



Stantec Consulting Services Inc.

**5 Burlington Woods Drive
Burlington, MA 01803**

Date: January 14, 2016
To: Cambridge Redevelopment Authority
From: William Beyer
Re: Timeline for Galileo Galilei Way Site Activities Reference

MEMORANDUM

The following timeline describes the discovery, evaluation, remediation and regulatory closure of the Trichloroethene (TCE) contamination encountered by the new pathway along Galileo Galilei Way. The contamination has been remediated, contaminated soil was removed for off-site treatment, and closure documents were filed with DEP.

Discovery, June 2014

Concerns were raised regarding the potential for contamination in the soil to be excavated for the proposed widening of this path and the consequent effect on reuse options for excess soil. Four shallow soil samples were collected alongside the pathway between Main Street and Broadway. The attached figure presents the sample locations. While some typical "urban fill" contaminants were detected, an unexpected TCE also was detected in samples 3 and 4 at concentrations of 0.153 and 24.1 mg/Kg (parts per million). The concentration in Sample 4 exceeds the DEP Reportable Concentration of 2 mg/Kg for this chemical. The Cambridge Redevelopment Authority (CRA) notified DEP as required.

Evaluation, July - August 2014

Additional investigations were conducted subsequently to evaluate the extent of the soil contamination, and determine any effects on groundwater. The investigation consisted of nine (9) borings, the installation of three (3) monitoring wells, collection and analysis of fourteen (14) additional soil samples and three (3) groundwater samples. The analyses focused on the contaminant of concern, TCE, and related chlorinated volatile organic compounds.

The results of the soil testing confirmed the presence of TCE, albeit at low concentrations. Only two samples contained detectable concentrations of TCE and the highest concentration detected in this second round of sampling was 0.22 mg/Kg compared to the highest previous concentration of 24.1 mg/Kg. Boring SB-7 was taken very close to the location of the original sample with the high concentration. No TCE was detected in the three samples from this boring.

No TCE was detected in the three groundwater samples. One sample contained 0.001 mg/L of cis-1, 2 Dichloroethene, a related chemical. The concentration that triggers reporting to DEP for this chemical is 20 times higher than the detected concentration.

Table 1 - Laboratory Results: TCE in Soil

| Date | Sample w/interval | TCE (mg/Kg) | Detection Limit (mg/Kg) |
|-----------|----------------------|----------------|----------------------------|
| June 2014 | SS-1 (0-3') | ND | <0.057 |
| " " | SS-2 (0-3') | ND | <0.072 |
| " " | SS-3 (0-3') | 0.153 | 0.052 |
| " " | SS-4 (0-3') | 24.1 | 0.526 |
| July 2014 | SB-2 (0-2.5') | 0.215 | 0.0396 |
| " " | SB-3 (0-2.5') | ND | <0.0048 |
| " " | SB-4 (0-5') | ND | <0.0038 |
| " " | SB-5 (0-2.5') | ND | <0.0046 |
| " " | SB-5 (2.5-5') | ND | <0.0043 |
| " " | SB-5 (5-10') | ND | <0.0067 |
| " " | SB-6 (0-5') | ND | <0.0041 |
| " " | SB-6 (5-10') | ND | <0.0033 |
| " " | SB-7 (0-2.5') | ND | <0.0049 |
| " " | SB-7 (2.5-5') | ND | <0.004 |
| " " | SB-7 (5-10') | ND | <0.0051 |
| " " | SB-8 (0-5') | ND | <0.0061 |
| " " | SB-8 (5-10') | ND | <0.0044 |
| " " | SB-9 (0-5') | ND | <0.0037 |

Remediation, Spring and Summer 2015

The sampling data indicates TCE contamination concentrated at one location. It was not found wide spread across the project length. This evaluation led to a decision to address the contamination during construction of the path. The agreed-upon approach was the excavation and disposal of the TCE-contaminated soil. Stantec, as CRA's LSP, would provide field inspection to determine limits of excavation and collect confirmatory samples post excavation. Provisions to implement this approach were included in the project's plans and specifications for inclusion in the bid package, and required submittals were sent to DEP.

The plan was implemented during construction. On September 11, 2015, the location of sample SS-4 was determined by the Stantec staff member who had taken the samples using field notes and memory. Stantec used visual, olfactory, and photoionization detector (PID) screening indications to monitor TCE-contaminated soil. Soil at this location was excavated by hand and placed in a drum. Excavation continued until the PID headspace screening of soils from the sides and bottom of the excavation were less than 1 ppmv. Stantec collected confirmatory soil samples along the sides and bottom of the excavation. The following table contains the analytical results. Concentrations in samples from the sidewall were below detection limits. The sample from the bottom of the excavation contained 0.067 mg/Kg of TCE. This concentration is significantly below the most-stringent DEP remediation soil standard of 0.30 mg/Kg. The detection, albeit at low concentration, supports our objective that the excavation occurred at the correct location.

| Sample | TCE (mg/Kg) | Detection Limit (mg/Kg) |
|------------|----------------|----------------------------|
| Sidewall-1 | ND | < 0.05 |
| Sidewall-2 | ND | < 0.05 |
| Sidewall-3 | ND | < 0.05 |
| Bottom | 0.067 | 0.05 |

The drummed soil was properly stored and shipped to a treatment facility in New Jersey. The facility acknowledged receipt of, and acceptance of the soil. The drummed soil was shipped to:

Cycle Chem, Inc.,
217 South First Street,
Elizabeth, NJ 07206

Regulatory Closure

The evaluation determined that the TCE contamination was not widespread but was restricted to a small area. The source is not known. DEP's database does not contain any information indicating that a neighboring property has TCE contamination that could have been a source. The shallow depth and limited volume of TCE-contaminated soil suggests a spill as the possible source. One possible scenario would be a minor spill of dry cleaning fluid.

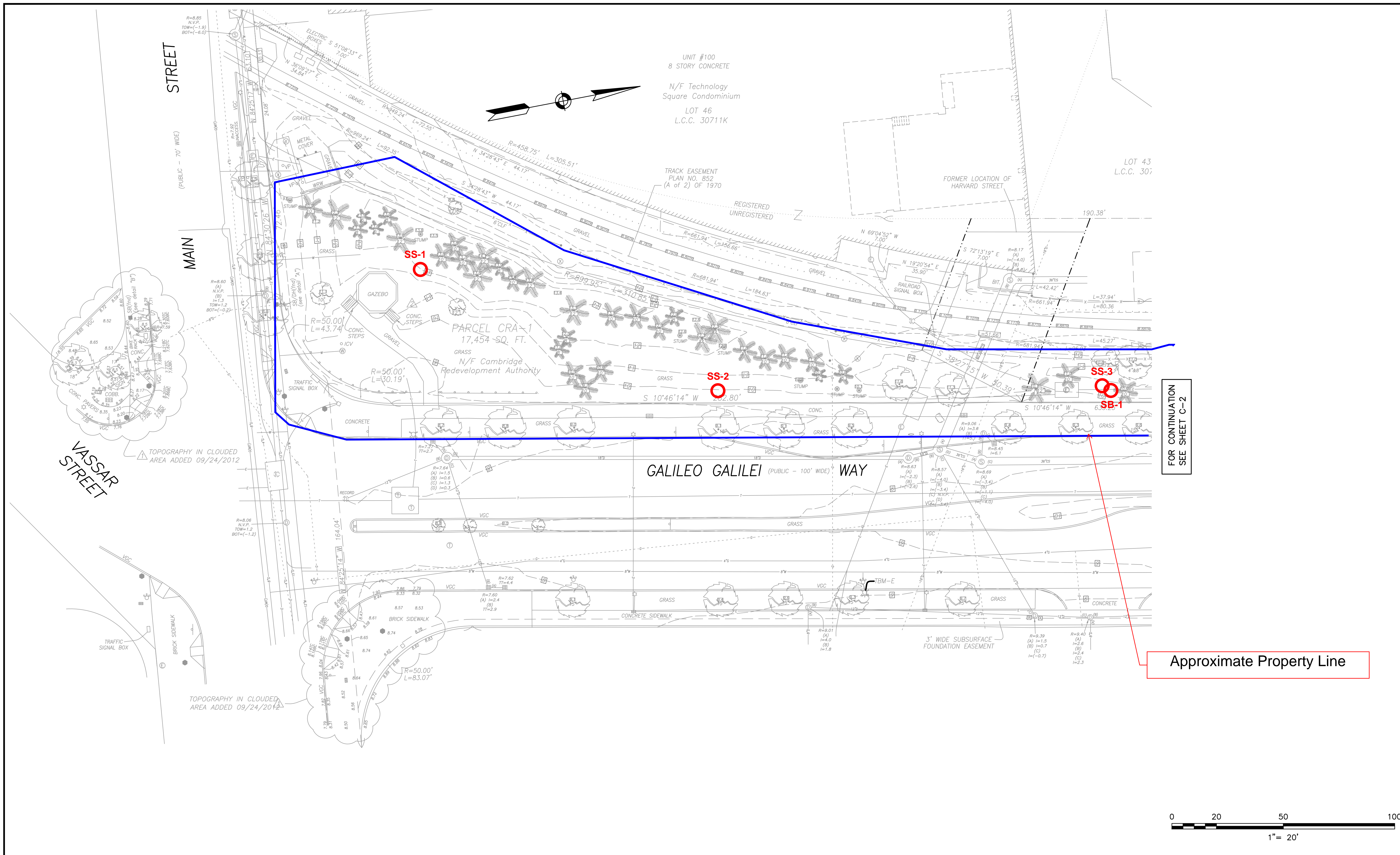
The data collected indicated that the highly TCE-contaminated soil was excavated, leaving only remnant concentrations. Those concentrations are significantly below the remediation standards. There is no source to locate and control. This supports a permanent closure for the site. Stantec prepared the proper documentation for a Permanent Solution Statement with No Conditions. CRA and Stantec's LSP signed off on the documentation and it was submitted to DEP. Stantec considers the site closed.

STANTEC CONSULTING SERVICES INC.



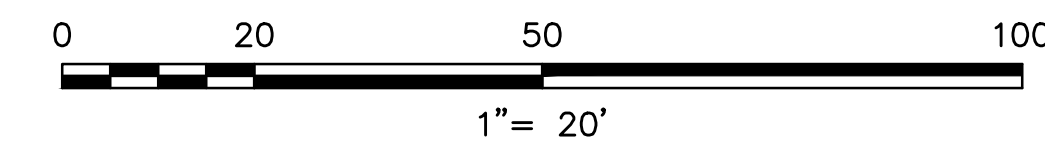
William Beyer, LSP
Principal Hydrogeologist
Phone: 781-221-1276
Bill.Beyer@Stantec.com

Attachment: Sample Locations Plan



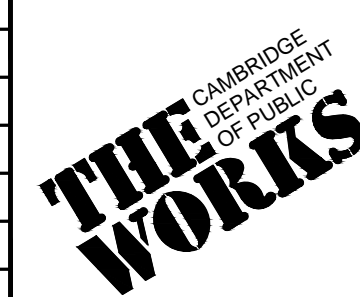
FOR CONTINUATION
SEE SHEET C-2

Approximate Property Line



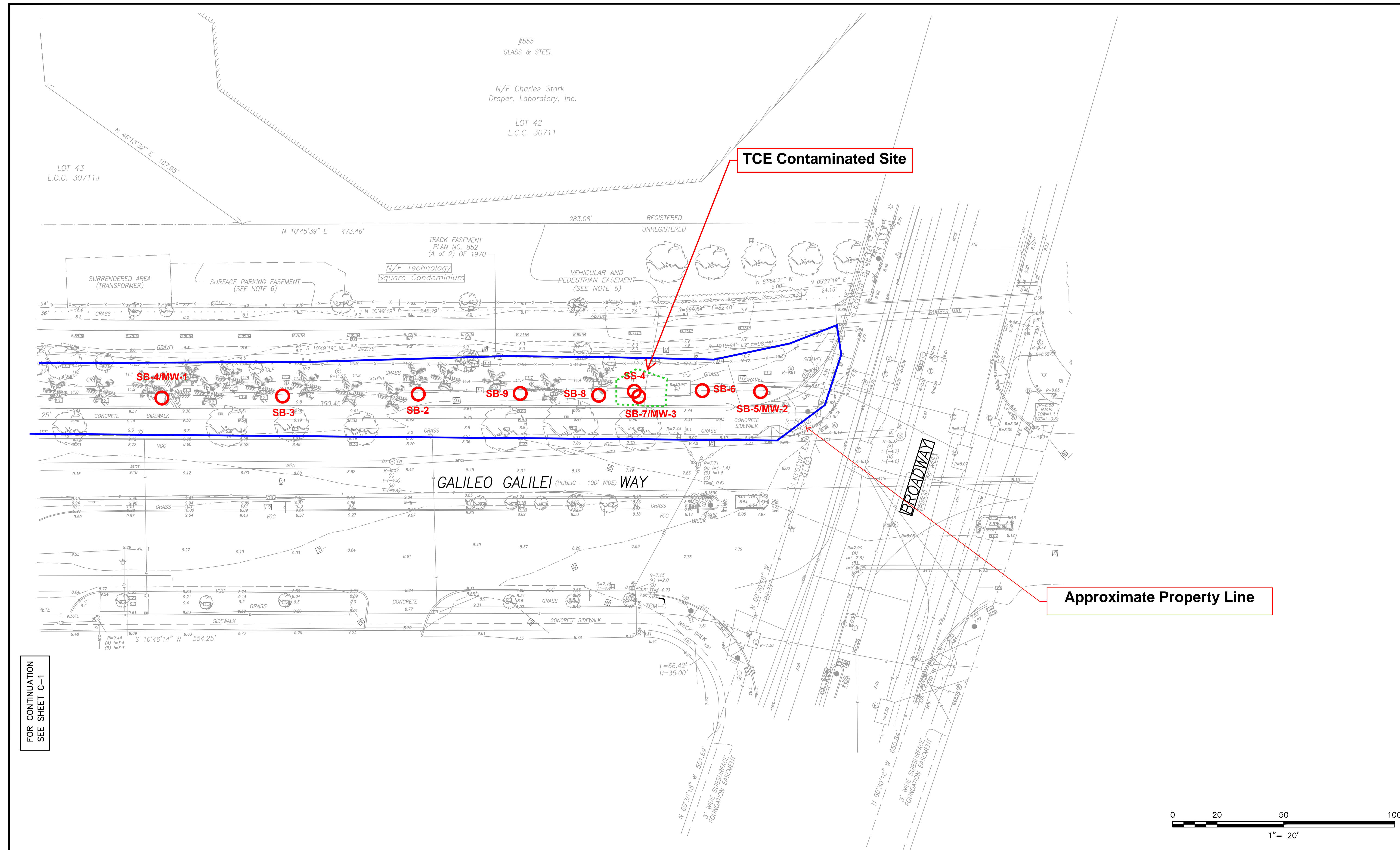
FAY, SPOFFORD & THORNDIKE, LLC
ENGINEERS · PLANNERS · SCIENTISTS
5 BURLINGTON WOODS, BURLINGTON, MA 01803

| | | | |
|-------------|---------------|-------------|------|
| Scale | AS NOTED | | |
| Date | JUNE 12, 2014 | | |
| Job No. | XXXXXXXX.XXXX | | |
| Designed by | | | |
| Drawn by | | | |
| Checked by | No. | Description | Date |
| Approved by | JMM | REVISIONS | |

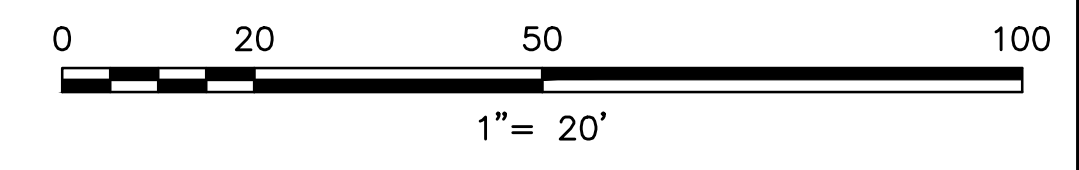


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|---------|---|
| Client | CITY OF CAMBRIDGE, MASSACHUSETTS |
| Project | INNOVATION BOULEVARD STREETSCAPE & PEDESTRIAN IMPROVEMENTS |
| Drawing | SURVEY CONTROL PLANS - PART 1 |

Figure 1A
Sample
Locations



FOR CONTINUATION
SEE SHEET C-1



FST
100 YEARS

FAY, SPOFFORD & THORNDIKE, LLC
ENGINEERS · PLANNERS · SCIENTISTS
5 BURLINGTON WOODS, BURLINGTON, MA 01803

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|-------------|---------------|-----|-------------|
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| Date | JUNE 12, 2014 | | |
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|---------|---|
| Client | CITY OF CAMBRIDGE, MASSACHUSETTS |
| Project | INNOVATION BOULEVARD STREETSCAPE & PEDESTRIAN IMPROVEMENTS |
| Drawing | SURVEY CONTROL PLANS - PART 2 |

Figure 1B
Sample
Locations