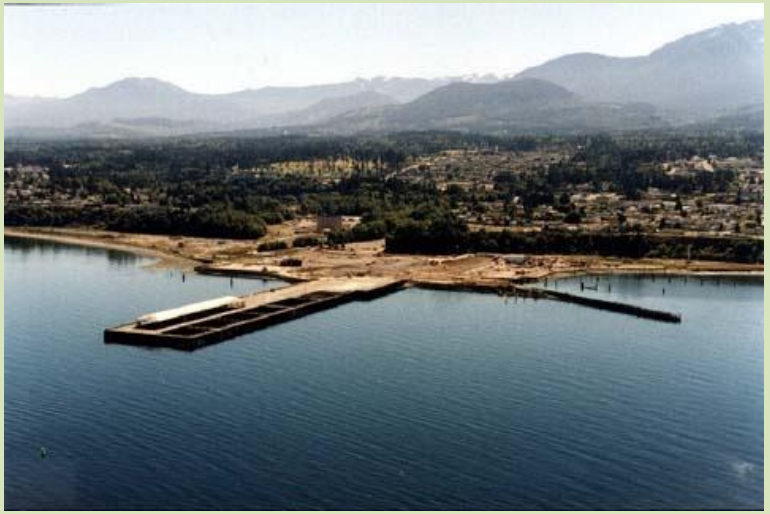
# Visualizing Environmental Data using GIS



A Presentation by:

**Tonya Kauhi**

**GeoEngineers, Inc.**

GeoEngineers

# Presentation Outline

- ArcGIS Server Example
- ArcMap Desktop Example
- 3D Example
- Other Examples

GeoEngineers

# Project Background

- A pulp mill operated from 1930 until 1997

- Contaminants
  - Petroleum hydrocarbons (hydraulic or fuel oil)
  - Polychlorinated biphenyls (PCBs) from electrical equipment
  - Lead from a lead-based mortar between bricks inside part of the mill
  - Dioxins and furans from ash.
  - Arsenic

# Project Background

- Problem: Needed a centralized way to view, query and assess existing environmental data.
  - Site is under an Agreed Order with Ecology.
  - Our task Complete an Upland Remedial Investigation (RI) work plan

- Solution: Web-based viewer via MS SharePoint
  - Communicate and coordinate efficiently with all involved parties
    - Client, Internal (Project Managers, Staff) and Ecology

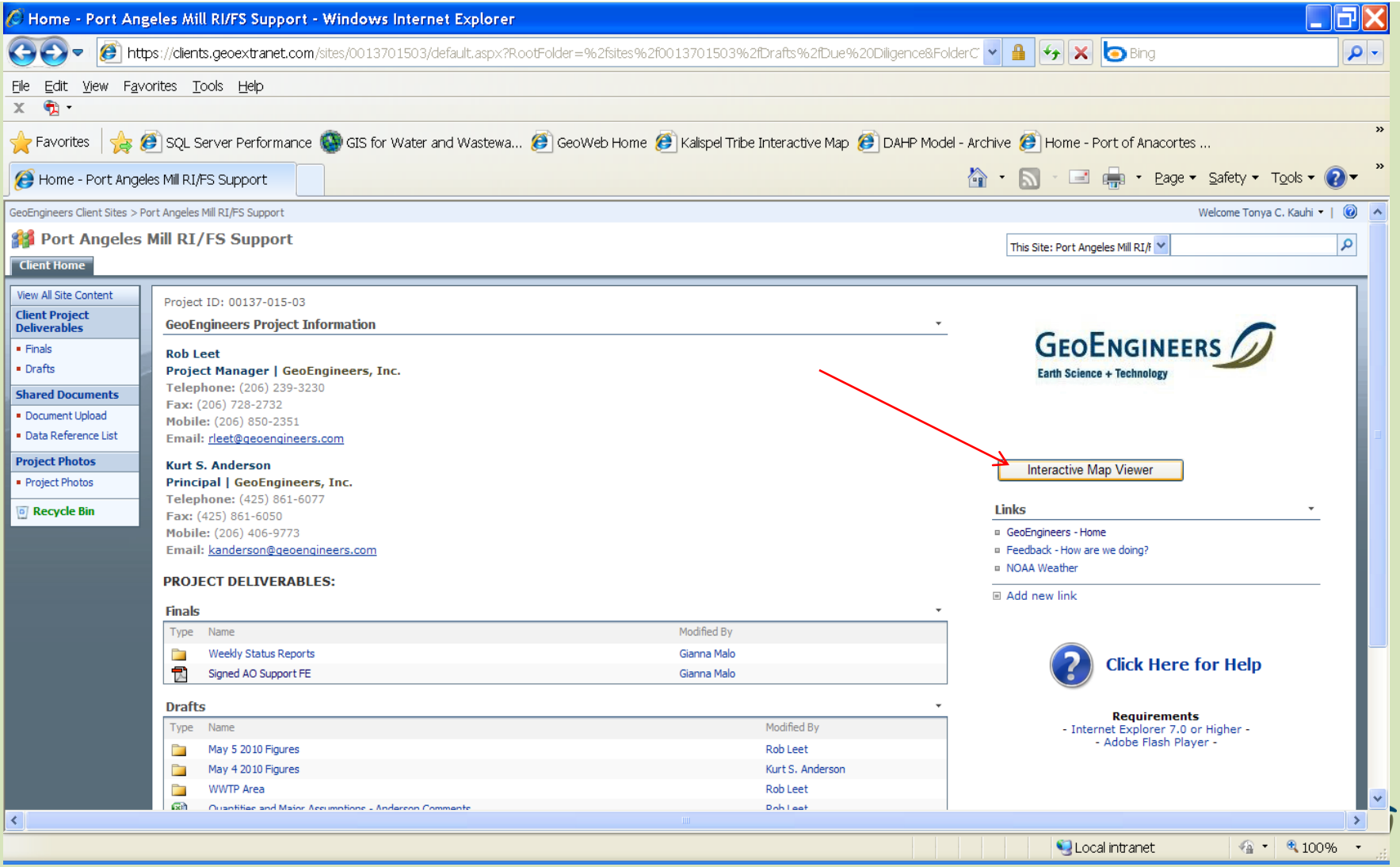
GeoEngineers

# Data Challenges

- Historic data collected from multiple consulting companies over 10 years.
- Good News – Consulting firm provided an EQuIS backup file
- Bad News – Data was in pretty bad shape

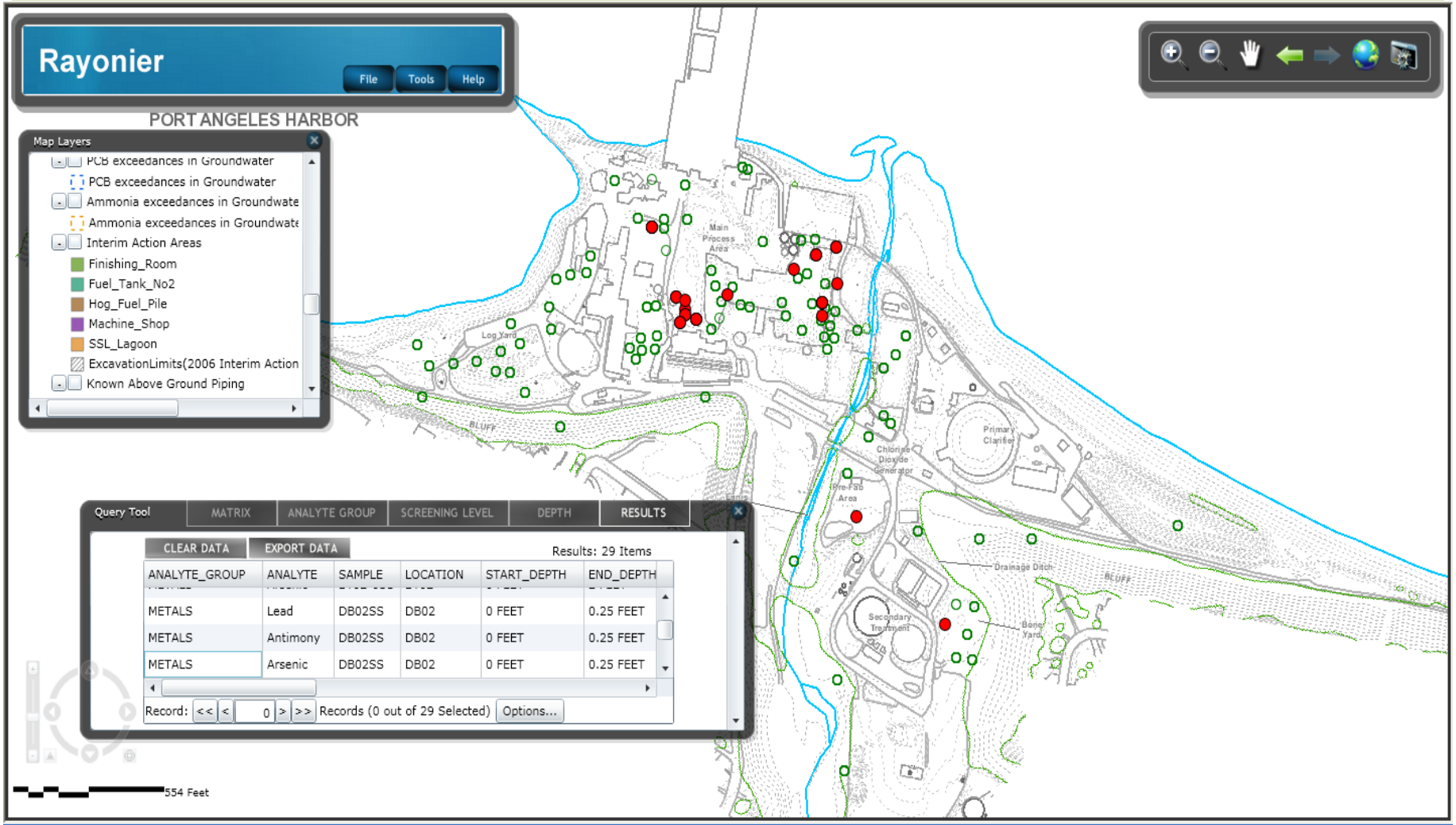
GeoEngineers

# ArcGIS - Map Viewer Demo



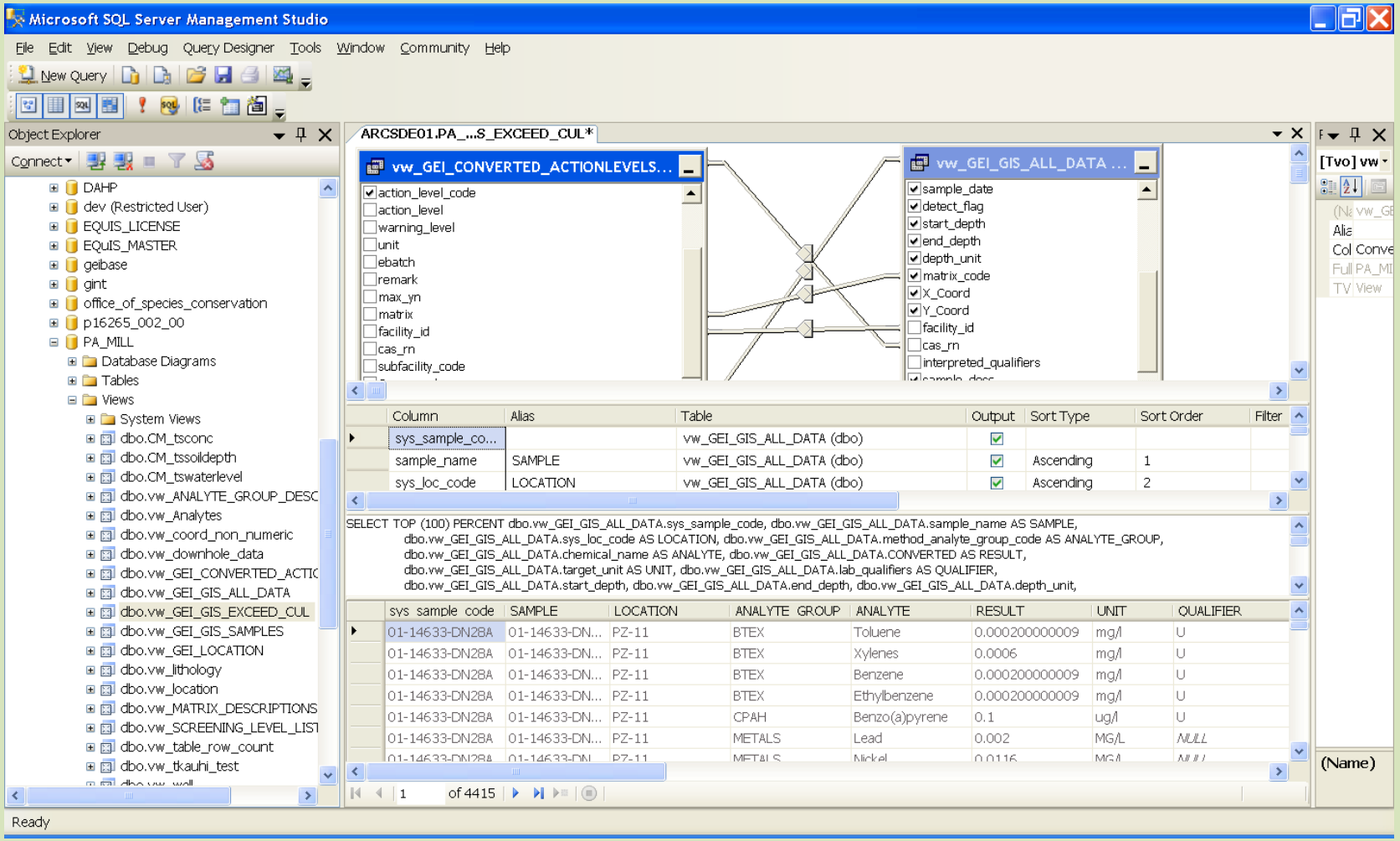
# Map Viewer Demo

http://gis.geoengineers.com/rayonier_silverlight/index.aspx



# How Do You Do That?

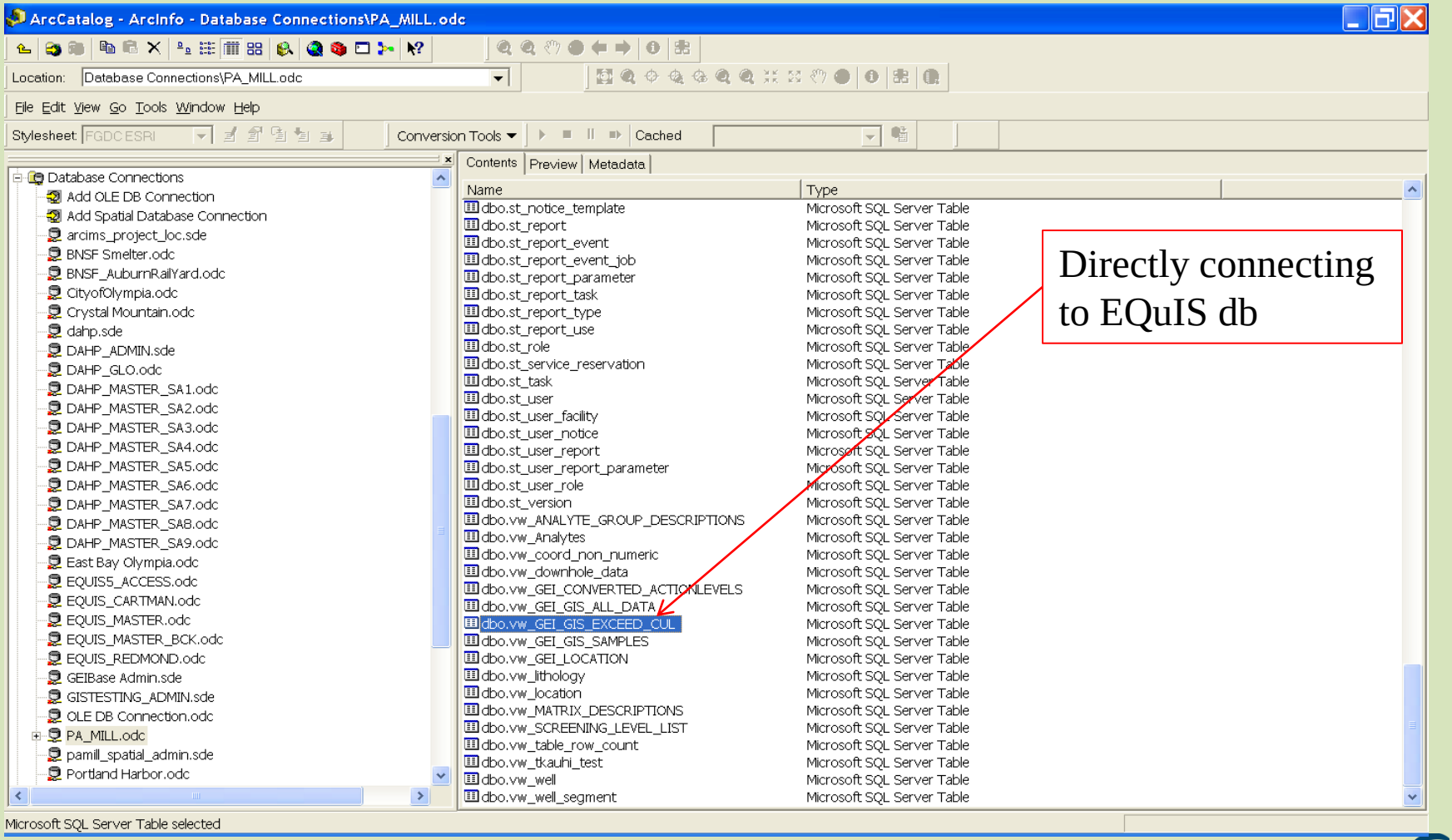
Views created in SQL Management Studio Express




GeoEngineers

# How Do You Do That?

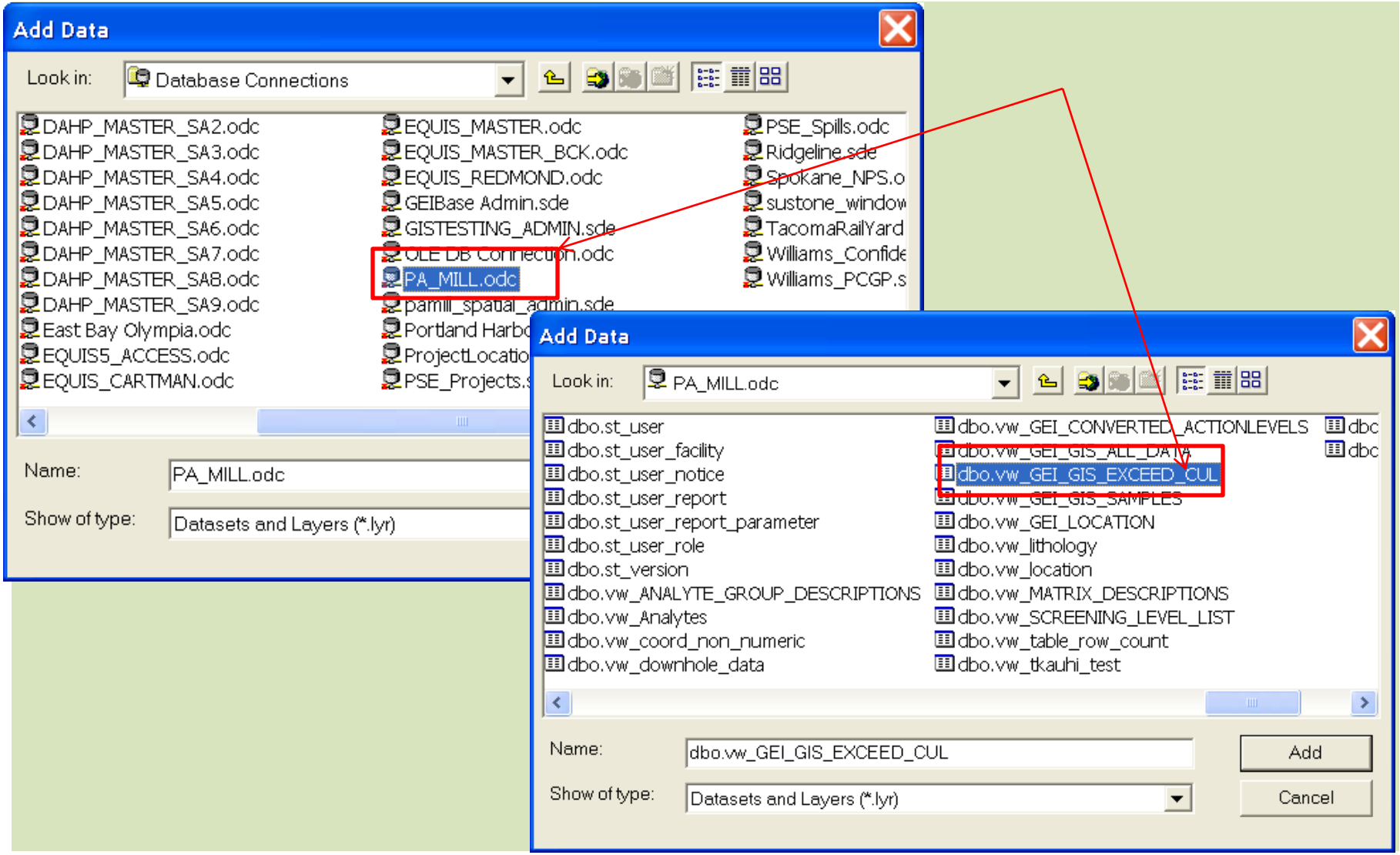
ODBC connection through ArcCatalog (ArcGIS)




GeoEngineers

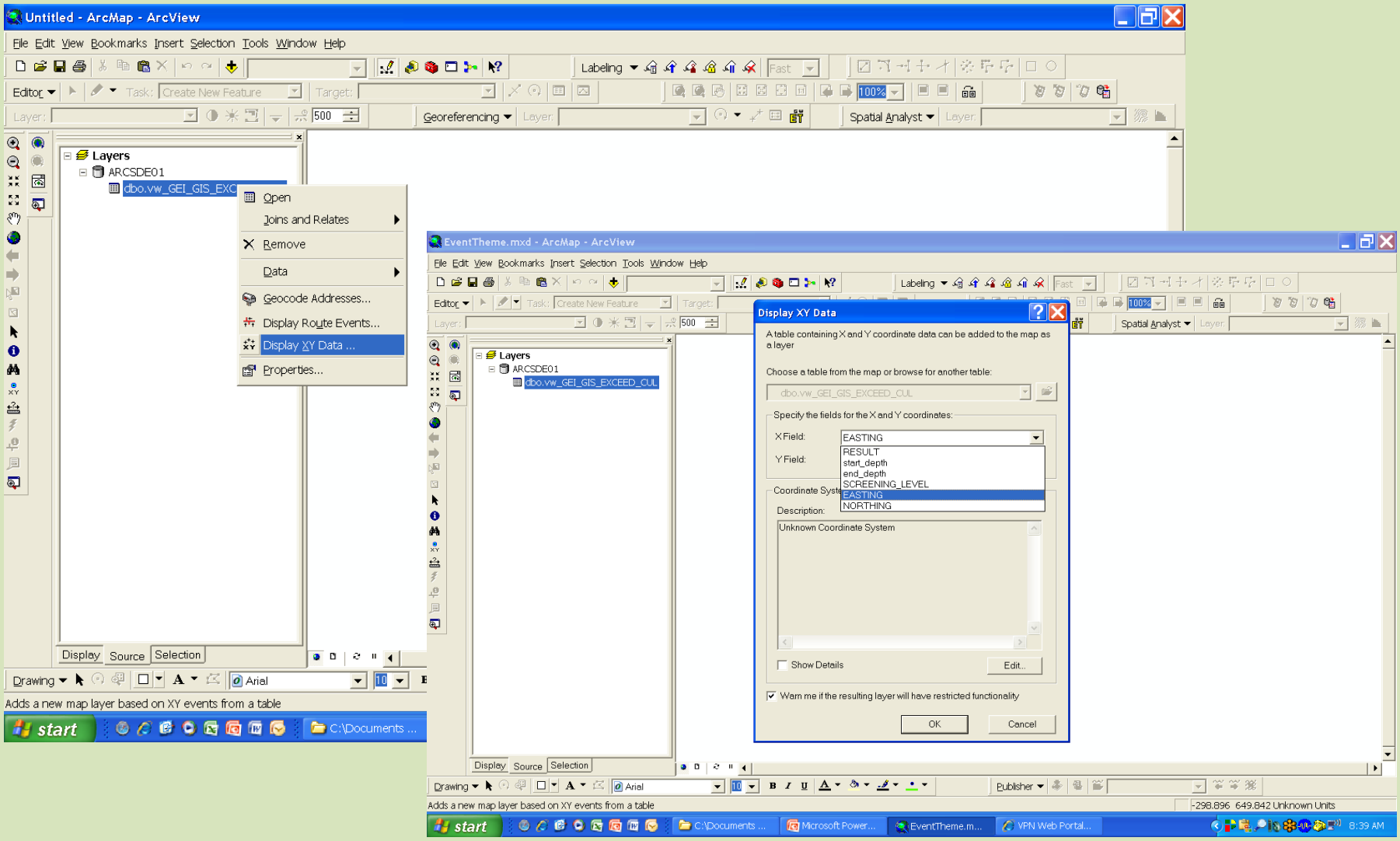
# How Do You Do That?

Created an Event Theme within ArcMap



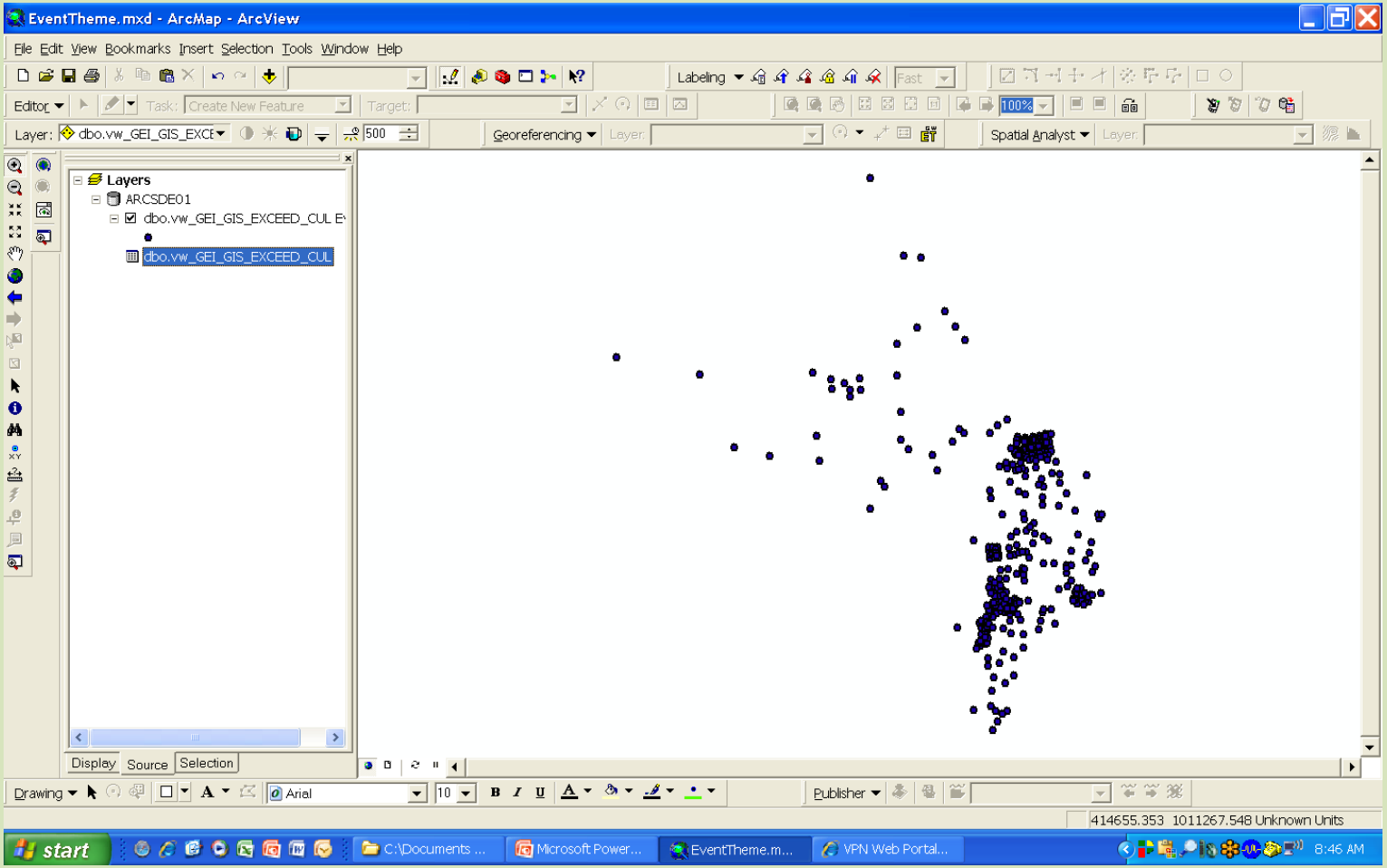
# How Do You Do That?

Created an Event Theme within ArcMap



# How Do You Do That?

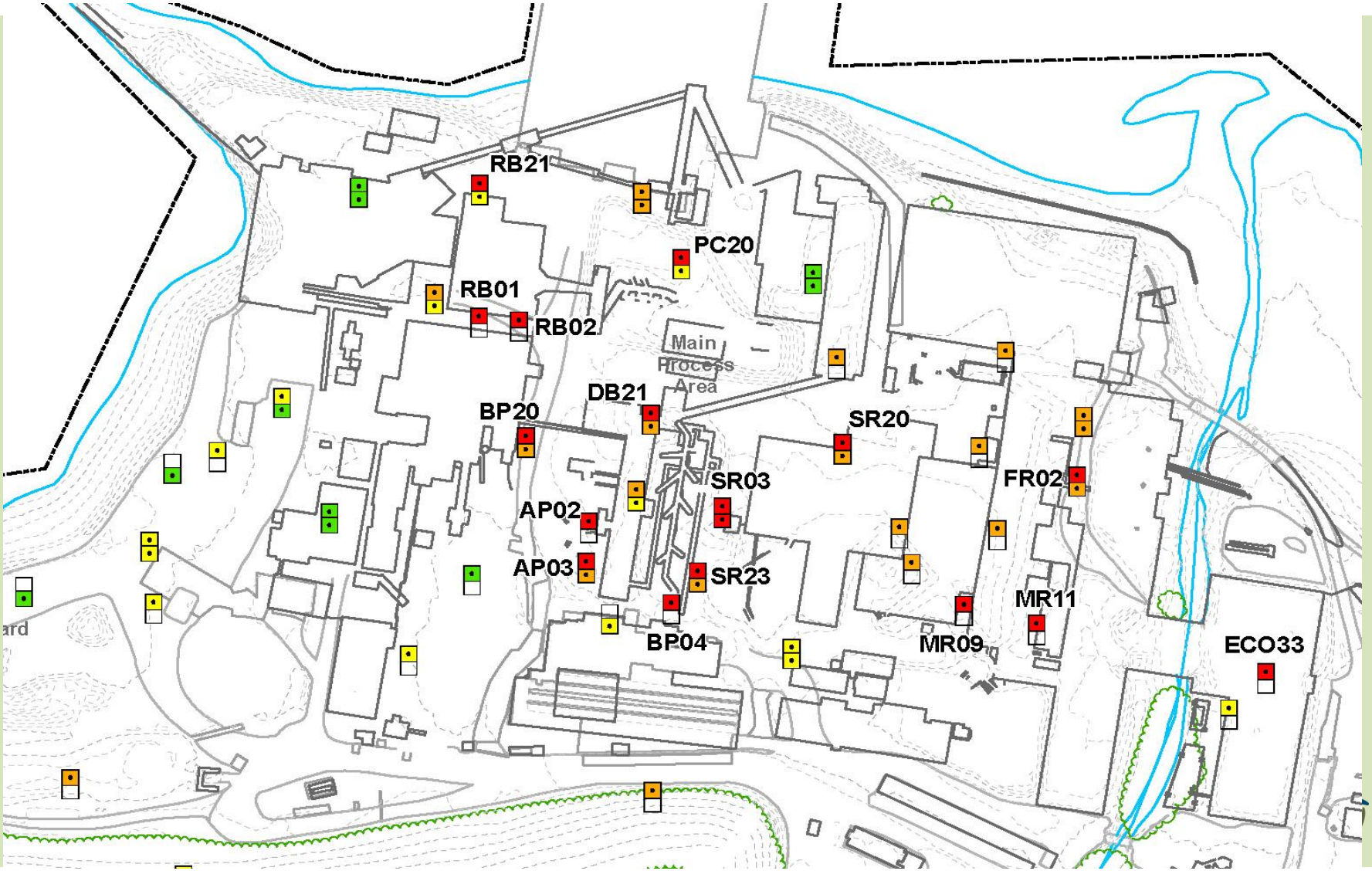
Created an Event Theme within ArcMap



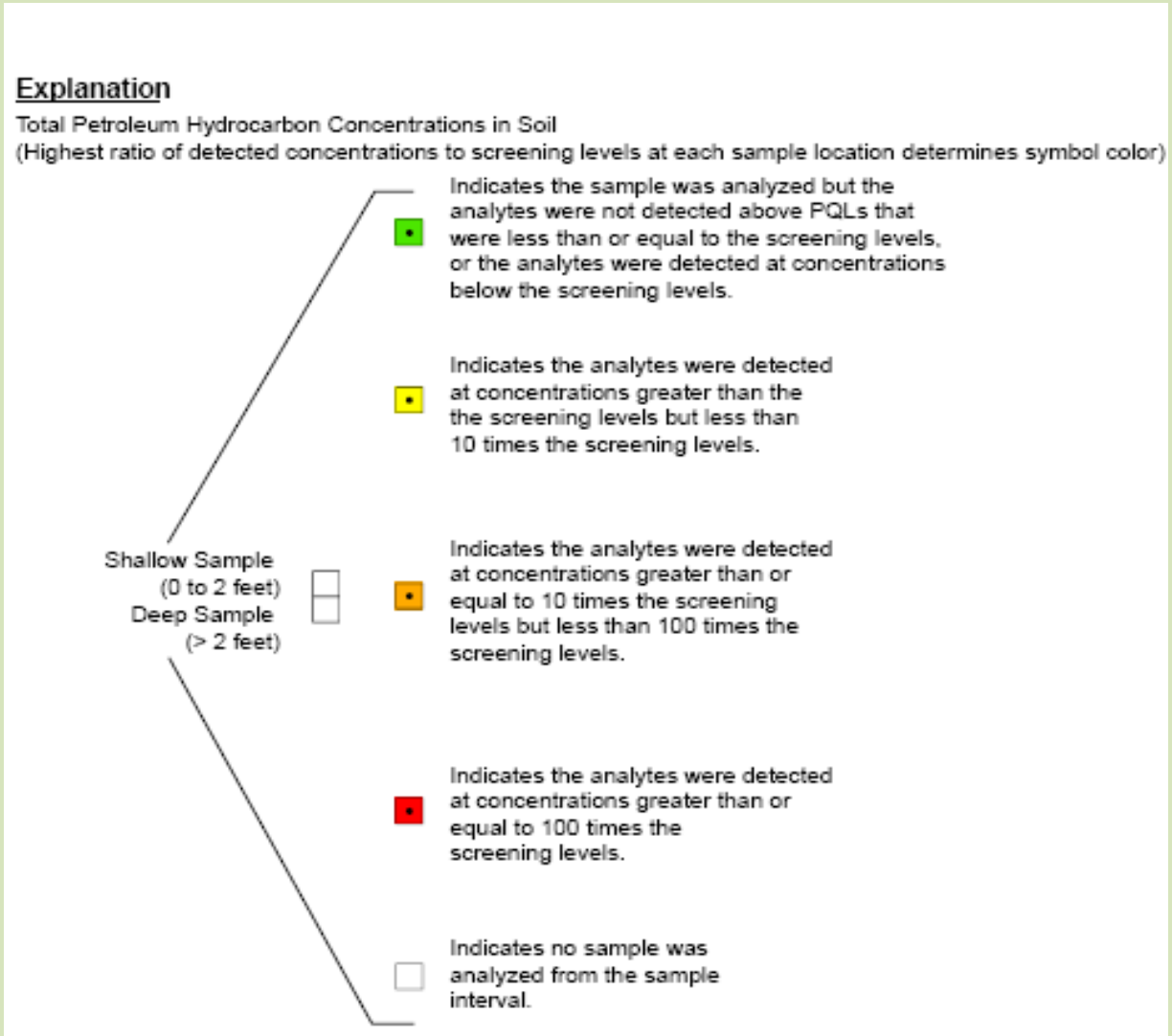

All GIS data stored on ArcSDE

GeoEngineers

# ArcGIS Desktop Example “Lego” diagrams



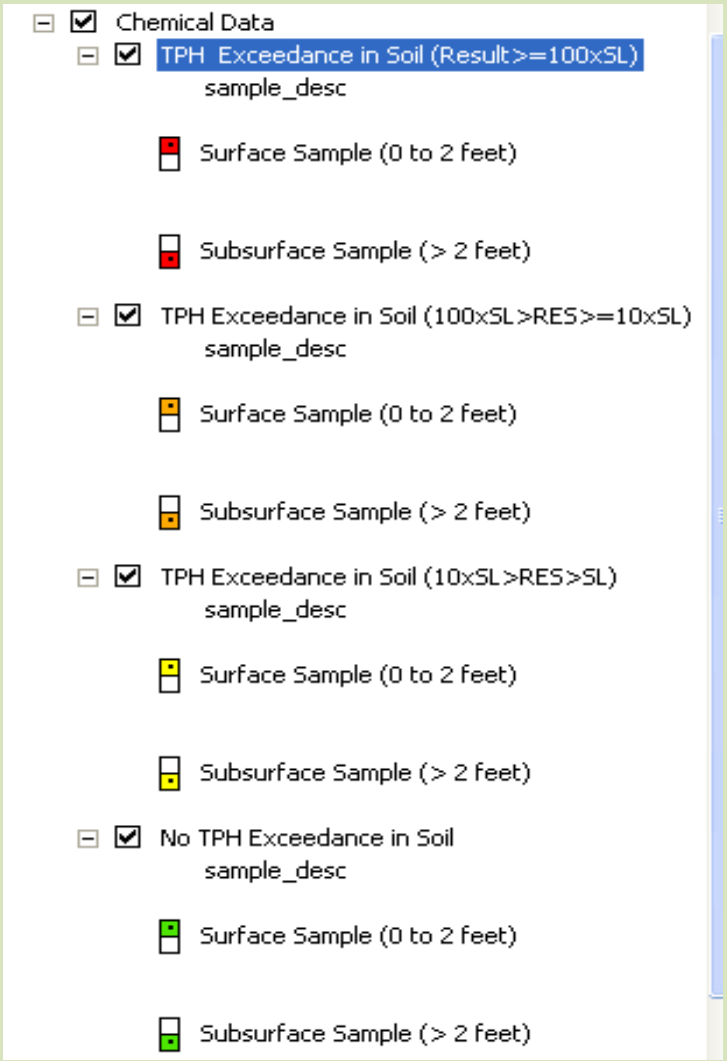
# ArcGIS Desktop Example "Lego" diagrams




In one graphic we are showing 7 pieces of information

GeoEngineers

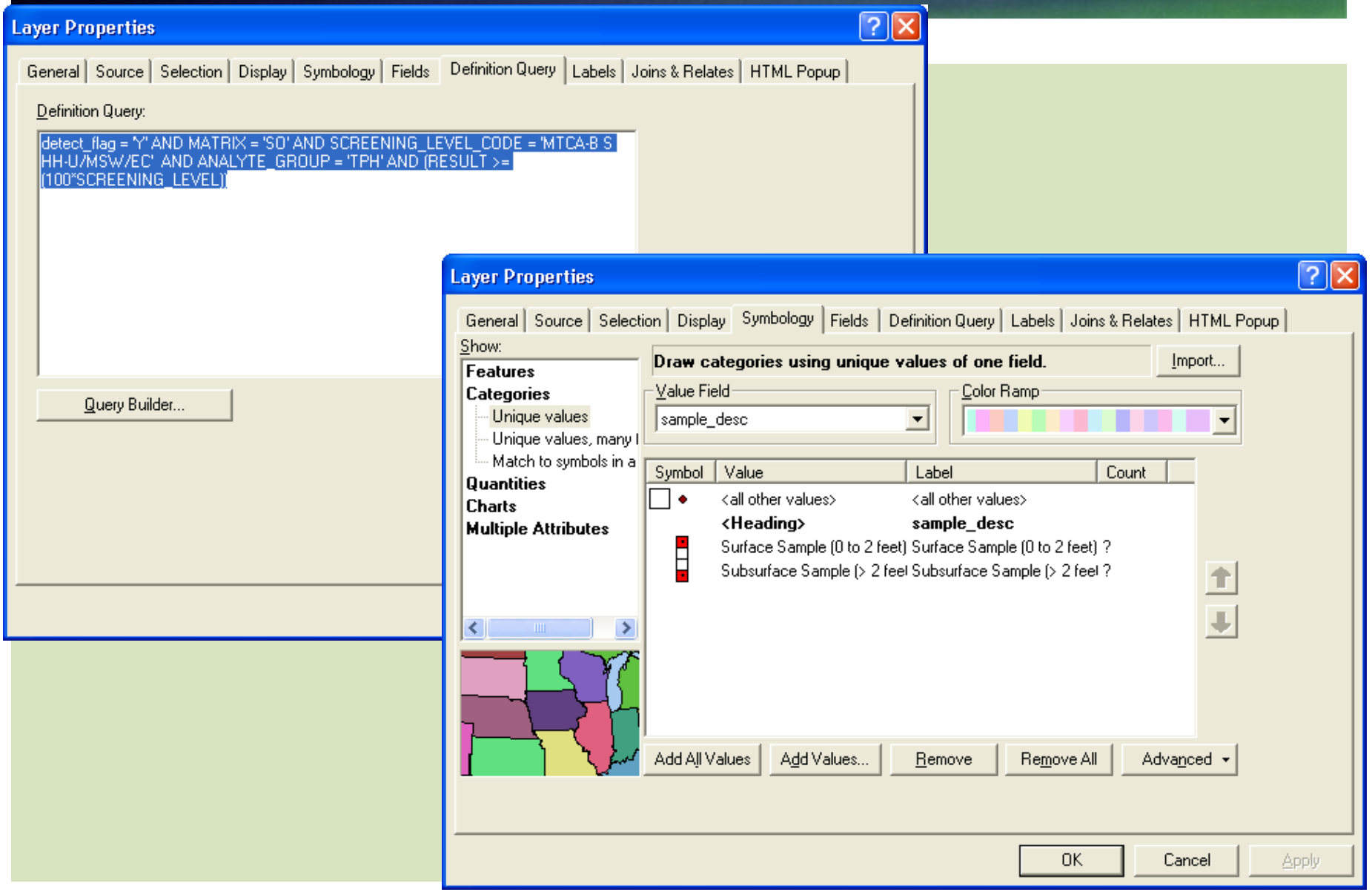
# How Do You Do That?



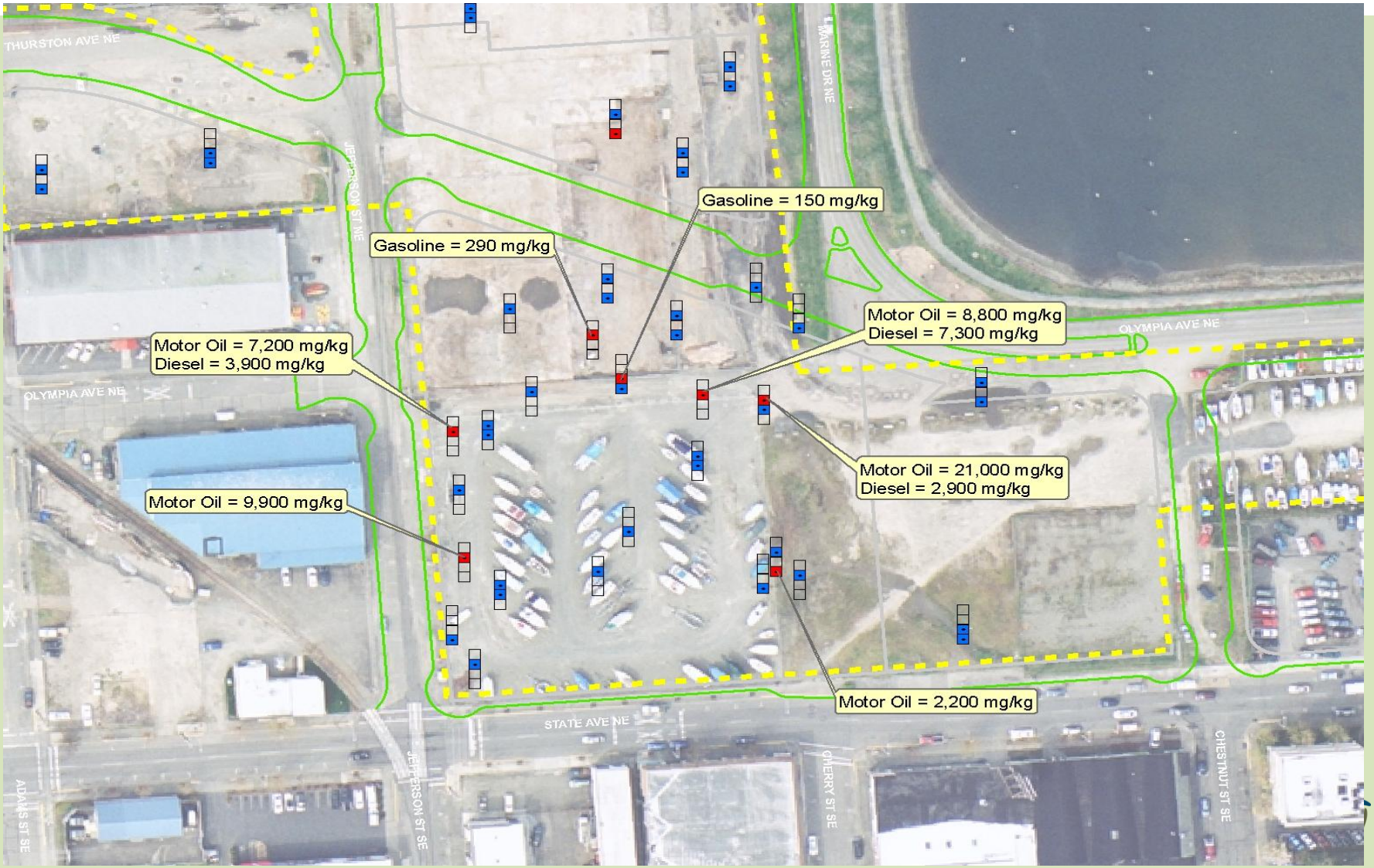

From one SQL View complete definition queries within ArcMap to show different information

GeoEngineers

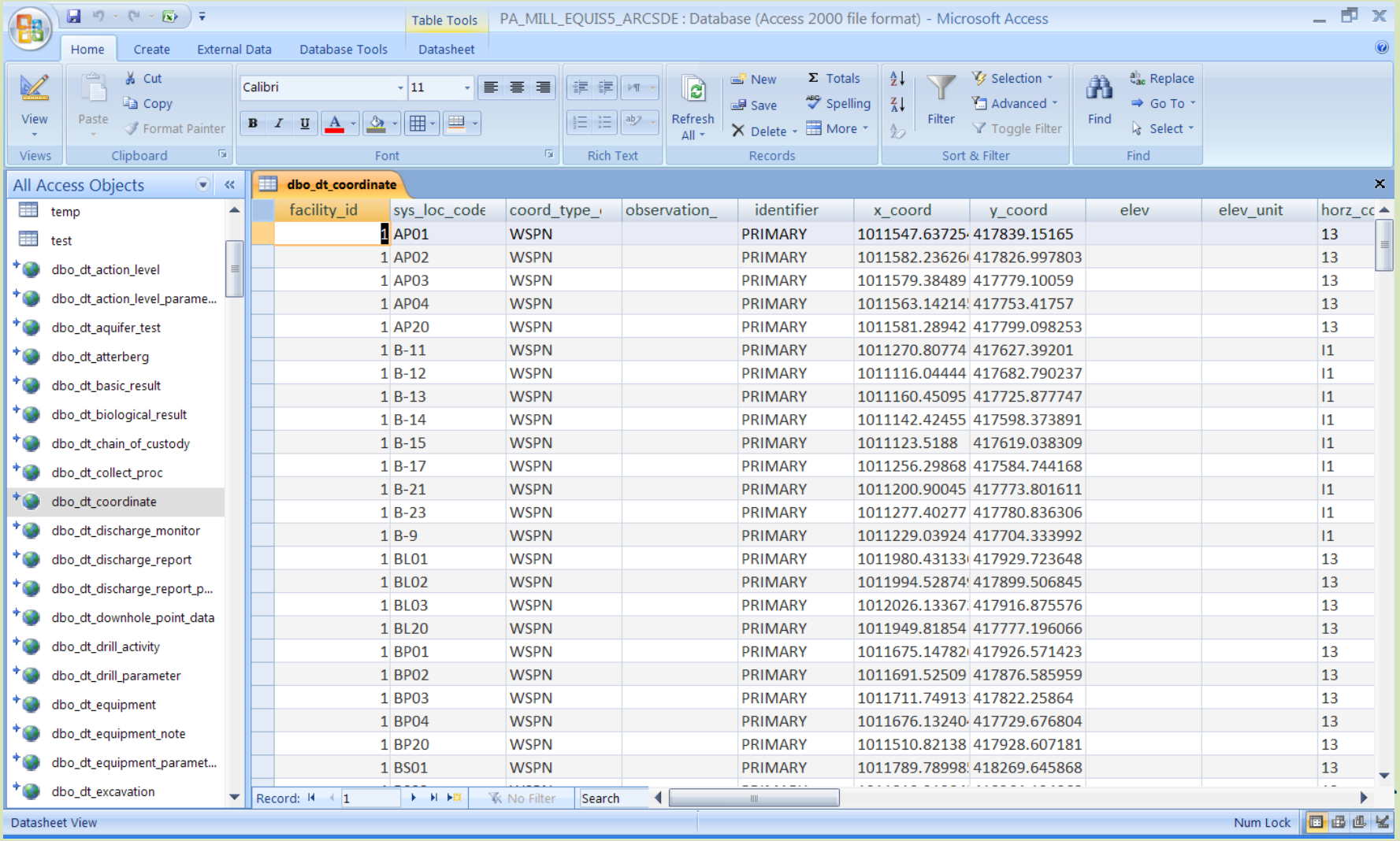
# How Do You Do That?



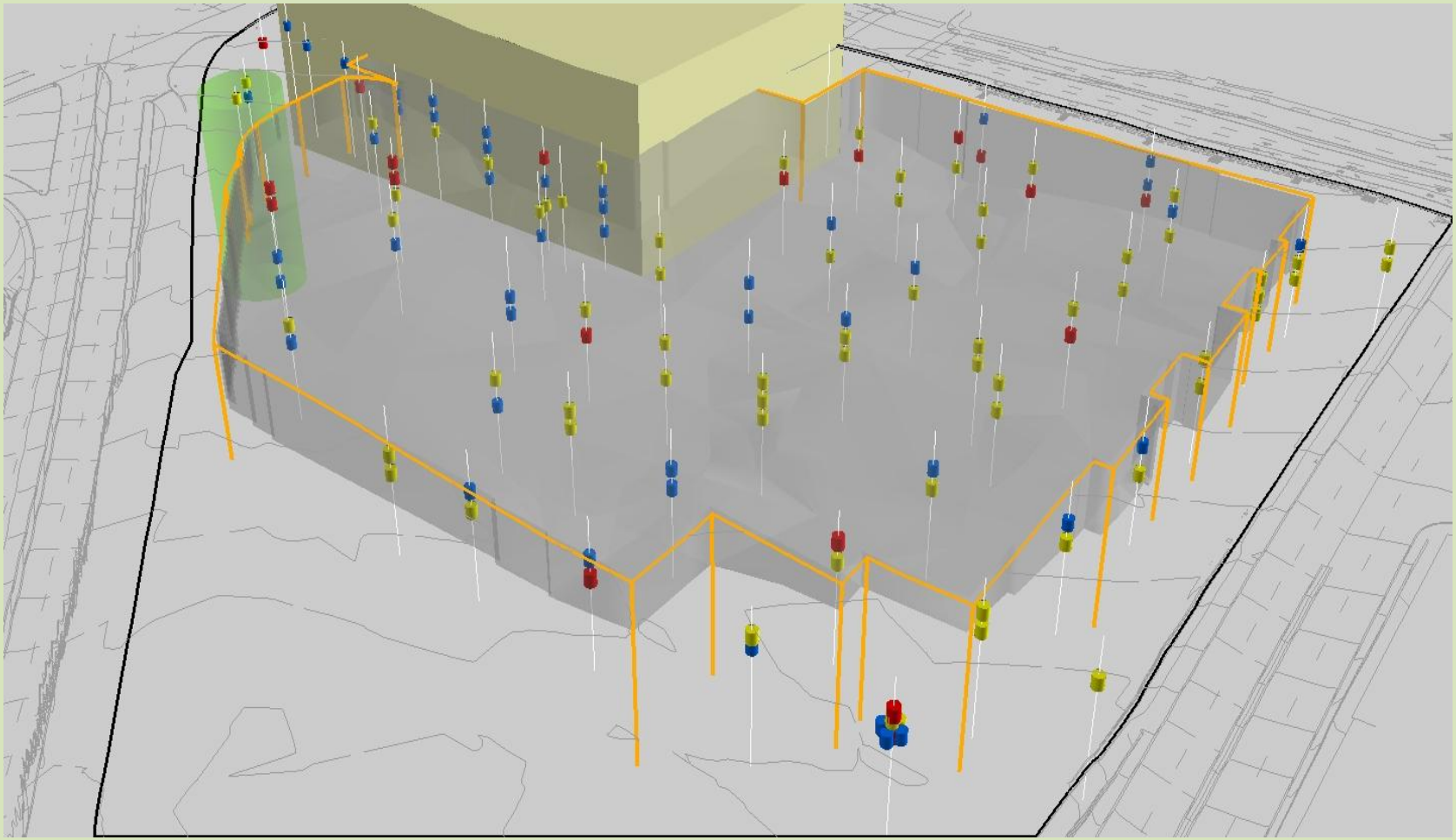
# ArcGIS Desktop Example "Lego" diagrams



# ODBC Connection – MS Access

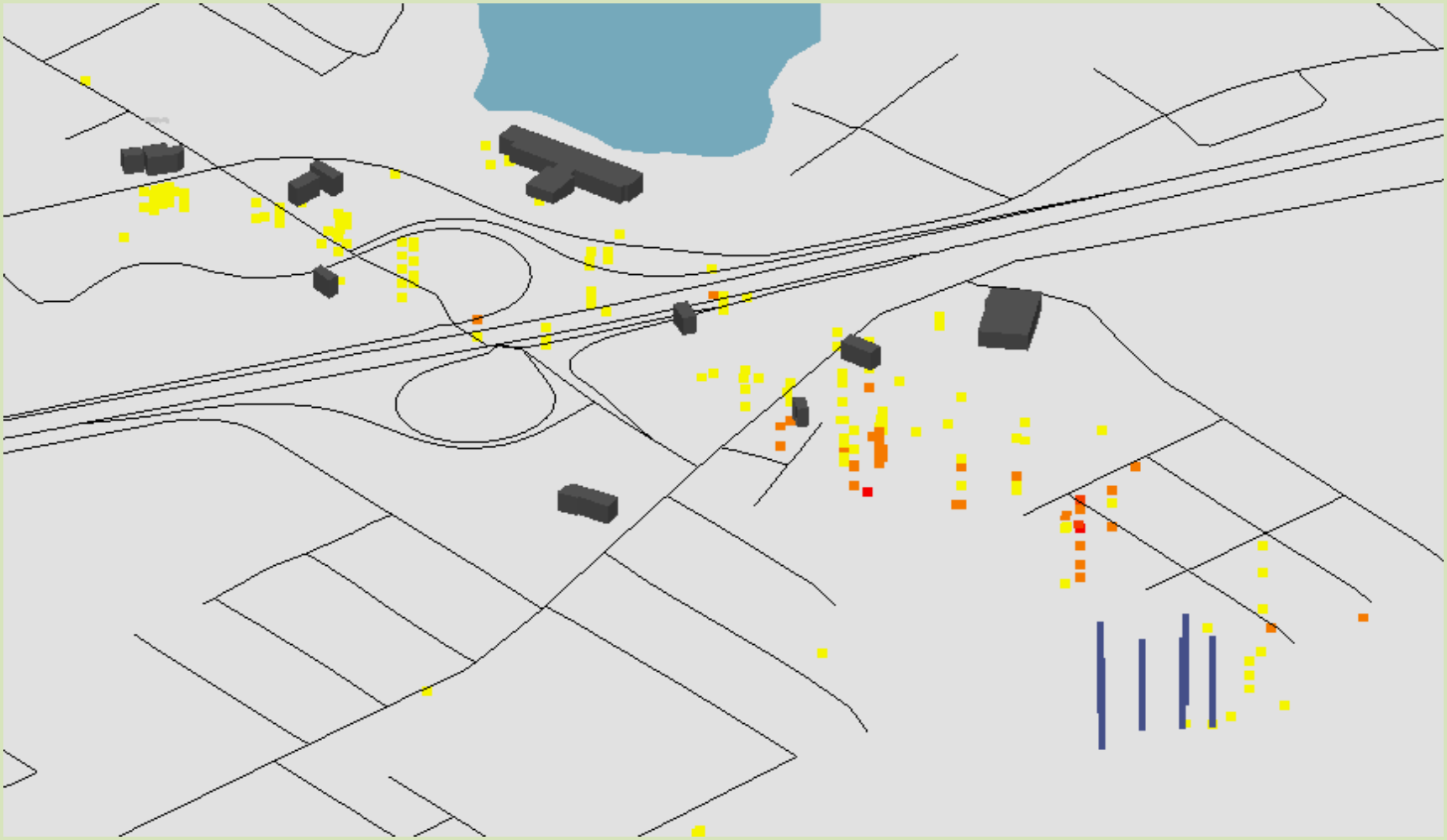


# 3D Example



GeoEngineers

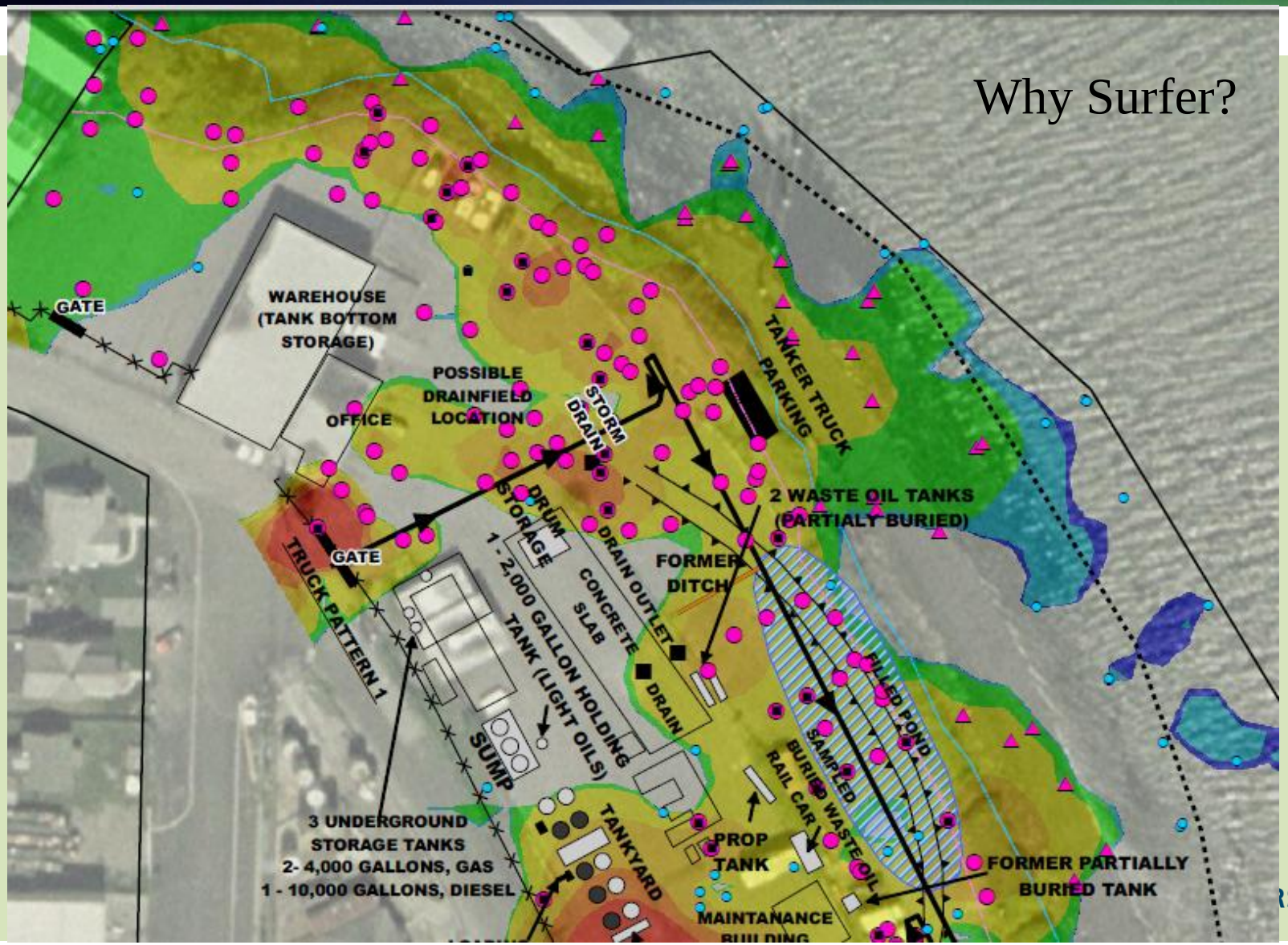
# 3D Example



GeoEngineers

# Mapping Concentrations in Surfer

# Chemical Concentrations - Surfer



# Aroclor Ratios

**RATIO OF DETECTED AROCLOR 1260 TO PCB TOTALS**

- <25 percent
- 25 to 50 percent
- 50 to 75 percent
- 75 to <100 percent
- 100 percent Aroclor 1260

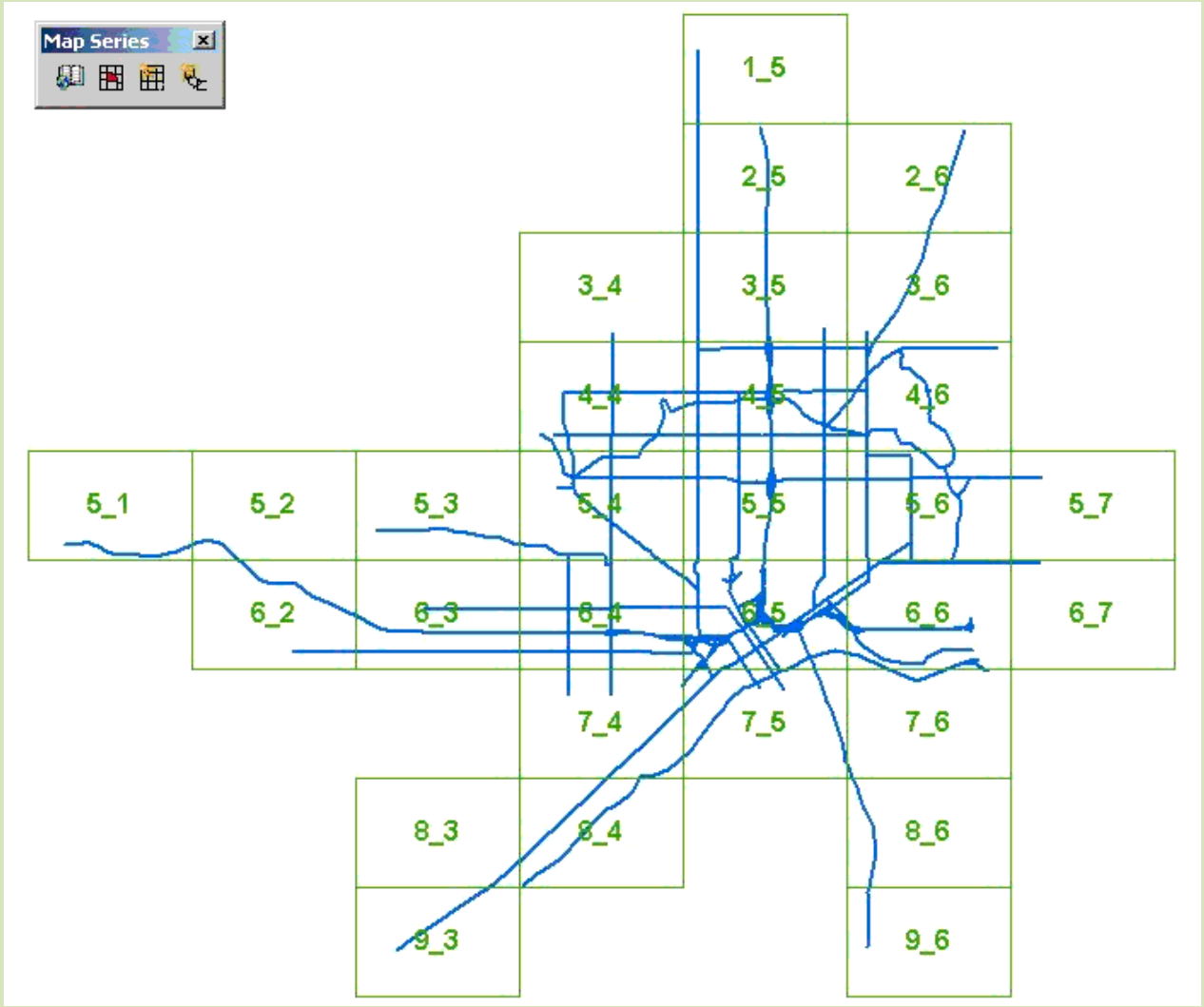
**Sample Depths Below Ground Surface (ft)**

| Area | Location | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Terminal | SB-36 | | 100 | | 100 | | | 100 | | 100 | | | | | | | | | |
| Terminal | CS-B2-S5 | | | 100 | | | | | | | | | | | | | | | |
| Terminal | IS-B3-B3 | | 100 | | | | | | | | | | | | | | | | |
| Terminal | T-117 B5 | | 100 | | 100 | | | | | | | | | | | | | | |
| Terminal | CS-B2-B2 | | | 100 | | | | | | | | | | | | | | | |
| Terminal | T117-PS-6 | | 100 | | 100 | | | 100 | | 100 | | | | | | | | | |
| Terminal | T-117 D10 | | 100 | | 100 | | | 100 | | | | | | | | | | | |
| Terminal | IS-BA-S3 | | 100 | | | | | | | | | | | | | | | | |
| Terminal | SB-40 | | 100 | | | | | 100 | | 100 | | | | | | | | | |
| Terminal | SB-24 | | 100 | | 100 | | | | | | | | | | | | | | |
| Terminal | SB-50 | | 100 | | 100 | | | | | | | | | | | | | | |
| Terminal | SB-25 | | | | 100 | | | | | | | | | | | | | | |
| Terminal | T-117 B3 | | 100 | | 100 | | | 100 | | | | | | | | | | | |
| Terminal | T-117 B2 | | 100 | | 100 | | | 100 | | 81 | | | 71 | | 58 | | 100 | | |
| Terminal | IS-B2-S6 | | | 100 | | | | | | | | | | | | | | | |
| Terminal | IS-BA-B1 | | 100 | | | | | | | | | | | | | | | | |
| Terminal | T117-RW-05 | 100 | | | | | | | | | | | | | | | | | |
| Terminal | IS-B3-S4 | | 100 | | | | | | | | | | | | | | | | |
| Terminal | T-117 B4 | | 100 | | 100 | | | 100 | | 100 | | | | | | | | | |
| Terminal | IS-B2-S2B | | | | | | | 100 | | | | | | | | | | | |
| Terminal | T117-PS-7 | | 100 | | 100 | | | | | 100 | | | | | | | | | |

gry_PCB_Stats

# Custom Symbols

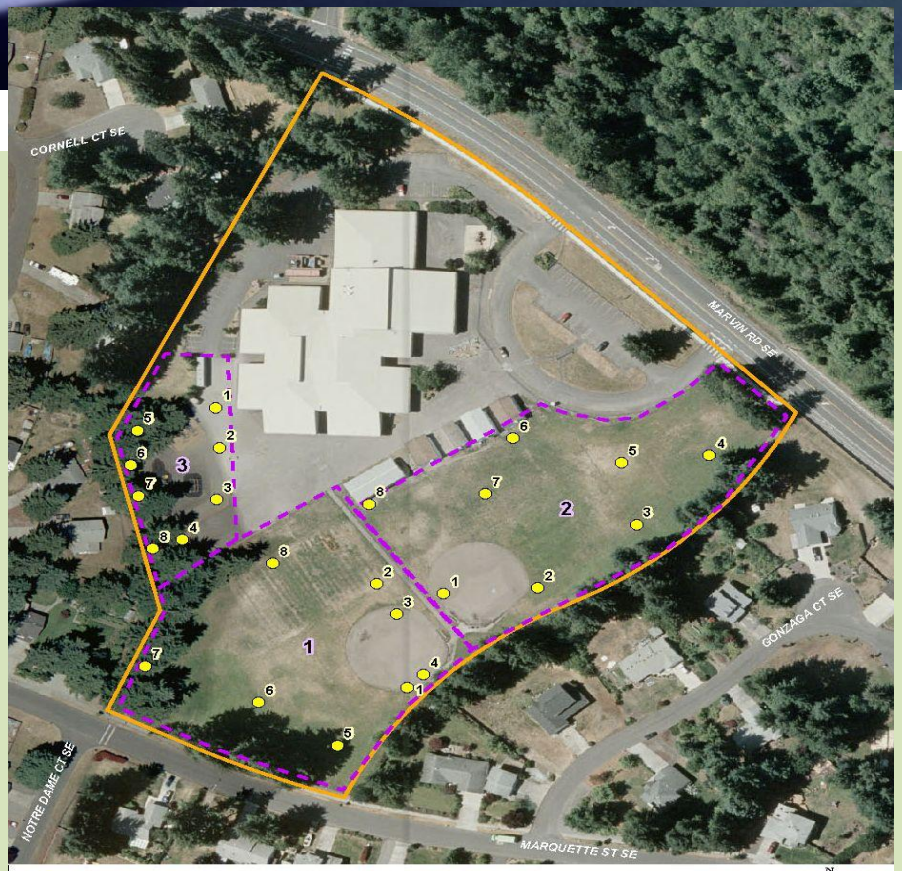
# MapBook Example




Multipage document based on a dataset and an index grid representing the pages

GeoEngineers

# MapBook Example




1 ○ Sample Location and ID (0 to 6 inches bgs)

1 Play Area and ID

Subject Parcel

150 0 150 Feet

N W E S

Contact: Karen Johnson
Contact Phone No: (360) 412-4670
Site Address: 3025 MARVIN RD SE
OLYMPIA, WA. 98516

Reference: Parcels and aerial photo (June 2003) from Thurston County GeoData Center (obtained April 2007).

**EVERGREEN FOREST ELEMENTARY**

Ecology's Soil Safety Program
Thurston County, Washington

GeoEngineers

Ecology ID: 34-0003

**EVERGREEN FOREST ELEMENTARY**
**Ecology's Soil Safety Program - Thurston County, WA.**
**Ecology ID: 34-0003**
**X, Y: 1077009, 622524**

| ARSENIC (mg/kg) Sample Location | Play Area 1 5/7/2007 | Play Area 2 5/7/2007 | Play Area 3 5/8/2007 |
|---|---|---|---|
| 1 | 4.9 | 5.4 | 3.4 |
| 2 | 3.7 | 4.2 | 5.9 |
| 3 | 4.8 | 4.4 | 4.5 |
| 4 | 4.2 | 5.7 | 4.7 |
| 5 | 3.4 | 3.5 | 4.6 |
| 6 | 11 | 5.5 | 2.6 |
| 7 | 12 | 4.5 | 3.5 |
| 8 | 4.7 | 5.4 | 3.3 |
| Average | 6.1 | 4.8 | 4.1 |
| Max | 12 | 5.7 | 5.9 |

| LEAD (mg/kg) Sample Location | Play Area 1 5/7/2007 | Play Area 2 5/7/2007 | Play Area 3 5/8/2007 |
|---|---|---|---|
| 1 | 5.4 | 6.9 | 4.2 |
| 2 | 5.9 | 6.9 | 9.3 |
| 3 | 8.6 | 7.0 | 6.0 |
| 4 | 5.2 | 8.5 | 5.3 |
| 5 | 5.4 | 4.6 | 5.5 |
| 6 | 21 | 9.9 | 2.9 |
| 7 | 18 | 7.4 | 3.9 |
| 8 | 7.1 | 8.3 | 3.7 |
| Average | 9.6 | 7.4 | 5.1 |
| Max | 21 | 9.9 | 9.3 |

Notes:
Sample depth interval = 0 to 6 inches below ground surface (bgs).
X, Y coordinates for the facility are provided in NAD 83 Washington State Plane South, feet.

*TAC\0\0504040\00\Database\Soil_Safety_Program.mdb\MAIN REPORT-3*

GeoEngineers

*Friday, June 29, 2007*

*Page 1 of 1*

Displayed data collected (over 1,000 samples) from 44 facilities using MapBook and EQuIS

# Discussion

Thank you, for more information contact Tonya Kauhi 253-383-4940 or tkauhi@geoengineers.com

GeoEngineers