SITE ASSESSMENT REPORT (SAR) TECHNICAL REVIEW

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SITE ASSESSMENT

Technical Report Review

Goals:

- Technical accuracy and completeness of all documents.
- Meet requirements of Chapter 62-780.600(8), F.A.C. and associated guidance documents.
- Adherence to established professional standards.
- Consistency between site managers across the department and local programs.

We set the standard!!

SITE ASSESSMENT

Chapter 62-780.600(8), F.A.C. Site Assessment Report Requirements.

Site assessment report (SAR) contents:

- Complete site history.
- Summary of tasks completed.
- Descriptions of investigative methods.
- Site-specific geology/stratigraphy.
- Site-specific hydrogeology.
- Results of testing and data collection.
- Data analysis and interpretation.
- Summary of findings.
- Recommendations.

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Chapter 62-780.600(8) SAR requirements.

Site history summary:

- Property and facility owners.
- Past and present operations, including tank history.
- Description of known products used, stored or manufactured.
- Summary of environmental permits and enforcement actions.
- Discharge history.
- Prior assessment and remediation history.
- Free product recovery.
- Interim source removals/initial remedial actions.

Photo credit: https://www.floridamemory.com/items/show/1088

SITE ASSESSMENT

Chapter 62-780.600(8) SAR requirements.

Required figures:

- United States Geological Survey (USGS) topographic site location map.
- Site vicinity map including locations of public water supply wells within .5-mile radius and private potable wells within .25-mile radius.
- **Scaled** site plan.
- Scaled site map(s) showing water-level elevations at each monitoring point, estimated groundwater elevation contours, and estimated direction of groundwater flow.
- Use separate maps for different aquifer zones (e.g. shallow, intermediate, deep).

SITE ASSESSMENT

Chapter 62-780.600(8) SAR requirements.

Required figures – continued:

- At least two geologic cross sections (structural or stratigraphic).
- Well construction diagram(s) – typical shallow and deep.
- Scaled site map(s) showing soil sample locations and horizontal **and** vertical extend of vadose soil contamination.
- Scaled site map showing horizontal extent of free product.
- Scaled site map(s) showing groundwater and surface water sampling locations and the extent of contamination.
- Separate maps for each constituent >Groundwater Cleanup Target Levels (GCTLs).
- Use separate maps for different aquifer zones (shallow, intermediate, deep, etc.).

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Chapter 62-780.600(8) SAR requirements.

Required tables:

- Well construction.
- Soil screening summary (Organic Vapor Analyzer [OVA] data).
- Groundwater elevation summary.
- Soil analytical summary:
  - Volatile Organic Aromatics (VOAs), Total Recoverable Petroleum Hydrocarbons (TRPH) and metals.
  - Non-carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs).
  - Carcinogenic PAHs.
  - TRPH fractionation.
- Groundwater analytical summary:
  - Volatile Organic Compounds (VOCs) and metals.
  - PAHs and TRPH.

SITE ASSESSMENT

Technical report review.

Report review process flow:

- Appendices:
  - Field notes, boring logs, sampling logs and lab reports complete.
  - Verify Schedule of Pay Items (SPI) quantities.
- Tables:
  - Match field notes, boring logs, sampling logs and lab reports.
- Figures:
  - Match tables.
  - Technically correct.

SITE ASSESSMENT

Technical report review.

Report review process flow – continued.

- Text:
  - Summarizes work completed.
  - Presents data and analysis.
- Conclusions supported by data in the tables, figures and appendices.
- Recommendations are reasonable and appropriate.

SITE ASSESSMENT

Technical report review – appendices.

What to look for:

- Field notes.
  - Personnel, vehicle(s)/equipment and start/stop times.
  - Important for evaluating requests for per diem fees.
  - Static depth to water.
  - Top-of-casing survey.
- Groundwater sampling logs.
  - Proper purge method – partially or fully submerged well screen.
  - Purge rate.
  - Purge volume.
  - Drawdown.
  - Stabilization parameters.

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Technical report review – appendices.

What to look for – continued:

- Equipment calibration records.
  - Calibration type (Initial Calibration (IC), Initial Calibration Verification (ICV), Continuing Calibration Verification (CCV)).
  - Lot numbers/expiration dates for standards.
  - Results, including standard deviation where required.
- Lab reports:
  - Sample temperature and hold times.
  - Quality Assurance (QA) issues – refer to case narrative.
- Boring logs:
  - Header info.
  - Field screening data.
  - Unified Soil Classification System (USCS) codes (SC does not equal sandy clay).

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Technical report review – appendices.

What to look for – continued:

- Well construction and development logs:
  - Well construction info complete and tables match.
  - Well development times.
- Photo-documentation:
  - Drum fill photos.

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Technical report review – figures and tables.

Why so important?

- Tables summarize all data in chronological order.
- Critical for evaluating temporal trends.
- Figures provide a visual presentation of the data.
- Vital to understanding the spatial distribution of contaminants.
- Evaluate the movement of groundwater and contaminants in the environment.
- Critical for good decision making.

Accurate figures and tables are essential for SRCO!!

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Technical report review – tables.

Tables – general:

- Use most current formats from department.
- Must be cumulative – include **all** historical data.
- Confirm transcription of data against field notes, boring logs and lab reports.

SITE ASSESSMENT

Technical report review – tables.

Groundwater elevation tables:

- Confirm groundwater elevation calculations.
- If free product is present, groundwater elevations must be corrected for the thickness and density of free product.

$$CGWE = (TOC-DTW) + [(DTW-DTP) * \rho_{(LNAPL)}]$$

Where: GGWE = Corrected Groundwater Elevation
TOC = Top of Casing Elevation
DTW = Depth to Water Below TOC
DTP = Depth to Product Below TOC
$\rho_{(LNAPL)}$ = Density of Product (0.79 g/ml)

$\rho_{(Gasoline)}$ = 0.755 avg

$\rho_{(Diesel)}$ = 0.85 avg

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Technical report review – tables.

Analytical data tables:

- Identify units of measure.
- Show cleanup target levels.
- Include lab qualifiers:
  - Include description in the table notes/footnotes section.
- Confirm unit conversions (µg to mg).
- Significant figures, especially trailing zero's.
- Soil analytical data tables should not be used to report field OVA data.

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Technical report review – tables.

Analytical data tables – cautions:

- Pre-1996, common practice was to sum the concentrations of naphthalene, 1-methylnaphthalene (MNAPH), and 2-methylnaphthalene and report as Total Naphthalenes.
  - 1-MNAPH and 2-MNAPH reported as “NA” or left blank in historic data tables.
  - Individual concentrations are shown in lab reports.
  - Agency Term Contrator (ATCs) should update historical tables to show these data.

More info on analytical data rounding for site closure is available here:
https://floridadep.gov/waste/petroleum-restoration/documents/rounding-analytical-data-site-rehabilitation-completion

SITE ASSESSMENT

Technical report review – tables.

Analytical data tables – cautions:

- Watch for unnecessary rounding of data.
  - May be used for determining Cleanup Target Level (CTL) exceedances and evaluating closure eligibility.
  - Should not be applied to data tables.
- Watch for unit conversions – most often seen with TRPH data.

More info on analytical data rounding for site closure is available here:
https://floridadep.gov/waste/petroleum-restoration/documents/rounding-analytical-data-site-rehabilitation-completion

SITE ASSESSMENT

Technical report review – figures.

Site plans:

- Drawn to scale.
- Detailed – should include site boundaries, current and historical tank, piping, and dispenser locations, buildings and structures, driveways, utilities, paved and unpaved areas, large trees including canopy drip edge, objects that have the potential to restrict or obstruct access, etc.
- Site plan using only an aerial photo is **not** acceptable.

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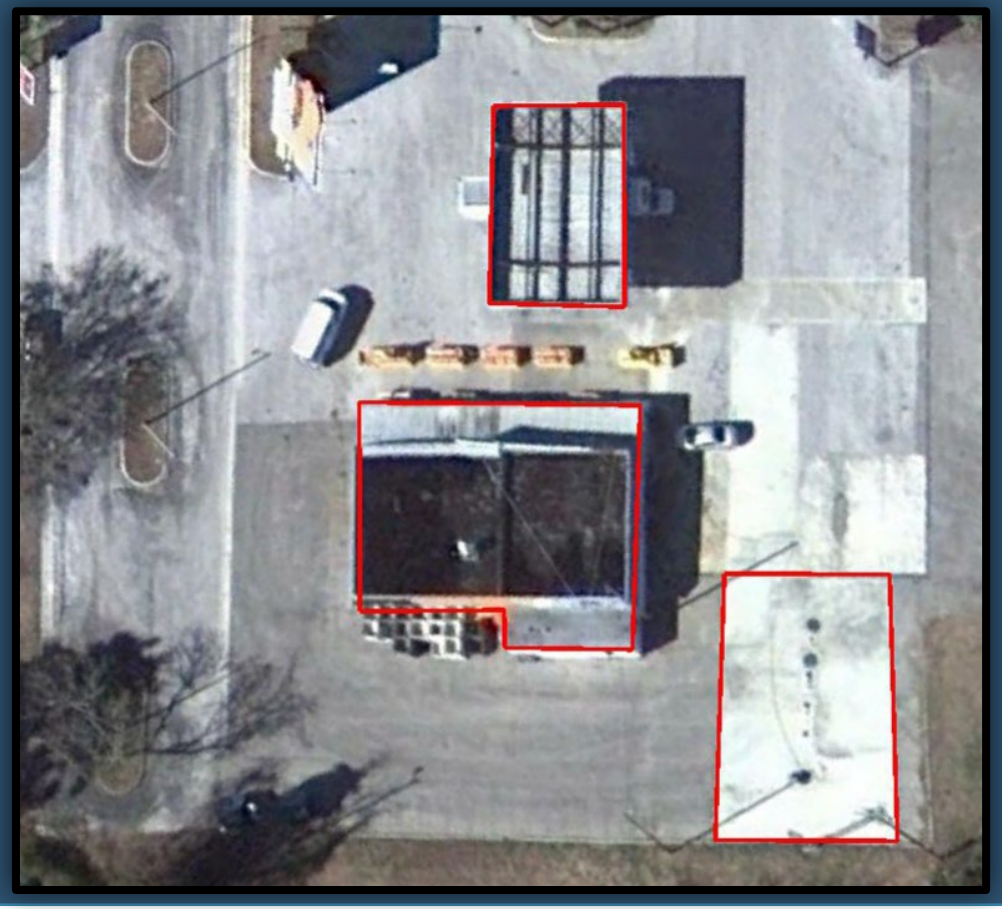
Technical report review – figures.

Why no aerials?



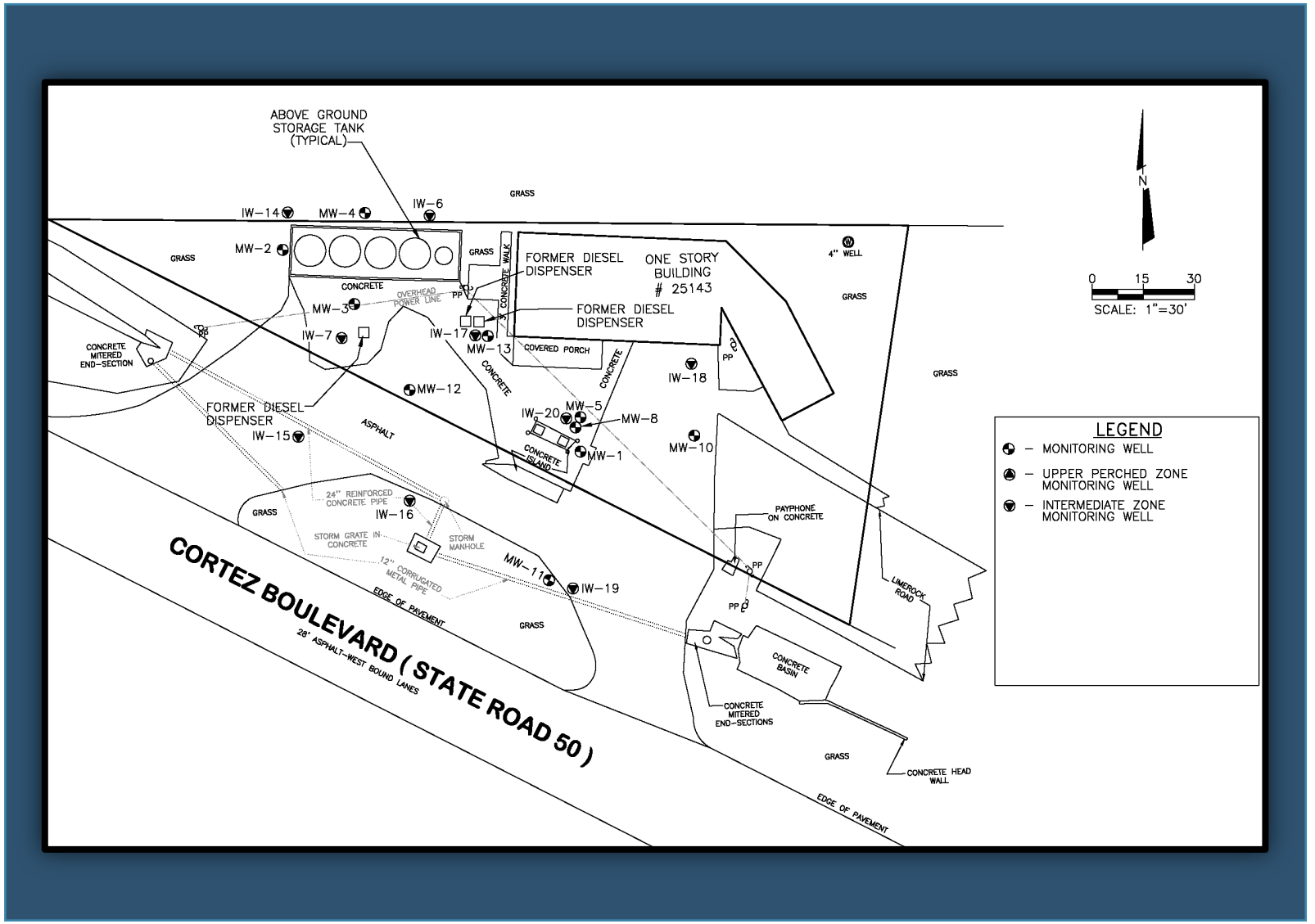
2011.

2018.

SITE ASSESSMENT

Good site plan:

- Site boundary.
- Properly scaled.
- Good details.
- Structures.
- Monitoring wells.
- Utilities.



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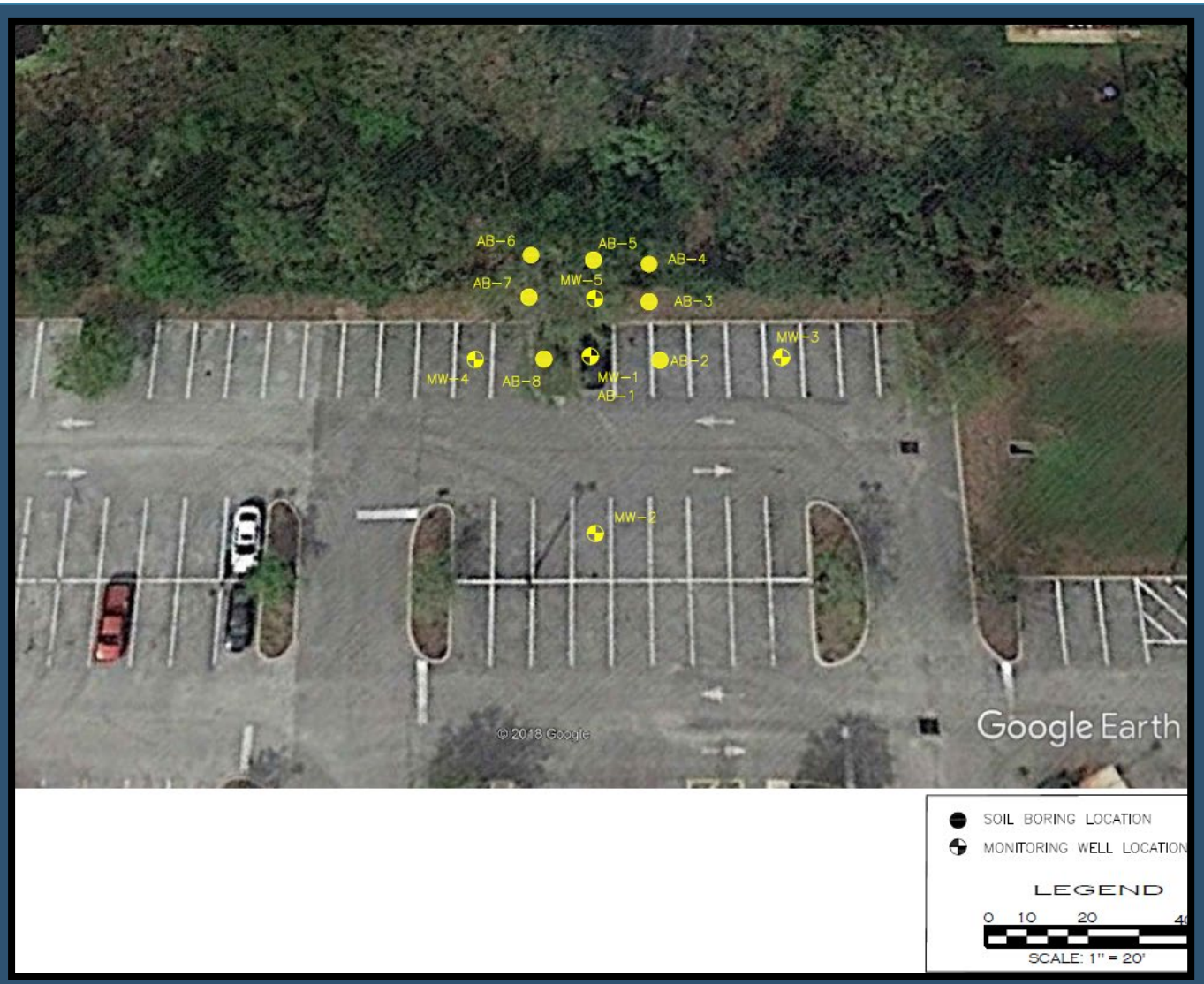
Poor site plan:

- Site boundary.
- Uses an aerial photo for the base map.
- No site details.

SITE ASSESSMENT

Poor site plan:

- Uses an oblique aerial photo.
- No site boundary.
- No site details.
- Cannot be properly scaled.



SITE ASSESSMENT

Technical report review – figures.

Geologic cross sections:

- Soil/rock types.
- Contaminant concentrations (soil OVA, soil analytical and groundwater analytical, including isocontours where possible).
- Depict soil borings and monitoring wells (including screened intervals).
- Water table.

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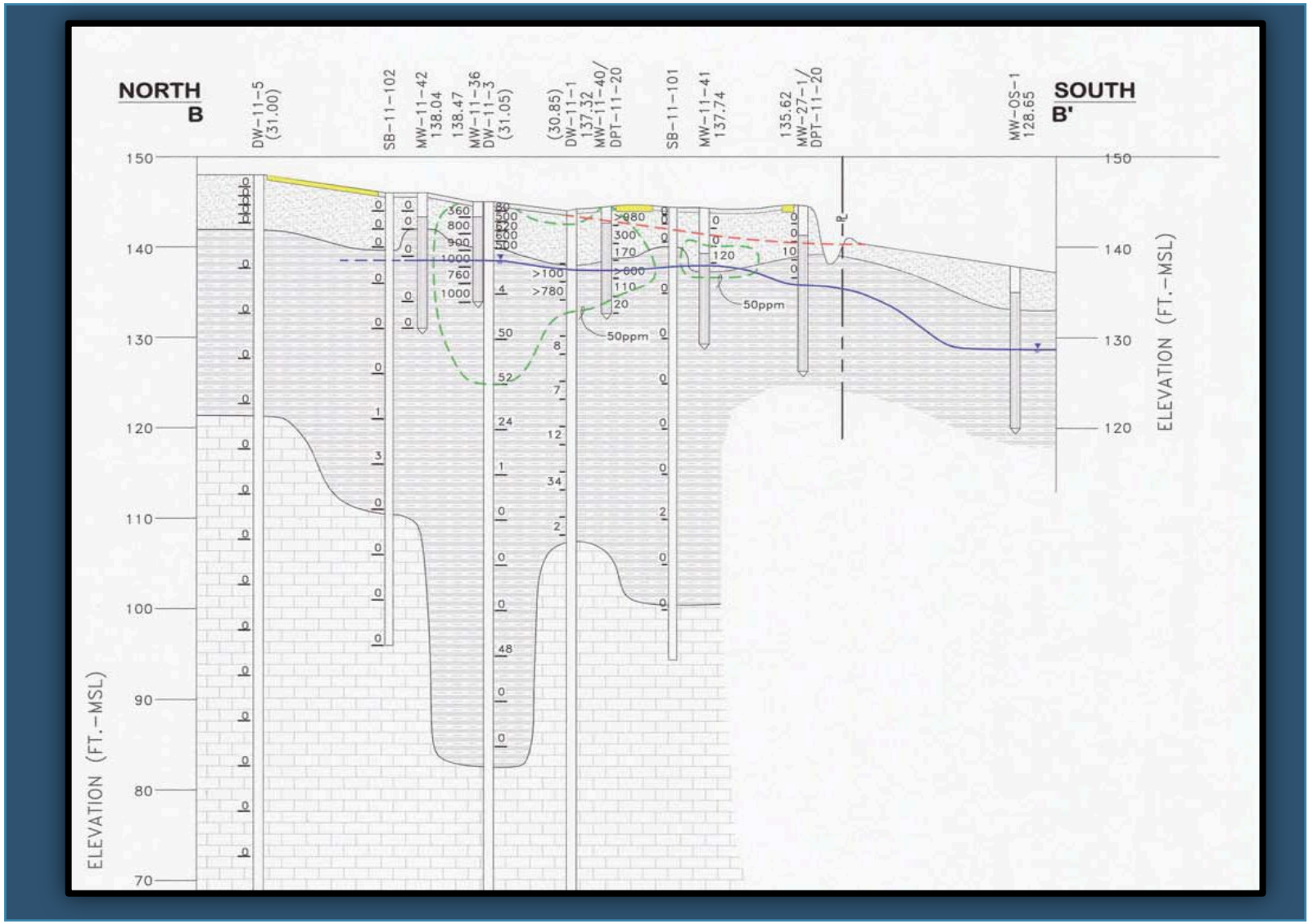
Geologic cross section:

- Ground surface elevation.
- Soil/rock types.
- Monitoring wells with screened intervals.
- Soil borings.
- OVA data and contours.
- Water table.



SITE ASSESSMENT

Technical report review – figures.

Groundwater (GW) elevation maps.

- Minimum of three data points.
- Data points spread out – i.e. **not** in a straight line.
- Data collected on same date.
- Data all from same aquifer zone – don't mix shallow and deep.
- Follow contouring rules.
- Contour lines extending outside of the data envelope are inferred and should be dashed.

SITE ASSESSMENT

Basic geometry of contouring:

- Two points in space define a line.
- Cannot contour.
- Three points in space define a plane.
- Contours should be straight and evenly-spaced.
- >Three points needed to define a complex surface.

Remember: Two points define a line; three points define a plane.

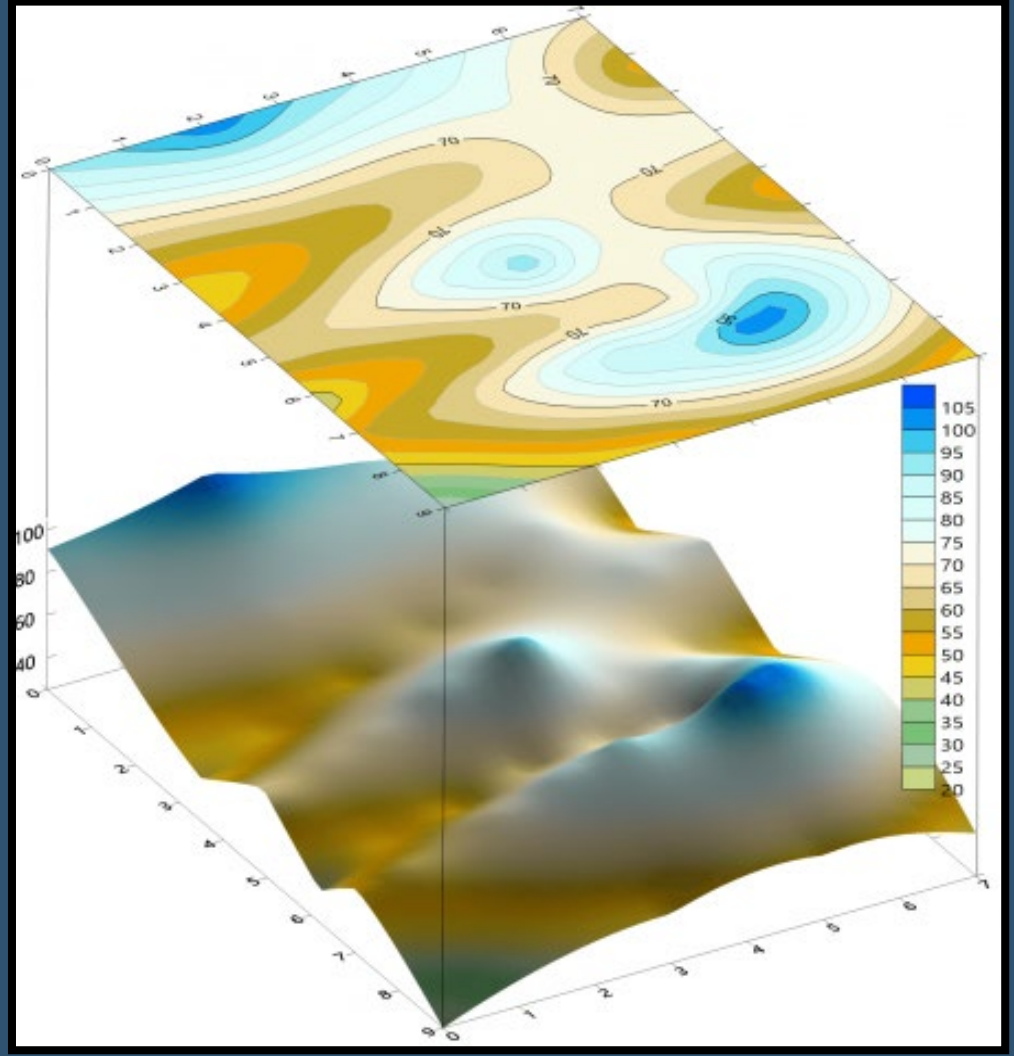
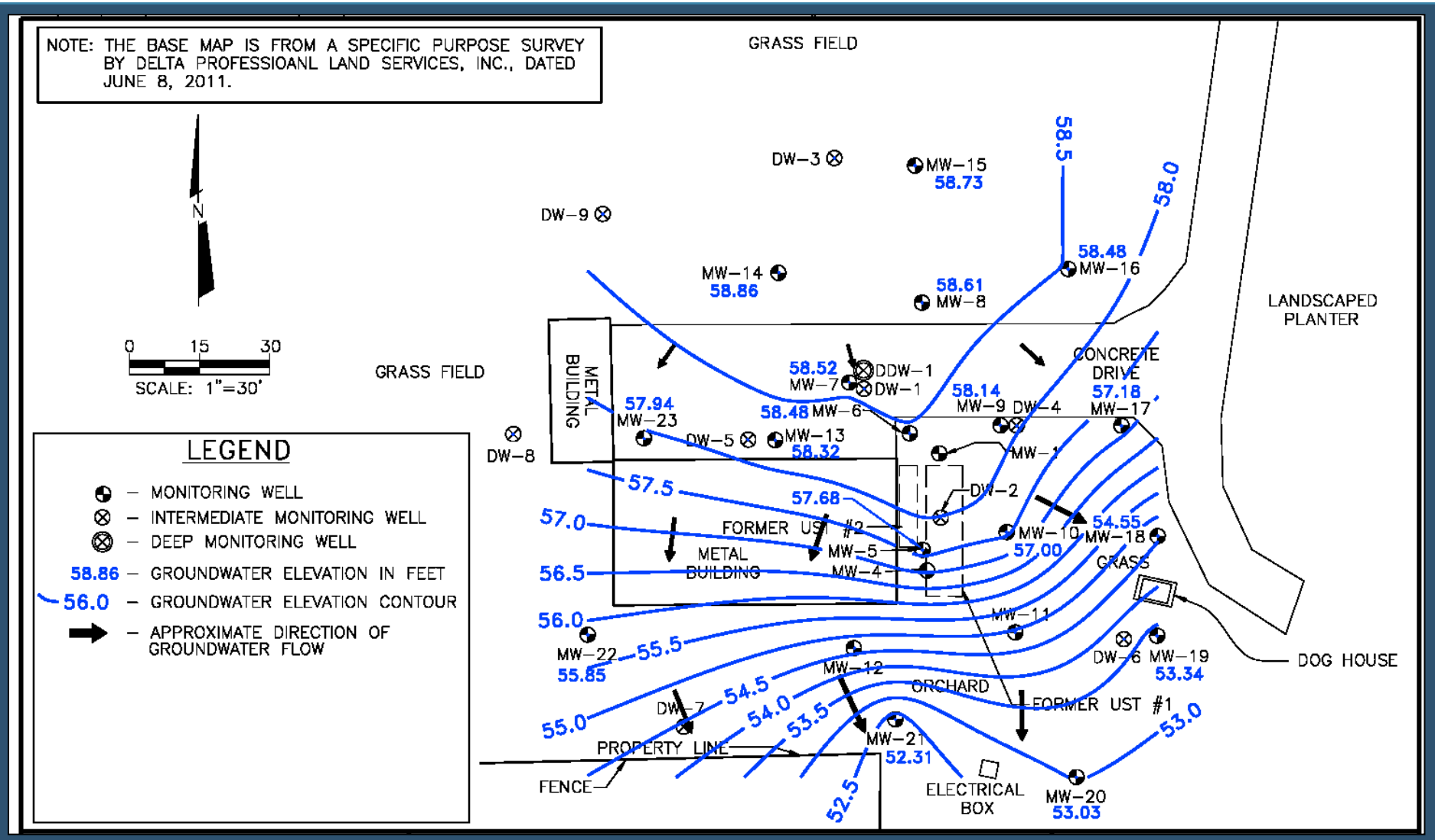


Image credit: https://www.goldensoftware.com

SITE ASSESSMENT

Good GW elevation map:

- Good base map.
- Constructed with ≥ three well-spaced data points.
- Follows contouring rules.
- Arrows showing groundwater flow.
- Contours within data envelope.

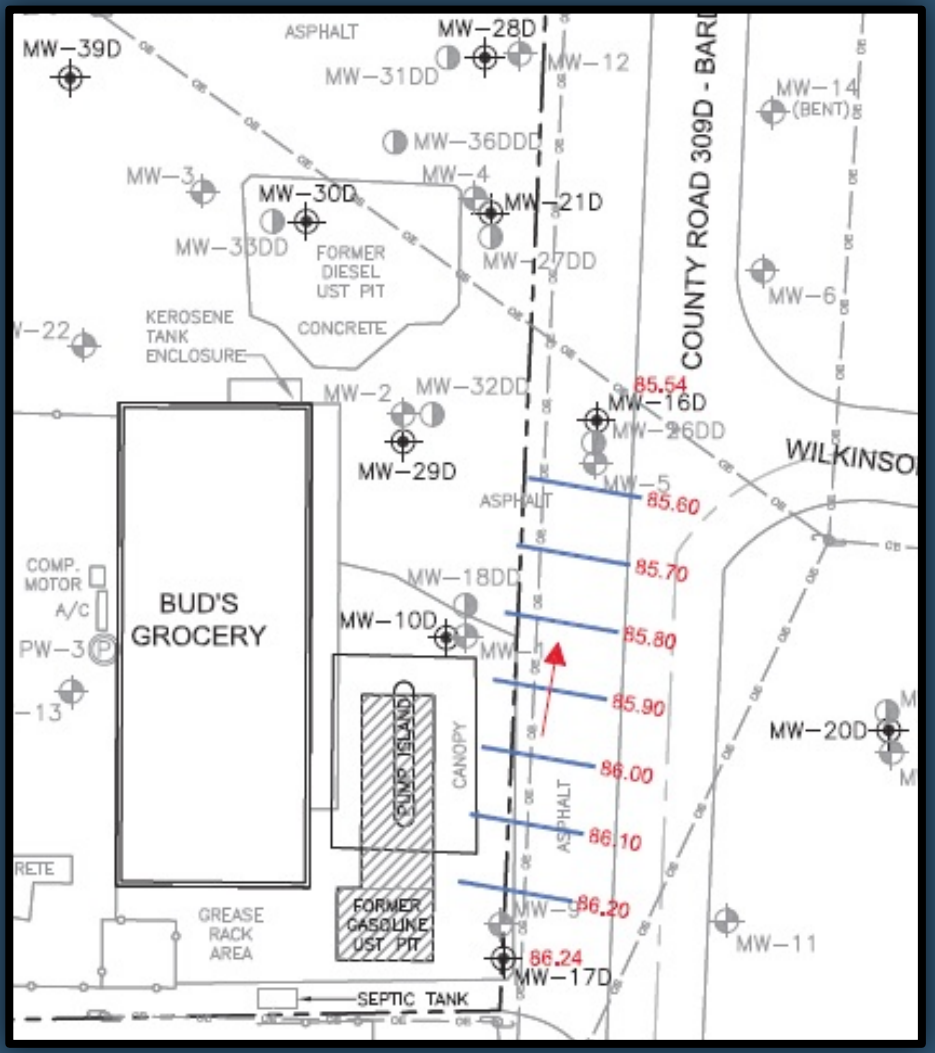


SITE ASSESSMENT

Poor GW elevation map:

- Good base map.
- Constructed with only two data points.
- **Not a valid map.**

Two points define a line!!



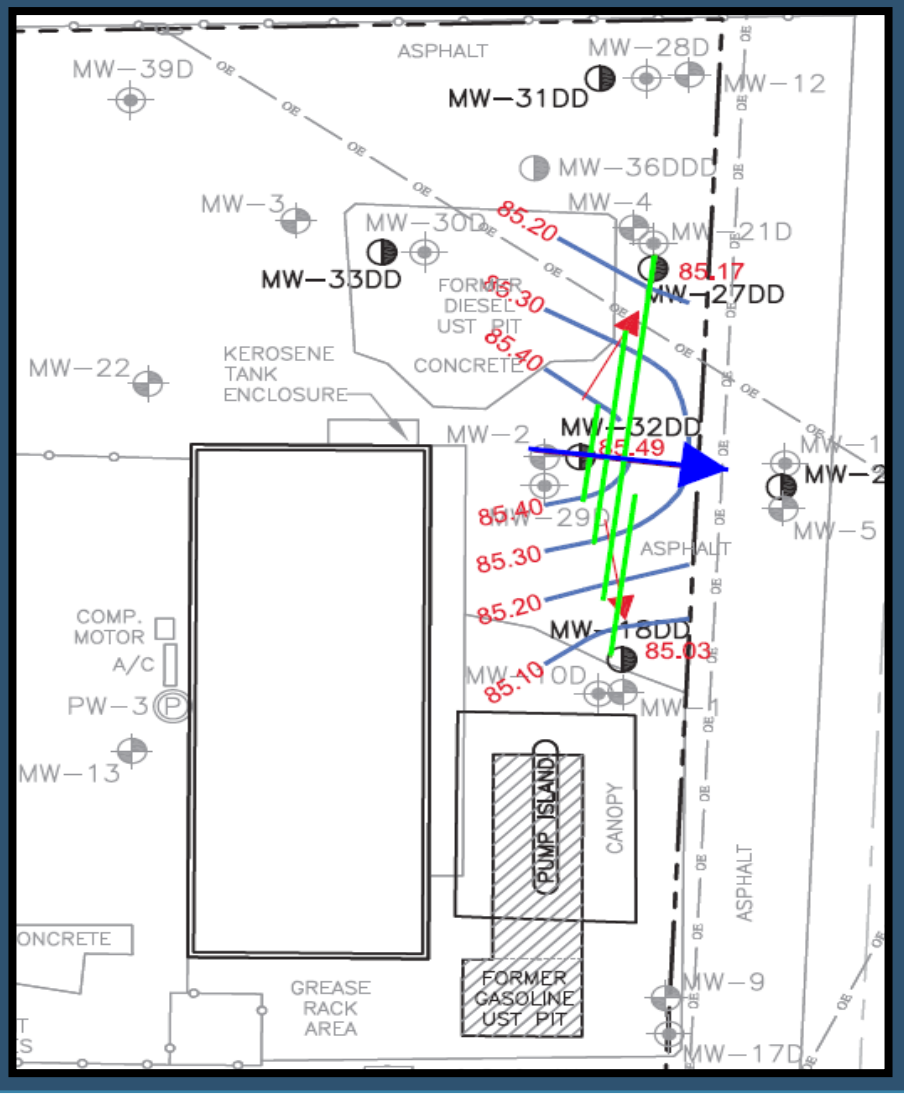
SITE ASSESSMENT

Poor GW Elevation map:

- Good base map.
- Constructed with ≥ three data points.

-- However --

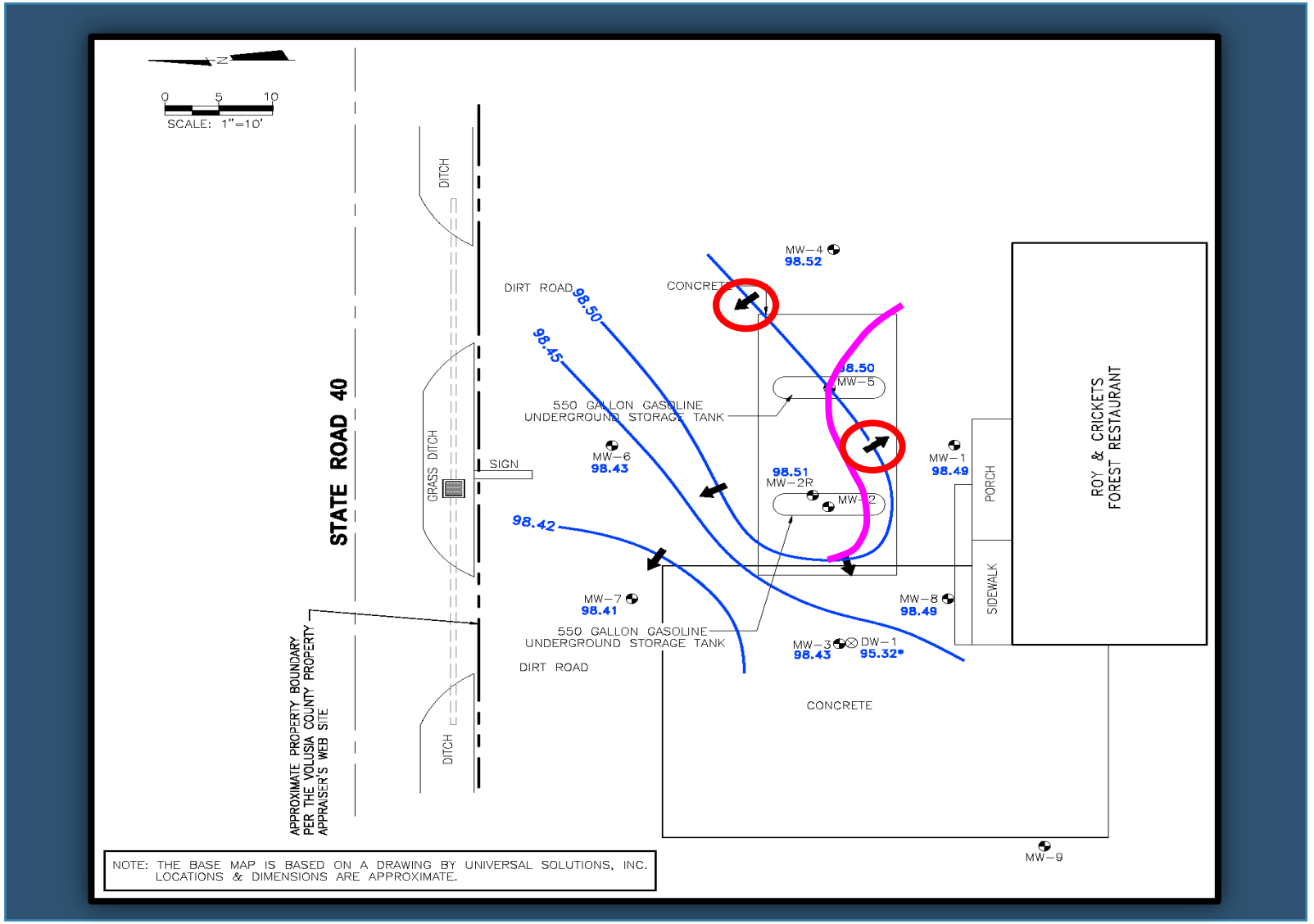
- Data points are nearly in a straight line.
- Three points define a plane, so contours may only be straight, equally spaced lines.



SITE ASSESSMENT

Poor GW elevation map:

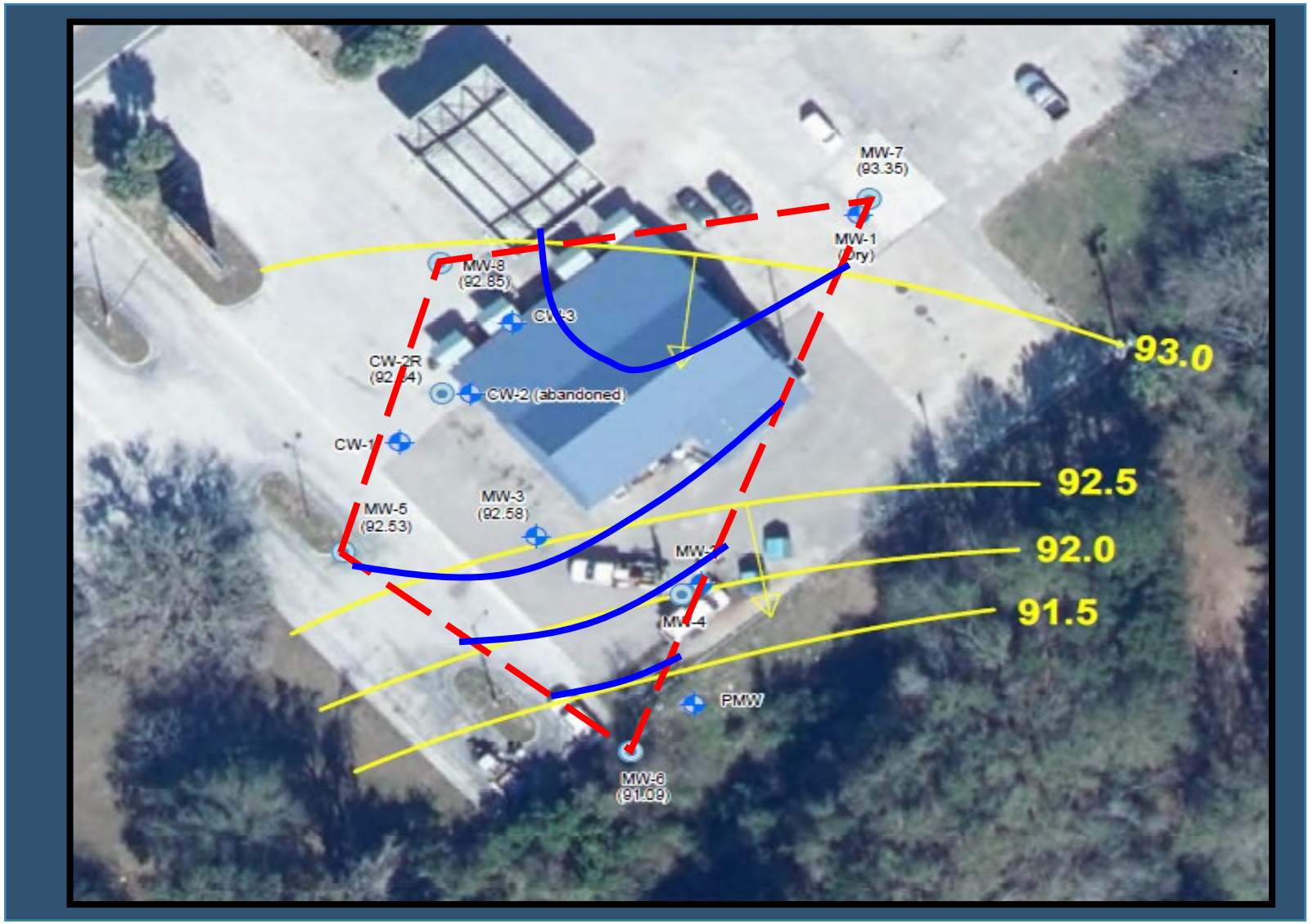
- Good base map.
- Constructed with ≥ three well-spaced data points.
- Arrows showing groundwater flow.
- Followed contouring rules…mostly!



SITE ASSESSMENT

Poor GW elevation map:

- Improper base map.
- Does not follow contouring rules.
- Contours extend well beyond the data envelope.



SITE ASSESSMENT

Technical report review – figures.

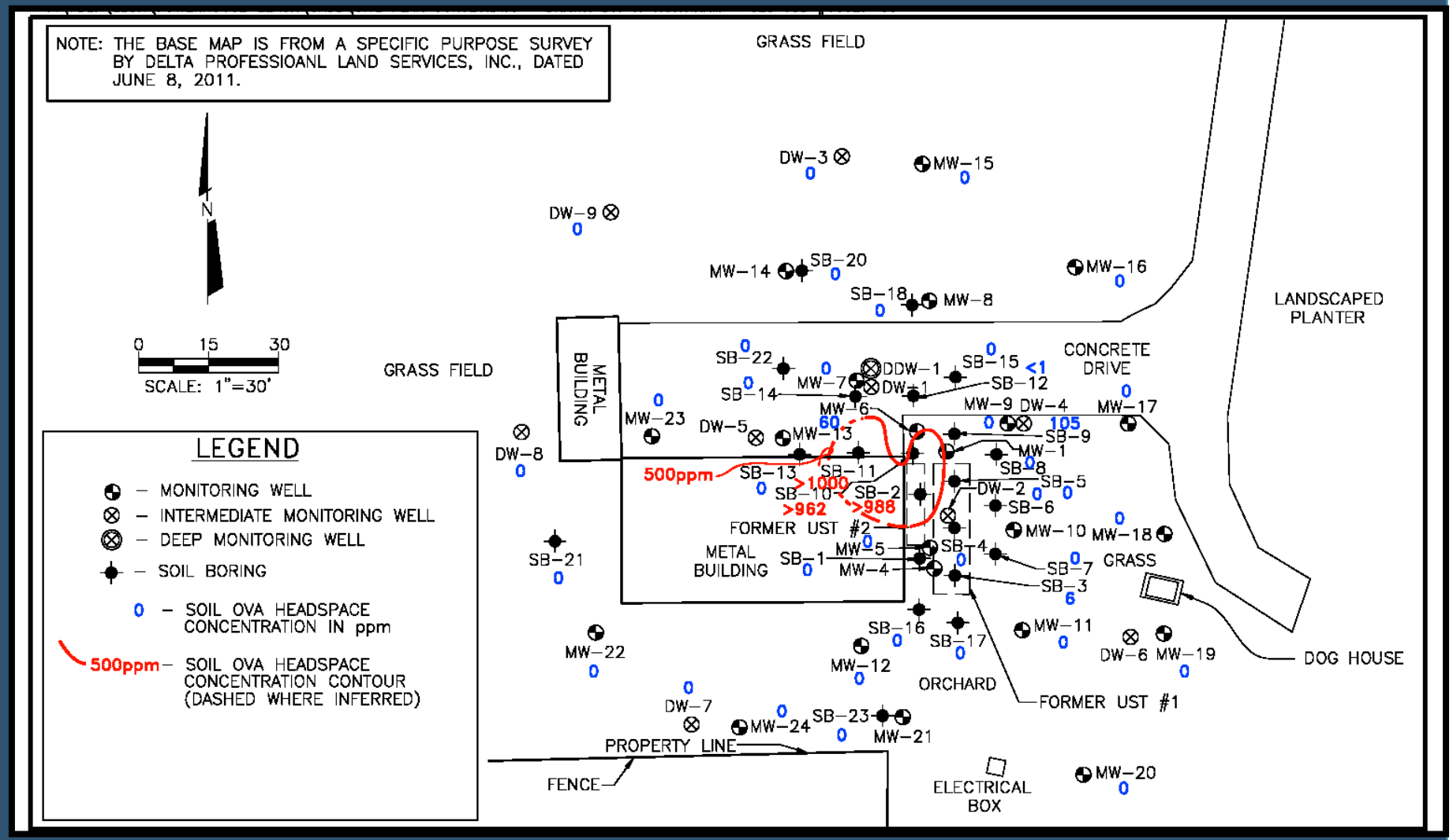
Soil OVA maps:

- When possible, should be constructed for discrete depth intervals, e.g. 0-5 ft., 5-10 ft., etc.
- Only use vadose zone samples for SAR.
- Contour lines dashed where inferred.

SITE ASSESSMENT

Soil OVA Map:

- Single depth interval.
- Only data for that interval posted.



SITE ASSESSMENT

Technical report review – figures.

Soil isoconcentration contour maps:

- Where possible, individual maps for each constituent that exceeds Soil Cleanup Target Levels (SCTLs) should be prepared.
- Constructed for discrete depth intervals, e.g. 0-5 ft., 5-10ft., etc.
- Contours for Groundwater Leachability (GWL), Residential Direct Exposure (RDE), and Commercial/Industrial Direct Exposure (CIDE) Soil Cleanup Target Level (SCTLs), as applicable.
- In most cases, only use vadose zone samples.
- Contour lines dashed where inferred.
- A data post map is acceptable when limited data is available.

SITE ASSESSMENT

Technical report review – figures.

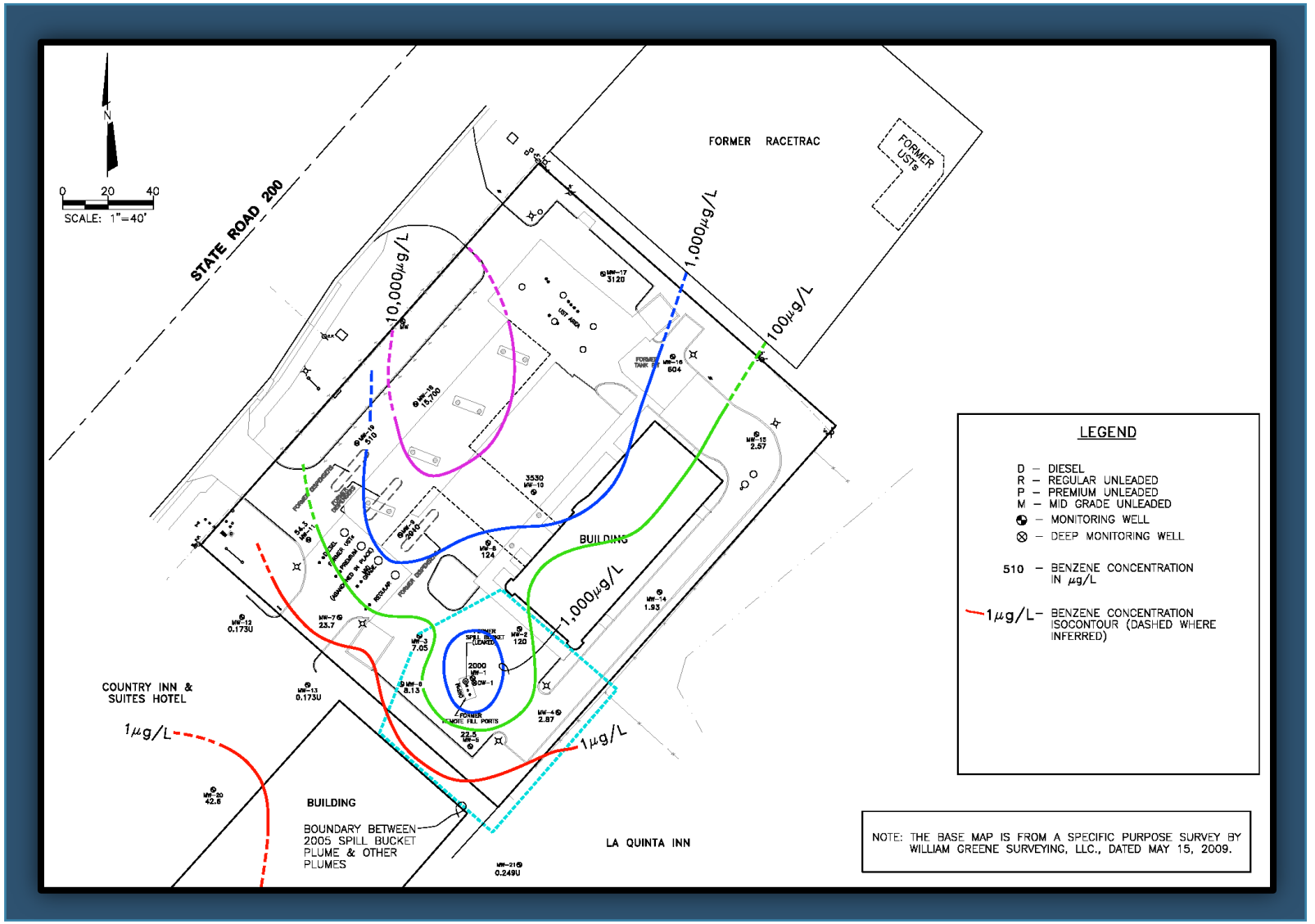
Groundwater isoconcentration contour maps:

- Individual maps for each constituent that exceeds Groundwater Cleanup Target Level (GCTLs).
- Contours for GCTL and Natural Attenuation Default Concentration (NADC), others as needed.
- Contour lines dashed where inferred.
- Should not include data from different aquifer zones, i.e. use separate maps for shallow, intermediate and deep aquifer zones, as needed.

SITE ASSESSMENT

Best map:

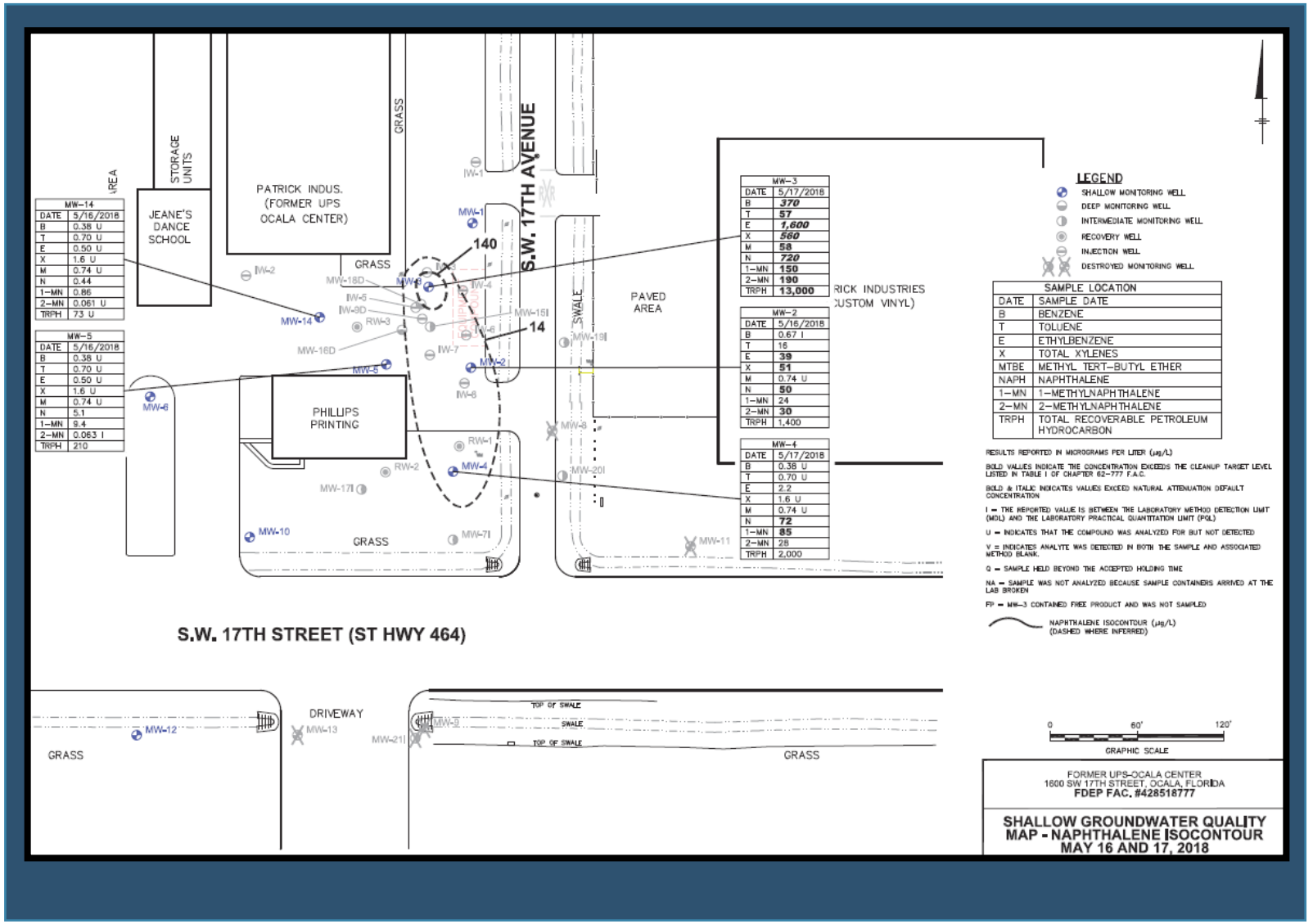
- Un-cluttered and easy to read.
- Wells easy to identify.
- Map is for a single analyte.
- Contours for GCTL and NADC.
- Displays only data specific to this analyte.



SITE ASSESSMENT

Good map:

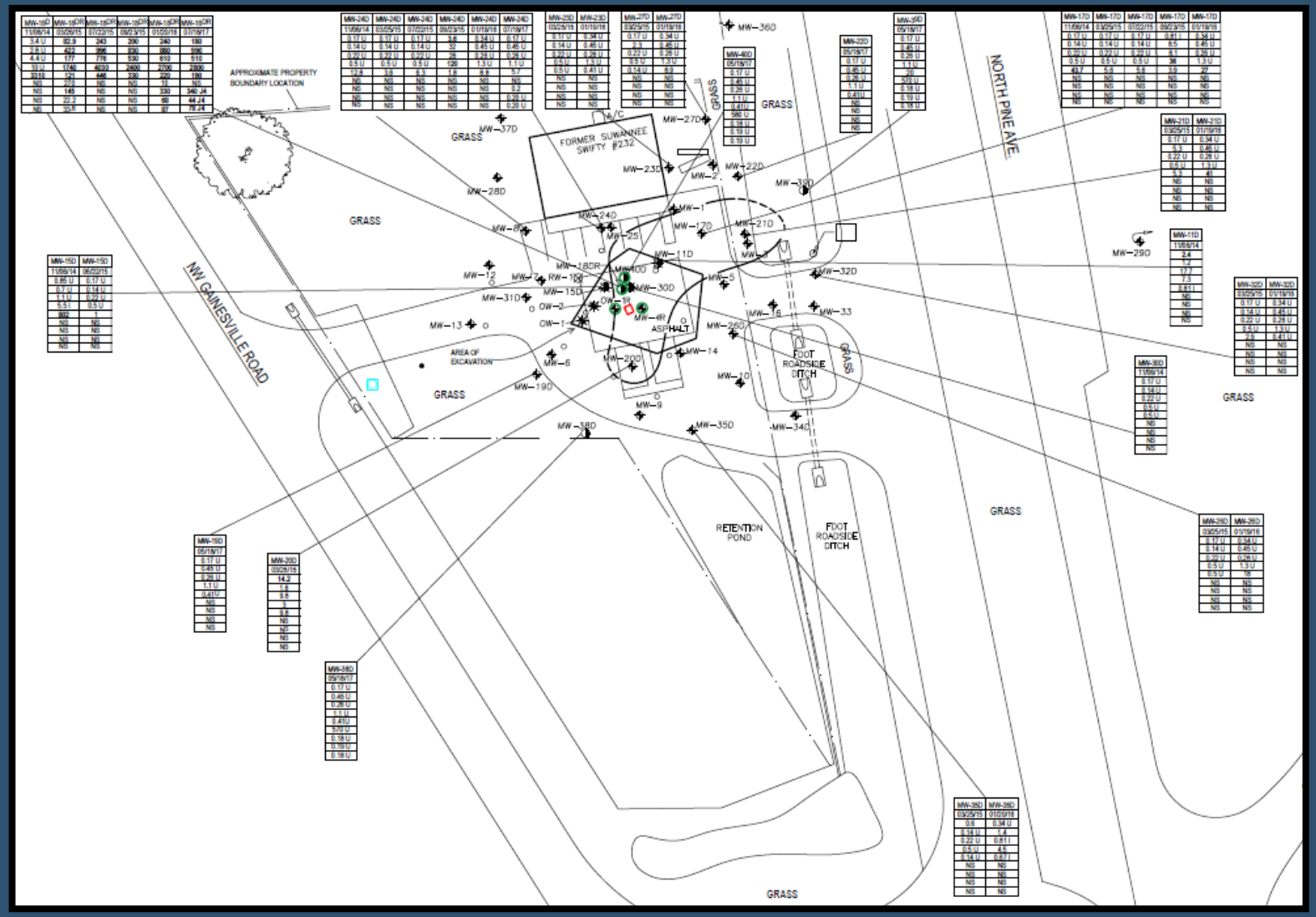
- Un-cluttered and easy to read.
- Wells easy to identify.
- Map is for a single analyte.
- Contours for GCTL and NADC.
- Uses data blocks.



SITE ASSESSMENT

Poor map:

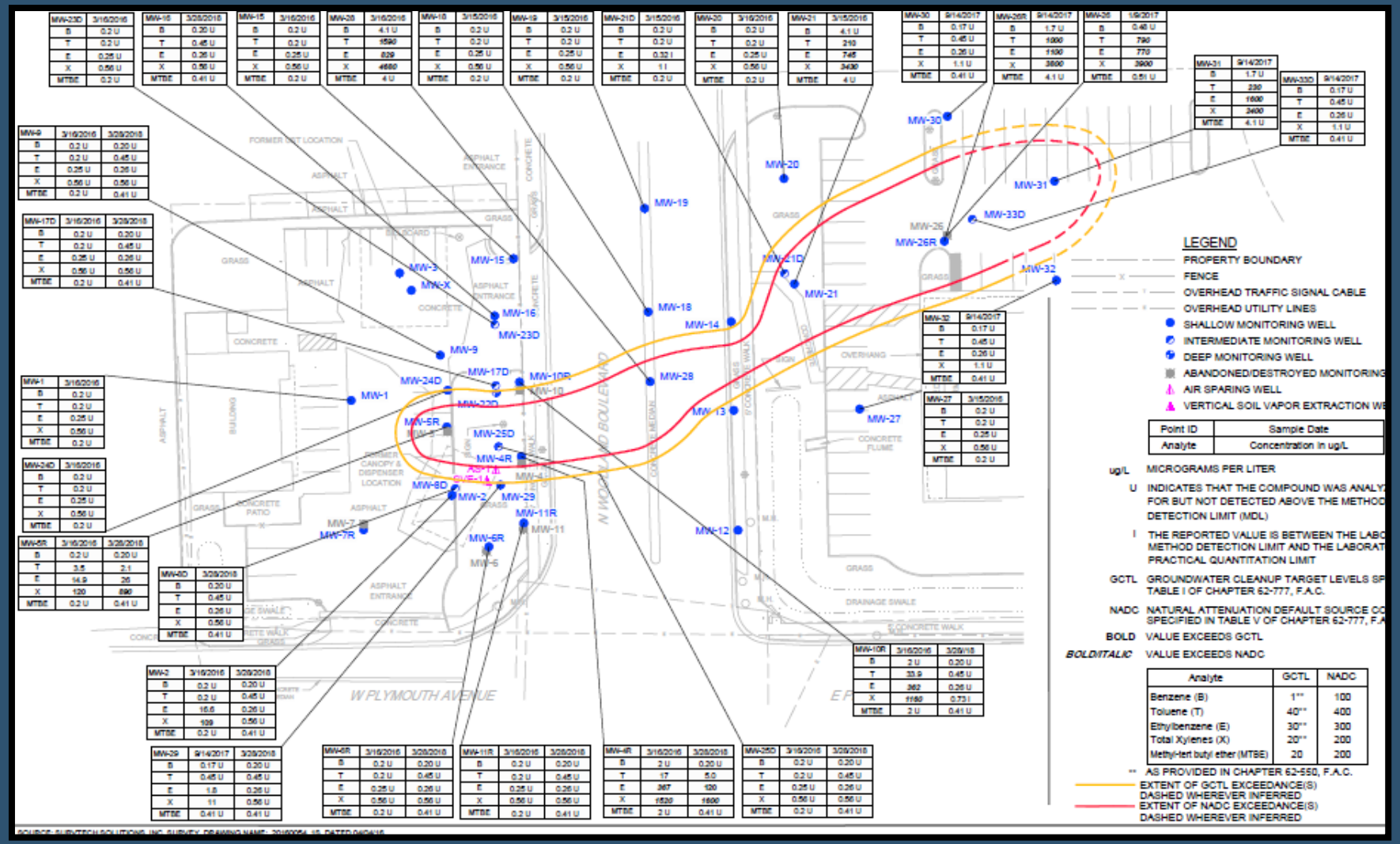
- Data from multiple depth intervals.
- Contours based on mixture of current and old data.
- Small font - **very** difficult to read.
- Too much wasted space.



SITE ASSESSMENT

Poor map:

- Most site features identifiable.
- Wells easy to identify.
- Individual contaminants not contoured.



SITE ASSESSMENT

Technical report review.

Summary:

- Complete, accurate reports.
- Meet requirements of Chapter 62-780.600(8) and associated guidance documents.
- Adherence to established professional standards.
- Consistency across the Petroleum Restoration Program (PRP).
- Chronological presentation of data in tables allows quick analysis of concentration trends over time.
- Accurate site plans and concentration maps are critical for good assessment and remediation decisions.

Remember: We set the standard!!

THANK YOU

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