CONGRÈS DEGÉNÉRATION RÉGÉNÉRATION
L'HORIZON TEMPORIFI DU PAYSAGE

MARS 2015

VICTOR STANLEY™
Create a timeless moment.™
De marais à sommet: l’architecture temporelle du dépotoir Fresh Kills

From low lands to ‘highlands’: the temporal architecture of the Fresh Kills Landfill
NYC DEPARTMENT OF SANITATION

Bill de Blasio, Mayor
Kathryn Garcia, Commissioner
Phillip J. Gleason, Asst. Commissioner
Waste Management Engineering
Robin L Geller, Program Manager
End-Use Development rgeller@dsvn.nyc.gov
Fresh Kills today

- Landfill perimeter: 3,000 acres (1,214 ha/569m2)
- Park perimeter: 2,200 acres (890 ha/ 3,084 m2)
- Highest point -- approx. 150’ (300+ m)
- The future park will sit on top of 150 million tons (approx. 136 million kg) of solid waste
That was never the intention of the planners who opened the site to accept waste as an interim solution.

So, how did this come about?
The temporal architecture of the Fresh Kills Landfill is the story of Staten Island’s place in the growth of a city
Described by one historian as “the struggle between New York and the natural world” – evidenced by the next chart
# Staten Island Marshlands

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SQ. MILES</th>
<th>KM²</th>
<th>ACRES</th>
<th>HA</th>
<th>% OF MARSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>7.97</td>
<td>20.64</td>
<td>5,099</td>
<td>2,063</td>
<td>100</td>
</tr>
<tr>
<td>1947</td>
<td>6.08</td>
<td>15.74</td>
<td>3,893</td>
<td>1,575</td>
<td>76</td>
</tr>
<tr>
<td>1969</td>
<td>2.35</td>
<td>6.086</td>
<td>1,502</td>
<td>607</td>
<td>29</td>
</tr>
<tr>
<td>2011</td>
<td>1.35</td>
<td>3.49</td>
<td>865</td>
<td>350</td>
<td>17</td>
</tr>
</tbody>
</table>

Congrès AAPQ le 27+28 mars 2015
Decline of Staten Island Marshlands
1900-1911

Congrès AAPQ le 27+28 mars 2015
But, it is also a story of modern landfill engineering that works with existing physical and environmental conditions and maximizes the potential to reclaim what was lost.
SCOPE OF PRESENTATION

- Regional and Historical Context
- Growth of a City -- Impacts
- How Waste Disposal Planning and Practices changed the topography of the landfill
- Landfill Closure and Post-Closure
- End-Use and Planning the Park
PAST | PRESENT | FUTURE

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REGIONAL CONTEXT

Congrès AAPQ le 27+28 mars 2015

Association of Landscape Architects of Quebec
Congrès AAPQ le 27+28 mars 2015
Congrès AAPQ le 27+28 mars 2015
PROJECTED AREA OF PARK

FRESH KILLS COVERS AN AREA OF 2,200 ACRES
(3.4 SQUARE MILES)

1 mile
HISTORICAL CONTEXT
COLONIAL SETTLEMENTS

1616-1664: New Netherland (city and north)

1625: Town of New Amsterdam: created as seat of government for New Netherlands

1664: New York – under British control until American Revolution in 1776

Dutch place names survived. Kills = brooks, streams
COLONIAL PROPERTY ACQUISITION

- 1638– institution of real property takes hold in Manhattan
- Land patents granted to Dutch, who settled along tidal inlets and saltwater marshes
- Dutch West India Company also granted charters for English settlements.
- Water lots became part of “real property”
## POPULATION GROWTH

<table>
<thead>
<tr>
<th>COLONIAL ERA</th>
<th>MANHATTAN</th>
<th>BROOKLYN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>17th century</strong></td>
<td>1640</td>
<td>400-500</td>
</tr>
<tr>
<td><strong>18th century</strong></td>
<td>1760</td>
<td>18,000</td>
</tr>
</tbody>
</table>

- 74 ACRES (56 American football fields’ worth) of land had replaced open water and marshlands

- Old growth trees and shrubs were near extinction

- Epidemic of yellow fever in 1732 led to further pressure to fill marshes
NYC POPULATION GROWTH

<table>
<thead>
<tr>
<th>POST-COLONIAL ERA</th>
<th>MANHATTAN</th>
<th>BROOKLYN</th>
</tr>
</thead>
<tbody>
<tr>
<td>19TH century</td>
<td>1810</td>
<td>4,402</td>
</tr>
<tr>
<td></td>
<td>1821</td>
<td>124,000</td>
</tr>
<tr>
<td></td>
<td>1860</td>
<td>813,669</td>
</tr>
<tr>
<td>EVE OF CIVIL</td>
<td>1890</td>
<td>2,500,000</td>
</tr>
<tr>
<td>WAR</td>
<td>1898</td>
<td>Density = 11,000/sq.mi</td>
</tr>
<tr>
<td></td>
<td>1898</td>
<td>Consolidation of Brooklyn and Staten Island with Manhattan</td>
</tr>
</tbody>
</table>
IMPACTS OF HIGH DENSITY DEVELOPMENT ON SOLID WASTE PRACTICES

Waste was composed mainly of ashes, dead animals, rotting food and other “street sweepings” – taken by horse and cart to waterfront, placed on scows, towed offshore, and dumped into Atlantic Ocean
IMPACTS OF HIGH DENSITY DEVELOPMENT: SOLID WASTE PRACTICES

- Waste also included “night soil” – manure – collected separately from street sweepings and also tossed into streets or water.

- 1843 estimate: 750 cubic feet (21m³) of manure collected annually
IMPACTS OF WASTE DISPOSAL PRACTICES

- Tides could only carry out so much
  - Interfered with shipping navigation
  - Water Quality
  - Public Health
  - Stench/Quality of Life

- Build-up of sedimentation
EARLY REFORMS

- 1895 – DEPARTMENT OF STREET CLEANING IMPLEMENTS CITY’S FIRST SOLID WASTE MANAGEMENT PLAN

- CORE OF PLAN: REPLACE OCEAN DUMPING WITH LAND DISPOSAL OF WASTE AND INTENSIVE MUNICIPAL RECYCLING

- 1898 – FEDERAL RIVERS AND HARBORS ACT ENACTED – Regulated dumping of debris in navigable waters and adjacent lands
20TH CENTURY

- City experiments with incineration, source separation, recycling technologies with varying degrees of success
- BY 1902–18 BARGE-FED LANDFILLS IN OPERATION
- City continues landfilling shorelines and opens truckfills further inland
1934

- NYC DEPARTMENT OF SANITATION CREATED
- FOCUS ON INCINERATOR PROGRAM
- 89 LANDFILLS OPERATING
- U.S. SUPREME COURT ENFORCES AN ORDER FOR NEW YORK TO STOP OCEAN DUMPING

- 1940 – NYC WASTE DISPOSAL EXCEEDS 27 MILLION CUBIC YARDS ANNUALLY (20 M3)
MEANWHILE – BACK ON STATEN ISLAND

- At sea level
- Limited filling for industrial use
Robert Moses
NYC Government Official
1924 to 1968
INITIAL GOALS for FRESH KILLS

- OPENED IN 1948
- Population of NYC approaching 10 million
- Planned elevations: 5’-10’ (1.5-3 m)
INITIAL GOALS for FRESH KILLS

- Reclaim “nuisance” lands for productive use and raise shoreline elevations for subsequent development

- Use Fresh Kills as interim waste disposal facility while revitalizing incinerator program
Fresh Kills - 1943

Still industrial landscape

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SEQUENCE OF LAND ACQUISITION
Early operations
Les marches d’antan
Fresh Kills: 1961

- Seven other landfills and six incinerators also operating throughout the boroughs
- West Shore Expressway under construction

1960 Elevations Plans: 15’-20’ (4.5-6m) – about 40% more in height to provide additional capacity
Fresh Kills: 1972

- **Verrazano-Narrows Bridge** opened in 1964—connects Staten Island to Brooklyn and rest of the city.

- **West Shore Expressway** completed – access to VNB

1969 elevation plan: 50’-100’ (15.2-30.5m)
Landfill-wide elevations ranged from 10’-50’ (3.3-15.2m)
January 1983 elevations (Approximate)

Section 3/4: 10’-50’ (3.3-15.2m)
Section 2/8: 25’-45’ (8-14m)
Section 6/7: 15’-30’ (5-7 m)
Section 1/9: 10’-40’ (3.3-13.3m)
1970’s and 1980’s

- Environmental movement
- New laws and regulations
  - Protection of water and air
  - Distinction between “household” waste and hazardous waste
  - Regulation of MSW management at federal and state levels
REGULATORY HIERARCHY

- Avoid
- Minimize
- Contain
- Collect
- Treat and Release
Consent Orders

• Allowed city to retain an essential resource while making operational and technical improvements to come into compliance with regulations

• Required city to apply to state regulators for operating permit (6NYCRR Part 360 solid waste facility permit)
Consent Orders

- 1980, 1985, 1990 – progressively more stringent
- Technical investigations
- Final grading and closure plans
- Protective systems to manage leachate, landfill gas, stormwater, drainage and erosion, and final cover during operations and post-closure
- End-Use Plan
Sanitation Plans

• Close 2/8, 3/4
• Apply for Part 360 operating permit for 6/7, 1/9-- estimated capacity of 15-20 years more
• March 1996-submitted application
• May 1996– notice of completion
Sanitation Plans

• End Use: vegetative cover to stabilize soils; promote growth of native species
• Final cover design included use of prairie grasses which don’t require fertilizing or watering
Fill progression plan

- Diversion berms to catch water
- Down slope moister
- Let nature choose which part of the seed mix would thrive
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Sanitation Plans

- June 1996- executive order to cease operations by December 31, 2001
- Major revision of grading and closure plans to accommodate 5-year life vs. 15
- Last barge: March 2001
March 22, 2001

LAST GARBAGE BARGE TO FRESH KILLS
Six mois plus tard

Six months later

• 10 septembre 2001: Revised final grading and closure plans submitted to state

• Executive order allowed the reopening of one section (Section 1/9) – closest to industrial sector and the only area large enough to accommodate the 9/11 debris

• Sorting and sifting operations continued for about one year
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## FINAL ELEVATIONS

<table>
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<tr>
<th>Section</th>
<th>Area</th>
<th>Heights (approximate)</th>
<th>Closure Dates</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Originally proposed</td>
<td>At closure or end of operations</td>
</tr>
<tr>
<td>Ac</td>
<td>Ha</td>
<td>Ft</td>
<td>M</td>
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Sud: 147’/
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<tr>
<td>Ac</td>
<td>Ha</td>
<td>Ft</td>
<td>M</td>
</tr>
<tr>
<td>6/7</td>
<td>305</td>
<td>320</td>
<td>Nord: 119’/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sud: 94’/</td>
</tr>
<tr>
<td>1/9</td>
<td>440</td>
<td>1985</td>
<td>505’</td>
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Congrès AAPQ le 27+28 mars 2015
Congrès AAPQ le 27+28 mars 2015
REGENERATION
Congrès AAPQ le 27-28 mars 2015
Congrès AAPQ le 27 et 28 mars 2015
Congrès AAPQ le 27+28 mars 2015
Congrès AAPQ Je 27-28 mars 2015
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Congrès AAPQ le 27 + 28 mars 2015
Congrès AAPQ le 27+28 mars 2015
Congrès AAPQ le 27 et 28 mars 2015
THE FUTURE?

Restez à l’affut!
The Freshkills Park Alliance

Mission
The Freshkills Park Alliance supports the development of Freshkills Park, the growth of on-site research and education about ecological restoration, and the staged expansion of tours, arts, recreation and events at the 2,200-acre site.

Go on a Virtual Tour

Support + Learn More

Freshkills Park remains closed to the public during this exciting transformation. Join us on one of our scheduled activities to see it for yourself. Dandelions, Knotweed, and Mugwort are growing in Schmul Park! Become a Green Warrior for Freshkills Park.
Recreation and Tours
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