



FOUNDATIONS FOR SUCCESS
WEBINAR SERIES

Subsurface Data-Enriched Site Intelligence

PRESENTERS:



Jacob Spinsby, P.G., MSc



Phillip Sinclair



Travis Kassebaum, P.E.



Levi Denton, P.E.



Vic Donald, P.E.



Mike Hagemeister, P.E.

ABOUT TERRACON

Our Services:

- Facilities
- Environmental
- Geotechnical
- Materials

7,000+
PROFESSIONALS

180+
LOCATIONS NATIONWIDE

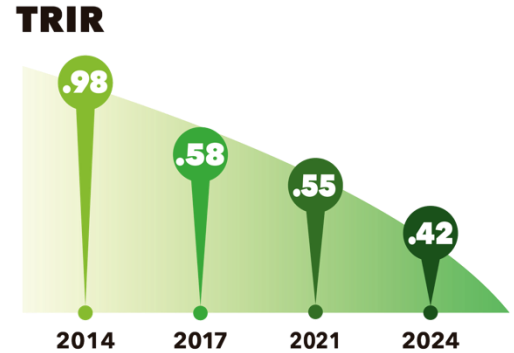
85,000+
PROJECTS COMPLETED
IN 2024
WITH OVER **23,000** CLIENTS

ENR RANKINGS 2025
#19
TOP 500
DESIGN FIRMS



PROJECTS
IN ALL
50
STATES

100%
EMPLOYEE-OWNED



IIFTM Incident and Injury-FreeTM



Prepare for the unexpected.

Projects sites may have safety risks:

- Underground storage tanks (USTs)
- Spills or chemicals
- Snakes, insects or animals that bite

Agenda



- **Reimagined Site Characterization: A Holistic Approach**

Phillip Sinclair



- **Remote Research: Subsurface Environmental & Geotechnical Data**

Travis Kassebaum, P.E.



- **Rapid Data Acquisition: Screening Tools**

Phillip Sinclair



- **Realized Results: Data-Powered Field Exploration**

Levi Denton, P.E.; Vic Donald, P.E.; Mike Hagemeister, P.E.



An aerial photograph of a landscape featuring rolling green hills, a winding road, and a dense forest. The image is partially covered by a dark green semi-transparent overlay.

Reimagined Site Characterization

A Holistic Approach



Where Do I Start?

TOOLS

RESULTS

GOALS

Predict

Explore

Visualize



Where Do I Start?

Pivvot/Stage1
 Soil borings/Split-spoons
 Monitoring Wells
 PIDs
 Soil-gas probes
 SPT/CPT/Shelby
 Trenches/Test Pits
 Seismic Testing
 Resistivity/Conductivity
 GPR
 NDG/DCP
 Maturity Logging
 DFT
 Compression Tests
 Rebound Hammer
 Moisture Meter
 LiDAR/Photogrammetry
 Crack Gauges
 Roof Corer
 Smoke Pencils

Soil Types
 Depth to Rock
 Groundwater Table
 Dynamic Soil Properties
 Seismic Site Class
 Subsurface Contamination
 Concrete Strength
 Bearing Capacity
 Rock Rippability/Quality
 Slope Stability
 Liquefaction Potential
 Well Head/UST Locations
 Buried Artifacts
 Unmarked Graves
 Rebar cover/layout
 Concrete Strength
 Fill Material/Extents
 Insulation Type/Thickness
 Pile Integrity

Site Selection
 Building Design
 Risk Mitigation
 Construction
 Asset Management

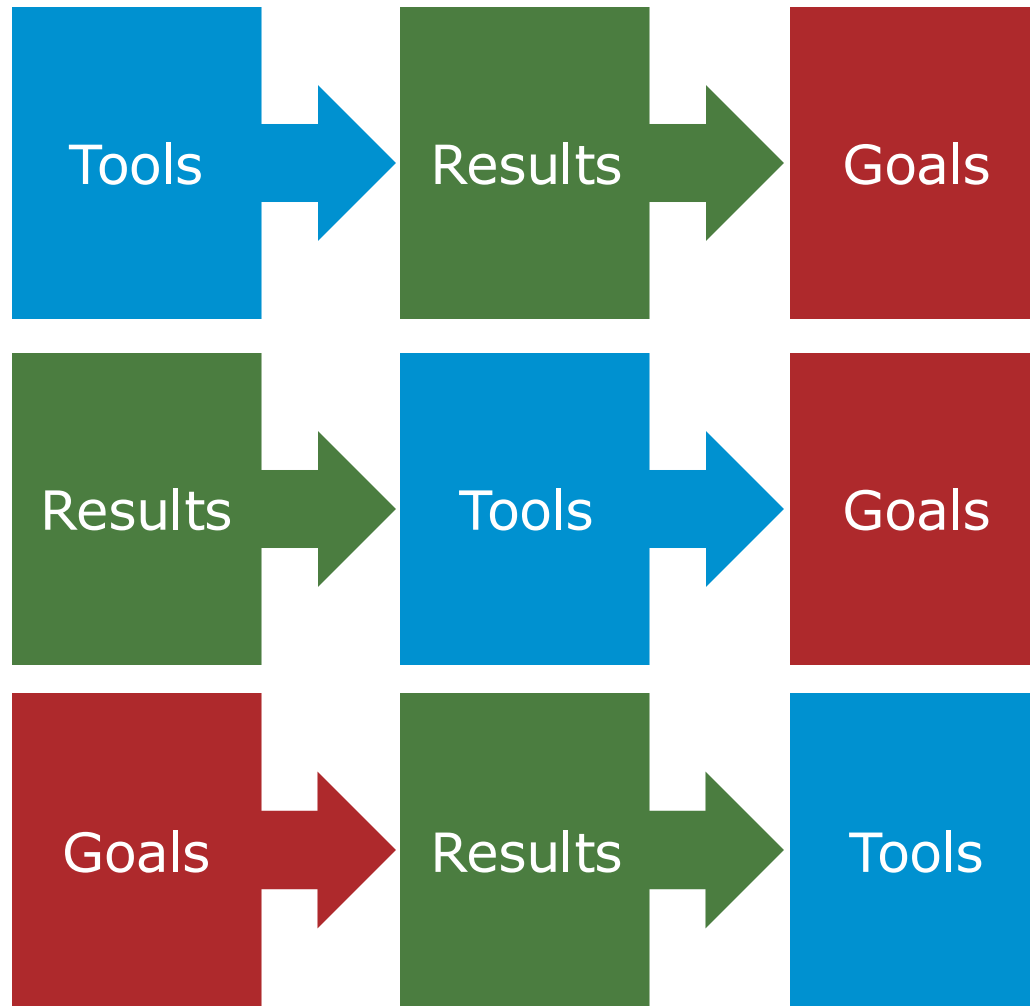
Predict

Explore

Visualize



Terracon's Role



Contractor

Consultant

Advisor

Predict

Explore

Visualize



Let's Get Practical

Site Selection Phase



Predict

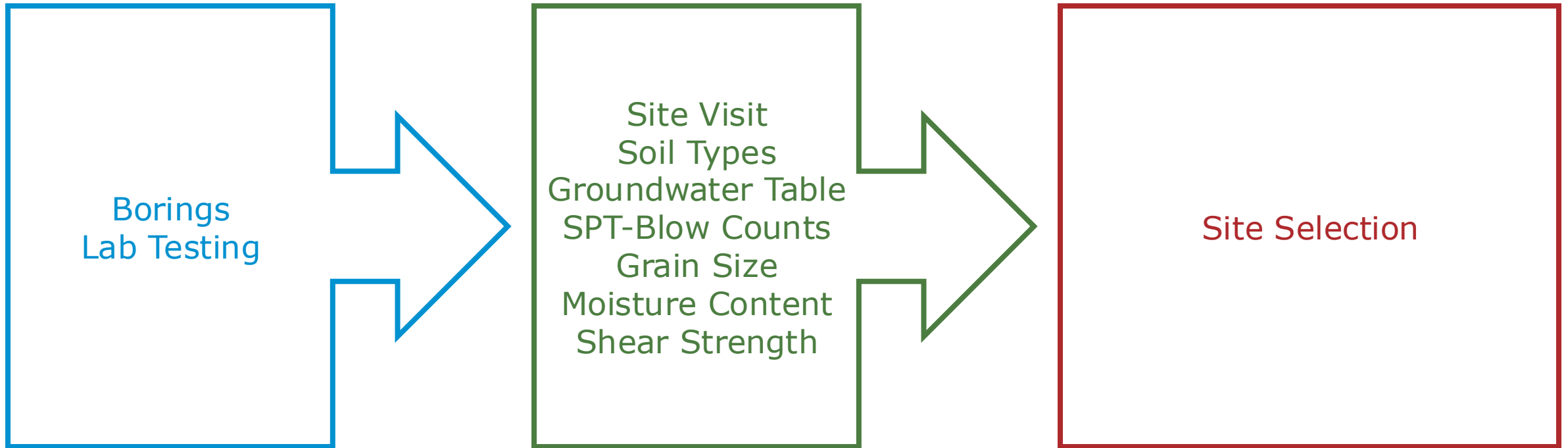
Explore

Visualize



Let's Get Practical

Contractor



Disciplines Involved: Geotechnical (GEO), Exploration (EXP), Laboratory (LAB)

Predict

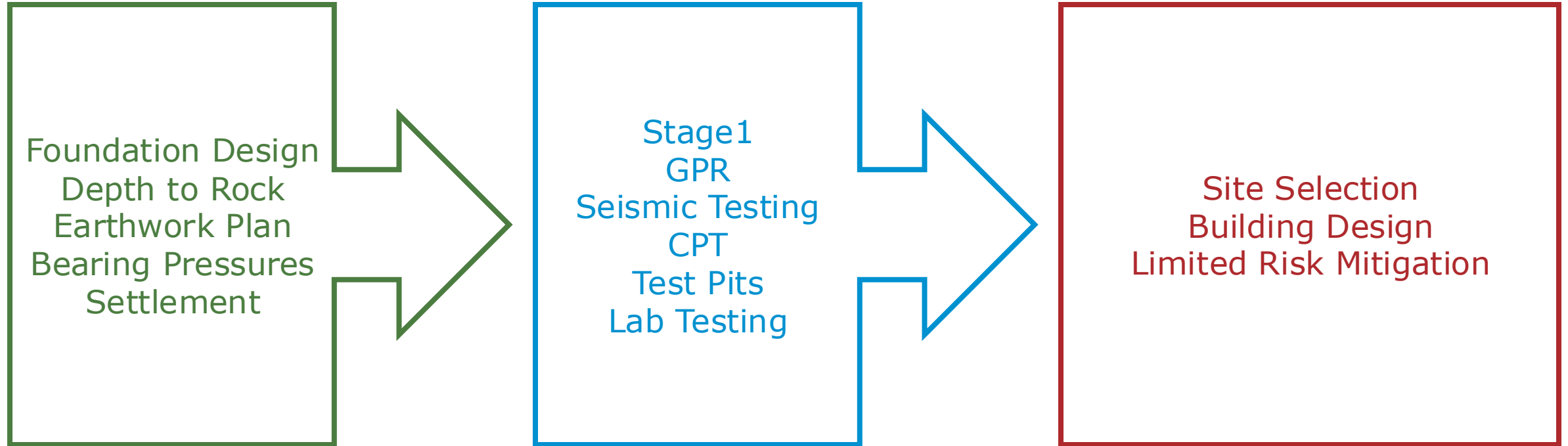
Explore

Visualize



Let's Get Practical

Consultant



Disciplines Involved: GEO, EXP, LAB, **Remote Research (RR)**, **Geophysics (GPX)**

Predict

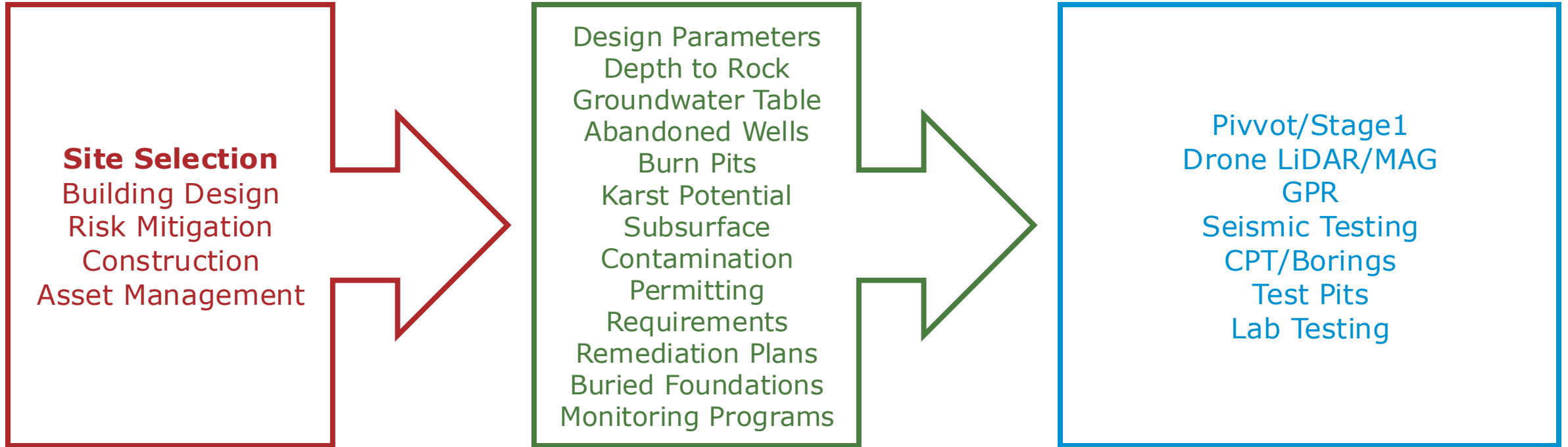
Explore

Visualize



Let's Get Practical

Advisor



Disciplines Involved: GEO, EXP, LAB, RR, GPX, **Environmental (ENV)**, **Materials (MAT)**, **Facilities (FAC)**

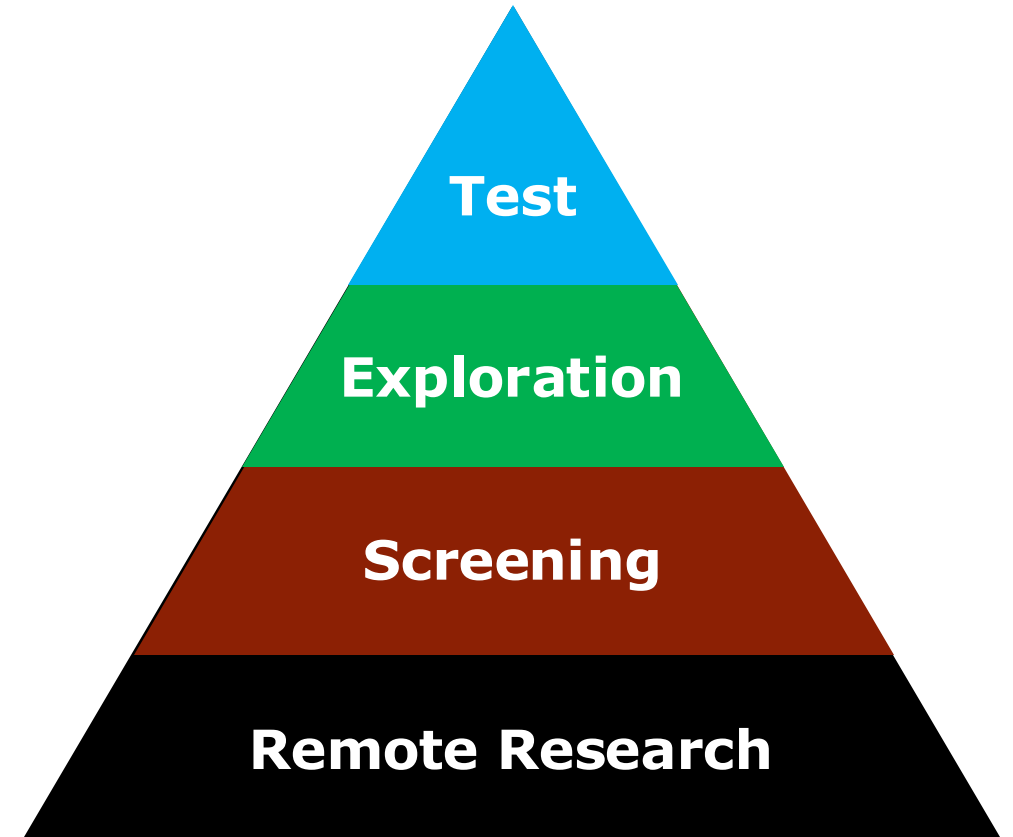
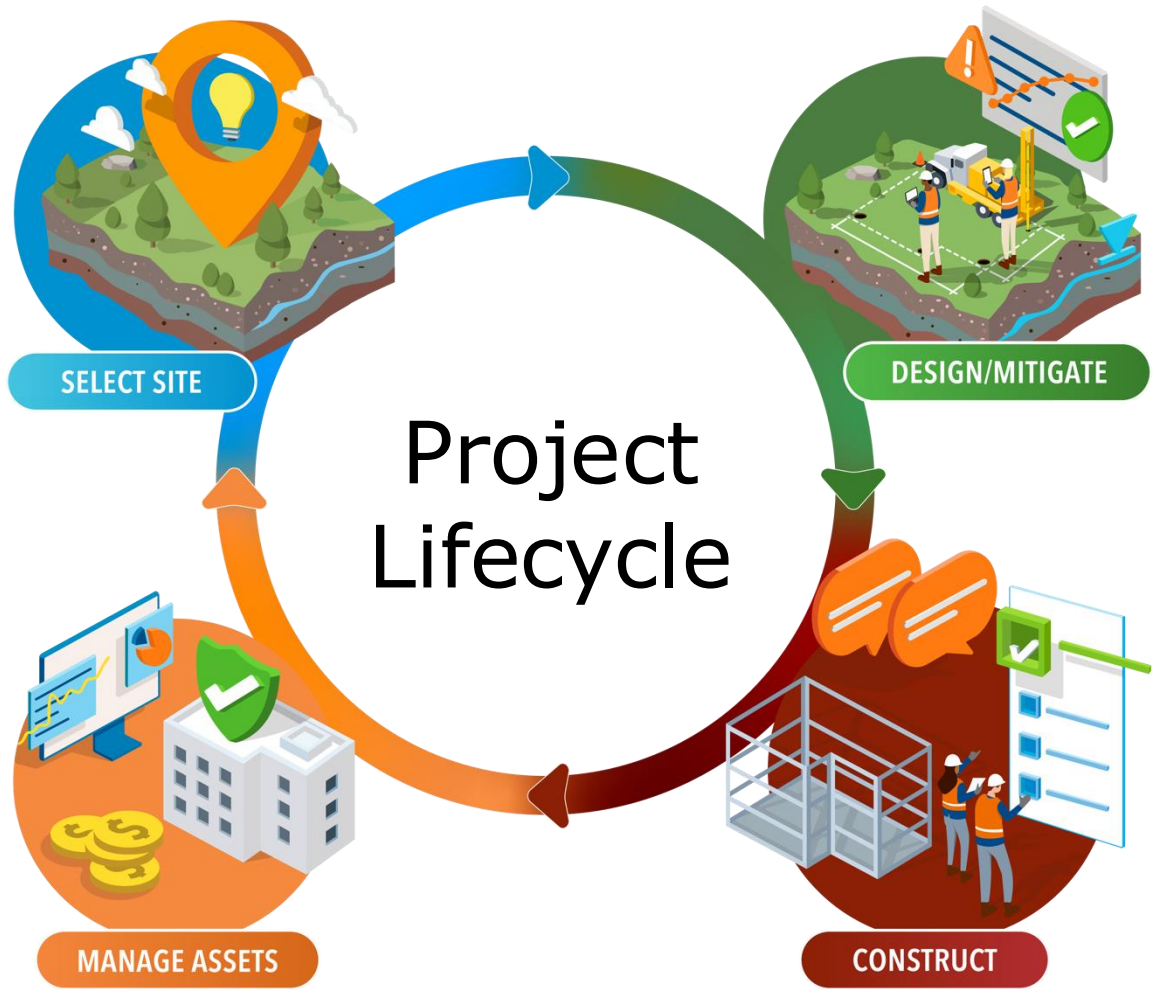
Predict

Explore

Visualize



Start with the End in Mind



Predict

Explore

Visualize



Remote Research

Subsurface Environmental
& Geotechnical Data





Identify usable land options and eliminate red flags in minutes

Predict



What is Pivvot?

Pivvot is Terracon's interactive georeferenced platform that pulls land, social, and environmental data from hundreds of verified sources into a visual format.

Our professionals use it to help you quickly understand site constraints and opportunities in minutes for better planning and decision-making throughout your project's lifecycle.



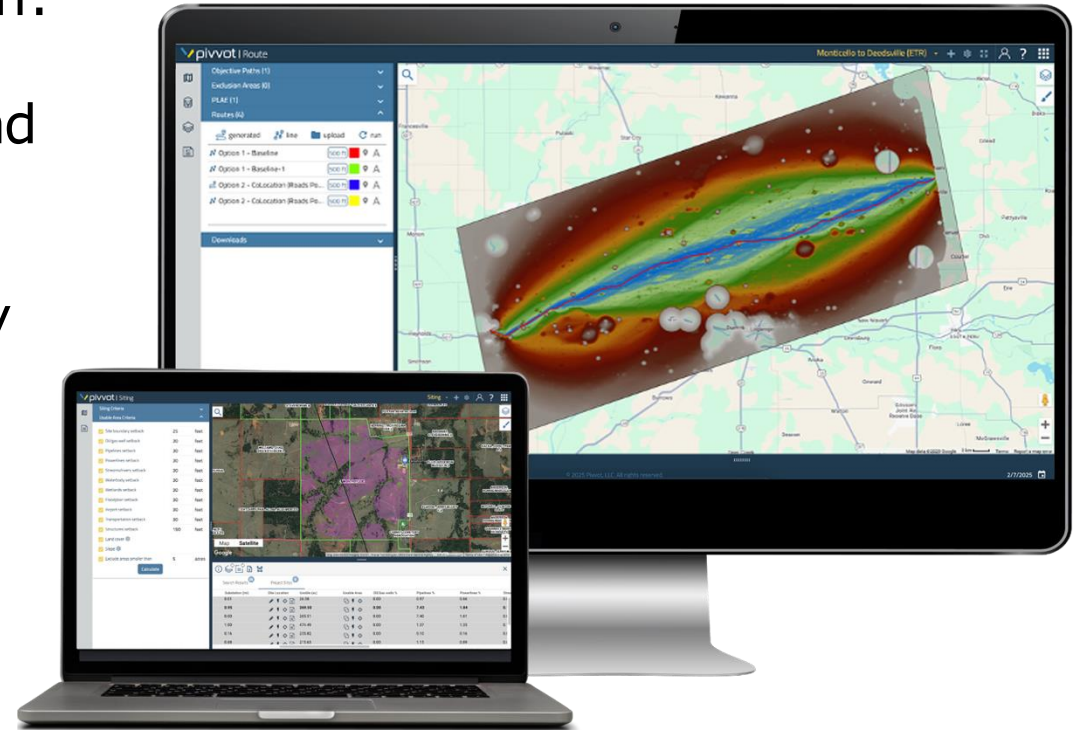
Predict



Pivvot Includes

Software-as-a-Service (SaaS) platform which:

- Streamlines siting, suitability analysis, and permitting with location intelligence
- Significantly reduces project schedules by over 50% and saves money
- Adds situational context to asset information
- Empowers clients to navigate regulatory compliance and reduce operational risk



Predict

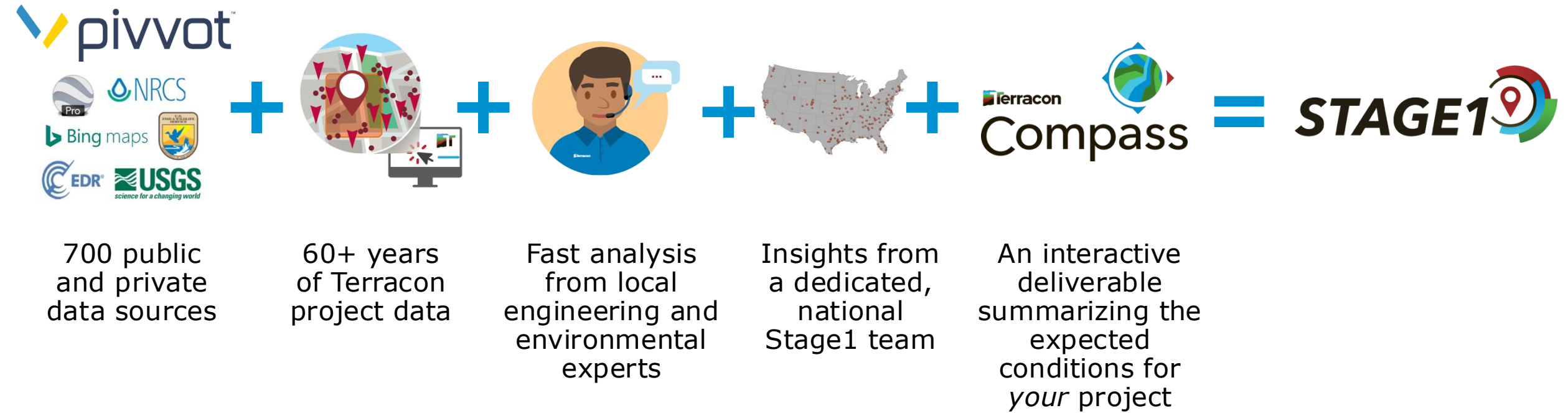


STAGE1

Data-driven, expert opinion of site risks to learn more
and refine your search without on-site investigation

Predict





Predict

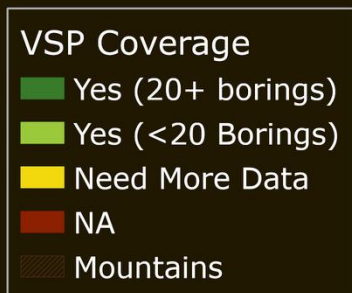


Terracon

VSP Coverage

Version 1.10

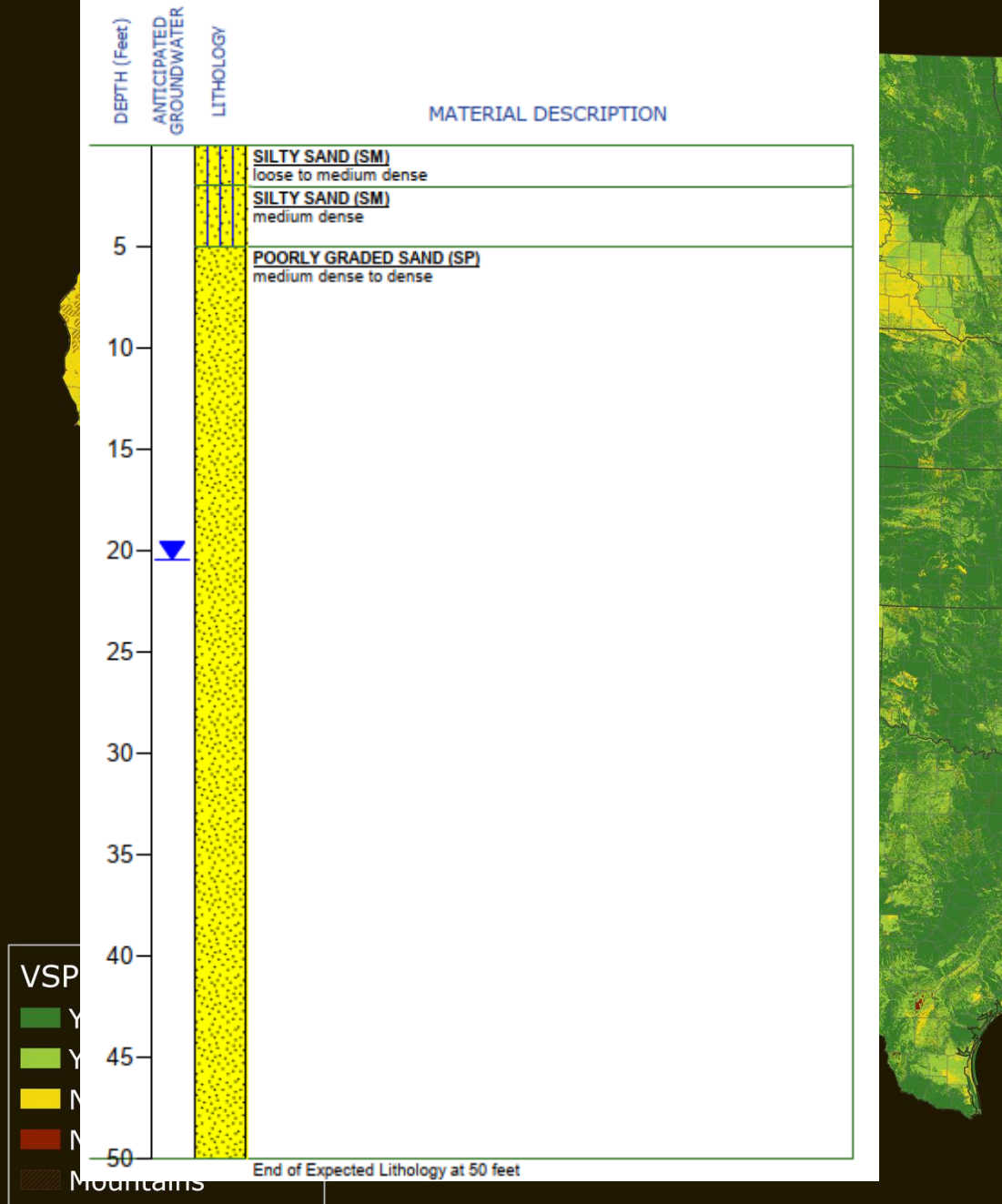
Exported: 6/24/2025



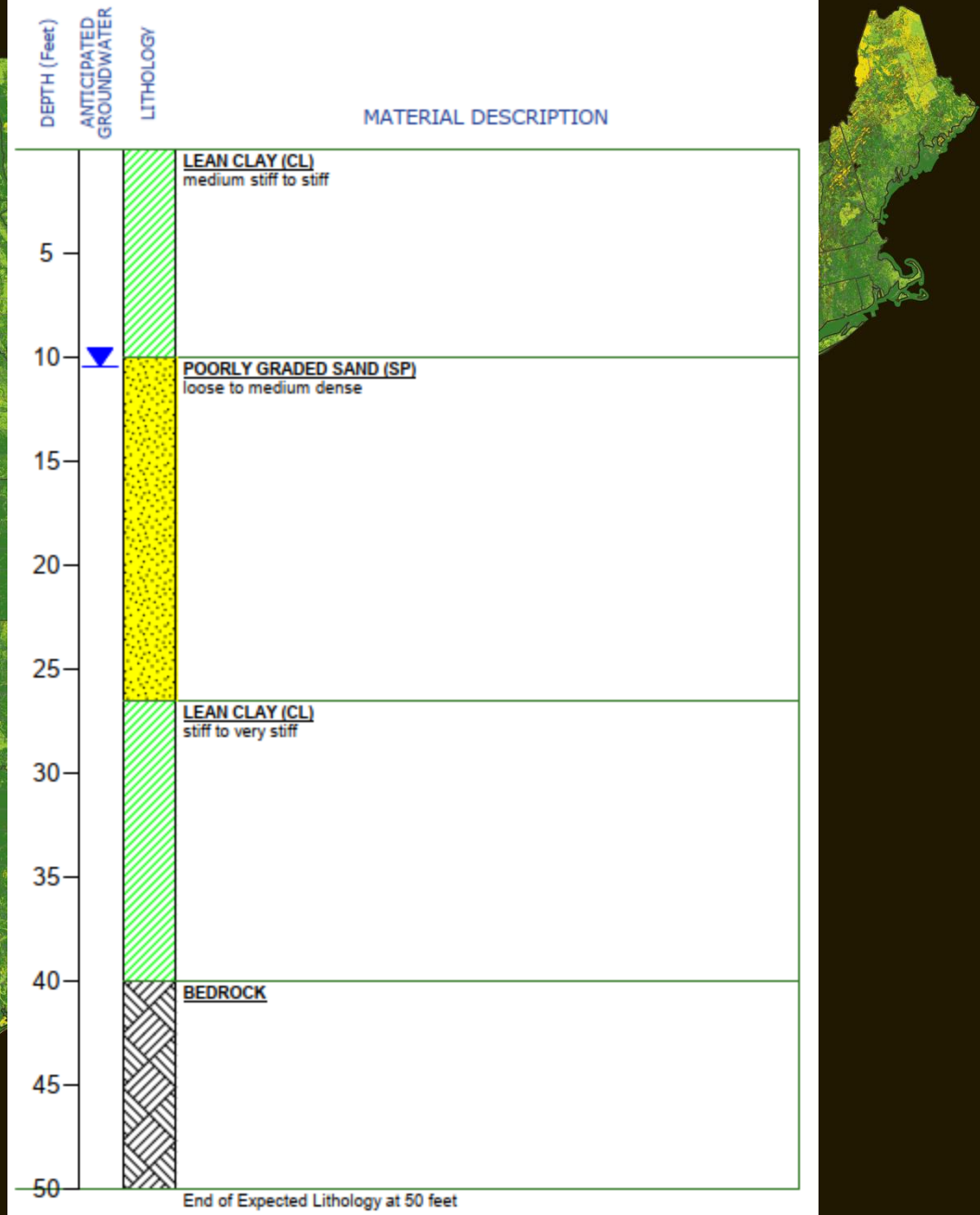
Coverage	Acres	Percent
Yes (20+ Borings)	1077.86M	55.4%
Yes (<20 Borings)	414.25M	21.3%
Need More Data	421.15M	21.7%
NA	31.53M	1.6%
Total	1944.78M	100%



Area Represented: SSURGO Soil Series Riverhead

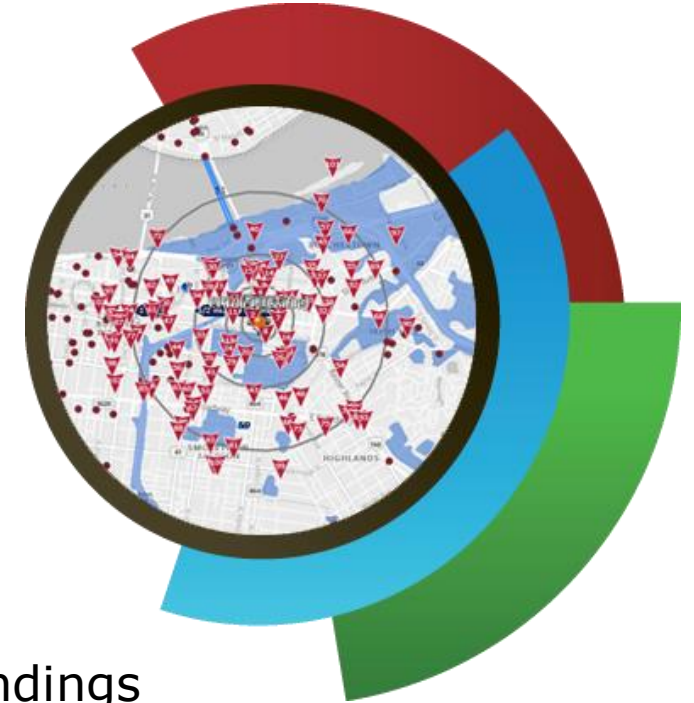


Area Represented: SSURGO Soil Series Wiota



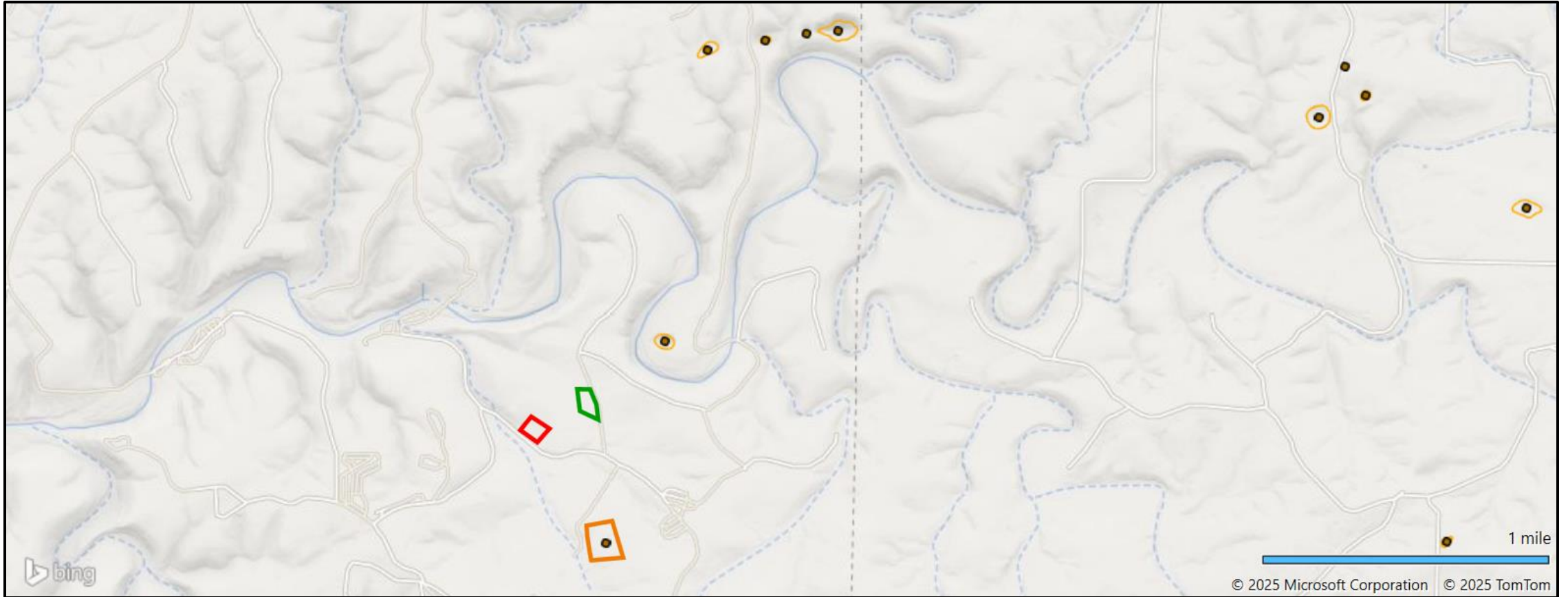
Stage1 Features

- A top-level summary of anticipated geotechnical, subsurface environmental, cultural, wetlands/waters, and federal protected species conditions and constraints.
- Tables of detailed considerations prepared and reviewed by **local** and national Terracon subject matter experts (engineers, environmental planners, ecologists, biologists, cultural resource practitioners).
- A **Smart Work Plan** with recommended next steps to confirm findings and expedite your project development.
- An interactive, online platform, **Compass**, with filtering tools and additional GIS layers to customize and view data in real time.



Predict

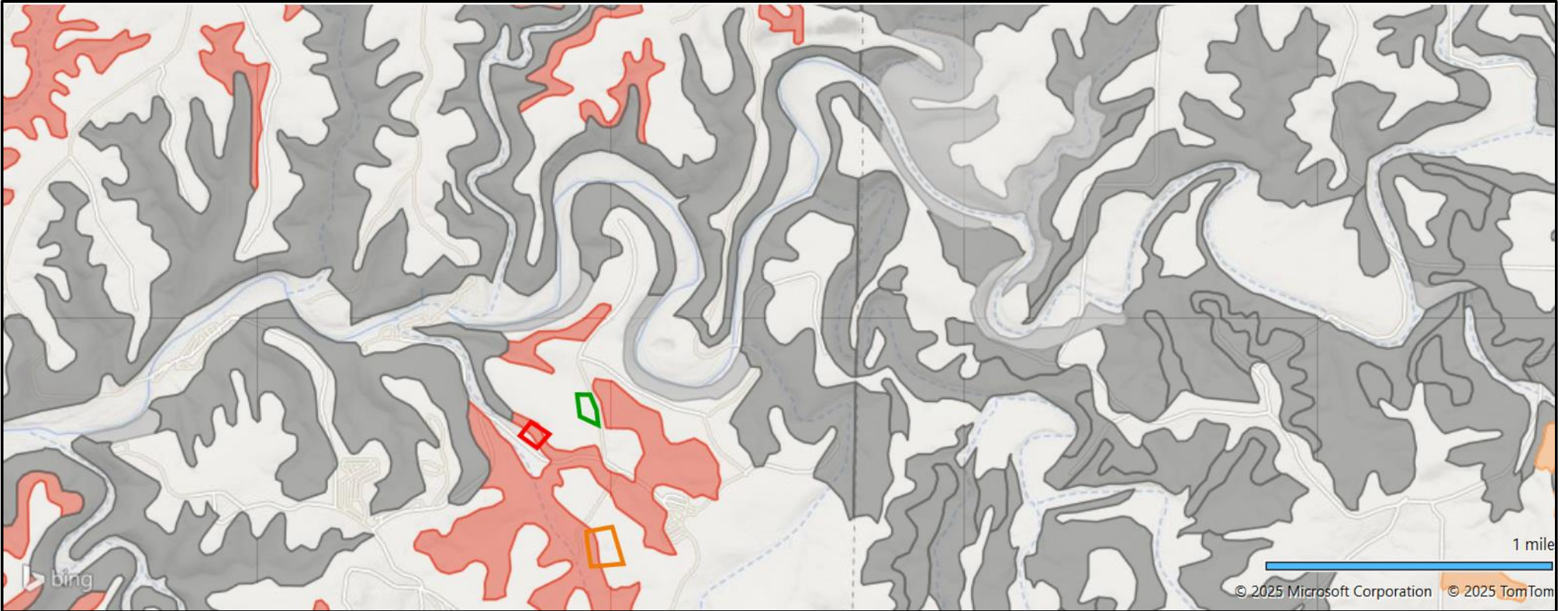
Real Project Study



Predict



Real Project Study



Predict



Rapid Data Acquisition

Screen the Site



What Does it Mean, to Screen?

Collecting surface to subsurface data with minimal to no destruction required.

- Transient Electromagnetism (TEM)
- Frequency Domain Electromagnetic Induction (FDEMI)
- Electrical Resistivity (ER)
- Seismic Refraction (SR)
- Multi-Channel Analysis of Surface Waves (MASW)
- Magnetometer (MAG)
- Ground Penetrating Radar (GPR)
- Ultrasonic Pulse Velocity (UPV)
- Profometer
- Light Detection and Ranging (LiDAR)
- Interferometric Synthetic Aperture Radar (InSAR)
- Photogrammetry
- DroneMAG
- DroneEM
- Sub-bottom Profiling
- Bathymetry

And so much more!

Explore



To Screen or Not to Screen

Map

Agile

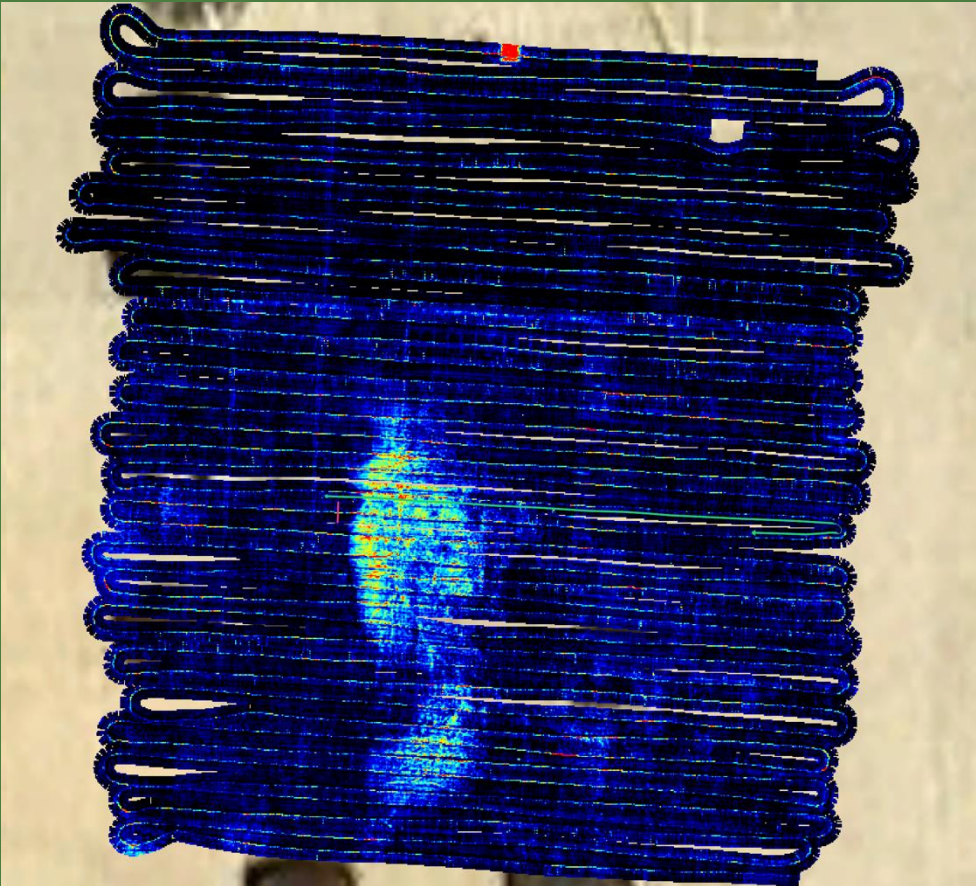
Rapid

Safe

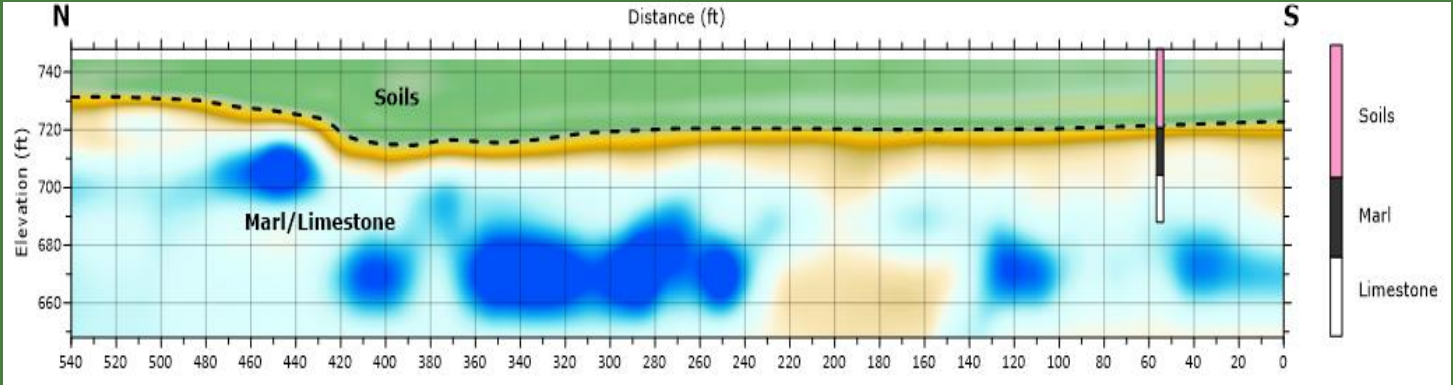
Explore



Map



Where to core



Where to drill



Where to sample



Explore

Agile



On/In water



Limited drill rig access



Under bridges



Confined spaces



Limited drill rig access

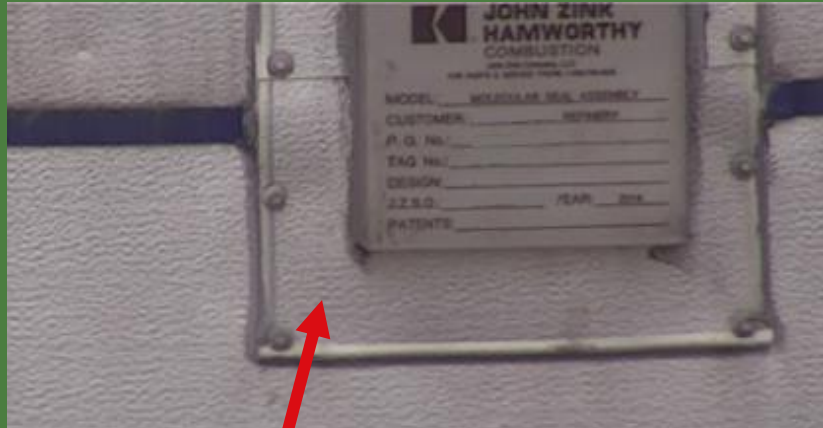
Explore

Rapid



Explore

Safe



Fewer site hazard encounters



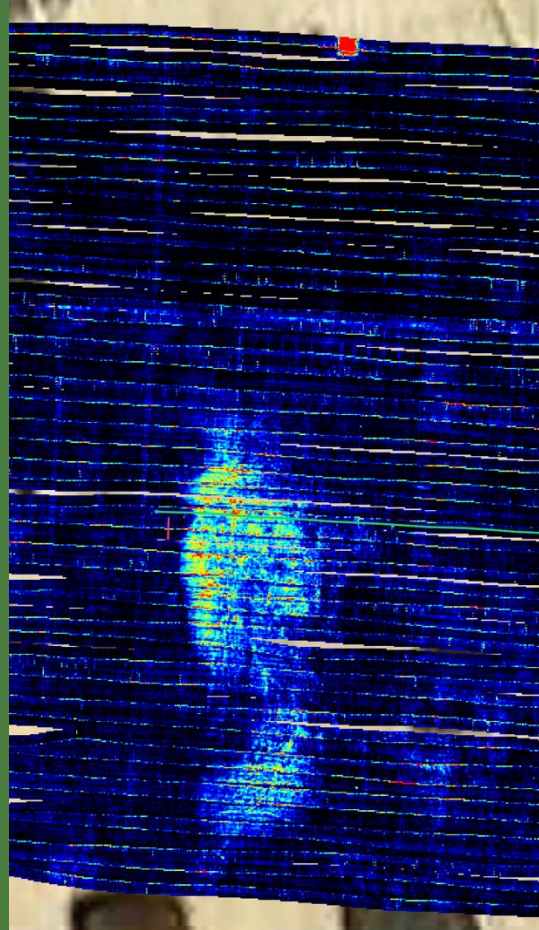
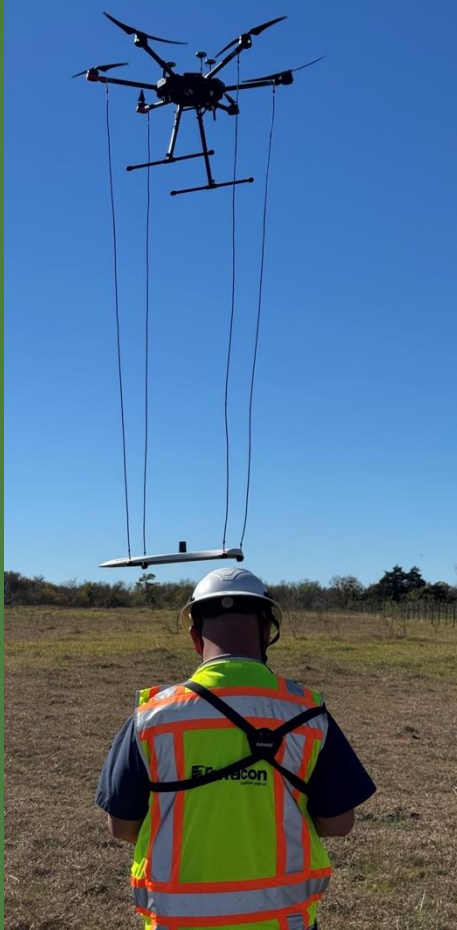
Explore

Map

Agile

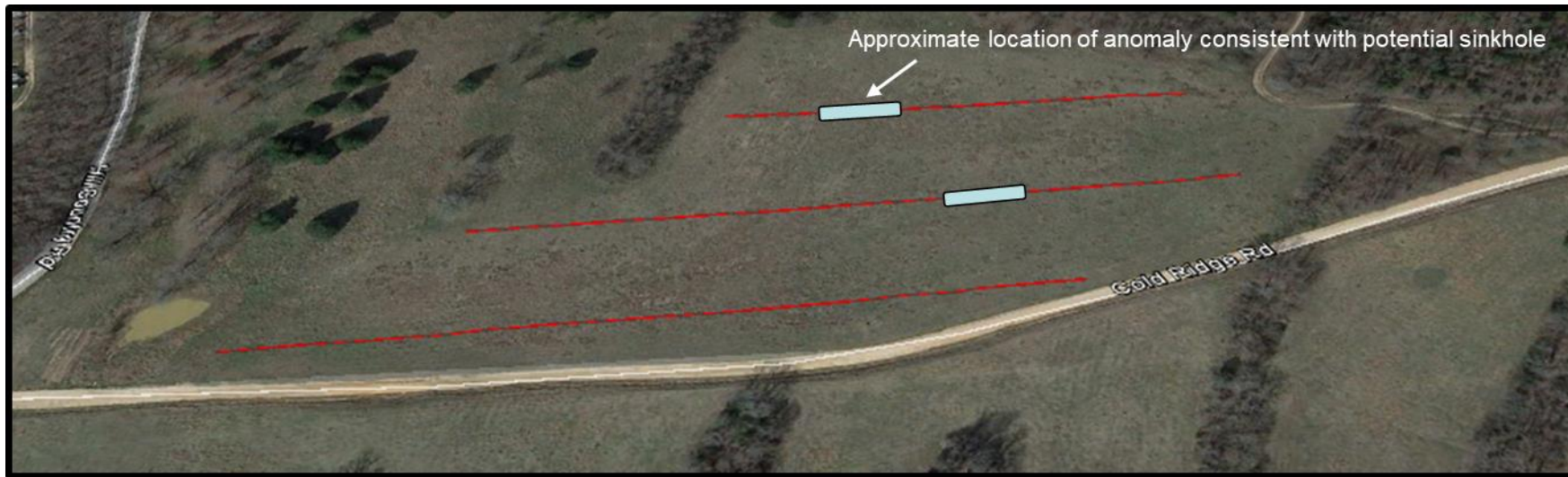
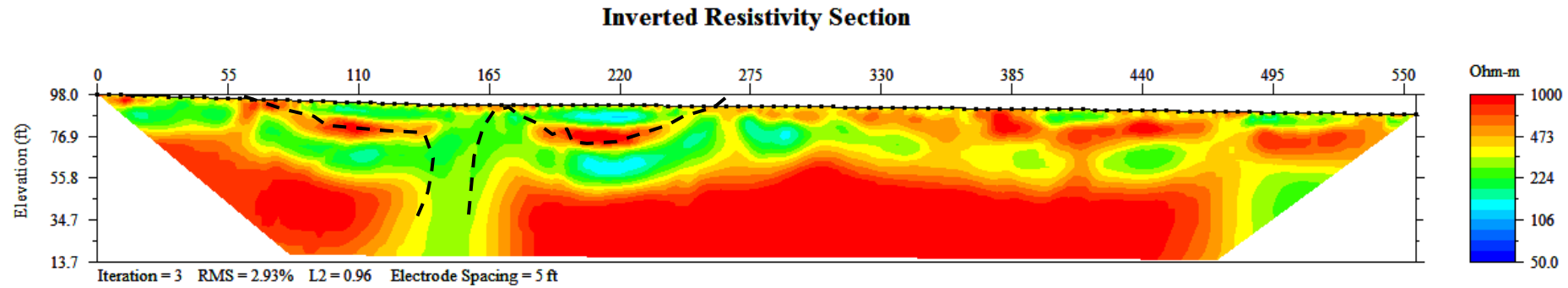
Rapid

Safe



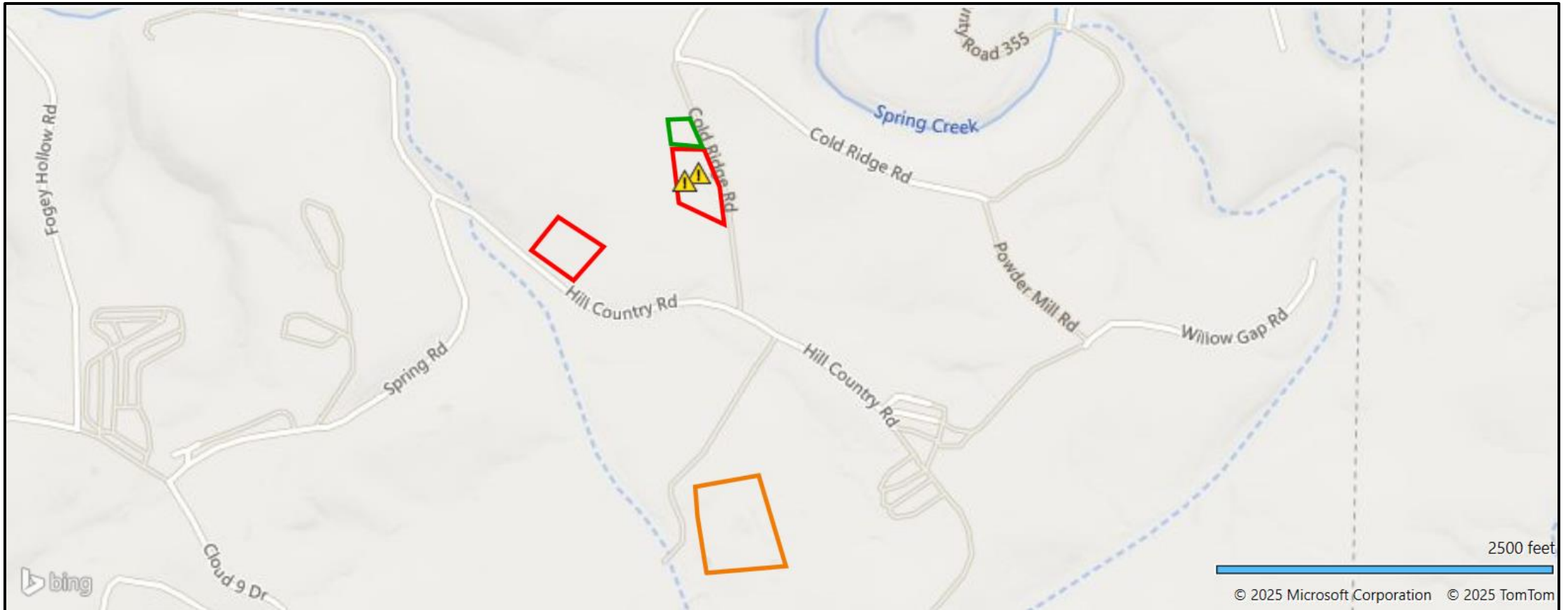
Explore

Real Project Study - Continued



Explore

Real Project Study - Continued



Explore

An aerial photograph of a coastal landscape. In the foreground, there is a dense green forest. A road runs diagonally from the bottom right towards the center. To the left of the road is a large, flat, brownish area, possibly a field or a dry lake bed. In the background, there is a body of water with a sandy beach and some vegetation. The sky is blue with some white clouds. The entire image is overlaid with a semi-transparent green filter.

Realized Results

Data-Powered Field Exploration



Proper Methods

Choose methods based on knowledge of expected/predicted conditions:

- Standard Penetration Testing (SPT)
– but not just SPT
- Cone Penetration Testing (CPT)
- Pressuremeter Testing (PMT)
- Dilatometer Testing (DMT)
- Vane Shear Testing
- Measurement While Drilling (MWD)
- Additional Geophysics
- Environmental- High Resolution Site Characterization (HRSC) tools



Conventional drill rig



CPT rig



Drill rig with MWD

Explore



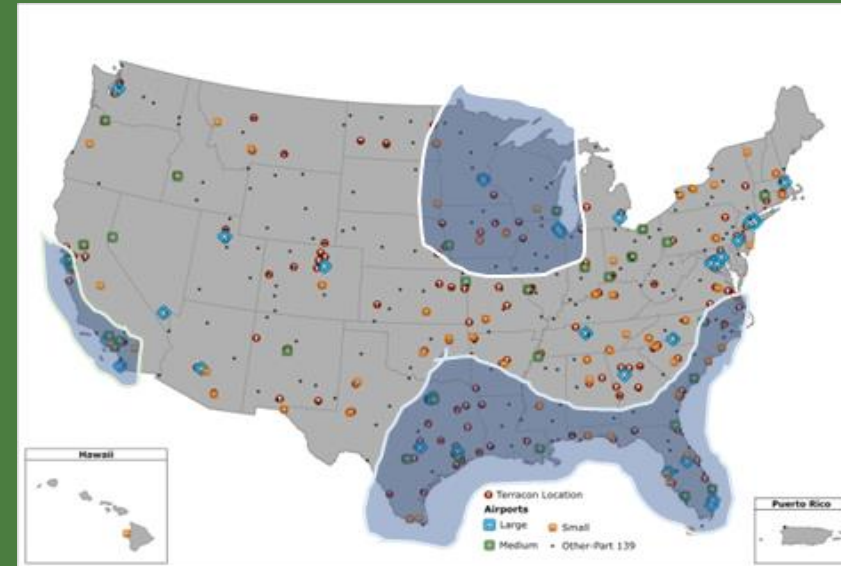
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Map of Surface Geology



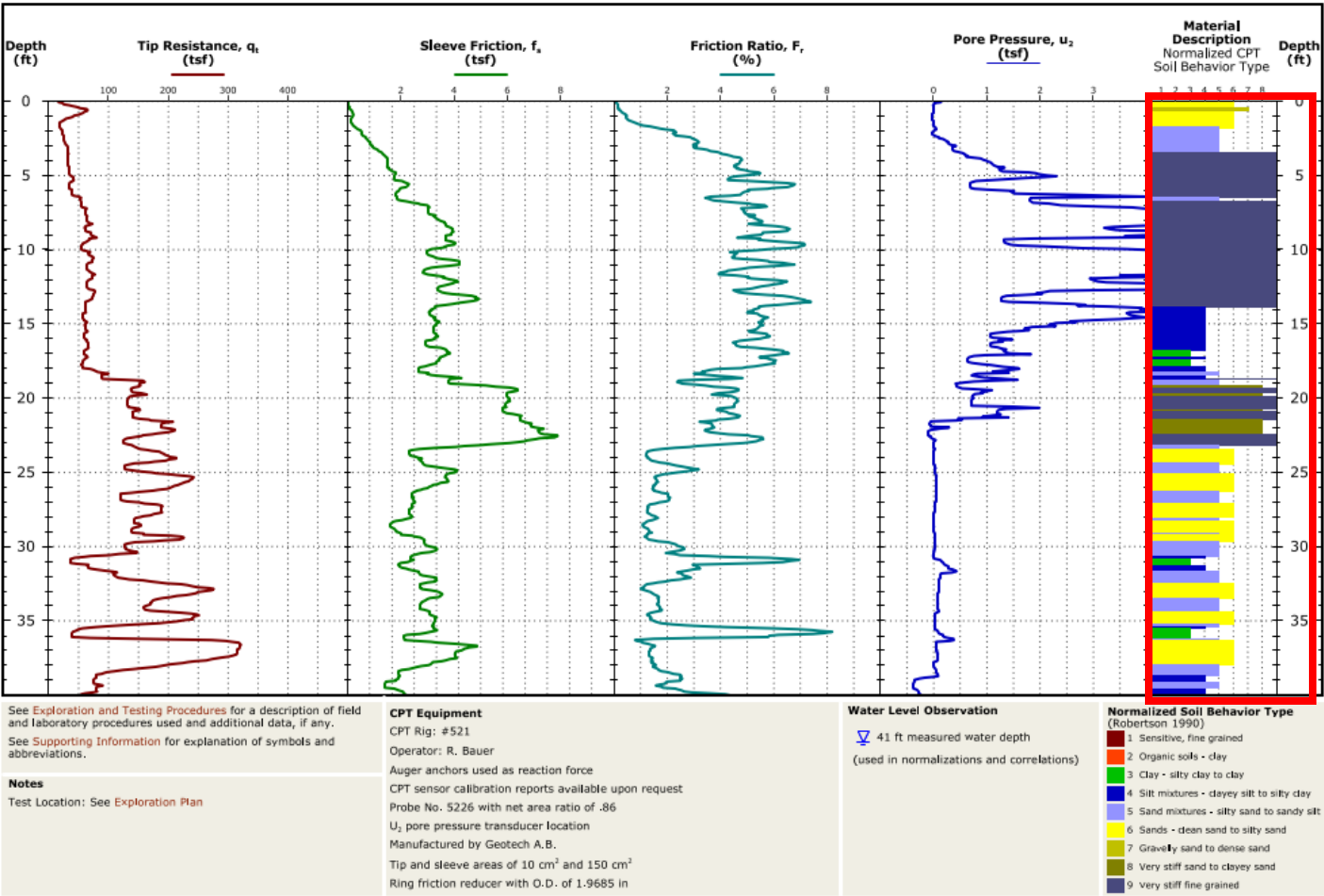
Shaded areas show CPT opportunities

Explore



Typical CPT Sounding Log

CPT Completed: 6/16/2023



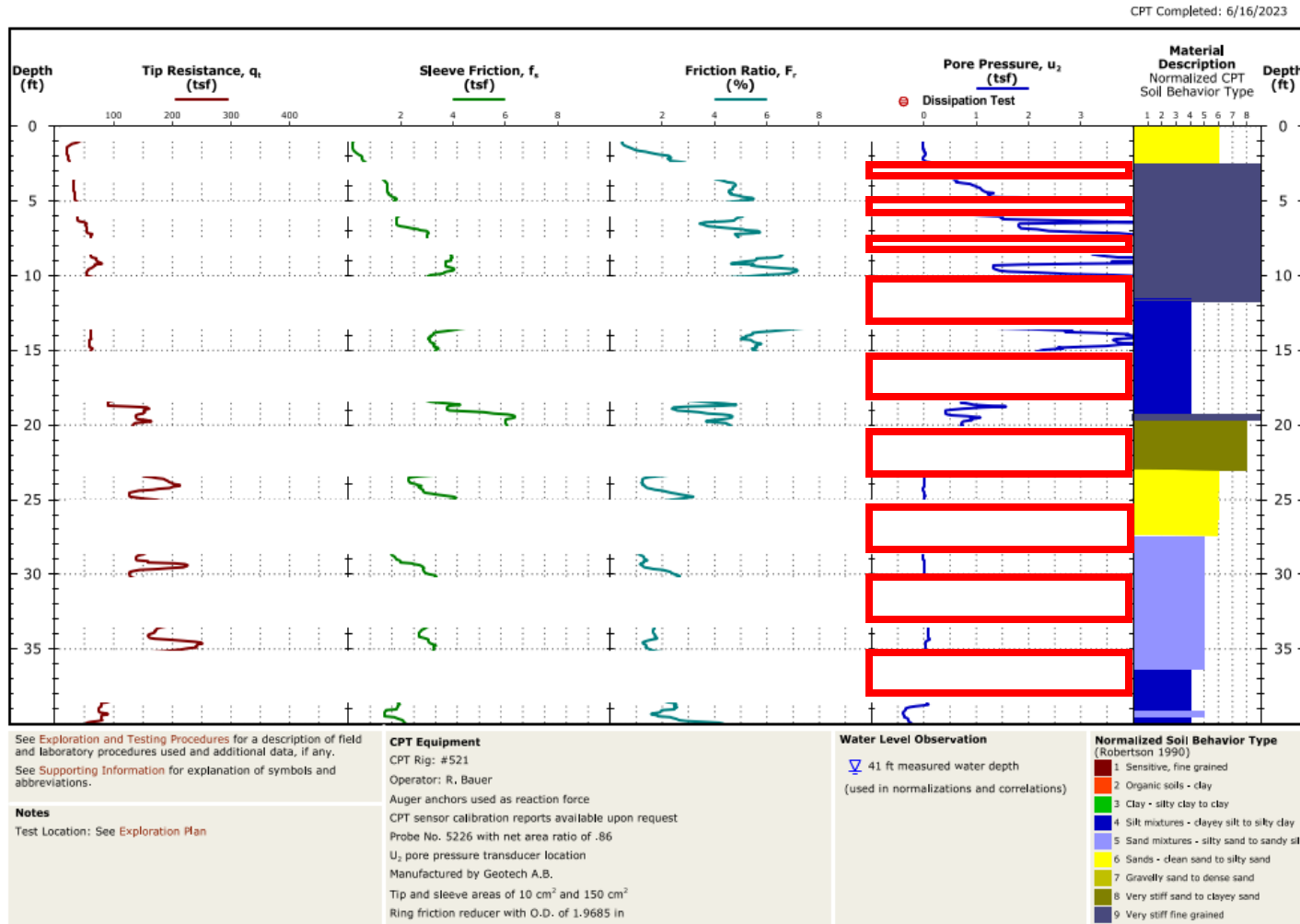
Note the detail in the data identifying the layering of the soils and capturing the variation of the soil profile.

Facilities | Environmental | **Geotechnical** | Materials



Explore

CPT Sounding, Data Redacted



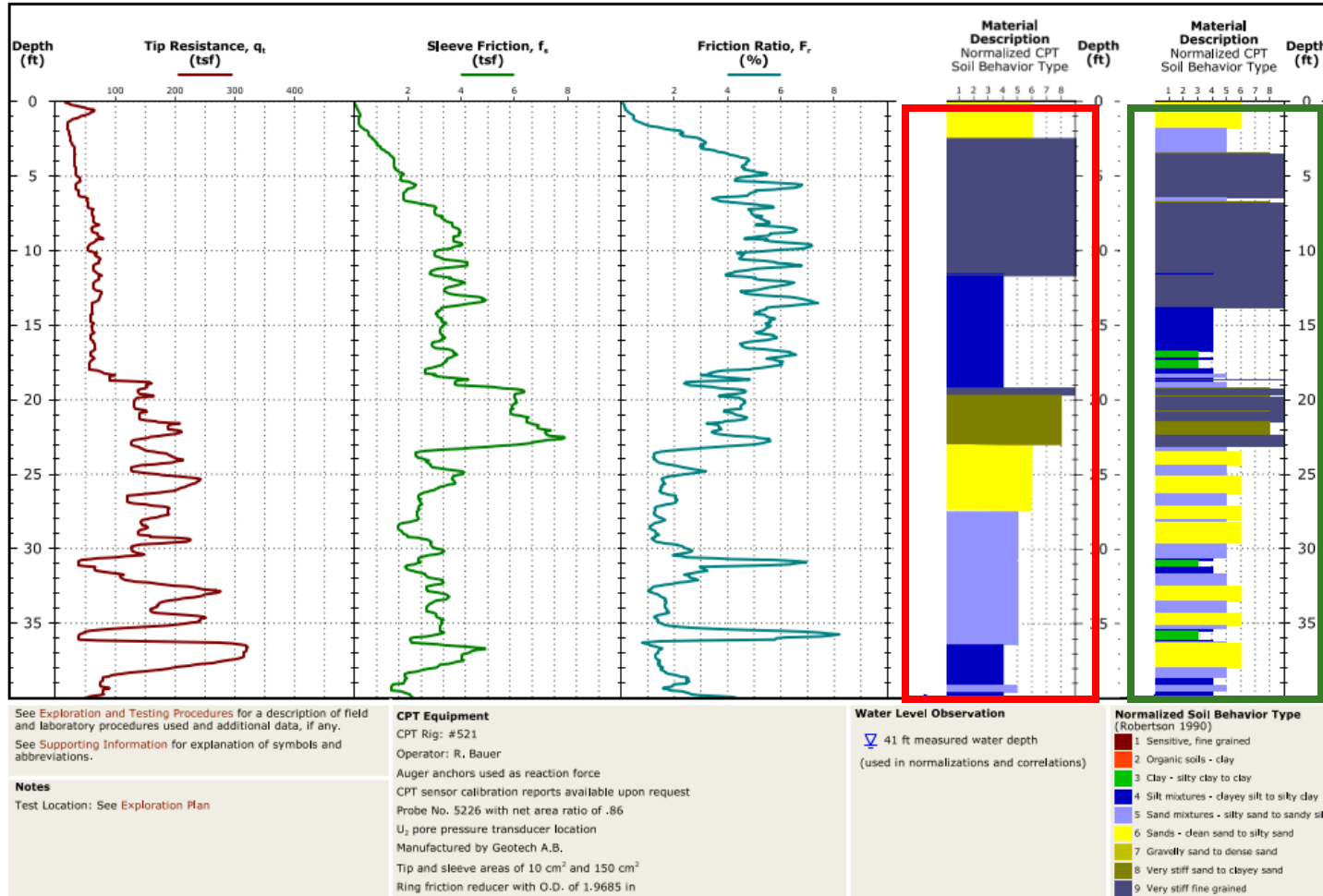
CPT data has been removed and only plotted as collected with SPT sampling on 5-foot centers.

Reduced data diminishes the ability to identify soil profile discrete layering and strength variations.



Comparing CPT & SPT Profiles

CPT Completed: 6/16/2023



This side-by-side comparison shows the benefits of CPT's continuous sampling profile and the ability to identify discrete layering leading to a better understanding of the subsurface conditions and soil strength parameters.

Soil Stratification
 Based on SPT sampling data.

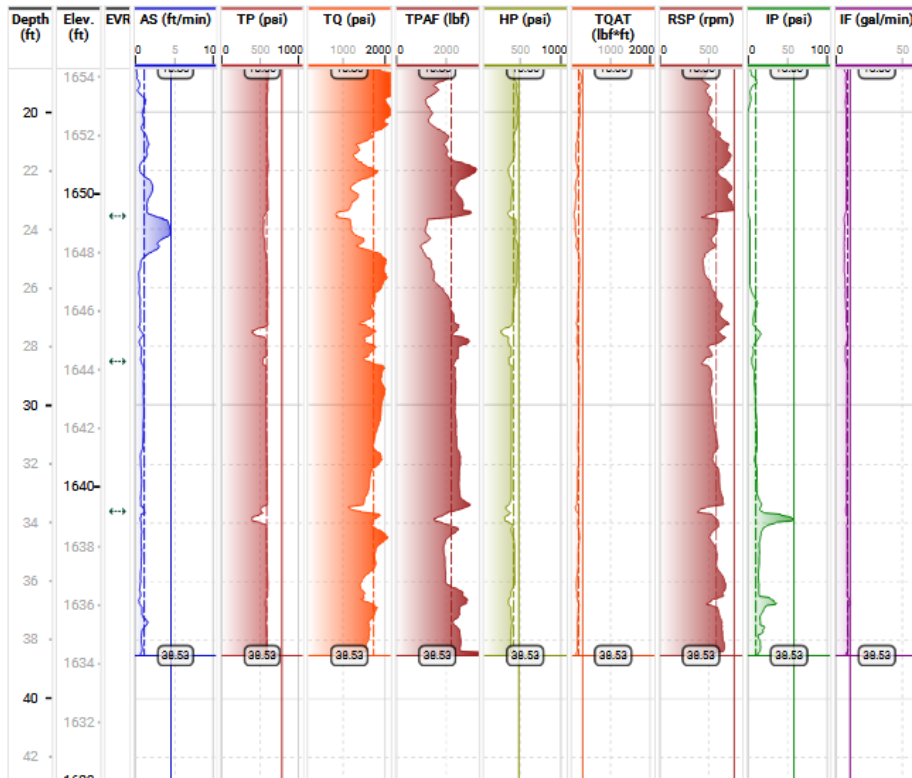


Explore

Data Enriched?

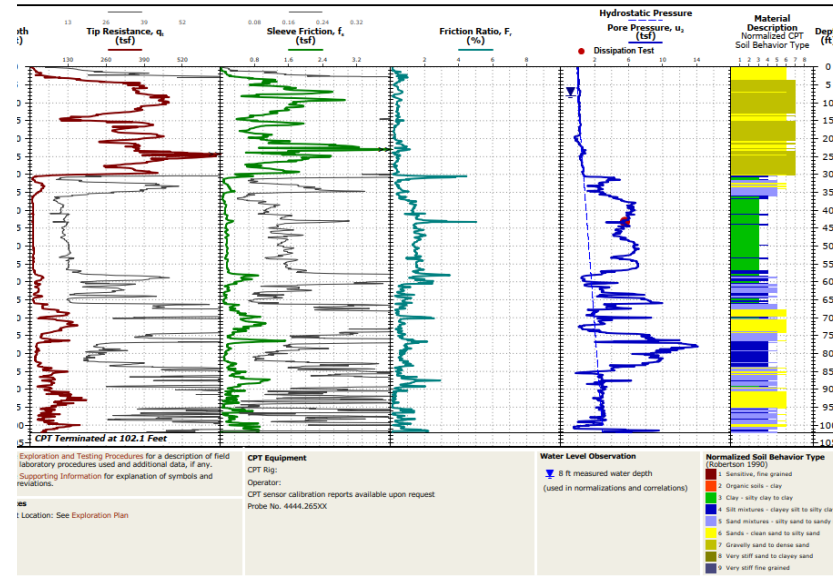
 Explore with us	Borehole		Drilling parameters	
	L27204A		Creation date	Starting Position
	Machine		01/17/2025	GPS location (lat, lon)
	3126GT-2		18.5 ft	35.4575424, -82.3010712
	Drilling Bit		Ending date	Ending Position
Core bit		01/17/2025	38.53 ft	1672.8 ft
Drilling Bit Diameter		Drilling Duration	Length	Inclination X/Y
3 in		1 h 31 min 27 s	20.03 ft	/

Project
US 74A Gerton Highway



Typical 50' boring

- SPT borings yields 12 "N Values"
- CPT sounding yields 600+ data sets
- MWD will continuously measure the torque, crowd, water pressure, insertion rate



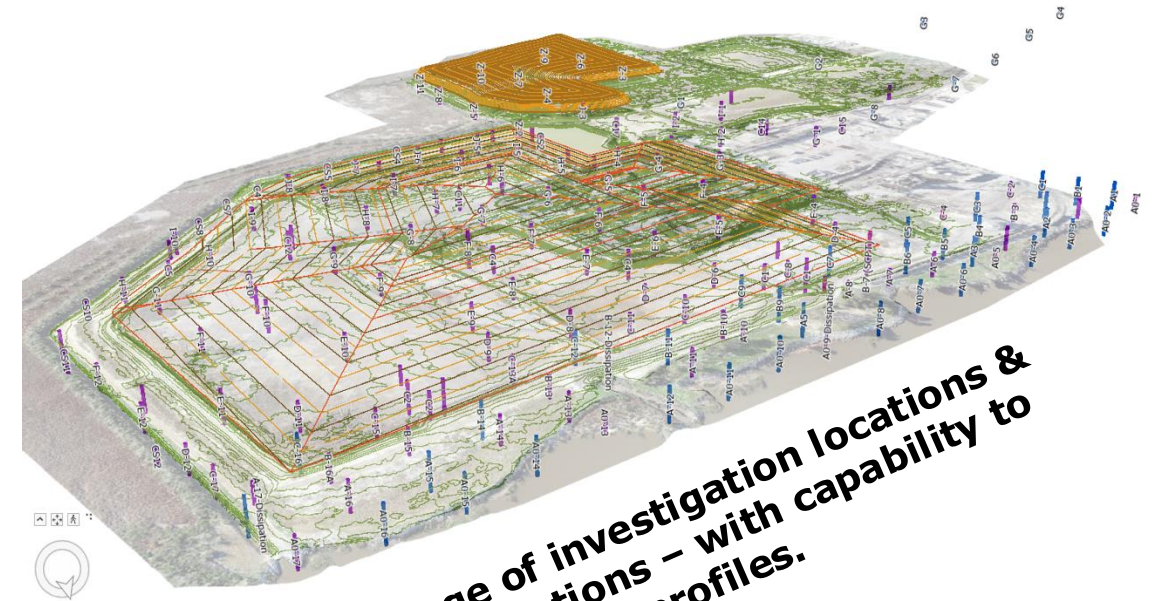
Enriched with
geophysics data
— the complete
picture.

Explore



Realized Results

- No guessing or broad interpretation between sample points
- Even though its more data, it's collected faster and more safely:
 - Enables broader site coverage
 - Reduced risk with Geophysics to understand variability spatially between intrusive testing locations
- Apply the best tool for the job
- More accurate and repeatable
- Vibrant Visualization



3D image of investigation locations & LiDAR elevations – with capability to add subsurface profiles.



Visualize



Q&A

Please type your questions into the Q&A feature at the top of your screen.

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Geophysical Services

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