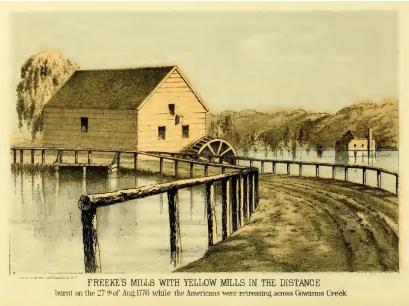


**Gowanus Canal**

## Tidewater



1. Adam Brouwer builds first tidewater gristmill in 1645.
2. More Mills are created after.
3. In 1664, several Breuckelen residents petition for the canal to be dredged (at their own expense) to supply water to run mills.

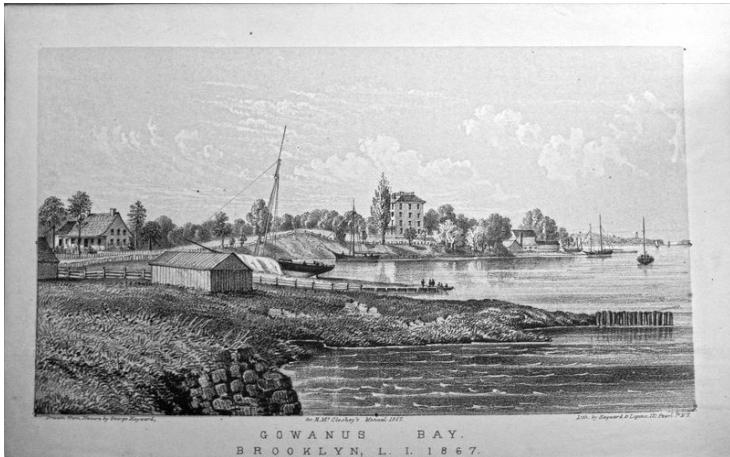
## Farming and Oyster Fishing



1. Dutch farmers settled along the marshland and engaged in clamming oysters. Became a notable first export to Europe
2. The Bay's Brackish water created an environment for large bivalves.

*Outcome: Government of New York enacts law in 1774 to widen creek into a canal, to keep watercourse in good condition and levy taxes on people who use land near it.*

## Early Legislative & Planning Foundations



1. New York State legislature authorized the transformation of the Gowanus creek into a deeper commercial water way in 1849.
2. Further deepening in 1867
3. United States Army Corps of Engineers transform it further into a canal in 1869.

*Outcome: canal becomes a 100-foot-wide, 1.8 mile industrial water serving shipping yards, coal yards, tanneries, and chemical plants.*

# Industrialization and Pollution



1. Canal becomes a vital transportation system and informal sewage system for the city.
2. Many industries pouring waste into the canal (coal processing, tanneries, manufacturing gas plants).
3. Condition get terrible and in 1889 legislature is passed to improve the canal.
4. Construction of “Big sewer” in 1890s for drainage and flushing the canal.

## **VERY VILE.**

### **The Disgusting Condition of Gowanus Canal.**

**A Nuisance Which Is Seriously Affecting  
the Health of South Brooklyn People.  
The Grounds of Complaint and the Rem-  
edies Proposed—Necessity of Early Ac-  
tion by the Common Council.**

The condition of the Gowanus Canal, arising from the accumulation of filth from the sewers

10

### **HENRY R. ASSERSON'S PLAN TO PURIFY GOWANUS CANAL**

Would Have City Erect a Plant to  
Pump Clear Water From  
the East River.

#### **CANAL SHOULD BE DREDGED.**

Concrete Quay Walls Should Replace  
Present Bulkheads—Total Cost  
About \$3,000,000.

## Decline and Regulation



1. Canal's Industrial role declined post-WWII
2. Gowanus Expressway created above the canal.
3. Federal Water Pollution Control Act (1948) and Clean Water Act (1972) create regulatory basis for water-pollution control.



## BROOKLYN DAILY EA

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### THE BIG SEWER TUNNEL.

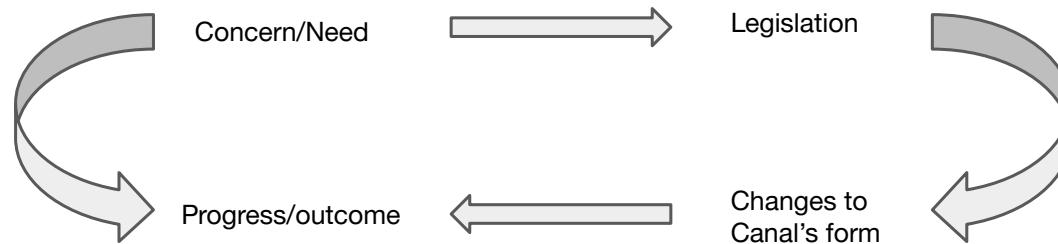
How It is Built and the Men  
Who Do It.

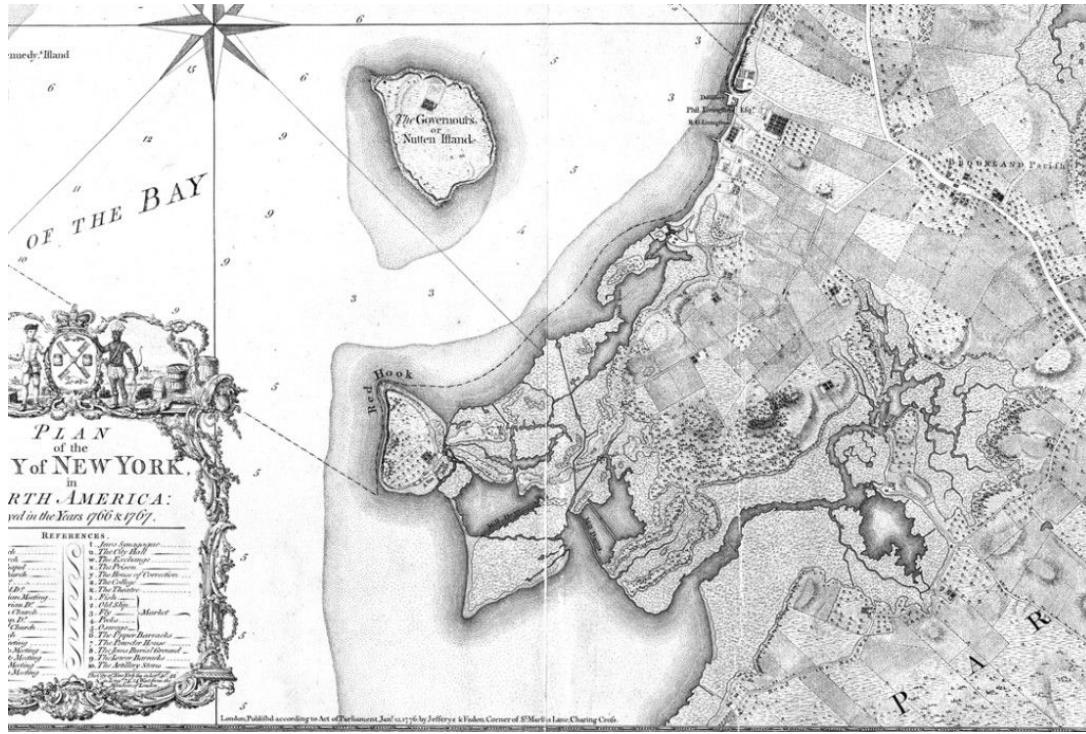
Scratching Gravel Forty Feet Beneath the  
Surface—A Brick Bore Through Which a  
Span and Road Wagon May be Driven—An  
Evening With the Night Shift. ¶

### N BAD BLOW TO BIG SEWER ALSO

Brooklyn Hard Hit—Scheme Is to  
Eventually Cut Down City  
Debt and Interest.

# Cycle





# **What is Superfund?**

## **42 U.S.C. §9601 et seq. (1980)**

The Comprehensive Environmental Response, Compensation, and Liability Act -- otherwise known as CERCLA or Superfund -- provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

1. Site Assessment
2. National Priorities List Site Listing Process
3. Remedial Investigation // Feasibility Study
4. Records of Decision
5. Remedial Design // Remedial Action
6. Construction Completion
7. Post Construction completion
8. National Priorities List Deletion
9. Site Reuse // Redevelopment



Issued by:

The United States Department of the Interior, New York State Department of Environmental Conservation, and National Oceanic and Atmospheric Administration in their capacity as Trustees of Natural Resources  
December 2014



#### HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Gowanus Canal

Date Prepared: April 2009

Contact Persons:

Site Investigation: Richard Dabal  
U.S. Army Corps of Engineers  
New York, NY

Documentation Record: Dennis Munhall  
U.S. Environmental Protection Agency  
New York, NY

Gerry Gilliland  
Weston Solutions, Inc. (Region 2 SAT 2 contractor)  
Edison, NJ

## Hazard Ranking System:

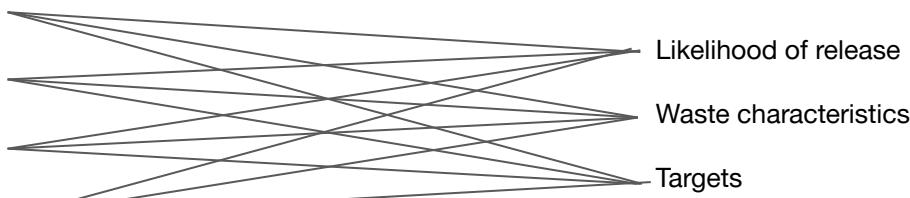
*Four Pathways for Movement of Contamination*

Groundwater

Surface water

Soil

Air



*Three Multipliers*

#### WORKSHEET FOR COMPUTING HRS SITE SCORE GOWANUS CANAL

	<u>S<sub>gw</sub></u>	<u>S<sup>2</sup></u>
1. Ground Water Migration Pathway Score (S <sub>gw</sub> ) (from Table 3-1, line 13)	<u>Not Scored</u>	
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	<u>100.00</u>	<u>10,000.00</u>
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	<u>Not Scored</u>	
2c. Surface Water Migration Pathway Score (S <sub>sw</sub> ) Enter the larger of lines 2a and 2b as the pathway score.	<u>100.00</u>	<u>10,000.00</u>
3. Soil Exposure Pathway Score (S <sub>s</sub> ) (from Table 5-1, line 22)	<u>Not Scored</u>	
4. Air Migration Pathway Score (S <sub>a</sub> ) (from Table 6-1, line 12)	<u>Not Scored</u>	
5. Total of S <sub>gw</sub> <sup>2</sup> + S <sub>sw</sub> <sup>2</sup> + S <sub>s</sub> <sup>2</sup> + S <sub>a</sub> <sup>2</sup>	<u>10,000.00</u>	
6. <b>HRS Site Score</b> Divide the value on line 5 by 4 and take the square root	<u>50.00</u>	

### 3. REMEDIAL INVESTIGATION

## Gowanus Canal Remedial Investigation Report

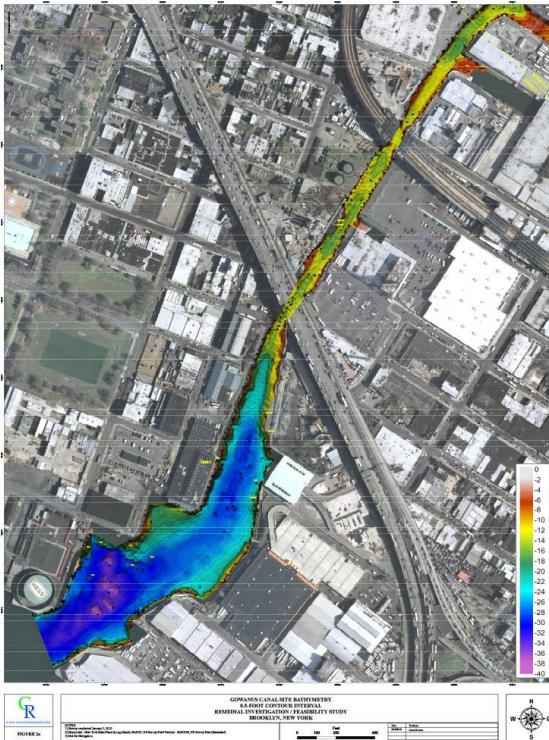
Draft

Volume 1

Prepared for:  
**U.S. Environmental Protection Agency**  
Contract No. EP-W-09-009  
Work Assignment No. 013-RICO-02ZP

Prepared by:  
**HDR**  
**CH2MHILL**  
GRB Environmental Services, Inc.

January 2011



# Gowanus Canal Remedial Investigation Report

## Volume 1

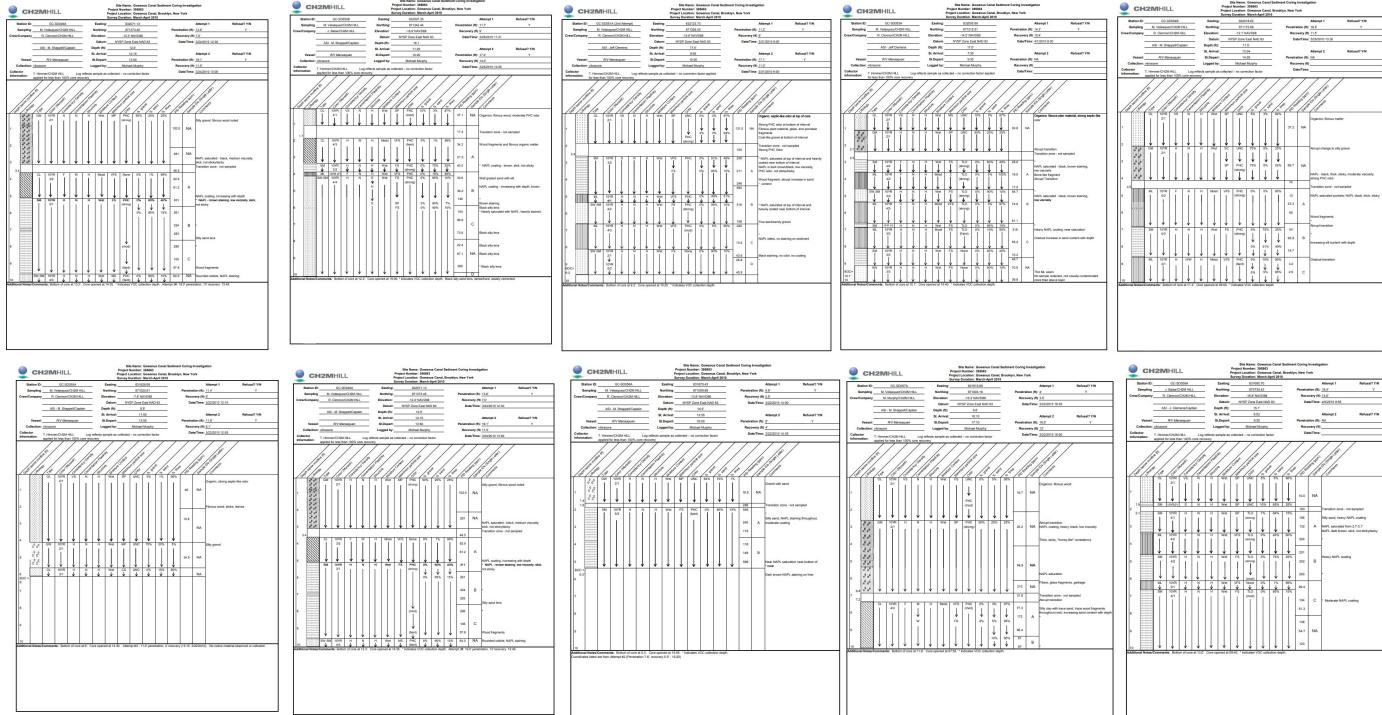
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**CH2MHILL**  
 GRB Environmental Services, Inc.

January 2011

## 3. REMEDIAL INVESTIGATION



# 3. REMEDIAL INVESTIGATION

Draft

## Gowanus Canal Remedial Investigation Report

### Volume 1

Prepared for:

**U.S. Environmental Protection Agency**

Contract No. EP-W-09-009

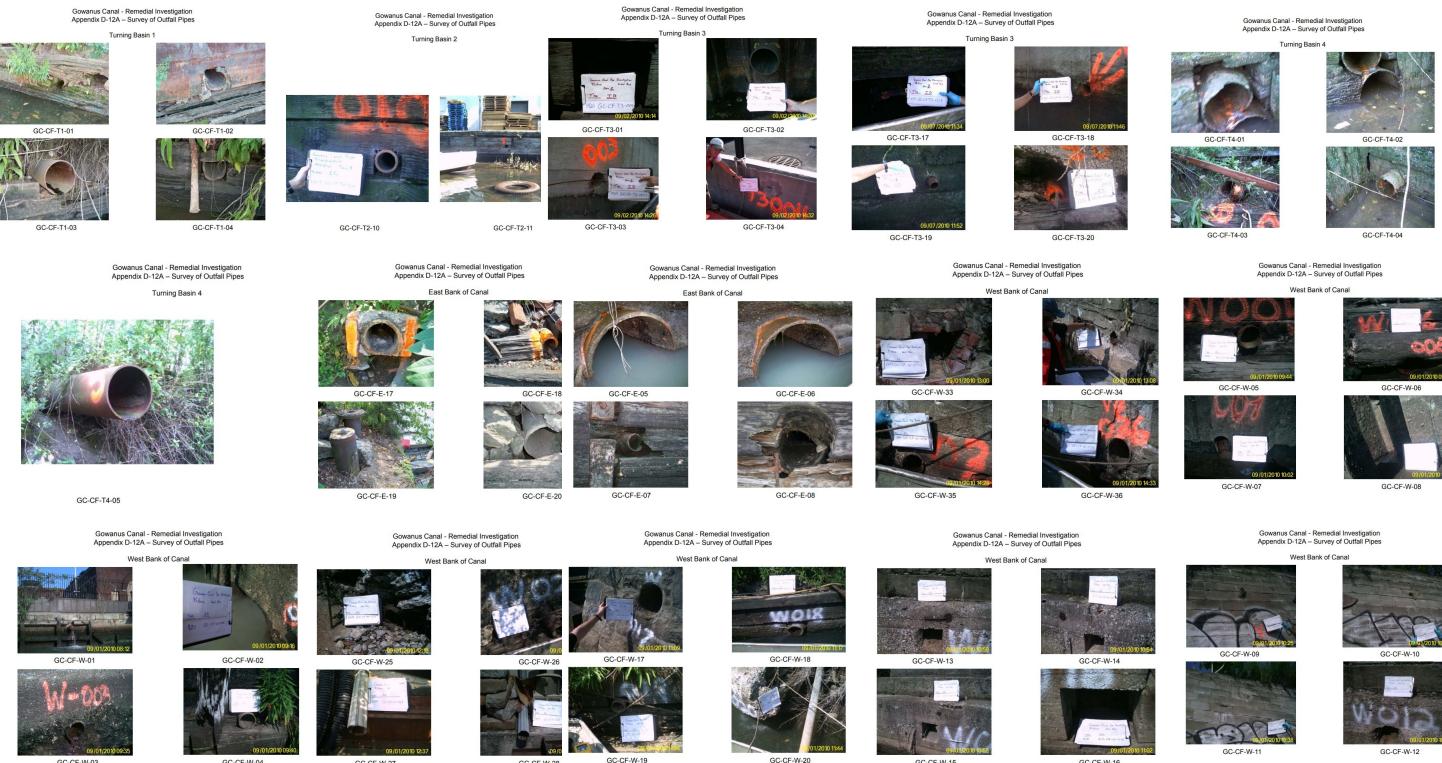
Work Assignment No. 013-RICO-022P

Prepared by:



**CH2MHILL**  
GRB Environmental Services, Inc.

January 2011



*Draft***Gowanus Canal Remedial  
Investigation Report**

Volume 1

**Gowanus Canal - Remedial Investigation  
Appendix D-12E - Surface Sediment Sampling Activities**

Prepared for:  
**U.S. Environmental Protection Agency**  
Contract No. EP-W-09-009  
Work Assignment No. 013-RICO-022P

Prepared by:  
**HDR**  
**CH2MHILL**  
GRB Environmental Services, Inc.

January 2011



Location 321



Location 322

### 3. REMEDIAL INVESTIGATION

## Gowanus Canal Remedial Investigation Report

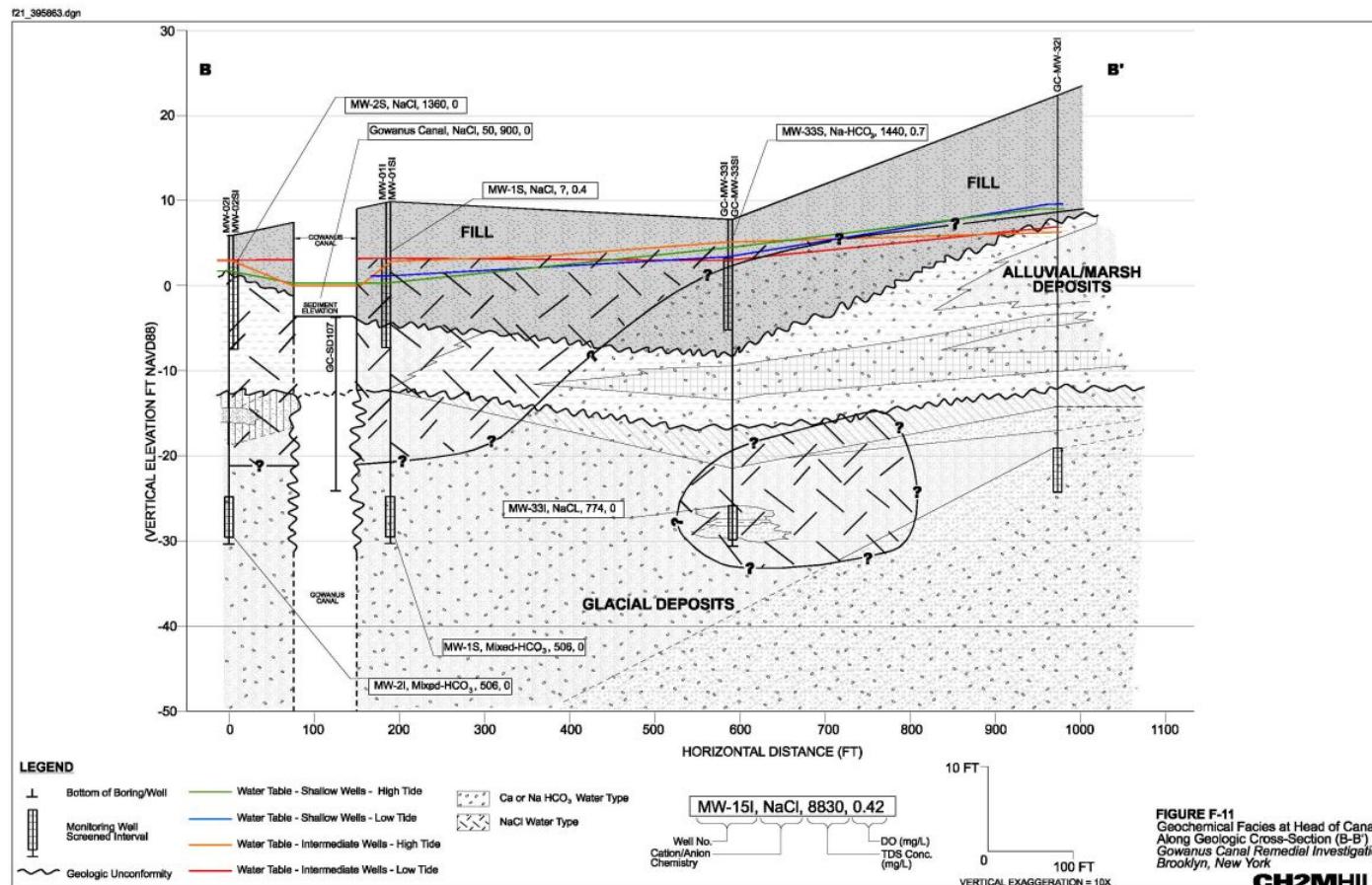
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GRB Environmental Services, Inc.

January 2011



**CH2MHILL**

### 3. REMEDIAL INVESTIGATION

Draft

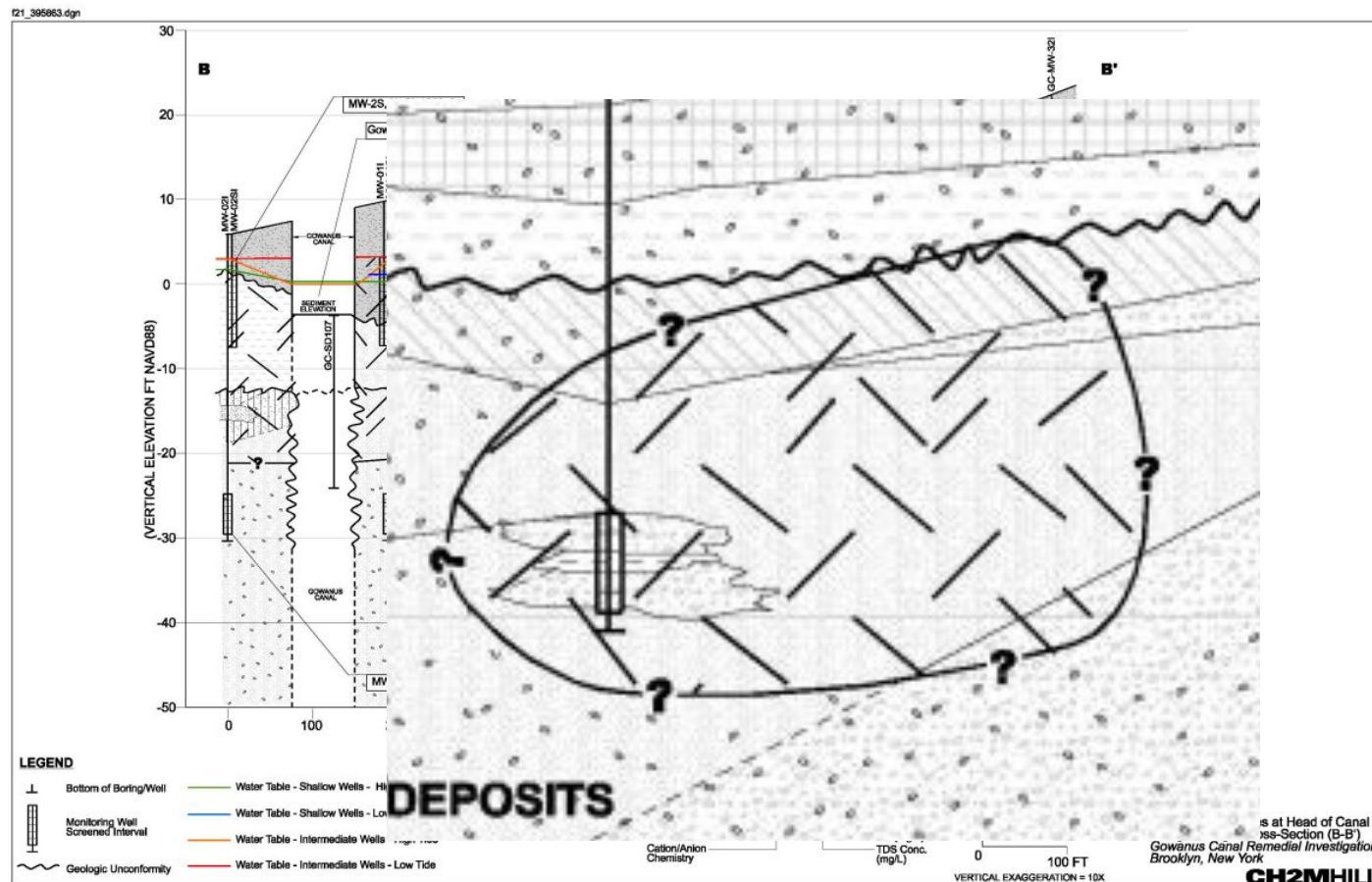
## Gowanus Canal Remedial Investigation Report

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**CH2MHILL**  
GRB Environmental Services, Inc.

January 2011



## 4. RECORDS OF DECISION

### RECORD OF DECISION

Gowanus Canal Superfund Site  
Brooklyn, Kings County, New York

### RECORD OF DECISION FACT SHEET EPA REGION II

#### Site

Site name: Gowanus Canal Site  
Site location: Brooklyn, Kings County, New York  
HRS score: 50  
Listed on the NPL: March 2, 2010

#### Record of Decision

Date signed: September 27, 2013  
Selected remedy: Dredging of accumulated sediments, capping, off-Site thermal treatment of dredged nonaqueous phase liquid (NAPL)-impacted sediments in the canal and existing turning basins, in-situ stabilization of native sediments with high levels of NAPL, excavation and restoration of a portion of the filled-in former 1<sup>st</sup> Street and a portion of the 5<sup>th</sup> Street turning basin beginning underneath the 3<sup>rd</sup> Avenue bridge, stabilization of sediments not impacted by NAPL and reuse off-Site, institutional controls and combined sewer overflow controls.

United States Environmental Protection Agency  
Region II  
New York, New York

September 2013



692106

Capital cost: \$285,700,000

Treatment and Disposal cost: \$216,000,000

Annual operation, maintenance,  
and monitoring cost: \$4,400,000

Present-worth cost: \$506,100,000

#### Lead

Primary Contact: Christos Tsiamis, Remedial Project Manager, (212) 637-4257

Secondary Contact: Joel Singerman, Chief, Central New York Remediation Section, (212) 637-4258

Main PRPs National Grid and New York City

#### Waste

Waste type: PAHs, PCBs and heavy metals, including mercury, lead and copper

Waste origin: Spills/disposal

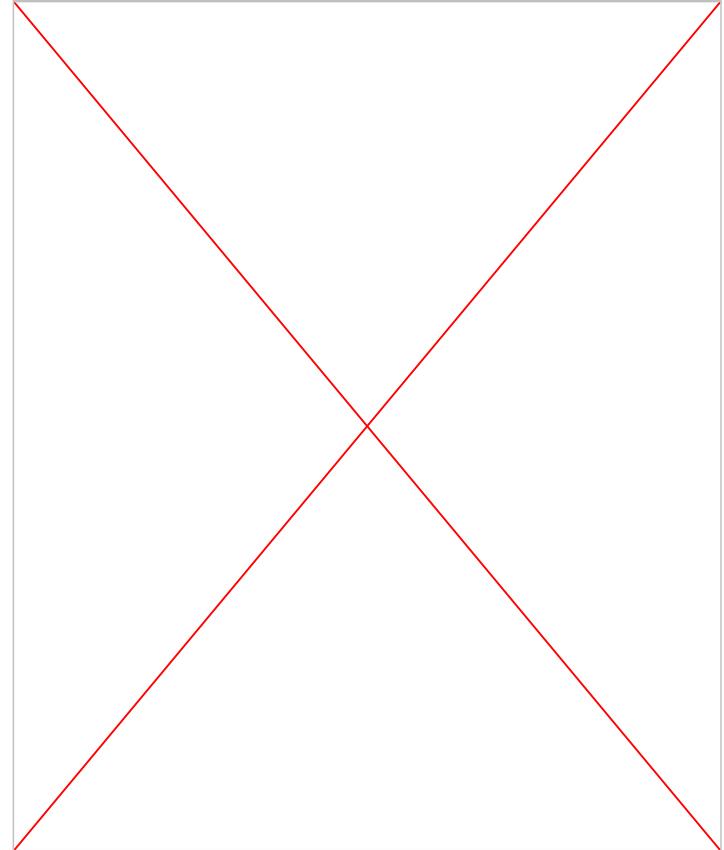
Contaminated media: Sediments

## PRPs (Potentially Responsible Parties)

### Gowanus Canal Superfund Site Potentially Responsible Party (PRP) Search Status - January 2013

As of January 2013, EPA has sent notices of potential liability to thirty-one companies, New York City, the US Navy, the US Postal Service, the US General Services Administration, the US Maritime Administration and the former owner of a company. Those parties were also sent information request letters. Seventy-three other companies have been sent information request letters as well. The recipients of each type of letter are listed below.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 2	
IN THE MATTER OF THE GOWANUS CANAL SUPERFUND SITE	X
Beam, Inc.	
Beezer, Inc.	
Brak's, Inc.	
Brooklyn Union Gas Co. d/b/a National Grid New York	
CBS Corp.	
Citigroup	
Consolidated Edison Co. of New York, Inc.	
Dan and Bradstreet Corp.	
ExxonMobil Oil Corp.	
Hancock Manufacturing Co.	
Hess Corp.	
Honeywell International Inc.	
Kraft Foods Global, Inc.	
MCGraw-Hill Financial	
Fifteen Second Avenue LLC	
36 2nd J Corp.	
107 Second Avenue LLC	
MRC Holdings, Inc.	
NL Industries, Inc.	
Northville Industries Corp.	
Patterson-Phelps Oil Co., Inc.	
Phillips 66 Co.	
Puget Sound Commerce Center, Inc.	
Russell Beverage Can Co.	
SPPX Corp.	
Stauffer Manufacturing Company, LLC	
TDA Resources, Inc.	
The Brooklyn Improvement Co.	
The Union Company of California	
Verizon New York Inc.	
Respondents	
Proceeding under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a).	
X	



## 5. REMEDIAL DESIGN

2013

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 2	X
IN THE MATTER OF THE GOWANUS CANAL SUPERFUND SITE	:
Beam, Inc.	:
Beazer East, Inc.	:
Brink's Inc.	:
Brooklyn Union Gas Co. d/b/a National Grid New York	:
CBS Corp.	:
Citigroup, Inc.	:
Consolidated Edison Co. of New York, Inc.	:
Dun and Bradstreet Corp.	:
ExxonMobil Oil Corp.	:
Hauke Manufacturing Co.	:
Hess Corp.	:
Honeywell International Inc.	:
Kraft Foods Global, Inc.	:
MCI2 Corp. and	:
Fifteen Second Avenue LLC	:
36-2nd-J Corp.	:
107 Sixth Street LLC	:
MRC Holdings, Inc.	:
NL Industries, Inc.	:
Northville Industries Corp.	:
Patterson Fuel Oil Co., Inc.	:
Phillips 66 Co.	:
Puget Sound Commerce Center, Inc.	:
Rexam Beverage Can Co.	:
SPX Corp.	:
Stauffer Management Company, LLC	:
TDA Industries, Inc.	:
The Brooklyn Improvement Co.	:
The Union Oil Company of California	:
Verizon New York Inc.	:
Respondents.	:
Proceeding under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a).	X

2020

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2

IN THE MATTER OF THE GOWANUS CANAL SUPERFUND SITE	X
Brooklyn Union Gas Co. d/b/a National Grid New York	:
City of New York	:
Consolidated Edison Co. of New York, Inc.	:
Hess Corp.	:
Honeywell International Inc.	:
The Brooklyn Improvement Co.,	:
Respondents.	:
Proceeding under Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. § 9606.	X

586740

**2013**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2IN THE MATTER OF THE  
GOWANUS CANAL SUPERFUND

Beam, Inc.  
 Beazer East, Inc.  
 Brink's Inc.  
 Brooklyn Union Gas Co. d/b/a National Grid  
 CBS Corp.  
 Citigroup, Inc.  
 Consolidated Edison Co. of New York  
 Dun and Bradstreet Corp.  
 ExxonMobil Oil Corp.  
 Hauck Manufacturing Co.  
 Hess Corp.  
 Honeywell International Inc.  
 Kraft Foods Global, Inc.  
 MC1Z Corp. and  
 Fifteen Second Avenue LLC  
 36-2nd-J Corp.  
 107 Sixth Street LLC  
 MRC Holdings, Inc.  
 NL Industries, Inc.  
 Northville Industries Corp.  
 Patterson Fuel Oil Co., Inc.  
 Phillips 66 Co.  
 Puget Sound Commerce Center, Inc.

Rexam Beverage Can Co. :  
 SPX Corp. :  
 Stauffer Management Company, LLC :  
 TDA Industries, Inc. :  
 The Brooklyn Improvement Co. :  
 The Union Oil Company of California :  
 Verizon New York Inc. :

Respondents. :

Proceeding under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a).  
-----X

**2020**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2

IN THE MATTER OF THE -----X

INDEX NO.  
CERCLA-02-2020-2003ADMINISTRATIVE ORDER  
FOR REMEDIAL ACTION

In March and May of 2014, EPA issued unilateral administrative orders (UAOs) to potentially responsible parties (PRPs) to conduct remedial design work associated with cleanup of the Gowanus Canal Superfund Site in Brooklyn, N.Y. The value of design work associated with these orders is \$38 to \$40 million.

On March 21, 2014 EPA issued a UAO to a large group of PRPs, including National Grid, to conduct the remedial design primarily for the dredging portion of the cleanup remedy at the Gowanus Canal Superfund Site. This portion of the remedial design is valued at \$35 million.

On May 28, 2014, EPA issued a UAO to New York City to conduct the remedial design on a portion of the Gowanus Canal, including the siting of the sewage holding tanks. The value of this UAO is \$3 to \$5 million.



586740

**2013**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2

IN THE MATTER OF THE  
GOWANUS CANAL SUPERFUND

Beam, Inc.  
Beazer East, Inc.  
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Phillips 66 Co.  
Puget Sound Commerce Center, Inc.  
Rexam Beverage Can Co.  
SPX Corp.  
Stauffer Management Company, LLC  
TDA Industries, Inc.  
The Brooklyn Improvement Co.  
The Union Oil Company of California  
Verizon New York Inc.

Respondents. . .

Proceeding under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a).

X

**2020**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2

IN THE MATTER OF THE . . . X

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CERCLA-02-2020-2003

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586740



# Gowanus Canal Superfund Site

Kings County, New York

December 2012

## PURPOSE OF THIS PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the Gowanus Canal Superfund site and identifies the preferred remedy with the rationale for this preference. This document was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this document as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the site and the remedial alternatives summarized in this document are described in detail in the January 2011 remedial investigation (RI) report, December 2011 feasibility study (FS) report and December 2012 FS report addendum. EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and EPA's cleanup proposal.

For the upper and mid-reaches of the canal, the preferred remedy consists of dredging the entire column of hazardous substance-contaminated sediments referred to as "soft sediments," which have accumulated above the native sediments, installation of a multilayered cap to prevent the migration of nonaqueous phase liquid (NAPL)<sup>1</sup> from native sediments and in-situ stabilization (ISS<sup>2</sup>) of those native sediments in areas contaminated with high levels of NAPL. For the lower reach of the canal, the preferred remedy consists of dredging the entire soft sediment column and constructing a multi-layered cap. Sediment removal and disposal methods would vary based on the reach or cutaway area location. The NAPL-impacted sediments dredged from the upper and mid-reaches of the canal would be treated through thermal desorption<sup>3</sup> and reused off-site (e.g., landfill cover). The less contaminated sediments dredged from the lower reach of the canal and sediments not impacted by NAPL would be stabilized and reused off-site. It is also technically feasible to place these stabilized sediments in an on-site confined disposal facility (CDF) properly designed to contain them<sup>4</sup> (the CDF will be evaluated based upon community acceptance during the comment period and approval from NYSDDEC and other appropriate governmental regulatory authorities). The preferred remedy would also include the excavation and restoration of the filled-in 1st Street Turning Basin, a former lateral canal extension which contains contaminated fill overlying contaminated sediment. Institutional controls would incorporate the existing fish consumption advisories (modified, as needed) and would include other controls to protect the integrity of the cap and the CDF, if a CDF were constructed.

The estimated present-worth cost of the preferred remedy ranges from \$467 - \$504 million.

To prevent recontamination, the upland sources of hazardous substances, including discharges from three former manufactured gas plants (MGP), combined sewer overflows (CSOs)<sup>5</sup> to the canal, other contaminated areas along the canal and unpermitted pipes along the canal, must be controlled. The former MGP sites are being addressed by National Grid, a potentially responsible party (PRP) for these sites and the federal site, under NYSDEC oversight. Based upon the first NYSDEC-selected remedy at the former MGP sites, actions will be taken to prevent the migration of contamination from the former MGP into the canal. In the unlikely event that a timely and effective State-selected remedy is not implemented at a given former MGP site, EPA may implement actions pursuant to CERCLA to ensure the protectiveness of the preferred remedy.

NYSDEC is currently overseeing work being performed by New York City (NYC) to reduce CSOs to the canal by approximately 94 percent. These reductions will affect only the mid- and lower canal CSO outfalls. To prevent recontamination of the canal, a number of CSO control measures for the upper reach of the canal were evaluated. EPA presumed that in-line storage tanks would be constructed to capture and reduce contaminated sediment from CSO discharges. Controls related to future sewer capacity would be necessary to maintain the effectiveness of the CSO measures. Since it is unlikely that permanent measures to control the CSO discharges would be in place before the commencement of the remediation of the sediments, interim controls may be necessary to mitigate sediment from the CSO discharges until permanent measures can be implemented. In addition, EPA and NYSDEC are coordinating measures to control discharges from other upland contaminated areas adjacent to the canal. Under the preferred remedy, unpermitted pipe outfalls will be either controlled or eliminated.

Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting comment on all of the alternatives considered because EPA may select a remedy other than the preferred remedy.

<sup>1</sup> Concentrated liquid contamination, typically oil-like, that forms a separate phase and does not dissolve in water.

<sup>2</sup> Mixing of materials, such as concrete, into the sediments to bind the contaminants physically/chemically.

<sup>3</sup> Utilization of heat to increase the volatility of contaminants so that they can be removed.

<sup>4</sup> A secure structure designed to contain dredged sediments (in this case after stabilization) within a waterway.

<sup>5</sup> Combined sewers receive both sewage and stormwater flows and discharge to the canal when the sewer system's capacity is exceeded.

2012

5.

# REMEDIAL DESIGN

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The estimated present-worth cost of the preferred remedy ranges from \$467 - \$504 million.

To prevent recontamination, the upland sources of hazardous substances, including discharges from three former manufactured gas plants (MGP), combined sewer overflows (CSOs)<sup>5</sup> to the canal, other contaminated areas along the canal and unpermitted pipes along the canal, must be controlled. The former MGP sites are being addressed by National Grid, a potentially responsible party (PRP) for these sites and the federal site, under NYSDEC oversight. Based upon the first NYSDEC-selected remedy at one of these sites, it is assumed that each would prevent the migration of contamination from the former MGP into the canal. In the unlikely event that a timely and effective State-selected remedy is not implemented at a given former MGP site, EPA may implement actions pursuant to CERCLA to ensure the protectiveness of the preferred remedy.

NYSDEC is currently overseeing work being performed by New York City (NYC) to reduce CSOs to the canal by approximately 34 percent. These reductions, however, affect only the mid- and lower canal CSO outfalls. To prevent recontamination of the canal, a number of CSO control measures for the upper reach of the canal were evaluated. EPA presumed that in-line storage tanks would be constructed to capture and reduce contaminated sediment from CSO discharges. Controls related to future sewer capacity would be necessary to maintain the effectiveness of the CSO measures. Since it is unlikely that permanent measures to control the CSO discharges would be in place before the commencement of the remediation of the sediments, interim controls may be necessary to mitigate sediment from the CSO discharges until permanent measures can be implemented. In addition, EPA and NYSDEC are coordinating measures to control discharges from other upland contaminated areas adjacent to the canal. Under the preferred remedy, unpermitted pipe outfalls will be either controlled or eliminated.

Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting comment on all of the alternatives considered because EPA may select a remedy other than the preferred remedy.

<sup>1</sup> Concentrated liquid contamination, typically oil-like, that forms a separate phase and does not dissolve in water.

<sup>2</sup> Mixing of materials, such as concrete, into the sediments to bind the contaminants physically/chemically.

<sup>3</sup> Utilization of heat to increase the volatility of contaminants so that they can be removed.

<sup>4</sup> A secure structure designed to contain dredged sediments (in this case after stabilization) within a waterway.

<sup>5</sup> Combined sewers receive both sewage and stormwater flows and discharge to the canal when the sewer system's capacity is exceeded.



# Gowanus Canal Superfund Site

Kings County, New York

December 2012

## PURPOSE OF THIS PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the Gowanus Canal Superfund site and identifies the preferred remedy with the rationale for this preference. This document was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this document as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the site and the remedial alternatives summarized in this document are described in detail in the January 2011 remedial investigation (RI) report, December 2011 feasibility study (FS) report and December 2012 FS report addendum. EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and EPA's cleanup proposal.

For the upper and mid-reaches of the canal, the preferred remedy consists of dredging the entire column of hazardous substance-contaminated sediments referred to as "soft sediments," which have accumulated above the native sediments, installation of a multilayered cap to prevent the migration of nonaqueous phase liquid (NAPL)<sup>1</sup> from native sediments and in-situ stabilization (ISS<sup>2</sup>) of those native sediments in areas contaminated with high levels of NAPL. For the lower reach of the canal, the preferred remedy consists of dredging the entire soft sediment column and constructing a multi-layered cap. Sediment removal and disposal methods would vary based on the reach or cutaway area location. The NAPL-impacted sediments dredged from the upper and mid-reaches of the canal would be treated through thermal desorption<sup>3</sup> and reused off-site (e.g., landfill cover). The less contaminated sediments dredged from the lower reach of the canal and sediments not impacted by NAPL would be stabilized and reused off-site. It is also technically feasible to place these stabilized sediments in an on-site confined disposal facility (CDF) properly designed to contain them<sup>4</sup> (the CDF will be evaluated based upon community acceptance during the comment period and approval from NYSDDEC and other appropriate governmental regulatory authorities). The preferred remedy would also include the excavation and restoration of the filled-in 1st Street Turning Basin, a former lateral canal extension which contains contaminated fill overlying contaminated sediment. Institutional controls would incorporate the existing fish consumption advisories (modified, as needed) and would include other controls to protect the integrity of the cap and the CDF, if a CDF were constructed.

The estimated present-worth cost of the preferred remedy ranges from \$467 - \$504 million.

To prevent recontamination, the upland sources of hazardous substances, including discharges from three former manufactured gas plants (MGP), combined sewer overflows (CSOs)<sup>5</sup> to the canal, other contaminated areas along the canal and unpermitted pipes along the canal, must be controlled. The former MGP sites are being addressed by National Grid, a potentially responsible party (PRP) for these sites and the federal site, under NYSDEC oversight. Based upon the first NYSDDEC-selected remedy at the former MGP sites, actions will be taken to prevent the migration of contamination from the former MGP into the canal. In the unlikely event that a timely and effective State-selected remedy is not implemented at a given former MGP site, EPA may implement actions pursuant to CERCLA to ensure the protectiveness of the preferred remedy.

NYSDDEC is currently overseeing work being performed by New York City (NYC) to reduce CSOs to the canal by approximately 94 percent. These reductions will affect only the mid- and lower canal CSO outfalls. To prevent recontamination of the canal, a number of CSO control measures for the upper reach of the canal were evaluated. EPA presumed that in-line storage tanks would be constructed to capture and reduce contaminated sediment from CSO discharges. Controls related to future sewer capacity would be necessary to maintain the effectiveness of the CSO measures. Since it is unlikely that permanent measures to control the CSO discharges would be in place before the commencement of the remediation of the sediments, interim controls may be necessary to mitigate sediment from the CSO discharges until permanent measures can be implemented. In addition, EPA and NYSDDEC are coordinating measures to control discharges from other upland contaminated areas adjacent to the canal. Under the preferred remedy, unpermitted pipe outfalls will be either controlled or eliminated.

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2012

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# REMEDIAL DESIGN

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For the upper and mid-reaches of the canal, the preferred remedy consists of dredging the entire column of hazardous substance-contaminated sediments referred to as "soft sediments," which have accumulated above the native sediments, installation of a multilayered cap to prevent the migration of nonaqueous phase liquid (NAPL)<sup>1</sup> from native sediments and in-situ stabilization (ISS<sup>2</sup>) of those native sediments in areas contaminated with high levels of NAPL. For the lower reach of the canal, the preferred remedy consists of dredging the entire soft sediment column and constructing a multi-layered cap. Sediment treatment and disposal methods would vary based on the reach and contaminant levels. The NAPL-impacted sediments dredged from the upper and mid-reaches of the canal would be treated through thermal desorption<sup>3</sup> and reused off-site (e.g., landfill cover). The less contaminated sediments dredged from the lower reach of the canal and sediments not impacted by NAPL would be stabilized and reused off-site. It is also technically feasible to place these stabilized sediments in an on-site confined disposal facility (CDF) properly designed to contain them<sup>4</sup> (the CDF will be evaluated based upon community acceptance during the comment period and approval from NYSDDEC and other appropriate governmental regulatory authorities). The preferred remedy would also include the excavation and restoration of the filled-in 1st Street Turning Basin, a former lateral canal extension which contains contaminated fill overlying contaminated sediment. Institutional controls would incorporate the existing fish consumption advisories (modified, as needed) and would include other controls to protect the integrity of the cap and the CDF, if a CDF were constructed.

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OPINIONS ♦ GOWANUS

## The Gowanus Canal will never be clean

New development will ensure the canal maintains its reputation as "The Lavender Lake" far into the future.

January 17, 2020 Joseph Alexiou

There is a troubling pattern to the civic efforts to fix the canal across history: The city identifies a water movement or flooding problem, orders an engineer to design a fix and then balks at the price, using whatever excuse there may be — war, an election or a fiscal crisis. Then they find an engineer or someone less qualified to do the job for cheaper and with less work, which is exactly what gets executed. After the job is done, within a decade but usually less, it becomes clear that the fix is ineffective and often makes the problem worse. Those responsible then throw up their hands and back away quietly, hoping that the next generation of decisionmakers will fix it.