THE WEBINAR WILL BEGIN SHORTLY

MAPPING FOR SUCCESS: USING GIS & REMOTE SENSING TO INVENTORY & PRIORITIZE YOUR BROWNFIELDS

APRIL 5, 2022
10:00 – 11:00 AM

Sean Vroom
Director
NJ Brownfields Assistance Center @NJIT

Mehmet Secilmis, GISP
Senior Global Account Manager
AEC & Environmental, Esri

Amy Ferdinand, GISP
Director of Environmental Health and Safety
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Housekeeping

- All will be muted during presentation.
- Submit questions via Q&A to “All”
- All slides and the recorded webinar will be made available on the NJ Brownfields Assistance Center’s website

Webinar Agenda

- NJ Brownfields Assistance Center @ NJIT
- How GIS & RS are used in Brownfields Inventory and Prioritization
- Use Cases and Available Resources
- Q & A

NJ Brownfields Assistance Center

@NJIT

New Jersey Institute of Technology

NJ Brownfields Assistance Center @NJIT New Jersey Institute of Technology

Mission

- to educate and engage communities around brownfield issues
- to provide free technical assistance and resources to county and municipal governments, and nonprofits challenged by former industrial and commercial properties
- to develop tools, strategies, and resources; create partnerships; and provide subject matter experts to brownfields-challenged communities

NJ Brownfields Assistance Center

@NJIT New Jersey Institute of Technology

The NJIT Team

planners, engineers,
environmental scientists, and social scientists
who have helped hundreds of communities
throughout the country

NJ Brownfields Assistance Center @NJIT New Jersey Institute of Technology

How can we help you?

Resource Center

njit.edu/njbrownfields

@njbrownfields

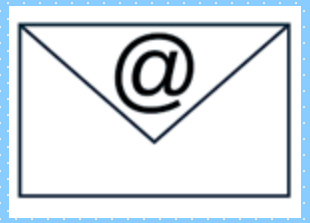
www.linkedin.com/company/njbrownfields

NJ Brownfields Assistance Center @NJIT New Jersey Institute of Technology

How can we help you?

Brownfields Help Desk

973-596-6415



njbrownfields@njit.edu

- Answers to quick questions
- Conversations about brownfield challenges
- Actions plans/next steps

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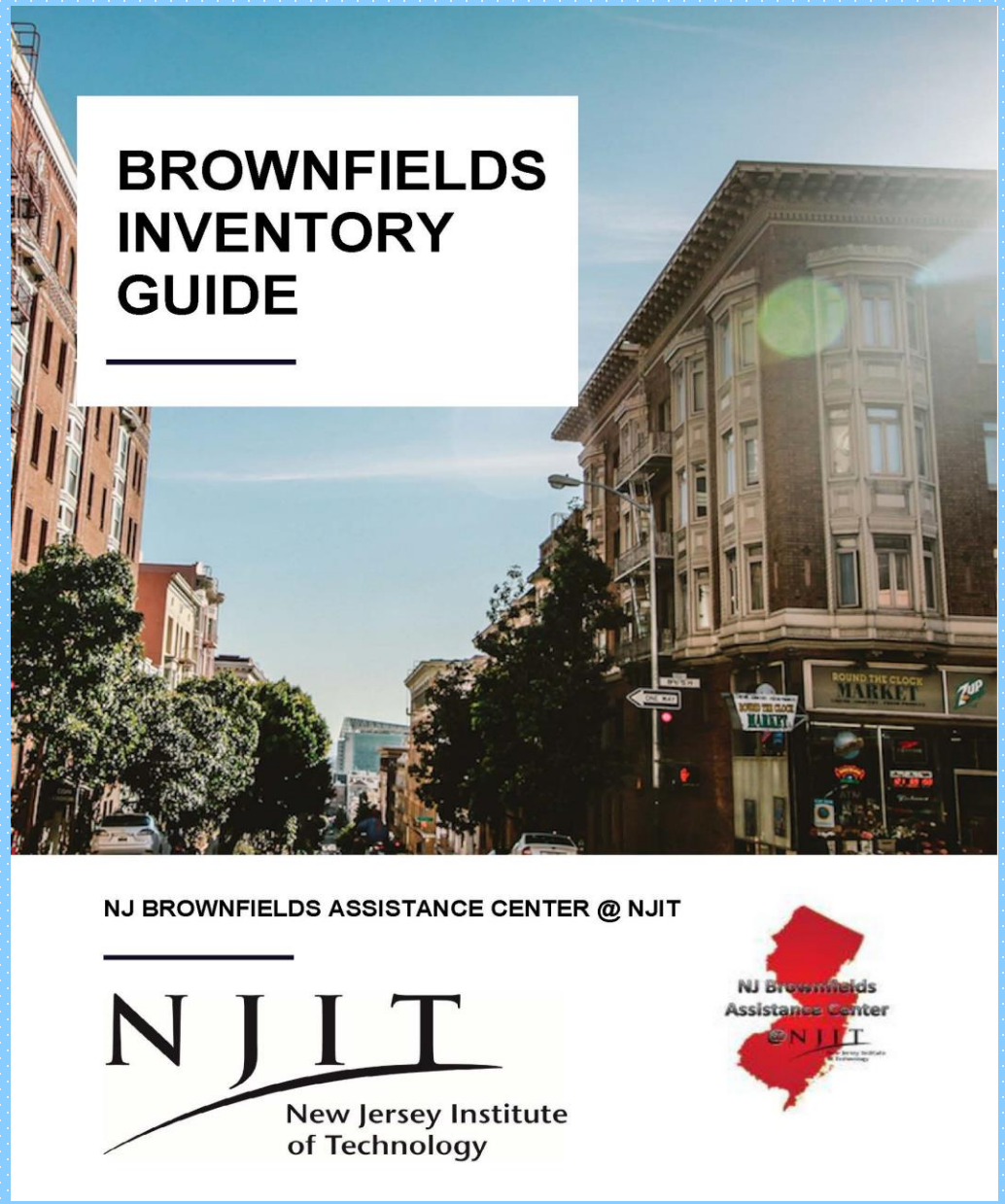
https://www.njit.edu/njbrownfields

Resources

↳ Topical Brownfields Guidance

↳ Brownfields Inventory Guide



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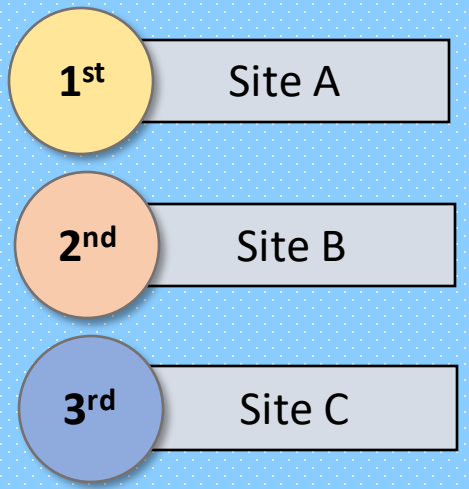
WHY IS BROWNFIELDS INVENTORY AND PRIORITIZATION IMPORTANT?

- ✓ Shows a Comprehensive Approach
- ✓ Helps When Pursuing Funding
- ✓ Focuses Project Goals



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WHAT IS A BROWNFIELD?

NJ State Definition

*"any former or current **commercial** or **industrial** site that is currently **vacant** or **underutilized** and on which there has been, or there is **suspected** to have been, a **discharge** of a contaminant."*

WHAT IS A BROWNFIELD?

Federal Definition

*"A brownfield is a property, the expansion, **redevelopment**, or reuse of which may be complicated by the presence or **potential presence** of a hazardous substance, pollutant, or **contaminant**."*

Geographic Information Systems

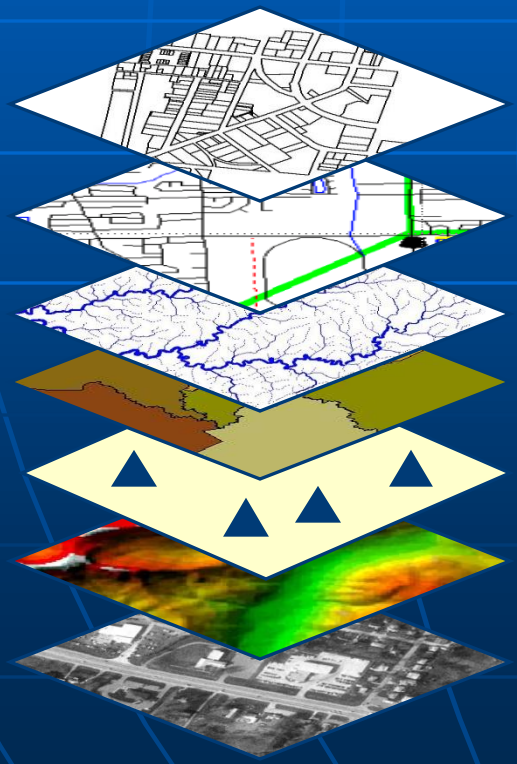
A Definition of GIS

GIS is a *System* of computer software, hardware and data, and personnel to help manipulate, analyze and present information that is tied to a spatial location –

- ***spatial location*** – usually a geographic location
- ***information*** – visualization of analysis of data
- ***system*** – linking software, hardware, data
- ***personnel*** – a thinking explorer who is key to the power of GIS

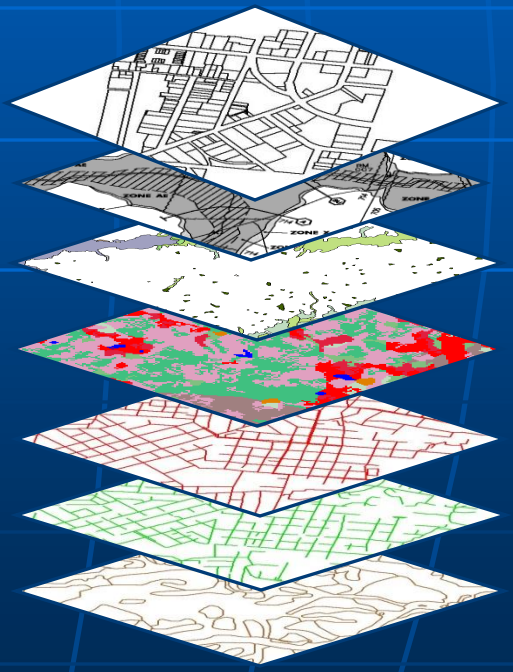
Relationships Among Data
Build Once, Use Many Times

Framework Data



- Land Ownership
- Transportation
- Surface Waters
- Boundaries
- Geodetic Control
- Elevation
- Aerial Imagery

Other Thematic Data



- Brownfields
- Flood Zones
- Demographics
- Landcover
- Water Lines
- Sewer Lines
- Soils

What Is a GIS?

A System for Managing, Sharing and Applying Geographic Information

GIS

Applied in Many Fields

Economic Development

Pollution Nature Conservation Health

Energy Transparent Government

Natural Resources Climate Change

National Security Science & Technology

Business **Environment** **Water Resources**

Agriculture Social Conflicts

Urbanization & Development

Natural Disasters

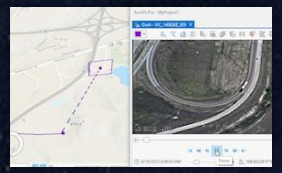
Infrastructure

Imagery and Remote Sensing Are Enriching GIS

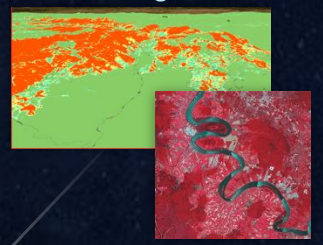
Transforming All Aspects of Geospatial Work

Oriented Imagery

Motion Imagery



Dynamic Image Processing



Point Cloud Visualization

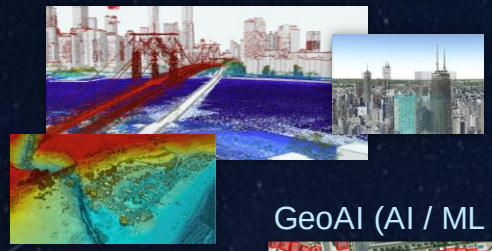
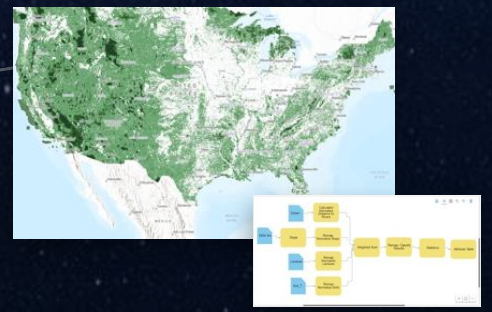


Image Basemaps

GeoAI (AI / ML / DL)

Raster Analytics & Modeling . . .

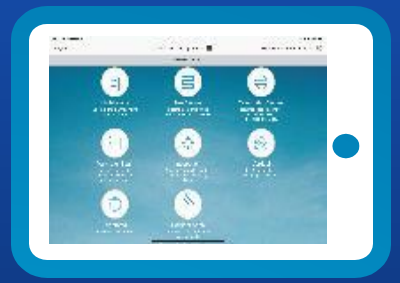


. . . Bring It Together

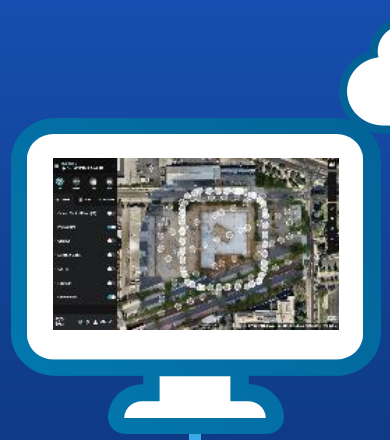
Advancing Geospatial Science

Integrating Massive & Timely Content

Map Production from Imagery



Site Scan
Flight
Planning



Cloud hosting
& processing

Site Scan
Manager

UAS
(Drone)

Site Scan
for ArcGIS

DSM
Orthomosaics

Digital
Elevation
Models

3D Meshes &
Point Clouds

ArcGIS Online

ArcGIS Enterprise

AutoDesk
BIM360

Field Operations

Location-enable all phases of field work with ArcGIS apps

Field Operations & Data Collection

Location-Enabling All Aspects of Field Work

Field Work Management

Tracker

Navigator

Workforce

Navigation

Work Coordination

Specialized Data Collection

Survey123

QuickCapture

Form-Centric Collection

Fast Observation Collection

Geocentric Data Collection

ArcGIS Field Maps

Comprehensive Field App

Operational Awareness

Dashboard

Integrates

- Collecting
- Updating
- Tracking
- Viewing
- Markup

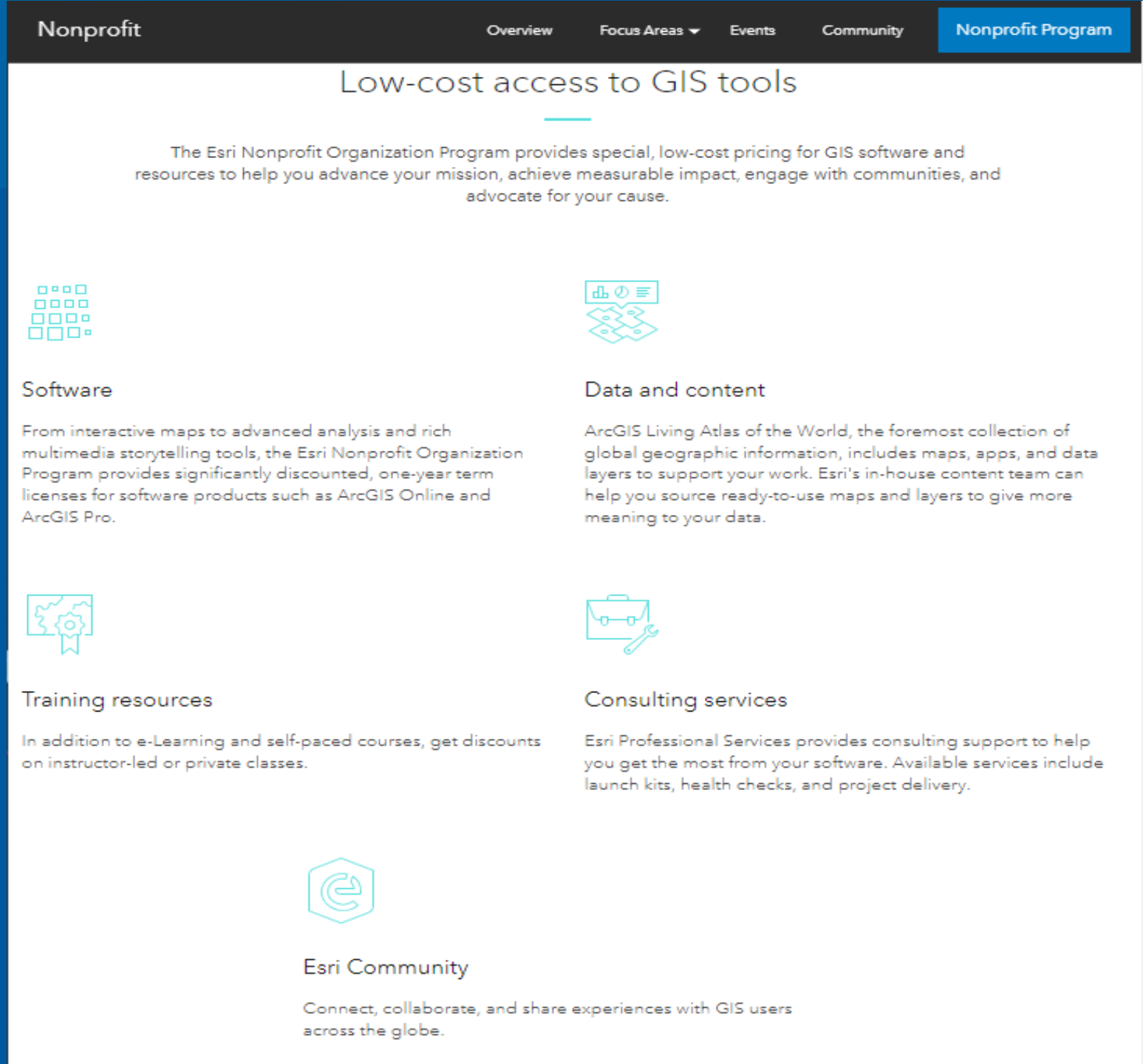
Connecting & Transforming Mobile Workflows

ArcGIS Licenses

Personal Use License

Non-profit License

Commercial License

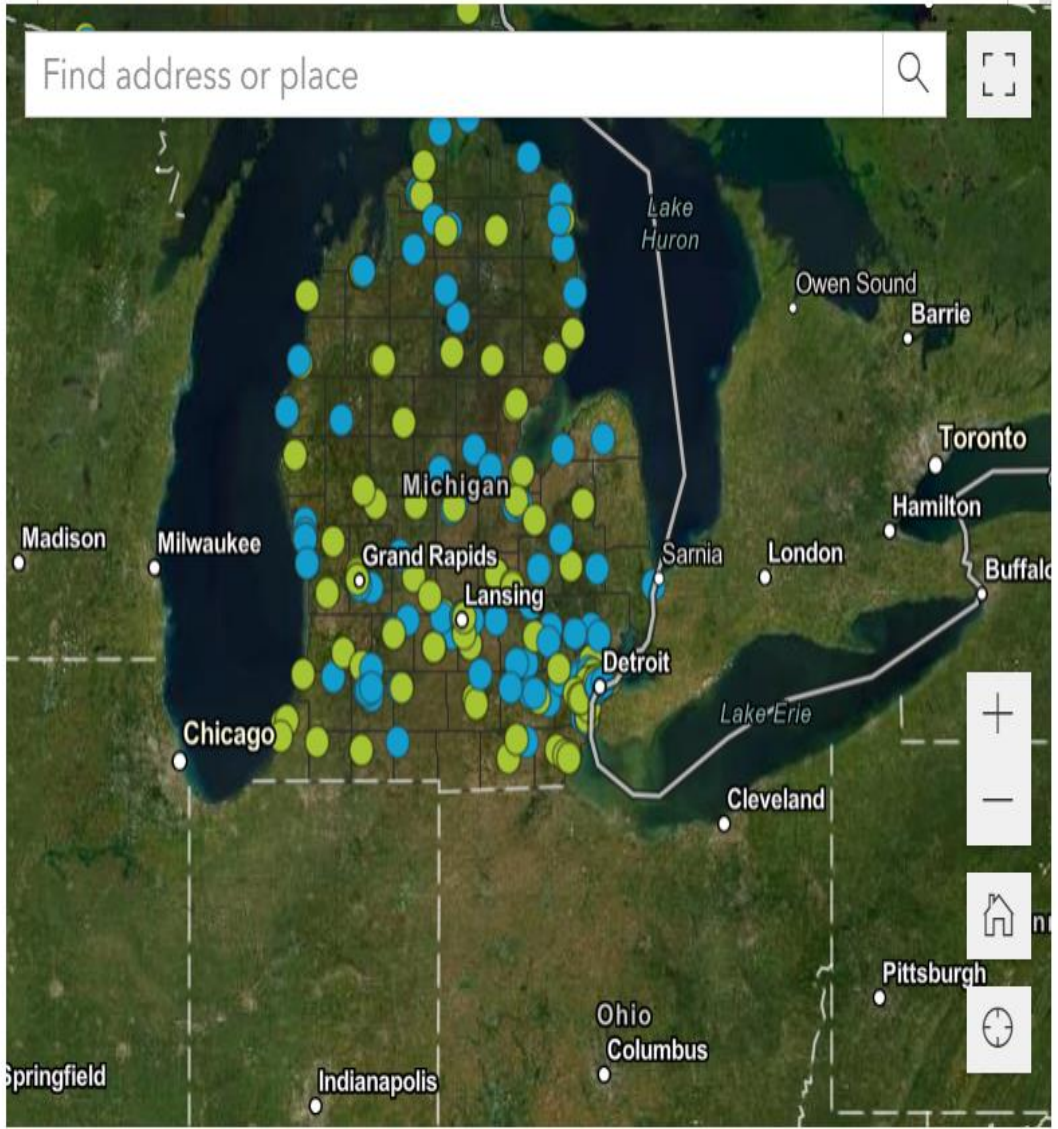


RenewMI Project Viewer

How to Use

In Progress Project Completed Project

See All Projects on Map



Search by Project Name, City, or County

11112 Resort Road
Pleasant Lake (Jackson County)
Read Project →

122 Muskegon Avenue
Muskegon, City of (Muskegon County)
Read Project →

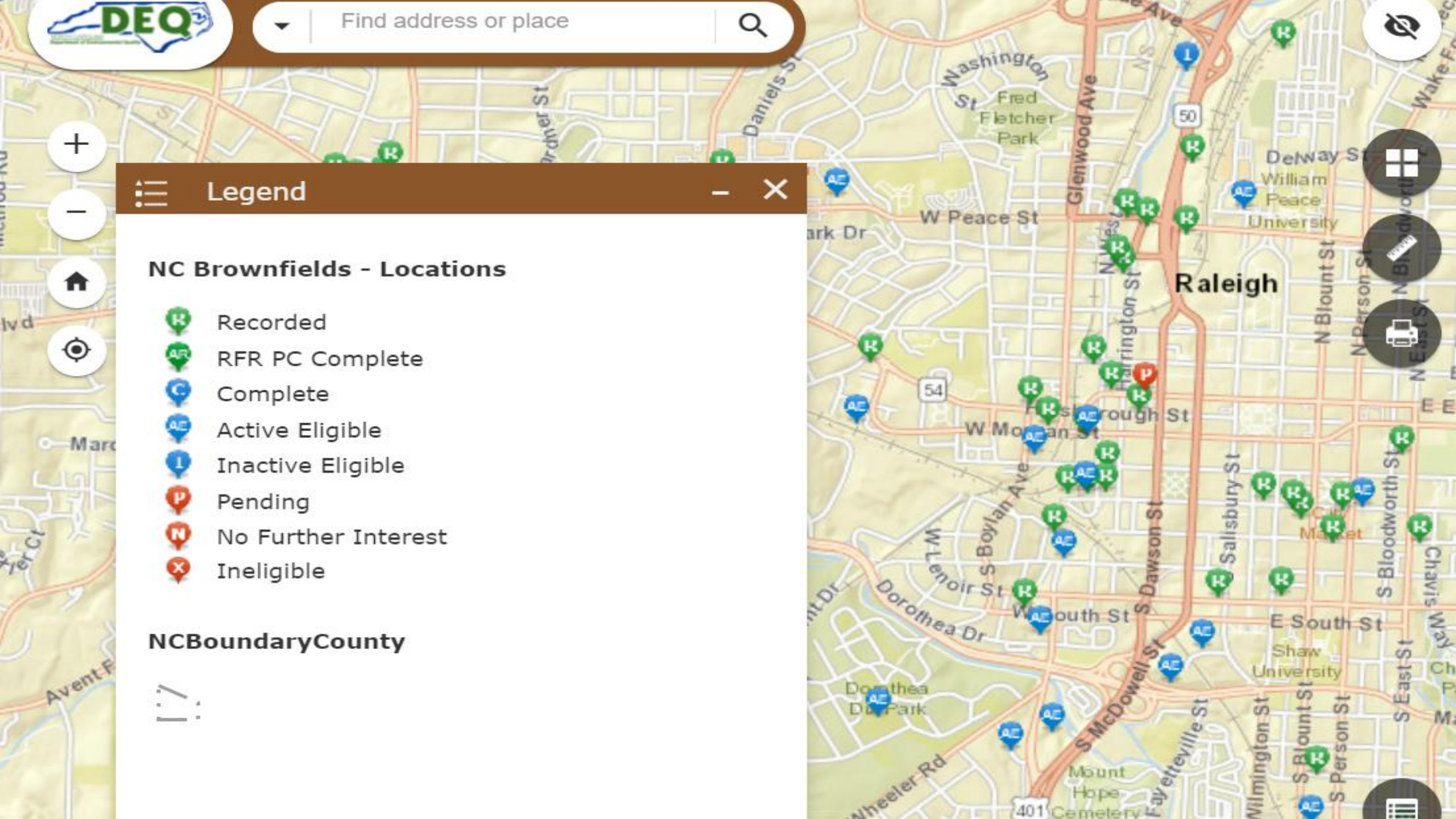
124 West Front Street
Traverse City, City of (Grand Traverse County)
Read Project →

303 East University Drive Redevelopment
Rochester, City of (Oakland County)
Read Project →

410 West Broadway
Mount Pleasant, City of (Isabella County)
Read Project →

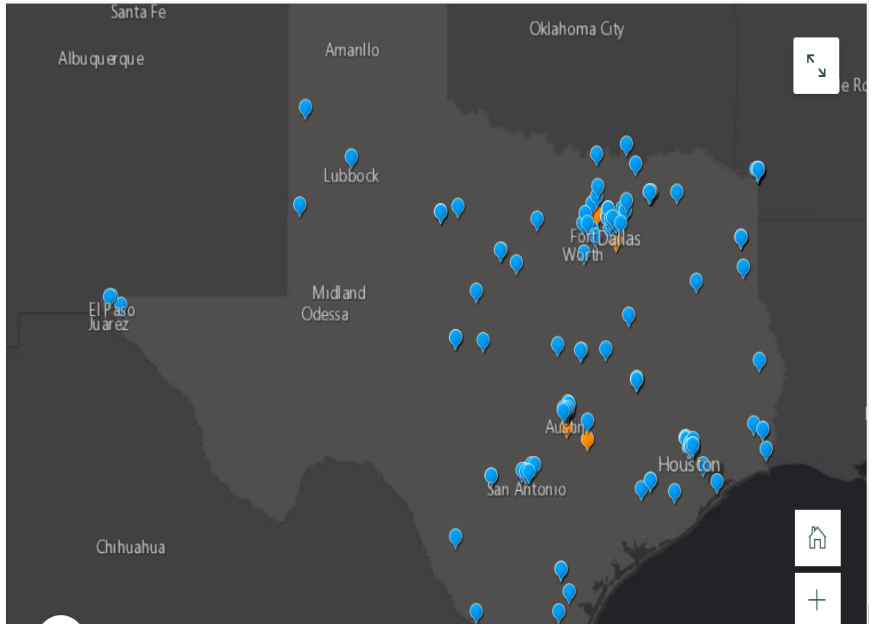
615 Holdings Redevelopment
Kalamazoo, City of (Kalamazoo County)
Read Project →

917 East Main Redevelopment
Read Project →


DEQ
Find address or place
Legend
NC Brownfields - Locations
Recorded
RFR PC Complete
Complete
Active Eligible
Inactive Eligible
Pending
No Further Interest
Ineligible
NCBoundaryCounty
Raleigh
W Peace St
Washington St
Fred Fletcher Park
Glenwood Ave
Delway St
William Peace University
N Blount St
N Person St
Harrington St
Hillsborough St
W Morgan St
S Boylan Ave
W Lenoir St
Dorothea Dr
S Dawson St
Salisbury St
S Bloodworth St
E South St
Shaw University
S McDowell St
Fayetteville St
Wilmington St
S Blount St
S Person St
S East St
Chavis Way
Mount Hope Cemetery
Wheeler Rd
Daniels St
Avent F
50
54
401

TCEQ Brownfields Program

TCEQ Brownfields Program sites are located in rural and urban communities throughout Texas as depicted in blue on this map. The orange points represent sites featured in this story map.



Who qualifies to enter the program?

Any governmental or quasi-governmental entity including corporations, councils of

TCEQ Brownfields Program

Lost Pines Art Center - Bastrop

Construction was completed in December 2016. The main building was repurposed into art galleries and studios as well as a local coffee shop, wine bistro, classrooms, and retail space. Demonstration areas and studios are now located in the silos.

Brownfield Land Register Toolkit

Thank you for using the Brownfield Land Register Toolkit.

By using this toolkit to supply information on brownfield land in your local area, you're helping to increase the amount of brownfield land which is available for development - ultimately protecting our precious greenspaces and countryside from development.

This toolkit aims to help people to tell their local planning authority about brownfield sites that could be developed, and to ensure they are included in the council's Brownfield Land Register and Land Supply dataset. This will increase the chances of these sites being developed, and take pressure off less appropriate places.

If vacant, what was its former use?

For example, housing, offices, industry and warehousing, community use, retailing, etc. Be as specific as you can, especially if it was the sort of use that may have led to any contamination of the land, eg petrol station, industrial units.

Type your answer here

979

Description of surrounding land uses

For example, housing, offices, industry and warehousing, community use, open / vacant land, parkland, etc. Details such as approximate heights of adjacent buildings, broad topography (is land flat or sloping) etc would be helpful.

Type your answer here

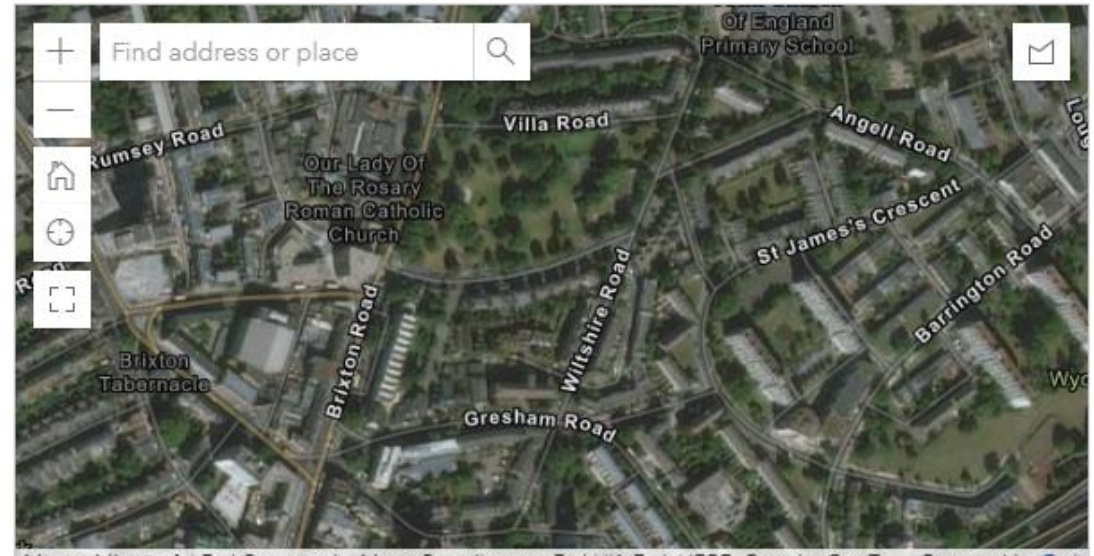
Image of the site

Please upload an image of the site, if you have one.

Select image file

Please provide the location of the brownfield site

Use the 'Find address or place' search bar in the map below to find the location of the brownfield site. Use the drawing tool in the top right hand corner to draw a line around the site. Remember to click the 'tick' button once you have finished using the tool.



No geometry captured yet.

Existing land use of site

Include general condition of existing buildings, eg derelict, sound, capable of conversion to housing).

Type your answer here

Brownfield Tracker v1.46

An observation tool to identify, track, and monitor condition and utilization of sites of environmental concern in your neighborhood.

Have you enabled GPS Location Services on your mobile device?*

On your device, please turn on "Location Services" and also ensure that "Cellular Data" is ON.

- ○ YES
- ○ NO - Then please switch on

I agree to conduct all Brownfield Tracking while remaining on sidewalks, public streets, and alleys for all site inspections.*

Please DO NOT Trespass! To participate you must agree you WILL NOT enter private property.

- ○ YES
- ○ NO is not an option

Brownfield Review Code

If you have received a Team or Individual Brownfield Tracker Code please enter it here. Otherwise, please continue.

Site Location*

Please identify the Site location for this Brownfield site review. Please ensure you are as near to subject site as possible when answering. **NOTE: Please check to make sure map identifies your correct site of interest and move map with finger or use + button to zoom and match site if it does not appear correct on the map. HINT:** The round button will take you back to

Brownfield Indicators

What (if any of these) do you see at the site? You may find examples of these types of sites in the Brownfield Tracker Field Guide.

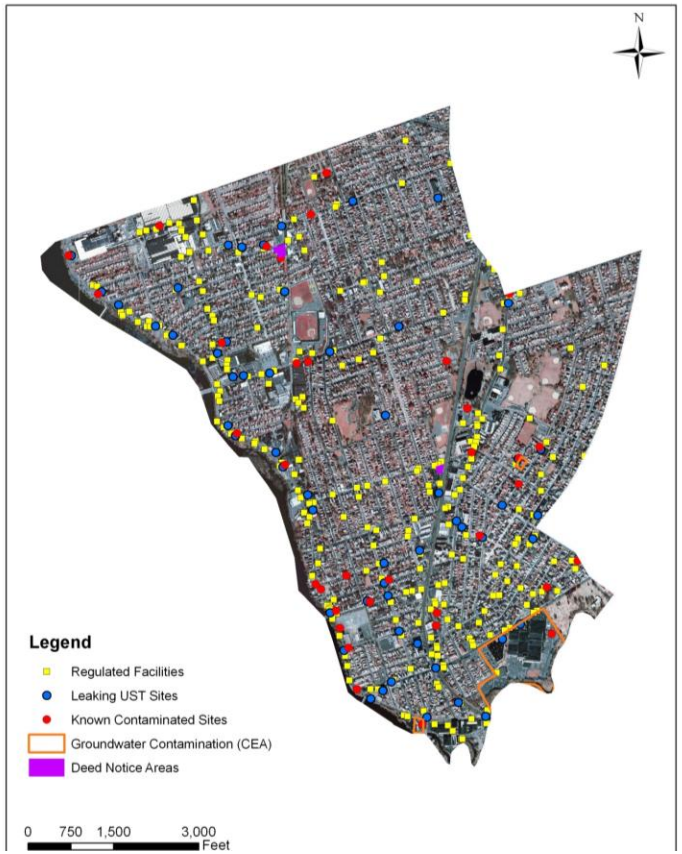
- ☐ Fuel Pumps / Islands
- ☐ Ground Water Monitoring Wells
- ☐ Above Ground Storage Tanks (ASTs)
- ☐ Remediation / Treatment System
- ☐ Fill Ports or Vent Pipes
- ☐ Vehicle Service Bays
- ☐ Hydraulic Lifts (inside/outside)
- ☐ Metal Drums / Liquids Storage
- ☐ Stained Soil or Pavement
- ☐ Distressed Vegetation
- ☐ Chemical Signs or Storage
- ☐ Gas / Petroleum Signage
- ☐ Other Brownfield Creating Conditions Witnessed

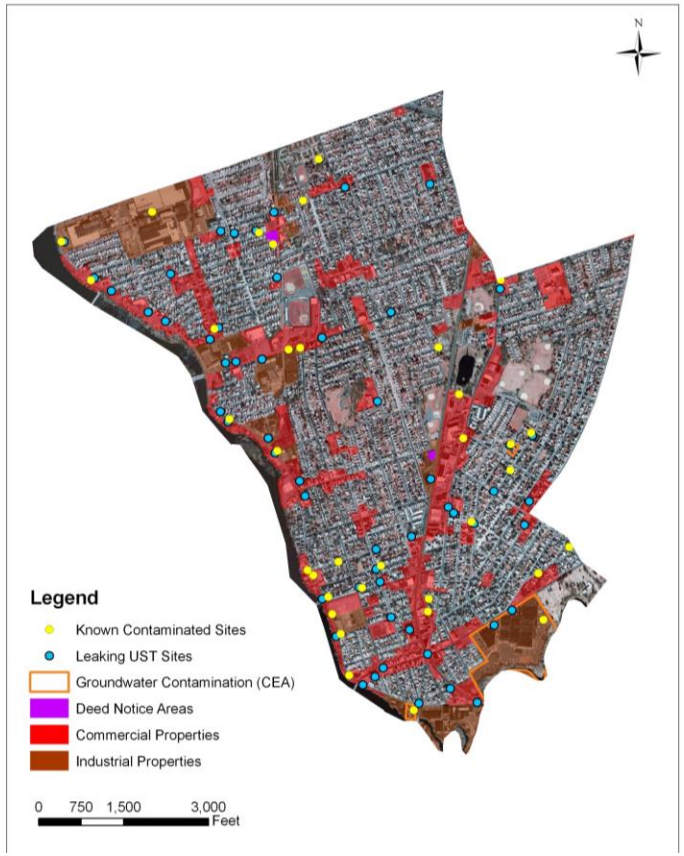
Other Site Conditions

Do you see any of the following at the site?

- ☐ Abandoned vehicles
- ☐ Paved or gravel lot
- ☐ Squatting or signs of trespass
- ☐ Dumping, litter, or graffiti
- ☐ Stray domestic animals
- ☐ Wild animals

City of Garfield, Bergen County, NJ Brownfield Inventory by Garfield Environmental Commission





Data layers were selected and clipped for Garfield

- 35 known contaminated sites (KCS)
- 3 groundwater contamination (CEA) sites
- 3 Deed Notice Areas
- 65 Underground Storage Tank (UST) contamination sites
- 307 Regulated facilities

Overlaid Commercial/Industrial zones

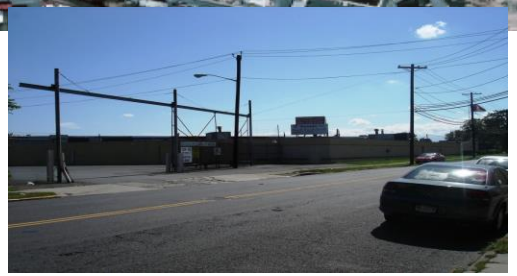
Obtained vacant/abandoned properties list from Garfield Building, Fire, Health, Public Works Departments and Redevelopment Agency

Field Visit

- ✓ Conducted a "**windshield survey**" of Garfield focusing on the data previously collected (three days)
- ✓ Identified sites of **vacant, abandoned, and underutilized** properties and took photographs (~250 photos)
- ✓ Obtained **occupancy** and current use information for 42 properties identified from Garfield tax assessor and fire departments

Data Review

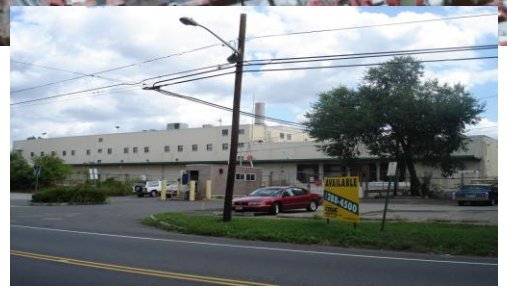
- ✓ Reviewed the properties based on their use/occupancy and contamination information
- ✓ Screened the sites with brownfield definition and identified **15 properties** as potential brownfields
- ✓ Selected and clipped parcels that were potential brownfields
- ✓ Prepared a map using aerial photo as a base map and overlaid parcel boundary of potential brownfield properties

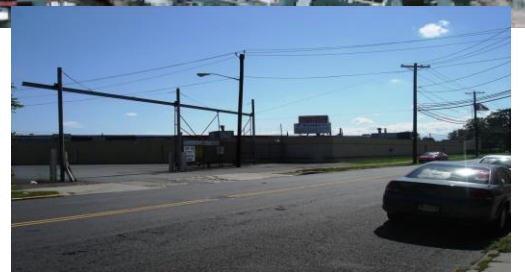


Results

- ✓ Over 200 properties were cataloged
- ✓ 4 large brownfield properties were designated as redevelopment zones by Garfield Redevelopment Agency
- ✓ Some small properties were redeveloped independently
- ✓ Other brownfield properties identified for future redevelopment

Before and After





Wayback Imagery – Esri Living Atlas

Brownfields Prioritization Model Using GIS by HR Green

1) **Environmental Risk** – A defensible approach identifies:

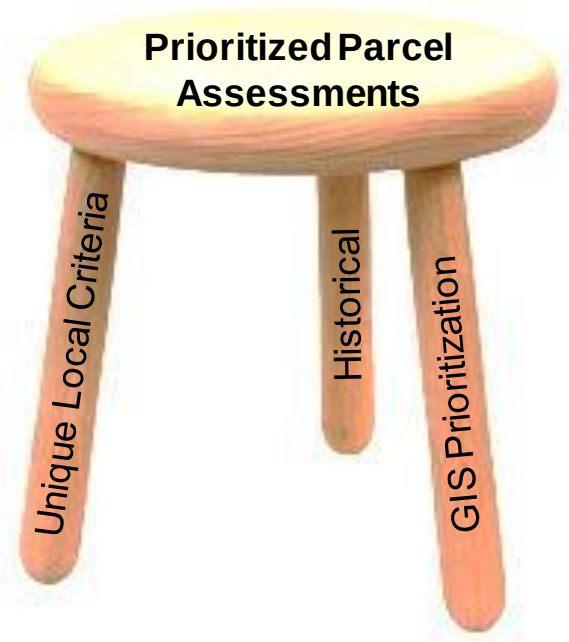
- i. environmental risk
- ii. available funding from the EPA to perform an environmental site assessment
- iii. how to move forward on clean-up.

2) **Redevelopment Potential** - Proximity to major transportation corridors, water service, and fiber optic networks are a few of the many redevelopment factors examined by a robust GIS model in generating each parcel's redevelopment score.

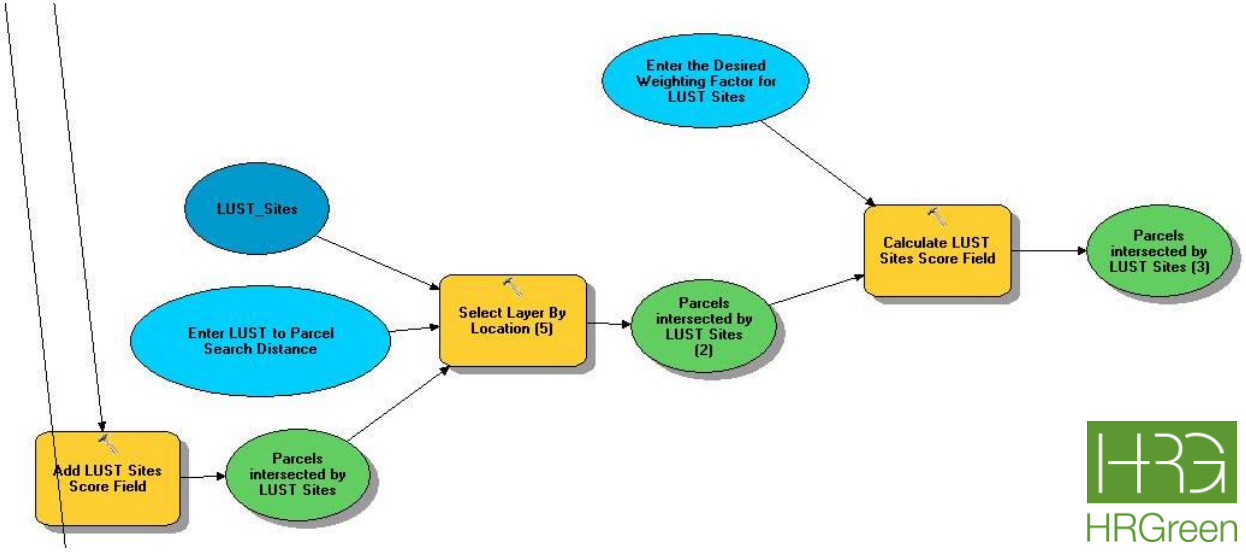
3) **Ground Truth** - The final part of a complete approach enlists the expertise of environmental professionals and local stakeholders.

Use of GIS to Prioritize Brownfield Locations

- HR Green has incorporated GIS analysis into a comprehensive process that helps client communities select sites for brownfield assessment, cleanup, and reuse.



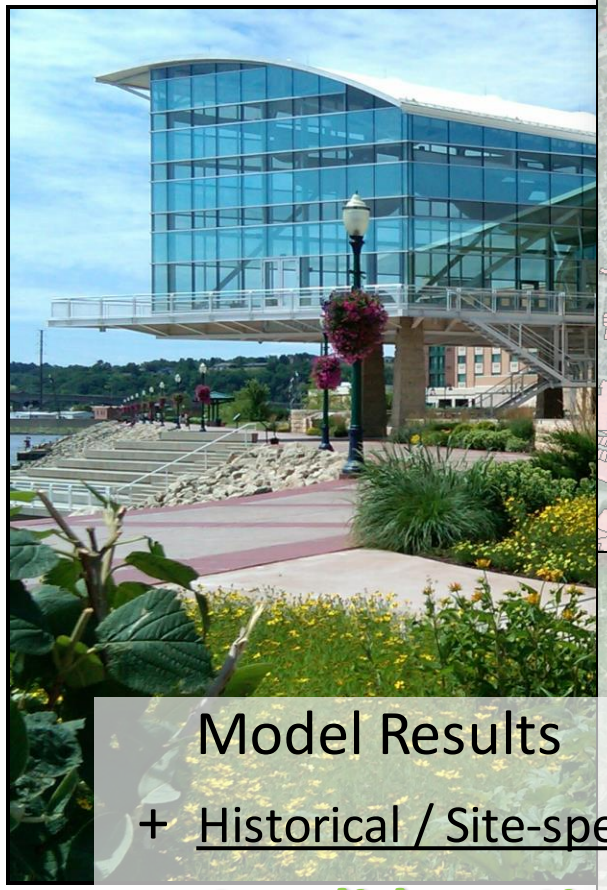
- GIS modeling is employed to perform customizable, repeatable analyses that can adapt to varying data availability and client priorities.

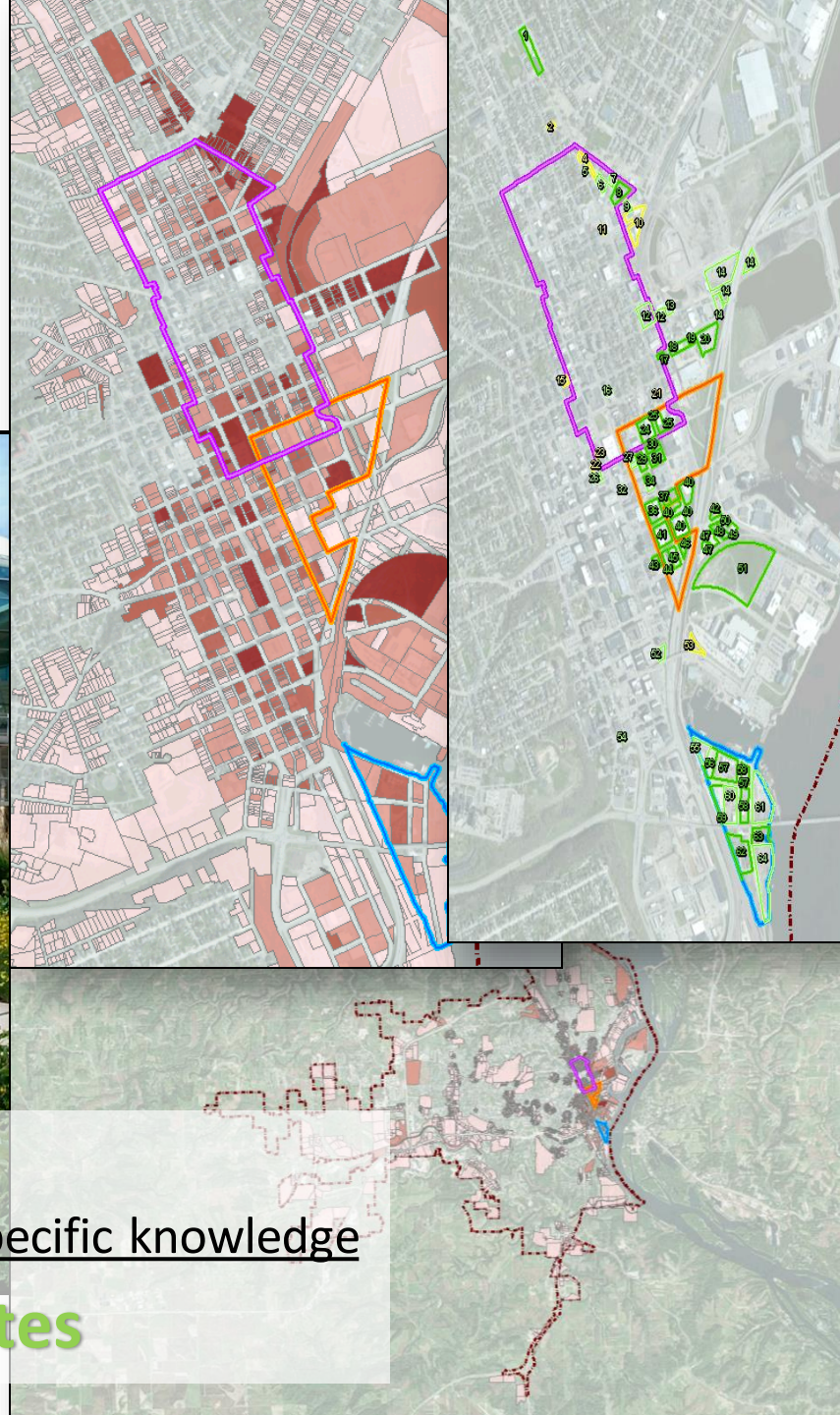


HRGreen

Use of GIS to Prioritize Brownfield Locations

- Case Study: Dubuque, IA
  - Over **26,000 parcels** analyzed
  - GIS modeling found environmental risk for **6,413 parcels**
  - Highest-scoring parcels concentrated heavily in downtown area, in and around three client-established target areas
  - High-scoring parcels were vetted by HR Green project team to arrive at **62 candidate sites**
  - Discussions with City officials and community stakeholders resulted in **26 of these sites being selected** for environmental assessment.



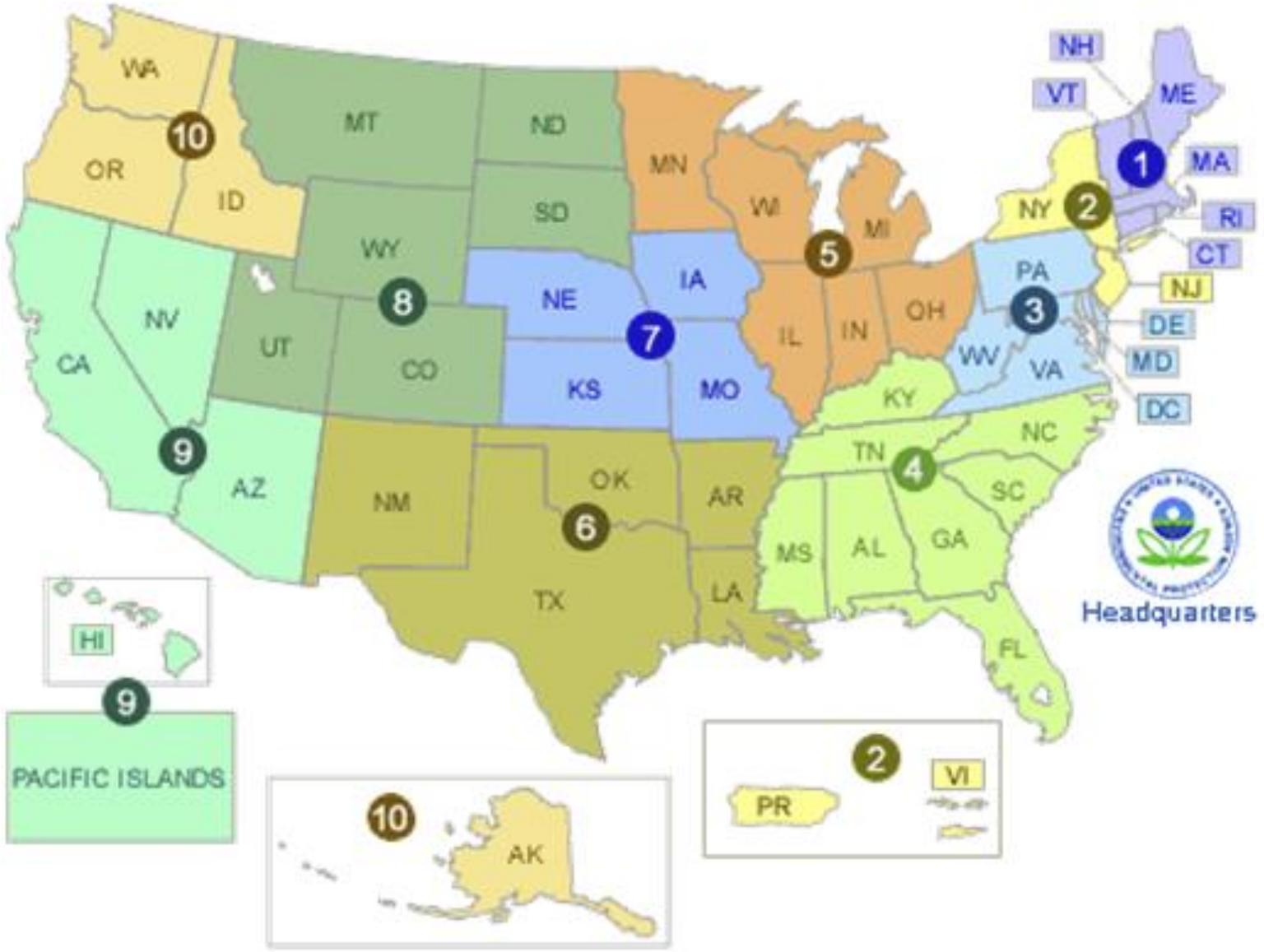


Model Results

\+ Historical / Site-specific knowledge

Candidate Sites

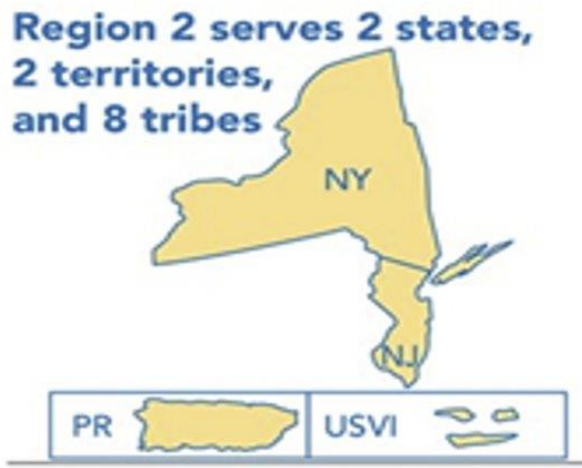
Brownfields Inventory and Prioritization *Across all 10 EPA Regions*



Brownfields and Land Revitalization in EPA Region 2

Regional Profile for EPA Region 2

This section examines TRI reporting in EPA Region 2. Region 2 includes New Jersey, New York, Puerto Rico, US Virgin Islands, and 8 tribes.



REGION 2'S POPULATION IS **31.4 million** PEOPLE

9% of the U.S. population

U.S. Census Annual Estimates of the Resident Population: July 1, 2020

The **sectors** with the greatest TRI releases are:

- Chemical manufacturing
- Electric utilities

The TRI **chemicals** released in the greatest quantities are:

- Nitrate compounds
- Zinc and compounds

U.S. EPA TRI, Reporting Year 2020

1,016 facilities in the region report to TRI

which is 5% of all TRI facilities

U.S. EPA TRI, Reporting Year 2020

US EPA
ACRES

The Assessment, Cleanup and Redevelopment Exchange System (ACRES) is an online database for Brownfields Grantees to electronically submit data directly to EPA.

- https://www.epa.gov/brownfields/brownfields-grantee-reporting-using-assessment-cleanup-and-redevelopment-exchange

- https://www.epa.gov/frs/geospatial-data-download-service (acres_frs.kmz)

Brownfields Inventory and Prioritization

ACRES

Across all 10 EPA Regions

Brownfields Inventory and Prioritization

ACRES

EPA Region 2

Brownfields Inventory and Prioritization

ACRES

New Jersey

Using GIS to turn Data into actionable information

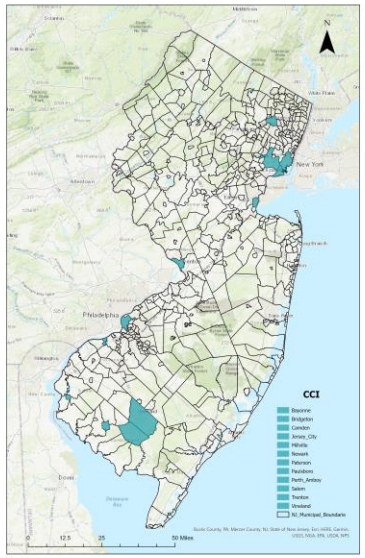
The Brownfield Inventory

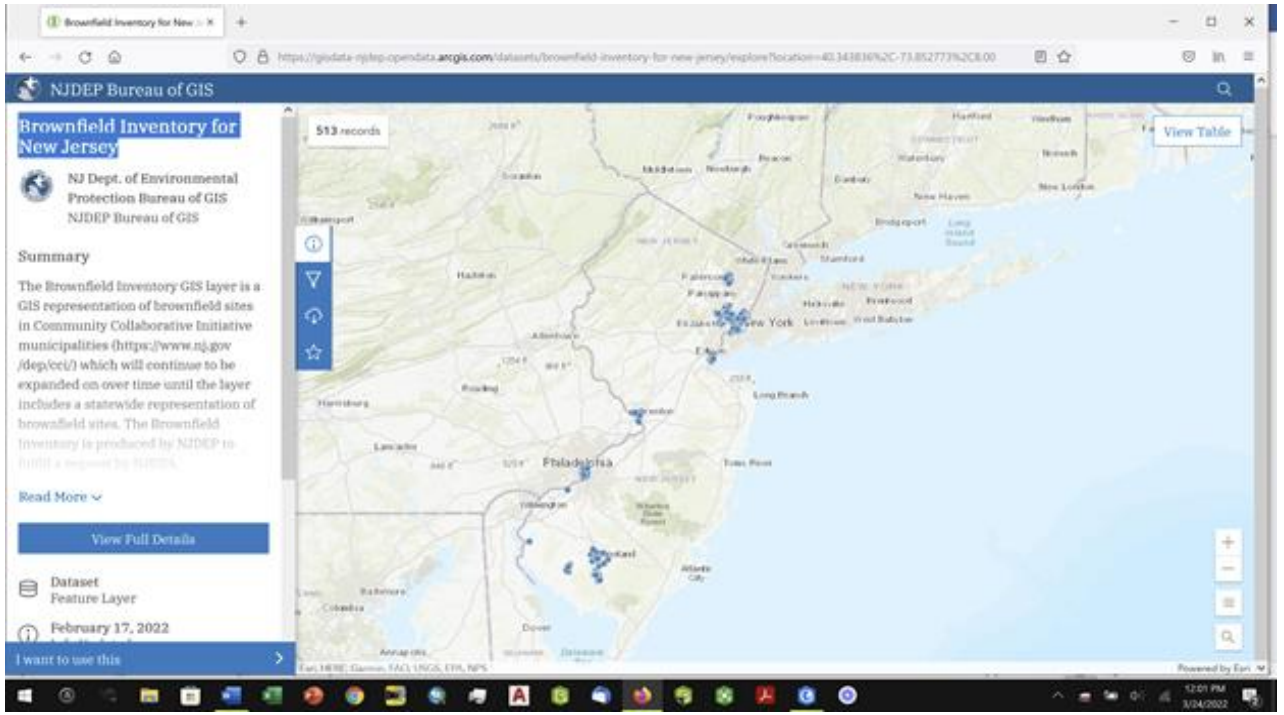
- The Brownfield Inventory is a subset of sites from the Known Contaminated Sites List (KCSL) for New Jersey.
  - Phase 1 of the Brownfield Inventory ***exclusively includes*** brownfield sites in Opportunity Zones in Community Collaborative Initiative municipalities.
  - Phase 2 of the Brownfield Inventory ***includes all brownfield*** sites within Community Collaborative Initiative municipalities.
  - Future phases will expand upon this work
    - https://njdep.maps.arcgis.com/home/item.html?id=a895bf0512044349bc6631b64457a33f
      - https://njdep.maps.arcgis.com/home/webmap/viewer.html?layers=a895bf0512044349bc6631b64457a33f

Brownfields Inventory and Prioritization

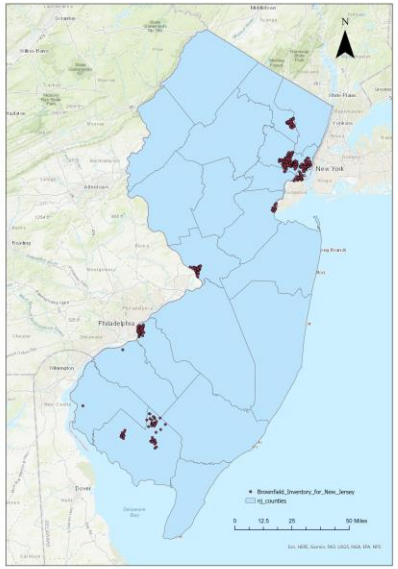
Community Collaborative Initiative (CCI)

Community Collaborative Initiative (CCI)





Brownfield Inventory for New Jersey (513 Sites)



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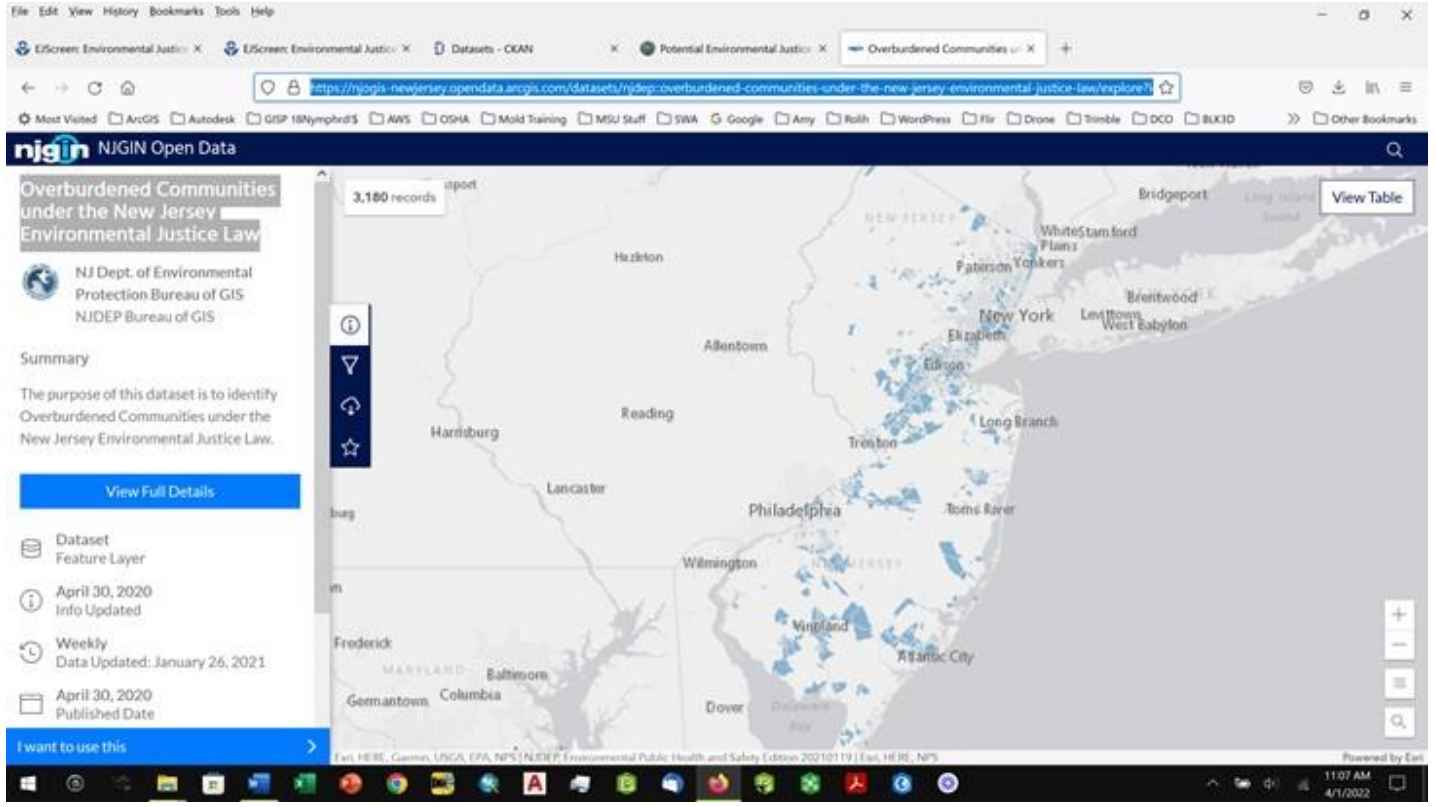
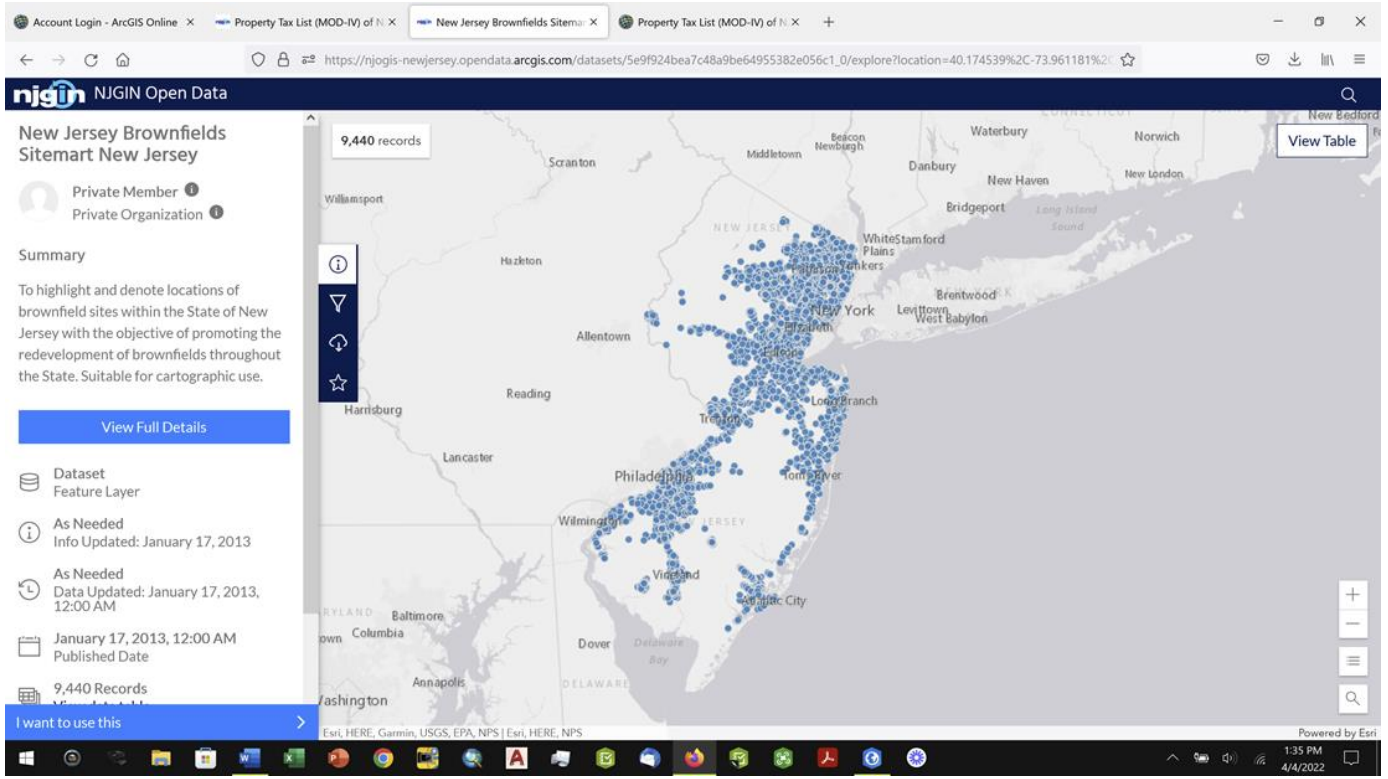
Overburdened Communities under the New Jersey Environmental Justice Law

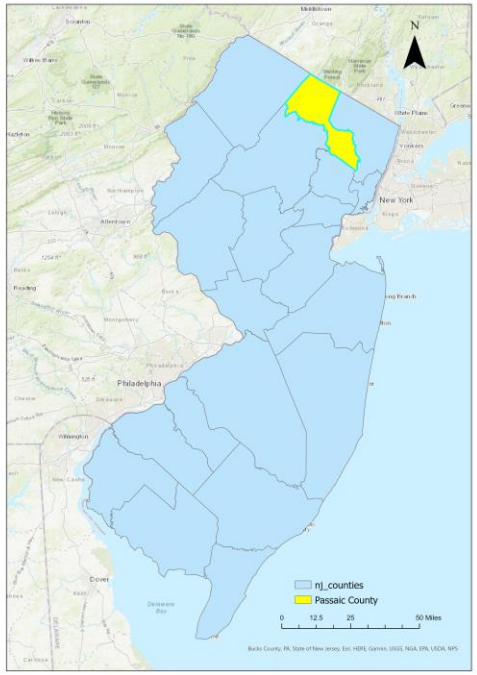


New Jersey Brownfields Sitemart

Info Last Updated: January 17, 2013



Passaic County



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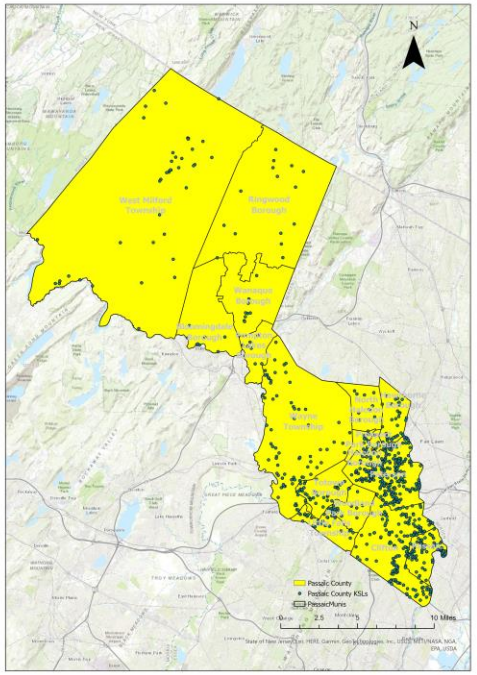
Passaic County Sites
from Known Contaminates Site List (776 Sites)



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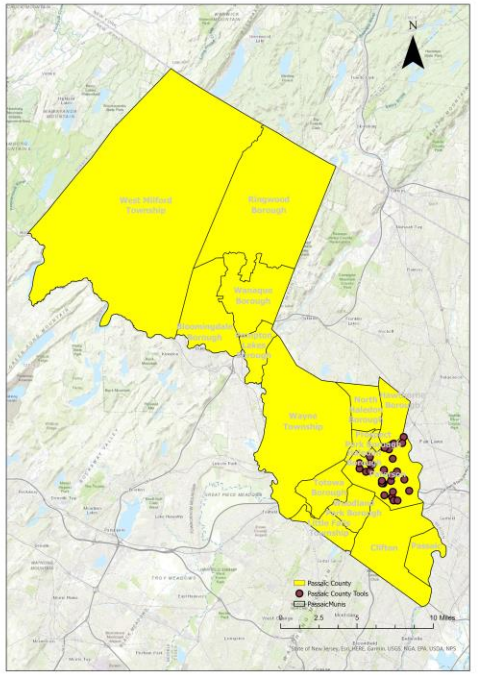
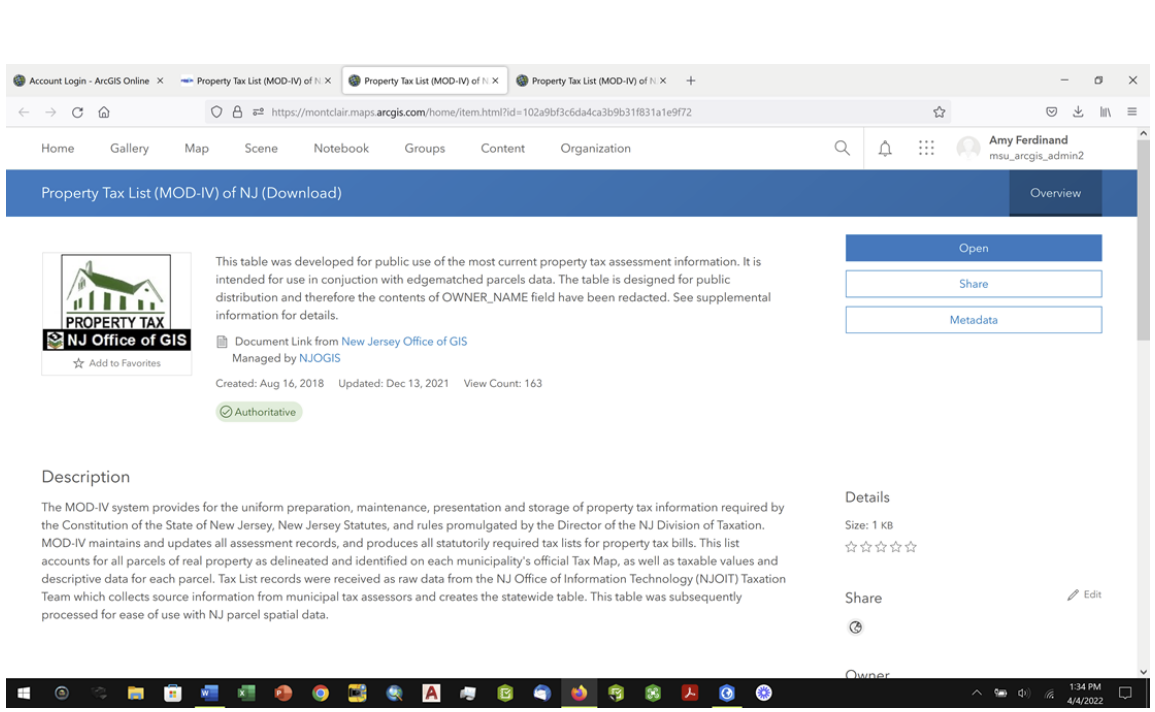
Passaic County Sites
from Brownfields Tool (32 Sites)



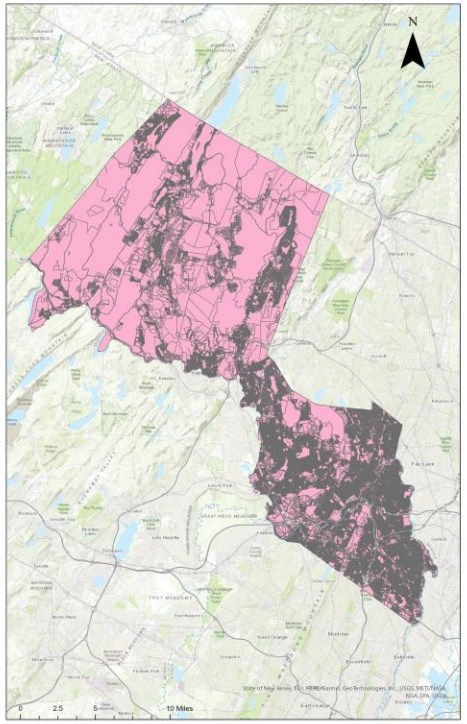
https://gisdata-njdep.opendata.arcgis.com/datasets/brownfield-inventory-for-new-jersey/explore?location=40.153600%2C-74.765750%2C9.33

The County of Passaic
Passaic County Brownfield Commission

Parcels and MOD-IV Composite of NJ
Date Updated: December 13, 2021

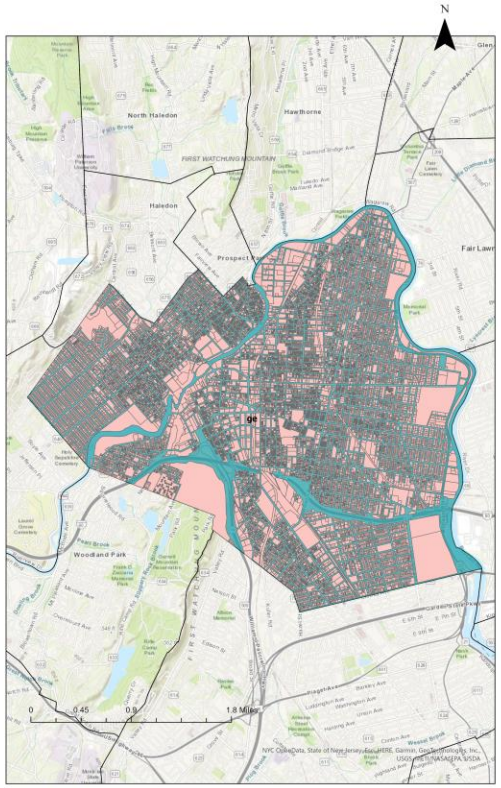


Passaic County Parcels from MOD-IV

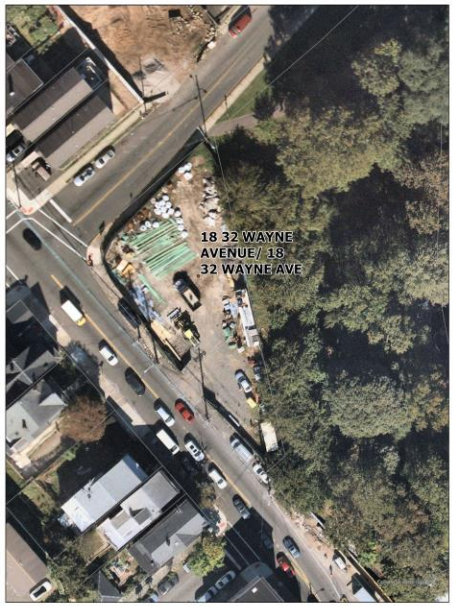


Brownfields Inventory and Prioritization
Community Collaborative Initiative (CCI)

Paterson, NJ - MOD-IV Parcels

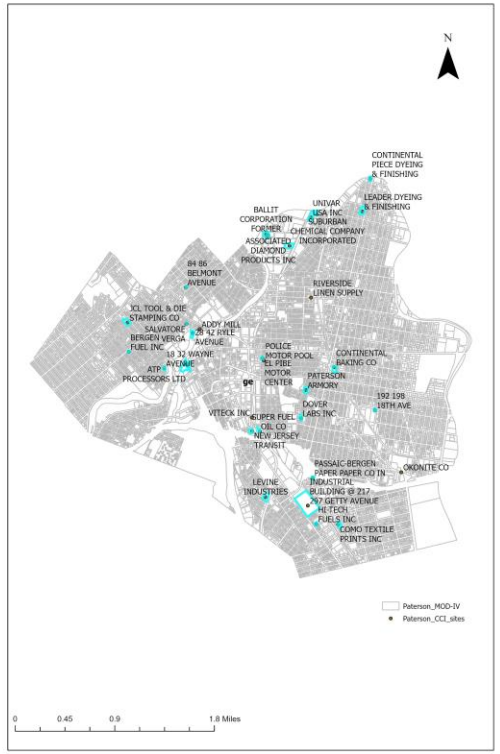


18 32 WAYNE AVENUE

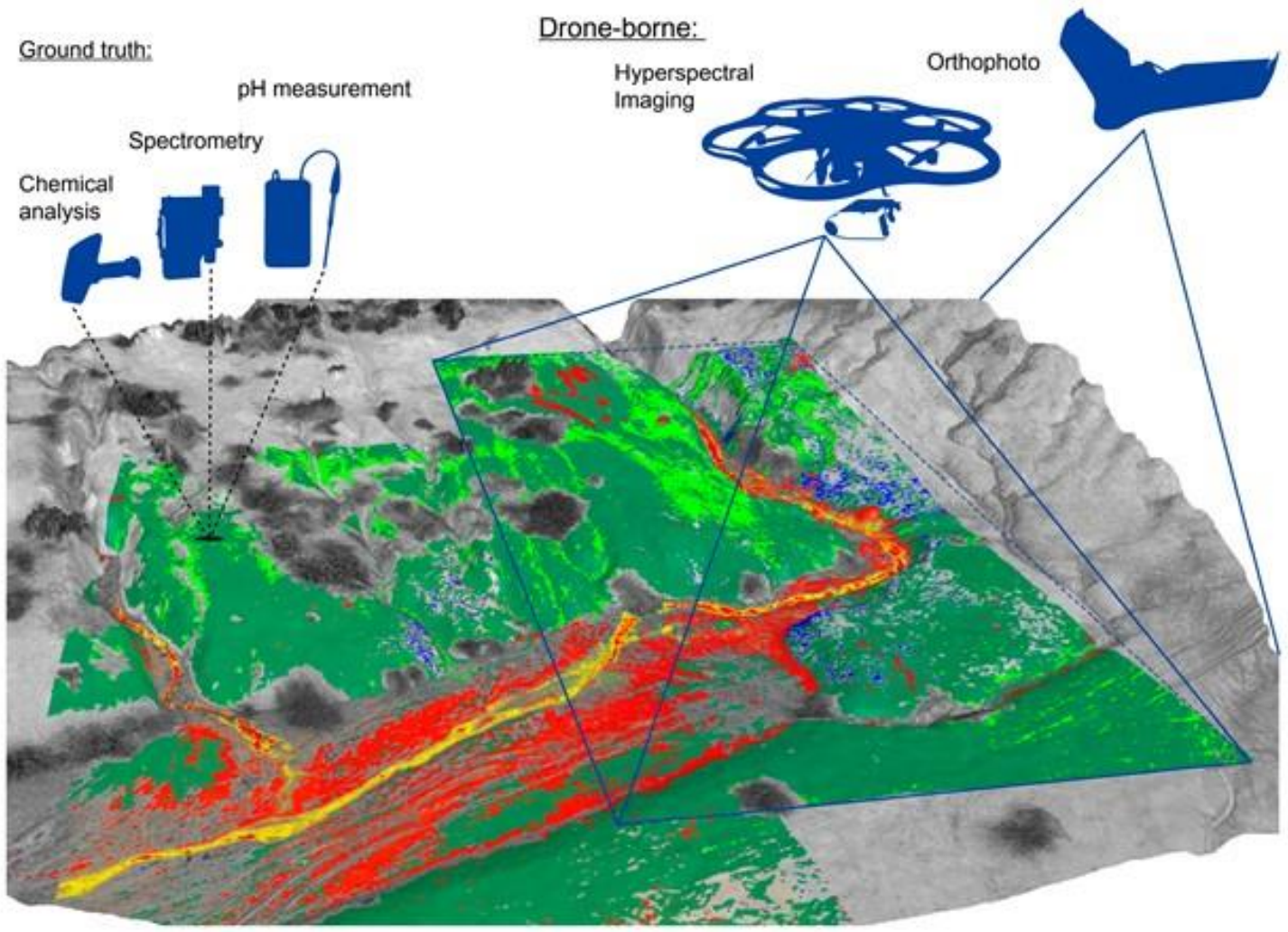


ATP Processors Ltd.

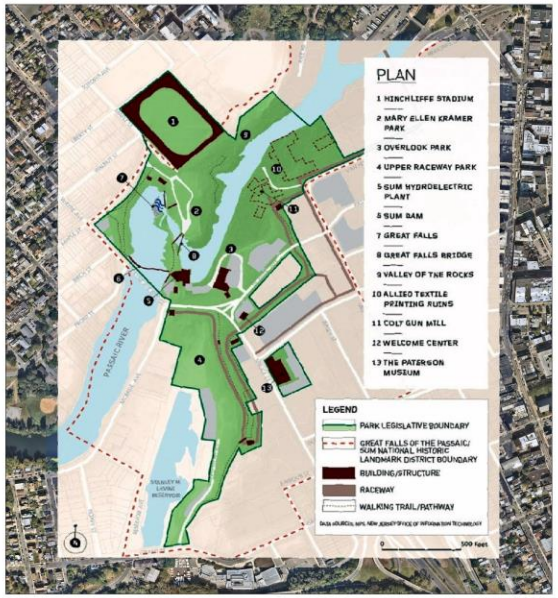
Paterson, NJ MOD-IV Parcels



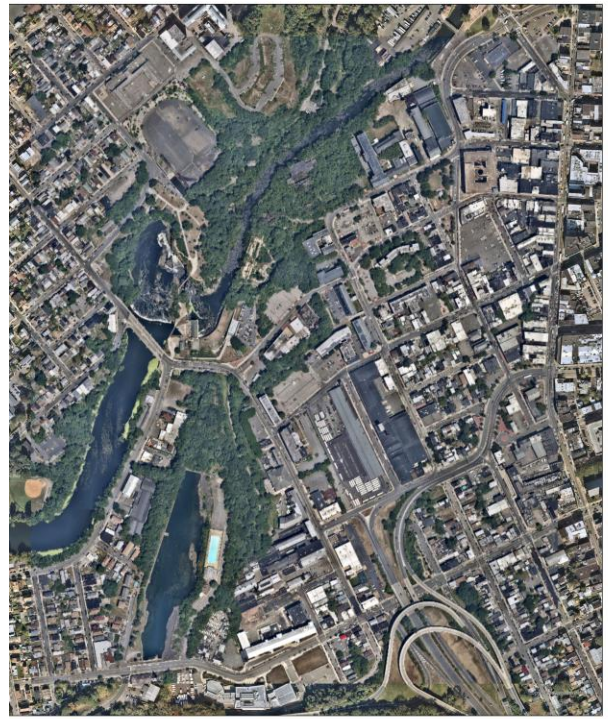
Use of Remote Sensing to Prioritize Brownfields: From Initial Assessment to Remediation

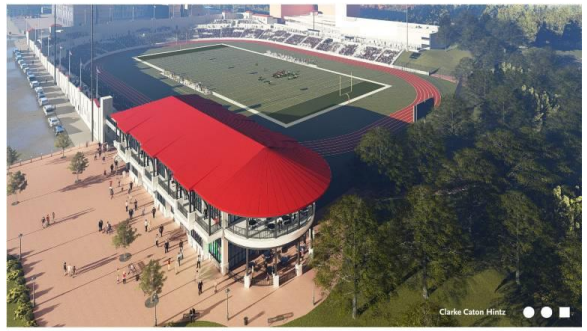


Hinchliffe Stadium

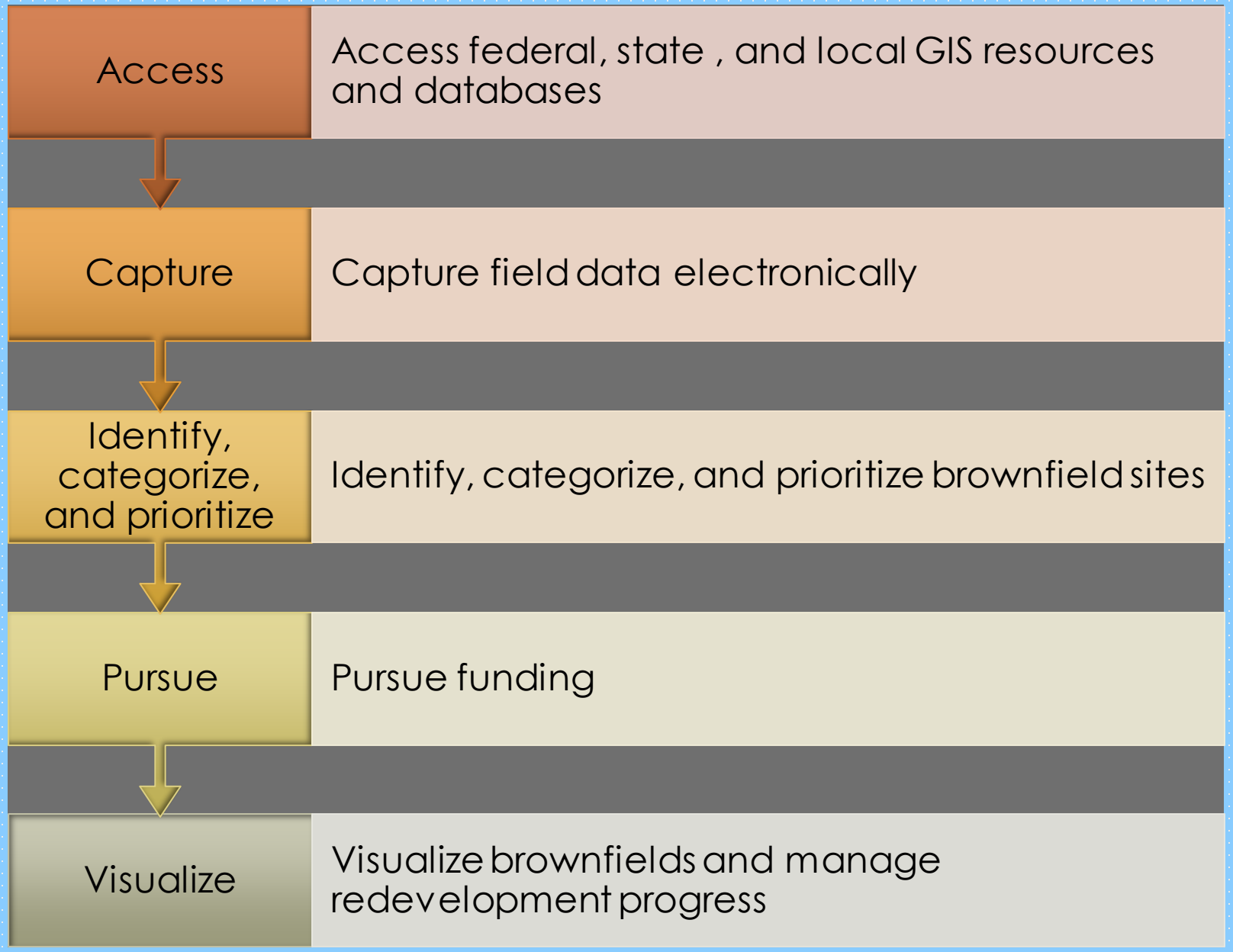


Hinchliffe Stadium





Using GIS & Remote Sensing Will Help You



NJ Brownfields
Assistance Center
@NJIT
New Jersey Institute
of Technology

Q & A

MAPPING FOR SUCCESS: USING GIS & REMOTE SENSING TO INVENTORY & PRIORITIZE YOUR BROWNFIELDS

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