow model and report production.	\$0	\$78,830
USGS Matching Sub-total	\$0	\$15,760
Cooperator(s) Sub-total	\$0	\$63,070
Program Total	\$30,430	\$137,060
USGS Matching Total	\$6,090	\$27,410
Cooperator(s) Total	\$24,340	\$109,650

Schedule:

Phase 1a:

1. Develop a set of working GIS maps including surface watershed, previous water-table delineations, hydrogeologic framework, engineered structures, and all existing wells.
2. Field reconnaissance and selection of existing well sites for monthly and synoptic monitoring; identify proposed drilling sites.
3. Produce a preliminary water-table map from field-reconnaissance data.
4. Surveying of existing wells.

Phase 1b:

1. Drilling of new wells.
2. Surveying of new wells and collection of final data.
3. Produce a final water-table map; delineate flow directions and groundwater contributing areas.

Phase 2:

1. Assemble new model-input data.
2. Rediscrretization and calibration of model.
3. Sensitivity analysis of model hydraulic properties.
5. Particle-tracking analysis of recharge-contributing areas.
6. Produce first draft of model report.
7. Publish model report.

References:

Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice Hall, 604 p.

Harbaugh, A.W., 2005, MODFLOW-2005, the U.S. Geological Survey modular ground-water model -- the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16, variously paginated.

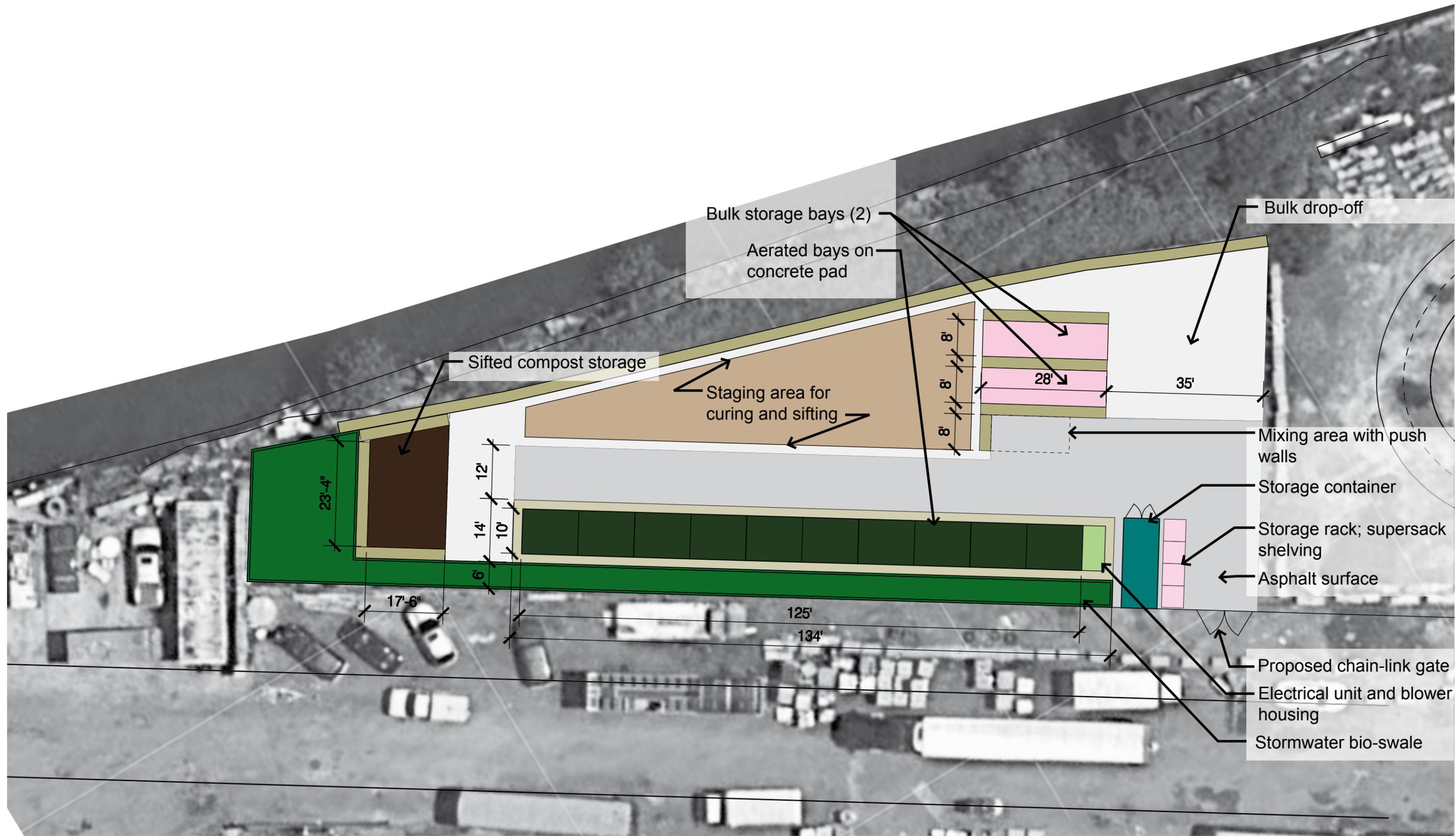
Misut, Paul E.; Monti, Jack, Jr., 1999. Simulation of ground-water flow and pumpage in Kings and Queens Counties, Long Island, New York. U.S. Dept. of the Interior, U.S. Geological Survey ; Branch of Information Services [distributor], Water-Resources Investigations Report 98-4071, v, 50 p. :ill., maps ;28 cm. [<http://ny.water.usgs.gov/pubs/wri/wri984071/>]

Pollock, D.W., 1994, User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post-processing package for MODFLOW, the U.S. Geological Survey finite-difference ground-water flow model: U.S. Geological Survey Open-File Report 94-464, 6 chapters.

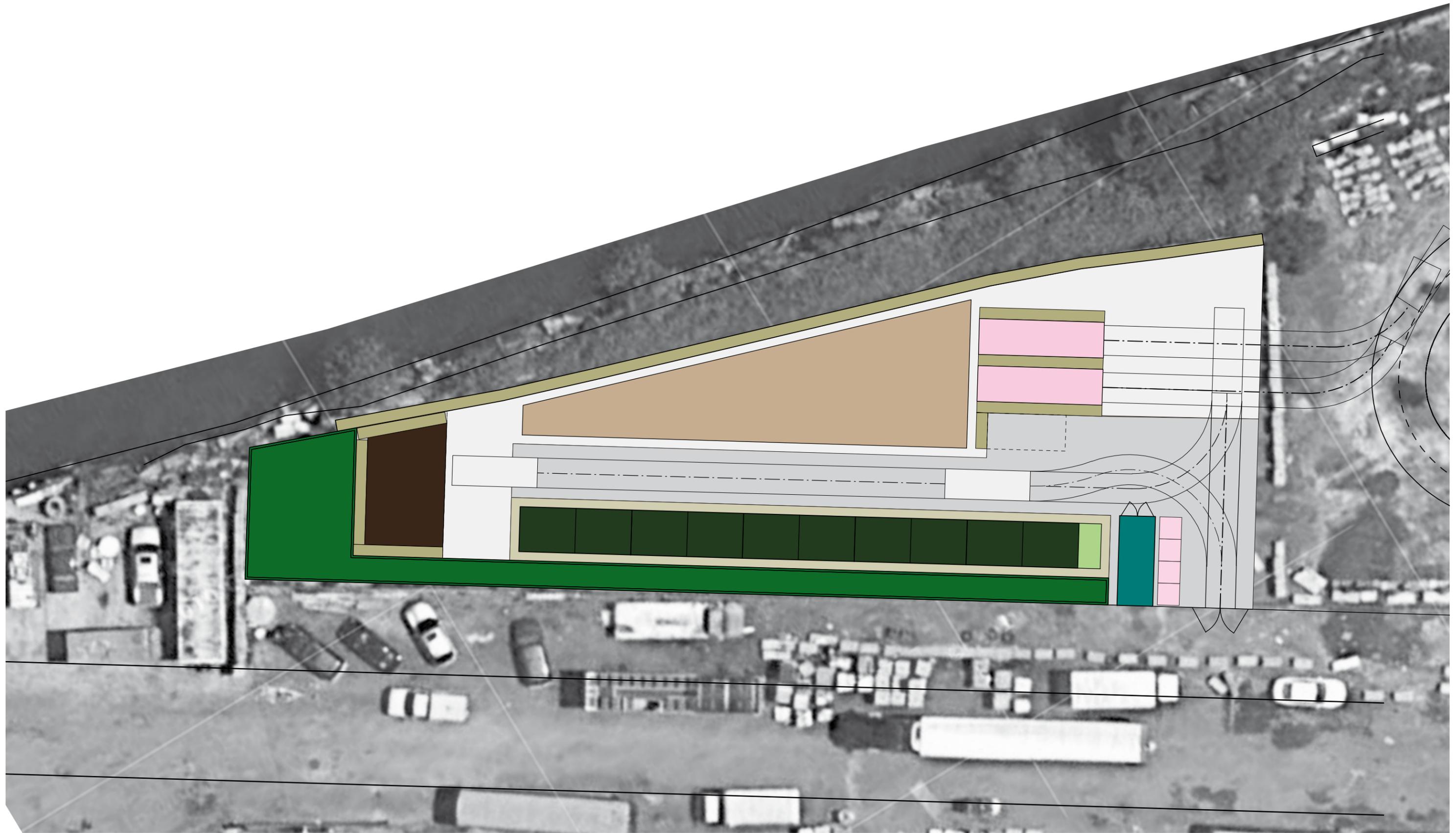
U.S. Environmental Protection Agency, 2011, Draft Remedial Investigation Report: Gowanus Canal, prepared by CH2MHILL.

U.S. Environmental Protection Agency, 2011, Draft Feasibility Study Report: Gowanus Canal, prepared by CH2MHILL, ES092211082805WDC.

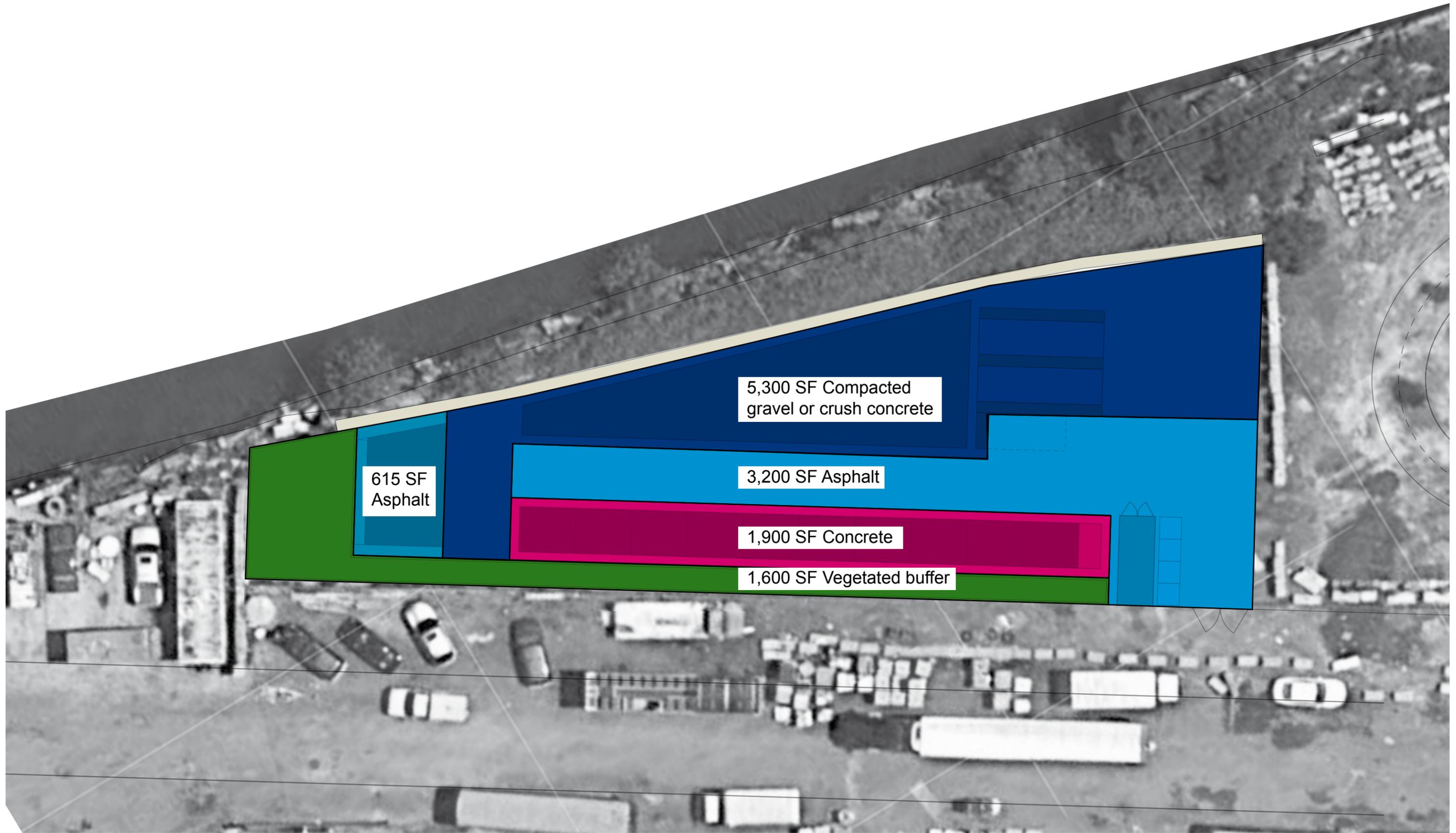
As the nation's largest water, earth, and biological science and civilian mapping agency, the USGS works in cooperation with more than 2000 organizations across the country to provide reliable, impartial, scientific information to resource managers, planners, and other customers. This information is gathered in every state by USGS scientists to: minimize the loss of life and property from natural disasters; contribute to the conservation and the sound economic and physical development of the nation's natural resources; and enhance the quality of life by monitoring water, biological, energy and mineral resources.



ATTACHMENT 2 This option utilizes a bay system and an aerated floor on a concrete pad. Each bay can accommodate an 8 ton batch held statically for 5 weeks. Every week a new bay is filled and after week 5 the first bay is emptied and windrowed for 3-4 weeks. The curing windrow is sifted and stockpiled for distribution. This technology is used at St. John's university where the school processes 40 tons of greens per year in a similar configuration.



Circulation



615 SF
Asphalt

5,300 SF Compacted
gravel or crush concrete

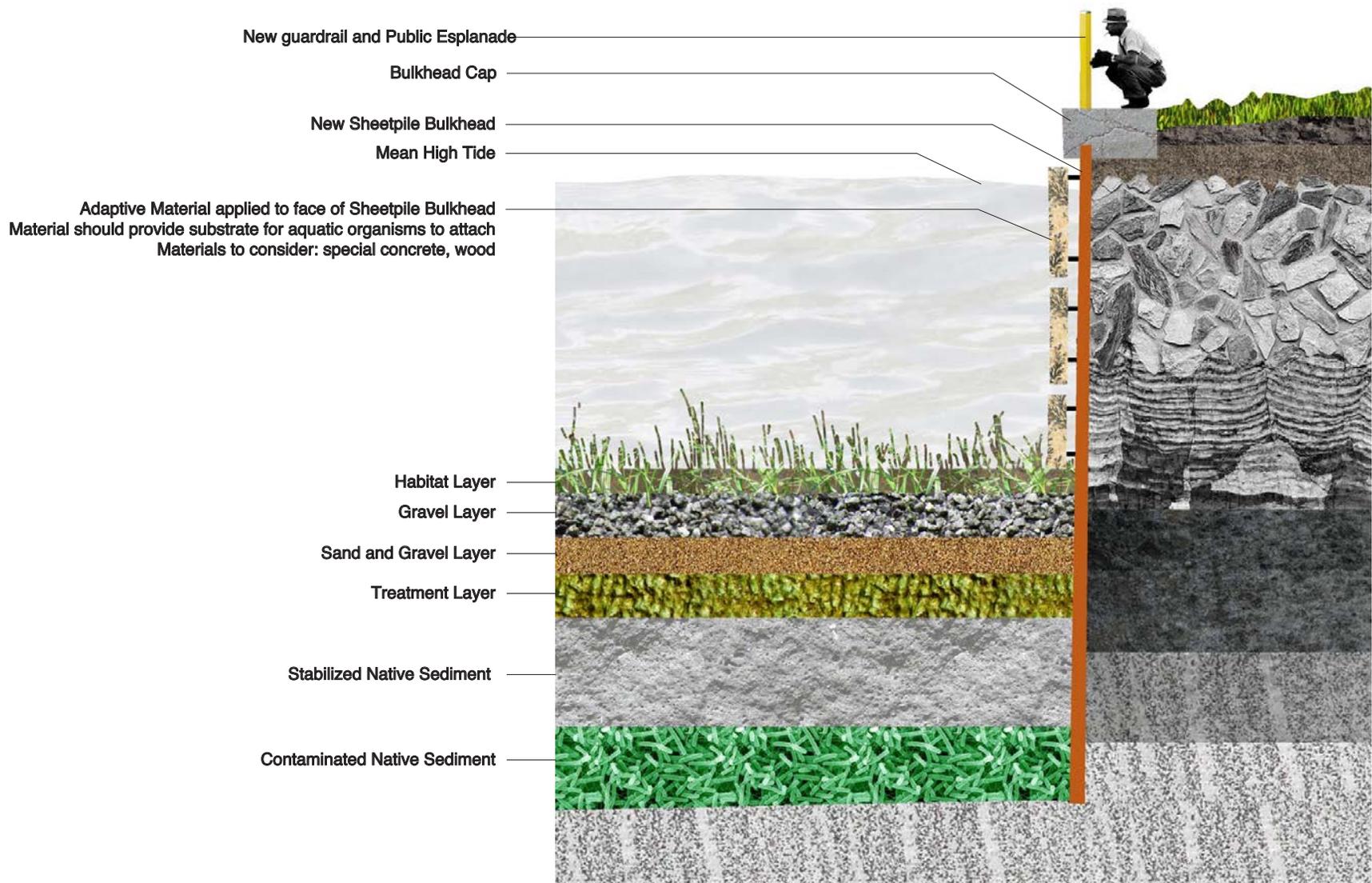
3,200 SF Asphalt

1,900 SF Concrete

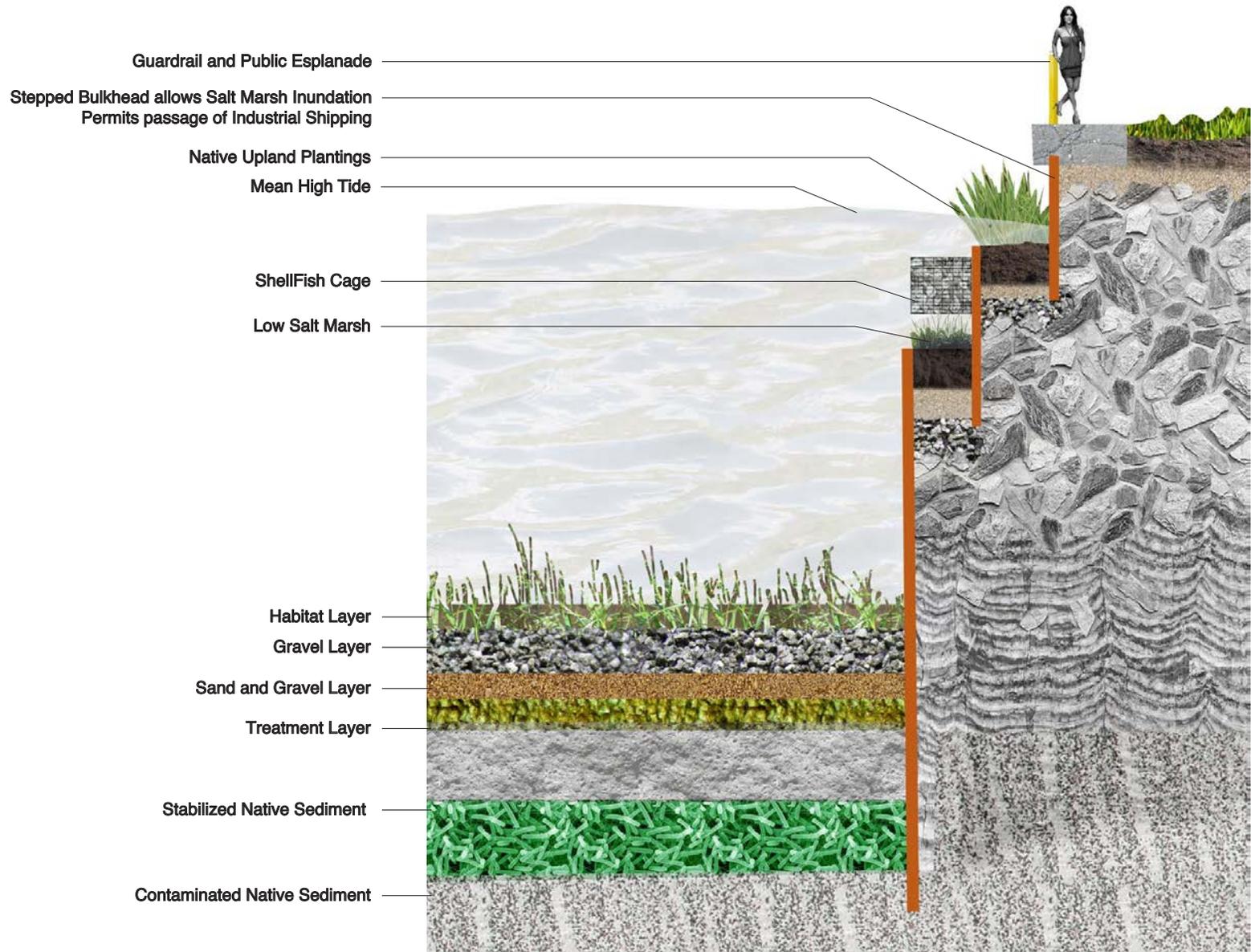
1,600 SF Vegetated buffer



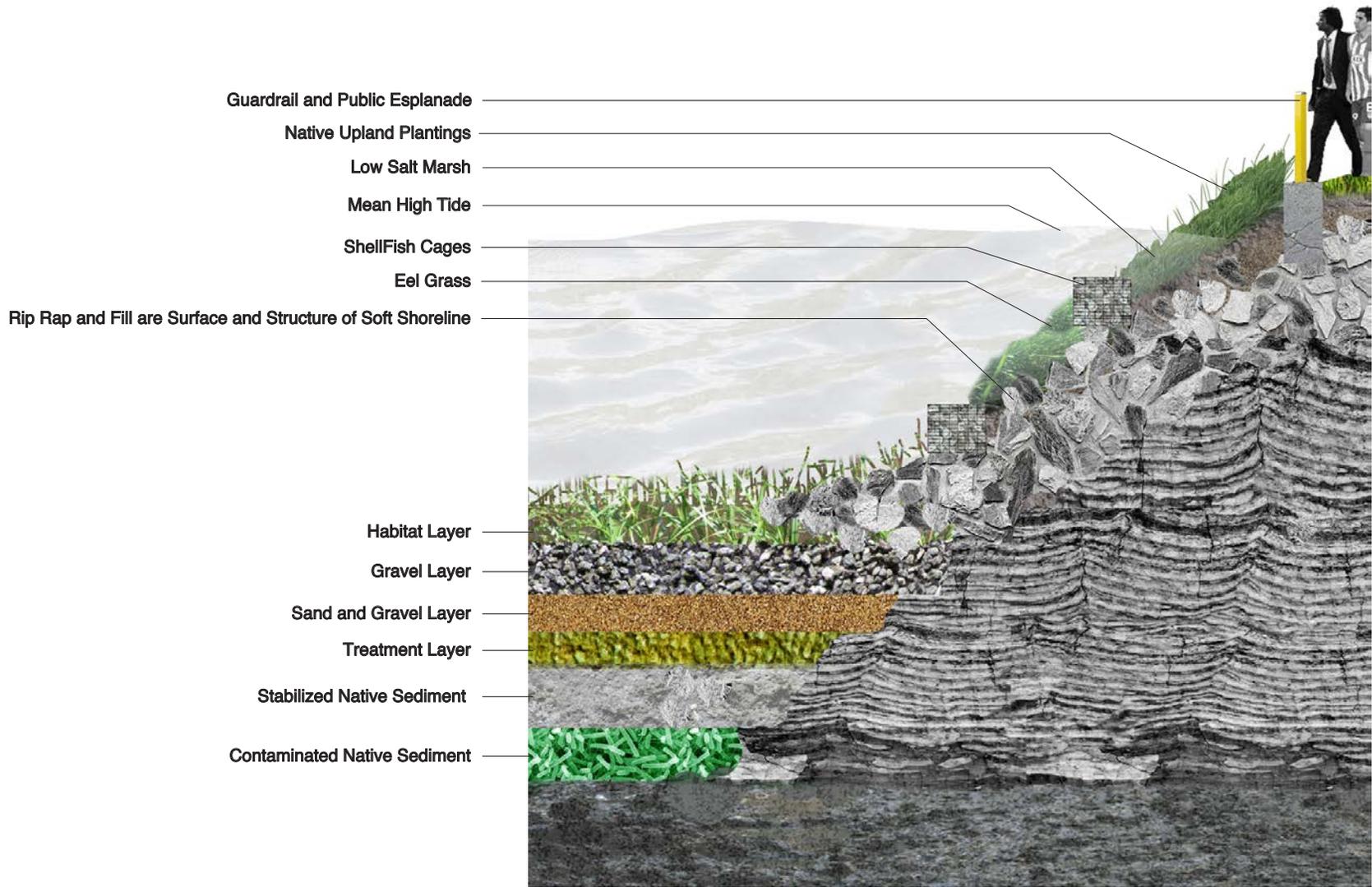
	Gowanus Canal Conservancy 321 Nevins St, 2nd Floor Brooklyn, NY 11215	Gowanus Canal Superfund Proposed Remedial Action Plan	ATTACHMENT 3
	Phone: 718 541 4378 www.gowanuscanalconservancy.org	Gowanus Canal Conservancy Comments	Shoreline Conditions



	Gowanus Canal Conservancy 321 Nevins St, 2nd Floor Brooklyn, NY 11215	Gowanus Canal Superfund Proposed Remedial Action Plan	ATTACHMENT 4
	Phone: 718 541 4378 www.gowanuscanalconservancy.org	Gowanus Canal Conservancy Comments	Hard Bulkhead



	Gowanus Canal Conservancy 321 Nevins St, 2nd Floor Brooklyn, NY 11215	Gowanus Canal Superfund Proposed Remedial Action Plan	ATTACHMENT 5
	Phone: 718 541 4378 www.gowanuscanalconservancy.org	Gowanus Canal Conservancy Comments	Stepped Bulkhead



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Gowanus Canal Superfund
 Proposed Remedial Action Plan
 Gowanus Canal Conservancy
 Comments

ATTACHMENT 6
 Soft Shoreline



	Gowanus Canal Conservancy 321 Nevins St, 2nd Floor Brooklyn, NY 11215	Gowanus Canal Superfund Proposed Remedial Action Plan	ATTACHMENT 7
	Phone: 718 541 4378 www.gowanuscanalconservancy.org	Gowanus Canal Conservancy Comments	Wetland Restoration Areas