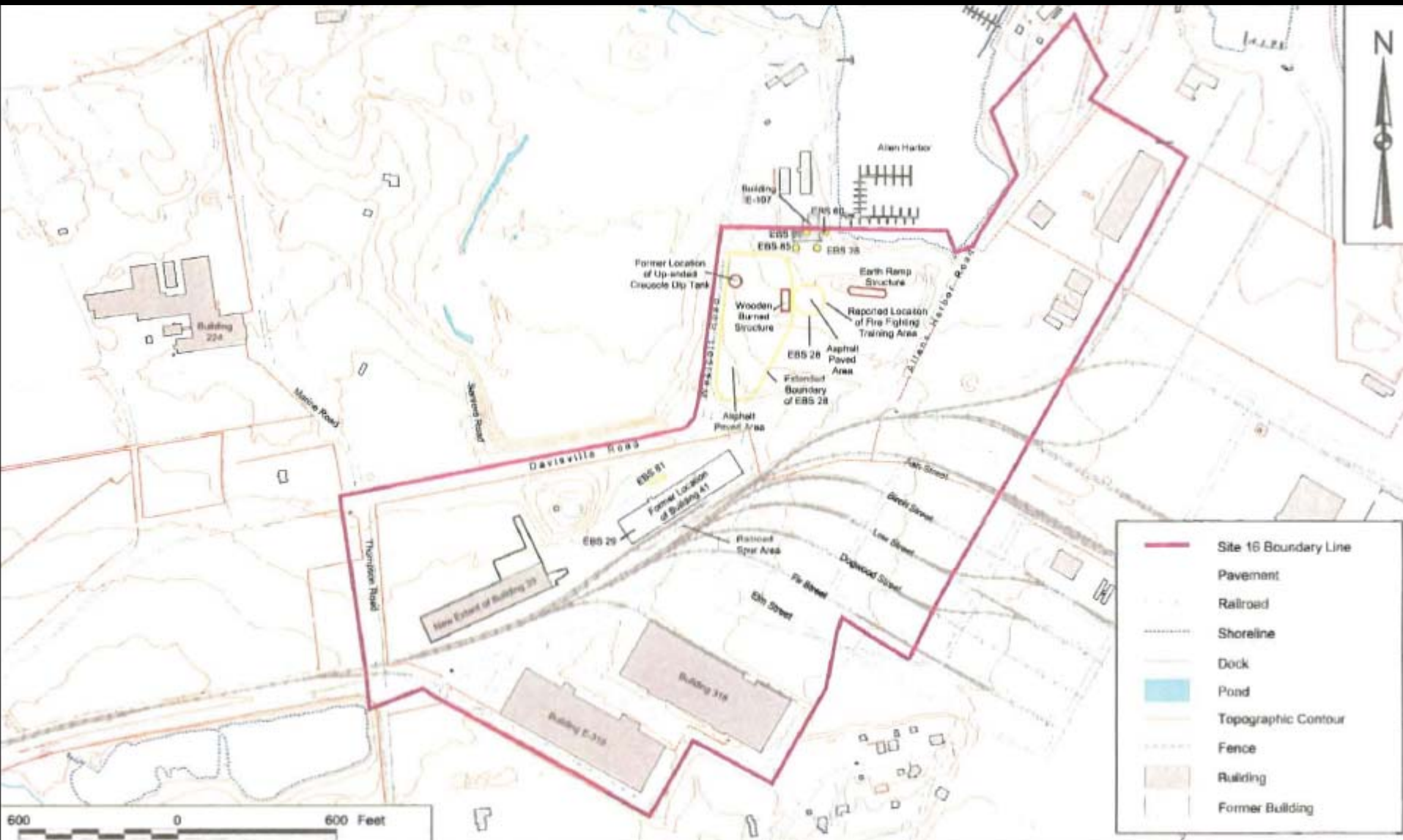
Former NCBC Davisville Site 16 – Former Creosote Dip Tank and Fire Training Area

- Review of Site 16 Information
- Phase III Quality Assurance Project Plan
  - Scope of Work
  - Implementation and Schedule

Site 16 Map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Allen Harbor
Building E-107
EBS 85
EBS 38
Former Location of Up-ended Creosote Dip Tank
Earth Ramp Structure
Wooden Burned Structure
Reported Location of Fire Fighting Training Area
EBS 28
Asphalt Paved Area
Extended Boundary of EBS 28
Asphalt Paved Area
Allen Harbor Road
Building 224
Marine Road
Sanford Road
Davisville Road
EBS 81
Former Location of Building 41
EBS 29
Railroad Spur Area
Thompson Road
New Extent of Building 39
Fox Street
Bevin Street
Low Street
Dogwood Street
Fir Street
Elm Street
Building 316
Building E-319
600 0 600 Feet
Site 16 Boundary Line
Pavement
Railroad
Shoreline
Dock
Pond
Topographic Contour
Fence
Building
Former Building

Environmental Investigations Conducted at Site 16

- Environmental Baseline Survey (EBS) Investigations (1996 – 1998)
- Phase I Remedial Investigation (RI) (1999 - 2001)
- Phase II RI (2002 – 2003)
- Phase II Screening Level Ecological Risk Assessment (SLERA) (2004)
- Supplemental Phase II Study and HRC Pilot Study (2004)
- Note...Approximately 200 monitoring wells have been installed to date.

Observations Regarding Surface/Subsurface Soils

- Most sampling conducted to date has been biased toward known/suspected source areas. Surface soils (0 to 2 feet bgs) collected in north-central (EBS 28 area) only.
- Polycyclic aromatic hydrocarbons (PAHs) and volatile organics (e.g., trichloroethene [TCE]) are the primary chemicals detected in surface and subsurface soils, respectively.
- Limited evidence of metals contamination.

Observations Regarding Surface/Subsurface Soils (Con't.)

- PAH concentrations are highest at the former location of the up-ended creosote dip tank. Relatively low concentrations at former fire training area. Some detected concentrations exceed EPA/State of Rhode Island benchmarks.
- TCE concentrations are highest (greater than 1000 part per billion [ppb]) in the deeper soils south of Davisville Road.
- Dioxin/furan concentrations in surface soil do not exceed EPA Action level (1 ppb).

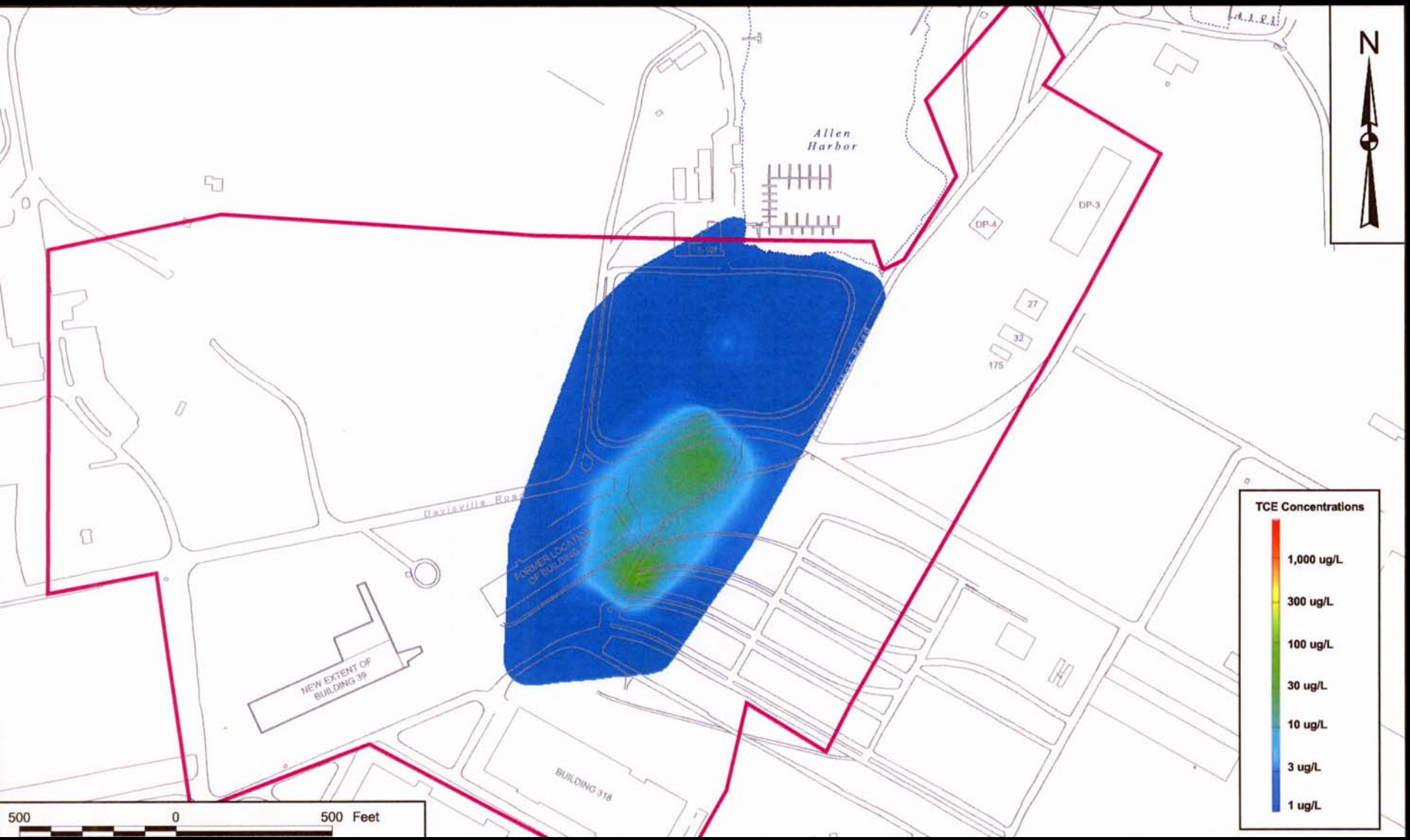
Observations Regarding Groundwater

- Generally, the groundwater is flowing to the northeast. However, deep groundwater below Davisville Road flows to the east. Groundwater flow in the southeastern part of the Site 16 is not completely defined.
- TCE (maximum concentration greater than 1,000 ppb) is major VOC detected in GW .... comprised greater than 95 % of the total chlorinated solvents detected. However, several degradation by-products have also been detected (e.g., vinyl chloride [VC], cis-1,2-dichloroethene [cis-1,2-DCE]).
- Multiple sources may be contributing to the plume(s) that extend from the former Building 41 area to well MW16-05 in the vicinity of Allen Harbor.

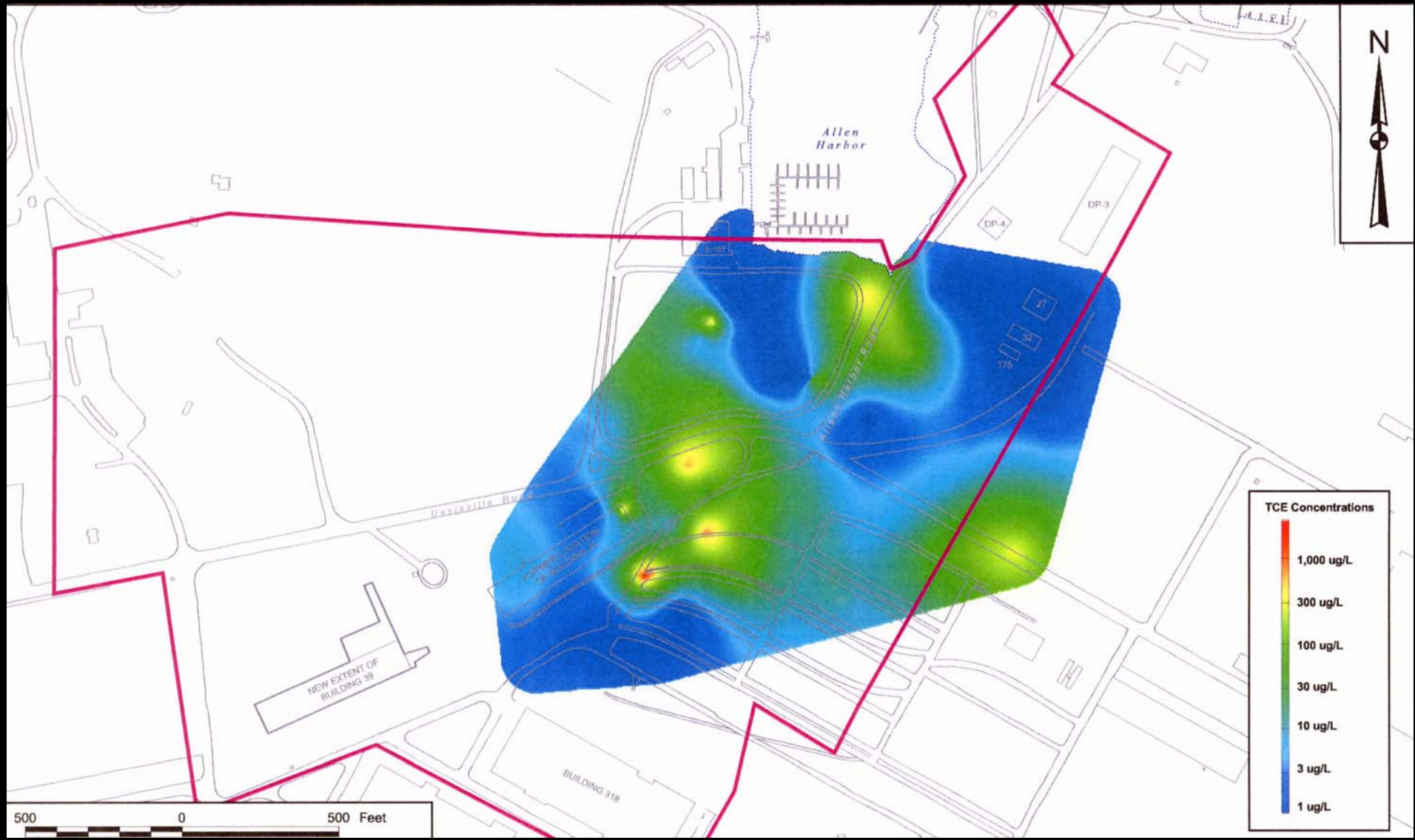
Observations Regarding Groundwater (Con't.)

- Other parameters (e.g., semi-volatile organics (SVOCs), pesticides, and metals) detected infrequently or at concentrations that may represent background.
- No evidence of non-aqueous phase liquid (NAPL) detected to date.
- TCE plume(s) not completely delineated with reference to Safe Drinking Water Act maximum contaminant level (MCL) of 5 ppb ... e.g., in the area to the east of the former Building 41.
- Additional upgradient well(s) are necessary to define upgradient conditions.

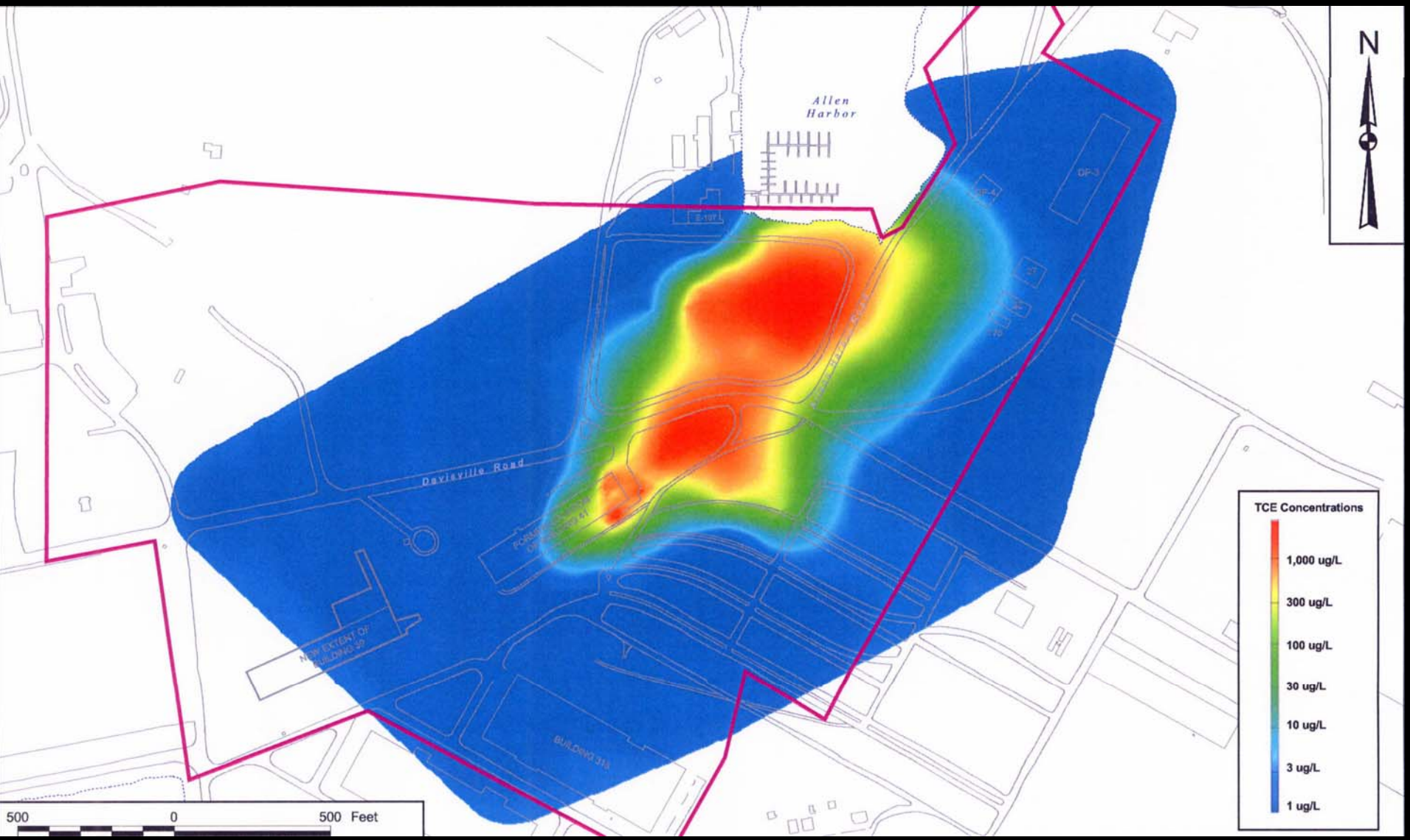
Shallow Overburden GW at Site 16



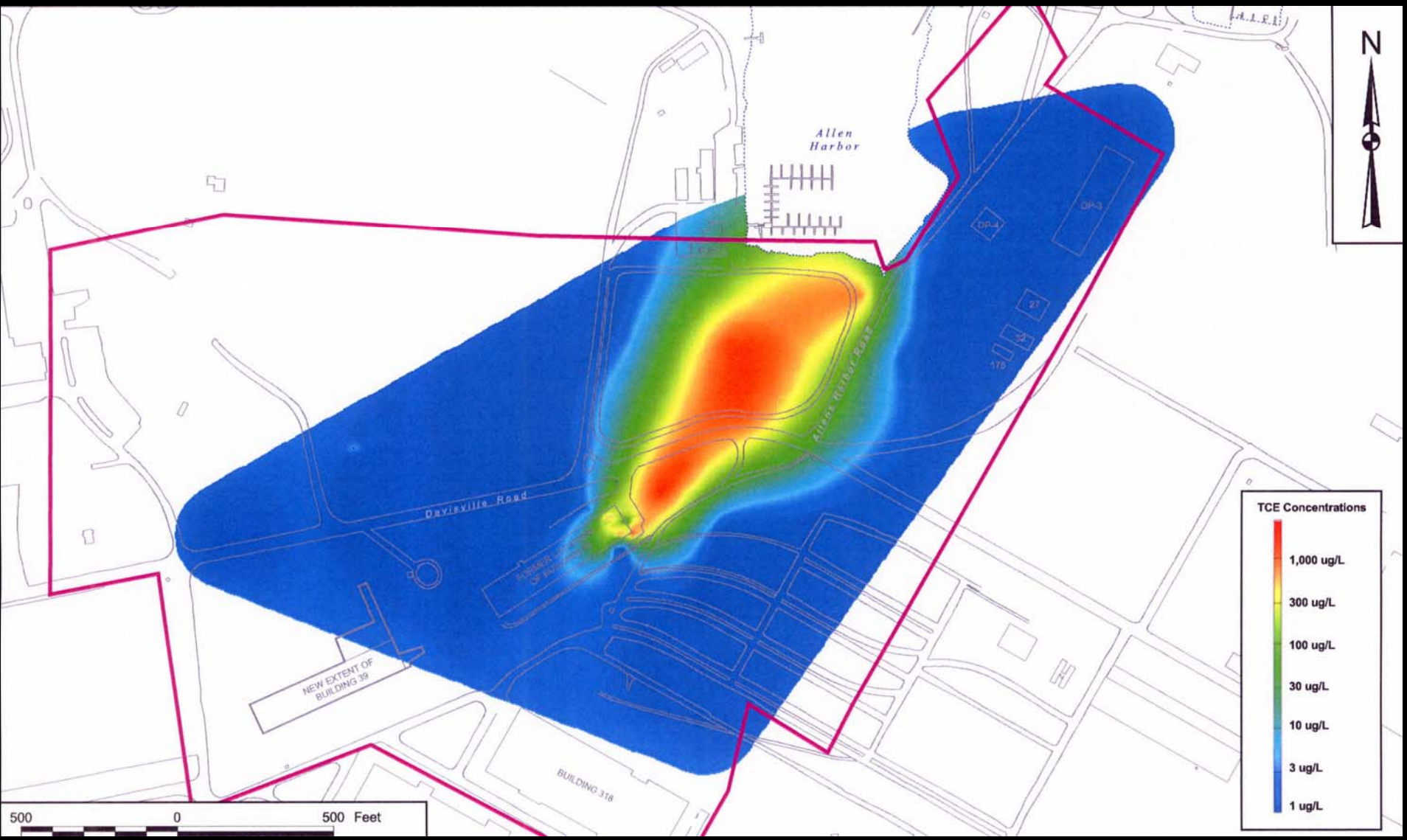
Intermediate Overburden GW at Site 16



Deep Overburden GW at Site 16



Bedrock GW at Site 16



Observations Regarding Surface Water/Sediments

- Extensive sediment sampling conducted during Phase II SLERA.
- Chlorinated VOCs (CVOCs) detected infrequently in sediments from Allen Harbor. The maximum detected TCE sediment concentration was 2 ppb.
- Cis-1,2-DCE , a TCE degradation by-product, was the primary chlorinated VOC detected in the sediments.
- Surface water samples have not been not collected from Allen Harbor. Low-level (less than 1 ppb) chlorinated VOC concentrations detected in shoreline seep samples.

Observations Regarding Surface Water/Sediments (Con't.)

- PAHs were primary chemicals detected in Allen Harbor sediments.
- Phase II SLERA concluded that Site 16 source areas did not contribute substantially to PAHs in Allen Harbor sediments..... Working hypothesis is that PAHs are likely a consequence of dock pilings, roadway runoff, etc.

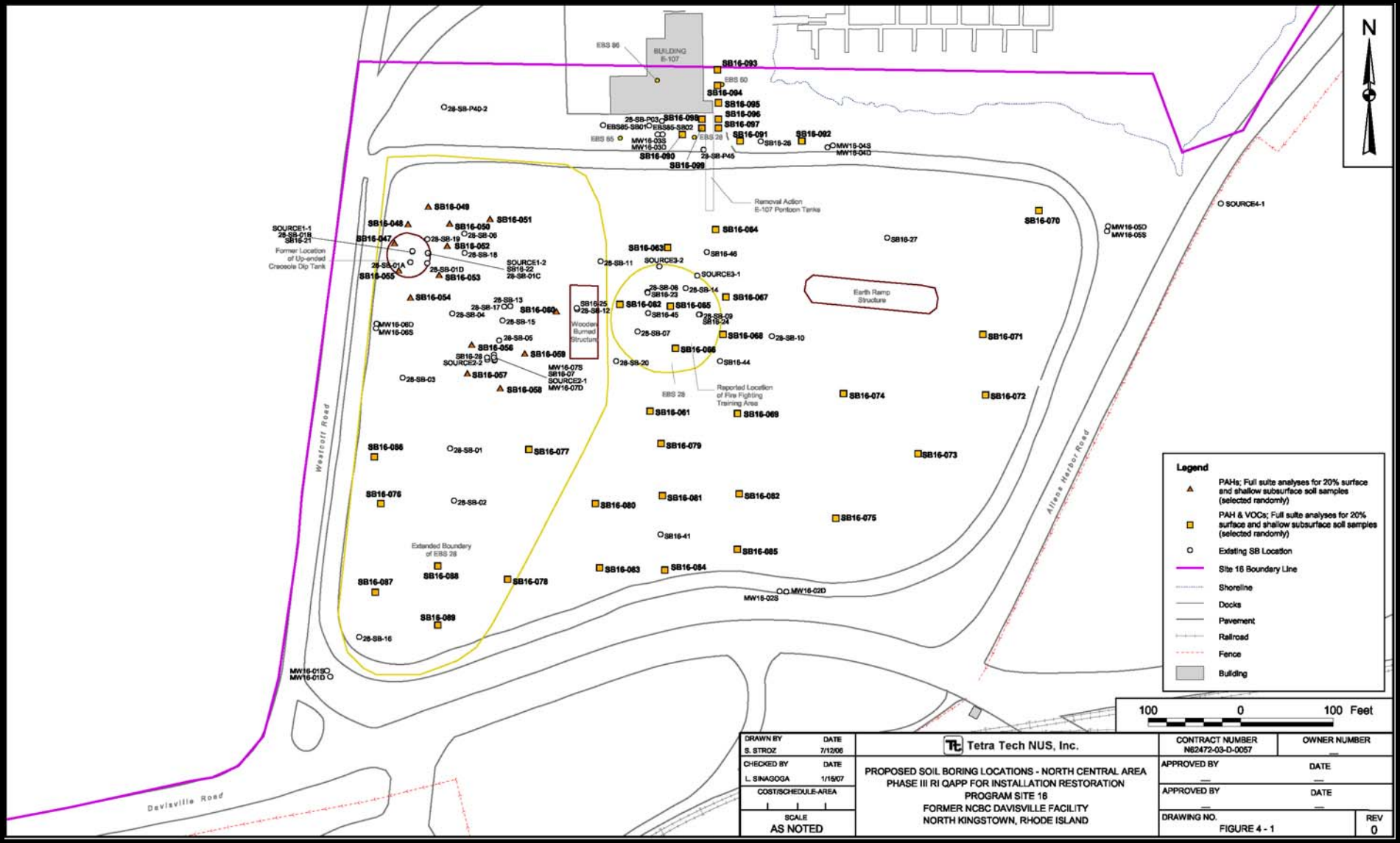
Overview of Scope of Work for Phase III Field Investigation at Site 16

- Soils Investigation (North and South of Davisville Road).
- Groundwater Investigation (including definition of upgradient conditions).
- Storm water System Investigation.
- Soil Gas Investigation.
- Forensics Investigation.

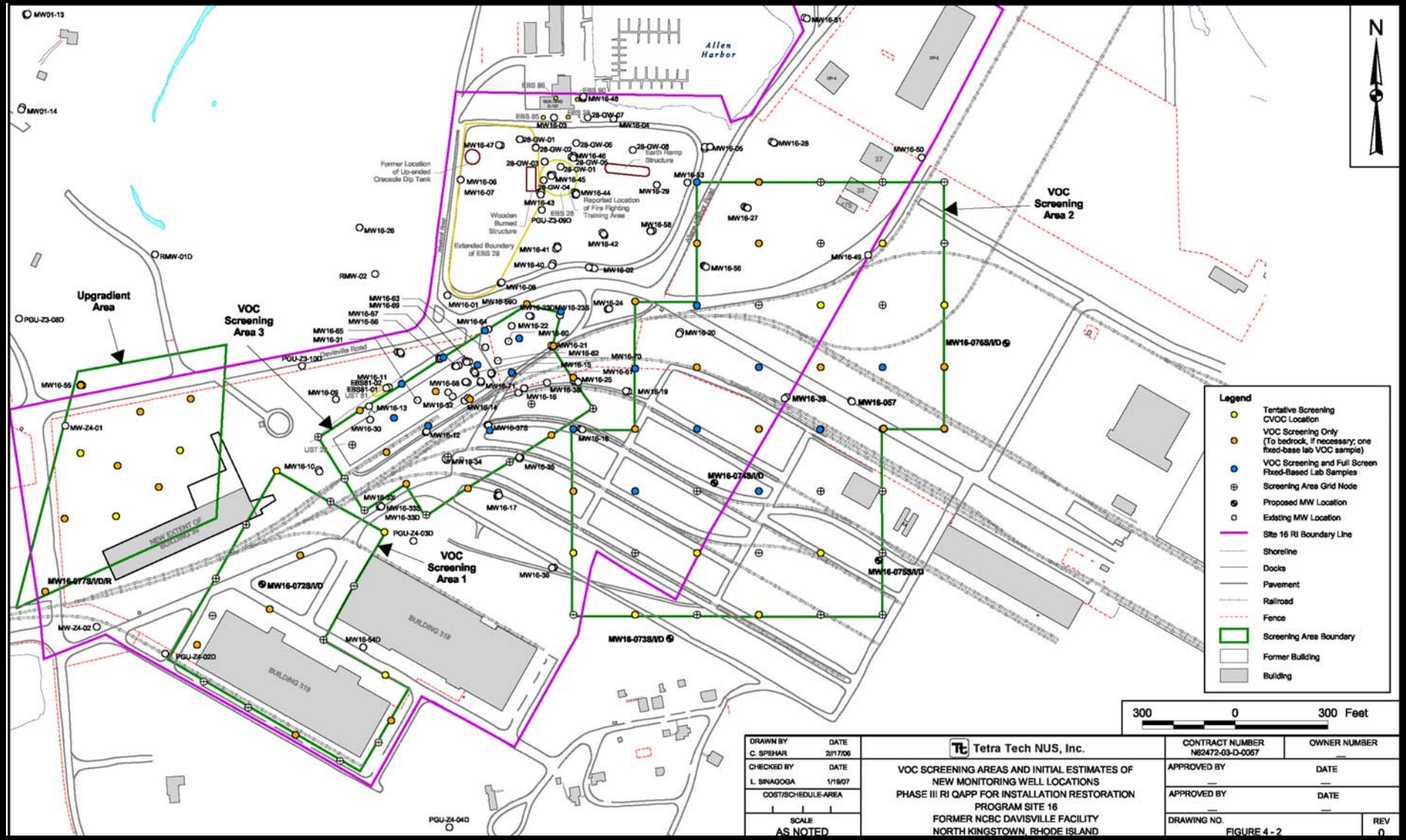
Soils Investigation for Site 16

- Approximately 50 soil borings will be advanced in the “North Central” area of Site 16.
- Approximately 60 soil borings will be advanced in the southern and eastern areas of Site 16 (i.e., the areas underlying the TCE plume).
- Objectives...
  - Delineate extent of contamination.
  - Investigate for additional sources of contamination (both nature and extent).
  - Collect adequate data for risk assessment.

Proposed Soil Boring Locations



VOC Screening Areas and Initial Estimates of New Monitoring Well Locations



Soils Investigation for Site 16 (Con't.)

- Soils samples will be collected by direct-push-technology (DPT).
- VOC, CVOC, and PAH screening tools will be used to help select soil samples for lab analysis.
- Most samples will be analyzed for VOCs and PAHs.
- Select surface and shallow subsurface soil samples will be analyzed for the full suite of chemicals (i.e., VOCs, SVOCs, PAHs, pesticides, PCBs, and metals).

Groundwater Investigation for Site 16

- At a minimum, three new bedrock wells will be installed to the west of Bldg 39 (in vicinity of Thompson Road) to define upgradient conditions for Site 16.
- Additional shallow, intermediate, deep, and/or bedrock wells will also be needed to delineate contamination in the southern and eastern areas of the TCE plume.
- Groundwater samples collected from approximately 120 wells will be analyzed for VOCs and metals. (A limited number of shallow wells upgradient of the Allen Harbor seeps will also sampled for PAHs.)
- Groundwater samples will be collected from 12 piezometer locations within Allen Habor and analyzed for VOCs.

Groundwater Investigation for Site 16 (Con't.)

- Additional geophysics will be performed to further understand the potential for contaminant transport in the bedrock zone.
- Slug tests will be performed on approximately 19 shallow and 4 deep bedrock wells (to determine hydraulic conductivities [i.e., the potential for movement of groundwater]).
- Packer tests will be performed on at least 5 shallow bedrock wells (to further investigate hydraulic conductivities).

Stormwater System Investigation

- Survey of stormwater system components within Site 16 area.
- CVOC screening of sediments (and possibly surface waters) at 12 locations.
- Collection and VOC analysis of sediments from 6 locations.

Soil Gas Investigation

- Five soil gas samples will be collected from each of five TCE groundwater "hot spot" locations.
- Analytical data gathered will be evaluated to determine the potential for vapor intrusion into a structure.
- Analytical data will be utilized in human health risk assessment prepared for Phase III RI.

Environmental Forensics Investigation

- Forensics – relating to or dealing with the application of scientific knowledge to resolve a problem.
- Primary Objective for Site 16: Determine if the PAH concentrations noted in the sediments of Allen Harbor are attributable to Site 16 source areas (i.e., the creosote dip tank area, the former fire fighting area).
- Advanced analytical techniques are utilized.

Environmental Forensics Investigation (Con't.)

- Eight new forensics soils samples.
- Eight pavement and sealer samples.
- Four shallow groundwater samples.
- Six samples from dock pilings.
- Six samples from sediments adjoining pilings.
- Six samples from Allen Harbor locations.
- Sample of sheen at southwest corner of Allen Harbor.
- Three storm water system sediment samples.

Challenges!!!

- Access to sampling locations on non-Navy property.
- The environmental program is complex and will likely occur over a 3 to 4 month period (May through August 2007).
- The “north central” area of the site is heavily vegetated.
- Much of the Site 16 area is actively used for commercial purposes. Therefore, sample collection must be performed in a manner that limits disruptions to commercial activities.
- Access to utilities (water, electric).

Thank You!