


# Advancing Roadway Evaluation Through Ground Penetrating Radar Technology

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Geophysical Services Manager



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## Outline

- What is Ground Penetrating Radar (GPR)?
- How can GPR be used to improve the quality of your projects?
- Project examples.



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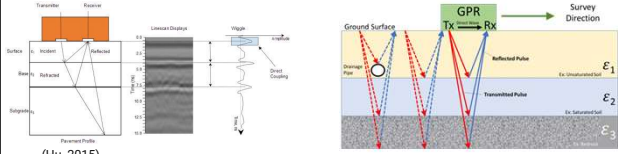
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## What is Ground Penetrating Radar (GPR)?



(Hu, 2015)

(source Brett Trotter, USGS)



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### GPR Equipment



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### When Should You Consider GPR?



- Safety
  - Large/busy roads where coring is difficult
- High Risk Sites
  - High traffic count/speed areas
  - Difficult construction conditions where pavement/base thickness, density, reinforcing is critical
- Large or Inaccessible Sites
  - Help reduce cores on large sites or linear corridors, with BETTER coverage
  - Driven without constant stops and minimal traffic control
- QA/QC
  - Working with new contractor
  - Verify Specs
  - Better coverage



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### Verification Cores

- Direct exploration is an essential part of site characterization.
- Direct exploration is an essential part of Geophysics.
- Use of geophysics to be SMARTER about our direct exploration.



"Goal of a good geophysical survey should be to provide enough subsurface data to reduce the need to drill boreholes or excavate test pits, and in doing so minimize environmental impacts."  
McClymont et al., 2016, CSEG Recorder



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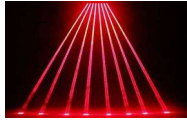
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## Smart Exploration Plan

Improve quality through better/faster coverage and reduce cores or other destructive testing.

Direct Exploration (LASER/Flashlight)  
(Floodlights)



Geophysics



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## General Project Examples



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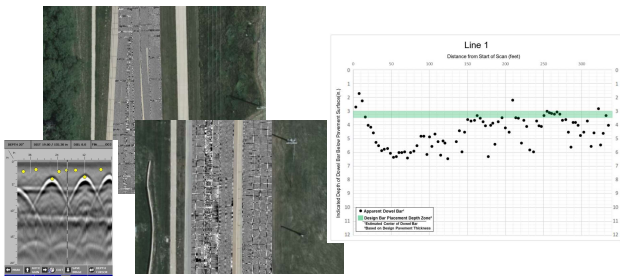
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## Reinforcement Locating



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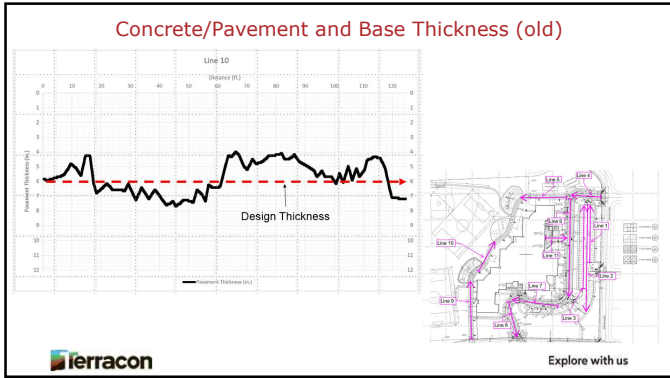
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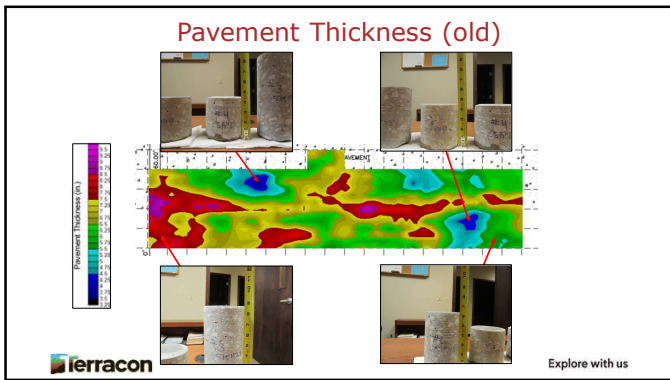
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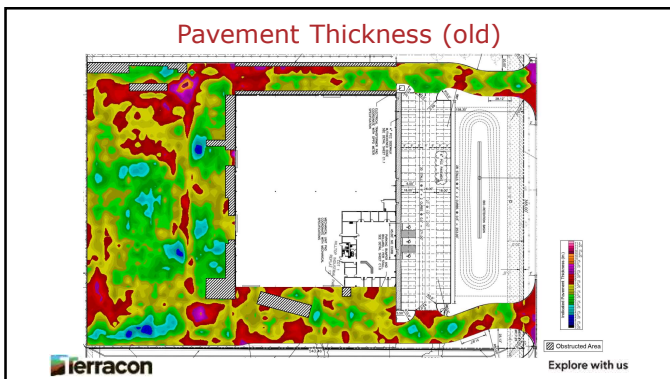
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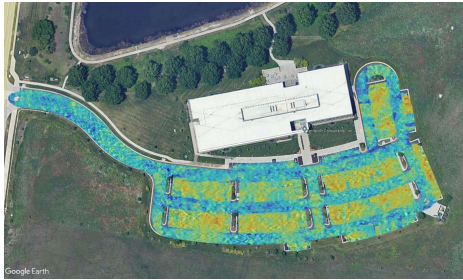
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### Pavement Thickness (new)



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### Pavement Thickness



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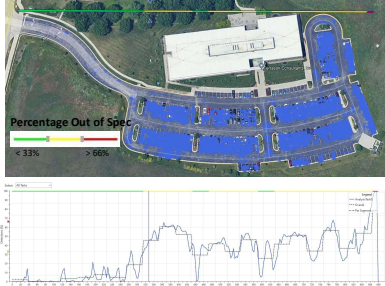
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### Pavement Thickness -Statistical



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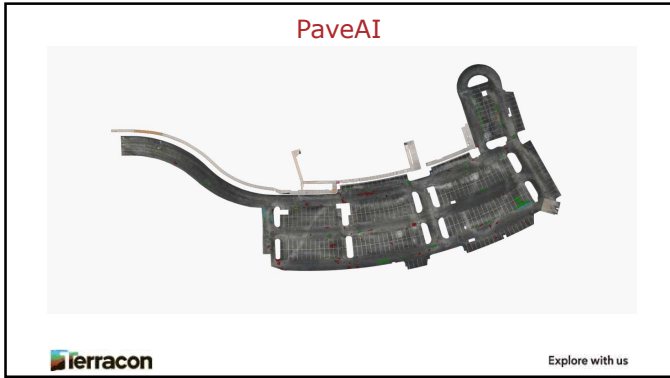
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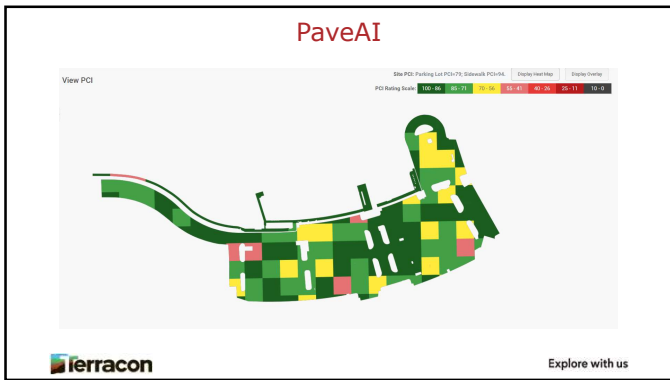
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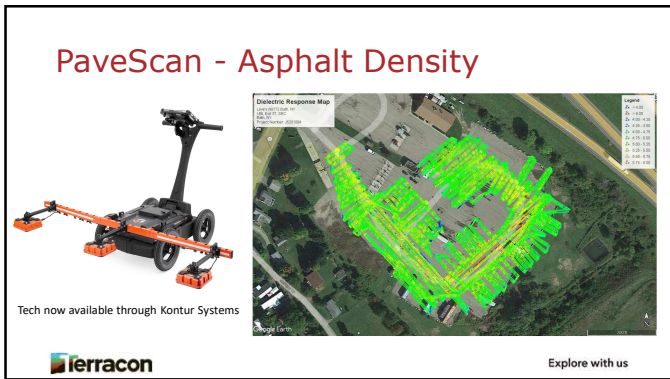
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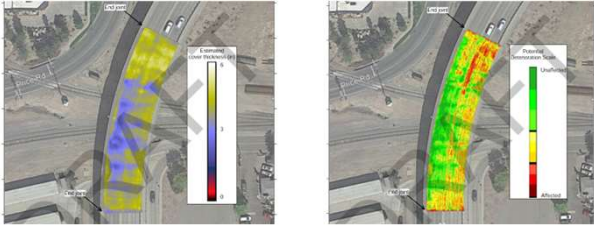
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### Bridges and Bridge Deck Evaluations



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### Void Locations



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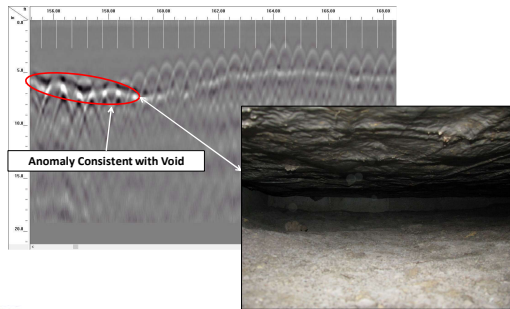
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### Void Locations



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## Subsurface Utility Engineering (SUE)

ASCE 38-22 "Subsurface Utility Engineering"



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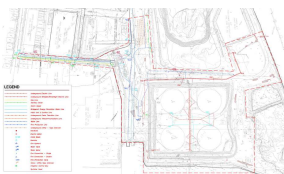
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## Utility Location and Asset Protection



ASCE 38-22 "Subsurface Utility Engineering"



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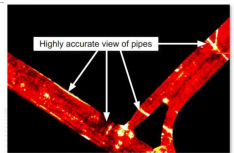
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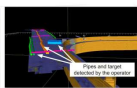
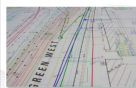
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## Utility Location and Asset Protection



GRID HD 3D CAD: subsurface time slice view



GRID HD 3D CAD: 3D pipe proximity results



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