

# Green Remediation Changing the Culture

## The New York Experience

**Kevin Carpenter, P.E.**

New York State Department of  
Environmental Conservation  
Division of Environmental Remediation  
Bureau of Technical Support

December, 2013



# Outline

- Overview - Green (Sustainable) Remediation in NY
- Implementation
  - Drivers and Related Issues
  - Challenges
  - Culture change
  - Successes
- Agency      Change      RP
- Examples → ←



# Green Remediation in NY

## Brief Overview

- Defined in DER-31 as: *“the practice of considering **all** environmental effects of remedy implementation and incorporating options to **minimize** the environmental footprint of cleanup actions.”*
- Combination of “Protection of the Environment” and a broader view.
  - Think other Agency programs and larger issues such as climate change.
- Sustainable Remediation adds economic and social considerations

# DER – 31 General Principles

- **Continue** to protect public health and the environment
- **Apply** to all phases of the cleanup process and **Document**
- **Consider** impacts over the life of the remedy
- **Reduce** energy use, emissions, material consumption, and waste generation during remediation
- **Improve** habitat value if possible (incidental to remediation)
- **Maximize** reuse options for land to preserve green space and slow suburban sprawl (beyond brownfields)
- **Integrate** the cleanup with the reuse and foster green and healthy communities

# DER-31 - The Mandatory Elements

- Renewable Energy / RECs
  - Offset 100% of the electricity demand at the site.
- Reduce Vehicle Idling
  - All vehicles (including construction equipment)
  - Shut off when not in use for more than 5 minutes
- Cover Systems
  - Habitat, passive recreation, minimal maintenance, infiltration of storm water, integrated with the next use (parkland, energy generation).
- Material Re-use
  - Example - crushed clean concrete as base or fill
- Ultra Low Sulfur Diesel (ULSD)



# Why Do Green Remediation?

## Agency Mission Statement

- “Conserve, improve, and protect its natural resources and **environment** and control water, land, and air pollution, in order to enhance the health, safety, and welfare of the people of the state and their overall **economic** and **social** well being”

## State and Agency Directives

- Energy - 30 x15 RPS, 15 by 15 demand reduction
- Climate Change - 80 by 50 GHG reduction Goal (EO 24), CP-49
- Green and Healthy Communities
- Preserve open space and working landscapes
- Conserve natural resources

## Why Wouldn't We?

- Given equivalent performance, why not choose a more sustainable way?
  - Awareness

# Culture Change

- Think about the changes in remedial technologies since this program started
  - Excavation and pump and treat
  - Landfills cap and fence
- The technical change is easier than the cultural change



# How do we Get There?

“Way of Doing Business”

Internal

Institutionalize/Integrate the Concepts

- Leadership
- Policy
- Procedures
- Awareness
- Training
- Drivers
  - Energy - 30 x15 RPS, 15 by 15 demand reduction
  - 80 by 50 GHG reduction Goal (EO 24)

# Climate Change as a Driver

- Site Impacting Climate Change (Mitigation)
  - Energy use
- Climate Change Impacting Sites (Adaptation)
  - Sea Level Rise
  - Precipitation changes – larger storms
  - Groundwater flux
  - Flooding
- Climate Change Policy

# Commissioner Policy 49

## Climate Change and DEC Action (Oct 2010)

- “In order to perform its core mission of conserving, improving, and protecting the State’s natural resources and environment, DEC must **incorporate climate change considerations into** all aspects of its activities, including but not limited to decision-making, planning, permitting, **remediation.....**”

### **Department staff are directed to**

- 1) “...make greenhouse gas (GHG) reductions a fundamental goal ...in DEC programs, actions and activities...”
- 2) “...incorporate climate change adaptation strategies into DEC programs, actions and activities....”
- 3) consider climate change implications as they perform their daily DEC activities.

# CP-49 - Continued

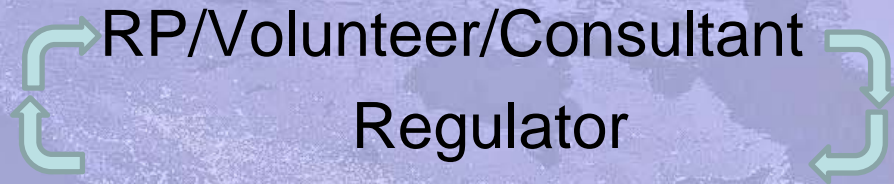
## **Mitigation Objectives**

- Reduce GHG emissions
- Encourage municipal GHG mitigation measures through (low carbon Strategies)
- Maintain and enhance carbon sinks (forests, wetlands)

## **Adaptation Objectives**

- Identify potential adverse impacts from climate change
- Incorporate adaptation strategies into DEC programs
- Work with federal partners to incorporate climate change principles into decisions on NYS projects

# External Process Drivers (Cont.)



- Savings/Customer Expectations/Experience/Community
- Guidance
  - ASTM
    - Integrating Sustainable Objectives into Cleanup
    - Green Remediation Standard Guide
  - USEPA
    - Environmental Footprint Analysis
  - ITRC
    - Green and Sustainable Remediation – A Practical Framework
  - SuRF
    - White Paper

# “Way of Doing Business”

## Integrating the Concepts

Administrative – What we’ve already done...

- **PRAP/ROD (Decision Document) Boilerplate**
  - Reference Green Remediation Key Concepts from policy
  - For design - Standardized Remedial Elements descriptions
- **DER-10 - Technical Guidance for Site Inv. and Rem.**
  - References Green and Sustainable Remediation
- **E- Contract Procurement**
  - 7 x/yr, 1000 pages 70 copies. Save 5 staffdays and \$28k
- **EDD** – Data delivered electronically
- **E-Citizen Participation Initiative**
  - Distribute CP info through County List-serves.

# “Way of Doing Business”

## Integrating the Concepts

### Contracting

- **Construction Contract Boilerplate**
  - Certification for compliance with ULSD and BART
- **State Assistance contract**
  - Reporting energy use and cost and whether utility or renewable.
- **Emergency Response Contract**
  - Includes DER-10 Green Remediation Language
- **SSF Work Assignment**
  - State-Wide Energy Study of SSF Sites in O&M

# Work Assignment Costing

## From the Work Assignment Costing Tool

### General

- The contractor can be requested to explore and implement green remediation strategies and applications in the performance of the scope under a work assignment to maximize sustainability, reduce energy and water usage, promote carbon neutrality, promote industrial materials reuse and recycling, and protect and preserve land resources.

# Work Assignment Costing

## From the Work Assignment Costing Tool

Green Remediation				Required
Green Remediation Plan				Yes
Progress Reports				Yes
Tracking of Removal Action Energy Consumption				No
Environmentally Preferable Practices				Yes
Commitment to Local Community - Local Expenditures				Yes
Diesel Chemical and Particulate Emissions				Yes
Clean Diesel				Yes
Clean Air				Yes
Renewable Energy				Yes
Clean Technologies				Yes
Green Landscaping				Yes
Industrial Materials Reuse (IMR)				No
Use of "Green" Concrete				No
Recovery of Methane from Landfills				No
Descriptions for selected activities can be generated as a Microsoft Word document				
WORK ELEMENT - Site Characterization				

# GR for Site Management - Guidance

- Purpose
  - Describe how GR applies to site management.
  - Describes how to consider O&M in the larger environmental context.
- Key Site Management Elements Addressed:
  - Treatment Systems
  - Building Operations
  - Periodic Activities
- GR evaluations
  - **Minor** Modifications – implement routinely
  - **Major** Modifications of remedial system components - formal  
**Remedial System Optimization**
- Metrics and Reporting

# GR Metrics for Site Management

- **Energy Usage:** Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.
  - *Also report energy reduction programs*

I. **Energy Usage:** Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	Total to Date
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

*Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.*

# GR Metrics for Site Management (cont.)

- **Solid Waste Generation:** Quantify the management of solid waste generated on-site (disposed, re-used, recycled)
  - *Also report waste reduction programs*
- **Transportation/Shipping:** Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.
  - *Provide a description of all mileage reduction programs*
  - *Include specifically any local vendor/services utilized that are within 50 miles of the site.*
- **Water Usage:** Quantify the volume of water used on-site from various sources.
- **Land Use and Ecosystems:** Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition
- *Provide a description of any implemented land restoration/green infrastructure programs for the site*

# RSOs Informing RDs

- General:
  - Identify a baseline for system's energy consumption
  - Verify the expected contamination concentrations through pump tests/field sampling
  - Plume/hot spot re-delineation if necessary
- Active Systems
  - Don't oversize the treatment system
  - Design the system for dynamic operational conditions (e.g. valving)
  - Include a sampling port on each extraction well
  - Premium efficiency motors for pumps/blowers
  - Variable frequency drives
  - Consideration of geothermal for heat/ac
  - Analyze need for continued polishing systems

# RSOs informing RDs (continued)

- Buildings
  - Improved weatherization (insulation/air sealing)
  - Efficient lighting/motion-sensor activated
  - Thermostat setpoint control - tamper proof thermostat with an automatic setback
- Controls:
  - Dial-in/online control monitoring systems ("remote access")
  - PLCs with feedback loop controllers linked to VFDs

# “Way of Doing Business”

## Integrating the Concepts

### Emerging GR Efforts in NY

- PPAs
  - Conventional State Procurement
  - Cooperative Agreement
  - Pollution Prevention Institute
- Green OM&M plan boiler-plate
  - In development

# “Way of Doing Business”

## Integrating the Concepts

### Examples

- Source Focus
- Habitat
- Local
- Efficiency
- Energy
- Minimize O&M

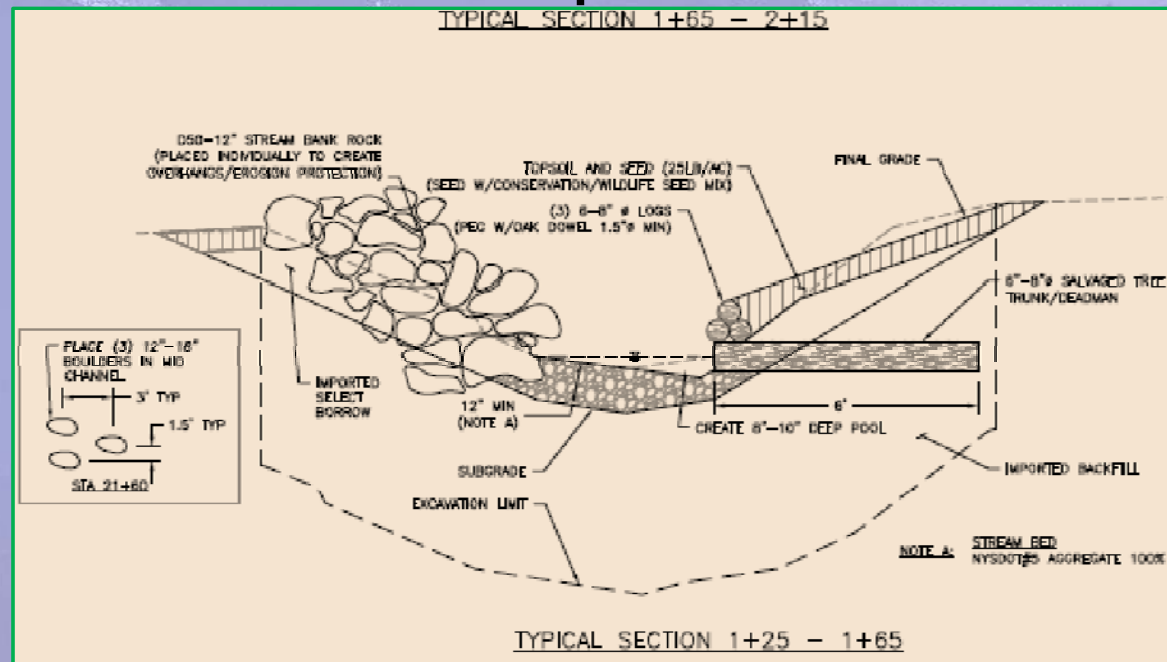


# Sauquoit Creek Restoration

- From the Decision Document...

“The Unnamed Tributary and Sauquoit Creek East Bank will be restored using **natural stream bank restoration techniques** to the extent practicable”

“Restoration will include bank stabilization using **native plant species** selected to **enhance** terrestrial and **aquatic habitats**”



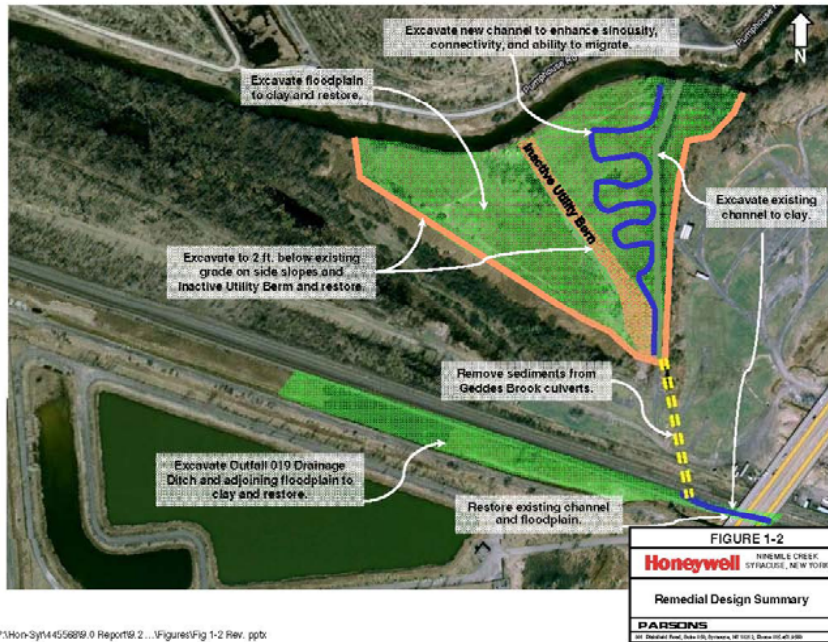
# Lawrence Aviation

- Integrate an onsite **geothermal** system into the water treatment process.
- Route extracted groundwater (56°F) to the heat pump. Heated or cooled air is transferred to heat or cool the building.
- On Site Facility - Returning treated water to the underlying aquifer for water storage, through a network of injection wells upgradient from the extraction wells
- Downgradient Facility - Discharging treated water to an existing pond and its adjoining creek rather than the sewer system

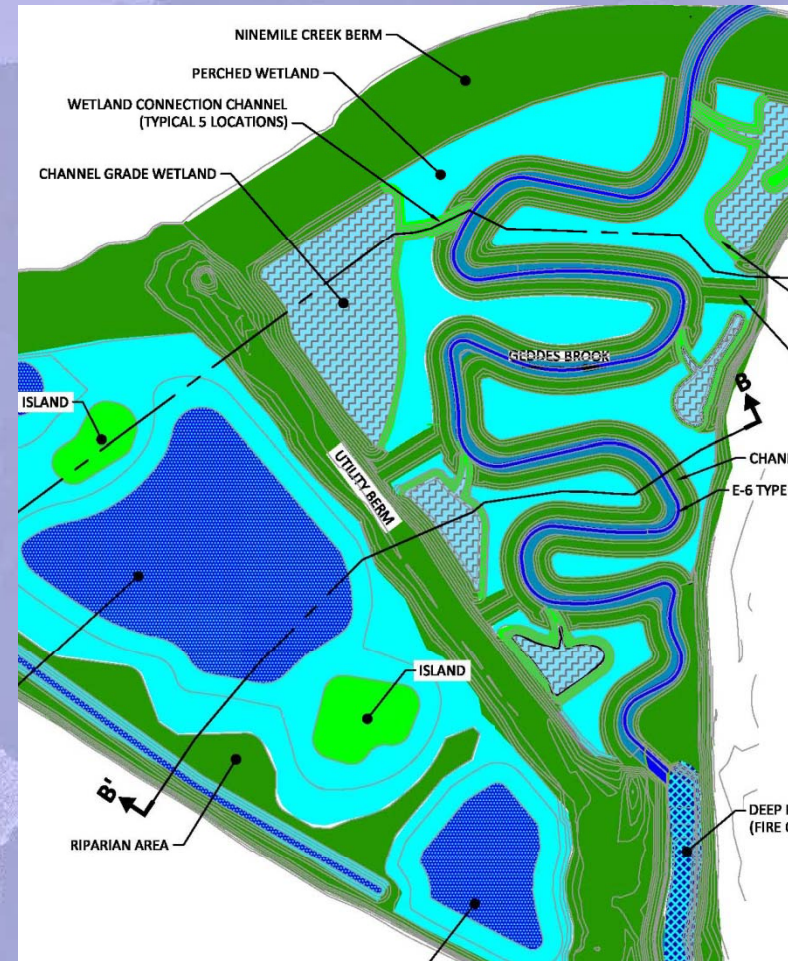


# Geddes Brook IRM

- Relocated brook channel to increase sinuosity. Increased connectivity between the brook channel and floodplain. Riparian buffers to provide shading. Increased habitat diversity to support native plants and animals.



P:\Hon-Syn\4455889\_0 Report\19.2 ... \Figures\Fig 1-2 Rev. pptx



# Geddes Brook Actual



# Standard Motor Products Design

- Final grades were designed to yield near zero net fill for the project.
- The grass seed specification is a low-maintenance no-mow mix.
- A low-maintenance stormwater infiltration trench was designed to capture increased runoff resulting from the installation of the asphalt SVE cover
- Permeable pavement to partially alleviate the existing flooding issues.
- The system was designed with reduced O&M visit frequency as a goal. O&M visits are only expected to be required on a monthly basis.
- The environmental footprint of the remedial action was assessed using the SiteWise™ Environmental Assessment Tool.

# Other Efforts

- **Metal Etching** - Porous pavement to reduce runoff into Freeport Creek/Great south Bay



- **David's Island** - Cleared wood was mixed into the sand to help create organic material. Bricks were crushed for a new foundation. Recycled steel revenue used to help fund cleanup.
- **Onondaga Lake** - Proposal to manage stormwater using green infrastructure (tree planting, green roofs, rain gardens and trenches, rain barrels and porous pavement).
- **BP Sinclair Refinery** - Engineered Wetland for water treatment

# References:

- ASTSWMO Greener Cleanups Information Resources Web Site:  
[http://www.astswmo.org/resources\\_sustainability\\_greenercleanups.htm](http://www.astswmo.org/resources_sustainability_greenercleanups.htm)
- ASTM
  - –Integrating Sustainable Objectives into Cleanup
  - Green Remediation Standard Guide (draft)
- EPA Green Remediation Web Site: <http://clu-in.org/greenremediation/>
- ITRC Tech Reg - Green and Sustainable Remediation: A Practical Framework
- SuRF White Paper
- DER Guidance:  
[http://www.dec.ny.gov/docs/remediation\\_hudson\\_pdf/der31.pdf](http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf)
- NYSDEC Commissioner Policy, CP-49 / Climate Change and DEC Action <http://www.dec.ny.gov/regulations/65034.html>



# Thank You