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   DEED BOOK 796 PAGE 58-RECORDED 5/19/95-THE CITY OF HUDSON TO THE COUNTY OF COLUMBIA

APPENDIX D NYSDEC CLOSURE APPROVAL LETTER
I. EXECUTIVE SUMMARY
Redevelopment of former landfill sites can play a major role in sustainable development, providing environmental, economic, and social benefits. The Columbia Land Conservancy (Conservancy), working in collaboration with and on behalf of the City of Hudson (City) and in partnership with Columbia County (County) are committed to exploring the possibility of transforming the existing North Bay landfill (Hudson landfill) and associated freshwater tidal wetland, located along the Hudson River in Hudson, NY, into a publicly accessible riverfront recreation area known herein as North Bay Recreational Area.

The Hudson landfill began operation as a landfill in 1962. The purpose of the landfill was two-fold: to dispose of the City’s refuse and to fill in lowlands that were originally considered to be of little value. The City of Hudson and Columbia County, from 1962 through mid-1980’s, operated the landfill. Through various consent orders issued by New York State Department of Environmental Conservation (NYSDEC), the complete landfill closure was required by June 1996.

Preparation of construction documents (Closure Plan) by Crawford & Associates Engineering, P.C. (C&A) for closure began in April 1994, in accordance with 6 NYCRR §360-2. The closure plan incorporated a construction activity plan that included removal of an approximately 30 foot wide band of waste encroaching on wetland buffer, backfilling with low permeability soil to create a leachate barrier, grading of the waste masses to maintain a minimum slope of 4 percent and a maximum of 33 percent and the installation of a gas venting system. In March of 1994, commencement of work associated with the construction activity plan began and by May of 1996, work on the landfill was completed. A closure certification report (CCR) prepared by C&A was completed in June 1996.

As required by the EPA, and in conformance with 6 NYCRR Part 360, monitoring and maintenance is to take place for a minimum of 30 years following landfill closure. Post-closure monitoring and maintenance is currently under the operation of the Columbia County Department of Public Works. Maintenance includes mowing and minor repairs needed as noted by monthly inspections. Monthly inspections are currently completed by C&A to assure that problems do not occur and include inspection of soil cover and slopes, cover vegetation, drainage structures, gas venting structures, leachate collection system and wet wells. Inspections also include monitoring of methane levels and water levels within wet wells and gas vents. Post-closure environmental monitoring (laboratory sampling) of the landfill is also required and includes annual baseline and quarterly monitoring of groundwater and surface water at several monitoring wells and surface water sites for the initial first five years of closure, however in the end of the fifth year the NYSDEC determined continued monitoring was needed. Post-closure monitoring will need to continue at the landfill regardless of the new proposed uses or entity responsible for the landfill.

In August, 2004, Peter Marotta, a representative for the City of Hudson, received a letter from DEC Region 4 Solid Waste Engineer Richard Forgea, PE, approving a proposal for post-closure development of the landfill. However, the proposal at that time was never followed through and in July 2008, the City, the County and the Conservancy committed once again to exploring a variety of potential natural and cultural connections that can be
made to and from the North Bay Recreational Area. The current proposal includes creation of trails connecting the North Bay Recreation Area to Greenport by creating one or more direct foot paths from the City to the Conservation Area (North Bay Recreational Area). The creation of an outdoor entertainment and events area, constructing Kayak/Canoe launch in the North Bay, possible outdoor sculpture space, and/or planning of a boardwalk and viewing platform in the marsh areas.

Risks associated with redevelopment include financial and others associated with environmental, ecological, and human health impacts. Since current records for the Hudson landfill ownership and risks associated with ownership are limited, establishment of current risks and liability are needed. Understanding the current risks and liability associated with post-closure monitoring and maintenance will give perspective on future uses and expectations. Further understanding of who is to take responsibility for the new proposed uses must first be established in order to provide risk and financial assessment.

There are several technical obstacles to redevelopment of capped landfills. The integrity of the cap must be maintained to preserve an impermeable barrier between the ground's surface and the gas venting and waste mass layers. Any penetrations into the two-foot thick barrier protective soil layer, which lies immediately below the 6” topsoil layer, can allow deeper cracks and holes to form, which can lead to erosion and slope failure in the upper layers and damage to the impermeable soil layer. Permanent features such as plantings, paved areas or structures, temporary installations such as tent poles, and even unplanned natural occurrences such as burrowing animals and weed trees and shrubs have the potential to cause damage to the landfill cap. Proper design and installation of structures and plantings, followed up by routine inspections ensure that the cap's integrity is maintained.

Another challenge to redevelopment is the settling that occurs as the waste mass decomposes and shifts. According to Richard Forgea, PE, DEC Region 4 Solid Waste Engineer, unless they are specifically designed to do so, landfill caps are not meant to support heavy loads, such as traffic or crowds. For this reason, he recommends that access to the landfill cap be limited to pedestrian activity and emergency or service vehicular use only. Paths can be laid out to disperse the load and steer traffic away from steep slopes. Flexible pavements are generally recommended for travel routes that cross a landfill cap, and permanent structures or monolithic pavements are not usually advised, particularly on a newly-capped landfill. Because landfill caps are not designed to support large crowds, mass gatherings held on the cap itself are discouraged, however modifications can be completed to accommodate such uses.

Any redevelopment on the landfill cap is considered a modification of cap design and would require a submission to the Region Solid Waste Engineer in NYSDEC’s Office of Environmental Quality which includes plans, engineers reports and other documents in support of the modification. The modification of the closure plan would detail any changes in inspections, maintenance, environmental monitoring activities or schedules that may arise as a result of newly proposed features. Following approval and construction, an amended CCR is required to be prepared and submitted to document the as-built conditions. It should be noted that the clock on the 30-year monitoring and maintenance period that started upon closure continues to run, so that if the proposed recreational development takes place in year 15 of the monitoring period, there would be
15 years of monitoring remaining. Additional permits would have to be received such as NYSDEC permits for protections of water and fresh water wetlands, and along with these permits, zoning changes for this area through the City of Hudson would have to be considered.

It is recommended that further discussion and documentation of either the continuation of monitoring and maintenance by Columbia County or the transfer of these responsibilities should be established. When the County and the City began the process of the closure, an agreement was signed between the two. We believe this agreement discusses assumed liabilities and risks. Furthermore, we understand that the law offices of Rapport, Meyers, Whitbeck, Shaw and Rodenhausen may have draft copies of the agreement; however, we have been unable to locate a completed and signed agreement. Understanding the current risks and liability associated with post-closure monitoring and maintenance will give perspective on future uses and expectations. There are three possible outcomes that may be discussed, one is that the county will continue the monitoring and maintenance of the existing and proposed uses second would be a joint agreement between the county and another entity, and the last option would be a complete transfer of all responsibilities and liability to another entity. However, with the proposed uses it must be understood that weather the landfill is transferred or the county remains as the owner, there must be a continued monitoring plan in effect for the EMSIG building(methane monitoring) which currently is not part of the land owned by Columbia County.

II. INTRODUCTION
A. PROJECT SUMMARY
The Columbia Land Conservancy (Conservancy), working in collaboration with and on behalf of the City of Hudson (City) and in partnership with Columbia County (County), has been awarded funding from the Hudson River Foundation to transform the existing North Bay landfill and associated freshwater tidal wetland, located along the Hudson River in Hudson, NY into a publicly accessible riverfront recreation area.

The City, the County and the Conservancy are committed to exploring a variety of potential natural and cultural connections that can be made to and from the North Bay Recreational Area. The potential uses to be explored for the North Bay Recreational Area include such activities as walking, jogging, picnicking, bird watching, educational programs and event venues. According to the Request for Proposals (RFP), it is anticipated that the County-owned portion of the reclaimed landfill area will be transferred to the City.¹

This report is intended to be used as an analysis of the current site conditions of the landfill and as a recommendation for the transfer of the landfill from the County to the City.

B. HISTORY/BACKGROUND OF SITE
The Hudson Landfill lies between the tidal wetlands of the Hudson River (north side) and the crest of the bluffs overlooking the river (see Figure 4 in appendix A). In 1873, George

¹ RFP: North Bay Recreation Area Analysis and Planning, 2008
C. Byrne owned the land and operated a brickyard on the north side of 2nd Street, using clay mined from deposits on site. The area was later used as a refuse burning area and ash-fill until its operation as a sanitary landfill was formally taken over by Columbia County and the City of Hudson in 1962. Debris and ash from burning activity was spread into wetland areas at the edge of North Bay, a practice that continued as a land-reclamation project until 1970 when the DEC banned disposal of refuse in wetlands and tidal estuaries.

Although it was unpermitted, the facility accepted household refuse from City and County residents from 1962 until 1984. Historically, the landfill accepted only household waste from residents of Columbia County and the City of Hudson. It had no formal waste management plan or closure plan, no fabricated liner or gas vents and until February of 1991, no monitoring wells were present. In 1967, the City of Hudson signed an agreement with the Fireman’s Association of the State of New York (FASNY) which owned the neighboring property, to use the entire area as a landfill. In 1982, the City of Hudson turned full responsibility for the landfill exclusively to Columbia County. In 1986, the New York State Department of Environmental Conservation issued an Order on Consent to Columbia County, requiring that refuse disposal cease by July 1988 and that the site be closed by December 1988 in accordance with Article 27 of the ECL and 6 NYCRR Part 360.

The Hudson Landfill had stopped receiving waste in 1984, and in 1987, Columbia County developed plans to close the landfill, but changes in DEC’s regulations made the closure plan obsolete before it could be implemented. The 1987 plans were updated to respond to the more stringent standards, but the revised plans were not carried out due to financial problems.

In 1991, DEC again issued an Order on Consent to close the landfill, this time by June 1993, and to complete construction certification by September, 1993. This order was later amended to require construction certification by June 15, 1996.

C&A created and submitted the Closure Plan for the Hudson Landfill to the NYSDEC in April of 1994. Due to modifications in the design, the target date for submission of the Closure Plan was delayed. After revising the Closure Plan to address NYSDEC recommendations, final approval of the plan was granted by the NYSDEC on May 1, 1995 (see appendix D for approved closure letter). The Columbia County Department of Public Works had begun preparation of the site for closure construction activities in December 1993, with relocation and consolidation of the waste mass. Closure was completed in October 1997. Slope failure was observed the following spring. Damage was assessed and repaired beginning in July 2000. The final Construction Certification Report was submitted in November 2000, following stabilization of the failed slopes.

C. CLC/CITY OF HUDSON OBJECTIVES
As early as December 1990, the Columbia County Board of Supervisors foresaw using the post-closure landfill site as a bird and wildlife sanctuary. In 1997, Anthony Orlich, then the Columbia County Administrator of Public Works, was sent a letter by John Ladd

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2 Beers Atlas of Columbia County, 1873
3 Environmental Conservation Law, January 20, 1970
at the DEC Estuarine Research Reserve Center at Bard College noting that the creation of a high-quality grassland habitat on top of the landfill cap would be valuable because of the site’s proximity to the North Bay wetlands.

I. Intent of Project
The Columbia Land Conservancy and the City of Hudson are currently conceptualizing the area to be used as a more actively programmed recreational space. The landfill site is a key piece of a recreational and pedestrian network that connects the City of Hudson to the Greenport Conservation Area. Three pedestrian routes are envisioned – an escarpment trail on the bluffs above the Hudson River, a riverside trail through the former Atlas Brickyard, and sidewalk route along Joslen Boulevard and Harry Howard Avenue – all pass through or close to the landfill, and would help to connect recreation resources in the Town of Greenport to recreation resources in the City of Hudson.

II. Proposed Uses/Alternatives
a) Multi-Use Space
In August 2004, Peter Marotta, representing the City of Hudson, received a letter from DEC Region 4 Solid Waste Engineer Richard Forgea, PE, approving a proposal for post-closure development of the landfill. The proposal included hiking trails on the capped areas of the landfill, a public gathering area in a designated amphitheater area, wintertime recreation including sledding and skiing, and a kayak and canoe launch at the base of the hill, on the cap edge. In this proposal, the cap would be accessible on trails only, and then, only to pedestrians and emergency and service vehicles. The proposal did not include anything that would cause penetrations to the cap, and trails and signs would be in place directing the public from areas such as gas vents, steep slopes or other hazards.

In July 2008, the City, the County and the Conservancy committed once again to exploring a variety of potential natural and cultural connections that can be made to and from the North Bay Recreational Area. The current proposal includes creation of trails connecting North Bay Recreation Area to Greenport by creating one or more direct foot paths from the City to the Conservation Area. The creation of an outdoor entertainment and events area, constructing a Kayak/Canoe launch in the North Bay, possible outdoor sculpture space, and/or planning of a boardwalk and viewing platform in the marsh are all consistent with the NYSDEC approved modifications to the closure agreement.

b) Linkage
The landfill site is a key piece of a recreational and pedestrian network that connects the City of Hudson to the Greenport Conservation Area. Three pedestrian routes are envisioned – an escarpment trail on the bluffs above the Hudson River, a riverside trail through the former Atlas Brickyard, and sidewalk route along Joslen Boulevard and Harry Howard Avenue – all pass through or close to the landfill, and would help to connect recreation resources in the Town of Greenport to recreation resources in the City of Hudson. In its northeast corner, the site abuts the grounds of the Hudson High School and along its northern boundary, the Greenport Conservation Area, and could provide access to proposed park spaces in the City of Hudson, on its south side (Charles William
In 2006, the City of Hudson received a grant from the New York State Office of Parks Recreation and Historic Preservation under the Environmental Protection Fund for development of the Charles William Park which is located southeast of the landfill. The potential exists to develop trails from this park to the proposed uses at the landfill.

III. Ownership

The land on which the landfill is located consists of multiple parcels and was originally owned primarily by the City of Hudson and by FASNY (see survey map titled Survey Prepared for the City of Hudson, dated December 19, 2008 in appendix B). Since the mid-1980’s, land owned by FASNY has been acquired by either the City of Hudson, the Hudson Development Corporation, the Hudson Community Planning and Development Agency and the City of Hudson Industrial Development Agency. In 1995, Columbia County was deeded ownership of the 9.19 acres of landfill located west of the EMSIG building and 2.31 acres of property located northeast to the EMSIG building from the City of Hudson Industrial Development Agency. An approximately 50-foot wide right-of-way still exists between the City of Hudson Industrial Development Agency and Columbia County. It is located between the EMSIG building and 9.19 acre landfill parcel. Additionally, in 1995, the City of Hudson conveyed 15.81 acres of land north of the EMSIG building to Columbia County. All lands conveyed to Columbia County can be found on the survey map located in appendix B, prepared by Alvin B. Huehnel, Professional Land Surveyor, a division of Crawford & Associates Engineering, P.C. on December 19, 2008 and last revised on January 22, 2009. A copy of the deeded information can be found in appendix C of this report.

When reviewing the survey prepared by Alvin B. Huehnel, Professional Land Surveyor, a division of Crawford & Associates Engineering, P.C., described above, it was noted that the entire landfill area is not located on the property owned by Columbia County and that a small portion of landfill located south of the parking lot for the EMSIG building and the parking lot for the EMSIG building are on lands owned by the City of Hudson Industrial Development Agency. Although these sections of the landfill are not located on lands owned by Columbia County, they are still monitored, and must continue to be monitored during the monthly inspections and yearly sampling areas for the post-closure monitoring and maintenance under the County.

III. REQUESTED INFORMATION

A. HISTORY & ASSESSMENT OF CURRENT LANDFILL CAP

I. HISTORY OF LANDFILL CAP

a) Pre-Closure Construction Activities

Prior to 1973, the landfill consisted of two separate disposal areas, separated by a small stream that flowed westerly from the clay banks into the Hudson River. Refuse disposal vehicles drove through the stream to enter the northern disposal area. In 1973, a 25-foot long concrete culvert was installed to allow unimpeded access to the northern area.

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4 Deed and title research by Huenel & Monahan, 2008.
In 1982, the concrete culvert was replaced with 550 linear feet of 48-inch diameter corrugated metal pipe (CMP) that began north of the EMSIG Manufacturing Corporation Facility and ended in the North Bay. The backfill used for the CMP was compacted clay from the City of Hudson clay banks and a leachate collection system was installed, creating a separate drainage and leachate collection system. After the culvert pipe and leachate collection system was installed, this area between the two waste disposal areas was filled as a disposal area, and the two waste masses were joined as one large area. The leachate collection system consisted of two 500-foot lengths of 6-inch diameter perforated pipes placed in broken stone on either side of the 48-inch CMP. These two pipes drained into two 4-foot diameter wet-wells that stored the leachate until it was pumped into tanker trucks and disposed of at the Hudson Sewage Treatment Plant.

In 1996, the existing drainage system consisting of the 48" CMP was retrofitted during the closure to meet the NYSDEC codes (100 year design life) using a technique called slip-lining. The slip-lining process included the installation of a 36-inch I.D. High Density Polyethylene (HDPE) pipe into the 48-inch CMP. The HDPE pipe has a predicted design life of 100-years as compared to the CMP of only 50-years.

b) Closure Plan
The closure plan was developed by C&A, in compliance with 6 NYCRR §360-2. The plan was originally submitted in 1994, and approved, with modifications made in response to comments by NYSDEC in 1995. The closure plan included waste relocation, design of a leachate barrier and a capping system. The design also included several innovative features, including use of recycled tire chips in the gas venting layer and a modification of the cap design to allow a section of the cap that had been traditionally used as a parking lot to continue its use at its original grade. These items required requests for variances and the use of equivalent design materials, which were supported by \textit{in situ} pilot studies and laboratory testing to ensure that materials and design modifications performed according to set standards. Variance and Equivalent Design Requests are as follows:

<table>
<thead>
<tr>
<th>Equivalent Design</th>
<th>6 NYCRR Part 360 Subpart</th>
</tr>
</thead>
<tbody>
<tr>
<td>A capping system variance for the North Second Street Extension, and increasing the allowed Permeability of Low Permeability Barrier Soil Layer material from $1 \times 10^{-7}$ cm/sec to $1 \times 10^{-5}$ cm/sec for the North Second Street Extension.</td>
<td>6 NYCRR Part 360-2.13(w)</td>
</tr>
<tr>
<td>The section of North Second Street Extension which intersects the Hudson Landfill be exempt from meeting the 6 NYCRR Part 360 Capping Requirements.</td>
<td>6 NYCRR Part 360-2.13(w)</td>
</tr>
<tr>
<td>Use tire chips as an equivalent to landfill granular gas venting material, in an 18-inch layer depth.</td>
<td>6 NYCRR Part 360-2.13(w)</td>
</tr>
<tr>
<td>Variance Description</td>
<td>6 NYCRR Part 360 Subpart</td>
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<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
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<tr>
<td>To construct the Low Permeability Barrier Soil Layer in two 9-inch lifts instead of three 6-inch lifts.</td>
<td>6 NYCRR Part 360-2.13(j)(2)(ii)</td>
</tr>
<tr>
<td>The elimination of the geotextile required between the waste mass and the tire chip gas venting layer.</td>
<td>6 NYCRR Part 360-2.13(p)(1)</td>
</tr>
<tr>
<td>To construct an oil/stone and 6-inch asphalt concrete pavement layer instead of a 6-inch vegetative layer for the EMSIG Parking Facility Landfill Cap.</td>
<td>6 NYCRR Part 360-2.13(t)</td>
</tr>
<tr>
<td>To construct a 12-inch Barrier Protection Layer instead of a 24-inch layer over the geomembrane liner for the EMSIG Parking Facility Landfill Cap. (Mandate Relief Variance)</td>
<td>6 NYCRR Part 360-2.13(r)(2)(ii)</td>
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</table>

The cap consists of four main layers placed on top of the waste mass. The first layer above the waste mass is the gas venting layer, which is designed to trap gas escaping from the decomposing waste and convey it to the atmosphere via vent pipes. The gas venting layer consists of 12” of granular material, and is typically encased in geotextile to prevent migration of soil and waste material. As noted above, tire chips were used in place of gravel or rock in many sections of the Hudson Landfill. An 18” thick layer of low-permeability clay soil is then placed above the gas venting layer. This layer, known as the Low Permeability Barrier Soil Layer, seals the gas venting layer and waste piles, keeping precipitation from infiltrating the waste mass and preventing leaching from the waste mass into surrounding soil. On top of the low permeability layer, a 24” layer of soil, known as the Barrier Protection Layer, is placed. Its purpose is to protect the Low Permeability Barrier Soil Layer from the elements, including freezing and thawing, erosion and desiccation. It also provides separation between the Barrier Soil Layer and hazards found on the ground’s surface, such as tree roots and burrowing animals. Finally, a 6” layer of topsoil is placed, and this is seeded with an erosion control turfgrass and legume mix.

c) Landfill Closure
The Columbia County Department of Solid Waste undertook the closure construction of the landfill on December 6, 1993 and completed the closure activities on October 9, 1997. Beginning in December 1993, trees, shrubs and phragmites were cleared from the landfill areas and haul roads were built at the perimeter of the landfill area. Waste outside the landfill perimeter was excavated and placed within the landfill boundary according to landfill closure plans. The leachate barrier was built first. It is essentially a sub-surface clay wall separating the landfill waste mass from the surrounding soil that prevents contaminated groundwater from the landfill from entering the wetland, and protects the lower elevations of the landfill from being inundated during tidal surges. It was built of low-permeability clay from the adjacent
clay banks and was placed first along the edge of the wetland at the toe of the landfill’s sloping western edge. The waste mass was compacted and, in November and December of 1994, covered with 12” of an intermediate layer of compacted sandy soil from the site, allowing it to settle overwinter. By the end of July, 1995, the relocation of the waste mass was complete and the leachate barrier was installed.

<table>
<thead>
<tr>
<th>CONSTRUCTION TASK (PHASE)</th>
<th>PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leachate Barrier</td>
<td>May 5, 1994 - June 20, 1995</td>
</tr>
<tr>
<td>Gas Venting Layer</td>
<td>June 1, 1994 - February 13, 1997</td>
</tr>
<tr>
<td>Parking Facility Landfill Cap</td>
<td>July 7, 1995 - August 8, 1995</td>
</tr>
<tr>
<td>Culvert Pipe Slip lining</td>
<td>July 1, 1996 - July 17, 1996</td>
</tr>
<tr>
<td>Low Permeability Barrier Soil Layer</td>
<td>April 24, 1996 - September 3, 1996</td>
</tr>
<tr>
<td></td>
<td>April 9, 1997 - August 8, 1997</td>
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<tr>
<td>Barrier Protection Layer</td>
<td>June 11, 1996 - September 10, 1996</td>
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<tr>
<td></td>
<td>April 23, 1997 - August 15, 1997</td>
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<tr>
<td>Topsoil Layer</td>
<td>August 27, 1996 - October 8, 1996</td>
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<tr>
<td></td>
<td>July 24, 1997 - September 18, 1997</td>
</tr>
<tr>
<td>Miscellaneous Closure Activities</td>
<td>September 5, 1996 - October 8, 1996</td>
</tr>
<tr>
<td></td>
<td>April 21, 1997 - October 9, 1997</td>
</tr>
</tbody>
</table>

d) Closure Certification Report
The final closure construction certification report (CCR) was submitted in November, 2000, and contains documentation of all construction phases and as-built conditions, including documentation of slides that took place in 1998 (following closure completion) on steeply sloping sections of the northern half of the landfill.

II. CURRENT LANDFILL CAP INSPECTIONS

a) Responsibility of County
The Columbia County Department of Public Works is responsible for post-closure monitoring, routine maintenance, including mowing and minor repairs. For the most part, maintenance inspections have turned up minor problems, such as broken locks, broken pipes, vandalism and overgrown vegetation, and the DPW has responded to calls for maintenance in an appropriate and timely manner.

b) Maintenance and Monthly Inspections
As required by the EPA and in conformance with 6 NYCRR Part 360, monitoring and maintenance is to take place for a minimum of 30 years following landfill closure. The final closure construction certification report (CCR) was submitted to New York State Department of Environmental Conservation (NYSDEC) on behalf of Columbia County Solid Waste Department in November 2000. Monitoring and maintenance will be required to continue thru 2030 under the terms of the closure plan. The 1994 Closure Plan included a Post-Closure Monitoring and Maintenance Manual, as required by §360-2.15 (k)(7). The Manual outlines the general monitoring and maintenance requirements, as follows:

- Drainage must be maintained to prevent ponding and erosion of the cover.
- Soil cover integrity, slopes, cover vegetation, drainage structures and gas venting structures must be maintained during the post-closure monitoring and maintenance period.
- Environmental monitoring points must be maintained and sampled during the post-closure period. Annual summary reports must be submitted to the NYSDEC. Annual baseline and quarterly routine monitoring must be performed on groundwater and surface water samples for a minimum period of five years. At the end of the initial 5 year period (from complete closure) the NYSDEC modified the schedule to continue sampling quarterly.
- A vegetative cover must be established and maintained on all exposed final cover material within four months after placement or adequate measures taken to ensure the integrity of the final cover system.

C&A has performed all routine maintenance inspections and environmental monitoring since the landfill closure was completed. Monthly maintenance inspections include visual checks of drainage structures and the cover system to ensure that erosion has not occurred and that no animal burrows are present, visual and sensory inspections of the gas venting system, visual checks of pavement areas to ensure that cracks, low spots or potholes have not developed, and visual checks of all landfill facilities and structures, including well casings, locks, gates, pipes, manholes and clean-outs, to ensure that they are in good working order. Additionally, monthly inspection includes depth to groundwater and gas level readings at 12 of the 25 gas vents, depth to groundwater readings at two monitoring wells, and a description of leachate (if any) at nine known seepage locations along the toe of the landfill cap. Please see Figure 1 for a map of monitoring well and gas vent locations and Figure 2 for a map of the seepage locations in appendix A.

Post-closure environmental monitoring (laboratory sampling) of the landfill includes annual baseline and quarterly monitoring of groundwater and surface water at several monitoring wells and surface water sites for the first five years of closure.
Since 2002, these sites have been monitored once annually on a schedule that rotates quarterly— in other words, in the first year, monitoring is performed in the first quarter of the year (January thru March); in the second year, monitoring is performed in the second quarter of the year (April thru June), and so on, so that by the fifth year, monitoring would be performed in the first quarter of that year. This schedule allows observation of the landfill during each season through the 30 year monitoring period.

c) Slope Failure and Repair

During the March 1998 monthly maintenance inspection, slides were noticed along the steep slopes of the northernmost hill, near the site’s northern property line. Subsequent inspections indicated that slope failure had occurred on the northwestern slope of the northern hill, adjacent to the access road and on the southern slope of the northern hill, approximately 200 feet east of the EMSIG parking lot (see Figure 3 in appendix A). In both areas, the slides had occurred in steep areas of the landfill cap where grass-lined diversion swales had been installed to carry stormwater away from steep slopes, and they affected both the topsoil layer and barrier protection layer. Fortunately, the low-permeability soil layer and gas venting layers were not impacted.

The slope failures were assessed, and the cause of the slides was attributed to increased hydrostatic pore pressure within the soil due to retention of excess water, which caused shearing in the barrier protection layer. Repair measures began in July, 2000, and included restoration of the barrier protection layer and topsoil layers, and construction of stone gabion swales approximately 8 to 10 feet wide and one to two feet deep, to divert runoff away from the slide areas. The swales included a layer of geotextile below the stone to provide additional protection to the barrier protection layer. A conservation mix of grasses and legumes was hand-applied and stabilized with hay and jute mesh.

III. Capacity of Cap

During the construction of the cap, lift tests were conducted and samples were taken to be analyzed. The lift tests were conducted in order to verify quality assurance in compliance with part 360 and ASTM (ASTM D-421, D-422, D-4318, D-5084, D-2216, D-698 and D-1557) standards. Results indicated that the cap either meet or exceeded the standards outlined in the closure report and closure certification report. The results from the lift tests can be found on the drawing titled Hudson Landfill Closure Certification Report; Low Permeability Barrier Lift #2 – Sampling Point Locations in appendix B of this report.

Adequate capacity in general exists for the use of mass gatherings and pedestrian trails; however vehicle access on the cap should be limited, based on C&A recommendations. Based on the compaction of waste and cap layer at the time of closure, the use of heavy vehicles such as excavators and dump trucks were on the cap itself, therefore in theory the landfill cap could be capable of supporting vehicles. However, since the time of closure, decomposition of the waste has occurred and it is likely that areas of the cap have settled creating changes to the cap capacity.
The overall landfill decomposition is dynamic and is expected to have patches of localized variable settlement throughout the life of the post-closure monitoring. It is likely that additional monitoring of the landfill is needed, particularly in sections where proposed mass gatherings and trails occur, in order to maintain public safety. The northeast side of the landfill where slope failure has already occurred is suggested to remain undeveloped due to the increased potential for failure and safety.

Although the landfill was capped adequately in accordance with part 360 and ASTM standards, it is likely that any regulatory agency who will issue a permit will require additional loading or cap capacity testing to establish cap capacity for areas for mass gatherings, trails and structures. Recommended testing may include soil borings, however, the potential for a spark in conjunction with methane gas present could potentially cause an explosion. If additional testing is required, testing procedures and standards will need to be specified and outlined in an additional report.

a) Erosion Potential
Rain, wind and surface runoff cause soil and vegetation to erode off the landfill cap liner system. Erosion control is a critical component to maintaining the existing landfill cap. Areas of the landfill cap that require particular attention to erosion control are side slope surfaces, swales used to subdivide the slopes, and the down chutes used to drain the swales.

Based on post-closure monitoring (past 6 years), data has indicated that the overall cover of the landfill has remained intact however, minor cracking has been observed on the north hill of the landfill. Occasionally, it has been observed that vehicles have driven on the cap and caused minor patches of vegetation to be removed, however, there appeared to be no signs of erosion occurring at removed vegetation areas. The greatest potential for erosion is on the northeastern portion of the landfill which has already had slope failure. It is suggested to restrict access to this area and to divert foot traffic and vehicles around this section. If future use is proposed in this area (northeast section), such as structures (amphitheater) it is suggested that driven piles be placed into the cap down to the soil layer under the landfill. These driven piles will allow for the proposed structure to have a platform build above the landfill cap on the piles in order to alleviate the loading on the cap itself. However, future soil borings should be considered in order to show that driven piles are ideal for loading capacity.

b) Long-term Settling
Potential settlement due to decomposition and consolidation of the waste and the underlying soils, and the non-homogeneity of the waste causing differential settlement is a limitation to the redevelopment of landfills. Since the Hudson landfill has been recently capped within the past 12 years, the likelihood of another 15 to 20 years of settling will occur. However, the settling of the landfill is dependent upon types of material, moisture content, temperature and vary based on the landfill itself.

Settlement may cause the surfaces of roadways and parking areas to be uneven, or it may cause damage to utility lines. All proposed trails and access
roads on the landfill should be made of flexible material (i.e. gravel) to allow the surface to move with the potential settlement that may occur on the landfill.

B. ASSESSMENT OF REQUIRED IMPROVEMENTS

I. General Improvements

To accommodate a change in site use, improvements must include appropriate site access to the proposed use, containment or abatement of groundwater seepages and a mechanism that prevents visitors from getting too close to the landfill gas vents.

There are several technical obstacles to redevelopment of capped landfills. The integrity of the cap must be maintained to preserve an impermeable barrier between the ground’s surface and the gas venting and waste mass layers. Any penetrations into the two-foot thick barrier protective soil layer, which lies immediately below the 6” topsoil layer, can allow deeper cracks and holes to form, which can lead to erosion and slope failure in the upper layers and damage to the impermeable soil layer. Permanent features such as plantings, paved areas or structures, temporary installations such as tent poles, and even unplanned natural occurrences such as burrowing animals and weed trees and shrubs have the potential to cause damage to the landfill cap. Proper design and installation of structures and plantings, followed up by routine inspections ensure that the cap’s integrity is maintained.

Another challenge to redevelopment is the settling that occurs as the waste mass decomposes and shifts. It has been noted that “like cereal in a box, municipal landfills settle from 5 to 20 percent over a two- or three-decade period.” According to Richard Forgea, PE, DEC Region 4 Solid Waste Engineer, unless they are specifically designed to do so, landfill caps are not meant to support heavy loads, such as traffic or crowds. For this reason, he recommends that access to the landfill cap be limited to pedestrian activity and emergency or service vehicular use only. Paths can be laid out to disperse the load and steer traffic away from steep slopes. Flexible pavements are generally recommended for travel routes that cross a landfill cap, and permanent structures or monolithic pavements are not usually advised, particularly on a newly-capped landfill. Because landfill caps are not designed to support large crowds, mass gatherings held on the cap itself are discouraged, however modifications can be done to accommodate such uses.

Landfill gas and seepage present additional concerns. Seepage can be collected and disposed of and signs and trails can be used to divert activity from collection sites.

II. Other Landfills’ Uses

In the United States, municipal landfill sites have been reclaimed as recreational space for at least a century, and New York State’s legacy of converting landfills to parkland

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began in 1935 when Robert Moses cleared the Corona Ash Dumps in Queens to make way for Flushing Meadows Park, the site of the 1939-1940 Worlds Fair. Since stricter environmental regulations on the state and federal level were enacted in the 1970’s, 1980s and 1990s, landfill closure and reuse practices have become more common and regulated.

- Norman J. Levy Park and Preserve, Merrick Landfill, Town of Hempstead, NY. Total site area is 179 acres, 49.6 acres of which are landfill, closure plan included use of landfill as recreational and conservation land. Kayaking, fishing, nature trails, amphitheater. Guided kayak tours. A pond has been constructed on top of the landfill cap.

- Ferry Point Park, Bronx, NY, is slated to be developed with an 18-hole Jack Nicklaus Signature Golf Course. The golf-course is city-funded and will be open to the public. Other components of the park will include basketball, baseball and playground facilities, paths with seating, educational signs and waterfront access.

- Town of Brookhaven Ecology Site. Park and Animal Preserve, Holtsville, NY. Since 1974, when the landfill closed, the Town of Brookhaven Highway Department employees had worked to revegate the hills filled with garbage and to build a modern recreational and educational facility.

- Fresh Kills Park, Staten Island, NY. 2,200 acre landfill, which had two of the four mounds capped in 1997. In 2001, the City of New York decided to conduct master planning process for a world class park. The park is to include a phasing plan that would incorporate recreational areas, public art and sports facilities.

### III. On-going Post-Closure Monitoring

Currently the Columbia County Department of Public Works is responsible for post-closure monitoring, routine maintenance, including mowing and minor repairs. Monitoring will need to continue at the landfill regardless of the new proposed uses and entity responsible for the landfill.

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6 Harnik, Taylor & Welle
9 [http://www.nycgovparks.org/parks/ferrypointpark/pressrelease/20402](http://www.nycgovparks.org/parks/ferrypointpark/pressrelease/20402)
IV. Costs

While costs for projects of this magnitude vary individually based on the site itself and the required amount of planning and engineering, based on other projects that have proposed similar recreational areas, construction costs can be outlined. However, continued post-closure monitoring and site maintenance are not factored into these costs.

- **Norman J. Levy Park and Preserve, Merrick, NY**
  - Project Term: 1994-2001
  - Construction Cost: $11 Million
  - Project Features:
    - Capping the uppermost 8 acre of the 45-acre site and allowing the existing slopes and adjacent stream to remain in their natural state
    - Minimizing disturbance of slopes, thus avoiding excavation of waste and sediment damage to adjacent stream and wetland
    - Three miles of hiking trails (many which are handicapped-accessible)
    - 2 acres of restored tidal wetlands
    - 18 exercise stations
    - Two rainwater ponds aerated by windmills
    - 500-foot Cumaru fishing pier
    - Amphitheater for educational presentation
    - Plantings of indigenous species
    - Kayak-launching ramp
    - Informational signs explaining the site ecology
    - Recycled materials used for paving and construction
    - Composting toilets

- **Ferry Point Park, Bronx, NY**
  - Project Term: 2008-On-going
  - Projected Construction Cost: $92 Million
  - Project Features:
    - 18-hole golf course
    - Sports fields/basketball courts
    - Waterfront access/Waterfront park
    - Pedestrian trails
    - Two community parks

- **Fresh Kills Park, Staten Island, NY**
  - Project Term: 2001-On-going
  - Projected Construction Cost: $300-400 Million
  - Project Features:
    - Network of pathways
    - Network of waterway for kayaking & canoeing
    - Waterfront access

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12 [http://www.csinews.net/IntheNews/April_06/7_Fresh_Kills.htm](http://www.csinews.net/IntheNews/April_06/7_Fresh_Kills.htm)
Public space & facilities
Wildlife habitat areas
Planting communities
Connection of roadways and pathway between other Staten Island parks

C. SEEPAGE MANAGEMENT

I. Analysis
a) Post-closure Monitoring
Some leachate from the landfill is expected, and DEC regulation requires that leachate be collected for treatment or disposal. 6NYCRR Part 360, 360-2.15(k)(5) states:

Maintenance and operation of the leachate collection system are required during the [30-year] post-closure period and the method of leachate treatment or disposal must be addressed for as long as leachate is capable of adversely impacting the environment. The department may waive this requirement when the owner demonstrates that leachate no longer poses a threat to human health or the environment.

Over the past 10 years of routine post-closure inspections, C&A has monitored groundwater seepage at nine locations at the edges of the landfill cap. The character of seepage – its color, whether moisture is present, or if old, dry stains are visible – has been documented by C&A. Testing performed as part of the environmental monitoring program includes sampling of three of the seepages and chemical analysis of any water that is present. These locations are monitored once annually on a schedule that rotates quarterly (see annual monitoring schedule in “Maintenance and Monthly Inspection” section). Seepage has generally decreased in recent years, and analytical testing has shown that toxic levels have remained static, however, in more recent years the sampling sites have been dry and samples were not taken.

b) Groundwater Monitoring
C&A conducts groundwater monitoring at two monitoring wells and fourteen gas vents throughout the landfill. C&A staff uses a water level meter with a probe on the end to detect the level of standing water in the well or vent. Water levels are recorded monthly and field comparisons of upgradient to down gradient well levels are done.

Laboratory groundwater sampling is done on and annual basis. (See annual monitoring schedule in “Maintenance and Monthly Inspection” section). There are three down-gradient monitoring wells which are sampled for 6NYCRR Part 360 Routine Parameters. The results are then sent to C&A for review and comparison to 6NYCRR Part 703 Groundwater Standards and Guidance Values (T.O.G.S. 1.1.1), revised June 1998. As indicated by the results, the three down gradient wells show the presence of inorganic constituents in the groundwater that exceed the parameters. Theses results are incorporated into a yearly report that is sent
to the NYSDEC and Columbia County for record of tracking the progression of exceedances.

Since the yearly reports have shown that contaminants for the landfill are declining and in some years that contaminants barely exceed the levels outlined in the Groundwater Standards and Guidance values, the NYSDEC has not issued an active response decision. Therefore, levels outlined in the reports do not pose a justification for remediation action by the NYSDEC based on the findings and current use of the landfill.13

c) Methane
The gas vents are located in the central section of the waste piles, approximately 75 to 120 feet on-center from one another, and 80 to 100 feet from the perimeter of the landfill cap and access roads. There are 25 gas vents in all. Measurements of gas levels are taken during monthly inspections at 12 of the gas vents, three soil-gas probe locations and two monitoring wells. 6 NYCRR specifies that one gas vent per acre of cover be provided, and the Hudson Landfill was designed with 1.5 gas vents per acre.

Landfill gas is produced by the anaerobic bacteria that are responsible for decomposition of the waste mass. The primary components of landfill gas are carbon dioxide and methane, although other gases, such as malodorous hydrogen sulfide and other sulfur-based compounds, and trace amounts of non-methane organic compounds (NMOCs) which can include volatile organic compounds (VOCs), may be present. Methane, which is a flammable and potentially explosive gas, typically makes up 40% to 60% of the volume of gas produced during decomposition14, 15. Gas is released from the waste mass into the gas venting layer, which is below the impermeable cap, and is released into the air via gas venting pipes. Landfill gas is greatly diluted by the time it escapes via the venting pipes. The lower explosive limit (LEL) for methane is reached when it's at a concentration of 5% per volume of air, or 10,000 parts per million (ppm). According to 360-2.17(f)(1)(i, ii), the concentration of methane and other explosive gases generated by the facility must not exceed the lower explosive limit (LEL) at the property boundary, and in structures, gas concentrations must not exceed 25% of the lower explosive limit, which corresponds to 1.25% concentration per volume of air, or 2,500 ppm.

Monthly landfill monitoring indicates that methane numbers have not exceeded these levels, and during routine monthly monitoring of gas vents, soil probes and monitoring wells since 2003, the majority of measurements have indicated that there is no methane present, with readings of 0 ppm. Gas Vents #13 and #16, located on the eastern side of the southern hill, typically have the highest readings, with recent measurements in 2007 and 2008 between 82 and 100 ppm.

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13 US EPA, Presumptive Remedy for CERCLA Municipal Landfill Sites, 1993
15 AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, ch. 2.4 MUNICIPAL SOLID WASTE LANDFILLS
http://www.epa.gov/ttn/chief/ap42/ch02_final/c02s04.pdf
II. Options for Seepage Control and Gas Venting Systems

a. Seepage Pit Collection System for Seepage Control Option
Units to collect seepage water are utilized to store the seepage water until it can be emptied by trucks. Land fill seepage water is hazardous for the environment, ground water and other waters. Through a series of Leachate Collection Systems (LCS), current seepage on the site can be maintained. LCS would be a secondary collection system that would be installed around the perimeter of the landfill and it would include a series of collection pipes and manholes/wells that would collect and store the seepage until emptied by a qualified hauler possibly to the Hudson sewage treatment plant. These manholes/wells would be inspected during the monthly inspections and allow safe passage of visitors in the areas. Design and location of this type of system would require further investigation of existing seepage problem and proposed location for these systems.

b. Constructed Treatment Wetlands for Seepage Control Option
Constructed wetlands treat a wide variety of wastewaters and runoff waters using emergent plants. Constructed wetlands use a combination of fixed-film biological activity and physical, chemical, or photochemical mechanisms. The use of a vertical flow (VF) constructed wetland has been widely used to treat landfill leachate.16

VF wetlands are two to three foot deep sand beds that are under drained, and have bulrush and reeds on the surface. Leachate is collected into a storage tank from which it is pumped to the wetlands. Periodic or intermittent dosing of leachate onto the wetlands often lasts for an hour followed by five hours of resting. To accommodate this intermittent application, the site is divided into multiple sub-basins; one is wetted while the other five are drying.

Leachate composition depends on the type and quantity of materials placed in the landfill and on the time since placement. Thus, characterization of the leachate is essential for proper wetland design because it can contain high concentrations of biochemical oxygen demand (BOD), ammonia, metals, high or low pH, and possibly priority pollutants of concern. In addition, the nutrient balance in the leachate may be inadequate to support vigorous plant growth in the wetland and supplemental potassium, phosphorus, and other micronutrients may be necessary. Typically, the wetland will be sized to achieve a specific level of ammonia or total nitrogen in the final effluent. This may be accomplished with a single free-water surface (FWS) or VF wetland or with a series of VF cells (As an example, a VF wetland recently designed to treat 15 gallons per minute of landfill leachate required approximately one-half acre). Because leachate is collected from the subsurface of the landfill, the treatment wetlands are usually sited downgradient from the landfill or the leachate is pumped to the wetlands. Design and location of these systems would need to be investigated more efficiently during phase II of this project.

16 http://www.swhydro.arizona.edu/archive/V5_N1/feature7.pdf
c. Methane Collection System Option

The landfill is estimated to contain 682,150 tons of municipal waste. The EPA uses a screening process to determine potential landfill gas (LFG) to energy projects, the following chart compares the Hudson landfill against these criteria.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Hudson Landfill</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 1 million tons of waste in place</td>
<td>0.68 million tons</td>
</tr>
<tr>
<td>Still receiving waste, or not closed for more that a few years</td>
<td>Stopped Receiving waste 24 years ago</td>
</tr>
<tr>
<td>Landfill depth of 40 feet or more</td>
<td>Average Landfill Depth 30’</td>
</tr>
</tbody>
</table>

Under these criteria the Hudson Landfill does not meet minimum screening criteria for LFG project. Primarily the number of years since the landfill stopped receiving waste results in a significant decrease in the LFG potential. Even if the landfill did produce LFG, there is significant cost to upgrade the Hudson landfill from a passive gas collection system to an active one. The EPA estimates $950,000 in capital costs for collection system of 1 million ton landfill for blowers and condensate collection\(^\text{17}\). Additional capital costs for LFG to energy equipment (internal combustion engine or boiler and steam turbine) would be incurred. Ideally, the landfill would have potential to generate energy however; given the age, recovering enough gas to make it a profitable project would be difficult if not impossible.

d. Gas Venting System Extraction Option

Removing the entire gas venting system for the landfill is not recommended. However, conservations with Richard Forgea, PE of the NYSDEC indicated that removal of some gas vents at the Hudson landfill is practical. Since the monthly landfill monitoring has indicated little to no methane is present at the vents; removal of some vents is a viable option. To determine how many vents can be removed, Mr. Forgea has indicated that calculations showing the amount of current gas released by the landfill in comparison to the total amount of gas released by the landfill with vents removed should be equal.

D. ASSESSMENT AND ANALYSIS OF FINANCIAL OR OTHER RISKS

In general, risks associated with redevelopment include financial and other associated with environmental, ecological, and human health impacts. Since current records for landfill ownership and risks associated with ownership are limited, establishment of current risks and liability are needed. When the County and the City began the process of the closure, an agreement was signed between the two. We believe this agreement discusses assumed liabilities and risks. Furthermore, we understand that the law offices of Rapport, Meyers, Whitbeck, Shaw and Rodenhausen may have draft copies of the agreement; however, we have been unable to locate a completed and signed agreement. Understanding the current risks and liability associated with post-closure monitoring and maintenance will give perspective on future uses and expectations.

Further understanding of who is to take responsibility for the new proposed uses must first be established in order to provide risk and financial assessment.

Currently, Columbia County is responsible for post-closure monitoring and maintenance, however, discussion and documentation of either the continuation of monitoring and maintenance by the county or the transfer of these responsibilities should be established. There are three possible outcomes that can be discussed, one is that the county will continue the monitoring and maintenance of the existing and new proposed uses, second would be a joint agreement between the county and another entity, and the last option would be a completely transfer all responsibilities and liability to another entity. However, with the proposed uses it must be understood that weather the landfill is transferred or the county remains as the owner, there must be a continued monitoring plan in effect for the EMSIG building(methane monitoring) which currently is not part of the land owned by Columbia County.

E. PARKING AND ACCESS

I. General Considerations
Vehicular access to the landfill is limited with the only formal entry to the landfill site found at the northern end of North Second Street, which terminates at the parking lot of the former EMSIG building at the eastern edge of the landfill. This parking area is approximately 120’ x 400’, not including the road right-of-way. An access road follows the western perimeter of the landfill along the top of the leachate barrier, dropping downhill to the west from North Second Street and continuing north to the approximate location of the northern slope failure. While it is not a formal entrance to the site, trails used by off-road vehicles traverse the High School grounds' northern property line and extend into the Greenport Conservation Area, meeting the landfill property at its northeastern corner, in the vicinity where the amphitheater has been discussed.

With the exception of the paved parking lot at the former EMSIG Building, which is part of the cap, the landfill cap was not designed to accommodate the weight or wear of vehicular use, except in emergency situations. Additional access roads, driveways or parking areas would have to be accommodated off-cap, or would require reconstruction of the existing maintenance road.

a) Parking
The parking lot adjacent to the former EMSIG building is approximately 135’ x 395’, and could accommodate parking for approximately 150 vehicles. The City of Hudson's zoning code requires one parking space for each 5 seats in a proposed theater, so if the amphitheater were considered a theater, the existing parking lot would be adequately sized for 750 event attendees. However, the City’s parking requirements rely on a portion of theater-goers who are walking or parking on the street or in existing municipal lots in the city’s center. Given the site’s location at the periphery of the city, municipal lots and on-street parking are not probable options. For planning purposes, we recommend one parking space for each 2-1/2 attendees is recommended. This reduces the available parking from accommodating 750 attendees to 375 attendees.
b) Access to Kayak/Canoe Launch
The existing service road provides access to the water. Location and access to the kayak/canoe launch should be looked into further in Phase II of the project when development plans are to be drawn up. The access location may include improvements to the roads and footpaths leading to the launch.

c) Trail Connections
The landfill site is a key piece of a recreational and pedestrian network that connects the City of Hudson to the Greenport Conservation Area. Three pedestrian routes are envisioned – an escarpment trail on the bluffs above the Hudson River, a riverside trail through the former Atlas Brickyard, and sidewalk route along Joslen Boulevard and Harry Howard Avenue – all pass through or close to the landfill, and would help to connect recreation resources in the Town of Greenport to recreation resources in the City of Hudson on its south side (Charles William Park). In 2006, the City of Hudson received a grant from the New York State Office of Parks Recreation and Historic Preservation under the Environmental Protection Fund for development of the Charles William Park which is located southeast of the landfill. The potential exists to develop trails from this park to the proposed uses at the landfill.

d) Amphitheater
Currently, an amphitheater is proposed in the northeast corner of the landfill site. As past years have shown, this particular section of the site has undergone extensive slope repair due to failure. While the potential for slope failure still exists; additional engineering design and modifications to construction can possibly be explored to stabilize and protect the area of potential use.

F. PERMITS REQUIRED

I. Local Zoning and LWRP
The City of Hudson is currently undergoing SEQR for adoption of a Local Waterfront Revitalization Plan (LWRP), along with the adoption of zoning changes that would implement the LWRP. According to a Long Environmental Assessment Form (LEAF) and supporting documentation, submitted on October 30, 2008, the City intends to prepare a General Environmental Impact Statement (GEIS), the passage of which will obviate the need for SEQRA review of projects which conform to the LWRP. The landfill site is within the proposed Hudson Local Waterfront Revitalization Plan (LWRP) boundary, but to date, the LWRP has not been adopted by the City of Hudson. According to the LEAF for the LWRP, “provision of additional public open space along the Hudson Riverfront” and, “protection and enhancement of wetlands and associated open space within the North and South Bays” are among of the City’s planning goals. While the current zoning is Industrial; recreational uses are permitted. The rezoning recommended in the LWRP would zone the site as part of the Recreational Conservation District, therefore, the proposed use will conform with the LWRP. Additionally, adoption of the LWRP would make additional funding available to carry out recreational and conservation programs.

If the LWRP is not adopted, the project may be subject to SEQR.
II. Closure Plan Modification Approval

Any redevelopment on the landfill cap is considered a modification of cap design and would require a submission to the Region Solid Waste Engineer in NYSDEC’s Office of Environmental Quality which include plans, engineer’s reports and other documents in support of the modification. The modification of the closure plan would detail any changes in inspections, maintenance, environmental monitoring activities or schedules that may arise as a result of newly proposed features. Following approval and construction, an amended CCR is prepared and submitted to document as-built conditions. It should be noted that the clock on the 30-year monitoring and maintenance period that started upon closure continues to run, so that if the proposed recreational development takes place in year 15 of the monitoring period, there would be 15 years of monitoring remaining.

A modification of the landfill plan is required for changes to landfill structures or functional elements, including features constructed on top of the cap, the application of additional topsoil, changes to vegetation management plans, changes to the access road that sits atop the leachate barrier, require a modification to the original closure plan and subsequent changes to the CCR. The NYSDEC Office of Environmental Quality is required to review the plans and approve the changes, and following construction, the CCR must also be amended to reflect changes made during redevelopment. If proposed use of the site avoids the landfill cap entirely, then technically, no modification to existing documents is required.

Most simply, the proposal for a modification must ensure that the cap continues to comply with Part 360. There is not a single, set procedure for making such a modification, and no uses or actions are specifically prohibited. In a telephone conversation with Richard Forgea, PE, he indicated that the greater the complexity of a modification, the longer the review process would take. For instance, while it is generally advised that any changes avoid penetrating the barrier protection layer, it may be possible to demonstrate through pilot projects and additional documentation that a particular structure would have no impact on the integrity of the low-permeability barrier soil layer and the gas venting layer, even though it does penetrate the barrier protection layer. A proposal to remove gas vents would require an engineering report demonstrating that the volume of gas being generated could be successfully vented by the remaining gas vents (if any), and that subsurface migration would not occur outside the gas venting layers.

III. DEC Permits

The wetland adjacent to the landfill is designated New York State Freshwater Wetland HN-2, and therefore, any actions proposed in the wetland or its 100’ buffer zone are subject to NYSDEC regulation. As-built plans prepared for the CCR indicate that the leachate barrier and access road at the western edge of the landfill abut or are partially within the wetland boundary. Construction in the wetland or its buffer zone would require a NYS Freshwater Wetland Permit and a NYS Protection of Waters permit, both applied for using the Joint Application for Permit. Wetland HN-2 is a Class 1 wetland, meaning it is of the highest quality and is subject to stringent standards when permits are reviewed. Additionally, the site falls within a 1/2-mile radius of known rare plants, animals and/or significant natural communities. Permit applications will need to

18 Via telephone, November 24, 2008
demonstrate that proposed actions will have no impact on the habitats of designated plants and animals. Streams in the vicinity of the site are classified “C,” and are not subject to Freshwater Wetland and Protection of Waters Permits.

An application consists of the Joint Application for Permit and supporting documents, including SEQRA materials.

Both the Freshwater Wetland Permit and the Protection of Waters Permit distinguish between major and minor projects. Generally speaking, once an application is determined to be complete, the review time for a minor project is significantly shorter than the review time for a major project. If a project is considered minor, DEC must complete its review within 45 days of declaring the application complete. For major projects, DEC has up to 90 days to render a decision if no public hearing is held. If a hearing is held, DEC notifies the applicant and the public of a hearing within 60 days of the completeness determination. The public hearing must begin within 90 days of the DEC’s completeness determination, and the DEC must render a final decision on the application within 60 days of receiving the hearing record.

a) Freshwater Wetlands Permits
Freshwater Wetlands Permits are reviewed for their compatibility with wetland functions, values and qualities. Standards for Wetlands Permits are enumerated in 663.5 Subdivision 663.5 (e) “Standards for Permit Issuance.” As noted above, Class 1 Wetlands are subject to the strictest standards, requiring that a “proposed activity satisfies a compelling economic or social need that clearly and substantially outweighs the loss of or detriment to the benefit(s) of the Class 1 wetland.” Projects that are found to be generally incompatible must demonstrate their benefits to the health and welfare of the community, and minimize adverse impacts to the wetland and its buffer zone.

The following are regulated activities, subject to a Freshwater Wetland Permit:
- Filling, draining or excavating, grading, and dredging.
- Constructing buildings, roadways, septic systems, bulkheads, dikes, dams, and docks.
- Clear-cutting timber and other vegetation.

Activities that are exempt from the Freshwater Wetlands Permit include:
- Agricultural activities except filling, clear-cutting of trees, or construction of non-agricultural structures.
- Harvesting natural products.
- Recreational activities.
- Continuing lawfully existing land uses.
- Ordinary maintenance and repair of existing functional structures.
- Conducting educational and scientific research.
- Establishing individual recreational moorings.

Minor Projects are also subject to Freshwater Wetland Permits. Any regulated action not specifically named in the list of minor projects below is considered a major project:
- Public utilities in existing corridors not involving new clearing and grading.
- Reconstruction in-kind of existing docks and similar structures.
- Installation of open-work docks with 200 square feet or less of deck area.
• Maintenance dredging of navigation channels of 500 cubic yards or less.
• Public utilities in existing corridors not involving new clearing and grading.
• Reconstruction in-kind of existing docks and similar structures.
• Installation of open-work docks with 200 square feet or less of deck area.
• Maintenance dredging of navigation channels of 500 cubic yards or less.

b) Protection of the Waters Permits
The Protection of Waters Permit regulates, among other things, the construction or reconstruction of docks, piers and similar structures. It should be noted that a Memorandum of Understanding between a municipality and the NYSDEC may take the place of a permit for regulated activities. When reviewing a Protection of Waters Permit Application, NYSDEC considers the potential impact of the proposal on natural resources such as fish and wildlife habitat, spawning or nesting grounds, water quality, hydrology, and watercourse and water body integrity, project design and construction, safety of the proposal, the extent to which the proposed use is water-dependent and resource management objectives.

The Protection of Waters Permit regulates the following types of activity:
• Modification or disturbance of the bed or banks of protected streams that are classified C(t) and above, including removal of sand or gravel.
• Filling or dredging in navigable waters.
• Construction, reconstruction, or repair of certain dams.
• Construction, reconstruction, or modification of certain docks, mooring areas or other structures in navigable waters.

Activities that are exempt from Protection of the Waters Permits include:
• Agricultural activity limited to livestock or wheeled farm equipment crossing of protected stream, or withdrawal of irrigation water.
• Construction, reconstruction or repair of a structure used to impound water which satisfy certain size criteria
• Piers, docks and wharves meeting certain criteria, as indicated below:
  o docks, piers, wharfs, platforms, moorings or other structures for which a lease or conveyance authorizing use and occupancy has been obtained from Commissioner of General Services;
  o a dock, pier, wharf or other structure used solely as landing place on water providing dockage for five (5) or fewer boats and encompassing within its perimeter an area of less than four thousand (4,000) square feet;
  o a mooring area which accommodates fewer than ten (10) boats;
  o seasonal replacement or reinstallation of floating docks and other structures existing prior to May 4, 1993;
  o relocation of floating docks, temporary ramps, walkways, and anchoring devices within the established perimeter of a marina or boat basin; and
  o ordinary maintenance or repair of existing structures (such as redriving piles, replacing boards in docks, repainting).

Minor Projects subject to the Protection of Waters Permit are listed below. Any regulated action that is not specifically named below is considered a major project.
Among regulated major actions, there are varying impacts, and open-work construction such as fixed and floating docks or boardwalks are considered to have less of an impact than projects involving dredging and filling. Because the burden of proof to demonstrate compatibility of a proposed action is on the applicant, use of relatively low-impact structures as an alternative to other forms of construction is recommended.

G. VEGETATION MANAGEMENT RECOMMENDATIONS

The objective in landfill cap vegetation is to provide a fire resistant cover that will prevent the cap from eroding. Turfgrass and erosion control mixes that can be mown are typically used to achieve this end. Slopes at the Hudson Landfill are steep, with areas approaching 50% slopes, requiring some care as to plant selection and maintenance. The original seed mix consisted of 50% Creeping Red Fescue (Festuca rubra), 41% Crown vetch and 9% Redtop (Agrostis gigantea), which is a typical erosion control turf mix. The landfill cap vegetation is generally in good condition. Ongoing maintenance has included seasonal mowing – according to Jolene Race of the Columbia County Department of Solid Waste, the County’s highway crew mows at least twice during the summer, typically when their schedule allows, or if requested following a monthly inspection.19

However, alternative plantings and vegetation management schemes have been used at other landfills in New York State.

**High Acres Landfill**, fifteen miles south of Rochester, located in the Towns of Perinton (Monroe County) and Macedon (Wayne County) is an active landfill. It has implemented a comprehensive wildlife habitat management plan, which includes goals to increase species diversity through grasslands enhancement and allowing growth of shrubs and trees in designated areas. Sections of the landfill that are already closed are planted with native grasses which are infrequently mowed. The Long-Term plan also incorporates agricultural and horticultural components, including a vineyard, but most of these components appear to be outside the cap itself.

**Pennsylvania Avenue Landfill** and **Fountain Avenue Landfill**, adjacent to Jamaica Bay, Brooklyn, are being reforested using northeastern coastal woodlands species.20 Early research by ecologists at Rutgers suggested that root penetration was not a significant problem in clay-capped landfills, despite

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19 Via telephone, November 24, 2008.
20 “A Forest Grows on a Brooklyn Landfill” http://www.wnyc.org/news/articles/73332
conventional wisdom to the contrary. New York City Department of Environmental Protection undertook pilot studies in conjunction with closure plans for the Fresh Kills Landfill which upheld these findings. Landscape architects recommended that a new layer of topsoil at least three feet deep be placed on top of the existing topsoil layer so that a wider variety of woody plants could be planted.

While variation is possible if site-specific conditions are amenable to proposed changes, it must be acknowledged that DEC does require a formal modification to the Closure Plan if changes in vegetation and its management are proposed, and may require additional testing and documentation before approving such a change. In a telephone conversation with Richard Forgea PE, he noted that much of the fear of cap penetration by woody roots has been “overblown,” and that, while some species of plants may be precluded from use because of root structure, plants other than the traditional sod-forming grass can be used on landfill caps without damage to the subsurface layers. Other factors, such as a relatively low methane concentration, may support a proposal that limits mowing.

IV. EVALUATION OF PHASE 1 STUDIES, RECOMMENDATIONS

Redevelopment of former landfill sites can play a major role in sustainable development, providing environmental, economic, and social benefits. Environmental benefits may include isolation of waste from the environment, mitigation of ecological impacts, and remediation of soil and groundwater impacts. Economic benefits from redevelopment can include revenue to offset the costs of long term care of the former landfill, profits for the successful developer, and indirect economic benefits for the community. Social benefits can include optimal siting of facilities that provide desired services or amenities for the community, creation of jobs, indirect economic benefits, and aesthetic enhancements. While real and perceived risks may deter certain types of redevelopment, modern waste containment technologies can generally overcome engineering challenges associated with landfill redevelopment and facilitate a wide range of landfill redevelopment schemes.

It is recommended that a new survey showing the current landfill topography be completed. The survey would then be used to compare the elevations of the existing site to the original elevations shown when the landfill was closed. The survey would show a more accurate representation of where the settlement of the landfill has occurred when compared to the as-built closure survey. Since it is assumed that settlement in the lower layers of the landfill have occurred; further testing with regards to the capacity of the cap may be needed. If a structure is proposed on the landfill cap, it is recommended that a pile driven system be placed in the landfill. This system will allow for the proposed structure to hover over the landfill cap with out load being placed on the cap. Boring tests would be required if this method is chosen as a design parameter for driven piles.

The introduction of a secondary seepage collections system should be incorporated in efforts to allow visitors to the future site to safely pass these areas. One option is to use

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22 Via telephone, December 1, 2008.
a network of piping and collection manholes/wells be installed around the perimeter of the landfill and these manholes/wells be monitored during the monthly inspections and pumped when inspections show high levels of seepage. Collected seepage would be hauled and disposed of in a proper manor to the Hudson sewage treatment plant. Another option that is recommended is the use of constructed wetlands be considered, this option provides an alternative method to the standard collection and treatment method. Design of the secondary seepage collection system would be completed in the second planning phase of the project and would be incorporated into the overall master development plan and modified post-closure report.

Since the monthly landfill monitoring has indicated little to no methane is present at the vents, the concept of removing vents is reasonable. In order to be able to remove a few vents, Mr. Forgea, PE has indicated that calculations showing the amount of current gas released by the landfill in comparison to the total amount of gas released by the landfill with vents removed should be equal. It is recommended that further calculations be completed on the methane production at the landfill and the selection of vent removal be examined. Vent removal should be selected based on the methane produced at certain vents and the placement of trails and roads in the master development plan. The safety of visitors to the park should also be kept in mind and gas vents left on site should be either housed or caged to keep people away from them.

It is recommended that further discussion and documentation of either the continuation of monitoring and maintenance by Columbia County or the transfer of these responsibilities should be established. When the County and the City began the process of the closure, an agreement was signed between the two. We believe this agreement discusses assumed liabilities and risks. Furthermore, we understand that the law offices of Rapport, Meyers, Whitbeck, Shaw and Rodenhausen may have draft copies of the agreement; however, we have been unable to locate a completed and signed agreement. Understanding the current risks and liability associated with post-closure monitoring and maintenance will give perspective on future uses and expectations. There are three possible outcomes that can be discussed, one is that the county will continue the monitoring and maintenance of the existing and new proposed uses, second would be a joint agreement between the county and another entity, and the last option would be a completely transfer all responsibilities and liability to another entity. However, with the new proposed uses it must be understood that weather the landfill is transferred or the county remains as the owner, there will be a need to establish the risk associated with ownership, funding available for post-closure monitoring and maintenance (both for the landfill and EMSIG building) and the permits required for proposed redevelopment of the landfill.
APPENDIX A

FIGURES
1. MAP OBTAINED FROM NYS DEC FRESHWATER WETLAND MAP
HUDSON NORTH QUADRANGLE
DATED 1953, REVISED 1976
HUDSON SOUTH QUADRANGLE
DATED 1963, REVISED 1976

NORTH BAY RECREATION AREA
TOWN OF GREENPORT
COLUMBIA COUNTY

SITE & NYSDEC WETLAND MAP

CRAWFORD & ASSOCIATES
ENGINEERING, P.C.
551 Warren Street, Hudson New York 12534

DATE 11/26/08
DRAWN BY: ADK
DESIGNED BY: ADK
CHECKED BY: PJG
APPROVED BY: BKN
C&A JOB# 3258.0
DRAWING: FIGURE 4
APPENDIX C

DEEDS
Deed copies

To: Dan Russell
From: Aaron J. Allers

Email: drussell@crawfordandassociates.com
Pages: 12

Phone: 1/21/09

Re: Hudson North Bay

Attached are 2 deeds into the County of Columbia for the landfill.

1. Deed Book 796 Page 51 – recorded 5/19/95 – the City of Hudson Industrial Development Agency to the County of Columbia

2. Deed Book 796 Page 58 – recorded 5/19/95 – the City of Hudson to the County of Columbia
QUIT CLAIM DEED

THIS Instruments, made the 2ND day of May, Nineteen Hundred and Ninety-Five

BETWEEN

THE CITY OF HUDSON INDUSTRIAL DEVELOPMENT AGENCY, a public benefit corporation, organized and existing under the laws of the State of New York, having its principal place of business at 444 Warren Street, Hudson, New York 12534,

party of the first part, and

THE COUNTY OF COLUMBIA, a municipal corporation organized and existing under the laws of the State of New York, having its principal place of business at 401 State Street, Hudson, New York 12534,

party of the second part,

WITNESSETH that the party of the first part, in consideration of ONE DOLLAR and 0/100 ($1.00) lawful money of the United States, and other good and valuable consideration paid by the party of the second part, does hereby renounce, release and quitclaim unto the party of the second part, its successors and assigns forever.

(See Schedule "A" attached hereto)

TOGETHER with an easement in common with others over Second Street Extension as now laid out and more particularly described in Schedule "B" attached hereto.

The County of Columbia agrees to release its interest in the right-of-way as described in Schedule "B" in the event that the roadway described in Schedule "B" is dedicated as a public street to the City of Hudson. (See Schedule "C" attached hereto).

TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises.

TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, its successors and assigns forever.

IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and seal the day and year first above written.

IN PRESENCE OF

THE CITY OF HUDSON INDUSTRIAL DEVELOPMENT AGENCY

By: [Signature]
Arthur Loewer, Chairman
Proposed Description City of Hudson Lot 2A

Beginning at a point at the southwesterly corner of Lease Disposition parcel 2 for EMSIG Manufacturing Company, being the most southerly corner of this parcel and referenced as being located the following courses and distance from the westerly line of lands of Fliman’s Association of the State of New York:  

1. N 64 deg 55' 15" W 228.10 feet
2. N 70 deg 00' 35" W 208.73 feet
3. N 79 deg 22' 25" W 172.51 feet

Proceed through the lands of City of Hudson Industrial Development Agency:

THENCE North 73 degrees 22 minutes 25 seconds West for a distance of 57.75 feet
THENCE North 55 degrees 15 minutes 45 seconds West for a distance of 419.59 feet
THENCE North 41 degrees 12 minutes 50 seconds East for a distance of 745.03 feet to a corner of lands of City of Hudson.
Continue along the lands of the City of Hudson:

THENCE South 60 degrees 03 minutes 33 seconds East for a distance of 564.92 feet to the lease parcel of EMSIG Manufacturing medley property corner. Continue along the westerly line of EMSIG Manufacturing lease parcels 1 and 2.

THENCE South 25 degrees 39 minutes 13 seconds West for a distance of 126.65 feet
THENCE along a curve to the right, having a radius of 274.00 feet and an arc length of 245.14 feet, being substantiated by a chord of South 51 degrees 30 minutes 13 seconds West for a distance of 229.61 feet

THENCE South 77 degrees 25 minutes 15 seconds West for a distance of 69.42 feet
THENCE along a curve to the left, having a radius of 175.00 feet and an arc length of 94.68 feet, being substantiated by a chord of South 61 degrees 51 minutes 15 seconds West for a distance of 83.53 feet
THENCE South 45 degrees 21 minutes 15 seconds West for a distance of 163.74 feet
THENCE along a curve to the right, having a radius of 275.00 feet and an arc length of 59.18 feet, being substantiated by a chord of North 58 degrees 58 minutes 45 seconds West for a distance of 98.26 feet

THENCE South 18 degrees 23 minutes 45 seconds East for a distance of 62.89 feet to the point or place of beginning. Being all of parcel 2A on a map entitled “PROPERTY LINE SURVEY PLAN HUDSON LANDFILL CLOSURE” prepared by Robert J. Hillenburg and dated April 14, 1996.

Together with and subject to covenants, easements, and restrictions of record.

Sold property contains 9.1827 acres more or less.

Schedule "A"
PROPOSED DESCRIPTION HUDSON LANDFILL PARCEL 20

Beginning at a square concrete monument at a southeasterly corner of lands of the City of Hudson on the western line of lands of Fireman's Association of the State of New York, being the northeastern corner of this parcel, referenced as being located 39 degrees 30 minutes 09 seconds West and 12 feet from the Town of Greenport, City of Hudson, N.Y.

Proceed along the lands of Fireman's Association of the State of New York.

TRENCE South 40 degrees 12 minutes 00 seconds West for a distance of 347.14 feet to the northern property parcel of EMDIG Manufacturing. Continue along the base parcel of EMDIG Manufacturing.

TRENCE North 31 degrees 31 minutes 25 seconds West for a distance of 183.14 feet.

TRENCE North 26 degrees 31 minutes 25 seconds West for a distance of 351.24 feet to a square monument found at line of the City of Hudson. Continue along the line of the City of Hudson.

TRENCE North 21 degrees 56 minutes 30 seconds East for a distance of 60.02 feet to a square concrete monument.

TRENCE South 65 degrees 05 minutes 30 seconds East for a distance of 499.00 feet to a square concrete monument.

TRENCE South 22 degrees 34 minutes 22 seconds East for a distance of 267.90 feet to the point or place of beginning. Being all of parcel 20 on a map marked "PROPERTY LINE SURVEY PLAN HUDSON LANDFILL CLOSURE" prepared by Robert J. Iltenburg and dated April 24, 1995.

Together with and subject to covenants, easements, and restrictions of record.
ALL that piece or parcel of land situate in the City of Madison, County of Columbia, State of New York, bounded and described as follows:

BEGINNING at a point on the easterly right of way line of a 'right of way and easement lot for ingress, egress and utility purposes as described in Libra 97 at Page 57, being on the southerly line of Lot 2A and referenced as being located the following true courses and distances from the disposal lot of E.M. Johnson Manufacturing Co.:

1. North 74 degrees 22' 25" West 67.76 feet; (2) North 55 degrees 15' 45" West 37.31 feet, proceed along the southerly line of Lot 2A North 55 degrees 15' 45" West for a distance of 53.84 feet to a point on the westerly line of the right of way; proceeding thence along the westerly line of the herein described right of way on a curve to the left having a radius of 325.00 feet for an arc length of 13.51 feet, being subtended by a chord of South 51 degrees 35' 10" East 96.00 feet; then due South 47 degrees 16' 15" W. for a distance of 372.95 feet; thence on a curve to the right having a radius of 411.00 feet for an arc length of 60.53 feet, being subtended by a chord of South 52 degrees 31' 45" East 90.33 feet; thence South 37 degrees 23' 15" West for a distance of 276.72 feet to the end of North Second Street, proceeding thence along North Second Street South 42 degrees 12' 00" East for a distance of 25.75 feet; proceeding thence along the easterly side of the herein described right of way North 49 degrees 21' 15" West for a distance of 188.60 feet; thence on a curve to the left having a radius of 255.80 feet for an arc length 89.34 feet, being subtended by a chord of North 52 degrees 28' 45" East 92.23 feet; thence North 49 degrees 36' 15" East for a distance of 373.59 feet; thence on a curve to the right having a radius of 275.50 feet; thence 132.11 feet; thence on a curve to the right having a radius of 275.50 feet for an arc length of 13.27 feet, being subtended by a chord of North 73 degrees 18' 35" East 1.27 feet to the point of beginning.

BEING all of the right of way and easement lot that runs to Lot 2A as shown on a map entitled "PROPERTY LINE SURVEY PLAN HUDSON LANDSCAPING COMPANY" prepared by Robert J. Zinnerburg and last revised April 25, 1993.
Schedule "C"

The City of Hudson Industrial Development Agency retains the
right to extend and dedicate as Second Street Extension a
roadway fifty feet (50') in width over the demised premises.

Said property contains 3.066 acres more or less.

[Handwritten Signature]
STATE OF NEW YORK

COUNTY OF COlnmbIA

On this 2nd day of May, Nineteen Hundred and Ninety-Five, before me personally came ARTHUR J. KONCEWSKI, to me personally known, who, being by me duly sworn, did depose and say that he resides in Hudson, New York; that he is the Chairman of THE CITY OF HUDSON INDUSTRIAL DEVELOPMENT AGENCY, the corporation described in, and which executed, the within instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the Board of Directors of said corporation.

[Signature]

CARL O. WHITNECK, JR.
Notary Public, State of New York
04/08/1965, Qualified in Columbia County
My Commission Expires April 30, 1967

JUN - 2 1965

[Signature]

WILLIAM J. KEILOR
Columbia County Attorney's Office
111 State Street
Hudson, N.Y. 12534
COLUMBIA COUNTY CLERK'S OFFICE
COURTHOUSE, HUDSON, NY 12534
(518) 828-3339

** RECORDING PAGE **

Type of Instruments: DEED
Recorded: 5/19/1993
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Location: HUDSON
In Lib.: 0796
Off: DEED
At Page: 0051

Control No: 9505180007

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Mortgage Amount: $ .00
Tax received on above Mortgage:

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Spec Add: $ .00 NO

Total: $ .00 YES
Exempt

Total: $ .00 NO

IT No. 95001996

[THIS PAGE IS PART OF THE INSTRUMENT]

John C. Hilliard
COLUMBIA COUNTY CLERK
HUDSON INDUSTRIAL DEVELOPMENT, AGENCY, CITY OF
COLUMBIA, COUNTY OF.
QUIT CLAIM DEED

THIS INDENDMENT, made the 2nd day of May, Nineteen Hundred and Ninety-Five

BETWEEN

THE CITY OF HUDSON, a municipal corporation organized and existing under the laws of the State of New York, having its principal place of business at 528 Warren Street, Hudson, New York 12534,

party of the first part, and

THE COUNTY OF COLUMBIA, a municipal corporation organized and existing under the laws of the State of New York, having its principal place of business at 461 State Street, Hudson, New York 12534,

party of the second part,

WITNESSETH that the party of the first part, in consideration of ONE DOLLAR and 0/100 ($1.00) lawful money of the United States, and other good and valuable consideration paid by the party of the second part, does hereby resign, release, and quitclaim unto the party of the second part, its successors and assigns forever,

See Schedule "A" attached hereto,
See reservation contained in Schedule "A"

TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises,

TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, its successors and assigns forever.

IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and sealed the day and year first above written.

IN PRESENCE OF

THE CITY OF HUDSON

By: [Signature]
Richard R. Scalara, Mayor
All that certain piece, parcel or lot of land, situate, lying and being in the City of Hudson, County of Columbia, and State of New York, more particularly bounded and described as follows:

PROPOSED DESCRIPTION HUDSON LANDFILL PARCELS A AND B

Beginning at a concrete monument found at the northwestly corner of the land of City of Hudson Industrial Development Agency, being on the west line of land of Firemen's Association of the State of New York, referenced as being located N 40 deg 12' 50" E, 247.11 foot from the lease parcel of EMER Manufacturing.

Proceed along the east line of City of Hudson Industrial Development Agency on the south and this parcel on the north.

THEENCE North 25 degrees 25 minutes 20 seconds West for a distance of 26.72 feet to a concrete monument.

THEENCE North 40 degrees 03 minutes 30 seconds West for a distance of 450.00 feet to a concrete monument.

THEENCE West 23 degrees 46 minutes 20 seconds West for a distance of 23.00 feet to a concrete monument.

THEENCE North 55 degrees 03 minutes 30 seconds West for a distance of 53.18 feet to a corner of parcel 2A. Continue along parcel 2A.

THEENCE North 56 degrees 03 minutes 30 seconds West for a distance of 656.52 feet to a point. Leave parcel 2A and continue.

THEENCE North 33 degrees 35 minutes 30 seconds East for a distance of 270.22 feet.

THEENCE North 42 degrees 46 minutes 30 seconds West for a distance of 748.02 feet to the reputed Town of Greenport line on the north and west of the City of Hudson on the South. Continue along the Greenport, City of Hudson line.

THEENCE South 10 degrees 17 minutes 00 seconds East for a distance of 7862 feet to the west line of the Firemen's Association of the State of New York. Continue along the north edge of the Firemen's Association of the State of New York.

THEENCE South 82 degrees 34 minutes 30 seconds West for a distance of 578.23 feet to the point of beginning. Being all of lots 4 and 5 on a map entitled "PROPERTY LINE SURVEY PLAN HUDSON LANDFILL CLOSURE" prepared by Robert J. Blumenfeld and last revised April 26, 1993.

Together with and subject to covenants, restrictions, and reservations of record.

The City of Hudson retains the right to extend and dedicate as second street extension a roadway fifty feet (50') in width over the described premises.

Said property contains 15.4667 acres more or less.

Schedule "A"
STATE OF NEW YORK
COUNTY OF COLUMBIA

On this 2nd day of May, Nineteen Hundred and Ninety-Five, before me personally came RICHARD E. רשף, to me personally known, who, being by me duly sworn, did depose and say that he resides in Hudson, New York; that he is the Mayor of the CITY OF HUDSON, the corporation described in, and which executed, the within instrument; that he knows the seal of said corporation; that the seal, affixed to said instrument as such corporate seal; that it was so affixed by resolution of the Common Council of the City of Hudson.

[Signature]

CARL C. WHITRICK, Esq.
Notary Public, State of New York
HUDSON, County of Columbia
My Commission Expires April 20, 1925

[Signature]

WILLIAM J. BURKE
Clerk of the Court

JUN-2 1925
COLUMBIA COUNTY CLERK'S OFFICE
COURTHOUSE, HUDSON, NY 12534
(518) 828-3338

** RECORDING PAGE **

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Recording Fee: $.00
Location: HUDSON

Control No.: 9308190008

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TOTAL: $ .00

(THE PAGE IS PART OF THE INSTRUMENT)

HUDSON, CITY OF,
COLUMBIA, COUNTY OF,

JOHN C. MILIARD
COLUMBIA COUNTY CLERK

[Signature]
APPENDIX D

NYSDEC CLOSURE APPROVAL LETTER
May 1, 1995

Mr. David Crawford, P.E.
Crawford & Associates
551 Warren Street
Suite 301
Hudson, New York 12534

RE: Hudson Sanitary Landfill
    Final Closure Plan

Dear Mr. Crawford:

The Department has reviewed the submittal of April 3, 1995 and determined that the information provided adequately addresses the remaining issues raised by the Department during our March 31, 1995 meeting. In addition, Variance requests numbered 2, 3, and 4 are approved without qualification. The Department has determined the request in Variance Request number 5 to be an equivalent design in accordance with §360-2.13(w). It has also been determined that Variance Request number 5 encompasses Variance Request number 6, rendering Variance Request No. 6 redundant, and not requiring further consideration.

Variance Request number 1 is approved contingent upon the following quality assurance protocol being followed. Two (2) permeability tests per acre per lift (for that portion of the landfill being covered with a clay cap) must be performed. The permeability tests must verify that the bottom three (3) inches of each of the two nine-inch lifts is less than 1x10(-7) cm/sec. The test of the upper lift must include the interface zone between the upper and lower lifts. Provided this protocol is followed, the variance request is approved. Obviously, if the tests show that the proposed construction technique can not produce adequate permeabilities, then standard six-inch (compacted) lift construction must be followed.
Via this communication, the Department is approving the final closure design. If you have any questions, please feel free to contact me at (518) 357-2045.

Sincerely,

[Signature]

Howard M. Vics
Environmental Engineer I
Region 4

HMV/djp-COLCO28

cc:  R. Baldwin
     A. Orlich
     C. Van Guilder