



Brownfield Case Study for a New Jersey Petroleum Terminal

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Overview

- Site Setting and History
- Environmental Studies and Remediation
- Reuse and Redevelopment Planning
- First Reuse Opportunity
- Path Forward
- Key Learnings

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Setting





Setting



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Terminal - 1950's



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Terminal - Late 1990's



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Site History

- Site began operations in late 1920's by Patterson Oil
- BP purchased in 1969 from ARCO
- BP closed facility in May 1996
- Site operated as refined petroleum and specialty chemical bulk storage and distribution facility
- Site and abutting properties total 130 acres; formerly 100 aboveground storage tanks and storage capacity of 3-million barrels (126-million gallons)

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Site Setting

- Marine terminal, pipelines, truck loading, rail access, highway access
- 95 % site unpaved; soil conditions are sandy
- Depth to groundwater is 10 to 20 feet bls
- Clay confining layer at 90 feet bls
- Local drinking water supplies draw from below clay at depths greater than 200 feet bls
- Local effects due to groundwater pumping

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Environmental History

- Environmental corrective action initiated in 1981
- LNAPL recovery initiated in 1984
- Groundwater recovery initiated in 1989
- Groundwater treatment plant on line in 1991
- Off-site impacts to neighborhood identified in 1994; five homes purchased; VPP initiated
- Residential indoor air studies completed in 1995

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Environmental History

- Facility closed in 1996
- Off-site SVE system on line in 1997
- Pumping system upgraded in 1999
- Source area SVE systems on line in 2001
- Deep groundwater studies started in 2001
- Potential impacts to municipal water supply identified in 2002

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Environmental History

- Over 600 soil borings completed to date
- Over 250 groundwater monitoring wells installed to date (including 28 off site); depths to 130 feet bls
- 350-gpm groundwater treatment plant
- 4,000-cfm soil vapor extraction systems
- Documented impacts to soil and groundwater with petroleum and chlorinated-petroleum hydrocarbons
- No documented health effects to community



Regulatory History

- Administrative Consent Order (ACO) in 1984
- Second ACO in 1989 for Groundwater Treatment
- Memorandum of Agreement in 1994 for investigation of 14 AOC's
- ISRA Remediation Agreement signed by BP and New Jersey DEP in 1996, amended in 2001



Regulatory Requirements

- Follow NJ Technical Regulations and comply with ISRA Remediation Agreement
- Set Priorities with Case Manager
 1. Delineate extent of on-site and off-site impacts to soil and groundwater
 2. Manage migration of groundwater and soil vapor
 3. Implement source area reduction
 4. Improve communication with Community

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On-Site Investigations



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Off-Site Areas

Former
Exxon/Mobil
Terminal

Valero
Refinery

BP
Terminal

Essex
Chemicals
Property

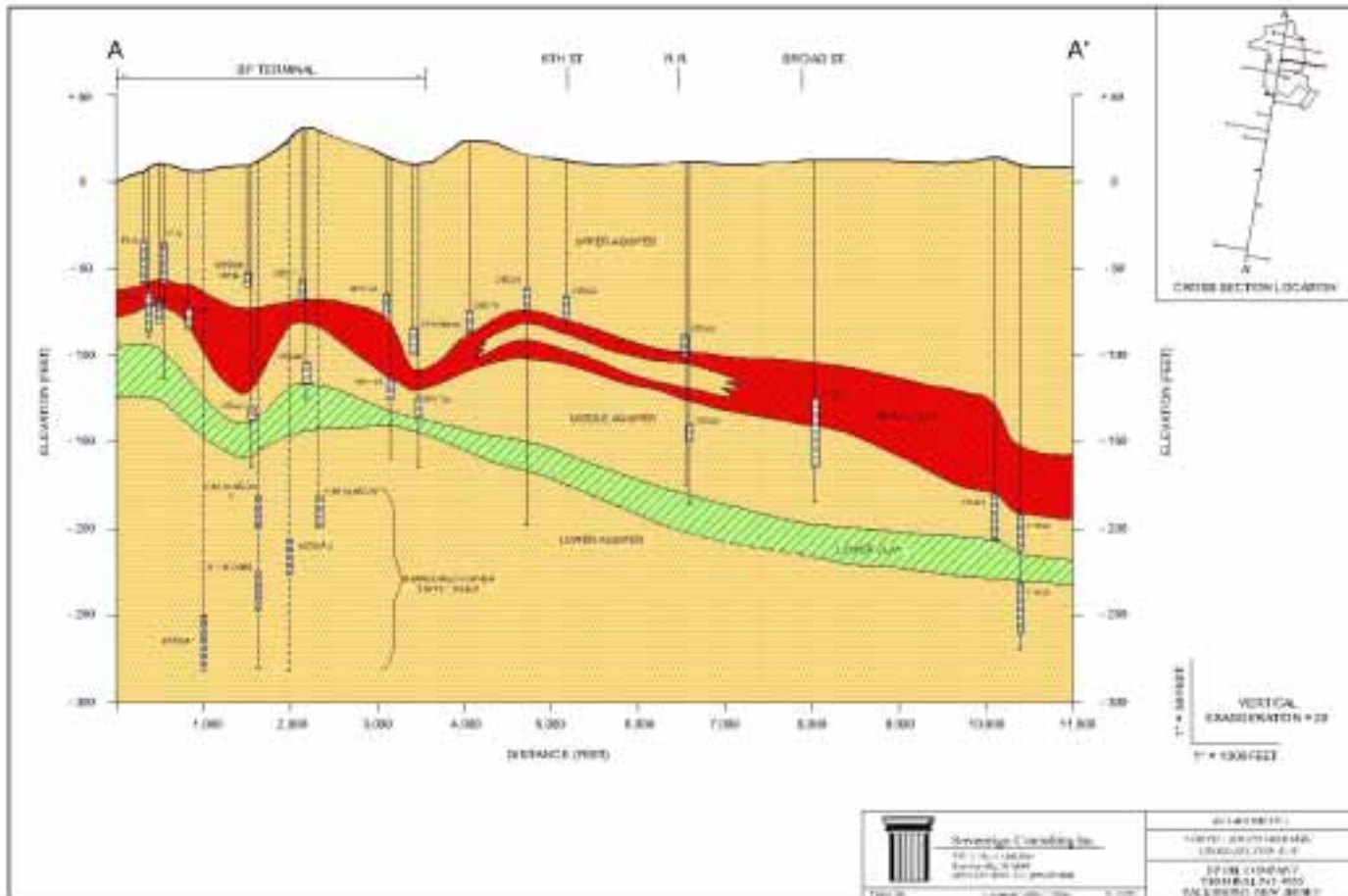
CITGO
Refinery

Paulsboro
Municipal Wells





Site Geology





LNAPL Delineation





Groundwater Capture





Remediation Systems



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Groundwater Treatment



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Soil Vapor Extraction



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Remediation Summary

- >500,000 gallons petroleum have been removed as LNAPL since 1989 (25,000 gallons in 2002)
- GWTP treated 180 million gallons of ground water in 2002 (1.4 billion gallons since 1995)
- GWTP has removed 172,000 lbs petroleum since 1995 (28,000 gallons)
- SVE has removed 527,000 lbs petroleum since 1997 (88,000 gallons); mostly in 2001-2002

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Improved Communication

- Use of Data Visualization Tools
- Hot Line: 856-423-3648
- Newsletter
- Website: www.paulsboroterminal.com
- Public Forums



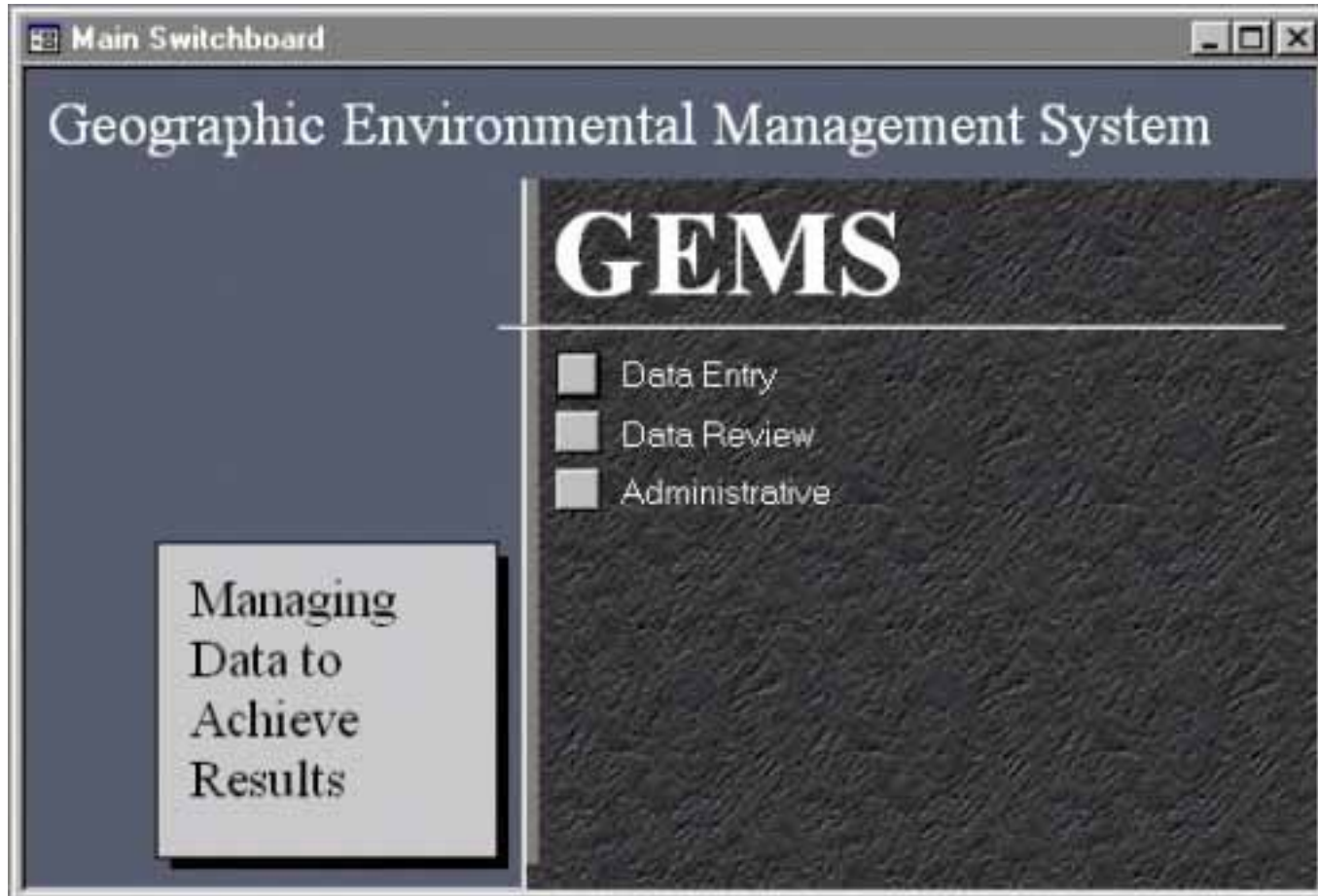
Geographic Information Systems



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Environmental Database





Newsletter

BP Amoco Summer 1997

Pipeline PAULSBORO

Paulsboro Environmental Satellite Web Site Goes Live!

Who's online? Dial up your Internet server and go to www.ppa.com/emsat.html and you will see another way BP Amoco is pursuing its commitment to clean water with the Paulsboro community. The Paulsboro Environmental Satellite was created to allow residents of Paulsboro access to information available regarding the cleanup at the BP Amoco facility located at 303 Market Avenue. The front photo is actually a duplicate of the home page of our new web site. The web site designed by Web

Applications of Minnesota, LLC has several features:

- an electronic version of each of the quarterly newsletters, Paulsboro Pipeline
- the ability to view actual results of the ongoing environmental tests and
- links to other web sites of similar interest such as the New Jersey Department of Environmental Protection or BP Amoco's corporate website.

Click on an icon and you can be transported to other parts of the web site. There are several areas of "under construction". For instance, actual sampling results are still being compiled into a database. In the future, we expect to have the results portion of the website constructed so that you can click on a DB view, much like the one that was featured in our last newsletter, and see a table with the sampling results. After surfing the site, let us know what you think. Call the Paulsboro hotline 800-425-2945 or click on any number of contacts to send an e-mail message.

Don't have a Computer Yet? Use the Library!

The public will be able to access the Internet through computers at the BP Memorial Library, located on the corner of Board and Commerce Streets. The library staff is in the midst of setting up its new computers to access the Internet, and by mid-summer they should have several more computers for patrons to use—all with access to the Internet! We'll make sure the library has instructions for easy access to our website. Summer hours for the library are: Tuesday and Thursday 12 pm to 7 pm and Wednesday 12 pm to 5 pm. It is closed Friday through Monday.

Upcoming in Next Pipeline!

- Update on the Future of the Central
- Groundwater Recovery and Treatment Made Simple
- Meet BP Amoco's Sat Study

CONTACTS

Paulsboro Hotline:
800-425-2945

Address of Terminal
Operational Environmental
Investigation Project
Manager:
Steve Karm
903-203-0100


Address of Terminal
Operational Environmental
Manager:
Daphne Goss
903-203-0100

Address of Terminal
Manager:
Carl Bennett
903-203-0100

Office of the Mayor
Jane Rowland
903-203-1000

10 Department of
Environmental Protection
New Jersey
908-988-0100

Groundwater Quality
Investigation
BP Amoco
903-203-0100





Website

The screenshot shows a Microsoft Internet Explorer browser window displaying the website for 'Environmental Satellite, Paulsboro New Jersey'. The browser's address bar shows the URL 'http://www.paulsboroterminal.com/'. The website content includes the BP logo, the title 'environmental satellite paulsboro, new jersey', a navigation menu with 'developers', 'events', 'technical data', and 'Pipeline newsletter', a 'news & events' section with a green background, a 'for developers' section with a yellow bird image, and a footer with copyright information and a 'bp.com' link. The Windows taskbar at the bottom shows the Start button, several open applications, and the system clock at 2:03 PM.

Environmental Satellite, Paulsboro New Jersey - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Back Forward Stop Search Fewer Fes History

Address <http://www.paulsboroterminal.com/> Go Links

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environmental satellite paulsboro, new jersey

developers events technical data Pipeline newsletter

news & events

The 2001 Annual Report has been released to the public.

View more for more...

for developers

Sign up for information about land for sale in the Paulsboro area.

[Register here.](#)

Providing information, communication and cooperation with the residents of Paulsboro, New Jersey.

developers events technical data Pipeline newsletter about contact us home

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Start paulsboro_unass... paulsboro_0503... coe_houston_09... Inbox - Microsof... Environmental ... 100% Internet 2:03 PM

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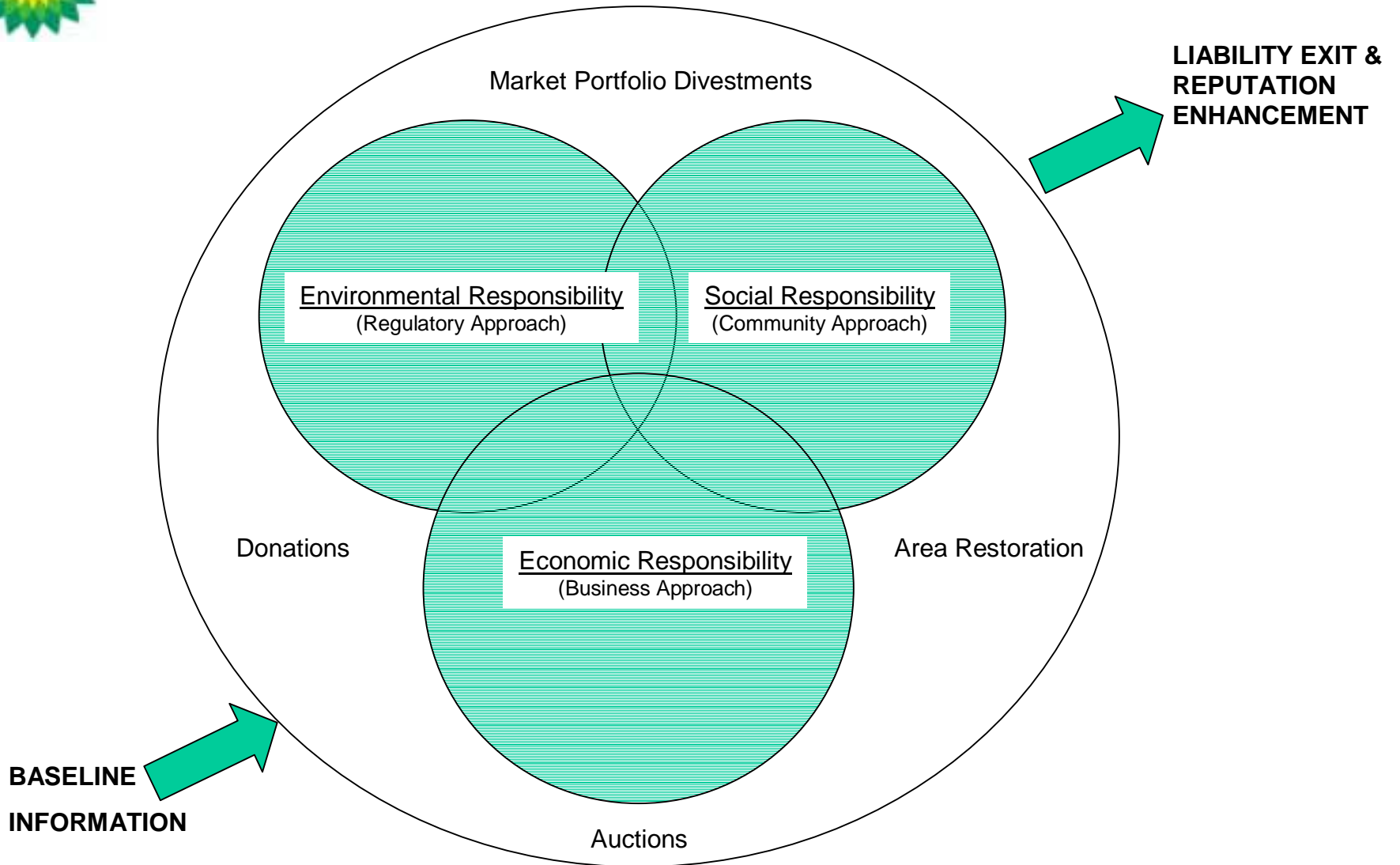


Why Look at Reuse and Redevelopment?

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The Triple-Bottom Line





BP's Goal

“To catalyze development of a sustainable economic enterprise while meeting all of our long-term environmental cleanup responsibilities.”

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Community Commitment

- Commitment to address site-related environmental issues per NJDEP requirements (over >\$40M long term)
- Commitment to help Community stimulate a sustainable economic development
- Commitment to fund “Highest and Best Use” studies to explore site reuse and redevelopment (over \$300k investment)
- Commitment to explore early reuse opportunities

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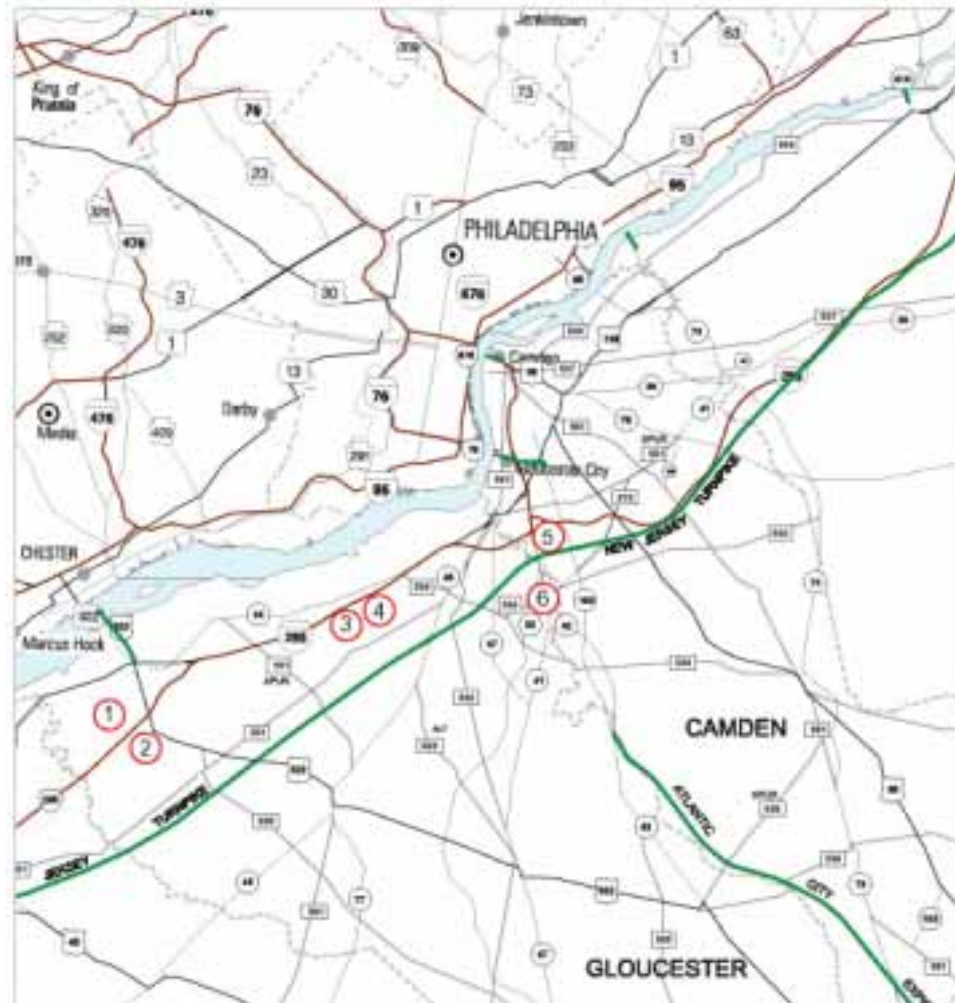


Keys to Redevelopment Planning

- **Alignment of Corporate Business Units and Functions**
- **Funding Commitment**
- **Involvement and Input of Community**
- **Involvement of Neighboring Property Owners**



Redevelopment Setting



COMPETING INDUSTRIAL PARKS

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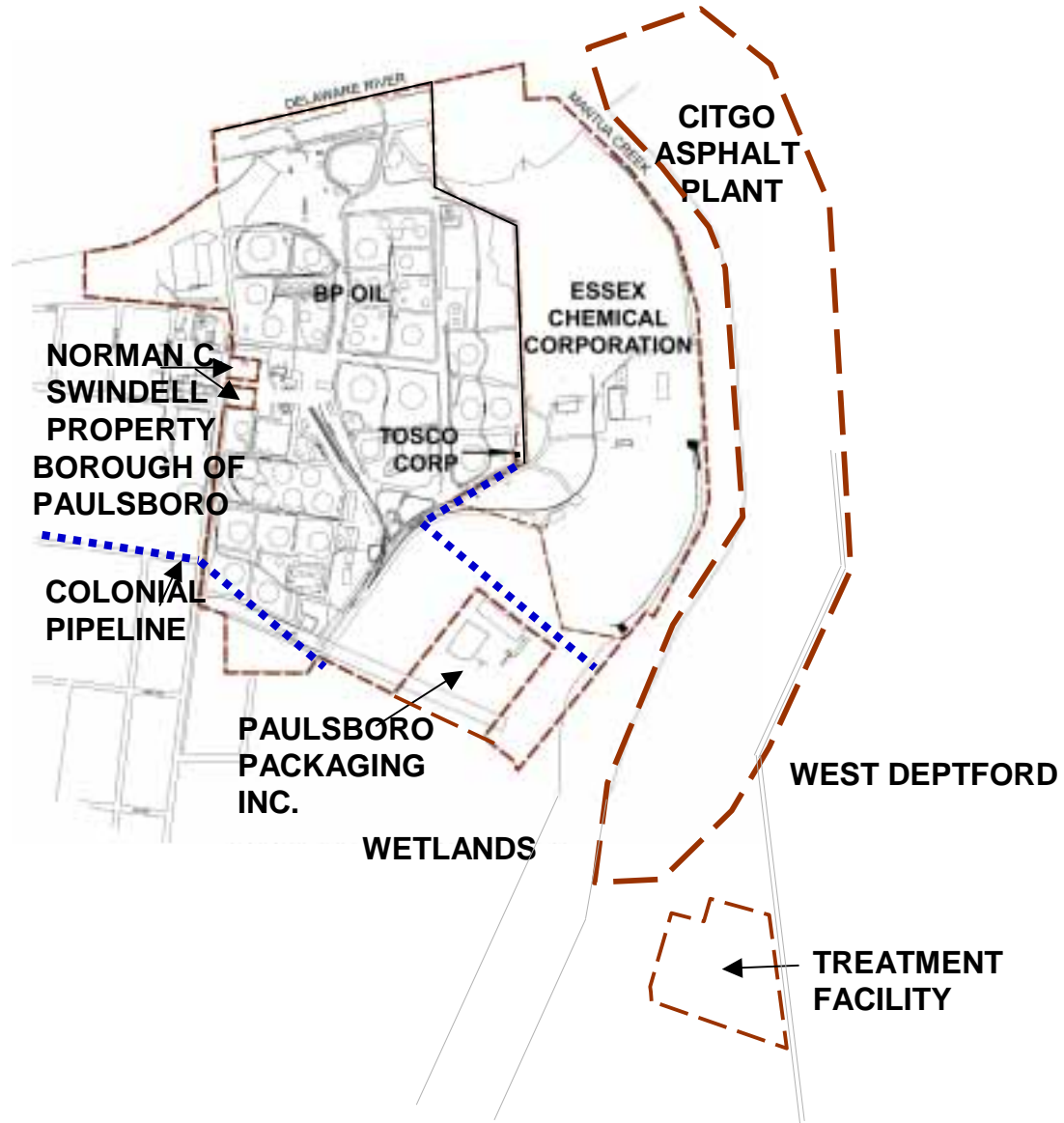
The Redevelopment Site



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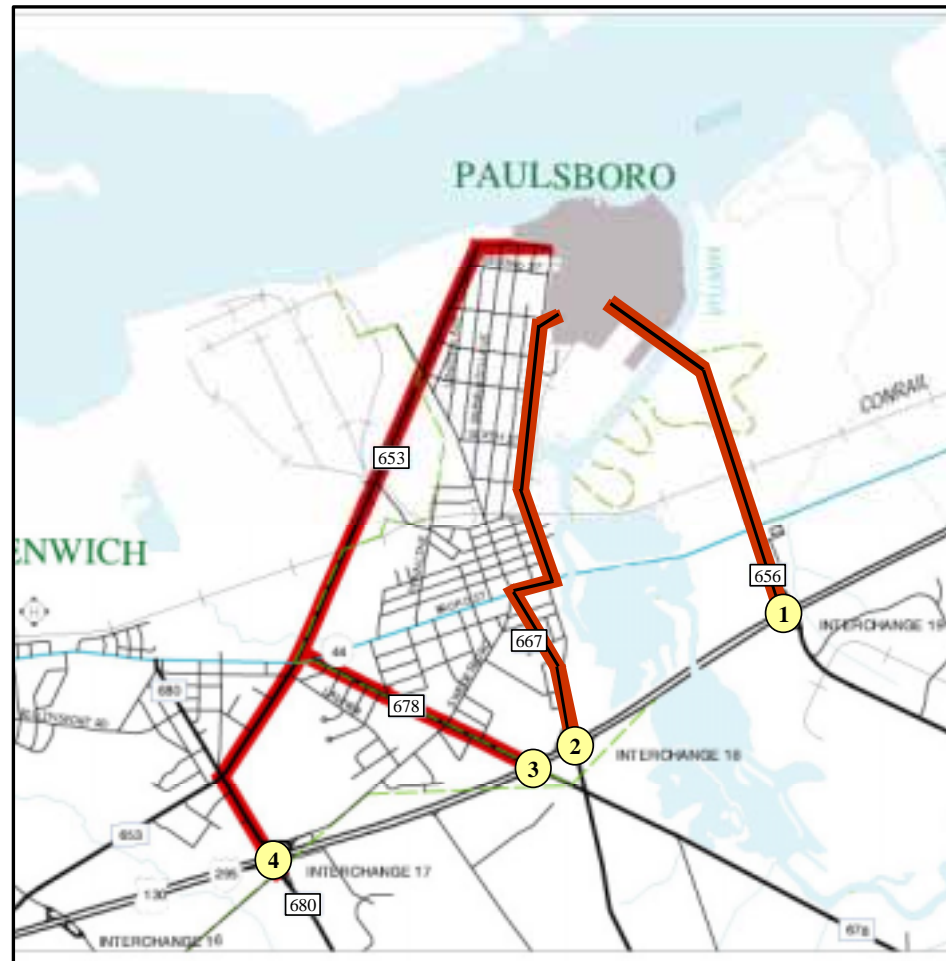


Parcel Ownership





Site Access



DISTANCES TO SITE FROM I-295

- | | |
|-------------|-------------|
| ① 1.5 Miles | ③ 3.0 Miles |
| ② 1.8 Miles | ④ 3.1 Miles |

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Redevelopment Planning

- Initiated Phase 1 planning study in 2000 to evaluate whether redevelopment could:
 - Increase asset value
 - Reduce environmental costs by use of engineering controls, deed restrictions, covenants, property control
 - Create positive image in community
- Phase 1 recommended:
 - Commercial/industrial alternative
 - Maritime port alternative

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Redevelopment Planning

- Initiated Phase 2 in 2001
- Recommended alternative incorporates:
 - On-going remedial needs
 - A new overpass and access from the east
 - An internal roadway network that allows for phased demolition and development
 - A buffer area for the residential neighborhood to the west
 - Capitalization of river frontage through a 30 to 40 acre flexible out-parcel for some type of river loading/unloading operation
 - A small commercial/recreational district located due north of the adjacent neighborhood

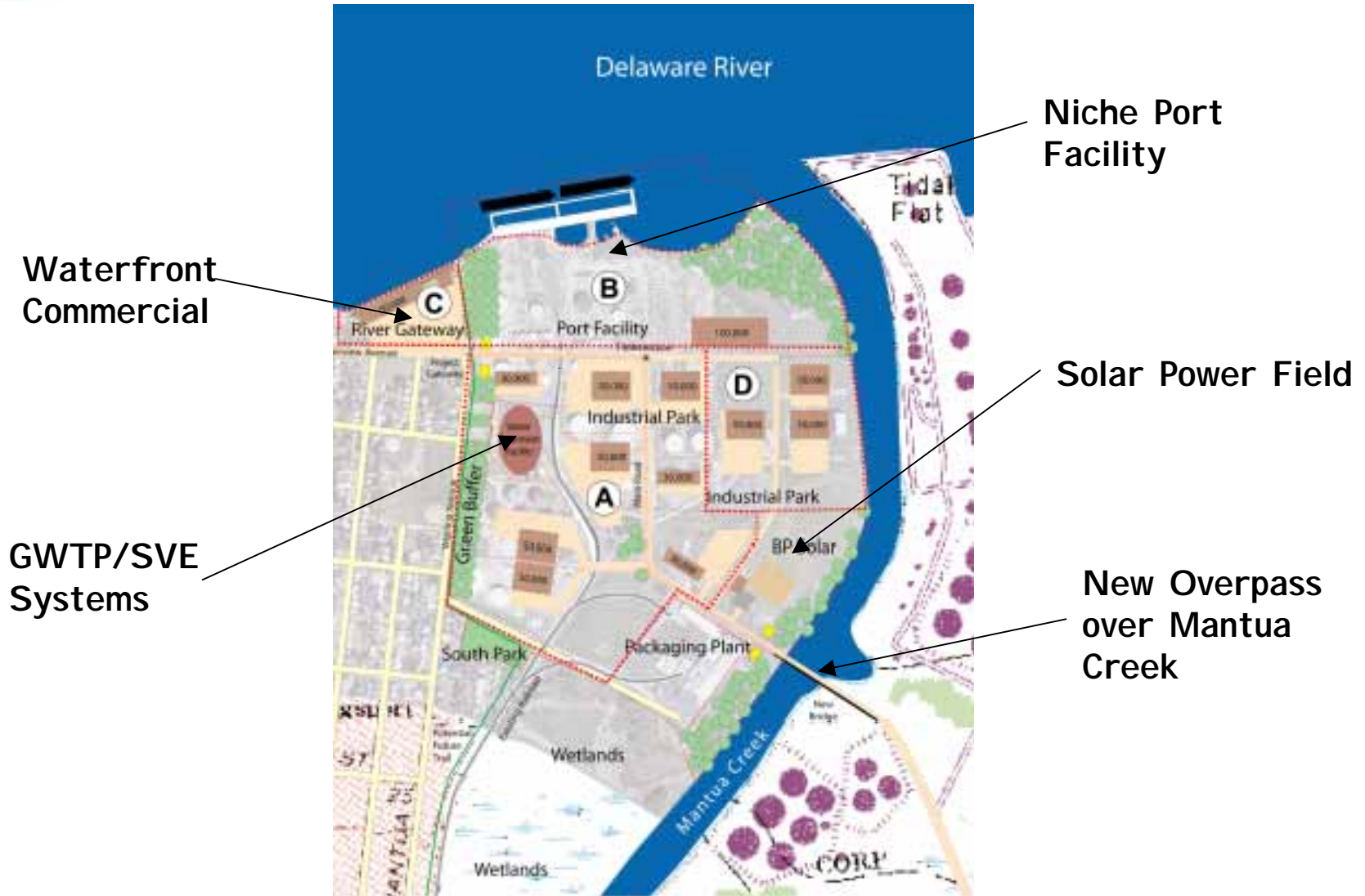


Redevelopment Benefits

- \$90M in New Public and Private Investment
- Construction Jobs - 1,500 FTE/year
- Permanent Jobs - 400-500 FTE
- Projected Payroll - \$20M/year
- Additional Tax Revenues - \$1.4M
- Positive Spin-off Effects Supporting the Borough's Neighborhood/Business District Revitalization
- *Over \$5M in potential environmental savings plus goodwill, reputation, tax benefits*



Phase 2 Highest & Best Use





Current Site Plan





Future Site Plan





Project Financing

- BP is not a developer
- Project requires significant public subsidy / total amount yet to be identified
- Project requires equity / source yet to be identified
- Project requires lowest possible debt financing
- Normal rate of returns associated with debt and equity sources

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First Reuse Opportunity



A Solar Power Facility



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Solar Project Facts

- First Reuse project....
- Plant output is 276 kW
- Design life is 25 years
- Plant to generate 350,000 kWh/year
- 5,880 2'x4' thin film panels
- Power approximately 30% of demand for Terminal remediation
- Panel arrays occupy area of 5+ acres of 17.3 acres leased from Essex

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Funding

- VASE Grant for \$408k
- NJ Clean Energy Program for \$908k
- BP GEM contribution of \$700k (includes extra costs of needed for reuse of landfill)
- Additional \$300k will be needed to complete Public Awareness component (visitor/education/park)

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Environmental Benefits

- Reduction of CO₂ gases by 571,000 lb/year
- Reduction of SO₂ emissions by 1,600 lb/year
- Reduction of NO_x emissions by 1,100 lb/year



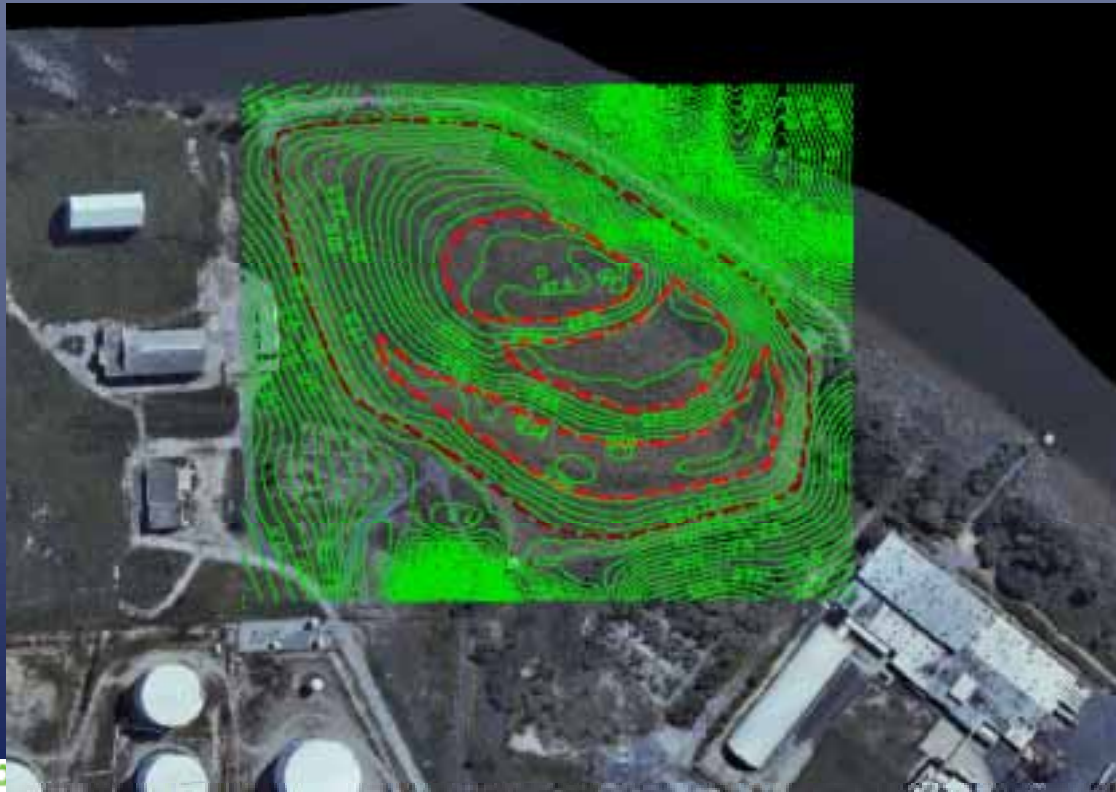
Landfill



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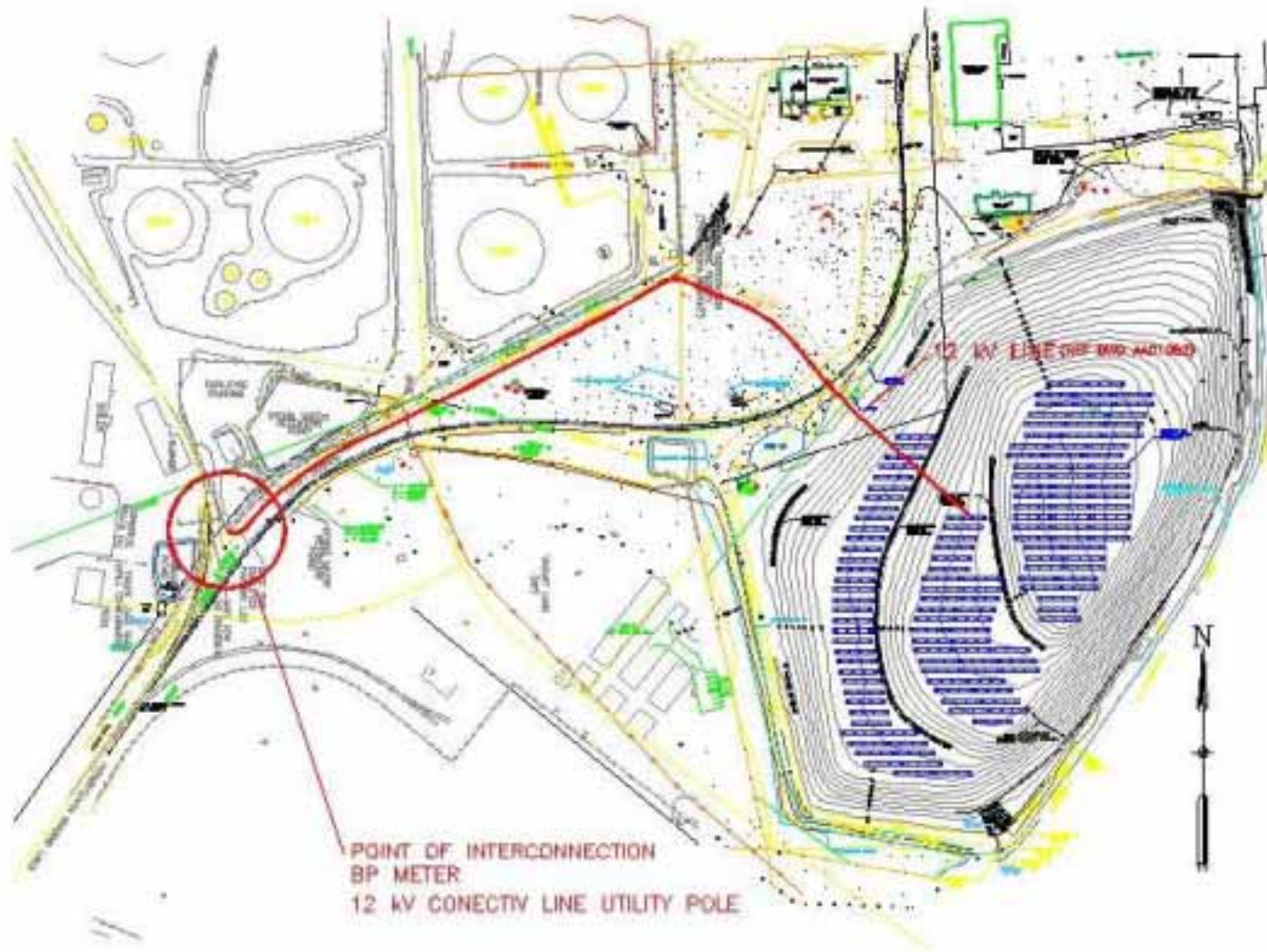


Project Design





Project Design



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Solar Field



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Solar Field



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Solar Field



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Solar Field



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Solar Field



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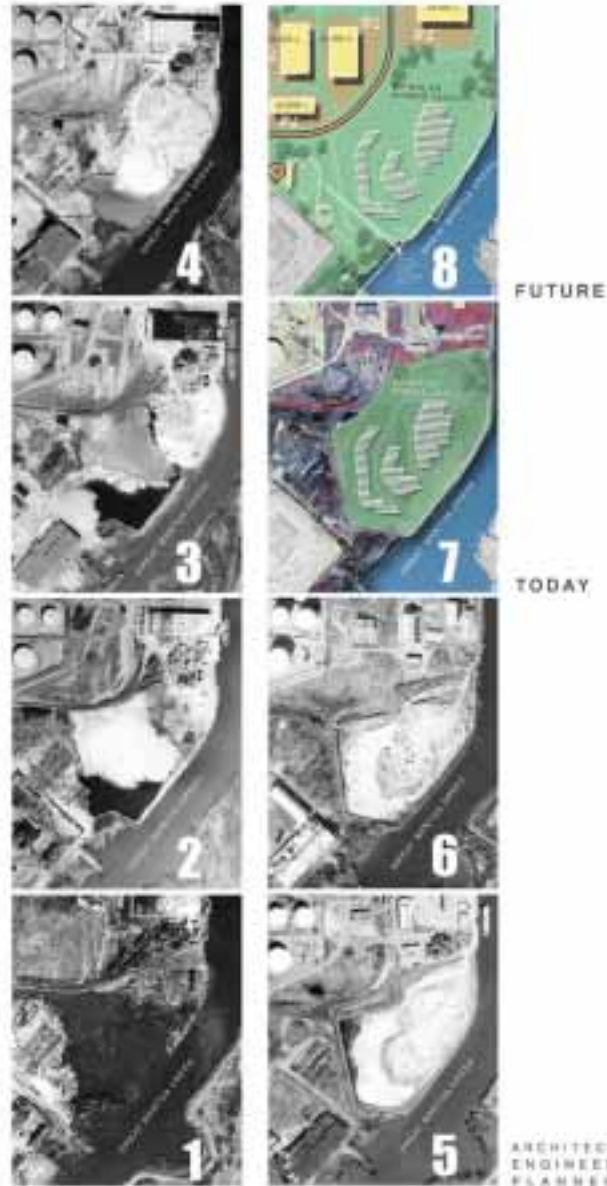


“Brownfield to Brightfield”





Landfill to Solar Field



FUTURE

TODAY



Visitor/Education Park Concept



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Redevelopment Learnings

- Involve the local Community stakeholders early and often
- Complete Best Use Studies: What does the Site want to be?
- Look at an Area-Wide Approach: You are not alone.
- Involve the Regulators
- Seek out other available resources
- Keep the Politicians involved



Redevelopment Learnings...



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Future Tasks

- Continue with environmental investigations and remediation (5-7 years estimated)
- Continue to work with Community and neighbors
- Continue to pursue outside funding opportunities
- Continue to “market” the Redevelopment Concept
- Tank removal and surface clean up
- Conveyance of land “control” to third party



Questions?

