

Excavation and Disposal of Soils Impacted by Dry-cleaning Solvents

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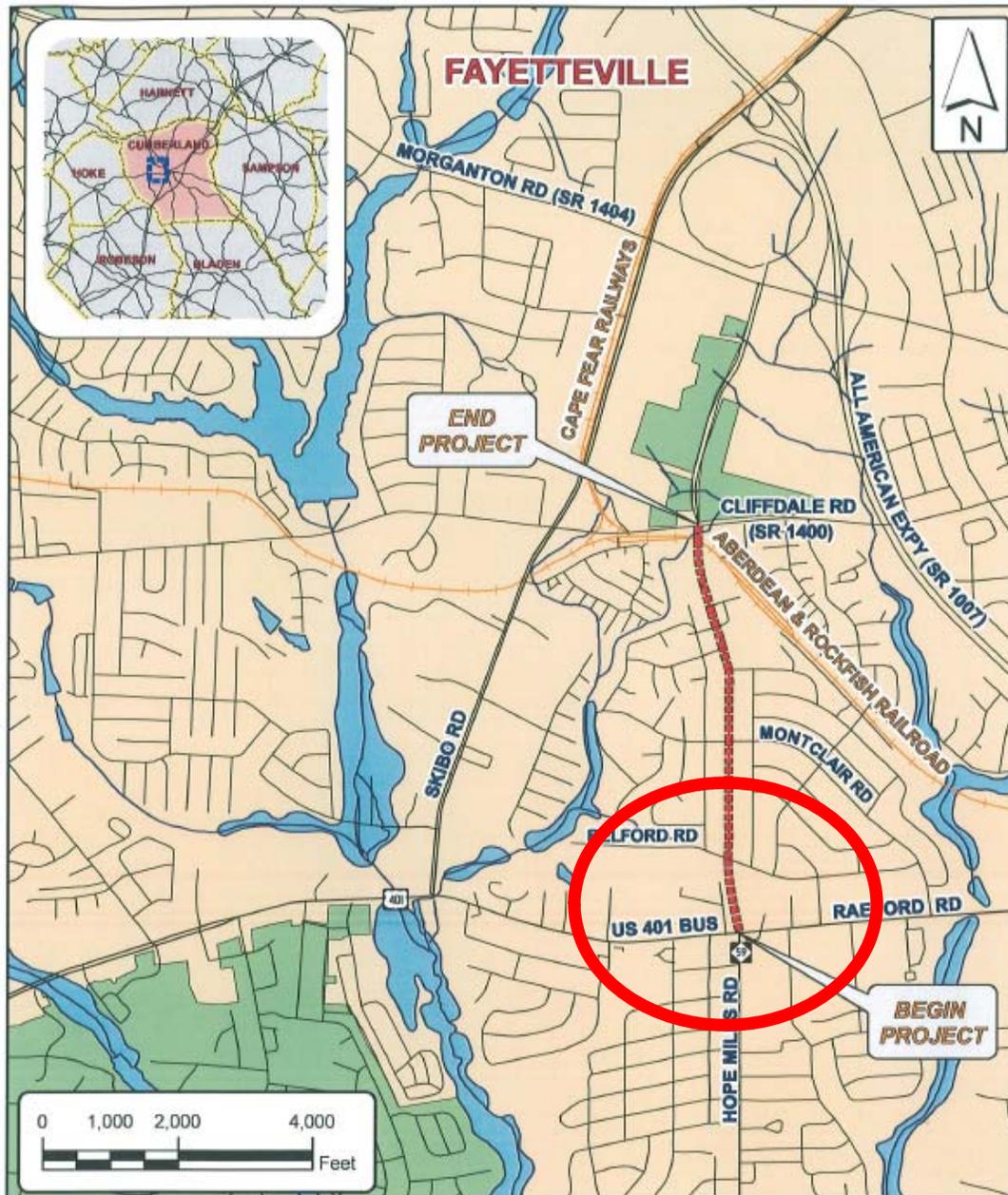
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- **NCDOT Mission:**
- *Connecting people and places safely and efficiently, with accountability and environmental sensitivity to enhance the economy, health and well-being of North Carolina.*



TIP U-4422 - SR1596 (Glensford Rd) from US401B (Raeford Rd) to SR1400 (Cliffdale Rd) Fayetteville, Cumberland County, NC





N



40 ft

RAEFORD RD

HOPE MILLS RD



N



4924 Raeford Rd

RAEFORD RD

HOPE MILLS RD



Raeford RD

LEFT TURN
YIELD
ON GREEN

CHURCH
SUITES

Dry Cleaning

Laundry

424-4887

DRIVERS
LICENSES
\$15

5 Shirts
Laundered

3 PC Suit
or
Plain Dress

3 Sweaters
Skirts or
Pants

3 Blouses
Shirts

Tailoring
Laundering

Alteration

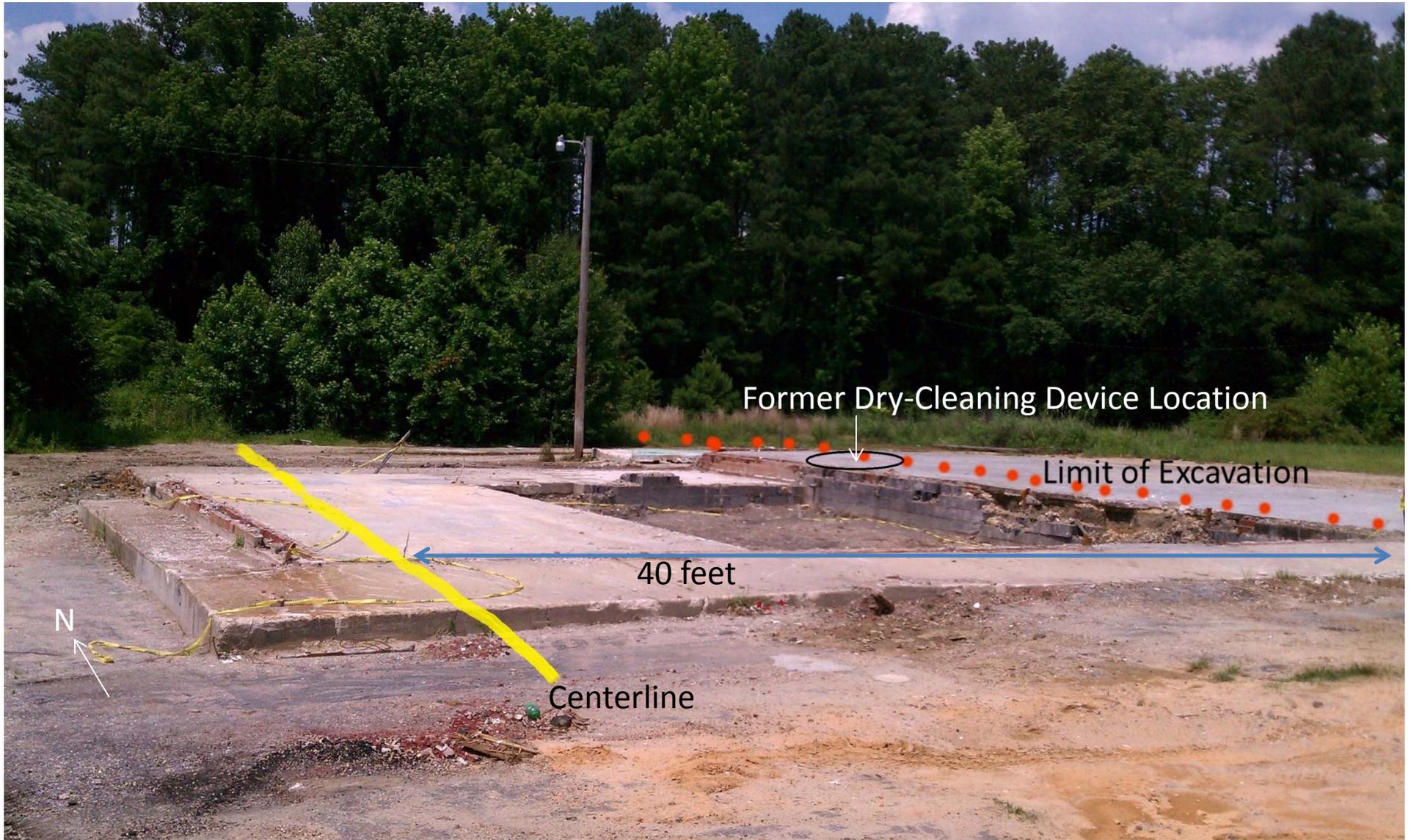
BDU's

U-4422 Parcel 19 - 4924 Raeford Rd, Fayetteville, NC

RAEFORD RD

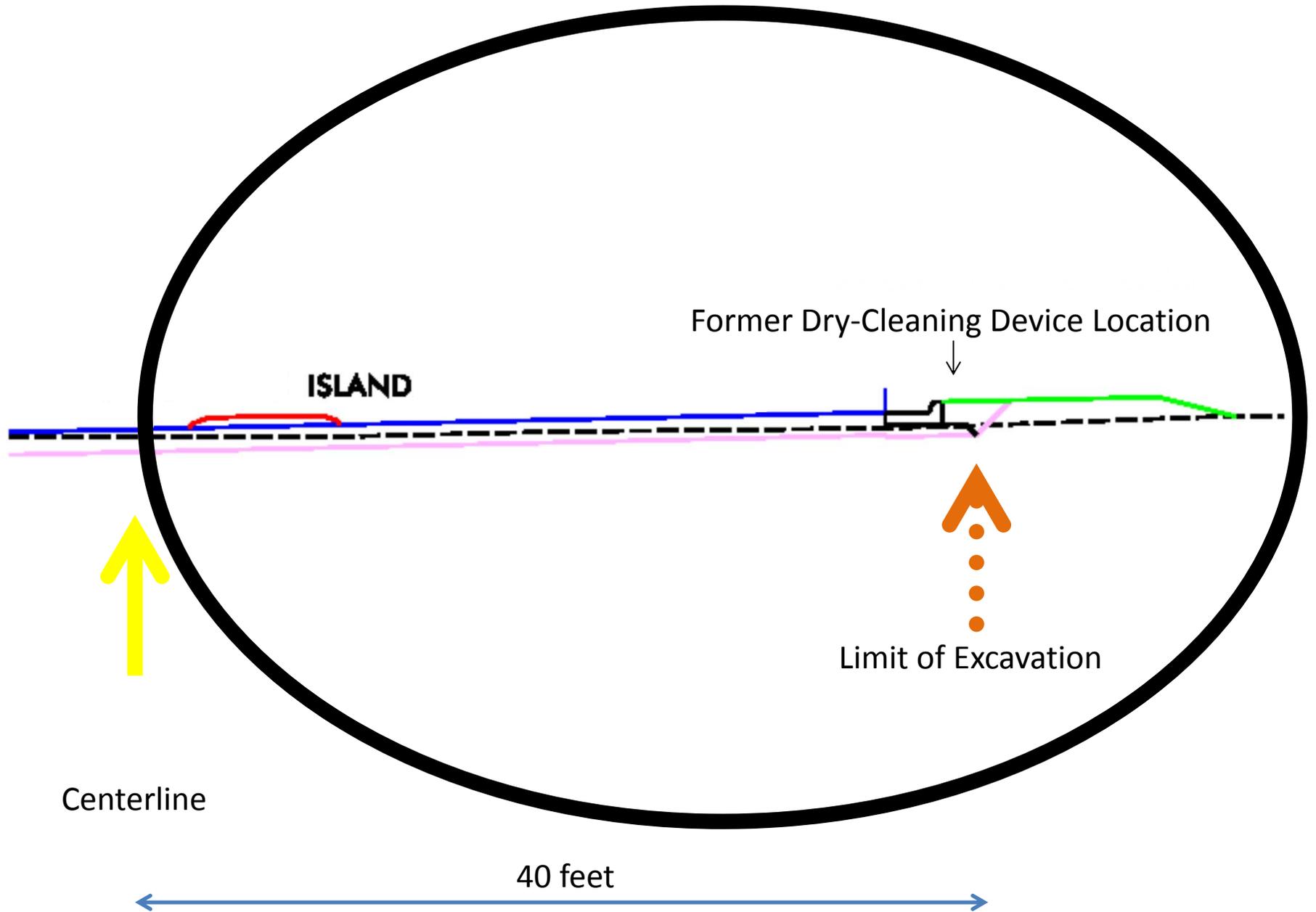
HOPE MILLS RD





U-4422 Parcel 19 - 4924 Raeford Road, Fayetteville, NC

Cross Section through Dry Cleaner at U-4422 Parcel 19 at 4924 Raeford Rd





Excavation and Disposal of Soils Impacted by PCE Drycleaning Solvent

- Disposal regulations
- Mobile laboratory technology
- Case studies
 - Fayetteville NCDOT Project
 - Other NC DSCA Program Projects

Disposal of Soil Contaminated by PCE Drycleaning Solvent

- Wastes generated by drycleaning operations that use PCE are listed hazardous wastes under 40 CFR 261.31 and 15A NCAC 13A .0106.
- Includes contaminated soil and groundwater.
- Why do we care? **HIGH DISPOSAL COSTS.**
- Luckily there is an exemption.

North Carolina
Hazardous Waste
Section's
"Contained-in Policy"

North Carolina Hazardous Waste Section
"Contained-in" Policy for Soil Contaminated with Listed Hazardous Waste

Revised May 20, 2005
Revised March, 2004
Revised May 7, 2002
Revised December 7, 2002
Created January 24, 2001



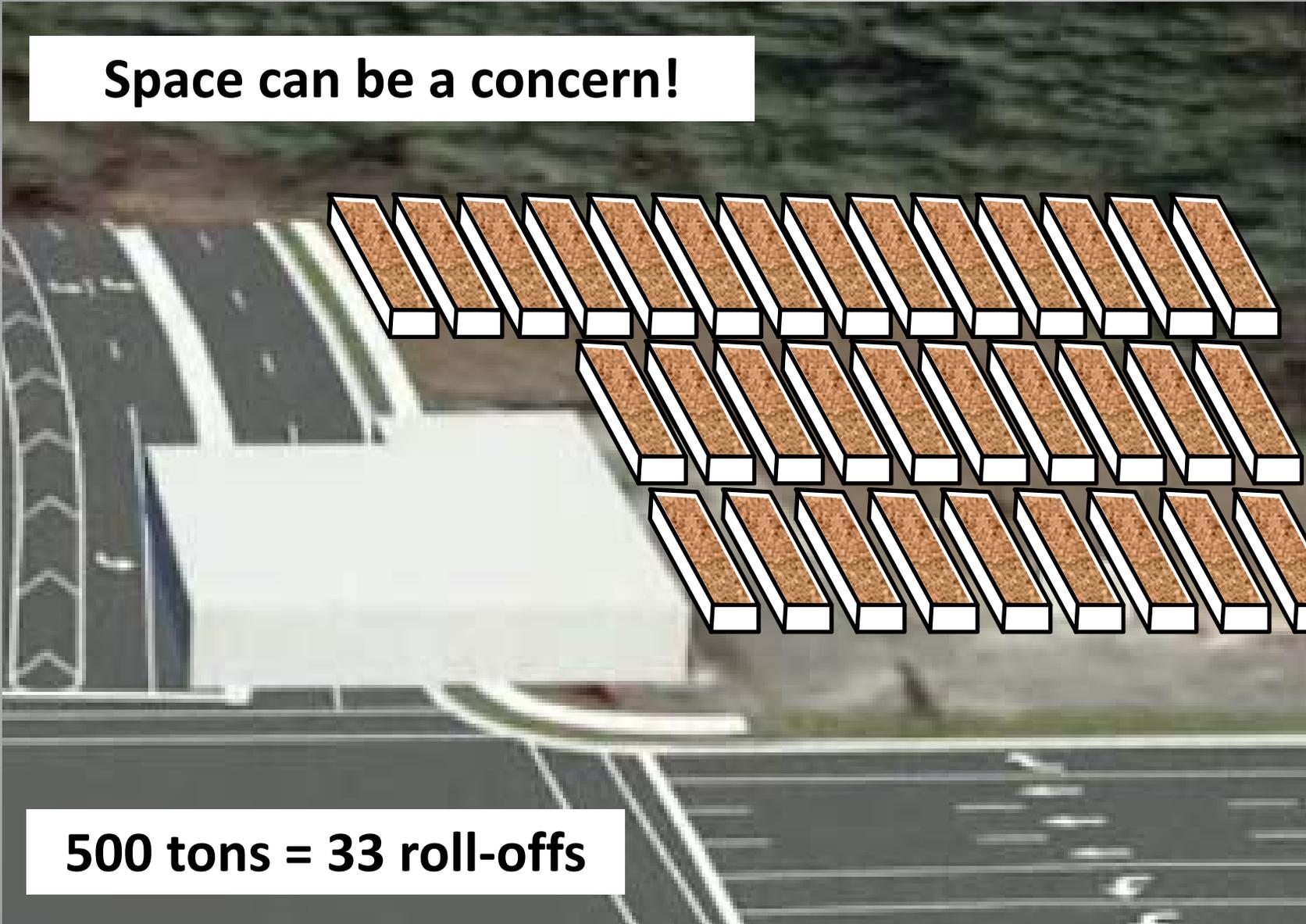


Excavated soil must be placed in drums or roll-offs unless special approval granted.

50 tons = 3 roll-offs

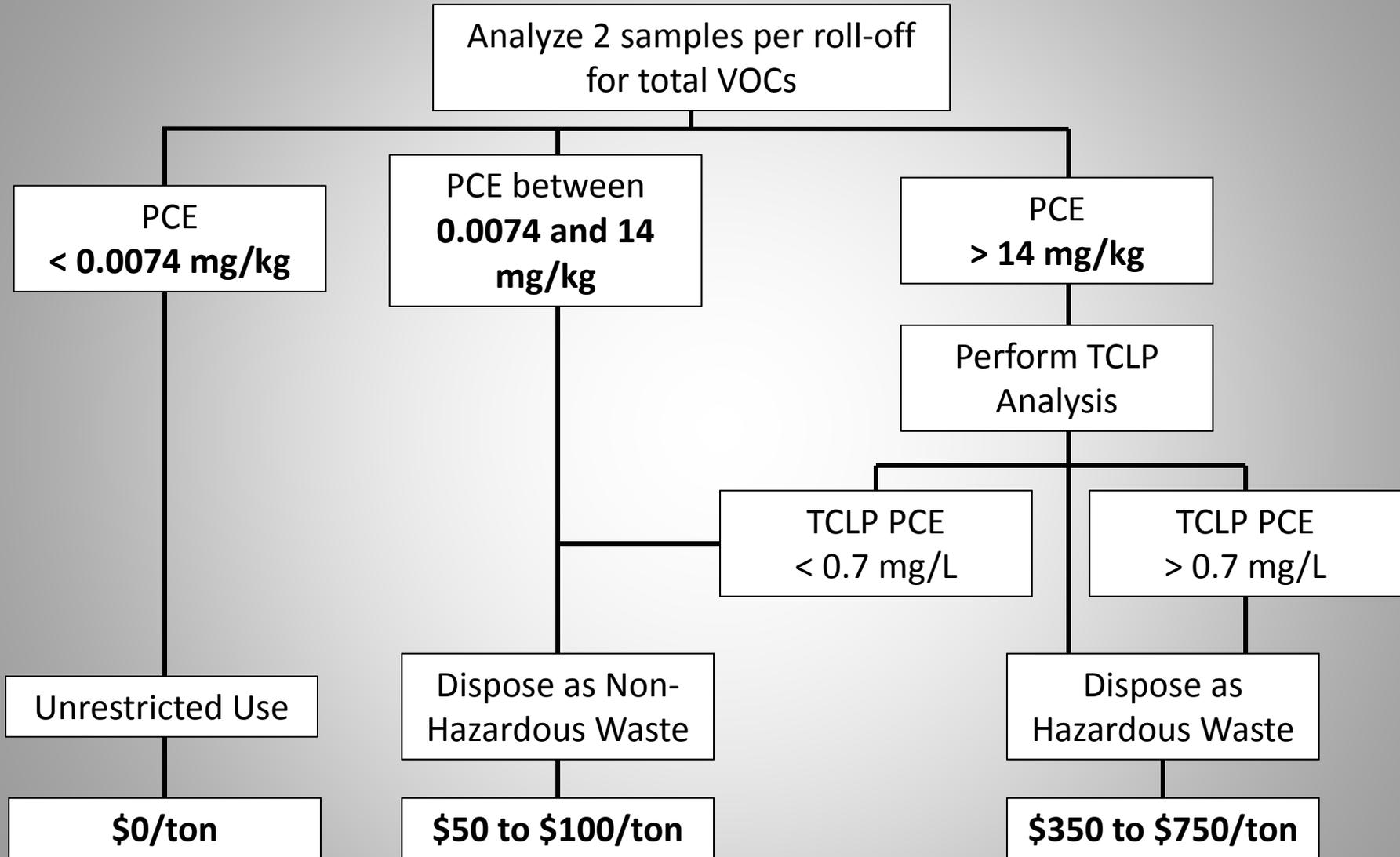


Space can be a concern!



500 tons = 33 roll-offs

Application of Contained-In Policy



Mobile Laboratory Details

- Fully certified lab data
- Three labs certified in NC
- 1-2 hour turnaround
- 15-30 samples per day
- Low detection limits
 - PCE 0.7 ug/L for groundwater
 - PCE 0.002 mg/kg for soil

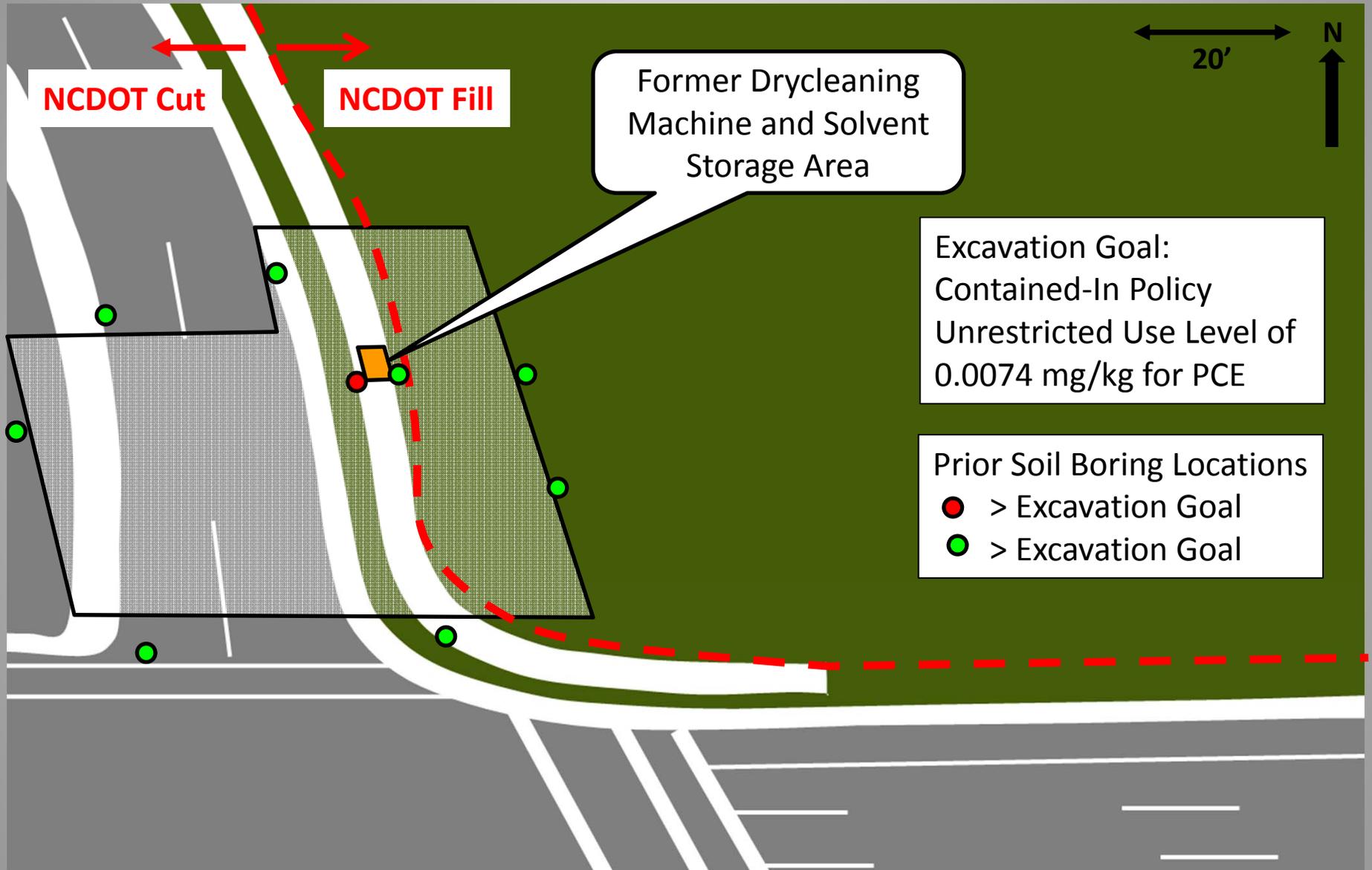
Mobile Laboratory Costs & Analyses

- KB Labs (Cary, NC):
 - Mobilization - \$300 to \$1,000
 - Daily Rate - \$1,500
 - Certified in NC for VOCs only
 - \$1,500/20 samples = Average \$75/sample
- ECCS (mobe from Wisconsin):
 - Mobilization - \$1,750 to \$3,500
 - Daily Rate - \$1,925/day
 - Certified in NC for VOCs, SVOCs, PCBs, pesticides, explosives, metals
- New Age Landmark (mobe from Michigan):

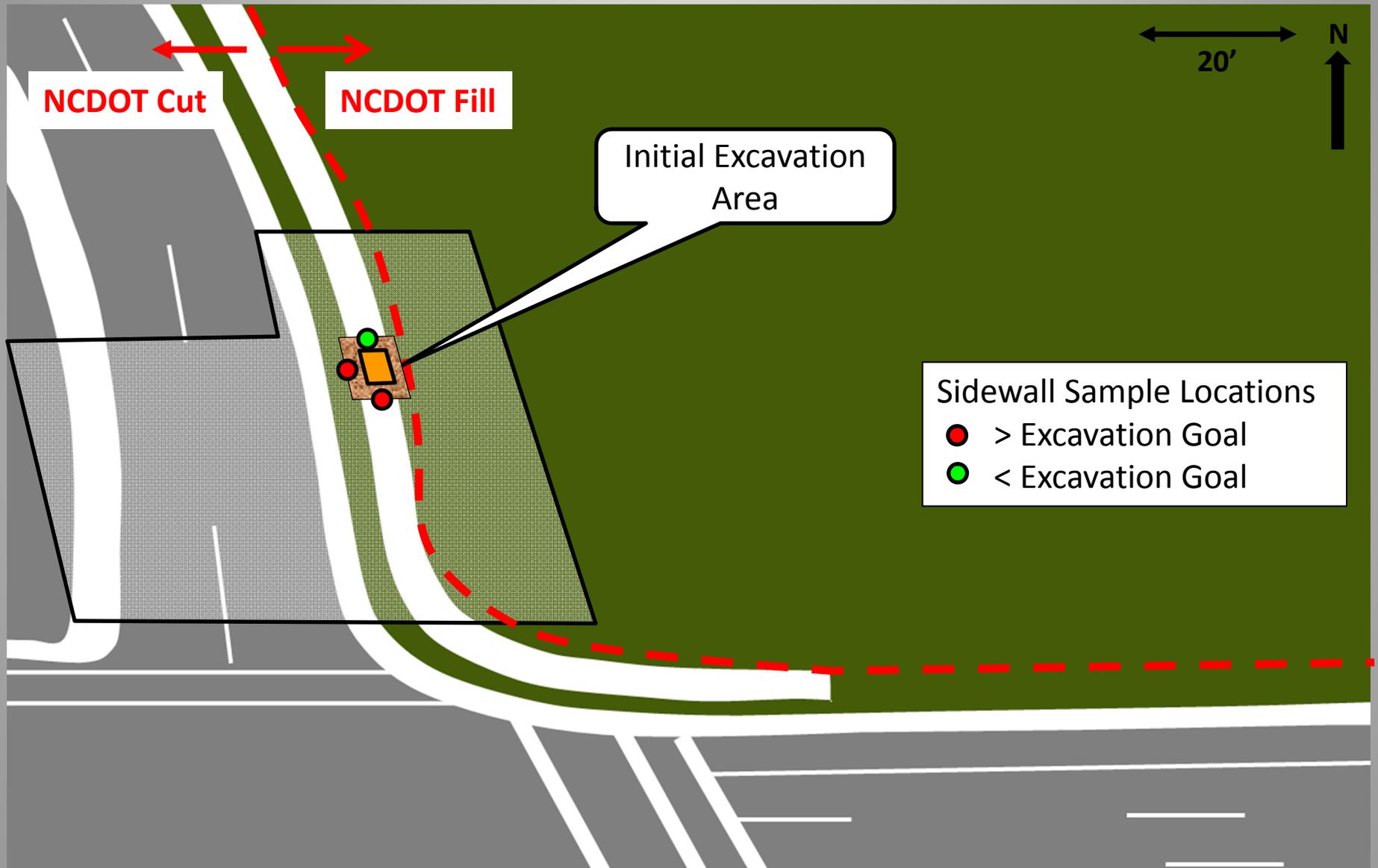




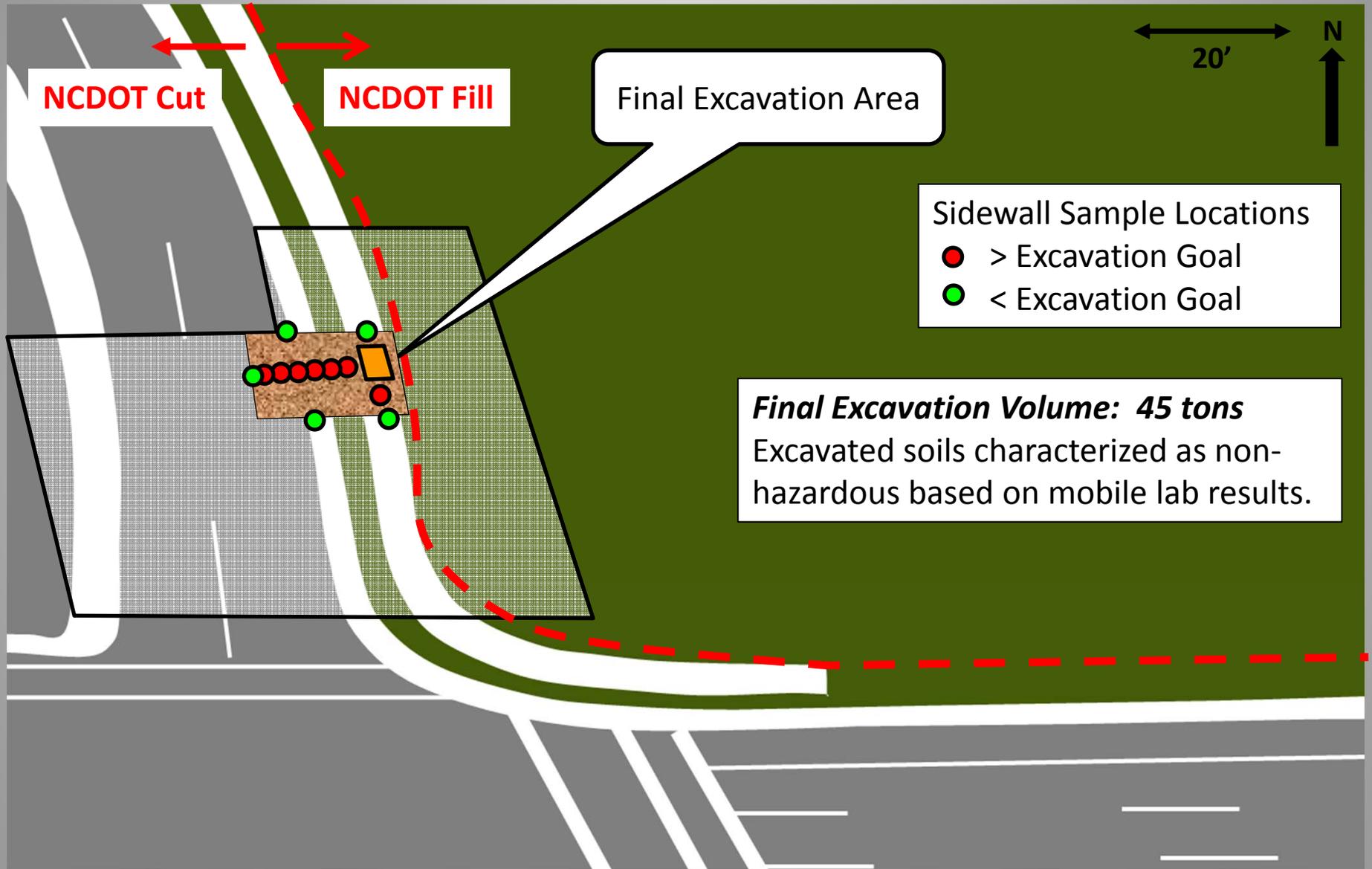
One Hour Koretizing, Fayetteville, NC



One Hour Koretizing, Fayetteville, NC



One Hour Koretizing, Fayetteville, NC



NC Drycleaning Solvent Cleanup Act (DSCA) Program

- Voluntary program that helps pay for cleanup of sites impacted by dry-cleaning solvents.
- Primary source of funding is a sales tax and a tax on dry-cleaning solvent purchases.
- State hires contractors to perform work.
- Proponent of Triad approach.





Ange Speed Wash, Manteo, NC

- 5-day direct-push/mobile laboratory survey
- Vertical profiling at all boring locations

● Direct-push boring

Ange Speed Wash, Manteo, NC



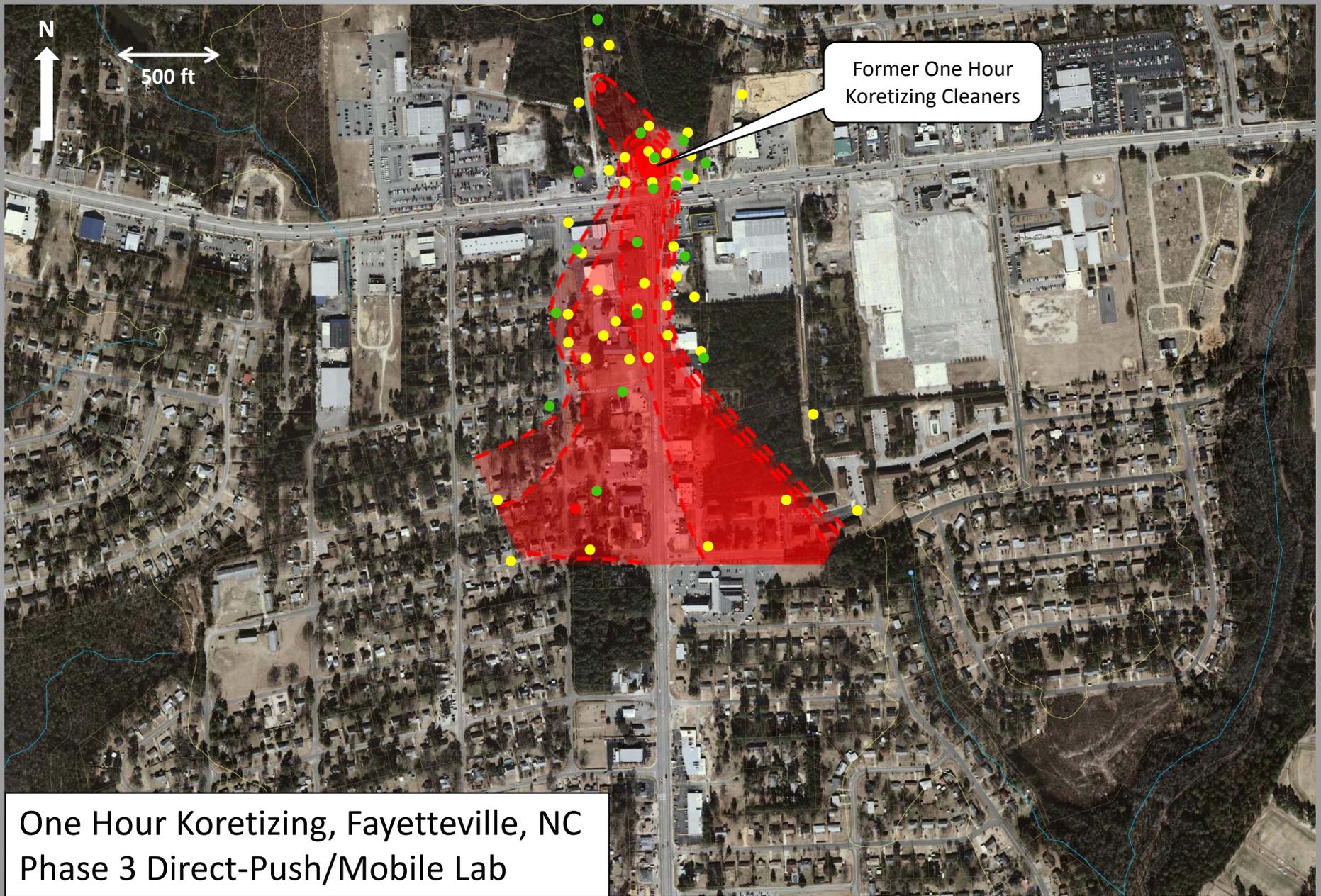


One Hour Koretizing, Fayetteville, NC
Phase 1 Direct-Push/Mobile Lab





One Hour Koretizing, Fayetteville, NC
Phase 2 Direct-Push/Mobile Lab





Former One Hour
Koretizing Cleaners

One Hour Koretizing, Fayetteville, NC
Phase 4 Direct-Push/Mobile Lab



Options Beyond Excavation to Address PCE Impacted Soils

- Soil vapor extraction
- Chemical amendments:
 - Enhanced reductive dechlorination (ERD)
 - Chemical oxidation
- Thermal treatment

WP Ballard, Durham, NC

- Soil partially excavated.
- Emulsified Zero Valent Iron (ZVI) placed in base of excavation for on-going ERD.



Fuller Supply, Concord, NC



Soil blending using ABC+ for ERD



Direct-Push Injection

Distribution in unsaturated soils can be problematic.



Sodium Permanganate

Pinehurst Hotel Cleaners, Pinehurst, NC

Ex-situ soil treatment using mobile steam distillation unit.



Excavation Pros and Cons

- **Pros** – Most foolproof method to ensure contaminant removal, fast.
- **Cons** – Expensive, contamination must be accessible with excavation equipment, room needed for roll-off storage.

In-Situ Treatment Pros and Cons

- **Pros** – Often much less expensive for larger projects, some options can reach less accessible areas.
- **Cons** – Contaminant removal less reliable, longer timeframe, permitting requirements, possible geotechnical compaction issues.



Summary

- Excavation and disposal of soil impacted by PCE drycleaning solvent is strictly regulated and expensive.
- Mobile laboratories and other Triad approach technologies can save cost and time.
- Consider in-situ or ex-situ treatment options beyond traditional excavation and disposal.



Questions?