PROPOSED REMEDIAL ACTION PLAN

Newland Island/Lock 4
Dredge Spoil Disposal Area

Town of Schaghticoke - Rensselaer County - New York

Site No. 442033

August 2009

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

Printed 2009-08-31

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Newland Island/Lock 4 Dredge Spoil Disposal Area (Newland Island). The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the placement and stockpiling of pre-2002 dredge spoil material associated with routine maintenance dredging operations of the New York State Champlain Canal/Hudson River navigation channel between Canal Lock 4 (near Stillwater, NY) and Canal Lock 3 (near Mechanicville, NY), have resulted in the disposal of hazardous wastes, including polychlorinated biphenyls (PCBs) and metals. These wastes, sporadically entrained within the sediment of the Hudson River and subsequently removed with some of the sediment from the Champlain Canal/Hudson River navigation channel as dredge spoil material in the past, have contaminated the surface soil, subsurface soil, and groundwater at the site, and have resulted in:

- a significant threat to human health associated with the potential for exposure to PCBs through direct contact with PCB-contaminated dredge spoil material/soil present at the surface or that may be encountered in the subsurface during any excavation activities.

- a significant environmental threat associated with the potential for contaminants to impact terrestrial plants, invertebrates in soil, and wildlife, such as the American robin and short-tailed shrew. Metals (cobalt, copper, lead, mercury, and zinc) in soil are the risk drivers (chemicals or substances of concern that present the greatest potential risk) for plants and invertebrates, while PCBs in soil are the risk drivers for other wildlife.

To eliminate or mitigate these threats, the Department proposes to cover the contaminated dredge spoil areas, divert/enhance drainage in one area of the site, monitor groundwater conditions, and apply an environmental easement with periodic certification.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Hereafter, these Standards, Criteria and Guidance are represented by the acronym SCG.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the August 2009 "Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area" (RI), the August 2009 "Feasibility Study for the Newland Island Dredge Spoil Disposal Area" (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Town of Schaghticoke Clerk's Office
Schaghticoke Town Hall
290 Northline Drive
Melrose, New York 12121
(518) 753-6915 extension 101
Review by appointment:
  9:00 AM to 4:30 PM - Monday through Friday
  extended hours Thursday - 8:30 AM to 5:30 PM
Contact: Town Clerk Janet Salisbury

Arvilla E. Diver Memorial Library
136 Main Street
Schaghticoke, New York 12154
(518) 753-4344
Open hours:
  2:00 PM to 7:00 PM - Monday and Wednesday
  1:00 PM to 8:00 PM - Tuesday and Thursday
  9:00 AM to 1:00 PM - Saturday
Contact: Suzette Cyr - Librarian

Town of Stillwater Clerk's Office
Stillwater Town Hall
66 East Street - Riverside
Mechanicville, New York 12118
(518) 664-6148 extension 206
Review by appointment:
  8:00 AM to 4:00 PM - Monday through Friday
Contact: Town Clerk Sue Cunningham

Stillwater Free Library
74 Hudson Avenue (State Routes 4 and 32)
Stillwater, New York 12170
(518) 664-6255
Open hours:
  10:00 AM to 7:00 PM - Tuesday through Friday
  10:00 AM to 2:00 PM - Saturday
Contact: Sara Kipp - Librarian

NYSDEC Central Office
625 Broadway
Albany, New York 12233
(518) 402-9676
Review by appointment:
  8:30 AM to 4:00 PM - Monday through Friday
Contact: William Shaw

Newland Island Project Manager:
William Shaw
NYSDEC
Division of Environmental Remediation
Remedial Bureau D - Hudson River Unit - 12th Floor Southwest
625 Broadway / Albany, New York 12233-7013

The Department seeks input from the community on all PRAPs. A public comment period has been set from August 26, 2009 to September 28, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for September 1, 2009 at the Stillwater Central School Auditorium located at 334 North Hudson Avenue (Routes 4 and 32) in Stillwater, New York, beginning at 7:00 PM. The Department will also hold a public availability session for this project between 3:00 PM and 5:00 PM on September 1st at the same location.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. William Shaw at the above address through September 28, 2009.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Newland Island/Lock 4 Dredge Spoil Disposal Area site is located along the southern and eastern margins of Newland Island in the Town of Schaghticoke (Rensselaer County), just south of Champlain Canal Lock 4 and near the confluence of the Hoosic River with the Hudson River and the navigation channel of the Champlain Canal (Figure 1). The site consists of a series of large basins and earthen containment berms built by the Waterways Maintenance Division of the New York State Department of Transportation (NYSDOT) to hold sediment removed from the Champlain Canal/Hudson River navigation channel between Canal Lock 4 and Canal Lock 3 - with emphasis on the navigation channel in the Hudson River near Canal Lock 4 and the mouth of the Hoosic River - in conjunction with routine maintenance dredging operations of the Canal System. The unlined settling basins at this site were excavated down to shale bedrock during initial construction and the displaced soils and shale debris were graded outward and upward to form the various containment berms. During subsequent maintenance operations, it is likely that some of the older dredge spoil materials were re-graded in order to deepen a basin and accommodate the disposal of additional dredge spoil materials. The basin and berm system at this site is between 100 and 500 feet wide and extends about 1,800 feet along the southeastern side of the island with a foot-print covering nearly 12.1 acres on the 28.6 acre parcel owned by New York State (Figure 2). The remainder of the State-owned parcel is undeveloped and unoccupied. The adjoining property on the lower island is privately owned and is occupied by two dwellings, equine stables, equine riding facilities, and several small service structures. There are a pair of private wells on this part of the island that draw water from the bedrock aquifer. The wells are approximately 875 feet away from the northern portion of the site and approximately 1,680 feet away from the southern portion of the site.

The Hudson River and the Champlain Canal surrounding Newland Island are part of the United States Environmental Protection Agency's (EPA's) Hudson River PCBs Superfund Site as listed on the National Priority List (NPL) and listed in the Department's "Registry of Inactive Hazardous Waste Disposal Sites in New York State" under site number 546031 with a Class 2 designation (a site where hazardous waste disposal has been confirmed and presents a significant threat to public health and/or the environment - action is required). PCBs, from two upstream General Electric plant site sources, are the main contaminants of concern for this NPL site. These wastes, sporadically entrained within the sediment of the Hudson River and subsequently removed with some of the sediment from the Champlain Canal/Hudson River navigation channel as dredge spoil material in the past, have contaminated the surface soil, subsurface soil, and groundwater at the Newland Island site.

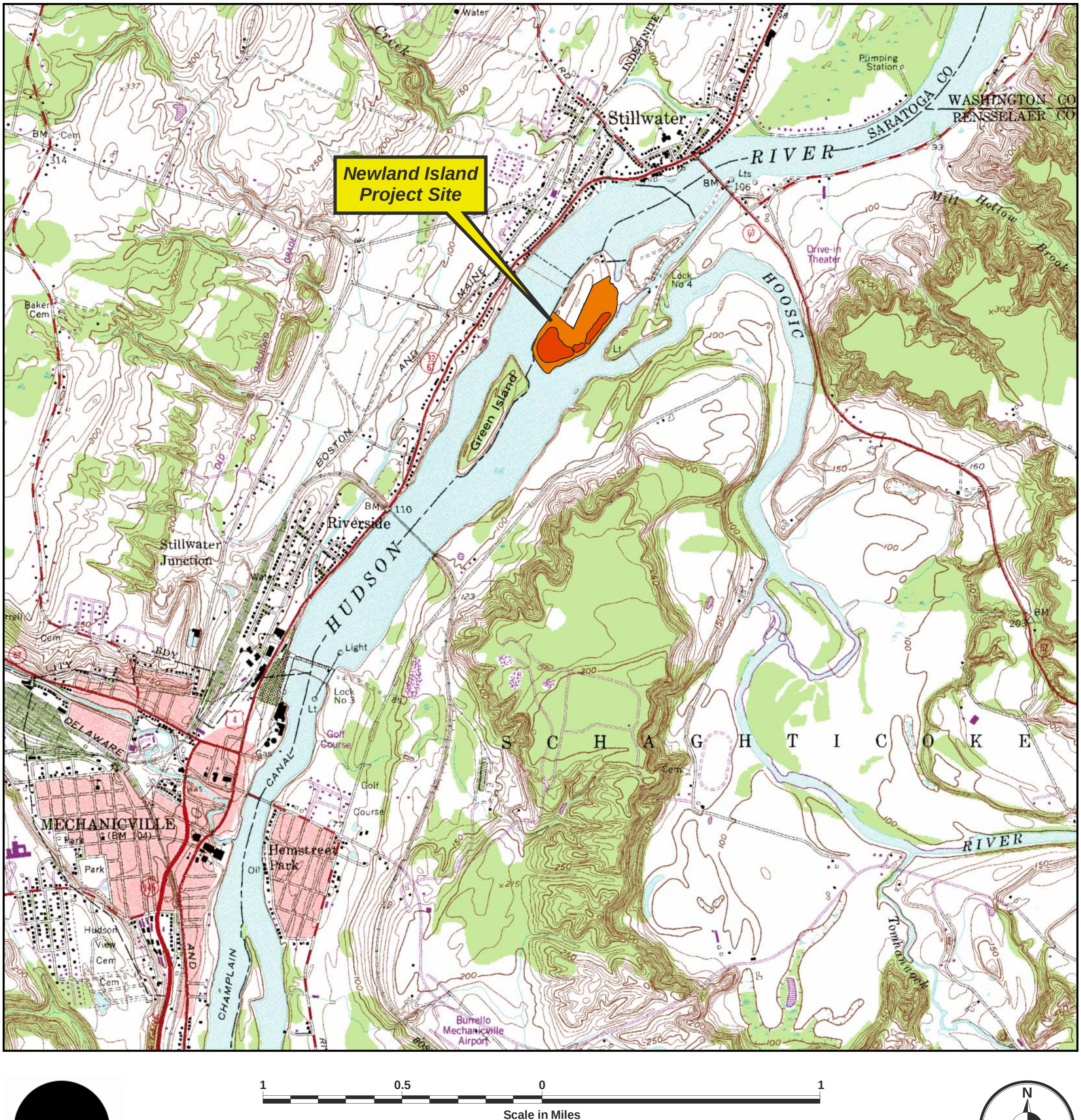
The geologic setting for the Newland Island site has a varied mixture of shale fragments, sands, and clays that were placed over bedrock by natural processes a long time ago - and a varied mixture of cobbles, pebbles, shale fragments, brick fragments, coal fragments, fused slag, glass shards, sands, silts, and clays that were placed over bedrock by unnatural processes a relatively short time ago.

The overburden materials in the natural setting are located in most areas outside of the basin and berm system at the site. In a few locations, these native soils were found buried under dredge spoil materials in the basin and berm complex. The overall thickness of these native soils on Newland Island is not known, but where encountered in undisturbed locations around the site, the thicknesses varied from a few inches to about five feet. The thickness of these native soils where observed in the basins, varied up to two feet.

The overburden materials in the unnatural setting are best described as mechanically reworked native soil and bedrock mixed with dredge spoil materials in the basin and berm complex. The older, pre-2002 dredge

Figure 1 - Location Map

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009



Excerpt from the Mechanicville Quadrangle
7.5 Minute Topographic Series Map
published by the U.S. Geological Survey
in 1954 and photo-revised in 1980.

Figure 2 - Site Details

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009

spoils are typically dark gray to black, fine to medium sands with varying amounts of silt and black shale fragments. The more recent dredge spoil materials characterized as light gray to medium brownish-gray, coarse to fine sand with varying amounts of gravel. Based on observations made during borehole drilling and sampling, materials that could be characterized as pre-2002 dredge spoils varied in thickness from a few inches to nearly 10 feet within the southern basin and were up 27 feet thick in parts of the surrounding berm; varied in thickness from a few inches to nearly four feet within the central basin and were up to 14 feet thick in part of that berm; and varied in thickness from a few inches to nearly eight and one-half feet within the northern basin and were up to seven feet thick in part of that berm structure.

Bedrock at this site is a dark gray to grayish-black, variably calcareous shale that is sometimes finely laminated with very fine sand. This shale is rather friable and weathers to slightly lighter colors.

Groundwater flow throughout the year mimics the topography of the site and moves radially away from the topographic ridge in the central part of the island. This results in groundwater flowing southeast, southwest, and northwest, depending on the point of reference on the island. Overall groundwater flow is either toward the Hudson River or the Champlain Canal. Based on groundwater elevation measurements and other observations made during the RI, groundwater appears to flow either within the weathered shale bedrock below the overburden and older dredge spoil materials at the site, or along the bedrock surface in the overburden.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

As described in Section 2, three unlined settling basins were constructed at this site by the Waterways Maintenance Division of the NYSDOT and were used to hold dredge spoil material removed from the Champlain Canal/Hudson River navigation channel between Canal Lock 4 and Canal Lock 3 in conjunction with routine maintenance dredging operations of the Canal System. Available NYSDOT records report that the Newland Island dredge spoil disposal area, known in the past as the Lock 4 site, was used between 1952 and 1984. The records covering the 1970s and forward also report the disposal of dredge spoil material at this site totaling 135,450 cubic yards, 23,960 cubic yards, 21,470 cubic yards, and 44,509 cubic yards for the years 1971, 1977, 1981, and 1984 respectively. At the time of these disposals, the Newland Island site was controlled and operated by the NYSDOT. PCBs were found in shallow surface soil samples collected within the basin complex in 1989 by the NYSDOT while they prepared the site for the disposal of additional dredge spoil material that year. As a result, NYSDOT abandoned plans to use the site in 1989. As described earlier, PCB contamination at the Newland Island site is attributable to the presence of PCB wastes (from activities at two upstream General Electric plant site sources) in some Hudson River sediments that were removed from the Champlain Canal/Hudson River navigation channel as dredge spoil material.

State legislation enacted in 1992 transferred the responsibility for all Canal System operations and properties from the Department of Transportation to the New York State Canal Corporation, a subsidiary of the New York State Thruway Authority. A subsequent navigational dredging operation completed by the Canal Corporation in 1996, resulted in the disposal of another 35,974 cubic yards of dredge spoil material at this site in the southern basin. These 1996 dredge spoil materials were mingled with the earlier spoils. In 2002, the Canal Corporation modified and improved the southern basin to stage approximately 25,000 cubic yards of dredge spoil material (characterized as sand and gravel) that was removed from the navigation channel near the mouth of the Hoosic River. Prior to removal, environmental sampling verified that the sediments targeted for removal in 2002 did not contain any PCBs. As a result, the 2002 dredge spoil materials were segregated from the previous dredge spoil materials by a layer of geo-textile fabric as a marker making it possible to remove the later materials for reuse under an established beneficial use determination (BUD) from the Department. In 2006-2007, the Canal Corporation removed nearly 115,000 cubic yards of additional sand and gravel sediment during more navigational dredging near the mouth of the Hoosic and mingled them with the 2002 dredge materials (Figure 3). Again, environmental sampling done prior to removal verified that the targeted sediments did not contain any PCBs. Regardless of this, the mixing of

Figure 3
Dewatering Activities – Southern Basin – 2006 to 2007
Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009

Images Captured from Microsoft Virtual Earth (2008-12-29)
Photographs from the Spring of 2007

the 2006-2007 and 2002 dredge spoil materials nullified the earlier BUD. Use of Newland Island to stage additional sediment removed from the navigation channel near the mouth of the Hoosic River is expected to continue into the future as sediments from the Hoosic River continue to impact the canal system. Based on recent conditions, the need for channel maintenance dredging operations near the mouth of the Hoosic River occurs every four to six years.

3.2: Remedial History

During an assessment of areas with possible PCB contamination in the Upper Hudson River Valley completed by Weston Environmental for the Department in 1978, it was found that the dredge spoil materials disposed of at this site were contaminated with PCBs at levels up to 4,190 ppm. A follow-up assessment completed by Malcolm Pirnie in 1992 for the Department confirmed the presence of PCB contamination at the Newland Island site at levels greater than 50 ppm, the definition of hazardous waste, in 3 of the 26 samples that had reportable PCB detections. PCB concentrations for all samples ranged between non-detect (< 2 ppm) and 290 ppm while the overall average PCB concentration was calculated to be 21 ppm. Based on the results of the Malcolm Pirnie study, it was estimated that the Newland Island site contained 79,700 cubic yards of contaminated soil with a PCB concentration greater than 2 ppm. The mass of PCBs at this site was also estimated to be 4,100 pounds in the Malcolm Pirnie report.

A series of eleven surface soil samples were collected from the basin and berm system and from the adjoining residential property in August of 1998 by the Department. PCBs were detected at a concentration of 1 ppm in one of the eleven surface soil samples - this single sample was on the residential property. Three sediment samples were also collected by the Department - one sample from a swim area possibly used by the residents - two samples from a wetland area between Newland Island and the island peninsula to the north. PCBs were only detected in the two wetland samples with concentrations reported at less than 1 ppm. These findings were included in the Department's "July 2001 Dredge Spoils Investigation Report".

In November of 1998, the Department listed the site as a Class 2 site in the "Registry of Inactive Hazardous Waste Disposal Sites in New York State". A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Additional surface soil samples were collected at the residential property on Newland Island following the release of the "July 2001 Dredge Spoils Investigation Report". Three of the samples were collected to verify the results obtained earlier using field screening test methods. Twenty-three other samples were collected from areas of the property that were of concern to the resident family. All samples were analyzed for PCBs using a certified laboratory test method and all results were reported as non-detect.

In 2005, the Department contracted Ecology & Environment Engineering, P.C. to perform the Newland Island RI/FS to characterize the nature and extent of contamination at the site and to develop remedial alternatives to address that contamination.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include: the New York State Department of Transportation and the General Electric Company. After remedy selection, the Department will evaluate the site history for the consideration of further action against responsible parties regarding compliance with the law and cost recovery as required.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and/or the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between April 2005 and May 2008. The field activities and findings of the investigation are described in the RI report.

The tasks associated with the Newland Island RI included site reconnaissance and a records search; a surface soil sampling program; exploration borehole and well drilling programs with concurrent subsurface soil sampling elements; groundwater monitoring well installation and groundwater sampling programs; surveying and mapping programs; completion of a human health risk evaluation and a screening-level ecological risk assessment; and report preparation.

5.1.1: Standards, Criteria, and Guidance (SCG)

To determine whether the surface soil, subsurface soil, groundwater, and ponded surface water/seeps contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Cleanup Objectives provided in 6 NYCRR Part 375 - "Environmental Remediation Programs" - December 14, 2006.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated. As described in the RI report, many surface soil, subsurface soil, groundwater, and ponded surface water/seep samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are polychlorinated biphenyls (PCBs) and inorganics (metals). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil.

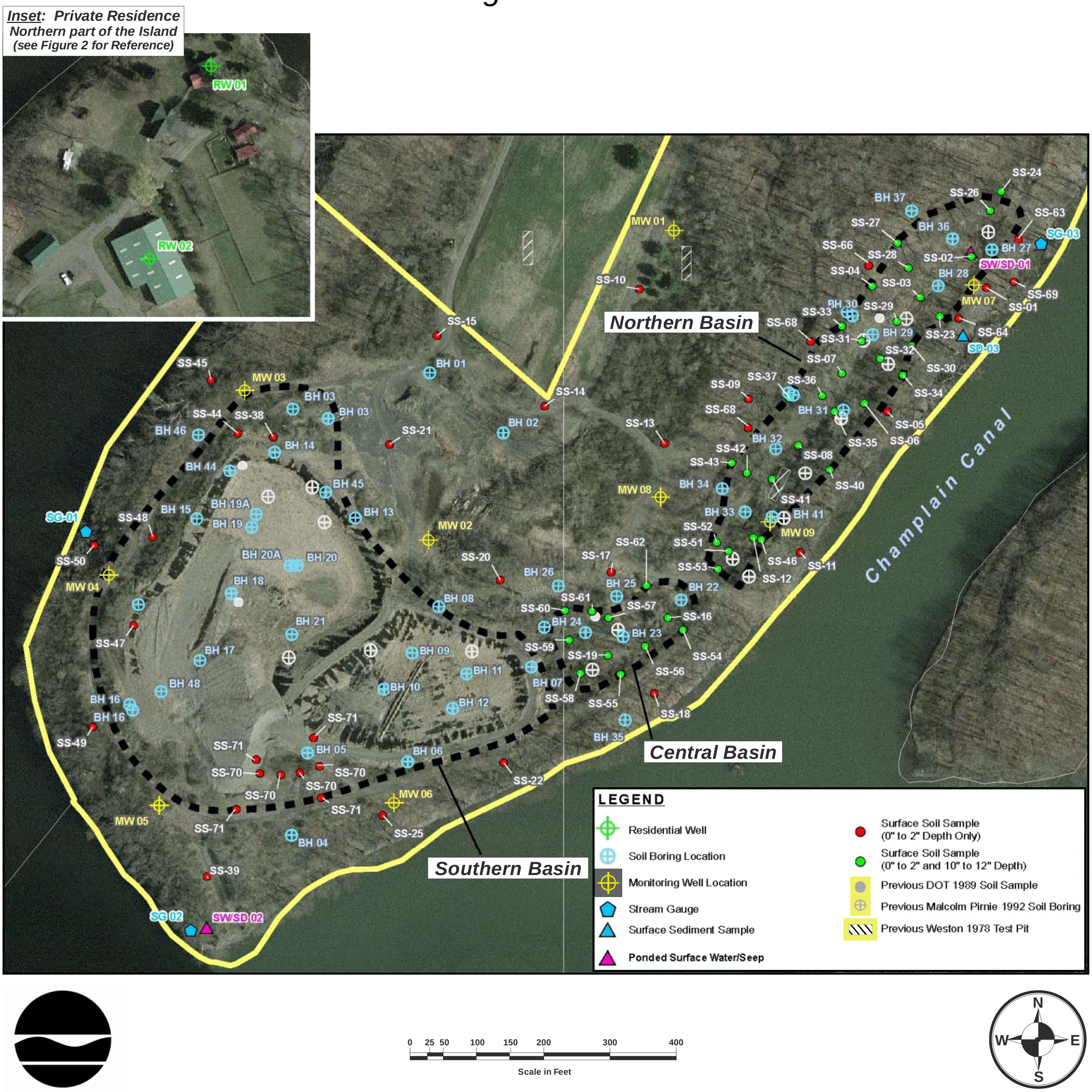
Figure 4 depicts the locations where environmental samples were collected at this site and Table 1 summarizes the degree of contamination for the contaminants of concern in surface soil, subsurface soil, groundwater, and ponded surface water/seeps, and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Dredge spoil materials are the waste materials at the Newland Island site, especially those spoils derived from sediment sporadically tainted with PCBs and metals (cobalt, copper, lead, mercury, and zinc) in the Hudson River and subsequently removed from the Champlain Canal/Hudson River navigation channel in the past. This designation as waste includes only those dredge spoils older than those placed in 2002.

Figure 4
Environmental Sampling Point Locations

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009



Environmental Sampling Point Locations

Excerpt from the August 2009 "Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Environmental sampling verified that the sediments targeted for removal in 2002 and later, did not contain any PCBs. These later dredge spoil materials were also segregated from the earlier, variably contaminated dredge spoil materials to avoid mixing.

The dredge spoil - waste materials (characterized as silt, sand, and gravel) at Newland Island were described and sampled as soil during the course of the RI/FS. Figure 6 depicts the extent of contaminated soil (dredge spoil - waste materials) at this site.

Contaminated dredge spoil material/soil identified during the RI/FS will be addressed in the remedy selection process.

Surface Soil

Surface soil samples (covering the 0 to 2-inch soil depth interval) were collected from 131 locations at this site, including points distributed within each dredge spoil disposal basin, upon each containment berm, and around each basin perimeter. Samples from the surface at each exploration borehole, monitoring well borehole, and ponded surface water/seep sampling point contributed to the overall surface soil assessment. All 131 samples were analyzed for PCBs. Results confirm PCBs at 89 surface soil sampling points with 76 samples reporting concentrations above 0.1 ppm (the unrestricted use Soil Cleanup Objective (SCO)) and 41 samples reporting concentrations above 1.0 ppm (the restricted use - commercial - SCO applicable to this site). The highest PCB concentration in surface soil was 12 ppm. PCBs in soil are the risk drivers for human health and for wildlife.

For the 26 surface soil samples analyzed for cadmium, chromium, lead, and mercury, the respective SCG value for each metal was exceeded 35 to 54 percent of the time. Lead and mercury in soil are two of the risk drivers for plants and invertebrates. Lead exceeded its SCG at 9 locations and mercury exceeded its SCG at 10. For the 8 surface soil samples analyzed for the other 19 metals listed in Table 1, the respective SCG values were exceeded 50 percent of the time or more in only two instances - once for zinc and once for manganese. Zinc in soil is a risk driver for plants and invertebrates and exceeded its SCG at 5 locations.

In summary for surface soil: PCBs exceeded the unrestricted use SCO of 0.1 ppm in 76 of 131 samples; lead exceeded the unrestricted use SCO of 63 ppm in 9 of 26 samples; mercury exceeded the unrestricted use SCO of 0.18 ppm in 10 of 26 samples; and zinc exceeded the unrestricted use SCO of 109 ppm in 5 of 8 samples.

Surface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Subsurface Soil

One hundred and ninety subsurface soil samples (deeper than the 0 to 2-inch soil depth interval) were collected from 99 locations at this site. Sampling locations were distributed within the dredge spoil disposal basins, upon the containment berms, and around the perimeter of the disposal areas at the site. Samples from below grade at each exploration borehole, monitoring well borehole, and hand-advanced sampling point contributed to the overall subsurface soil assessment. All 190 samples were analyzed for PCBs. Results confirm PCBs in 110 subsurface soil samples with 82 samples reporting concentrations above 0.1 ppm and 46 samples reporting concentrations above 1.0 ppm. The highest PCB concentration in the subsurface soil was 43 ppm. The distribution of subsurface soil samples containing PCBs at various depths is illustrated in Figures 6, 7, and 8. PCBs in soil are the risk drivers for human health and for wildlife.

For the 43 subsurface soil samples analyzed for cadmium, chromium, lead, and mercury, the respective SCG value for each metal was exceeded 16 to 35 percent of the time. Lead and mercury in soil are two of the risk drivers for plants and invertebrates. Lead exceeded its SCG in 9 samples and mercury exceeded its SCG in 7. Chromium and cadmium exceeded their respective SCG values in 11 and 15 samples. For the 17 subsurface soil samples analyzed for the other 19 metals listed in Table 1, the respective SCG value for

Figure 5
Map Extent of PCB-Contaminated Soil

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
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0 25 50 100 150 200 300 400

Scale in Feet

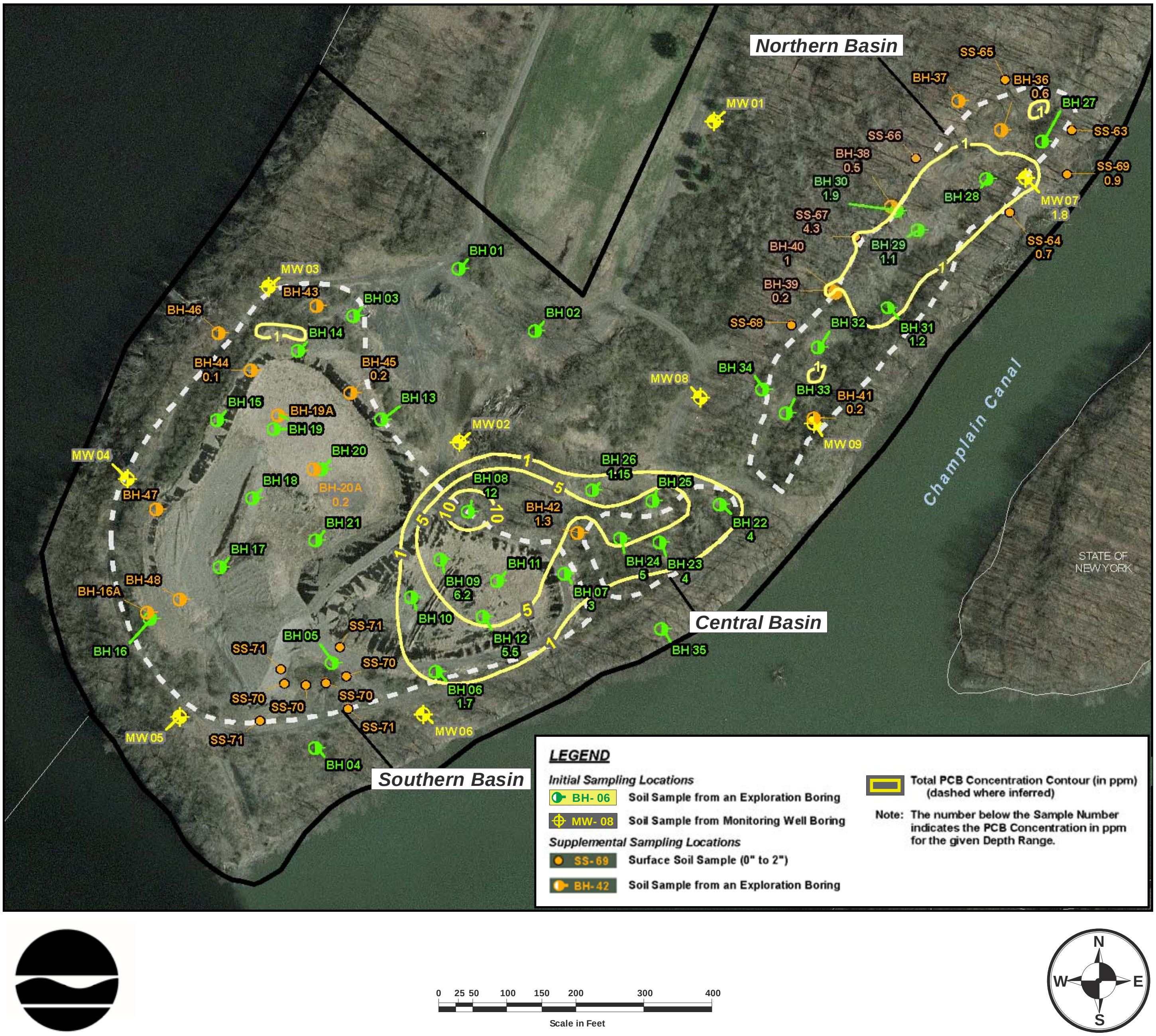
N W E S

Map Extent of PCB-Contaminated Soil (Dredge Spoil – Waste Materials)

Excerpt from the August 2009
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Figure 6
Maximum Total PCB Concentrations in the Soil Depth: Surface to 6-inches below the Surface

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009

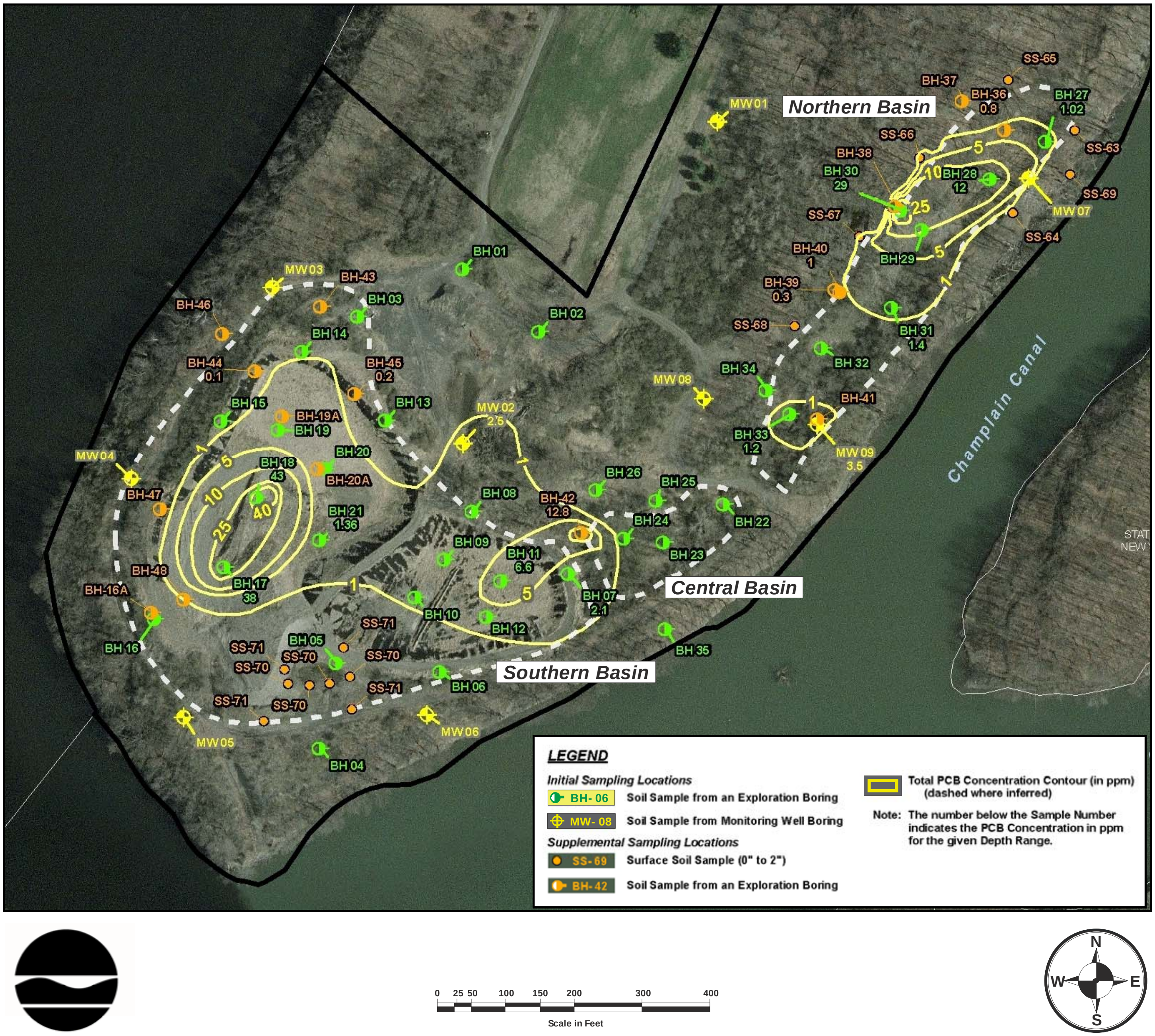


Maximum Total PCB Concentrations in the Soil
Depth: Surface to 6-inches below the Surface

Excerpt from the August 2009
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Figure 7
Maximum Total PCB Concentrations in the Soil
Depth: 6-inches to 8-feet below the Surface

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009



Maximum Total PCB Concentrations in the Soil
Depth: 6-inches to 8-feet below the Surface

Excerpt from the August 2009
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Figure 8
Maximum Total PCB Concentrations in the Soil Depth: Greater than 8-feet below the Surface

Newland Island / Lock 4 Dredge Spoil Disposal Area
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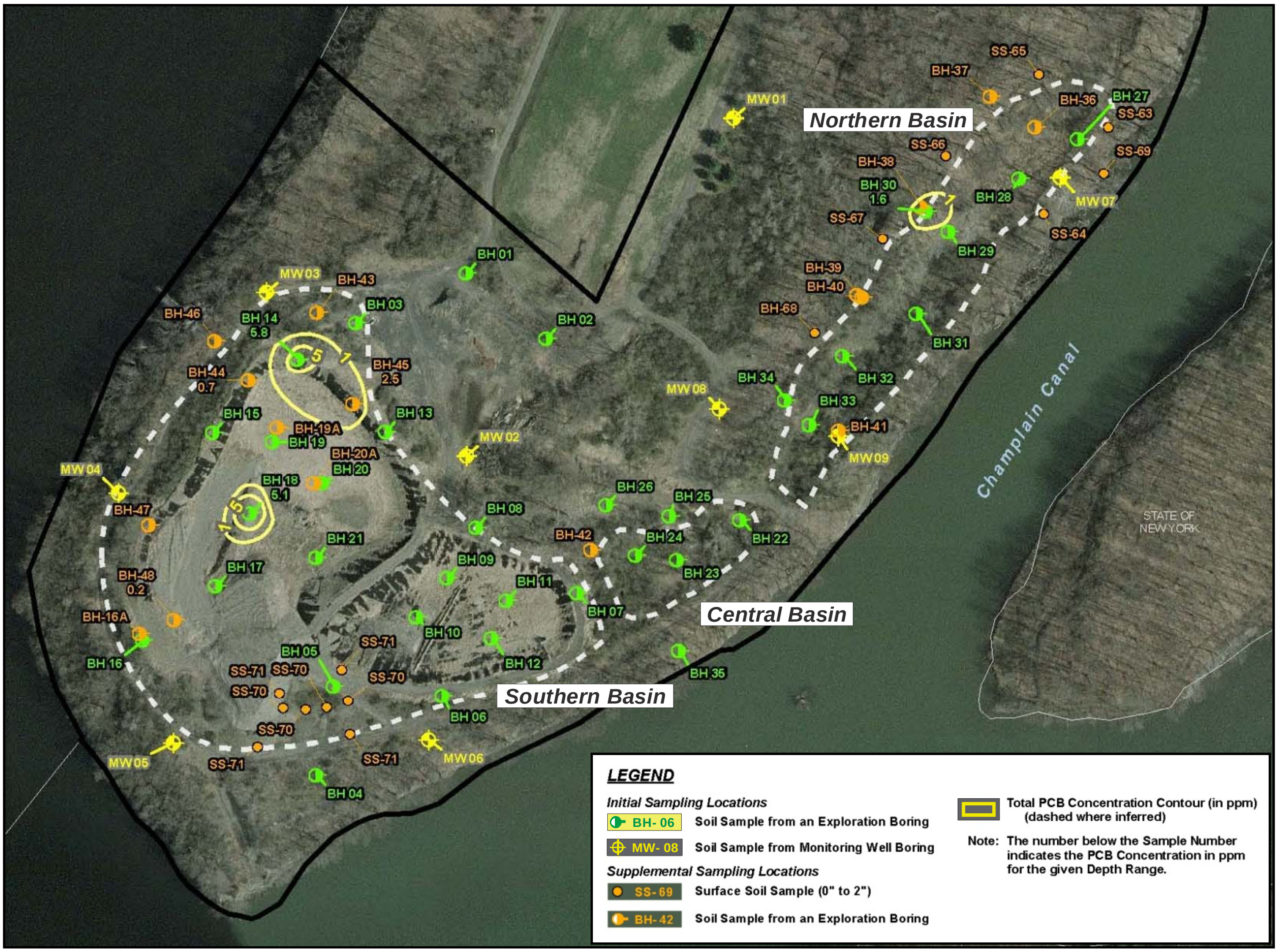


0 25 50 100 150 200 300 400
Scale in Feet

Maximum Total PCB Concentrations in the Soil
Depth: Greater than 8- feet below the Surface

Excerpt from the August 2009
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

each metal was exceeded 50 percent of the time or more in only one instance - manganese. The other risk drivers for plants and invertebrates in soil - cobalt, copper, and zinc, exceeded their respective SCG values in 5, 2, and 3 of the samples collected.

In summary for subsurface soil: PCBs exceeded the unrestricted use SCO of 0.1 ppm in 82 of 190 samples; cadmium exceeded the unrestricted use SCO of 2.5 ppm in 11 of 43 samples; chromium exceeded the unrestricted use SCO of 30 ppm in 15 of 43 samples; lead exceeded the unrestricted use SCO of 63 ppm in 9 of 43 samples; and mercury exceeded the unrestricted use SCO of 0.18 ppm in 7 of 43 samples.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Groundwater

A total of thirty-three groundwater samples were collected from nine shallow groundwater monitoring wells around the site in April, June, September, and December of 2006 (Figure 9). Three monitoring wells (MW-03, MW-07, and MW-09) were dry in September and did not yield a sample. All thirty-three samples were analyzed for PCBs and metals. Results confirm PCBs above the applicable water quality standard of 0.09 ppb in the April and June samples collected from MW-07 at concentrations of 1.45 ppb and 0.31 J ppb (an estimated result) respectively. These findings may reflect sample turbidity and not represent PCBs dissolved in water. The screen of this well is set in dredge spoil material. For metals that may be attributable to contaminated dredge spoil materials, chromium and lead exceeded their respective SCG values in the June sample from MW-06, barium exceeded its SCG value in the April sample from MW-01, and copper exceeded its SCG value in the June sample from MW-03. These findings may also reflect sample turbidity and not represent occurrences where these metals are dissolved in water. Other metals (iron, magnesium, and manganese) that exceeded their respective SCG values in the shallow groundwater monitoring wells around the site appear to represent natural conditions.

A total of six groundwater samples were collected from the two residential wells near the site in April, September, and December of 2006 on dates coincident with the sampling dates for the shallow groundwater monitoring wells around the site. These wells draw water from the bedrock aquifer and do not show any impact attributable to the site. All samples were analyzed for PCBs and metals. No PCBs were detected. Sodium was the only metal to exceed its SCG value at any time, and all three samples that did, were collected from the same well. Sodium is not attributable to the site.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

Surface Water

There are no sustained surface water bodies on this site. When the dredging operations are occurring and sediments are being de-watered in the southern basin, water ponds on the site temporarily, but is not sustained. One area where precipitation collects intermittently was identified in the northern basin and sampled once. One intermittent groundwater seep expression was identified in an area south and outside of the southern basin and sampled once. The location of these sampling points is shown on Figure 4 and the results are provided in Table 1. PCBs were not detected in either sample and the few metals found above the applicable SCG values were inconsequential.

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

Considering there are no sustained surface water bodies on this site, there are no aquatic sediments present on this site. No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediment.

Figure 9
Groundwater Monitoring Results for PCBs
April, June, September, and December of 2006

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009

0 25 50 100 150 200 300 400
Scale in Feet

N W E S

Groundwater Monitoring Results for PCBs – Samples collected in April, June, September, and December of 2006

Excerpt from the August 2009
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Soil Vapor/Air

Taking into account that volatile organic compounds were not associated with the known activities at this site and that previous environmental sampling did not indicate any soil contamination by volatile organic compounds, an evaluation of the soil vapor and indoor air conditions at the site during the RI/FS were not warranted. No site-related soil vapor or indoor air contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for this medium.

5.2: <u>Interim Remedial Measures</u>

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. There were no IRMs performed at this site during the RI/FS.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7 of the RI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five key elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Workers may come in contact with contaminated dredge spoil materials previously removed from the Hudson River and Champlain Canal that contained PCBs and metals. Exposure to these contaminants in the impacted dredge spoil material/soil can occur through prolonged direct contact, incidental ingestion, and the inhalation of airborne dust. Surface soils collected from the private residential property on the Island did not reveal impacts or the presence of any contaminated dredge spoil materials on the property.

Shallow groundwater in one monitoring well at the site was found to contain PCBs. The screen of this well is set in dredge spoil material. Two shallow groundwater monitoring wells at the perimeter of the southern basin contain metals that may be attributable to dredge spoil contamination. Other metals, such as iron and manganese, were found in several shallow groundwater monitoring wells around the site and appear to represent natural conditions. Groundwater is not used at the site; therefore, there are no current exposures to the contamination identified in the shallow groundwater. Two residential wells near the site that draw water from the bedrock aquifer have been sampled and do not show any impact attributable to the site.

5.4: <u>Summary of Environmental Assessment</u>

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Screening Level Ecological Risk Assessment, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. This assessment is limited to terrestrial habitats that are on the Newland Island and does not include the nearby Hudson River, Hoosic River, or Champlain Canal. The Hudson River and the portions of the Champlain Canal that are within it, are being addressed by the EPA Hudson River PCBs Superfund Site remedial program.

The following environmental exposure pathways and ecological risks have been identified:

- The results of phytotoxicity screening for metals in soil at this site confirm that cobalt exceeded the 13 ppm benchmark in 6 of 16 samples up to 17.5 ppm, copper exceeded the benchmark of 60 ppm in 5 of 16 samples up to 85.1 ppm, lead exceeded the benchmark of 120 ppm in 14 of 43 samples up to 332 ppm, mercury exceeded the benchmark of 0.3 ppm in 16 of 43 samples up to 2 ppm, and zinc exceeded the benchmark of 50 ppm in 15 of 16 samples up to 621 ppm. Considering this distribution, these metals in soil may pose a risk to terrestrial plant communities at the site.

- The results of fauna screening for metals in soil at this site confirm that copper exceeded the 50 ppm benchmark in 7 of 16 samples up to 85.1 ppm, mercury exceeded the benchmark of 0.1 ppm in 28 of 43 samples up to 2 ppm, and zinc exceeded the benchmark of 200 ppm in 8 of 16 samples up to 621 ppm. Considering this distribution, these metals in soil may pose a risk to invertebrates at the site.

- Based on food-chain modeling results, total PCBs in soil are likely to pose a risk to song birds, such as the American robin, and small mammals, such as the short-tailed shrew, that feed extensively on invertebrates in soil. Risks to carnivorous birds and mammals are minimal.

Although current levels of PCBs and metals (cobalt, copper, lead, mercury, and zinc) in soil may pose a risk to some groups of ecological receptors, the primary stressor to ecological receptors at the site is most likely the physical disturbance caused by placement, de-watering, and mechanical redistribution of spoil materials.

Environmental contamination at this site may pose a risk to some communities of terrestrial plants, some invertebrates in soil, and some wildlife species that use the site. Site contamination has impacted the groundwater resource in the shallow overburden aquifer at four locations, though the findings may reflect sample turbidity and not be representative of contamination dissolved in water. Residential wells near the site that draw water from the bedrock aquifer have been sampled and do not show any impact attributable to the site.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to PCB-contaminated dredge spoil material/soil present at the surface or that may be disturbed in the subsurface during any excavation activities - through the potential exposure pathway of direct contact;

- environmental exposures of flora or fauna to PCBs and metals (cobalt, copper, lead, mercury, and zinc) in dredge spoil material/soil - through the potential exposure pathways of direct contact and/or ingestion; and

- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards and
- Soil Cleanup Objectives for PCBs, cobalt, copper, lead, mercury, and zinc.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Newland Island/Lock 4 Dredge Spoil Disposal Area were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated dredge spoil material, surface soil, subsurface soil, and groundwater at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a basis for comparison. It provides for the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

The alternative would be acceptable only if it is demonstrated that the contamination at the site is below the applicable remedial action objectives, or that natural processes will reduce the contamination to acceptable levels. This alternative does not include remedial action, institutional or engineering controls, or long-term monitoring.

Alternative 2: Institutional Controls and Monitoring

Present Worth: *$66,000*
Capital Cost: *$13,000*
Annual Costs:
(Years 1-5): *$3,200*
(Years 5-30): *$3,200*

This alternative would implement an environmental easement on the property to limit the potential for human exposure to contaminated dredge spoil material/soil. This institutional control would specify limits relative to the use and development of the property, and require a site management plan to control activities at the site to minimize the potential for creating additional exposure pathways to site contamination. These institutional controls would take less than one year to implement.

Another element of this alternative involves a program to monitor the existing groundwater wells located along the Hudson River and Champlain Canal to verify that PCBs are not moving into these waters from the site. The existing series of nine groundwater monitoring wells would be sampled once, five years following the implementation of the remedy, and the results would be evaluated to determine if any modifications to the remedy or monitoring program are warranted.

Alternative 3: Excavation and Off-Site Treatment by High Temperature Thermal Desorption

Present Worth: *$42,500,000*
Capital Cost: *$42,500,000*
Annual Costs:
(Years 1-5): *$0*
(Years 5-30): *$0*

This alternative would address the PCB-contaminated dredge spoil material/soil at the site by excavation and treatment and remove the potential for human and ecological receptor exposures and impacts. In this alternative, excavated dredge spoil material/soil would be transported to an off-site High Temperature Thermal Desorption (HTTD) facility for treatment, and the remediated soils would not be returned to the site. The extent of the proposed excavation for this alternative would involve the handling of approximately 128,000 cubic yards of contaminated material.

PCB-contaminated dredge spoil materials/soils are nearly 27 feet thick in places and excavation would readily be accomplished using conventional construction equipment. PCB field screening tests would be used to establish final excavation limits out to 1 ppm. De-watering of excavated dredge spoil material/soil may be necessary in the northwest portion of the northern disposal basin if groundwater levels are higher than 90 feet above mean sea level in this area at the time of excavation. If needed, de-watering activities would be limited in duration and scope, and the water would be treated before being released to the environment under appropriate discharge limits.

Newland Island can be accessed either by land or water. The single access road is unimproved and involves crossing a narrow earthen causeway leading onto the island. The integrity of the access road and its ability to handle heavy construction and transport equipment on a routine basis is unknown. Further study would be required to determine the extent of improvements necessary for the road to handle the type and volume of truck traffic associated with this alternative. Access by water would only require the construction of a temporary loading dock and possibly some mooring structures along the margin of the Canal navigation channel next to the island. Based on access requirements and the ease of implementation, site access by water would provide the greatest benefit and was assumed in the development of this alternative.

Excavated material would be loaded into lined and covered roll-off type containers, that subsequently would be loaded onto barges using a crane located on a temporary crane platform/loading dock installed along the east side of the island. The barges would then be transported to the Port of Albany. Once at the port, the roll-off containers would be loaded onto roll-off trucks (provided by a transportation company), and transported to the nearest HTTD treatment facility that can accept contaminated dredge spoil materials/soils from this site.

Considering that up to 5 feet of backfill would be needed to restore grade in some portions of the site following removal excavations, it was assumed for this alternative that clean materials would be imported to the site by 1,000 ton capacity hopper barges from the Port of Albany, and that the laden hopper barges would be unloaded at the site using the crane system established at the site already.

Since all of the contaminated dredge spoil materials/soils would be removed from this site under this alternative, no institutional controls, monitoring program, or maintenance activities are necessary.

Alternative 4: Excavation and Off-Site Disposal

Present Worth: *$46,100,000*
Capital Cost: *$46,100,000*
Annual Costs:
(Years 1-5): *$0*
(Years 5-30): *$0*

This alternative would address the PCB-contaminated dredge spoil material/soil at the site by excavation and off-site disposal and remove the potential for human and ecological receptor exposures and impacts. In this alternative, excavated dredge spoil material/soil would be stockpiled, characterized, and transported to an appropriate disposal facility. Based on recent sampling, contaminated soils proposed for excavation and removal using this alternative do not contain PCBs greater than 50 ppm and, under NYS regulations, would be considered a non-hazardous waste and qualify for disposal in a permitted Department-approved, non-hazardous/solid waste landfill. The extent of the proposed excavation for this alternative would involve the handling of approximately 128,000 cubic yards of contaminated material.

Excavation, confirmation sampling, de-watering, and transportation of the contaminated dredge spoil materials/soils would be accomplished as described in Alternative 3. Excavated soils would be stockpiled in plastic-lined areas at the site for characterization as required by the disposal facility. Once approved for disposal, the contaminated material would be loaded for transport to the Port of Albany. This alternative assumes that the contaminated material would be transported in lined and covered roll-off type containers from the port to the disposal facility by truck. The requirements for backfill/site restoration and the methods to fulfill these requirements, would be the same as those described for Alternative 3.

Since all of the contaminated dredge spoil materials/soils would be removed from this site under this alternative, no institutional controls, monitoring program, or maintenance activities are necessary.

Alternative 5: Excavation and On-Site Disposal

Present Worth: *$18,900,000*
Capital Cost: *$15,900,000*
Annual Costs:
(Years 1-5): *$18,000*
(Years 5-30): *$18,000*

This alternative would address the PCB-contaminated dredge spoil material/soil at the site by excavation and disposal at a newly constructed, Department-approved and permitted, non-hazardous/solid waste landfill at the Newland Island site. The new lined landfill would be constructed, operated, and maintained in accordance with 6 NYCRR Part 360 requirements. Based on recent sampling, contaminated soils proposed for excavation and disposal using this alternative do not contain PCBs greater than 50 ppm and, under NYS regulations, would be considered a non-hazardous waste and qualify for disposal in the new non-hazardous/solid waste landfill. Institutional controls would also be established using this alternative to protect and monitor the integrity of the landfill.

The proposed landfill would be roughly in the central part of the island between the private parcel and the northern disposal basin. This location was selected because it is large enough to contain the contaminated dredge spoils/soils and because the current elevation of the ground surface is sufficient to keep the landfill materials above the local groundwater table. The proposed landfill dimensions would be calculated to hold approximately 128,000 cubic yards of contaminated material and approximately 20 % more to allow for the use of clean soil as daily cover during construction, a requirement in 6 NYCRR Part 360. Daily cover materials would come from the stockpile of clean soil excavated from the landfill footprint. The approximate dimensions of the proposed landfill at the ground surface (including cutback) would be 730 feet in length by 330 feet in width by 31 feet in height, of which 5 feet would be below ground level.

Excavation, confirmation sampling, and any necessary de-watering of the contaminated dredge spoil materials/soils would be accomplished as described in Alternative 3. The requirements for backfill/site restoration and the methods to fulfill these requirements, would be the same as those described for Alternative 3. Remedial excavation activities and landfill construction would likely be concurrent considering open space limitations on the island.

To construct the landfill as described, approximately 83,000 cubic yards of soil and gravel material would need to be transported to Newland Island. Considering the site access issues discussed in Alternative 3, it is assumed that the required clean materials for landfill construction would be transported to the site by 1,000 ton capacity hopper barges from the Port of Albany, and that the laden hopper barges would be unloaded at the site using the crane system detailed in Alternative 3.

Leachate and storm water captured by the drainage layers in the landfill would be directed into perforated piping located around the landfill border where the water will either be pumped out for disposal off of the site, or cycled through an on-site treatment system and into either the Hudson River or the Champlain Canal under appropriate discharge limits.

Other controls proposed in this alternative once the landfill has been constructed and closed include the installation of a perimeter fence around the landfill, and the construction of a berm structure around the landfill to minimize the transfer the landfill material in the event of runoff and erosion. In addition, specific management and monitoring plans would be required under Part 360 regulations.

This alternative would also implement an environmental easement on the property to limit the potential for human exposure to contaminated dredge spoil material/soil. This institutional control would specify limits relative to the use and development of the property, and require a site management plan to control activities at the site to minimize the potential for creating exposure pathways to site contamination.

Alternative 6: Soil Cover and Diversion Trench with Institutional Controls and Monitoring

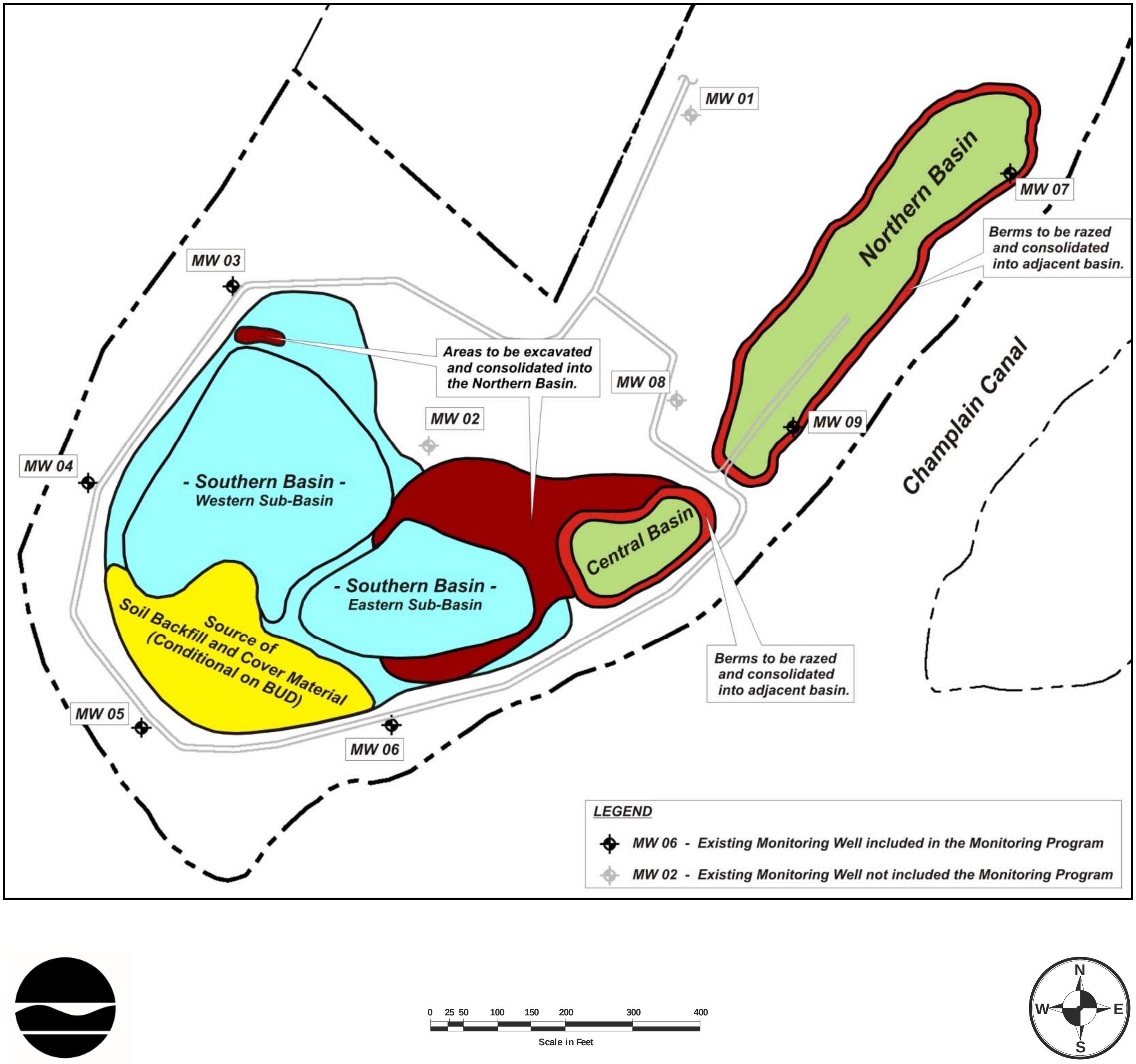
Present Worth: *$1,500,000*
Capital Cost: *$1,200,000*
Annual Costs:
(Years 1-5): *$5,000*
(Years 5-30): *$5,000*

This alternative would address the PCB-contaminated dredge spoil material/soil at the site by selective excavation and consolidation, construction of appropriate soil covers, construction of a drainage diversion trench, and the implementation of institutional controls and a monitoring program (Figures 10 and 11). This alternative would serve to reduce the potential for human and ecological receptor exposures at the ground surface through direct contact and would minimize the potential for migration of contaminants in the groundwater aquifer.

The construction elements proposed in this alternative would be readily accomplished using conventional construction methods and equipment. To reduce costs and make room for future navigational dredging operations, all backfill and cover material required for this project would come from the Canal Corporation's stockpile of nearly 130,000 cubic yards of clean dredge spoil material at the southern portion of the site, once the Department approves the material for beneficial use and if the material meets the Division of Environmental Remediation's criteria for backfill. Based on volume estimates for the backfill and cover material needed, the available volume would be sufficient for the proposed construction and no additional backfill or cover materials would need to be imported to the site. The assessment of access options are the same as presented in Alternative 3, however, based on project requirements and the ease of implementation, site access by land would provide the greatest benefit and was assumed in the development of this alternative.

Figure 10
Selective Excavation and Consolidation
Remedial Alternative 6

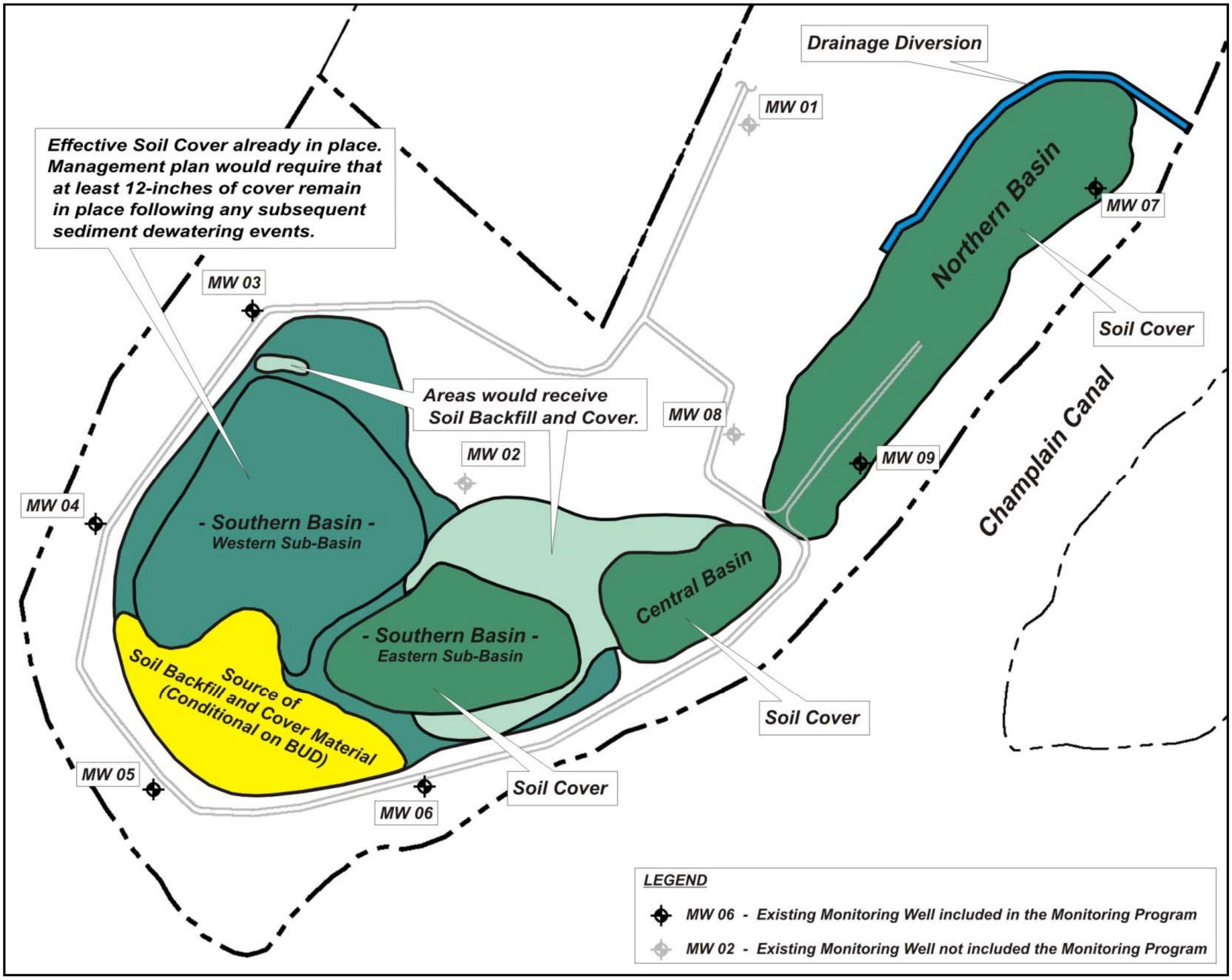
Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009

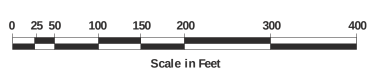


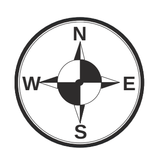
Selective Excavation and Consolidation – Remedial Alternative 6
"Remedial Investigation Report for the Newland Island Dredge Spoil Disposal Area"

Figure 11
Soil Cover and Drainage Diversion
Remedial Alternative 6

Newland Island / Lock 4 Dredge Spoil Disposal Area
Proposed Remedial Action Plan
August 2009







PCB-contaminated dredge spoil materials/soils that were identified at or near the surface in some parts of the containment berm for the southern basin and around the central basin would be excavated and placed in the northern basin prior to proceeding with cover construction. It is estimated that approximately 20,000 cubic yards of contaminated material would be excavated to a depth of three feet and moved to the northern basin by truck. Confirmation samples would be used to establish the final lateral excavation limits. Backfill would be required to restore the grade and slope of the berm structure following removal excavation and is readily available at the site. Prior to the placement of backfill, an isolation/demarcation indicator (with contrasting color) would be placed at the base of the excavation to serve as a warning and to delineate between clean cover and potentially contaminated materials at depth.

In preparation for the construction of the soil cover over the central and northern dredge spoil disposal basins, the containment berm around each basin would be razed, consolidated into the respective basin, and graded to match the adjacent ground surface elevations to the extent practical and with no appreciable increase in footprint area. In the northern basin, materials from the razed berm would be graded along with the contaminated materials placed there during the selective excavation program. Upon completion of grading, and prior to the construction of the soil cover for the central and northern basins, an isolation/demarcation indicator (with contrasting color) would be placed over the consolidated materials to serve as a warning and to delineate between clean cover and potentially contaminated materials at depth. Once, the isolation/demarcation indicator is installed, cover construction would begin. This element involves the placement, compaction, and grading of clean fill over both basins to a minimum thickness of twelve inches above the isolation/demarcation indicator. Attempts would be made to match adjacent grades to the extent practical. A slight pitch would also be incorporated into the cover grade to promote surface drainage toward the proposed drainage diversion trench along the northwestern margin of the northern basin. It is estimated that approximately 7,400 cubic yards of clean material would be required for the construction of this cover and that it would be approximately 4.6 acres in size when complete.

The southern basin is actively used by the Canal Corporation to process sediments on a four to six year cycle and was divided into two sub-basins during modification in 2002 into its current configuration to accomplish this. Both sub-basins were covered with a geo-textile fabric to segregate 2002 and later dredge spoil materials from earlier, potentially contaminated dredge spoil materials. The western sub-basin contains up to sixteen feet of clean sand and gravel placed during and after 2002 over the demarcation fabric and older dredge spoil materials, while the eastern sub-basin contains a very thin veneer of clean silt and fine sand placed during and after 2002 over the demarcation fabric and older dredge spoil materials. In some places in the eastern sub-basin, the demarcation fabric covering the basin floor and containment berm does not have any soil cover and is exposed at the surface. The soil thickness variations found in these two sub-basins is the result of the de-watering process. The western sub-basin receives all of the water and sediments discharged directly from the hydraulic dredge, while the eastern sub-basin only receives the silt and fine sands that settle out of the water that passes through spill box in the western sub-basin after a period of retention. Considering these different settings, two different approaches for cover construction would be used in this alternative.

For the western sub-basin, an effective, twelve to eighteen inch thick, clean soil cover is already in place over the potentially contaminated dredge spoil materials in this area. In addition, the existing geo-textile fabric would readily serve as a warning and marker to delineate between the clean cover and the potentially contaminated materials at depth. Recognizing the need to excavate/recover some of the sand and gravel in the basin to make room for future navigational dredging operations, the management plan for activities at this site would require that at least twelve inches of clean cover remain in place over the existing isolation/demarcation indicator on the basin floor and upon the face of the containment berm for this sub-basin.

In the eastern sub-basin, prior to the construction of the soil cover, the existing geo-textile fabric marker would be supplemented with another isolation/demarcation indicator (with contrasting color). Once, the new isolation/demarcation indicator is installed, cover construction would begin. This element involves the placement, compaction, and grading of clean fill upon the basin floor to a minimum thickness of twelve inches over the isolation/demarcation indicator, and the placement of at least twelve inches of clean cover over the isolation/demarcation indicator upon the face of the containment berm of this sub-basin. It is estimated that approximately 2,000 cubic yards of clean material would be required for the construction of this cover and that it would be approximately 1.2 acres in size when complete.

The top six inches of the soil cover over the central and northern basin would be sufficient to support grass and would be hydro-seeded to stabilize the cover and reduce the potential for erosion. Suitable top soil would be introduced prior to hydro-seeding as needed to facilitate the growth of the seeded vegetation. The soil cover in the southern, intermittently active basin that is used by the Canal Corporation to de-water sediment, would not be seeded. The soil cover in all areas and any exposed isolation/demarcation indicator on the face of the containment berm structures in the southern basin, would be inspected as required in the site management plan and repaired as needed.

This alternative also includes the construction of a drainage diversion trench along the northwestern margin of the northern basin to intercept and redirect any intermittent overland water flow in this area and adequately impede/eliminate the migration of this surface water into and through the known dredge spoil materials. As a permanent storm water management measure, the diversion trench would be constructed in accordance with the Department's New York Standards and Specifications for Erosion and Sediment Control (August, 2005). A grassed trapezoidal design is proposed to fit anticipated drainage calculations.

This alternative would implement an environmental easement on the property to limit the potential for human exposure to contaminated dredge spoil material/soil. This institutional control would specify limits relative to the use and development of the property, and require a site management plan to control activities at the site to minimize the potential for creating additional exposure pathways to site contamination. These institutional controls would take less than one year to implement.

Another element of this alternative involves a program to monitor the existing groundwater wells located along the Hudson River and Champlain Canal to verify that PCBs are not moving into these waters from the site. The existing series of nine groundwater monitoring wells would be sampled once, five years following the implementation of the remedy, and the results would be evaluated to determine if any modifications to the remedy or monitoring program are warranted.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCG). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are

evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 6, Soil Cover and Diversion Trench with Institutional Controls and Monitoring as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS

Alternative 6 (soil cover and diversion trench) is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by using selective consolidation and soil cover applications to reduce the potential for human and ecological receptor exposures to contaminated soils at the surface through direct contact, and by using intercept and diversion drainage control in part of the site to minimize the potential for migration of contaminants in the groundwater aquifer.

Alternatives 3 (excavation and off-site treatment), 4 (excavation and off-site disposal), and 5 (excavation and on-site disposal) would also comply with the threshold selection criteria. Considering that Alternatives 3, 4, 5, and 6 all satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternative 1 (no action) would provide no protection for potential exposure to contaminated soils. Alternative 2 (institutional controls and monitoring) would provide limited protection for potential human exposure to contaminated soils through institutional controls, but would not be adequate for the protection of ecological receptors. PCB contamination would also remain at the surface. Alternative 3 would provide a greater level of protection than Alternatives 4, 5, and 6 considering the contamination is both removed from the site and subsequently destroyed. Alternatives 4 and 5 would be more protective of human health and the environment than Alternative 6 because site-wide contaminated soils would be excavated and properly disposed of even though the contamination is not destroyed. Alternative 6 would be protective of human health and the environment because contaminated soils are covered to reduce the potential for exposures and measures would be taken to minimize migration of contaminants in groundwater, even though contaminated soils would remain on-site.

Alternatives 1 and 2 would not comply with SCGs because contaminated surface soils that exceed the 1ppm SCO for PCBs would continue to be a potential route of exposure to humans and wildlife. Alternatives 3, 4, and 5 would comply with SCGs since contaminated soils would either be treated or isolated in a landfill. Alternative 6 would also comply with SCGs since contaminated soils would be isolated beneath a twelve-inch to eighteen-inch thick soil cover.

Short-term impacts would not be anticipated for Alternatives 1 and 2, since no remediation activities would take place. Alternatives 3, 4, 5, and 6 would all have potential, adverse, short-term impacts related to construction, earth-moving, and material transport activities. These activities may cause dust and noise. Appropriate dust and noise monitoring and suppression programs would be followed during these activities to minimize impacts. With the transport of contaminated material off-site for Alternatives 3 and 4, there would be a risk for spills. The spill risks associated with the on-site transport of contaminated material in Alternative 5 would be less based on logistical considerations. Alternative 6 would have fewer short-term impacts than Alternatives 3, 4, and 5 since most contaminated material at the site would not be disturbed.

Alternative 1 would not be effective in providing protection against potential future exposures. Alternative 2 would be effective for human exposure but not for ecological exposures in the long-term, provided that the institutional controls and monitoring programs are enforced. Alternatives 3, 4, and 5 would have a higher level of long-term effectiveness and permanence when compared to Alternatives 1 and 2 considering all site-wide contaminated soils would be excavated and either treated or isolated in a landfill. Alternatives 5 and 6 would also be more effective than Alternatives 1 and 2 in the long term relative to both human and ecological receptors, provided that proper inspection, maintenance, and monitoring programs are performed.

A reduction in the toxicity, mobility, or volume of contaminants would not be achieved with Alternatives 1 or 2. Alternative 3 would reduce the toxicity, mobility, and volume of contaminants by treatment of the contaminated materials. Alternatives 4 and 5 would reduce the mobility of site contaminants by isolating contaminated materials in an appropriate disposal facility. Similarly, Alternative 6 would reduce the mobility of contaminants by covering the contaminated materials in place and by diverting storm water drainage away from these covered materials.

There would be no actions to implement for Alternative 1. Alternatives 2 through 6 would be readily implemented using standard construction means and methods. Implementation issues associated with Alternatives 3 and 4 would be more complex in comparison to the other alternatives considering contaminated materials would be removed from the site by barge and then transported to a separate location for treatment or disposal. Alternative 5 would also have some implementation issues, but related to the barging of materials to the site and the availability of open space during periods when remedial excavation and landfill construction activities are concurrent. Implementation issues would be minimal for Alternative 6 since no contaminated material would be transported off of the island and clean soils from areas on-site would be used for backfill and construction of the soil cover.

Alternative 1 would not incur any costs. Alternative 2 would cost less than Alternatives 3 through 6, but would not be as protective. Alternative 5 would cost less than Alternatives 3 and 4 considering there would be no component for off-site transport of contaminated materials. Alternatives 3 and 4 are relatively comparable in terms of cost, with Alternative 4 being the most expensive due to the differences between landfill and treatment costs. Alternative 6 would cost significantly less than Alternatives 3, 4, and 5 because most contaminated soils would not be disturbed and clean soils on-site would be used for backfill and construction of the soil cover, resulting in reduced material costs.

The estimated present worth cost to implement the remedy is $1,500,000. The cost to construct the remedy is estimated to be $1,200,000 and the estimated average annual costs for 30 years is $5,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. A soil excavation and consolidation program would be implemented to reduce the potential for exposure to contaminated soils in specific active areas of the site. Excavated soils would be consolidated and isolated beneath an appropriate soil cover. Excavated areas would be backfilled with clean soil approved for use by the Department and that meets the Division of Environmental Remediation's criteria for backfill.

3. An appropriate soil cover would be constructed over the central and northern dredge spoil disposal basins after their consolidation to prevent exposure to contaminated soils. The cover would consist of clean soil placed and compacted to a minimum thickness of twelve inches over an isolation/demarcation indicator (with contrasting color) placed over the consolidated materials to serve as a warning and to delineate between the clean cover and the potentially contaminated materials at depth. The top six inches of soil would be sufficient to support grass. Clean soil would constitute soil approved for use by the Department and that meets the Division of Environmental Remediation's criteria for backfill.

4. An appropriate soil cover would be constructed over the eastern part of the southern basin used by the Canal Corporation for sediment de-watering operations, to reduce the potential for exposure to contaminated soils at depth. The cover would consist of clean soil placed and compacted to a minimum thickness of twelve inches over the existing isolation/demarcation indicator on the basin floor and upon the face of the containment berm of this sub-basin. Clean soil would constitute soil approved for use by the Department and that meets the Division of Environmental Remediation's criteria for backfill.

5. An appropriate soil cover would be maintained over the western part of the southern basin used by the Canal Corporation for sediment de-watering operations, to reduce the potential for exposure to contaminated soils at depth. An effective, twelve to eighteen inch thick, clean soil cover is already in place and an existing geo-textile fabric marker serves to delineate between clean cover and potentially contaminated materials at depth. The cover would be maintained at a minimum thickness of twelve inches over the existing isolation/demarcation indicator on the basin floor and upon the face of the containment berm for this sub-basin.

6. A drainage diversion trench would be constructed along the northwestern margin of the cover area over the northern basin to minimize the potential for migration of contaminants in the local groundwater. The drainage diversion trench would intercept and redirect any intermittent overland water flow in this area and adequately impede/eliminate the migration of this surface water into and through the known, underlying dredge spoil materials. The diversion trench would be constructed in accordance with the Department's New York Standards and Specifications for Erosion and Sediment Control (August, 2005).

7. Imposition of an institutional control in the form of an environmental easement that would require: (a) limiting the use and development of the property to commercial use, which would also permit industrial use; (b) compliance with the approved site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined appropriate by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

8. Development of a site management plan which would include the following institutional and engineering controls: (a) management of the final cover systems to restrict excavation below the soil cover's demarcation layer. Excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) monitoring of the groundwater around the site; (c) identification of any use and development restrictions on the site; and (d) provisions for the continued proper operation and maintenance of the components of the remedy.

9. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

TABLE 1
Nature and Extent of Contamination

Sampling Period: December 2005 to May 2008

SURFACE SOIL	Contaminants of Concern	Concentration Range in parts per million (ppm) [a]	SCG [b] (ppm)	Frequency of Exceeding SCG
PCBs	Total PCBs	ND (0.017 U) to 12	0.1	76 of 131
Inorganic Compounds	Cadmium	ND (0.19 U) to 15.2	2.5	11 of 26
	Chromium	13.1 to 335 J	30	14 of 26
	Lead	10.9 to 332 J	63	9 of 26
	Mercury	ND (0.019 UJ) to 2.0 J	0.18	10 of 26
	Aluminum	4210 J to 18000	15800 †	2 of 8
	Antimony	ND (16.7 UJ)	2.17 ‡	0 of 8
	Arsenic	2.2 to 7.7	13	0 of 8
	Barium	22.2 to 158 J	350	0 of 8
	Beryllium	ND (0.25 U) to 0.16	7.2	0 of 8
	Calcium	950 J to 13700 J	9190 †	1 of 8
	Cobalt	3.2 to 17.5	13.3 †	2 of 8
	Copper	6.2 to 73.7 J	50	3 of 8
	Iron	9450 to 33500	25600 †	3 of 8
	Magnesium	2160 to 7130 J	5130 †	4 of 8
	Manganese	237 to 5290 J	1600	3 of 8
	Nickel	7.4 to 34.6 J	30	2 of 8
	Potassium	531 to 2010 J	1890 †	1 of 8
	Selenium	ND (4.2 U)	3.9	0 of 8
	Silver	ND (0.52 U) to 1.9	2	0 of 8
	Sodium	ND (146 U)	211 †	0 of 8
	Thallium	ND (6.3 U)	16.3 ‡	0 of 8
	Vanadium	6.8 to 33.3 J	31 †	1 of 8
	Zinc	42.0 to 415	109	5 of 8

TABLE 1
Nature and Extent of Contamination

Sampling Period: December 2005 to May 2008

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range in parts per million (ppm) [a]	SCG [b] (ppm)	Frequency of Exceeding SCG
PCBs	Total PCBs	ND (0.017 U) to 43	0.1	82 of 190
Inorganic Compounds	Cadmium	ND (0.19 U) to 34.7	2.5	11 of 43
	Chromium	6.5 to 580	30	15 of 43
	Lead	3.2 to 595	63	9 of 43
	Mercury	ND (0.018 U) to 2.9	0.18	7 of 43
	Aluminum	6010 J to 21000	15800 †	3 of 17
	Antimony	ND (0.53 U)	2.17 ‡	0 of 17
	Arsenic	ND (2.4 U) to 8.6	13	0 of 17
	Barium	30.1 to 154	350	0 of 17
	Beryllium	ND (0.31 U) to 0.73	7.2	0 of 17
	Calcium	1010 to 55100	9190 †	2 of 17
	Cobalt	4.1 to 18.6	13.3 †	5 of 17
	Copper	6.0 to 85.1	50	2 of 17
	Iron	13100 to 43200 J	25600 †	7 of 17
	Magnesium	2280 to 11600 J	5130 †	9 of 17
	Manganese	89.3 J to 953	1600	0 of 17
	Nickel	10.8 to 50.1 J	30	7 of 17
	Potassium	453 to 2490	1890 †	3 of 17
	Selenium	ND (0.57 U)	3.9	0 of 17
	Silver	ND (0.07 U)	2	0 of 17
	Sodium	ND (135 U) to 68.1	211 †	0 of 17
	Thallium	ND (0.30U) to 0.75	16.3 ‡	0 of 17
	Vanadium	9.7 to 38.5	31 †	2 of 17
	Zinc	30 to 621	109	3 of 17

TABLE 1
Nature and Extent of Contamination

Sampling Period: April 2006 to December 2006

GROUNDWATER - Monitoring Wells -	Contaminants of Concern	Concentration Range in parts per billion (ppb) [a]	SCG [b] (ppb)	Frequency of Exceeding SCG
PCBs	Aroclor 1016	ND (0.47 U)	0.09	0 of 33
	Aroclor 1221	ND (0.47 U)	0.09	0 of 32
	Aroclor 1232	ND (0.47 U)	0.09	0 of 33
	Aroclor 1242	ND (0.47 U)	0.09	0 of 33
	Aroclor 1248	ND (0.47 U) to 0.72	0.09	2 of 33
	Aroclor 1254	ND (0.47 U) to 0.73	0.09	1 of 33
	Aroclor 1260	ND (0.47 U)	0.09	0 of 33
Inorganic Compounds	Cadmium	ND (1.0 U)	5	0 of 33
	Chromium	ND (4.0 U) to 61.2	50	1 of 33
	Lead	ND (5.0 U) to 45.2	25	1 of 33
	Mercury	ND (0.2 U)	0.7	0 of 33
	Aluminum	ND (200 U) to 46900 J	NA	- - -
	Antimony	ND (20.0 U)	3	0 of 33
	Arsenic	ND (10.0 U) to 17.1	25	0 of 33
	Barium	7.1 to 1040	1000	1 of 33
	Beryllium	ND (0.10 U)	3	0 of 33
	Calcium	23100 to 324000 J	NA	- - -
	Cobalt	ND (4.0 U) to 37.5	NA	- - -
	Copper	ND (10.0 U) to 307	200	1 of 33
	Iron	ND (50.0 U) to 62900 J	300	26 of 33
	Magnesium	7570 to 163000 J	35000	14 of 33
	Manganese	ND (3.0 U) to 2810	300	14 of 33
	Nickel	ND (10.0 U) to 71.5	100	0 of 33
	Potassium	730 to 18100	NA	- - -
	Selenium	ND (15.0 U)	10	0 of 33
	Silver	ND (3.0 U)	50	0 of 33
	Sodium	ND (1000 U) to 16600	20000	0 of 33
	Thallium	ND (20.0 U)	0.5	0 of 33
	Vanadium	ND (5.0 U) to 81.7	NA	- - -
	Zinc	ND (10.0 U) to 282	2000	0 of 33

TABLE 1
Nature and Extent of Contamination

Sampling Period: April 2006 to December 2006

GROUNDWATER - Private Wells -	Contaminants of Concern	Concentration Range in parts per billion (ppb) [a]	SCG [b] (ppb)	Frequency of Exceeding SCG
PCBs	Aroclor 1016	ND (0.047 U)	0.09	0 of 6
	Aroclor 1221	ND (0.047 U)	0.09	0 of 6
	Aroclor 1232	ND (0.047 U)	0.09	0 of 6
	Aroclor 1242	ND (0.047 U)	0.09	0 of 6
	Aroclor 1248	ND (0.047 U)	0.09	0 of 6
	Aroclor 1254	ND (0.047 U)	0.09	0 of 6
	Aroclor 1260	ND (0.047 U)	0.09	0 of 6
Inorganic Compounds	Cadmium	ND (1.0 U)	5	0 of 6
	Chromium	ND (4.0 U)	50	0 of 6
	Lead	ND (1.0 U) to 3.84	25	0 of 6
	Mercury	ND (0.2 U)	0.7	0 of 6
	Aluminum	ND (200 U)	NA	- - -
	Antimony	ND (1.0 U)	3	0 of 6
	Arsenic	ND (1.0 U)	25	0 of 6
	Barium	36.2 to 111	1000	0 of 6
	Beryllium	ND (0.19 U)	3	0 of 6
	Calcium	29500 to 65800	NA	- - -
	Cobalt	ND (4.0 U)	NA	- - -
	Copper	ND (10.0 U) to 93.9	200	0 of 6
	Iron	ND (50.0 U)	300	0 of 6
	Magnesium	7470 to 16100	35000	0 of 6
	Manganese	ND (3.0 U) to 209	300	0 of 6
	Nickel	ND (10.0 U)	100	0 of 6
	Potassium	2710 to 4120	NA	- - -
	Selenium	ND (1.0 U)	10	0 of 6
	Silver	ND (3.0 U)	50	0 of 6
	Sodium	7360 to 65200	20000	3 of 6
	Thallium	ND (0.20 U)	0.5	0 of 6
	Vanadium	ND (5.0 U)	NA	- - -
	Zinc	ND (10.0 U) to 59.3	2000	0 of 6

TABLE 1
Nature and Extent of Contamination

Sampling Period: December 2005

SURFACE WATER (Ponded and Seeps)	Contaminants of Concern	Concentration Range in parts per billion (ppb) [a]	SCG [b] (ppb)	Frequency of Exceeding SCG
PCBs	Total PCBs	ND (0.47 U)	0.00012	0 of 2
Inorganic Compounds	Cadmium	ND (1.0 U) to 4.7	12 (1,5)	0 of 2
	Chromium	ND (4.0 U) to 31.4	1334 (1, 5)	0 of 2
	Lead	ND (5.0 U) to 25.4	360 (1)	0 of 2
	Mercury	ND (0.200 UJ)	1.4 (1)	0 of 2
	Aluminum	ND (200 U) to 1050	100 (2)	1 of 2
	Antimony	ND (20.0 U)	3 (3)	0 of 2
	Arsenic	ND (10.0 U)	340 (1)	0 of 2
	Barium	38.1 to 77.2	1000 (3)	0 of 2
	Beryllium	ND (0.04 U)	1100 (2)	0 of 2
	Calcium	17100 to 169000	NA	- - -
	Cobalt	ND (4.0 U)	100 (1)	0 of 2
	Copper	ND (10.0 U) to 19.6	36 (1, 5)	0 of 2
	Iron	131 to 1220	300 (1)	1 of 2
	Magnesium	6110 to 71600	35000 (3)	1 of 2
	Manganese	5.4 to 76.0	300 (4)	0 of 2
	Nickel	ND (10.0 U)	1128 (1, 5)	0 of 2
	Potassium	3140 to 5590	NA	- - -
	Selenium	ND (15.0 U)	4.6 (2)	0 of 2
	Silver	ND (3.0 U)	24 (1, 5)	0 of 2
	Sodium	1240 to 3580	NA	- - -
	Thallium	ND (20.0 U)	20 (1)	0 of 2
	Vanadium	ND (5.0 U)	190 (1)	0 of 2
	Zinc	ND (20.0 U) to 88.4	283 (1, 5)	0 of 2

TABLE 1
Nature and Extent of Contamination

Key to Notes

Note [a] ppb = parts per billion, which is equivalent to micrograms per liter or ug/L in water;
ppm = parts per million, which is equivalent to milligrams per kilogram or mg/kg in soil;
ug/m^3 = micrograms per cubic meter in air

Note [b] SCG = Standards, Criteria, and Guidance;

Surface Soil and Subsurface Soil

Criteria are from 6 NYCRR Part 375 - Environmental Remediation Programs - December 14, 2006 - Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, except as noted below.

Note † - Criteria are from NYS background (95th percentile), Source-Distant Data Set from NYS Brownfield Cleanup Program, Technical Support Document, Appendix D, September 2006.
Note ‡ - Criteria are from Eastern United States background (95th percentile) from Shacklette and Boerngen 1984.

Groundwater

Criteria are from NYSDEC Technical and Operational Guidance #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998.

Surface Water

Criteria are from NYSDEC Technical and Operational Guidance #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998, Table 1, Class A - D, Type W (fresh water).
Note (1) - Class D, Type A(A).
Note (2) - Class C, Type A(C).
Note (3) - Class A, Type H(WS).
Note (4) - Class A, Type (E).
Note (5) - An average hardness value of 183 milligrams per liter, calculated from the measured calcium and magnesium concentrations, was used to derive this screening value.

Data Qualifiers
J - data qualifier that indicates an estimated value.
U - data qualifier that indicates not detected at the reporting limit shown.
UJ - data qualifier that indicates not detected at the estimated reporting limit shown.
NA - indicates that there is no applicable standard or guidance value.
ND - indicates not detected at the reporting limit shown in parentheses.

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Action	$0	$0	$0
2. Institutional Controls and Monitoring	$13,000	$3,200	$66,000
3. Excavation and Off-Site Treatment by High Temperature Thermal Desorption	$42,500,000	$0	$42,500,000
4. Excavation and Off-Site Disposal	$46,100,000	$0	$46,100,000
5. Excavation and On-Site Disposal	$15,900,000	18,000	$18,900,000
6. Soil Cover and Diversion Trench with Institutional Controls and Monitoring	$1,200,000	$5,000	$1,500,000