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Integrated Spatial Analytics and Real-Time Data Management for Optimized Soil Reuse in Large-Scale Industrial Remediation

Tori Ward

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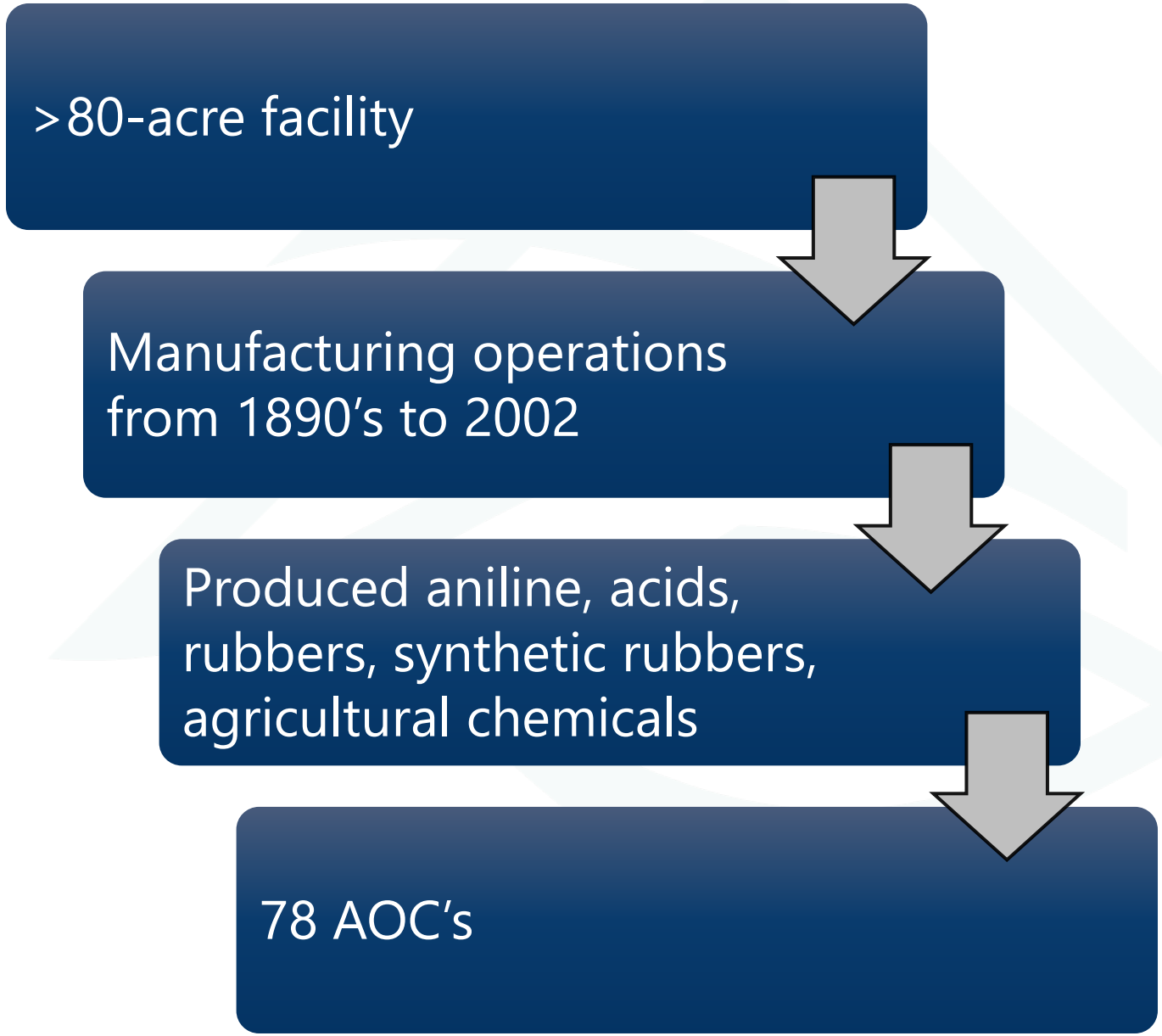
Site Background

- **Key Point**: Large site with a complicated release history and very large data set



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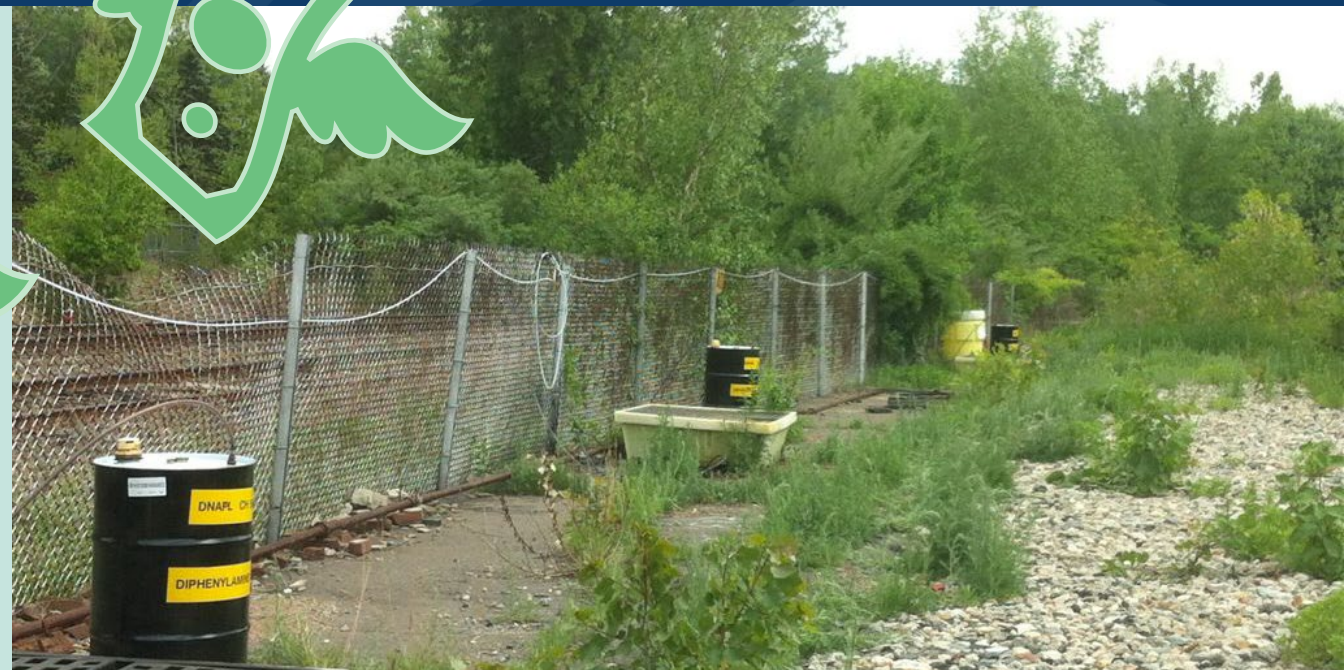
Lots of Remediation

- Tank Removals
- DNAPL Recovery
- Soil Excavation
- Soil Mixing
- Injections



Why use an Automated Pipeline?

Soil Management Plan for Each Phase of Work

+

Very Large Data Set

+

Development Plans are Fluid

+

All Soil to be Re-Used On-Site

=

<u>We need an innovative approach!</u>

Developed Site-Wide Grid and Soil Categories

Coding Pipeline

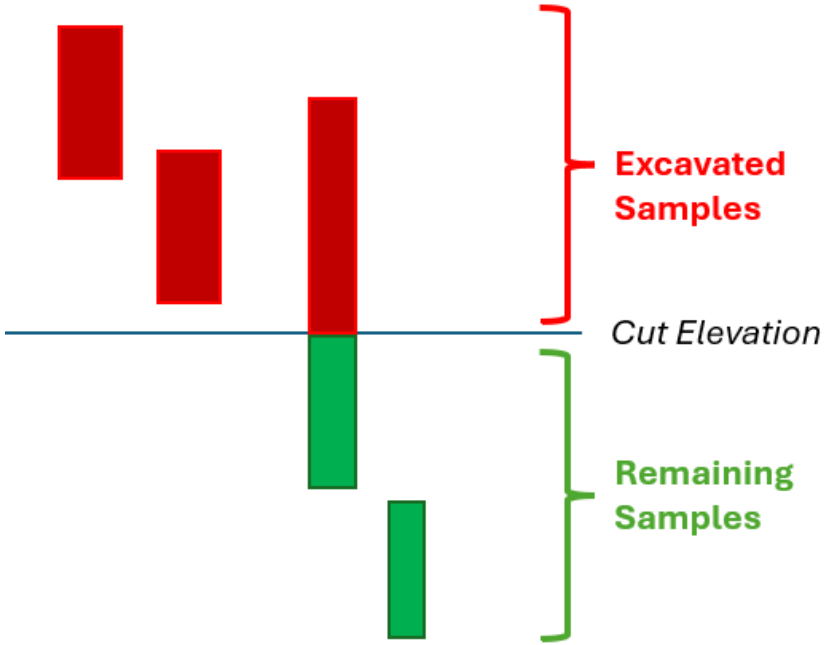
1) Individual Sample

- Query data from the database & generate a table of exceedance categories by sample

Location	Depth	GBPMC Exceed	ICDEC Exceed
SB1	6-8	NoExceed	NoExceed
SB2	0-2	NoDetections	DCNOV
SB2	4-6	NoDetections	DCNOV
SB3	0-2	LEP Review	LEP Review
SB3	2-4	ExceedDetect	NoExceed

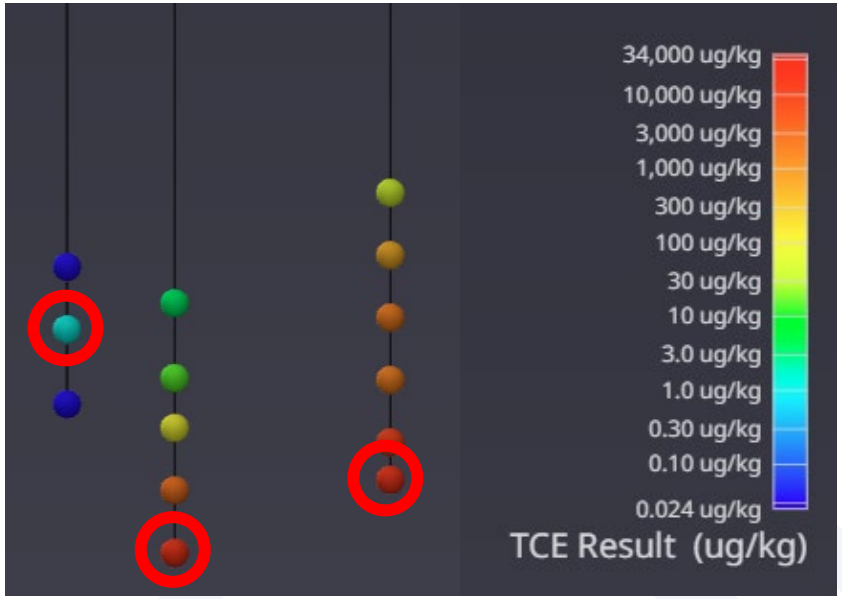
2) Cut/Fill

- Splits data into 'excavated' or 'remaining' samples based on cut/fill elevations



3) Max Exceedance By Depth

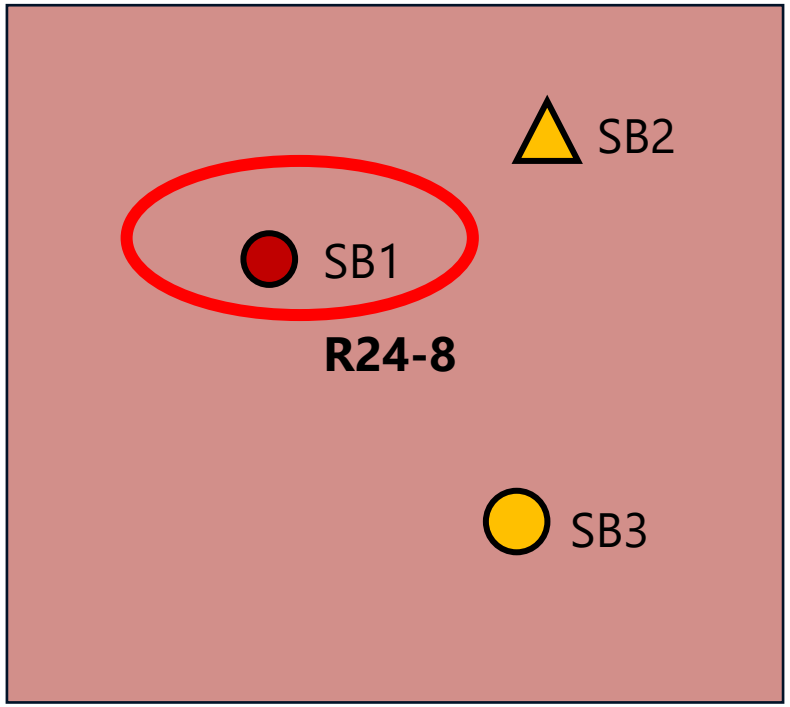
- Evaluate the maximum exceedance categories across all depths at an x,y-location



Coding Pipeline

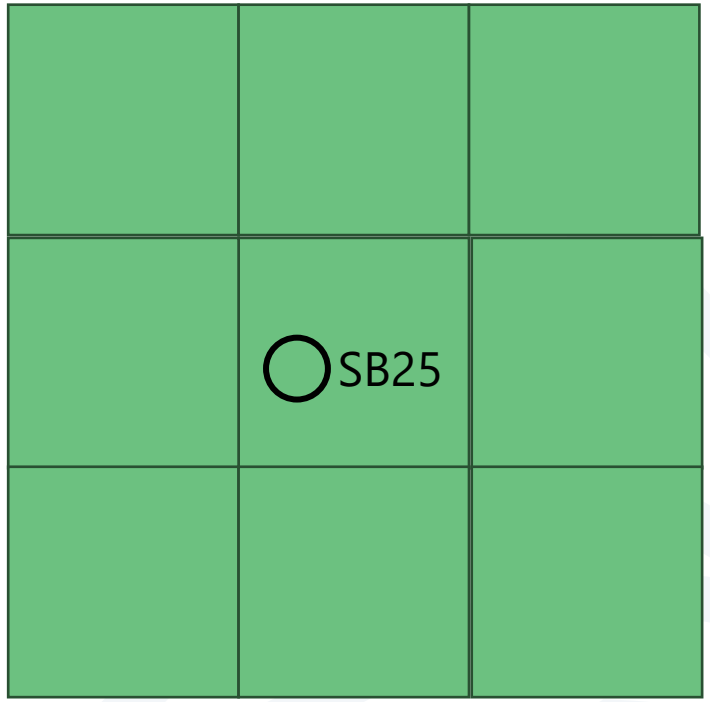
4) Max Exceedance GRID

- Assign most conservative exceedance to each grid cell (based on samples within)

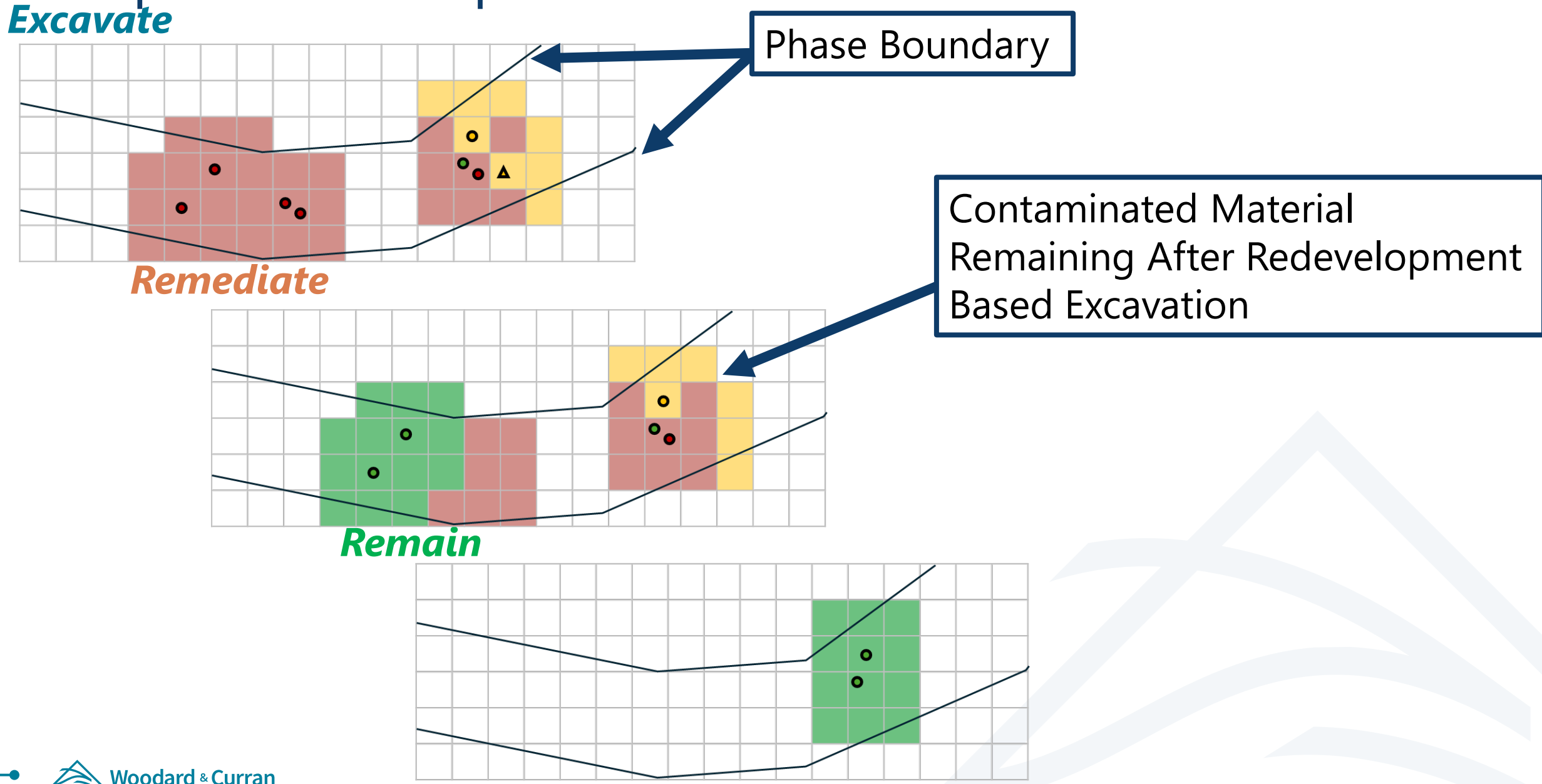


5) Max Exceedance GRID Extrapolated

- Assigns a designation to adjacent grids that do not contain samples

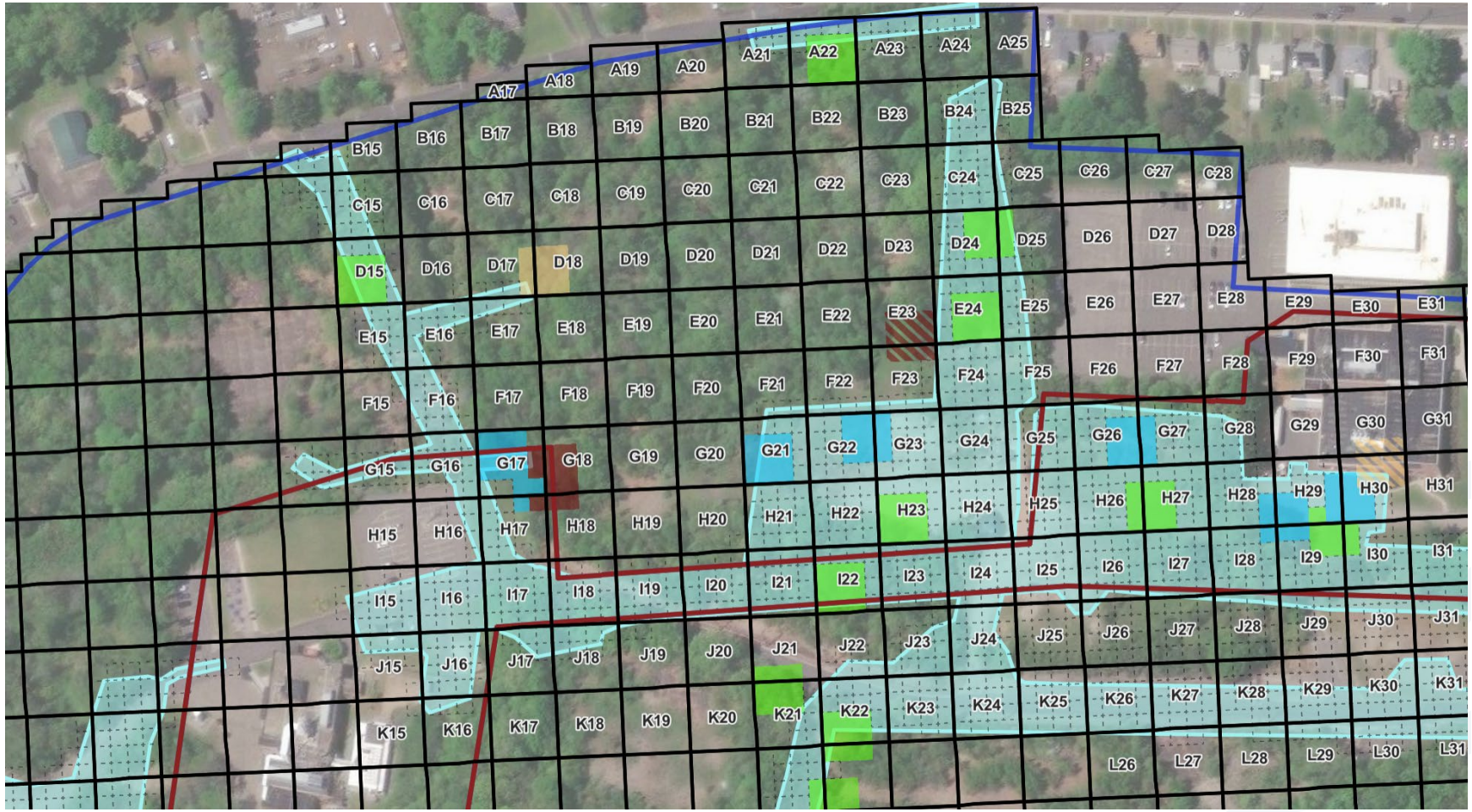


Example Redevelopment Phase



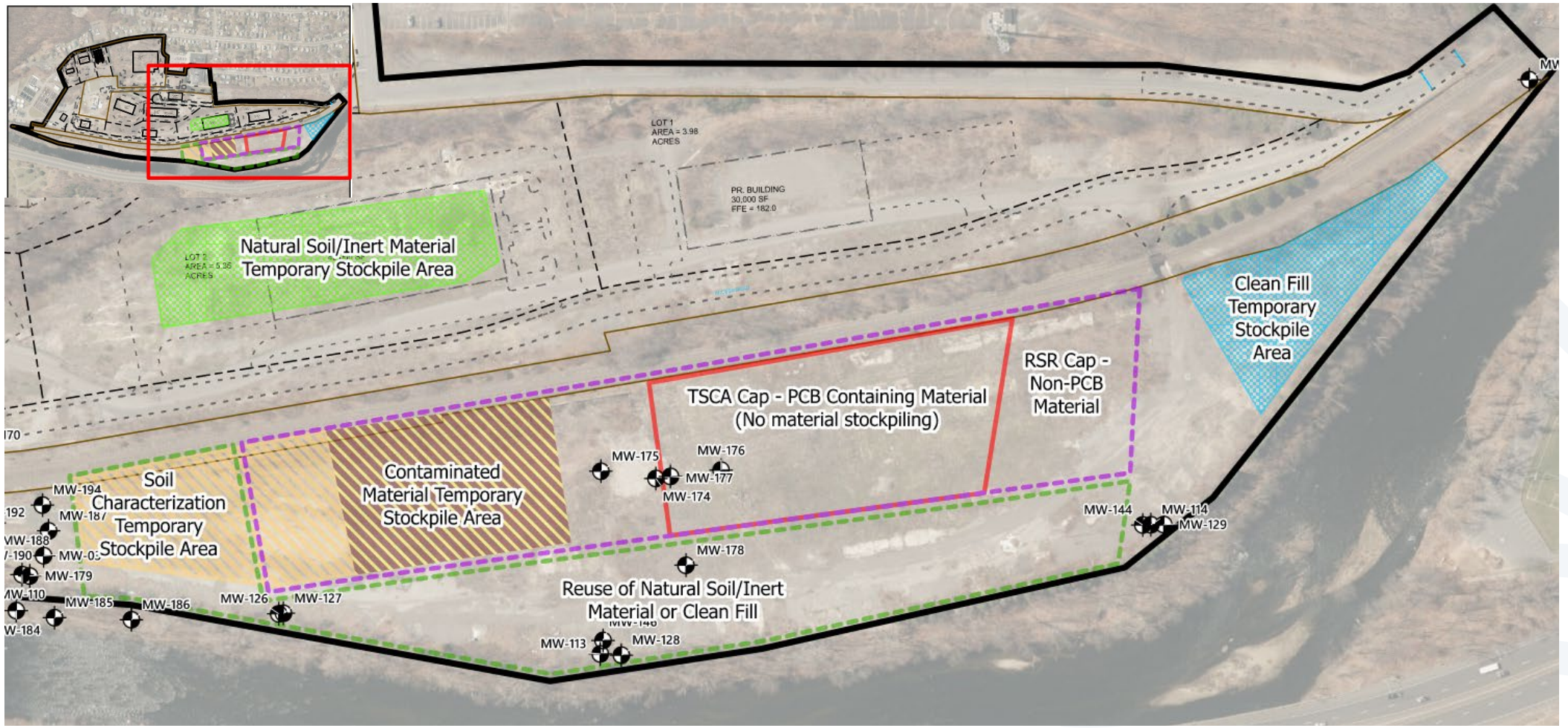
Field Maps - Real Time Tracking

- **Excavated** ArcGIS shapefile
  - Grid color indicates what contractors expect to encounter during excavation



Field Maps - Soil Management

- Colors & Hatching Symbology = Stockpile Areas

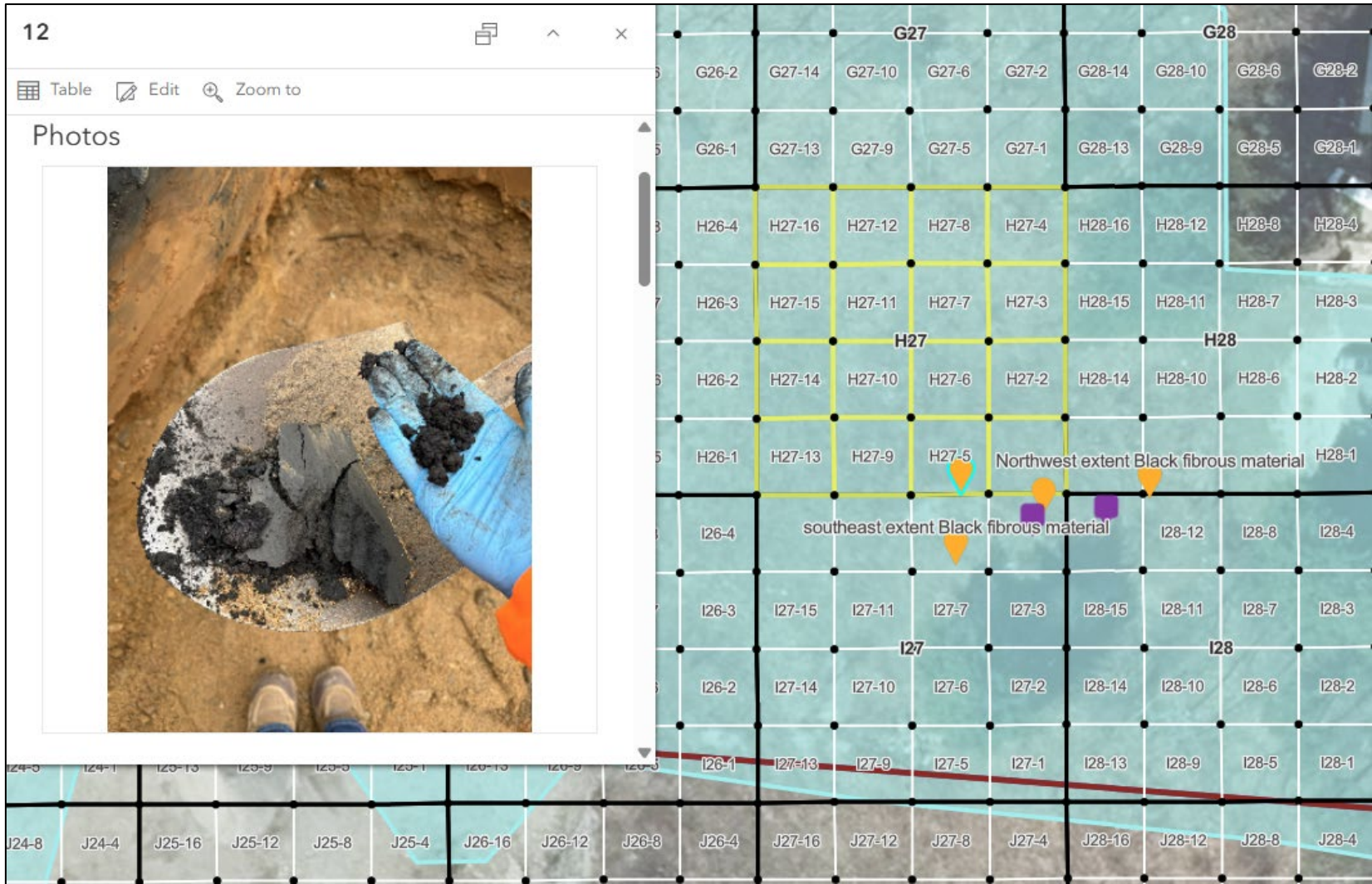


Field Maps - Functionality

- Precise Tracking
  - Pins with attached pictures & notes
  - Extents of excavation
  - Grid IDs for soil management

Example:

H27-5 grid cell, discovered dark fibrous material ->



Project Benefits and Outcomes

- **Field Maps**
  - Track in real time & quickly adapt to new data
- **Complex sites with numerous constituents, samples, historic data**
  - Automate delineation using grid cell approach
- **Process efficiencies**
  - Reduce time generating deliverables through automation of figures
  - Evaluate data gaps/ confirmation samples in a streamlined way
  - Reduce potential for human error

Savings that Scale

Maximizing on-site soil reuse minimizes costly soil disposal fees

+

Automating soil management eliminates hundreds of hours of manual labor

+

Minimizing human error lowers the risk of expensive rework

+

Precise, real-time field updates reduces lag time in making decisions, expediting the construction schedule

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Big Cost Savings!

Added Bonus: Increased project sustainability

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Questions?

Thank you for listening!

Tori Ward

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vward@woodardcurran.com