# Nonantum TCE Investigation

Massachusetts Department of Environmental Protection

April 12, 2017

# This presentation will cover:

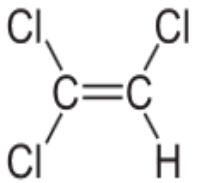
- MassDEP's main concern:

  Trichloroethylene (TCE) in indoor air via Vapor Intrusion
- Brief re-cap of site history and MassDEP testing prior to last meeting in October 2016.
- Groundwater testing by MassDEP since Oct 2016
- Indoor air testing by MassDEP since Oct 2016
- Next Steps

# Vapor Intrusion

- Vapor Intrusion is gas entering a building from the subsurface (e.g., radon)
- Vapors can contain TCE from contamination in soil and/or shallow groundwater
- Factors that affect Vapor Intrusion:
  - Contaminant concentration in soil and/or groundwater
  - Depth to groundwater
  - Integrity of basement floor

# Trichloroethylene (TCE)

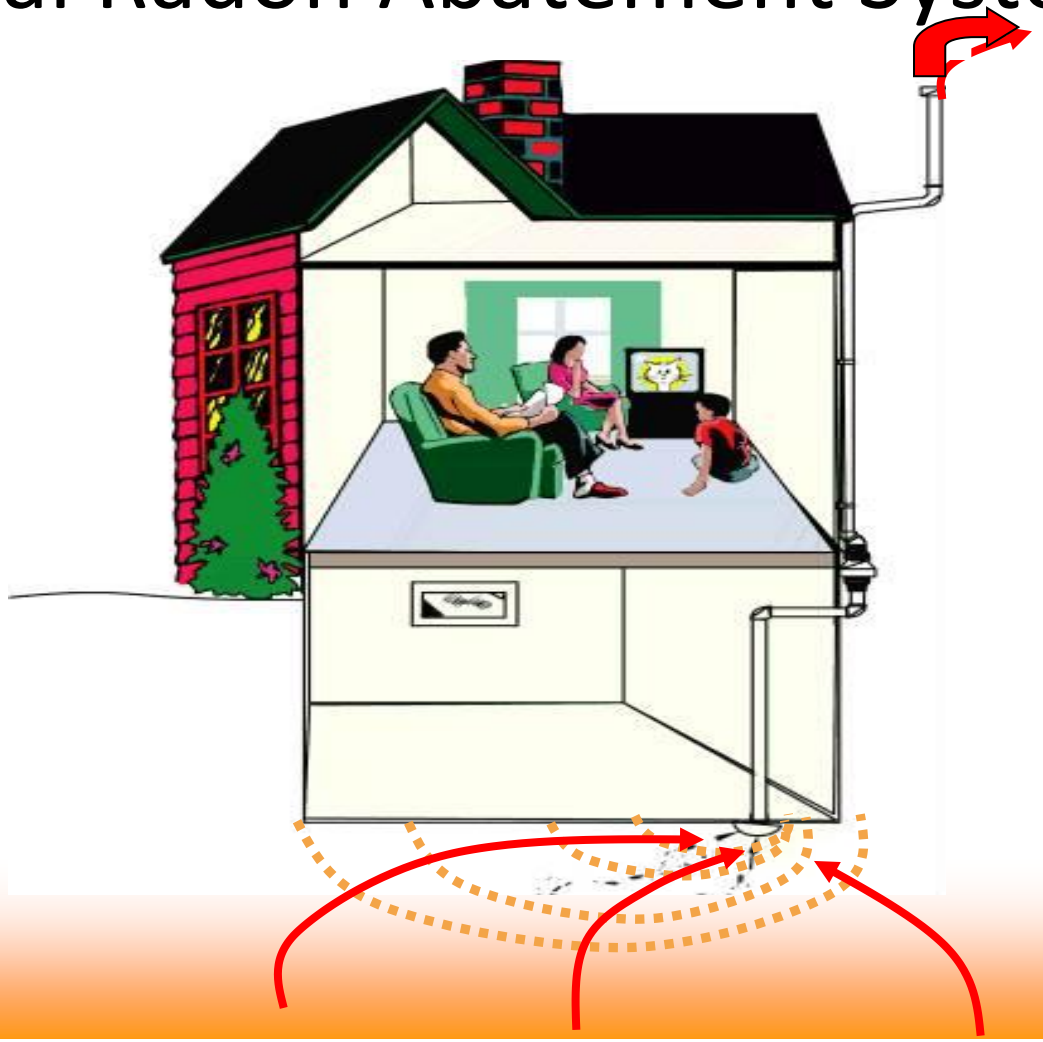



- Once a commonly used industrial solvent
- MassDEP has increased its attention on TCE sites due to lower limits for health protection
- Effects of TCE exposure include effects on developing fetus, immune system effects, and increased risk of cancers to kidneys, liver and non-Hodgkin's lymphoma.

# If TCE is Present in Indoor Air

- Follow-up actions may include one or all of:
  - Testing over 24-hour period (or 8-hr in workplace)
  - Air Purifying Unit(s)
  - Sub-Slab Depressurization System (e.g., Radon Abatement System)

# Typical Radon Abatement System



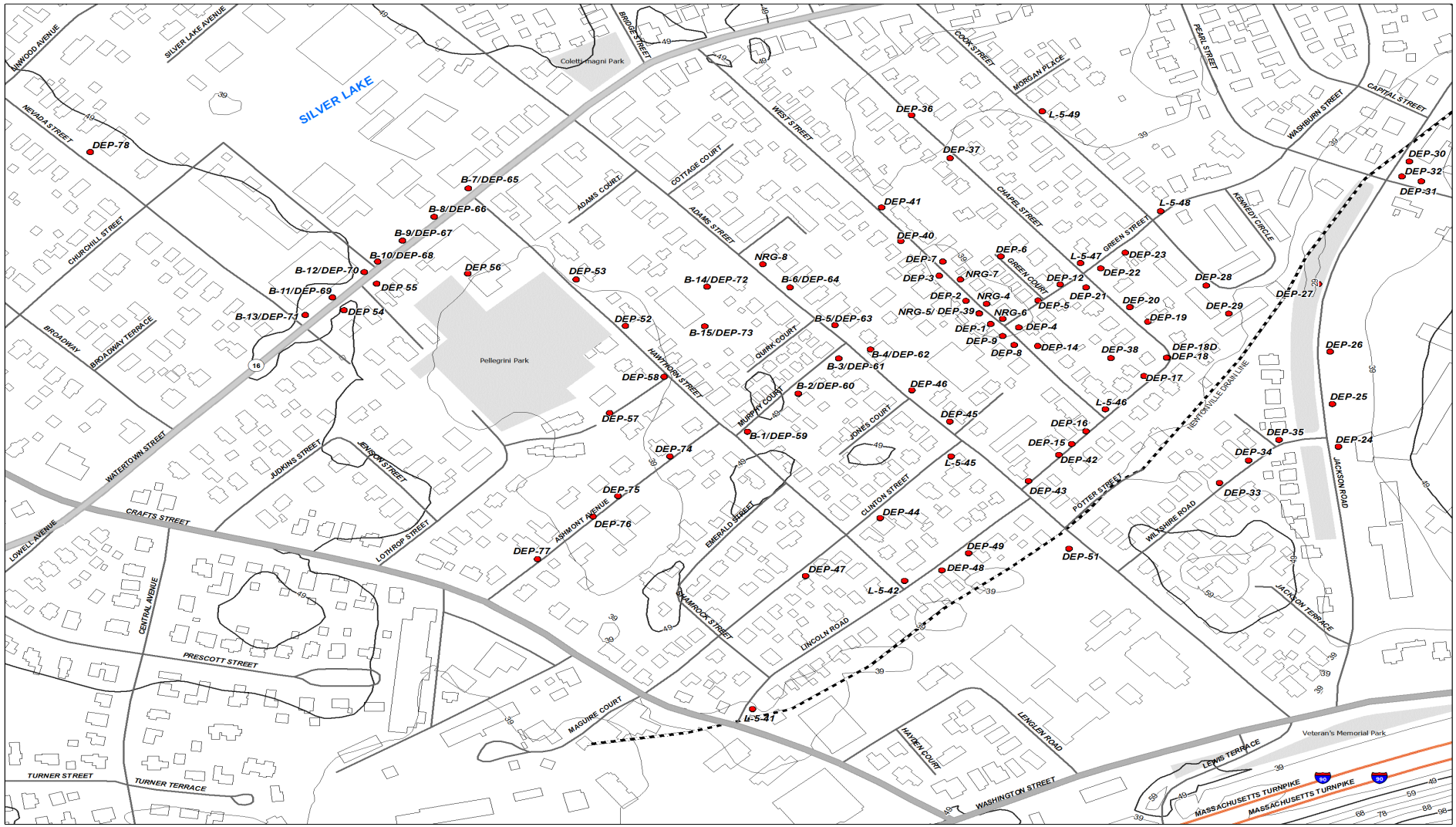
# MassDEP's Investigation

- Site on West St. with TCE contaminated groundwater identified via MassDEP audit
- Groundwater sampling was initiated to find levels of TCE that could result in vapor intrusion
- Indoor air of potentially impacted homes was tested

# Summary of Field Investigation up to October 2016

- Installation of 64 hand-driven wellpoints and 15 drilled wells to sample groundwater
- Sampling of indoor air of 134 buildings
- Based on indoor air testing, mitigation systems were installed in 6 homes.
- The area of groundwater contamination extended from Watertown Street to Middle Street

# October, 2016 - Nonantum Field Investigation



# Follow-up Actions

- Based on the groundwater testing results and historical records, MassDEP issued Notices to 3 potentially responsible parties (aka “PRPs”).
- The PRPs replied that they intended to take immediate actions, initially focusing on the Nevada St. property.
- The actions taken at 320 Nevada Street will be discussed by the Licensed Site Professional for the PRPs

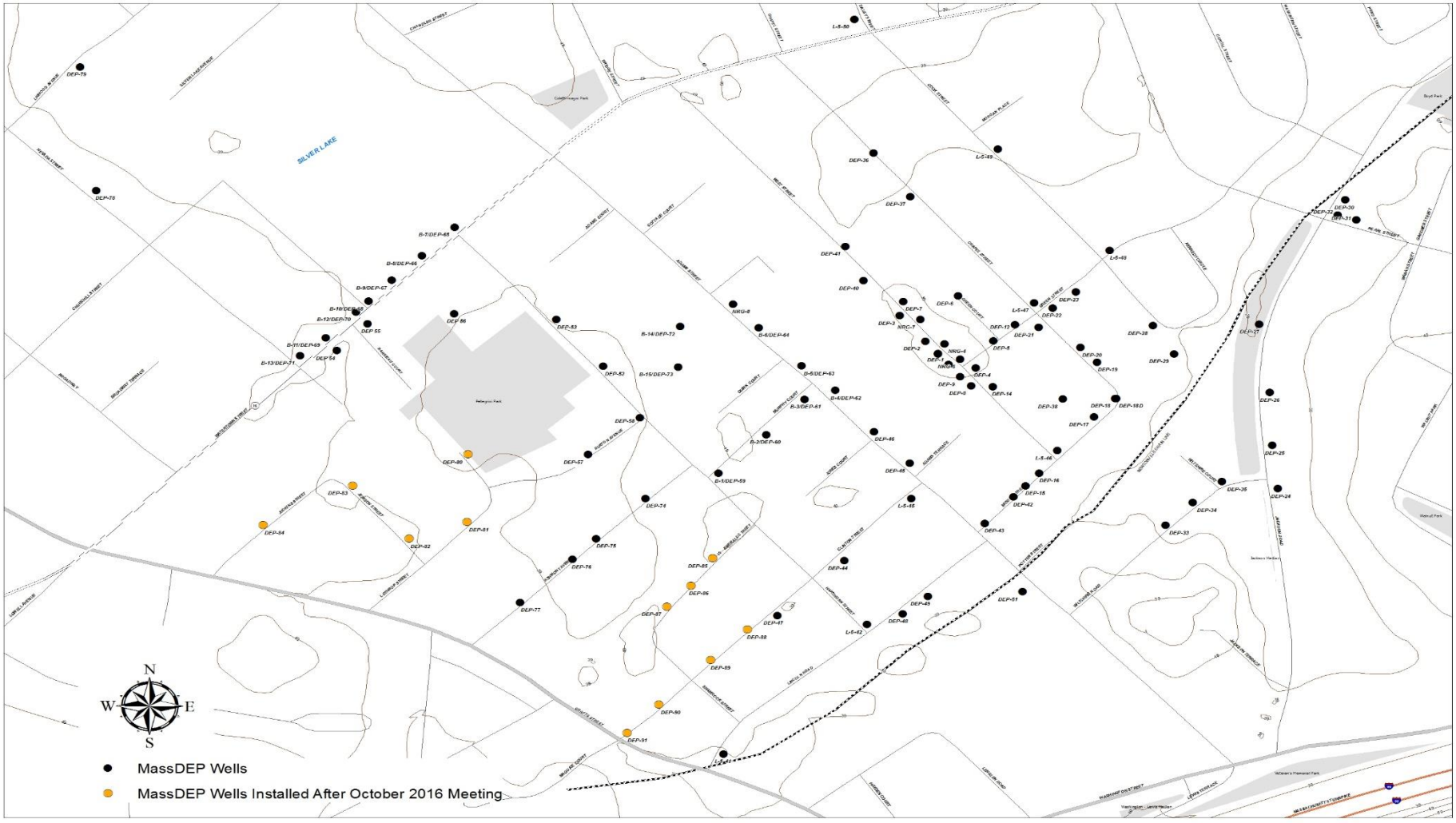
# Next Steps as of October 2016

- Installation of additional groundwater monitoring wells to address gaps in studies to date
- Continue to identify potentially affected properties within plume to test indoor air for TCE
- Oversee work conducted by Licensed Site Professional at 320 Nevada Street
- Install vapor mitigation systems in 3 addt'l homes

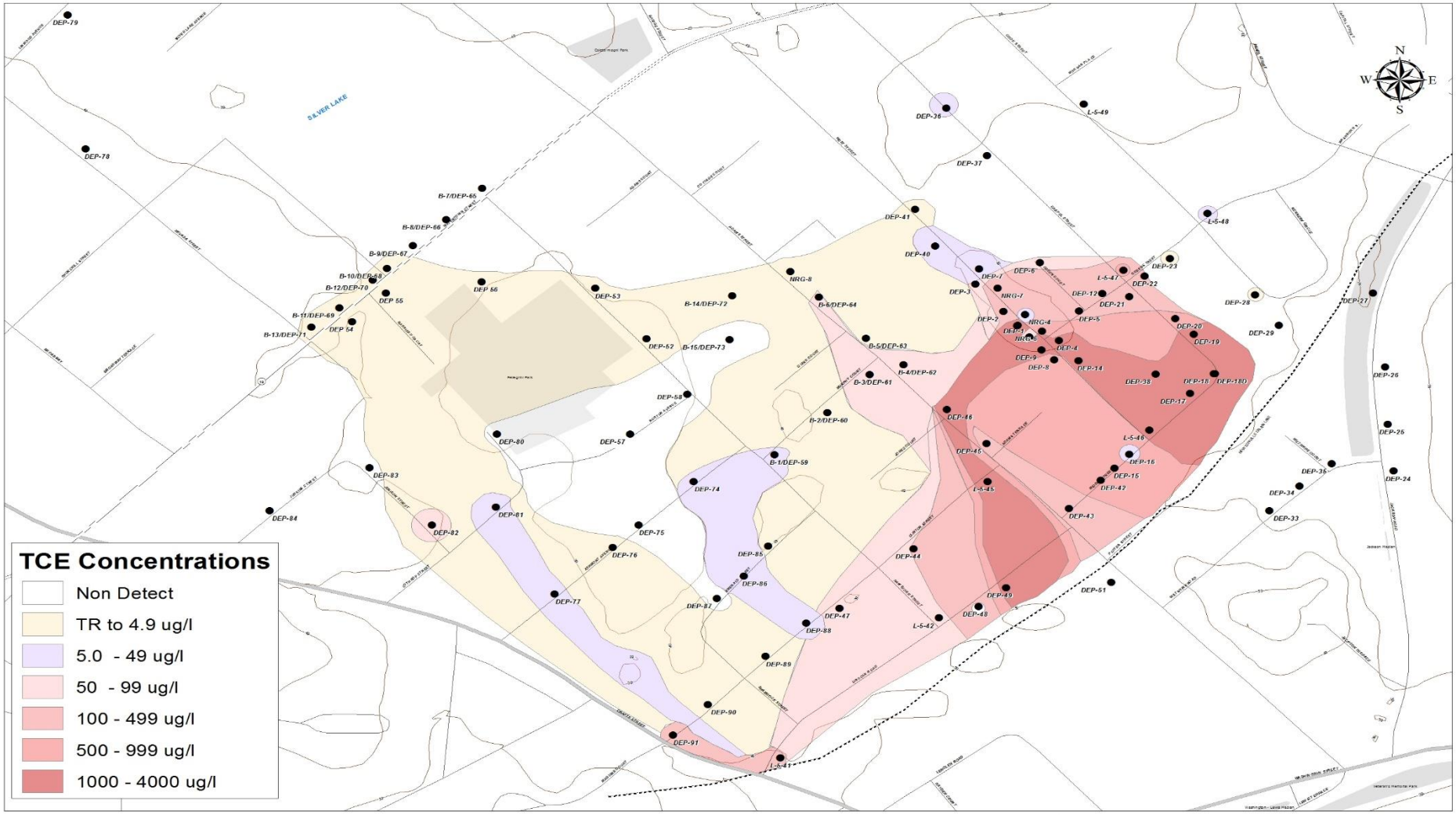
# Additional Monitoring Wells

- Twelve addt'l wells were installed on Judkins, Jenison, Lothrop, Emerald and Clinton Streets.
- Levels of TCE ranged from "not detected" to 110 µg/L, or parts per billion.
- To date MassDEP has installed 76 hand-driven wellpoints in the area, and 15 drilled wells, mainly focusing on shallow groundwater concentrations.

# 2017 - NEWTON - NONANTUM TCE INVESTIGATION
## MassDEP Monitoring Well Locations



# 2017 - NEWTON - NONANTUM TCE INVESTIGATION
# CONCEPTUAL SHALLOW GROUNDWATER CONCENTRATIONS




## TCE Concentrations

- Non Detect
- TR to 4.9 ug/l
- 5.0 - 49 ug/l
- 50 - 99 ug/l
- 100 - 499 ug/l
- 500 - 999 ug/l
- 1000 - 4000 ug/l

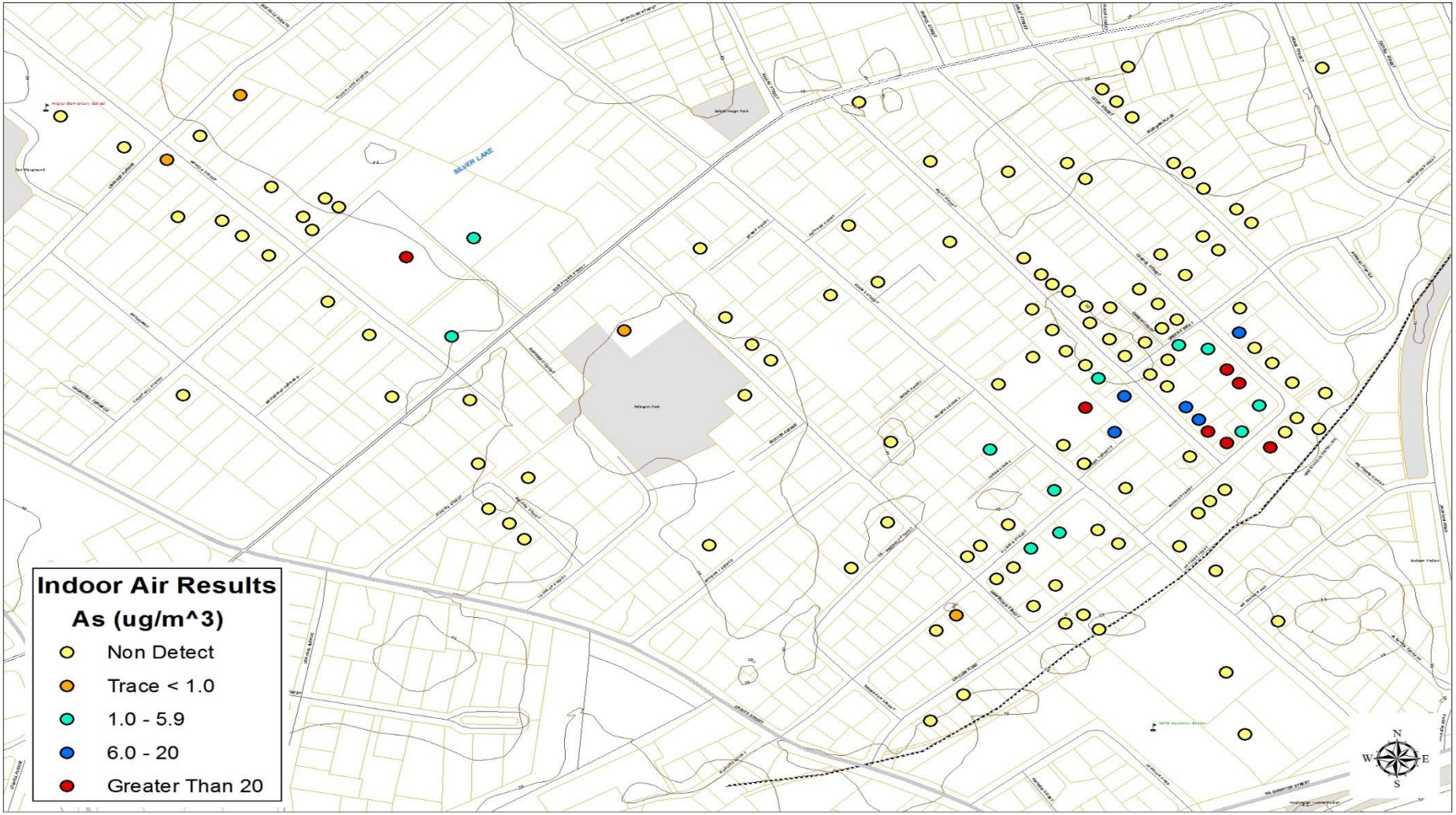
Map Produced by MassDEP GIS Group - March, 2017 - G:\localuser data\BWSC\Newton\TCE Conc.mxd

0 225 450 900 Feet

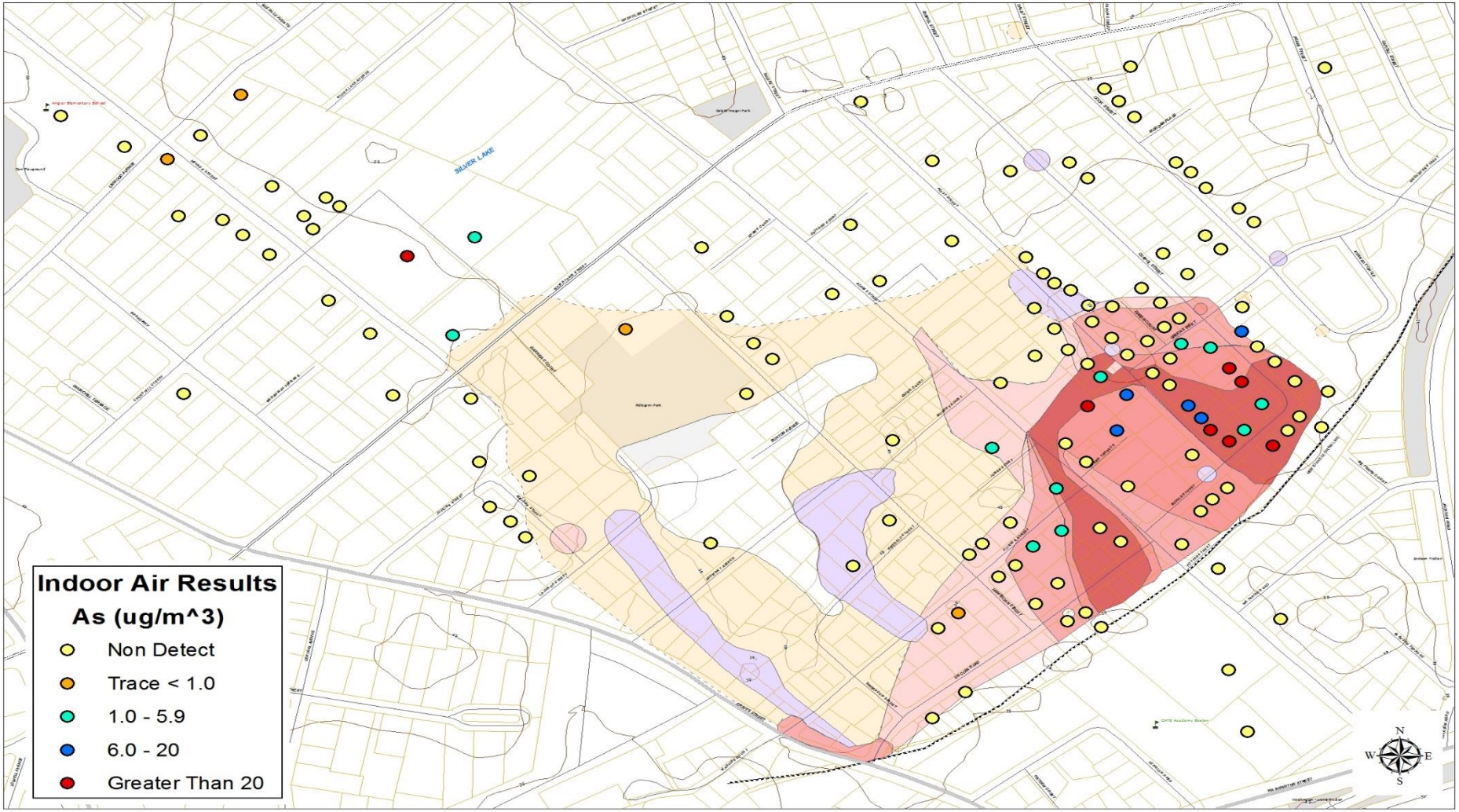
# Additional Indoor Air Testing

- Indoor samples have been collected at 25 additional buildings and the Carr School since October 2016.
- TCE was not detected at the Carr School
- No additional homes identified that need vapor intrusion mitigation.
- Indoor air contamination at nearby condos determined to be from polyurethane spray foam insulation.
- To date, 160 addresses have been tested by MassDEP

# 2017 - NEWTON - NONANTUM TCE INVESTIGATION
## MassDEP Indoor Air Test Results



# 2017 - NEWTON - NONANTUM TCE INVESTIGATION
## MassDEP Indoor Air Test Results



# Next Steps

- MassDEP will continue to test indoor air as necessary to identify vapor intrusion.
- Latest plan of actions proposed by LSP was submitted to MassDEP on March 24 for approval; that work will be conducted by the LSP on behalf of PRPs.
- Work deemed necessary by MassDEP that is not conducted by LSP will be done by MassDEP and its contractors.
- Comprehensive testing will ultimately determine the extent of contamination in all media.
- Extent and degree of contamination will inform remedial decisions.

# MassDEP Contact Information

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  stephen.johnson@state.ma.us

# FIELD INVESTIGATION SUMMARY

## Nonantum Business Park Property
## 459-471 Watertown Street, and 320-330 Nevada Street
## (RTN 3-0033794)

Lisa J. Campe, Licensed Site Professional

April 12, 2017

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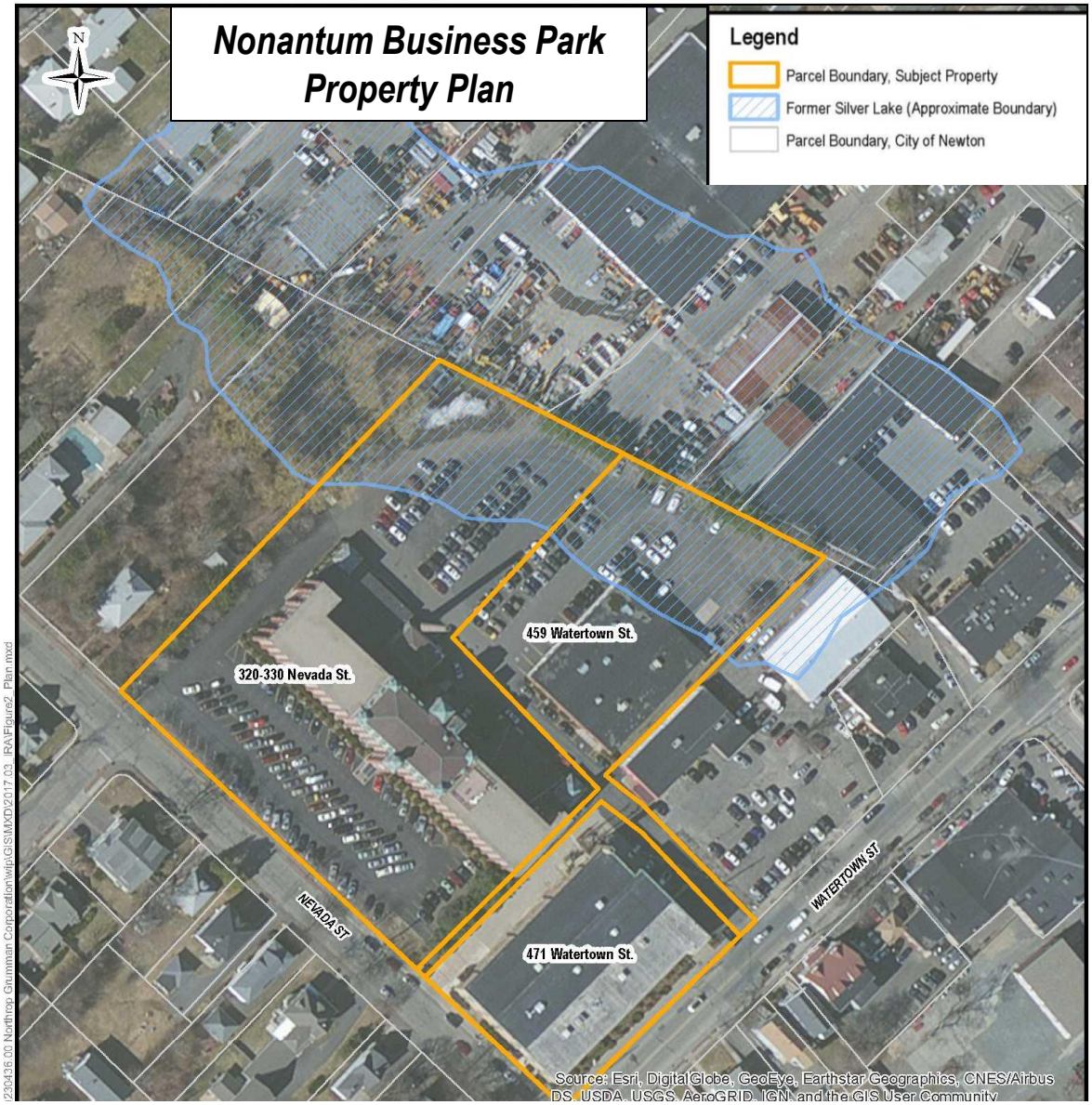
# Presentation Overview

- Nonantum Business Park Property background
- Regulatory history
- Investigation Findings to Date
  - Vapor Intrusion investigation
  - Source investigation
- Next Steps
- Q & A

# Project Roles

- MassDEP – environmental regulatory agency
- One Nevada Realty LLC - owner of the Property
- Northrop Grumman – company that acquired TRW, a former owner of the Property
- O'Reilly, Talbot & Okun Associates – environmental consultant for One Nevada
- Woodard & Curran – environmental consultant for Northrop Grumman
- Lisa Campe – overall project LSP

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# Property Background

- 1860s: Brick mill building constructed by Silver Lake Cordage Company
- 1928: National Packaging Machine Company took over the Property
- 1938-1980s: Ucinite Company, United-Carr, Inc. and TRW, Inc. occupied the Property
  - Manufacturing/production of specialty fasteners and assembly of electromechanical devices
- 1984: One Nevada purchased property
  - Redeveloped mill building as office space
  - Mixed commercial use at other two buildings

# Regulatory History

- MassDEP/EPA investigations 1980s-1990s
  - Nevada Street Site “closed”/no further action
- 2014: MassDEP initiated groundwater/indoor air assessment in Nonantum neighborhood following audit of former junkyard Site on West Street
  - TCE impacts identified in shallow groundwater, associated with vapor intrusion pathway
- 2016: MassDEP installed groundwater monitoring wells on corner of Watertown and Nevada Streets
  - Elevated levels of TCE detected in deep groundwater.

# Regulatory History, continued

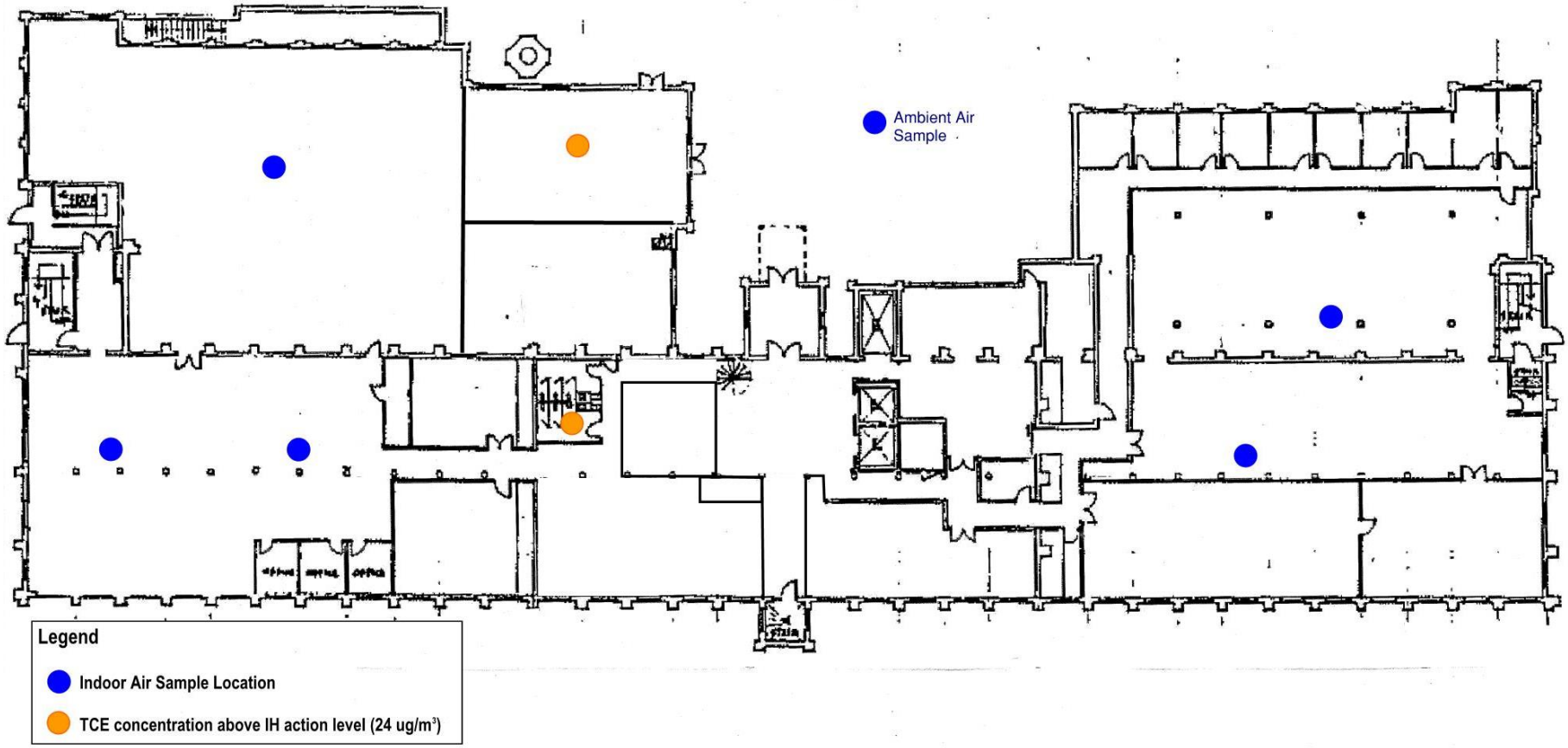
- Sept. 2016 -MassDEP sent Notice of Responsibility (NOR) to One Nevada and Northrop Grumman
- NOR identified need for “Immediate Response Actions” (IRA)
  - IRA must address any “Imminent Hazards” (IH)
- Focus on Vapor Intrusion in Property buildings

# Initial Indoor Air Sampling

- October 2016: Air samples collected by MassDEP and OTO from all three buildings
  - IH conditions identified in only 2 locations in central-eastern portion of mill building.
    - IH action level for TCE > 24 µg/$m^3$
  - TCE only contaminant in air above MassDEP indoor air threshold levels
  - Need for Immediate Response Actions (IRA) in former mill building due to IH.

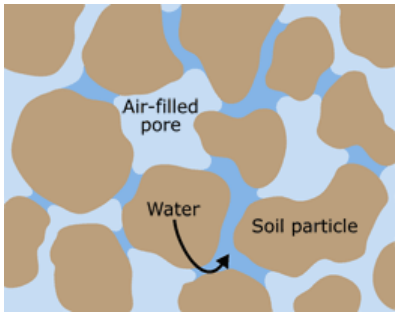

*Air sampling canister (SUMMA canister)*

# Former Mill Building Indoor Air Sampling Locations: Ground Level



# Sub-Slab Soil Vapor Sampling

- Soil vapor: vapor-phase chemicals in spaces within soil
- Woodard & Curran collected soil vapor samples through foundations of the three buildings Nov. 2016-Feb. 2017
- Used “vapor pin” set-up with SUMMA canister

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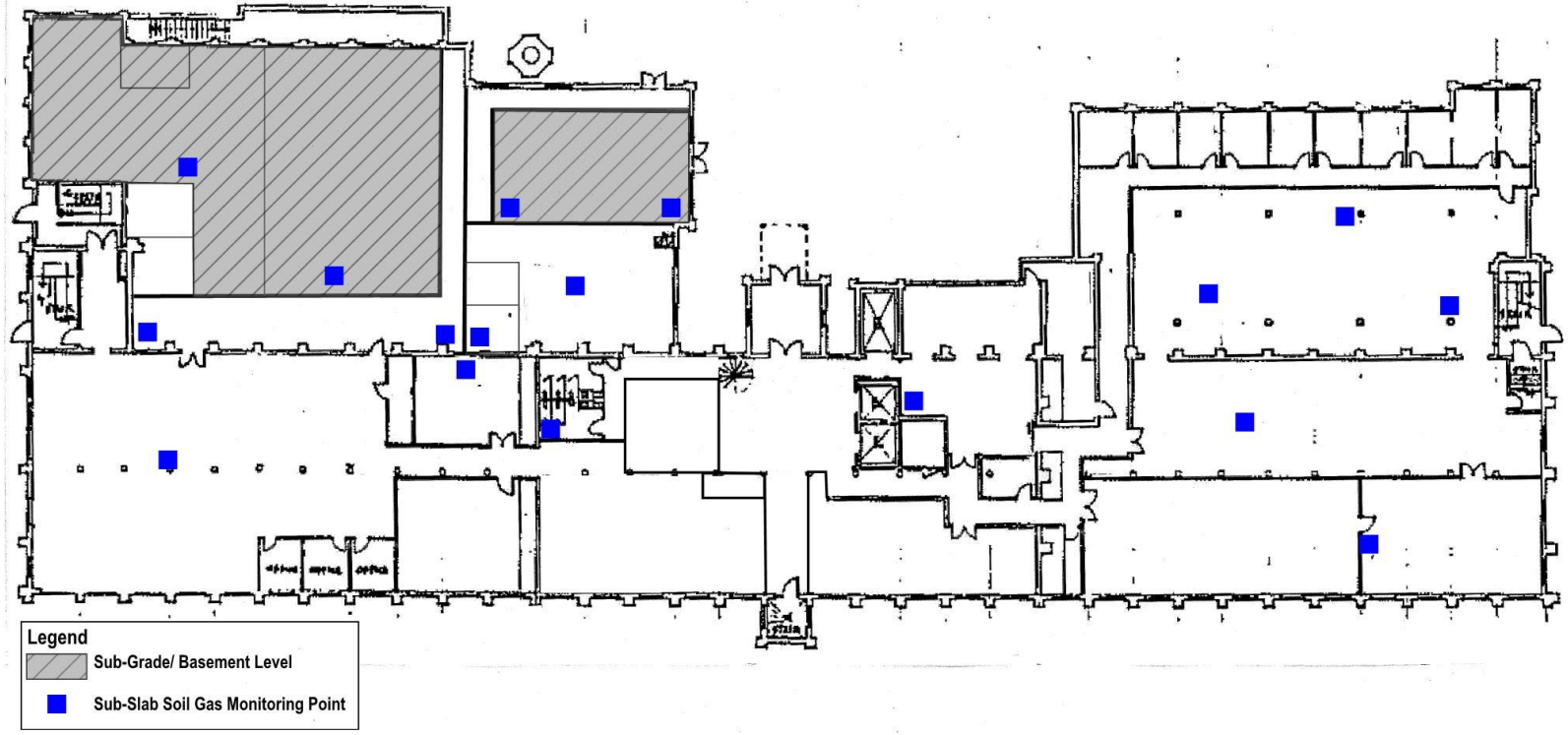
# Former Mill Building Sub-Slab Soil Vapor Monitoring Points

- Highest concentrations detected near former cistern/plating area
- Complete VI pathway present

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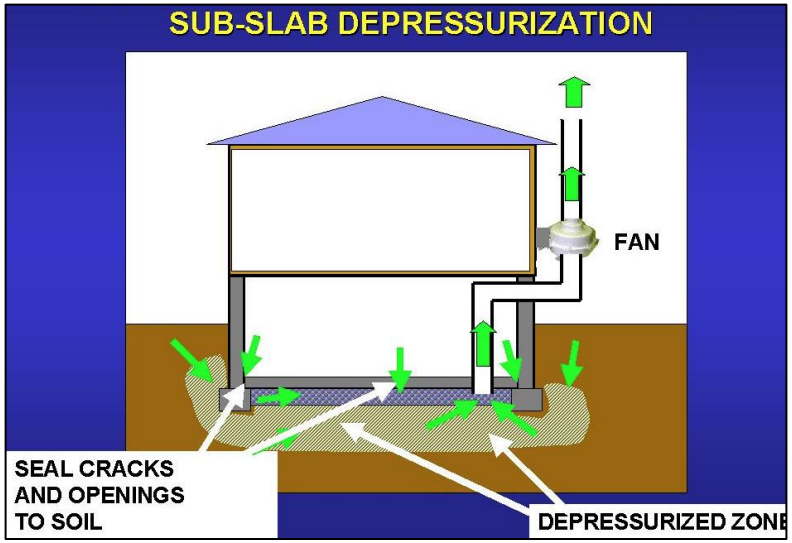
# Imminent Hazard Abatement

- Short-term actions to eliminate the IH:
  - Air-Purifying Units (APUs) installed
  - Bathroom drain traps filled
  - Fresh-air ventilation increased
- November 2016: areas with IH conditions resampled
  - TCE levels declined; IH conditions abated
- December  2016: all prior locations resampled
  - No IH conditions identified
  - Concentrations typically lower than initial sampling

# Vapor Intrusion Mitigation

- Long-term mitigation
  - Installation of Sub-Slab Depressurization System (SSDS) in spring 2017
- Follow-up air and soil vapor sampling after SSDS installation

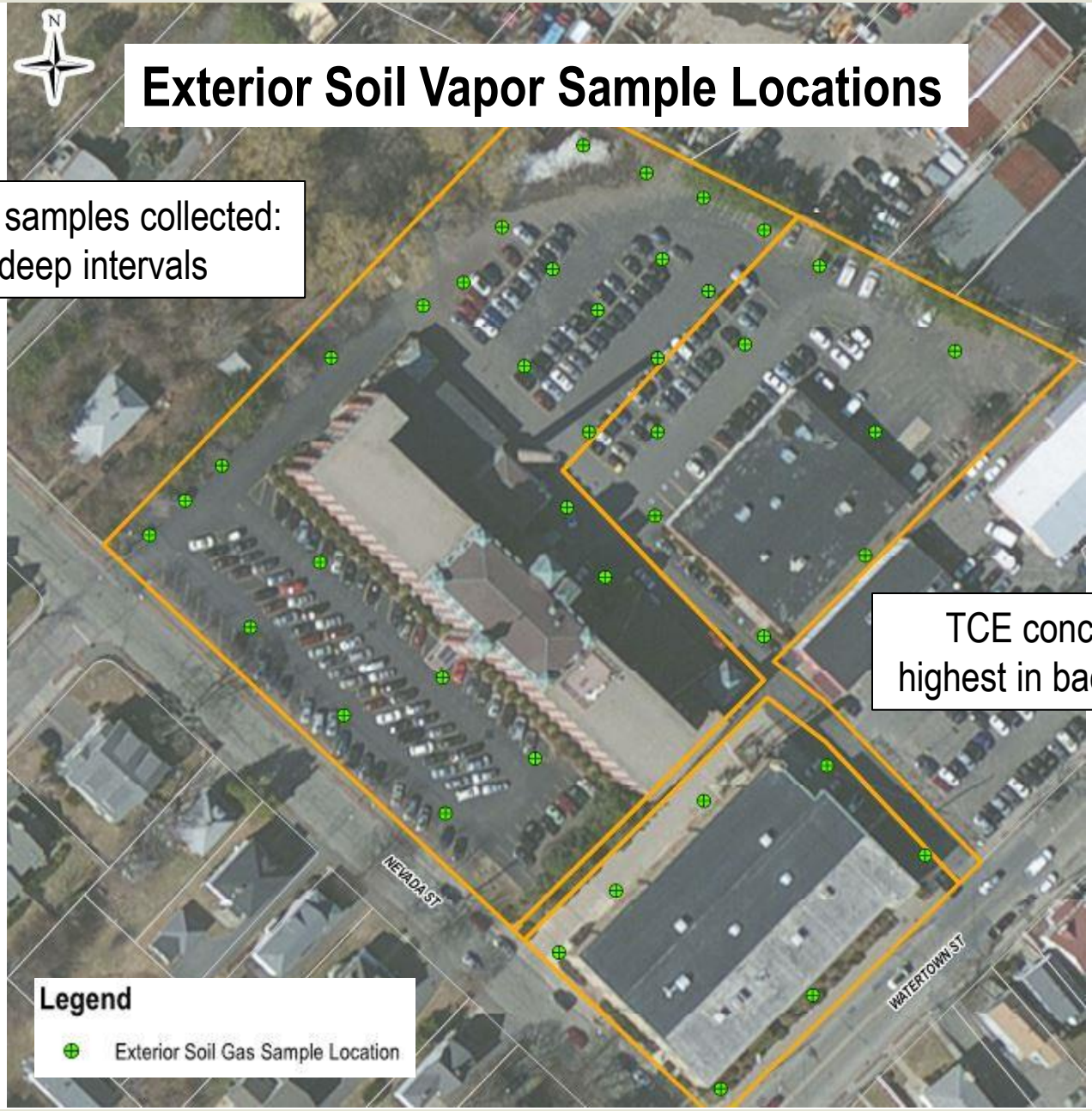


# On-Property Source Investigation

- Goals:
  - Identify source of VOCs, if present
  - Evaluate nature and extent of impacts
- Step-wise approach taken:
  - Soil vapor (exterior of building)
  - Soil
  - Groundwater (shallow/deep)
  - Groundwater flow
  - Geophysical survey

# Exterior Soil Vapor Sample Locations

59 soil vapor samples collected:
Shallow and deep intervals




TCE concentrations highest in back parking lot

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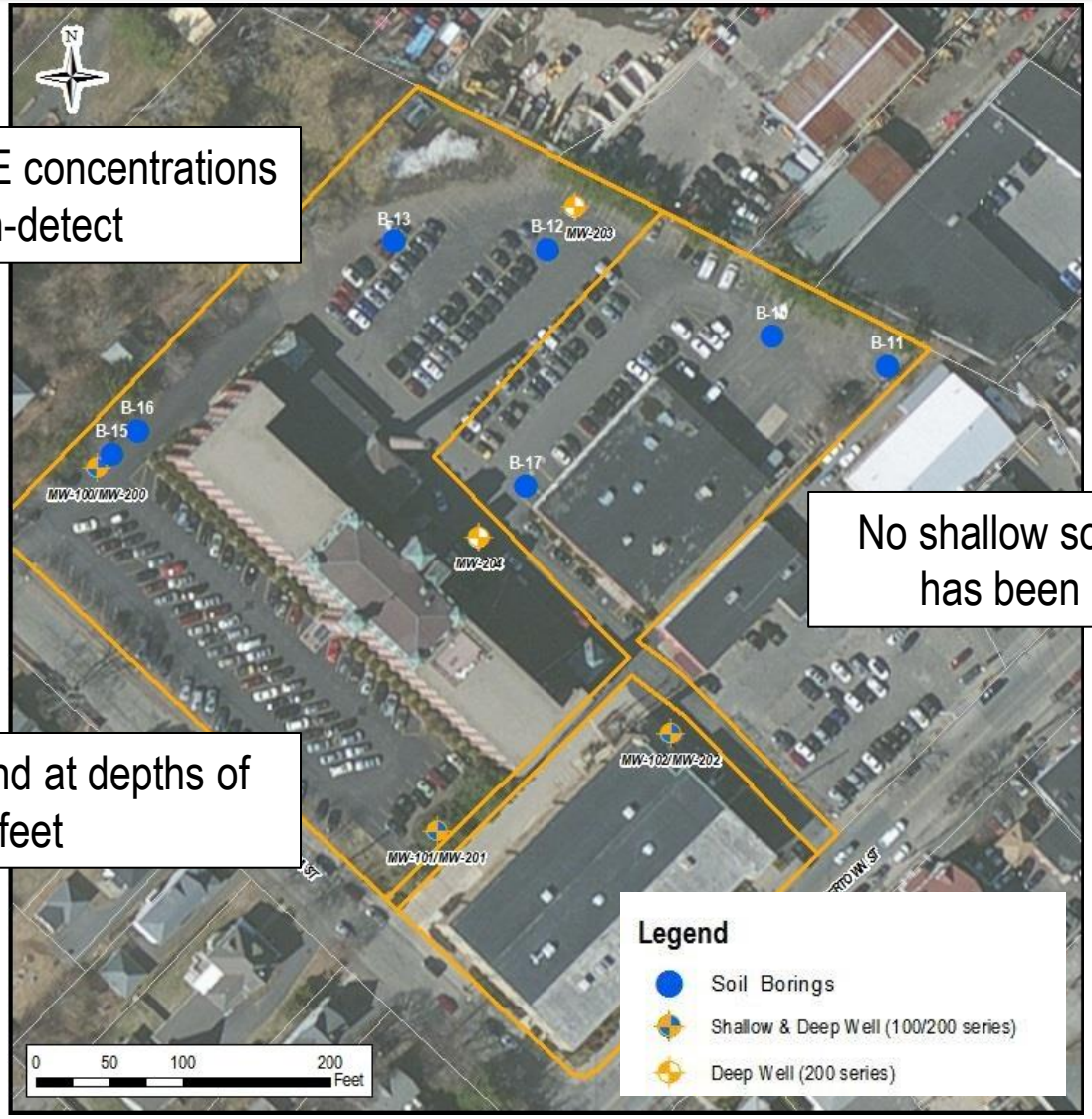
# Soil Boring and Monitoring Well Locations

Most samples: TCE concentrations low to non-detect

TCE impacts found at depths of 40-70 feet




No shallow source of TCE has been identified

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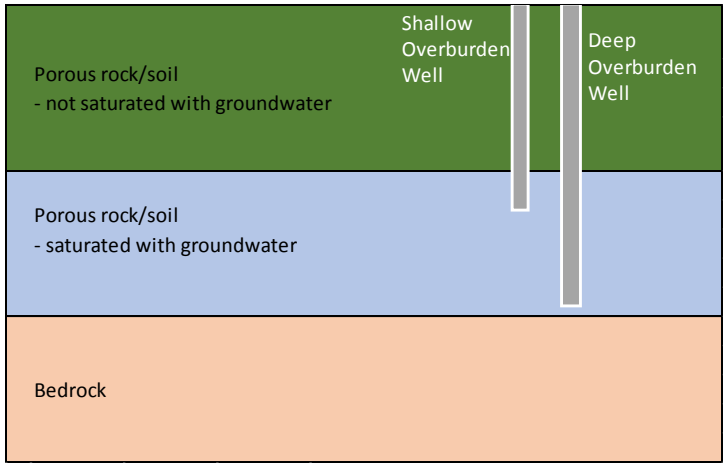
# Groundwater Assessment

- Sampling of 4 existing on-Property shallow wells
- Groundwater profiling at 8 locations
  - Samples collected at 10-foot intervals from water table until refusal
- Sampling of 3 new shallow and 5 deep wells on-Property
- Sampling of MassDEP deep wells on Watertown Street



# Shallow Groundwater Results

- Neither TCE nor its breakdown products detected in samples from new shallow overburden wells.
- Low levels (<20 ppb) TCE detected in samples from previously existing shallow wells
- No apparent source of VOC impacts to shallow groundwater observed

# Deep Groundwater Results

- VOC impacts not observed until approximately 50-70 feet bgs
- TCE concentrations in new deep wells similar in magnitude to MassDEP Watertown Street wells
- Highest on-Property TCE concentrations in central portion of 320 Nevada Street, near former cistern/plating area
- No apparent on-Property source of TCE impacts to deep overburden groundwater has yet been identified at the Property

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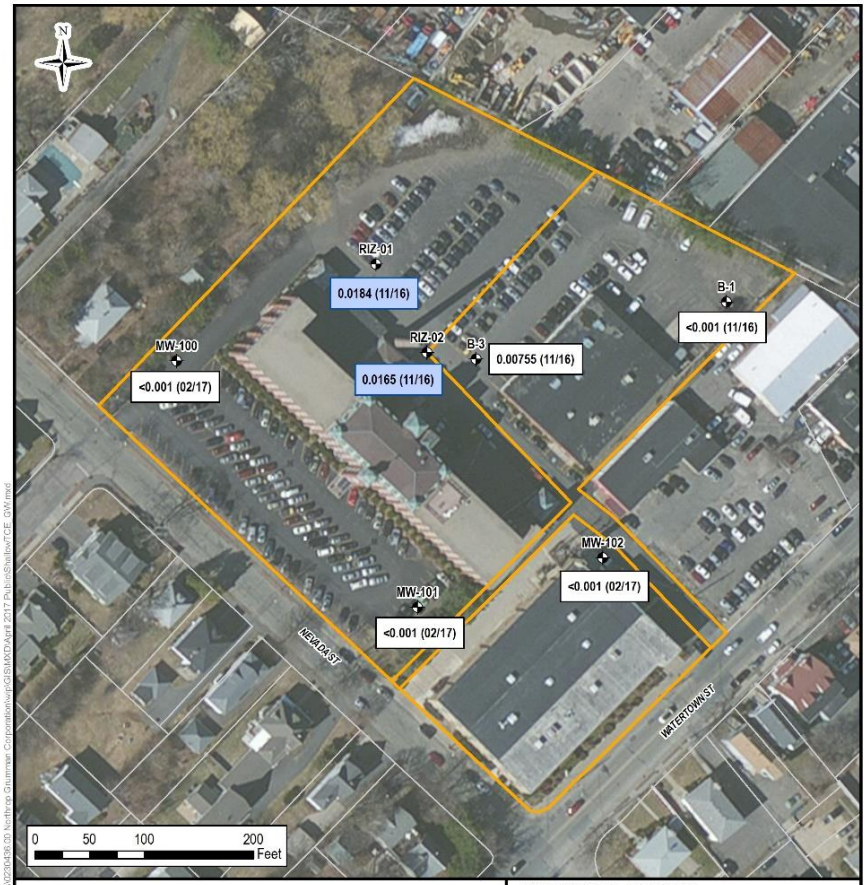



**Legend**

- Shallow Overburden Well & TCE Concentration (ppm)
- Parcel Boundary, Subject Property
- Parcel Boundary, City of Newton

**TCE Concentration**

- > 0.01 ppm

Notes:
1. Groundwater samples were collected in November 2016 (11/16) and February 2017 (02/17), where noted.
2. TCE = trichloroethylene.
3. ppm = parts per million.

TCE CONCENTRATIONS,
SHALLOW OVERBURDEN

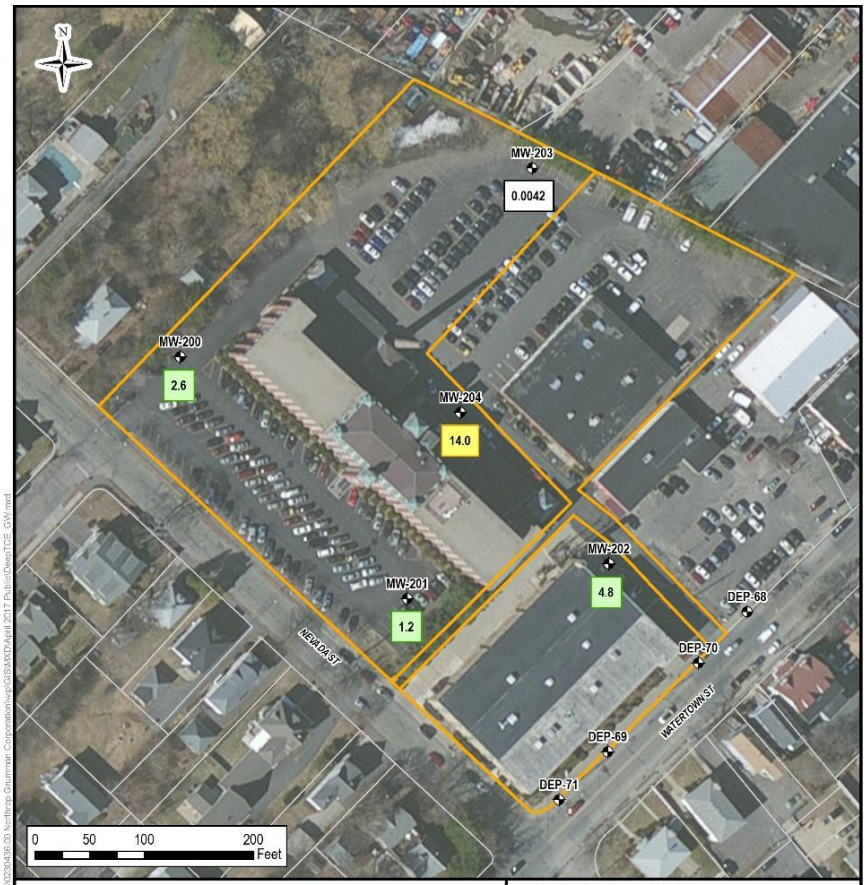
***459-471 Watertown Street &***
***320-330 Nevada Street, Newton, MA***

**FIGURE #A**

WOODARD & CURRAN



| | |
|---|---|
| SCALE: 1 " = 100 feet | DOC: ShallowTCE_GW.mxd |
| DATE: APRIL 2017 | PROJECT #: 0230436.00 |
| DRAWN BY: BVA | SOURCE: ESRI, Newton GIS, MassGIS |




**Legend**

- Deep Overburden Well & TCE Concentration (ppm)
- Parcel Boundary, Subject Property
- Parcel Boundary, City of Newton

**TCE Concentration**

- > 10.0 ppm
- > 1.0 ppm

Notes:
1. Groundwater samples were collected in February/March 2017.
2. TCE = trichloroethylene.
3. ppm = parts per million.

TCE CONCENTRATIONS,
DEEP OVERBURDEN

***459-471 Watertown Street &***
***320-330 Nevada Street, Newton, MA***

**FIGURE #B**

WOODARD & CURRAN



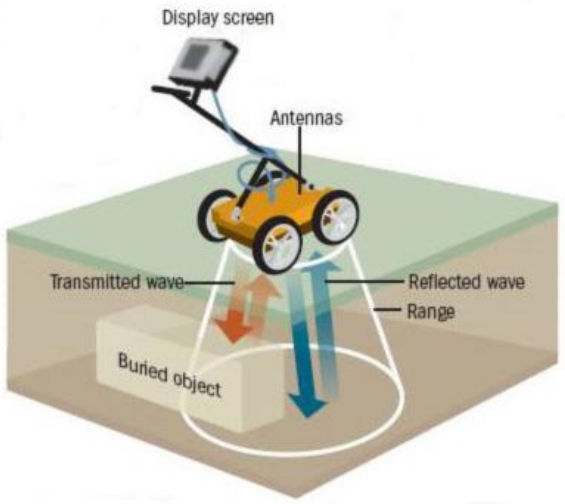
| | |
|---|---|
| SCALE: 1 " = 100 feet | DOC: DeepTCE_GW.mxd |
| DATE: APRIL 2017 | PROJECT #: 0230436.00 |
| DRAWN BY: BVA | SOURCE: ESRI, Newton GIS, MassGIS |

# Groundwater Elevation Survey

- Elevation Survey to evaluate direction(s) of groundwater flow
- Initial survey included all on-Property shallow and deep wells and select nearby neighborhood wells installed by MassDEP.
- Initial survey shows very flat gradient
- Flow direction(s) unclear at this time
- Additional survey data to be collected

# Geophysical Survey

- Ground-penetrating radar (GPR) in former mill building
- Identifies presence of underground “anomalies” – depressions, objects, structures
- GPR identified buried round structure
  - Suspected former cistern



# IRA Response Actions Summary

***Vapor Intrusion***

- Complete vapor intrusion pathway identified in former mill building
- IH pinpointed in two locations in former mill building abated through short-term measures (APUs)
- SSDS to mitigate vapor intrusion planned for mill building
- Future air quality monitoring planned for Nonantum Business Park Property

# IRA Response Actions Summary

***Source Investigation***

- Collected over 200 samples since November 2016 from various media across Property
  - 20 subslab soil vapor
  - 30 indoor air
  - 59 exterior soil vapor
  - 39 soil samples
  - 15 groundwater from monitoring wells
  - 41 groundwater (profiling)
- GPR Survey
- Well elevation survey

# IRA Response Actions Summary

***Soil/Groundwater Source Investigation***

- Data show little to no impact in shallow soils/groundwater
- Elevated VOC concentrations appear limited to deep (~50-70 feet bgs) groundwater
- No source of VOCs to deep groundwater identified, but former cistern/ plating area targeted for future assessment

# Ongoing Assessment Activities

- Installation/sampling of 2 angled monitoring wells beneath the former Mill Building to reach former cistern area
- Elevation Survey of Property and Neighborhood wells to evaluate groundwater flow direction(s)
- Repeat groundwater sampling at all on-Property wells
- Integrate all findings into Conceptual Site Model to identify next steps

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# QUESTIONS?

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