Stan A. Huber Consultants, Inc.
Health Physics and Radiation Safety Services

200 North Cedar Road – New Lenox, Illinois 60451-1751 – (800) 383-0468 or (815) 485-6161 – FAX (815) 485-4433 – Email sahci@sahci.com – Home Page www.sahci.com

December 22, 2020

Verneta Simon
U.S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, IL 60604

RE: Thorium Monitoring at 300 N. Michigan Avenue
Interim Report October 1, 2020 – December 21, 2020

Dear Ms. Simon:

This report is being submitted by Stan A. Huber Consultants, Inc. (SAHCI) on behalf of 300 N. Michigan, LLC c/o Sterling Bay, LLC. SAHCI was hired by 300 N. Michigan, LLC to provide radiological monitoring during demolition and construction activities at 300 and 310 N. Michigan Avenue in Chicago, Illinois. This report covers monitoring performed by SAHCI from October 1, 2020 – December 21, 2020.

Thorium monitoring was conducted in accordance with the *Thorium Investigation Work Plan for 300 N. Michigan Ave*, *Chicago, Illinois*, revision dated November 25, 2019 (Work Plan). Per the Work Plan, monitoring for thorium is required during construction activities involving the disturbance or exposure of subsurface fill. The removal action level for thorium at the site has been established as 7.1 picocuries per gram (pCi/g) total radium (radium-226 + radium-228).

The entire footprint of the planned building has been monitored to depths where native material has been reached, with no instances of thorium contamination. The remaining construction activities involve utility work within the ROW surrounding the private property. Thorium monitoring was performed for the following construction activities:

- Water Utility Installation 10/22/20-11/9/20
- Temporary Gas Utility Installation 10/30/20
- Sanitary and Storm Sewer Utility Installation 11/4/20-11/17/20

<u>Instrumentation</u>

Surface gamma scans were performed using Ludlum Model 2221 Scaler / Ratemeters (serial no. 134542, 132844, 127242, and 99147) with attached Ludlum Model 44-10 2”x2” NaI detectors (w/ 6” lead collimator shields). All meters were calibrated on July 28, 2020. The USEPA action level of 7.1 pCi/g total radium count rate correlation for the instruments are as follows:

Serial No. 134542: 7,228 counts per minute (cpm) - Mark Dewald, SAHCI
Serial No. 132844: 7,592 cpm – Brian Schmidt, SAHCI
Serial No. 127242: 7,013 cpm - Jeremy Kieser, SAHCI
Serial No. 99147: 6,959 cpm – Aaron Morris, RSSI

The background count rate ranged from 1,324 cpm – 1,982 cpm during the excavation of the 3 locations.

Surface Gamma Scans

Excavation of the water, gas, and sewer lines took place from October 22, 2020 to November 17, 2020. Survey data was collected by entering the excavations after each 18-inch lift and recording the highest count rate for the floors and walls to a maximum excavation depth of 8.5 feet below ground surface. At locations where the excavations were deeper than 4 feet below grade or could not be easily accessed, material was surveyed in the excavator bucket as it was removed or after stockpiling at the surface. The gross count rates in the excavations ranged from 1,400 cpm to 4,000 cpm. No count rates were observed at any time that exceeded the instrument specific threshold limits detailed above.

SAHCI technicians performed the monitoring on 4 of the 19 total days of excavations during this monitoring period. RSSI (subcontractor) performed monitoring on the remaining 15. Since the bulk of the surveys were performed by the subcontractor, a separate monitoring report was prepared coving that portion of the work.

The SAHCI surveys are detailed in Appendix A and the RSSI report is included as Appendix B.

Asbestos

Although no specific asbestos testing was performed, soils were visually screened during excavation for evidence of potentially asbestos containing mantles or mantle strings, per Section 4.1 of the Work Plan. No potentially asbestos-containing materials were identified, so no abatement is required at this time.

Conclusions

Since no count rates were identified above the 7.1 pCi/gram Removal Action Level, no additional soil sampling, air monitoring, or personnel monitoring were performed. As of December 21, 2020, no radiological contamination has been identified which would require notification of USEPA and/or remediation.

Upcoming Work Schedule

Native material has been reached at all locations and no fill material remains, radiological monitoring will not be required during any remaining construction activities within the building footprint

There are activities planned outside of the building footprint which will likely require radiological monitoring. The exact dates of the excavations have not been scheduled but should take place during 2021. These include:

- Permanent People's Gas service off Lower Wacker Place ROW - Q2 2021
- Communication Utilities in Lower Michigan, Wacker Place and MacChesney Court: TBD 2021
- Final Curb, Gutter, Sidewalk and Paving Work in Lower Michigan, Wacker Place and MacChesney Court: TBD 2021

Thank you for your assistance with this project. I will be providing a copy of this report to the City of Chicago Department of Public Health, as required. If you have any questions or need additional information, please call me at (815) 485-6161.

Sincerely,
Stan A. Huber Consultants, Inc.

Glenn Huber, CHP
President

Attachment A – SAHCI Gamma Scans

300 N. Michigan Avenue

Performed by:

Stan A. Huber Consultants, Inc.
200 N. Cedar Rd.
New Lenox, IL 60451

Stan A. Huber Consultants, Inc.

Radiation Survey Form

Location/ Project ID: 300 N. Michigan

Date: October 22, 2020 **Technician:** Jeremy Kieser

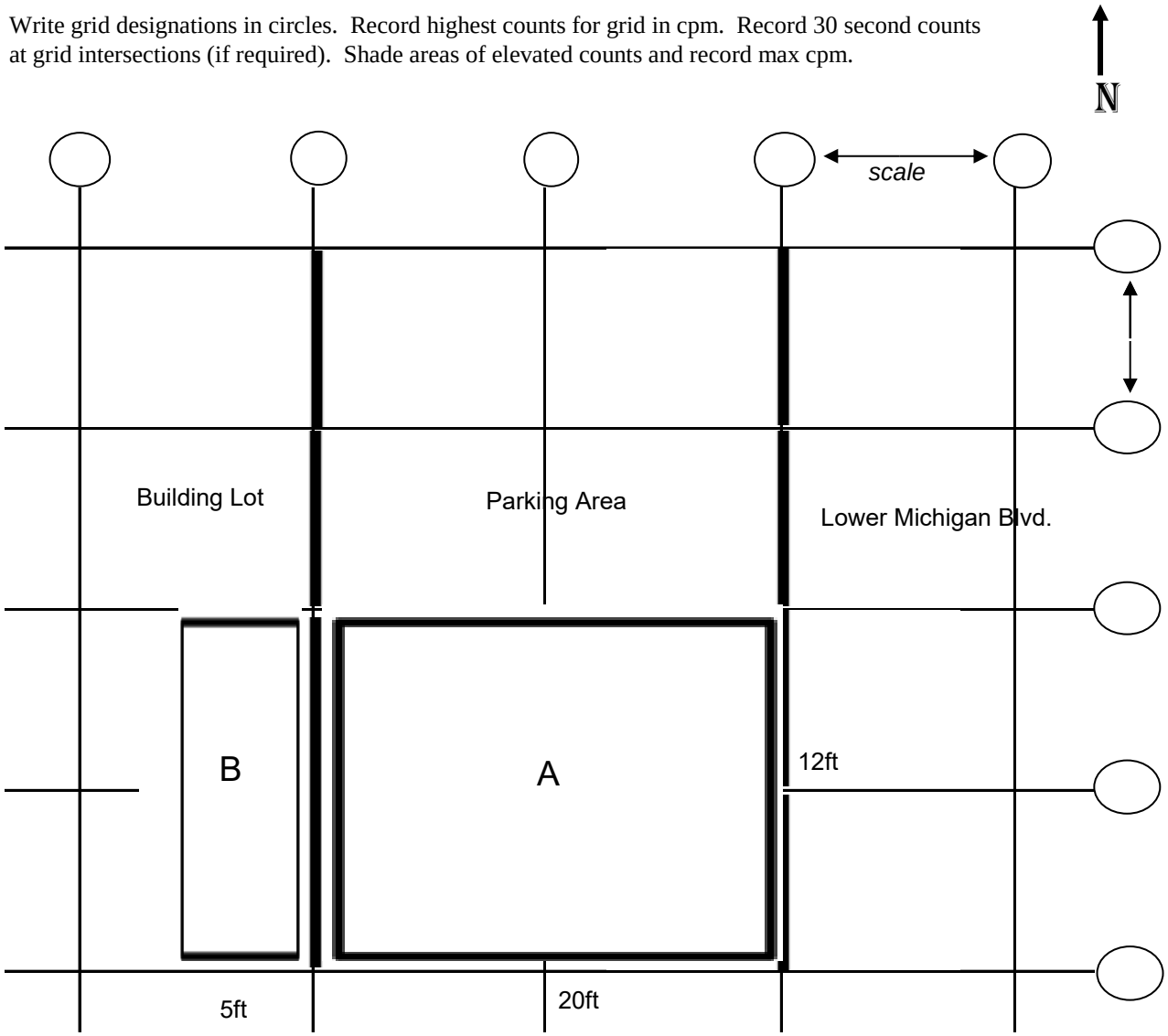
Inst Model: Ludlum 2221 **Serial No. :** 127242

Probe Type: 1"x1" NaI / 2"x2" NaI
Shielded / Not Shielded

Lift Elevation: Surface to 5ft.

Background 1876 **cpm** **Action Level:** 7013 **cpm**

Write grid designations in circles. Record highest counts for grid in cpm. Record 30 second counts at grid intersections (if required). Shade areas of elevated counts and record max cpm.



Location A:
Surface: 2100 cpm
18 inch: 1800 cpm
36 inch: 1900 cpm
48 inch: 2100cpm

Location B:
Surface: 1900 cpm
18 inch: 2300 cpm
36 inch: 2500 cpm
48 inch: 2100 cpm

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Radiation Survey Form

Location/ Project ID: 300 N. Michigan Ave.

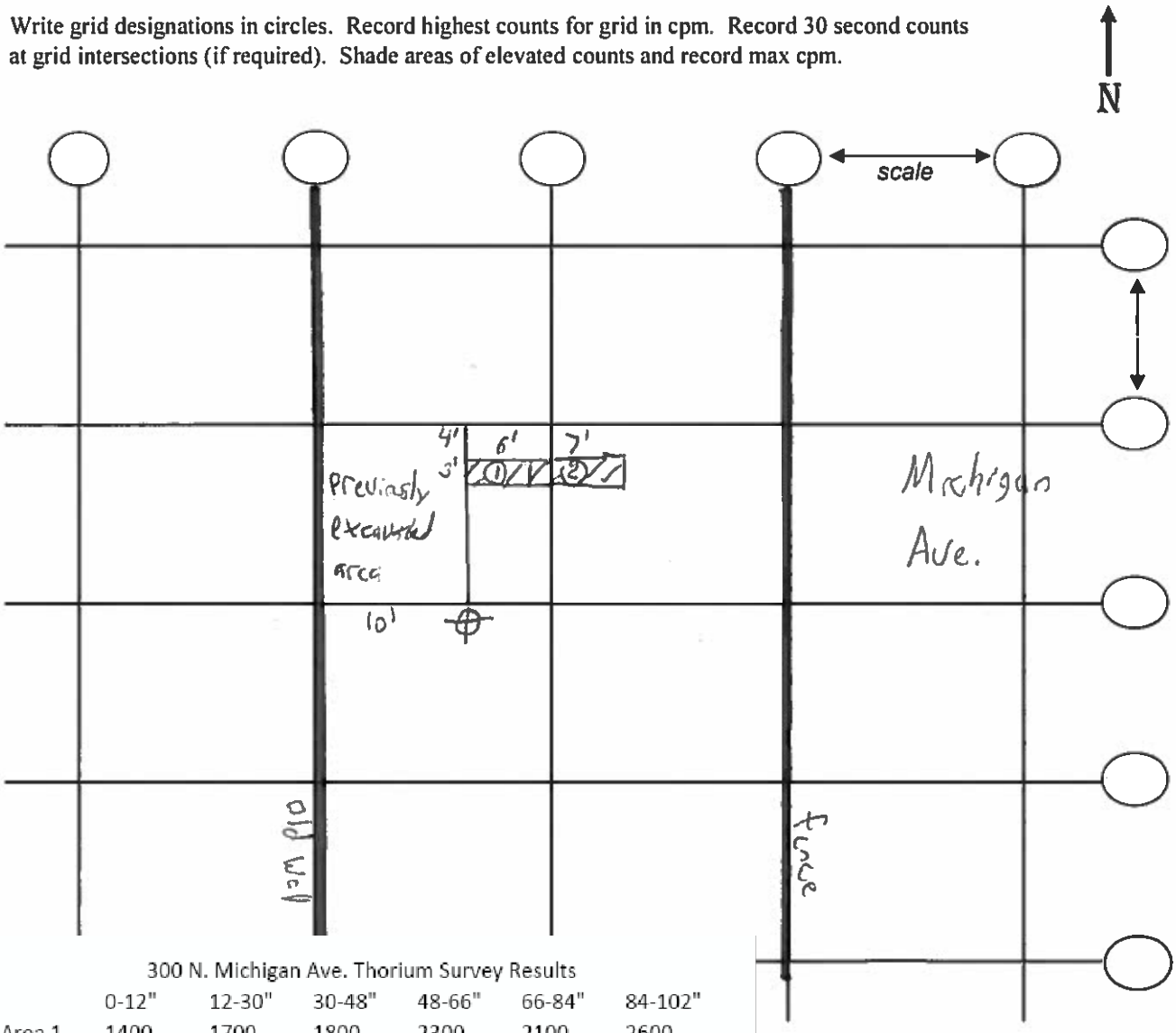
Date: 11/12/2020 **Technician:** Mark Dewald

Inst Model: Ludlum 2221 **Serial No. :** 134542

Probe Type: 1"x1" NaI (2"x2" NaI) Shielded / Not Shielded **Lift Elevation:** 0-7'

Background 1382 **cpm** **Action Level:** 7228 **cpm**

Write grid designations in circles. Record highest counts for grid in cpm. Record 30 second counts at grid intersections (if required). Shade areas of elevated counts and record max cpm.



300 N. Michigan Ave. Thorium Survey Results

	0-12"	12-30"	30-48"	48-66"	66-84"	84-102"
Area 1	1400	1700	1800	2300	2100	2600
Area 2	1600	2400	1800	NA	NA	NA

→ excavated area

→ background location

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Radiation Survey Form

Location/ Project ID: 300 N. Michigan Ave - Storm Sewer Service Install - ROW Radiological Soil Survey

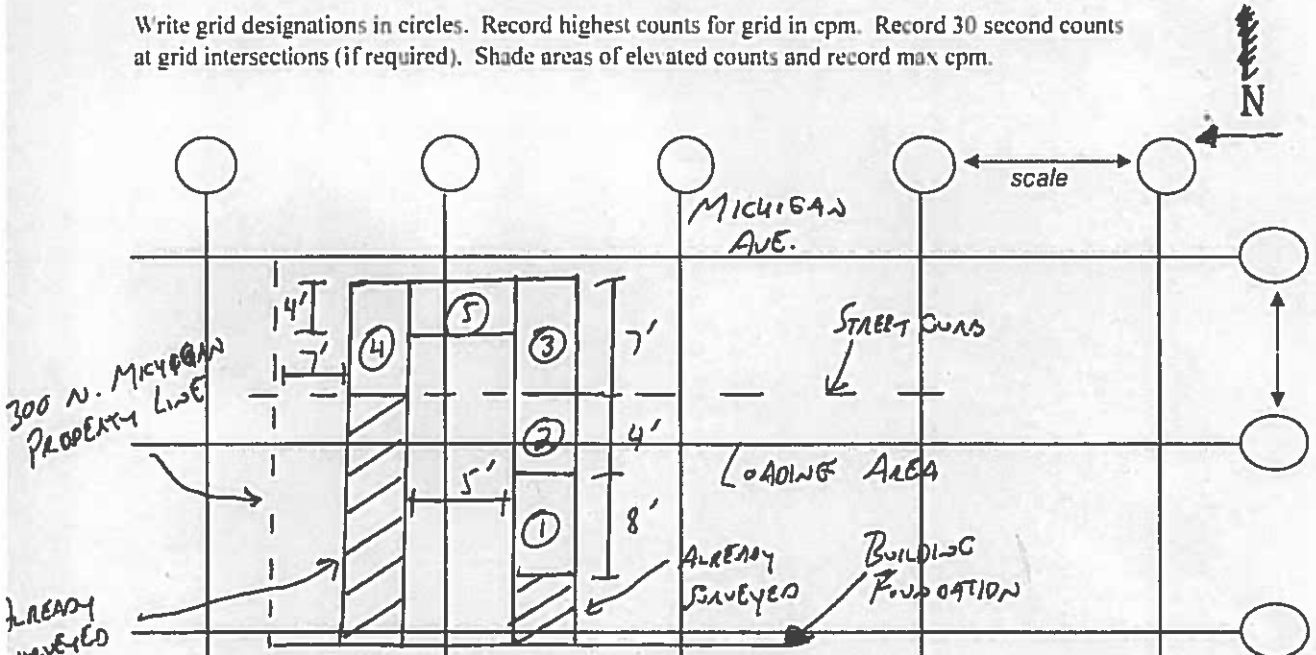
Date: 11/16-17/2020 **Technician:** Brian Schmidt

Inst Model: Ludlum-2221 **Serial No.:** 132844

Probe Type: 1"x1" NaI / ~~2"x2" NaI~~ (Shielded) / Not Shielded **Lift Elevation:** 0-102"

Background 1932 cpm **Action Level:** 7592 cpm

Write grid designations in circles. Record highest counts for grid in cpm. Record 30 second counts at grid intersections (if required). Shade areas of elevated counts and record max cpm.



Excavation ID	Depth	cpm
(1)	0-36"	Previously Surveyed
	36-54"	2100
	54-72"	2700
	72-90"	2300 (B)
	90-106"	1800 (B)
	102-170"	2000 (B)
(2)	0-12"	1600
	12-30"	2600
	30-48"	2800
	48-66"	2400
	66-84"	1800 (B)
	84-102"	1900 (B)
	102-120"	2200 (B)

Excavation ID	Depth	cpm
(3)	0-12"	1700
	12-30"	2300
	30-48"	2400
	48-66"	2900
	66-84"	1700 (B)
	84-102"	2100 (B)
	102-120"	2500 (B)
(4)	0-12"	1600
	12-30"	2500
	30-48"	2600
	48-66"	2400
	60-78"	2100 (B)
(5)	0-12"	2000
	12-30"	2700

(B) = Soils Surveyed By Excavation Bucket

Attachment B – RSSI Supplemental Report

300 N. Michigan Avenue

Performed by:

Stan A. Huber Consultants, Inc.
200 N. Cedar Rd.
New Lenox, IL 60451

RADIOLOGICAL MEASUREMENTS AT
300 N. MICHIGAN AVENUE
CHICAGO, ILLINOIS

FOR:

STAN A. HUBER CONSULTANTS, INC.
200 N. CEDAR ROAD
NEW LENOX, ILLINOIS 60451

ON:

OCTOBER 23RD THROUGH NOVEMBER 13TH, 2020

BY:

RSSI
6312 OAKTON STREET
MORTON GROVE, ILLINOIS 60053

DECEMBER 2, 2020

Introduction

Starting on October 23, 2020, RSSI measured radiation levels in areas excavated for water line, sewer line, and gas line installation at 300 N. Michigan Avenue in Chicago, Illinois as part of new building construction. The purpose of the measurements was to determine if elevated radiation levels associated with thorium contaminated soils were present.

Thorium-contaminated soils have been found at multiple locations in the Streeterville area of Chicago. Beginning in 1915, the Lindsay Light and Chemical Company (Lindsay Light) refined and used thorium in industrial operations. The Lindsay Light operation produced large volumes of thorium-contaminated tailings used as fill throughout Streeterville.

All isotopes of thorium are radioactive. Thorium's predominant isotopes are in the uranium and thorium decay series of naturally occurring radioactive isotopes. These series begin with uranium-238 (U-238) and thorium-232 (Th-232), respectively, and decay through a progression of radionuclides to stable isotopes of lead. The radionuclides include intermediate progeny include radium-226 (Ra-226) in the uranium series and Ra-228, and Ra-224 in the thorium series.

The EPA has set an action level in soil of 5 picocuries per gram (pCi/g) total radium (Ra-226+Ra-228) above a background concentration of 2.1 pCi/g for an action level of 7.1 pCi/g total radium. The EPA guidelines permit release of areas for unrestricted use when the concentration of total radium in soil does not exceed the action level.

Methodology

RSSI measured radiation levels using a Ludlum Model 2221 with a side-shielded Ludlum Model 44-10 gamma scintillation detector. The Ludlum Model 2221 is a general-purpose portable ratemeter and scaler. The Ludlum Model 44-10 has a 2"×2" thallium-doped sodium iodide (NaI(Tl)) gamma scintillator that responds to photons.

The instrument response was approximately 980 counts per minute (cpm) per pCi/g of total radium. The EPA's action level of 7.1 pCi/g total radium corresponds to approximately 6,959 cpm above the instrument background (net cpm).

Results

Three general areas were excavated at 300 N. Michigan Avenue. The largest excavation was for the water main connection along Michigan Avenue. The sewer connection was along the north end of the site, also along Michigan Avenue. A relatively small excavation was required for the gas connection, which was on Lower South Water Street. Radiation levels were measured at the sub-slab surface and every 1.5 feet lower, if possible, in addition to measurements over removed spoils. A portion of the site was excavated by hydro-excavation and those spoils could not be surveyed.

All radiation levels were below the action level with the highest concentration at the 3-foot depth in a portion of the water main excavation area where the count rate was 2644 net cpm, corresponding to 2.7 pCi/g total radium. The highest measurements over spoils was 2391 net cpm, corresponding to 2.4 pCi/g total radium.

Results are in Appendix A and site schematics are in Appendix B.

Conclusions

As no measurement exceeded the EPA action level, no further action is required at this time. In the event of additional excavation, radiation levels should be measured to ensure that excavated soils do not exceed the EPA's action level.

Appendix A: Full Results

Table 2: Measurements

Note: All readings taken with a Ludlum Model 2221, serial number 99147, attached with a 3-foot cable to a side-shielded Ludlum Model 44-10 gamma scintillation detector.

Date	Background [cpm]	Measurement [gross cpm]	Net CPM	Total Radium Concentration [pCi/g]	Location	Notes
Friday, 10/23/2020	No excavating					
Monday, 10/26/2020	1409	2000	591	0.6	Water: Southern trench spoils	(36" x 68" long)
		3600	2191	2.2	Water: Concrete + spoils	During breaking
		2400	991	1.0	Water: Northern trench spoils	Before breaking
		3800	2391	2.4	Water: Concrete + spoils	Broken
Tuesday, 10/27/2020	1356	2200	844	0.9	Water: Surface at top of ramp	
		2400	1044	1.1	Water: Mixed spoils	
		2100	744	0.8	Water: Northern spoils	
		2000	644	0.7	Water: Southern spoils	
		2400	1044	1.1	Water: Northern lower ramp	
		2400	1044	1.1	Water: Southern lower ram	
		2000	644	0.7	Water: Southern soils + flagstones	
		2400	1044	1.1	Water: Slurry + spoils	
Wednesday, 10/28/2020	No excavating					
Thursday, 10/29/2020	1355.8	3200	1844.2	1.9	Water: Southern trench expansion	3' x 9' @ 1.5'
		4000	2644.2	2.7	Water: Southern trench expansion	3' x 9' @ 3'
		2000	644.2	0.7	Water: Southern trench expansion	Spoils
		1800	444.2	0.5	Water: Diagonal	4' x 1' @ 1.5'
		2000	644.2	0.7	Water: Diagonal	4' x 1' @ 3'
		2200	844.2	0.9	Water: Square	@ 1.5'

Date	Background [cpm]	Measurement [gross cpm]	Net CPM	Total Radium Concentration [pCi/g]	Location	Notes
		1800	444.2	0.5	Water: Square	@ 1.5', spoils
		3100	1744.2	1.8	Water: Square	@ 3'
		2000	644.2	0.7	Water: Square	@ 3', spoils
		3200	1844.2	1.9	Water: Expansion (area around "Square")	~6' x 6' @ 1.5'
		2000	644.2	0.7	Water: Expansion (area around "Square")	~6' x 6' @ 1.5', spoils
		2200	844.2	0.9	Water: Expansion (area around "Square")	~6' x 6' @ 3'
		2200	844.2	0.9	Water: Expansion (area around "Square")	~6' x 6' @ 3', spoils
Friday, 10/30/2020	1423	2200	777	0.8	Water: Island and northern trench flattened to 2.5'	
		2000	577	0.6	Water: New northern slope	
		2400	977	1.0	Water: Spoils at top of slope	
		2400	977	1.0	Water: 2nd spoil pile	
		2200	777	0.8	Water: Spoils from middle area	~3.5'
		2000	577	0.6	Gas: Sub-slab	In S. Water St.
		2200	777	0.8	Gas: Sub-slab	Pathway cut
		2000	577	0.6	Gas: Sub-slab	Future valve location
		2000	577	0.6	Water: South expansion sub-slab	
		2300	877	0.9	Water: Spoils, misc. deepenings	
		2000	577	0.6	Water: Spoils, misc. deepenings	
		2300	877	0.9	Water: Spoils, misc. deepenings	
		2200	777	0.8	Water: Spoils, misc. deepenings	
Monday, 11/02/2020	1623.8	2100	476.2	0.5	Water: Southern wall cutting spoils	
		2200	576.2	0.6	Water: Northern wall cutting spoils	
		2000	376.2	0.4	Water: Dredging	

Date	Background [cpm]	Measurement [gross cpm]	Net CPM	Total Radium Concentration [pCi/g]	Location	Notes
		2200	576.2	0.6	Water: South square	Sub-slab
		2100	476.2	0.5	Water: South square	~1.5'
		1800	176.2	0.2	Water: South square	~3', became support slope
		2200	576.2	0.6	Water: South square	~4.5', became support slope
		2100	476.2	0.5	Water: Undercut spoils	
		2100	476.2	0.5	Water: Northern extension	Sub-slab
		1800	176.2	0.2	Water: Northern extension	Spoils
Tuesday, 11/03/2020	1574.4	2300	725.6	0.7	Water: Northern cutout extension and sloping spoils	(Cut now 6.5')
Wednesday, 11/04/2020	1524	2100	576	0.6	Sewer: Over-duct spoils (northern extension)	
		2000	476	0.5	Sewer: Northern sewer trench	Sub-slab
		2800	1276	1.3	Sewer: Southern half of northern trench @ 1'	
		2000	476	0.5	Sewer: Spoils from half	
		2200	676	0.7	Sewer: Deepening southern half spoils + southern trench east of wall spoils	
Thursday, 11/05/2020	1609.9	2800	1190.1	1.2	Spoils from west of old wall for pipes	
		2900	1290.1	1.3	Sewer: Northern pit spoils	Urban fill, lots of brick
		3000	1390.1	1.4	Sewer: Northern pit spoils	
		2900	1290.1	1.3	Sewer: Northern pit spoils	
		3200	1590.1	1.6	Sewer: Northern pit spoils	Wet
		2900	1290.1	1.3	Sewer: Northern pit spoils	Clay and bricks
Friday, 11/06/2020	1324	2300	976	1.0	Water: Deepening to west of duct bank spoils	Brown and gray clay
		2200	876	0.9	Water: Deepening to west of duct bank spoils	
		2300	976	1.0	Water: Deepening to west of duct bank spoils	

Date	Background [cpm]	Measurement [gross cpm]	Net CPM	Total Radium Concentration [pCi/g]	Location	Notes
Monday, 11/09/2020	1365	2200	835	0.9	Water: Clay spoils from Friday overnight	Gray, mostly
		1800	435	0.4	Water: Clay spoils from Friday overnight	Gray, mostly
		1800	435	0.4	Water: Clay spoils from Friday overnight	Gray, mostly
		2900	1535	1.6	Sewer: Spoils from sub-vault leveling	
		2900	1535	1.6	Sewer: Spoils from sub-vault leveling	
		2400	1035	1.1	Sewer: Spoils from sub-vault leveling	
		2300	935	1.0	Sewer: Deepening northern trench spoils	
Tuesday, 11/10/2020	No excavating					
Wednesday, 11/11/2020	1500	1800	300	0.3	Sewer: Sewer trench spoils	
		2000	500	0.5	Sewer: Sewer trench spoils	
Friday, 11/13/2020	No excavating					

Appendix B: Site Plan

Figure 1: Overall site schematic

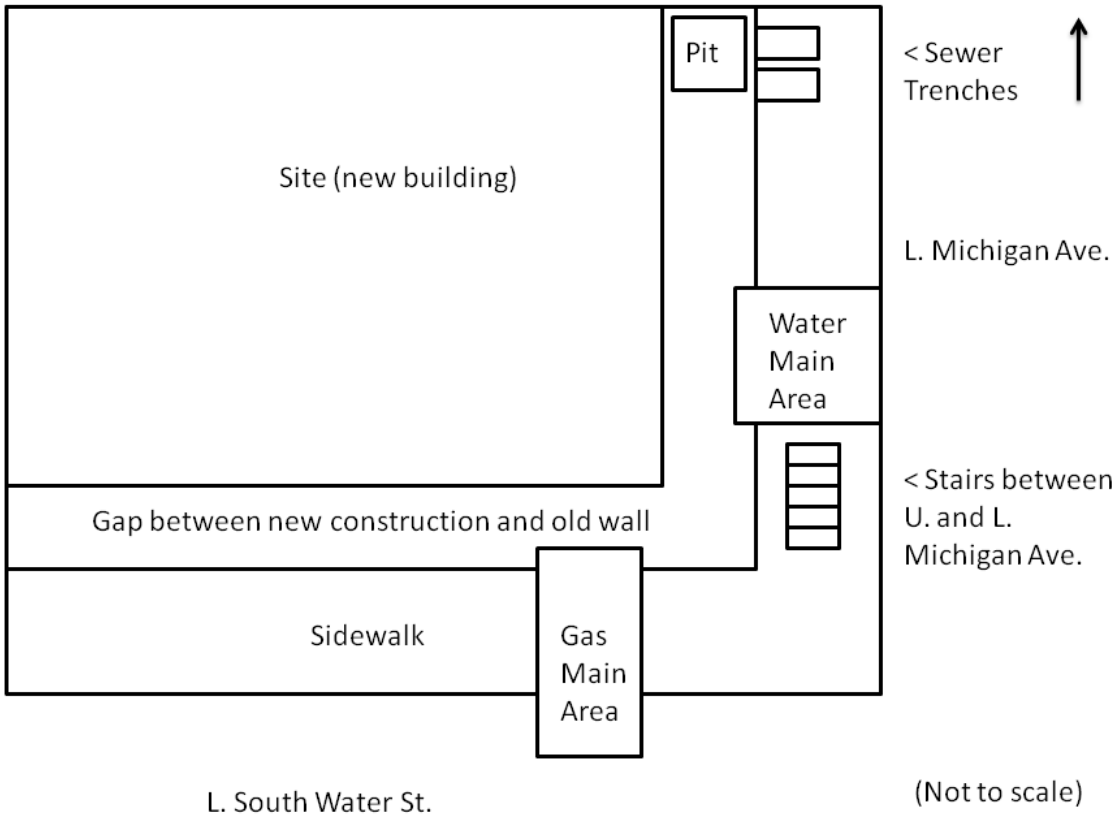


Figure 2: Water connection area pit, as present on 10/26/2020

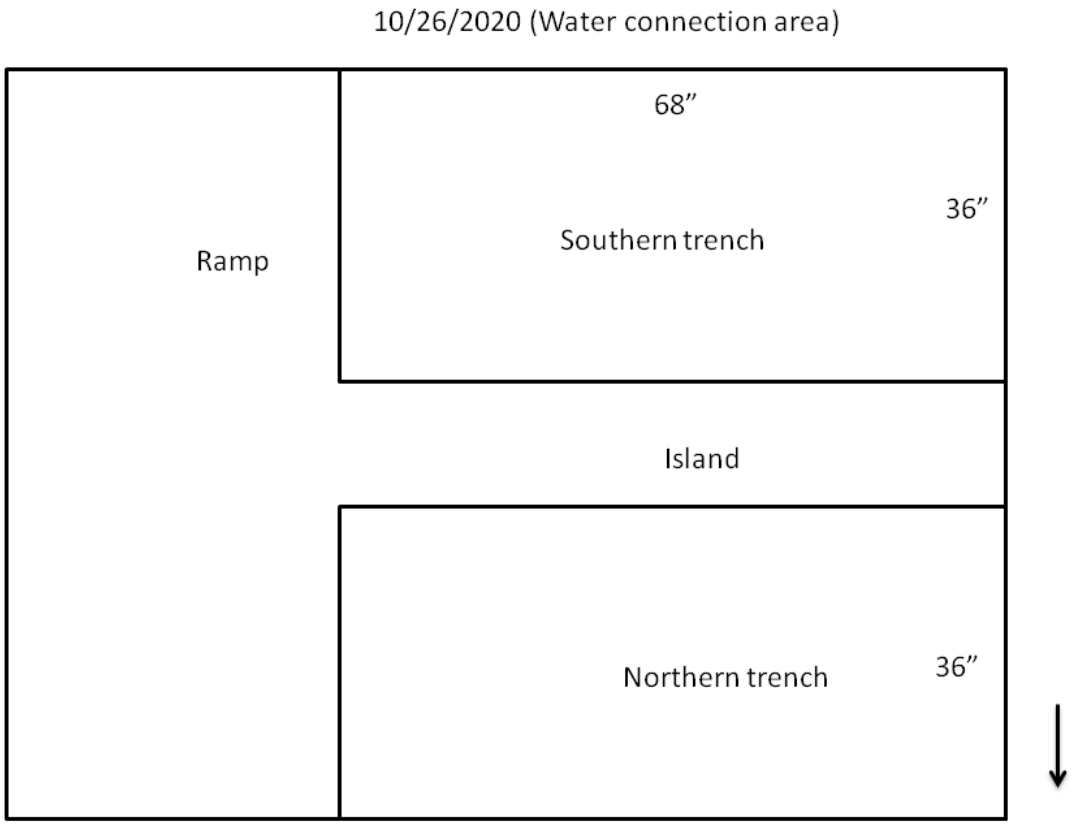


Figure 3: Water connection area pit, showing additional excavations uncovering old unmarked utilities

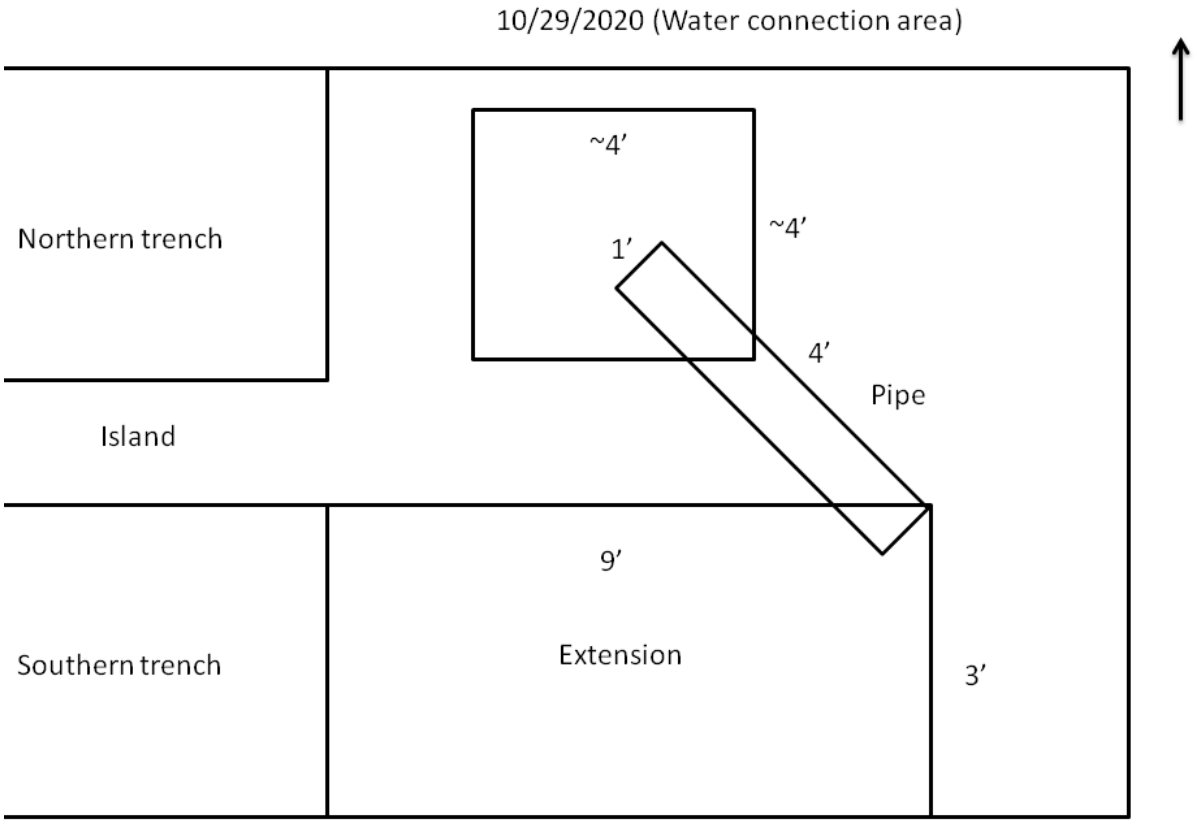


Figure 4: Water connection area pit, showing additional excavations uncovering old unmarked utilities

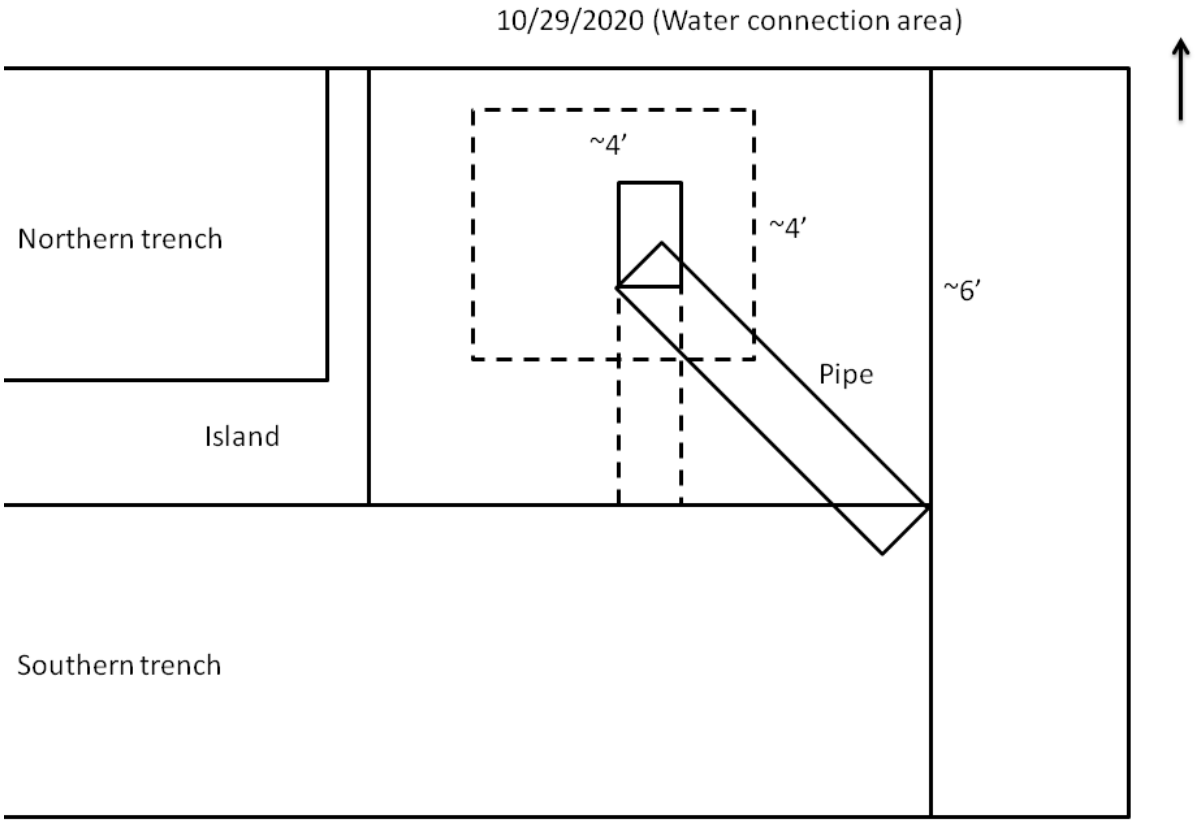


Figure 5: Gas connection area

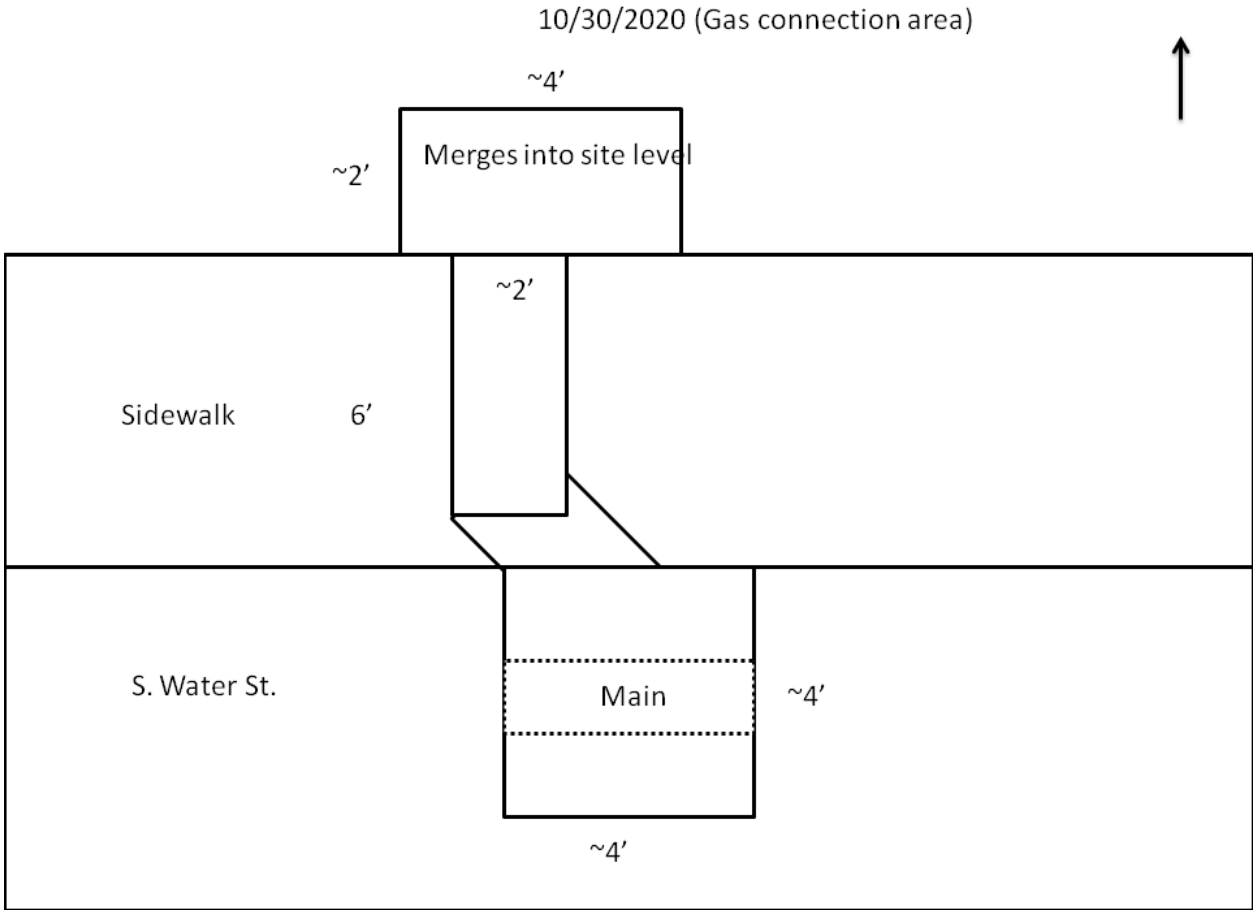


Figure 6: Water connection area, showing expansion to the south

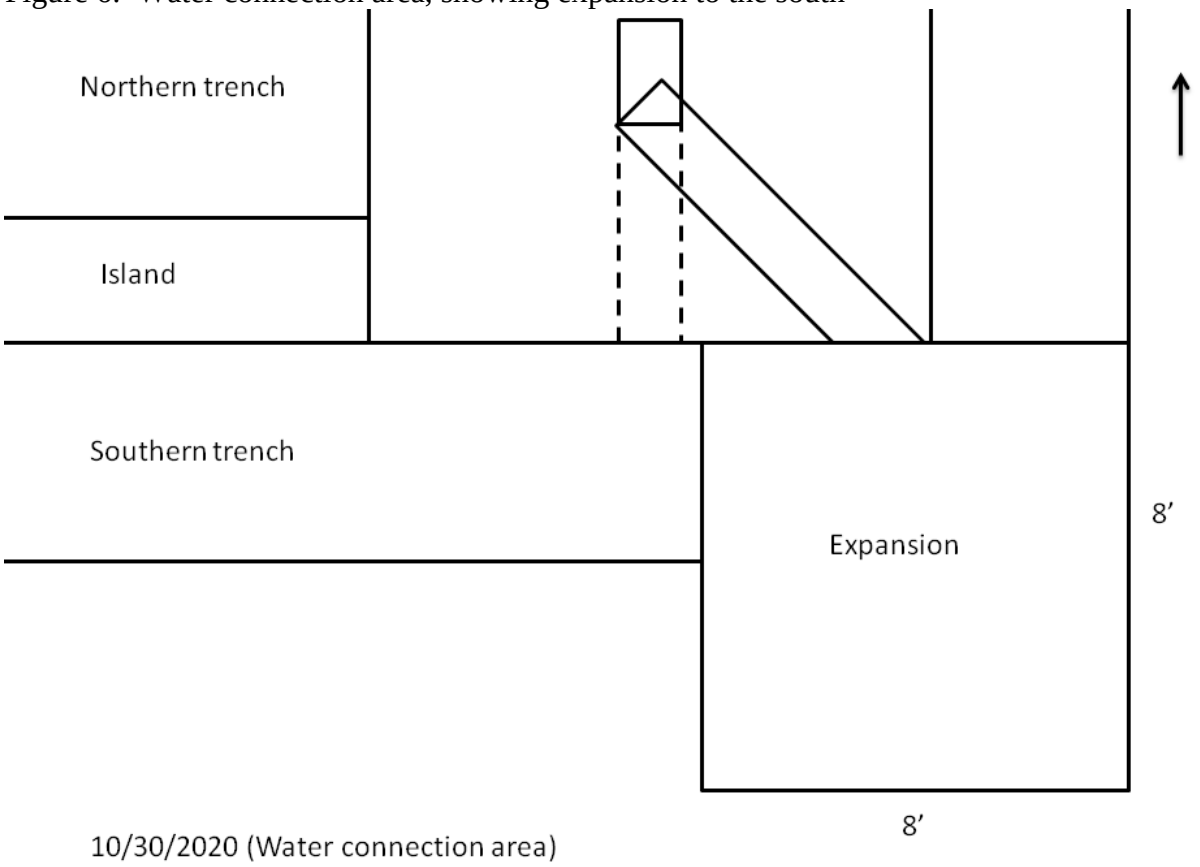


Figure 7: Water connection area showing overall final expansion

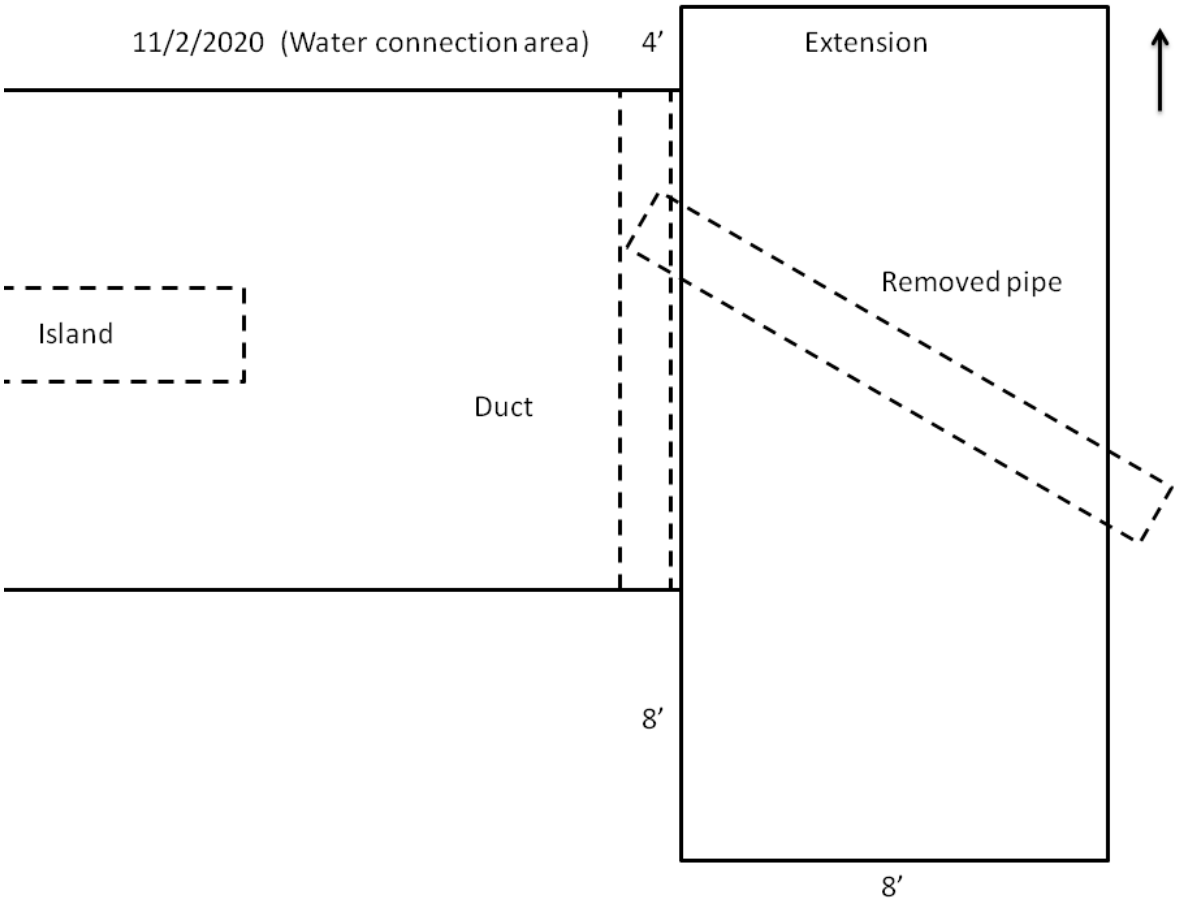


Figure 8: Sewer connection area. Northern edge is immediately adjacent to the adjacent property

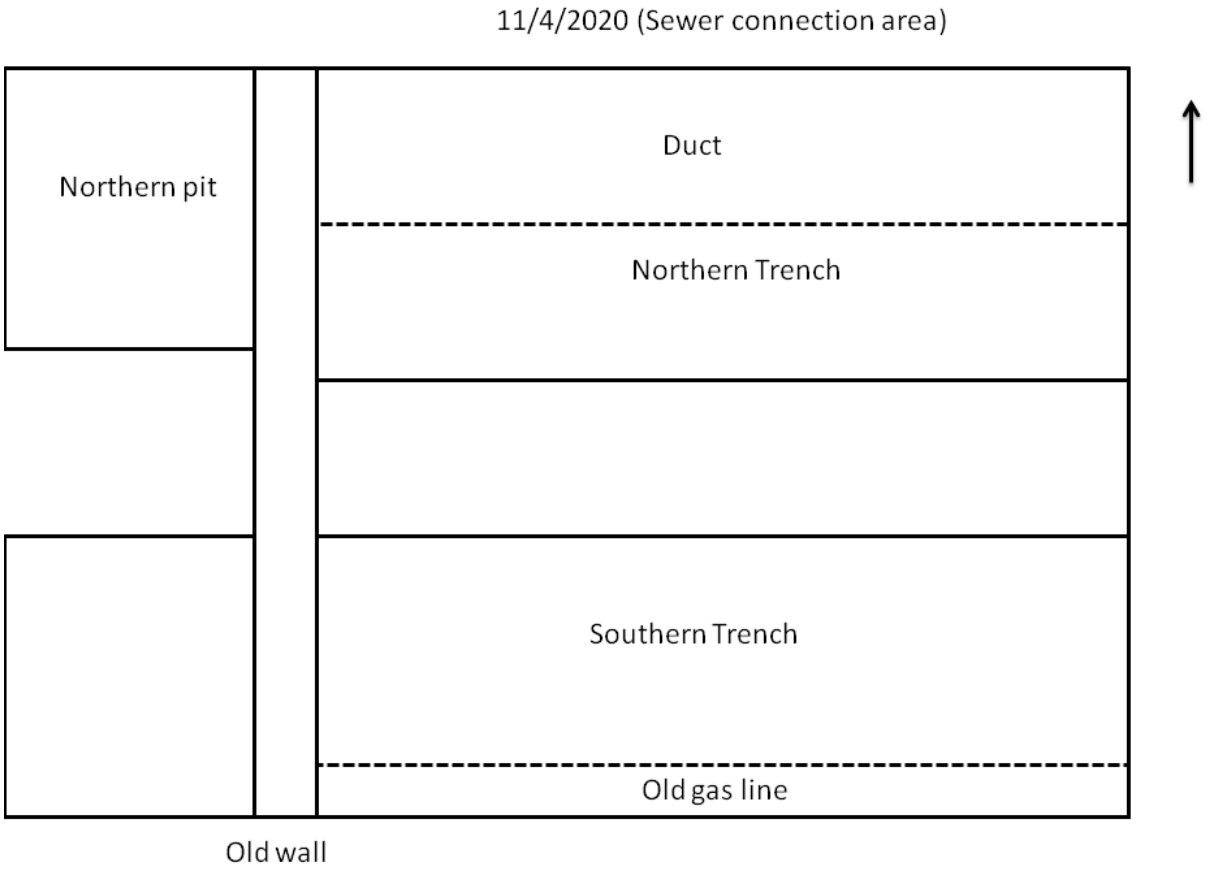


Figure 9: Water connection area, looking west, showing partially reburied utilities

Figure 10: Water connection area, looking northwest, showing new vault construction