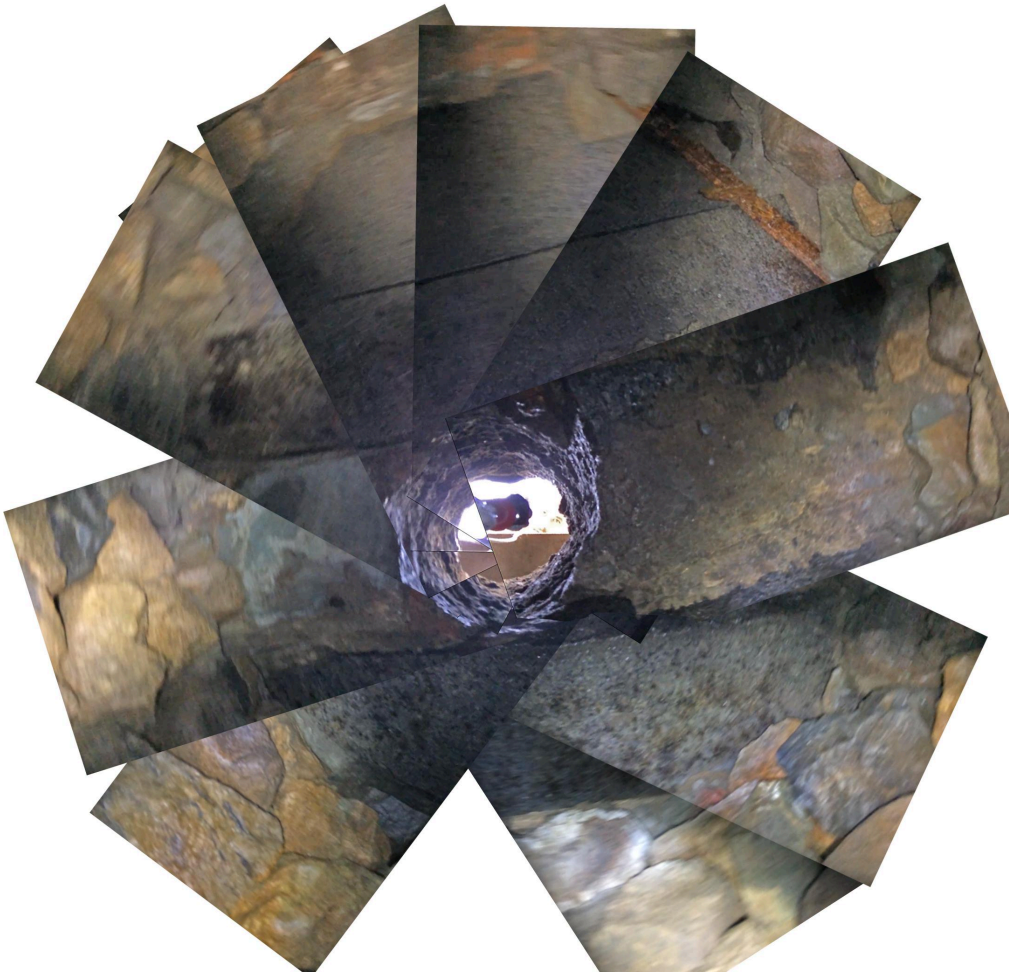

Report for Reconnaissance Archaeological Survey of the 17-19 Pinckney Street Well, Boston (Beacon Hill), Massachusetts

Joseph Bagley

2019

City of Boston Archaeology Program
201 Rivermoor St.
Boston, MA 02132

Cover: Composite image of the underside of the well at 17-19 Pinckney Street made from video from inside the well.

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Abstract

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On October 13, 2016, archaeologists of the City of Boston Archaeology Program were invited to 17-19 Pinckney Street to observe and document a possible well found during a landscaping project. On that day, the archaeologists recorded multiple videos and took measurements. The well has since been sealed and possibly filled. The well is constructed from dry-laid fieldstone and measures at least 34 feet from the well cap to the water surface at the bottom of the well and 4-5 feet wide. The cap is constructed from multiple slabs of mortared granite with a 1-foot octagonal opening in the well cap. Remnants of the well's wooden pipe, which transported water from the well to the hand pump on the surface, were documented. Two segments of wooden pipe approximately 10 inches wide and around 20 feet long were observed. No artifacts were documented or recovered other than those that fell in when the well was rediscovered. Historical research provides a detailed summary of wells in Boston as well as Boston's efforts to provide fresh drinking water to its residents throughout its history.

Management Summary

On October 13, 2016, a team from the City Archaeology Program had a rare opportunity to document a nearly intact well on Beacon Hill located at 17-19 Pinckney Street.

Based on historic maps, documents, and research, it appears that the well was built between 1798 and 1845. Prior to 1798, there were no structures on the property and it is unlikely that this location would have been selected for a well for nearby rope walks. The current building located at the address was built between 1798 and 1800. From that period until the installation of the Beacon Hill Reservoir in 1849, residents of the home would have needed nearby freshwater access via a well. It is most-likely that the well is contemporaneous to the building of the house; therefore it is likely that this well was built between 1798 and 1800. This date correlates to Kaye's description of early wells being predominantly stonework, without wooden linings.

The well extended to at least 34 feet in depth, based on current water levels, reaching an aquifer in the glacially-deposited gravels in Beacon Hill. It is constructed out of 8-10 inch cobbles and boulders of Quincy-like granite with a small minority of other local stones around 8-10 inches in size. No mortar was used in the construction of the well shaft except for small stones just below the well cap. The presence of granite suggests an origin of the stones in the area around Quincy where large amounts of natural granite outcrop. There is little bedrock in Boston, with most local stones being puddingstone or argillite/mudstone. These are either not present or very rarely used in the construction of this well.

The water was transported from the bottom of the well to the surface through a series of interconnected hollowed logs, likely of pitch pine, each around 10 inches across with an approximately 3 inch bore. These pipes traversed the bottom of the well to a cap where it met a hand pump on the surface of the yard. The uppermost segment of this pipe was not found and may have decomposed, was removed, or fell into the well and sunk to the bottom. If this is the case, the well extends at least 6 feet further in depth.

The cap was constructed out of three slabs of granite with a hole between two slabs outlined with more granite fragments. The opening of the well cap was octagonal with two walls formed by the large granite slabs, and the remaining six walls being made of brick, granite, and mortar. The construction elements of the cap were mortared together.

No artifacts beyond a high-visibility cord were visible within the well, having been dropped down into the well by construction crews exploring the depth of the well prior to the arrival of archaeologists. The water in the bottom of the well was opaque, and no contents were visible.

It is likely that the well was abandoned around 1850 when its use was no longer necessary, but it may have been kept during the period of time it took to extend pipes from the Beacon Hill reservoir

It is not known what the current conditions of the well are, but it is believed to be capped. The owners of the property were last exploring costs to fill the well with gravel. The owners had no intention of attempting to modify or remove the well, only re-seal the opening at the top and potentially fill it with sterile material in order to ensure nobody could fall into the otherwise open shaft.

Introduction

Scope of Survey

On October 11, 2016, then-preservation planner staff of the Beacon Hill Landmark District, Lisbeth Schwab, was contacted by the homeowner of 19 Pinckney Street (Figure 1) after a contractor conducting landscape improvements to the front of the property fell through a hole in their yard up to his hip. Fortunately, he was otherwise unharmed, but this event revealed the presence of a large void in front of the home and the homeowner was not sure what to do about it.

Figure 1- USGS Topographic map of project area, 17-19 Pinckney Street, in red, near center of image.

Ms. Schwab contacted the City Archaeologist to meet with the owner and examine the discovery before it was sealed. As the homeowner had two young children, it was their preference that the hole be covered as quickly as possible, but they allowed for a single day of examination of the discovery before it was re-covered.

The documentation of the feature occurred on October 13, 2016.

Compliance with Legislation

Beacon Hill is landmark-designated, though the jurisdiction of the City Archaeologist to regulate archaeological materials within the landscape has not been confirmed. This survey was conducted on private land with the permission by the land owner to access the property for a single day.

Personnel

The survey team consisted of City Archaeologist, Joseph Bagley, and Laboratory Manager, Sarah Keklak. Douglas Magners of Scansure LLC, a 3D scanning and recording company provided *pro bono* 3D scan of the well feature.

Site Background History

Native American History of Site

No intact Native sites have been documented on Beacon Hill, but it is likely that sites exist or once existed there. Large sections of the landscape have been heavily modified by hill removal and construction, greatly diminishing the likelihood for intact Native sites being found. The closest intact site to the project area is the Middle Archaic and Woodland-period Frog Pond site, located 270 meters south-southeast on Boston Common (Bagley 2007). A large stone adz (Figure 2), likely Archaic in age, was recovered from the African Meeting House site during the 1970s excavations there but never published. This site is located 160 meters northeast of the project area, but it is not certain if that artifact was a manuport or originated on-site.

Figure 2- Stone adz with damaged edge from the African Meeting House site on Joy Street, Beacon Hill.

Post-contact History of Site

Beacon Hill is part of the original Shawmut Peninsula and as such has a history that dates back to the arrival of Europeans to the region.

Given that the project area was located within an area of Boston largely undeveloped until the 18th century, the history of the specific land-ownership of the property from 1630-c.1800 is challenging. In 1920, Samuel C. Clough created several reconstructed property maps of Boston based on extensive deed research.

Clough's 1647 map (Figure 3), places the project area on the property of Edmond Dennis squarely between the peaks of Mt. Vernon to the west, and the central peak of the trimountain, Beacon Hill.

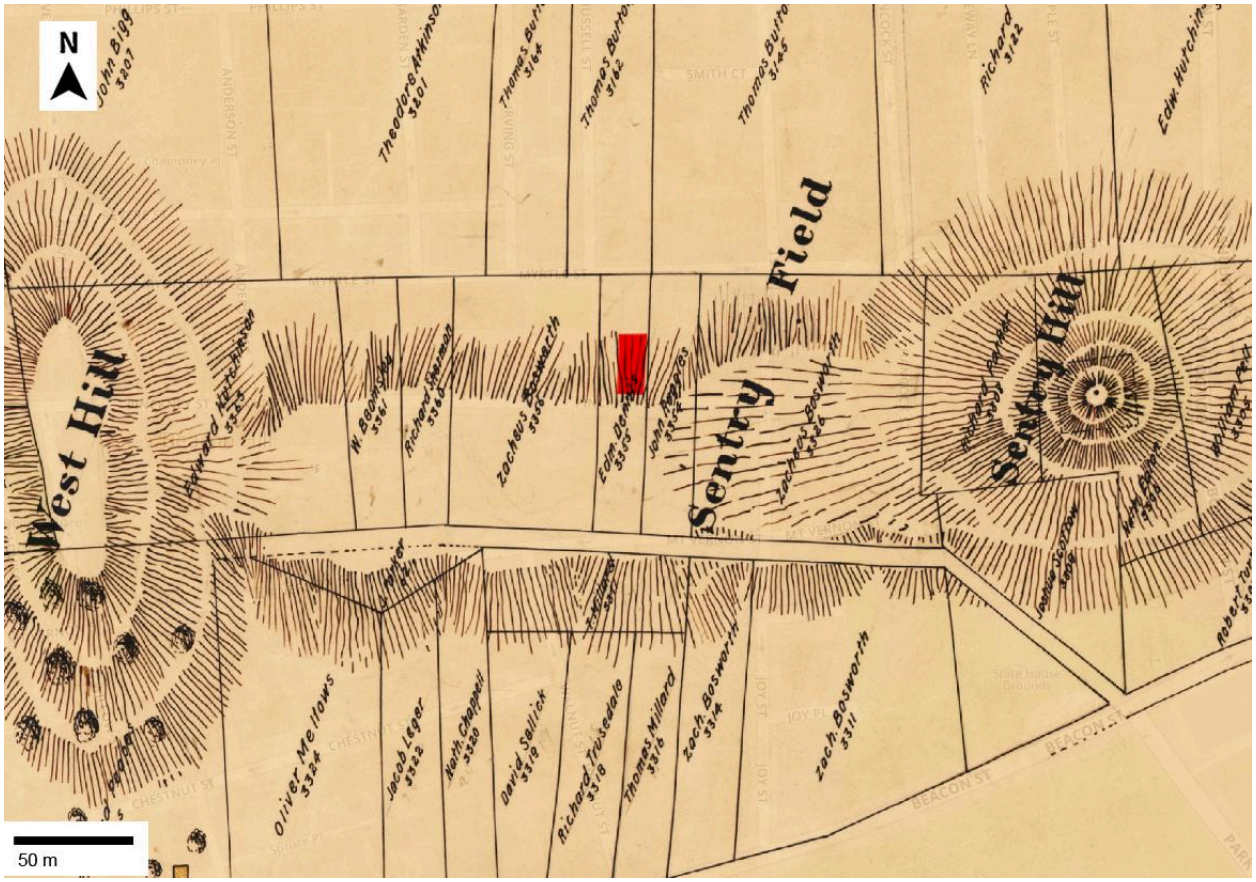

Figure 3- 1646 Clough reconstruction map of properties on Beacon Hill, project area in red.

Edmond Dennis does not appear in the Suffolk County deeds as a grantee of land, nor are there any 17th century listings for any Dennis as a grantee in the deed records.

Clough's 1676 reconstruction map places the project area solidly within Humphrey Davey's property (Figure 4). It is possible that this parcel is one of several purchased by "Humphrey Dauy" from Joshua Scottow on May 8, 1665 (Suffolk County Deeds [SCD] Book 4, Page 295). One parcel in particular was purchased from the late Martha Cogan, who inherited it from her husband, John Cogan, who purchased the orchard and dwelling house on February 14, 1659, though this may not be the exact property included in Clough's map. Alternatively, the parcel may be a pasture land in Boston's new field purchased by Scottow in 1648, same deed. The latter is the more-likely parcel as few if any structures were built on Beacon Hill prior to the 18th century.

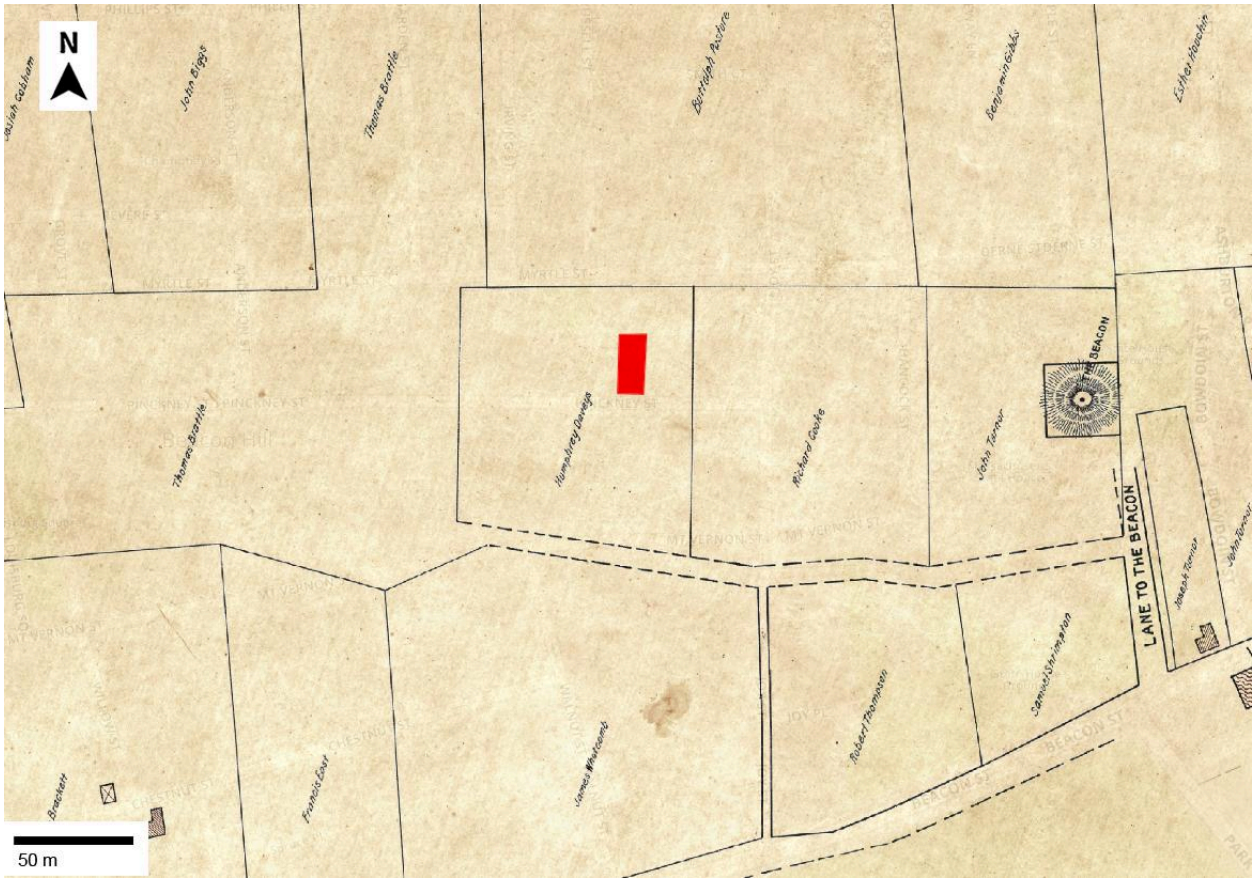

Figure 4- Project area in 1676 Clough reconstructed parcel map showing property on Humphrey Davie's land.

By the end of the 18th century, ropewalks were built along the southern side of what is today Myrtle Street, the road immediately north and parallel to Pinckney Street. Pinckney Street in 1798 was known as a "new street" and may have been as little as a pathway. The project area in 1798 was undeveloped.

Joseph Carnes Jr., rope maker, and Daniel Stainford, schoolmaster, purchased a 327-foot long tract of land that bounded the ropewalks to the north, Clapboard street to the east (now Joy), and the new street to the south (SBD Book 189, Pg. 227). This property was 73 feet north-south, roughly equivalent to the lots along Pinckney street extending north, today, including 17-19 Pinckney. The 327 foot lot purchased by Carnes and Stainford is roughly equivalent to the properties at 1-29 Pinckney Street (Figures 5-6). No buildings are mentioned in the deed description, nor are any wells specifically mentioned, suggesting the lots were undeveloped at the time.

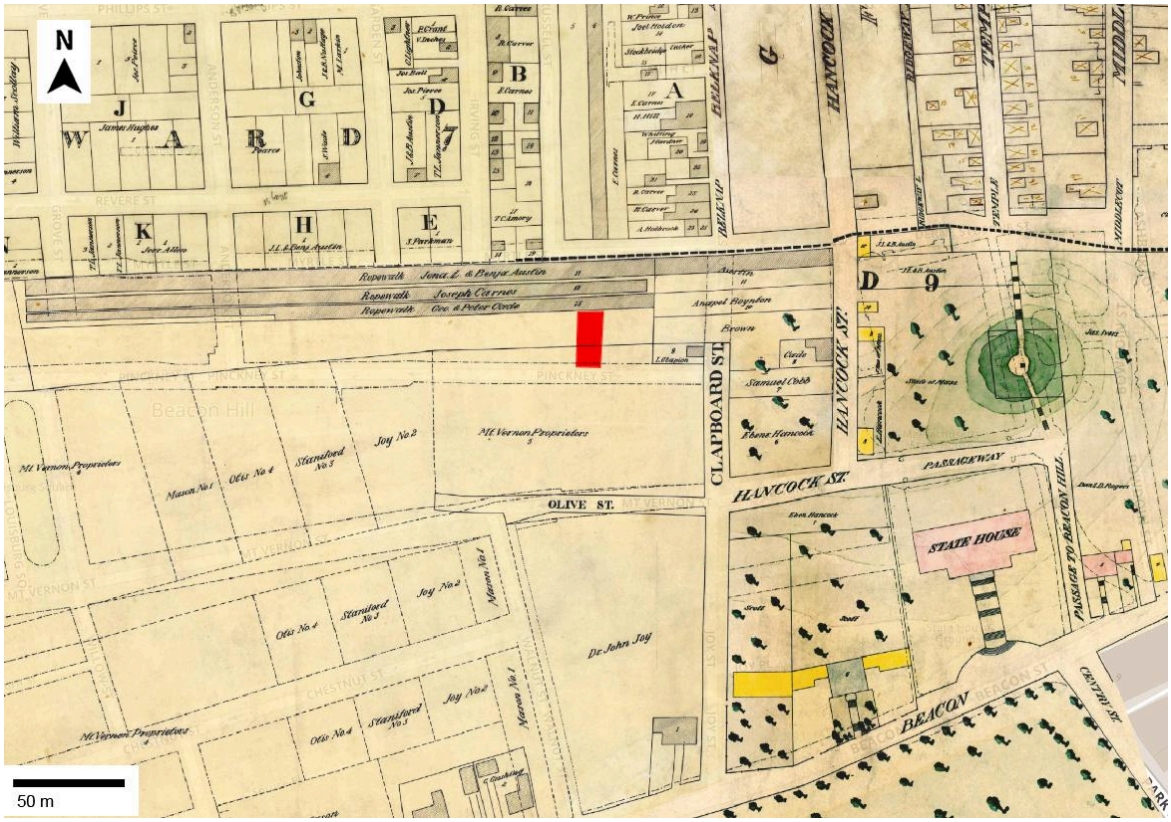

Figure 5- 1798 Clough reconstructed map showing rope walks north of 17-19 Pinckney Street lot.

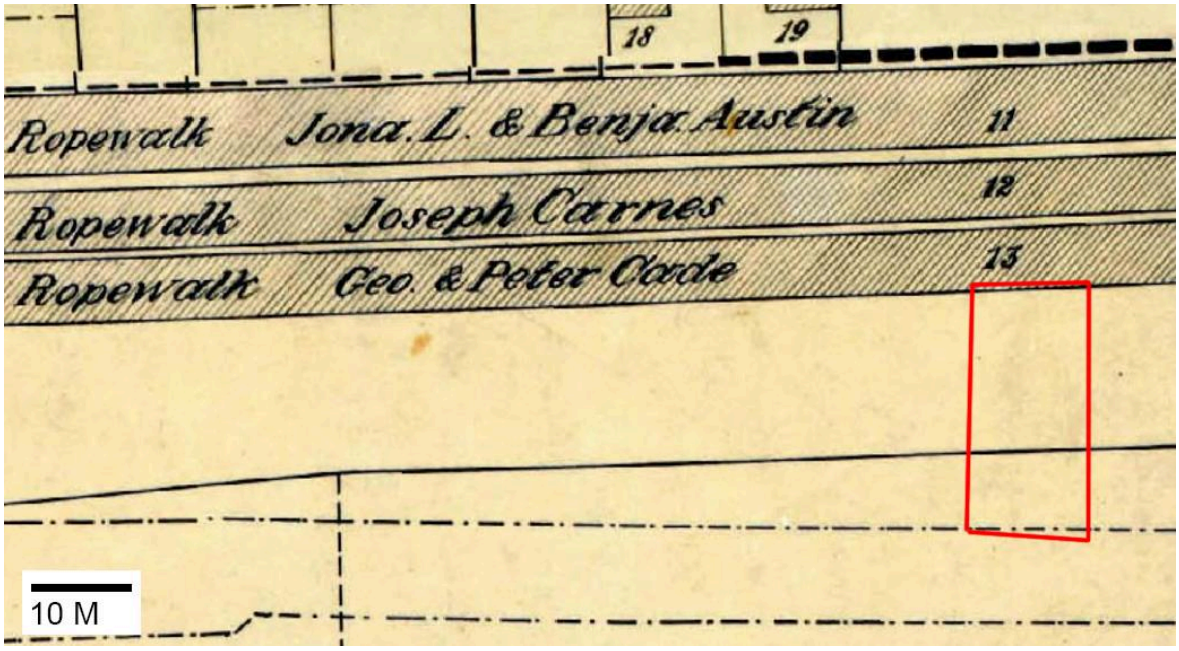

Figure 6- Detailed view of 1798 Clough reconstructed map showing ropewalks just north of project area.

Robert Wood, housewright, purchased a 40x80 foot lot on the “New Street” on August 29, 1798, this lot would become 17-19 Pinckney Street (SBD b. 190 p. 148). No building or well is mentioned in this deed. On January 15, 1800, Wood passes away leaving his estate to his wife, Suzanna. Suzanna, sold the property at auction to James Otis on August 26, 1800 (SBD b. 195 p. 208). The deed states that the property contains both a lot and a dwelling house, suggesting that 17-19 Pinckney Street was built between Aug 29, 1798 and August 26, 1800. A well is not mentioned in the deed.

17-19 Pinckney Street is an L-shaped structure. The main building, 17 Pinckney, is a 3.5-story brick structure with its narrow end facing Pinckney Street and its five-bay front facade facing a narrow courtyard to the west. 17 Pinckney and its neighbor, 21 Pinckney, are oddities in the neighborhood of adjoined row houses for this “sideways” orientation (Gordon 2001).

19 Pinckney Street is the rear portion of the main structure located on the Northern end of the property, but extending west from the main structure. Today, 19 Pinckney Street is a separate property, by ownership, but remains attached to 17 Pinckney. The well was found on land associated with 19 Pinckney Street, but would have been part of the 17-19 Pinckney Street property prior to its subdivision.

Given the lack of running water services in Boston prior to the mid-19th century, a private well would have been a valuable asset on a property. It is likely that the well discussed in this report was part of the landscape features of the original c. 1798 design and implementation plans at 17-19 Pinckney Street.

In 1846, James Otis purchases the rights to use, repair, and access a drain from the rear of his estate through a passageway on the property of Simon Palmer and Lucy Adams of Myrtle Street to a common sewer on Myrtle (SBD b. 556, p. 85). The 1814 Hales map (Figure 7) shows the possible passageway just north of an elongated property that is likely 17-19 Pinckney Street but may also be the neighboring property to the west. The 1852 Slatter map does not indicate a passageway (Figure 8), though it may have been a first-floor tunnel through a building.

Figure 7- 1814 Hales map with 17-19 Pinckney marked in red. Note narrow passageway extending north to Myrtle Street just northwest of the marked project area.

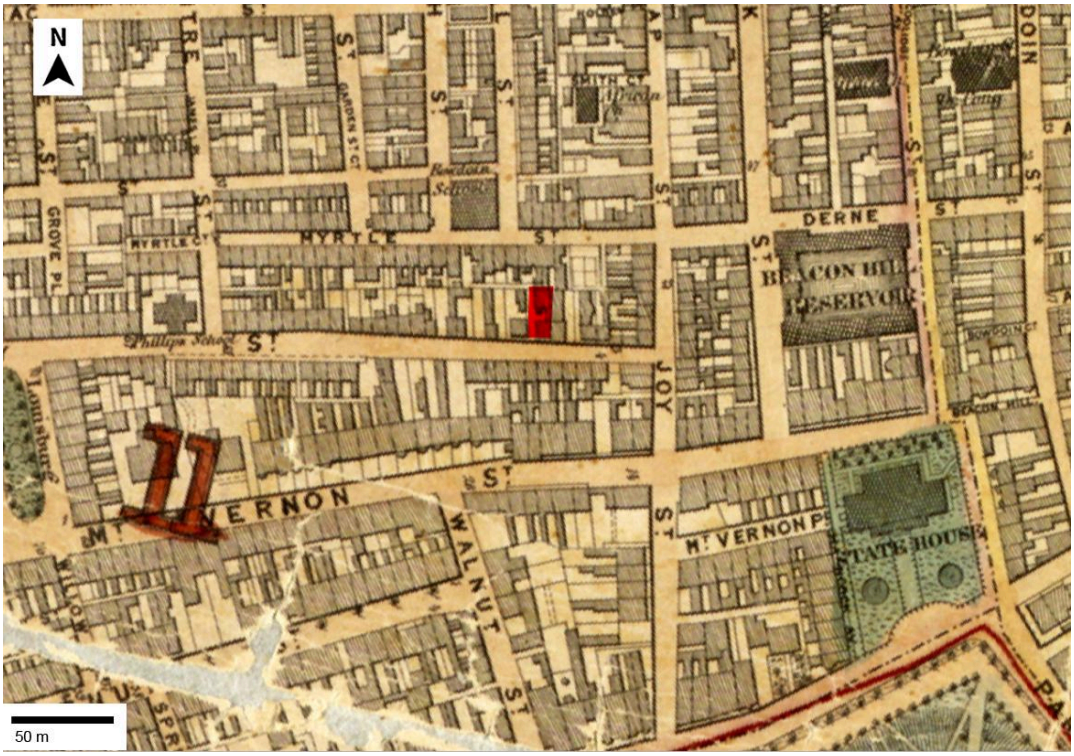

Figure 8- 1854 Slatter map with 17-19 Pinckney marked in red. Note the lack of passageway to Myrtle St.

The inability of Otis to drain his property into Pinckney Street may provide evidence of the presence of the well at this time. The well, located on the far western edge of the property may have made the construction of a drain from the home to the south impractical or impossible without disturbing or intersecting the well.

James Otis owned the property until his death, whereby the trustees of his estate sell the home on October 25, 1854 to Arnold Kendall, merchant and Bostonian. The deed references the Wood-Otis sale by book and page confirming the property is the same as Otis owned several properties on Pinckney Street. No renters or occupiers are mentioned in the deed, but directories and the historic building form (Gordon 2001) state multiple renters in the home owned by Otis, and Otis listed as occupying 15 Oak Street.

Arnold Kendall owned the property until October 1, 1856, when he sold it to Gridley Fox Bryant, a noted architect who is credited (Gordon 2001) with the Victorian Italianate ornamentation visible on the home today (SBD b. 705 p. 244).

Stephen Niles purchased the home from Bryant on October 14, 1870 (SBD b. 1019 p. 35). It remained in the Niles family for over a decade (Figure 9-10).

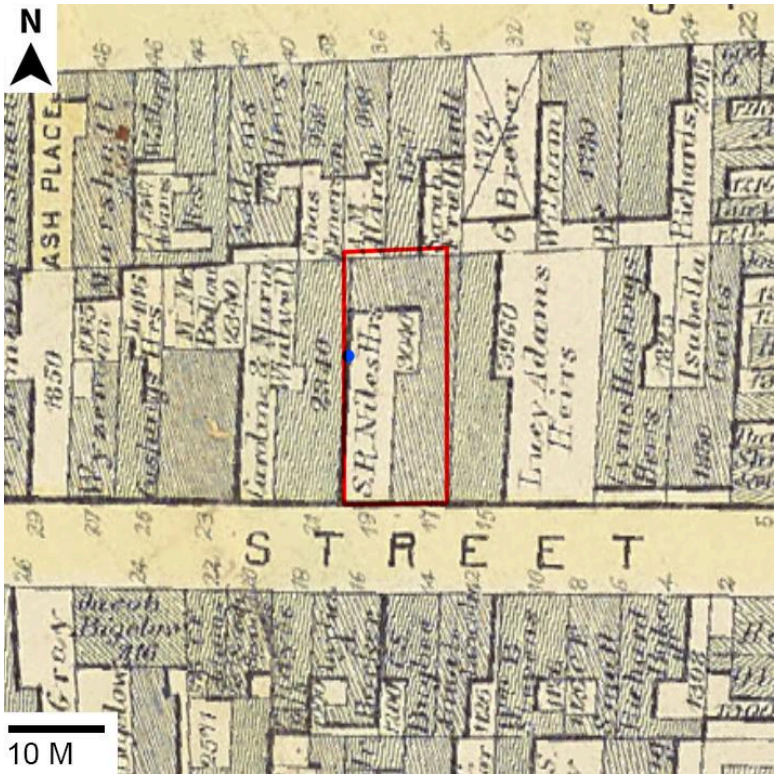

Figure 9- 1874 map showing S. Niles heirs as owner of 17-19 Pinckney Street. Well marked in blue

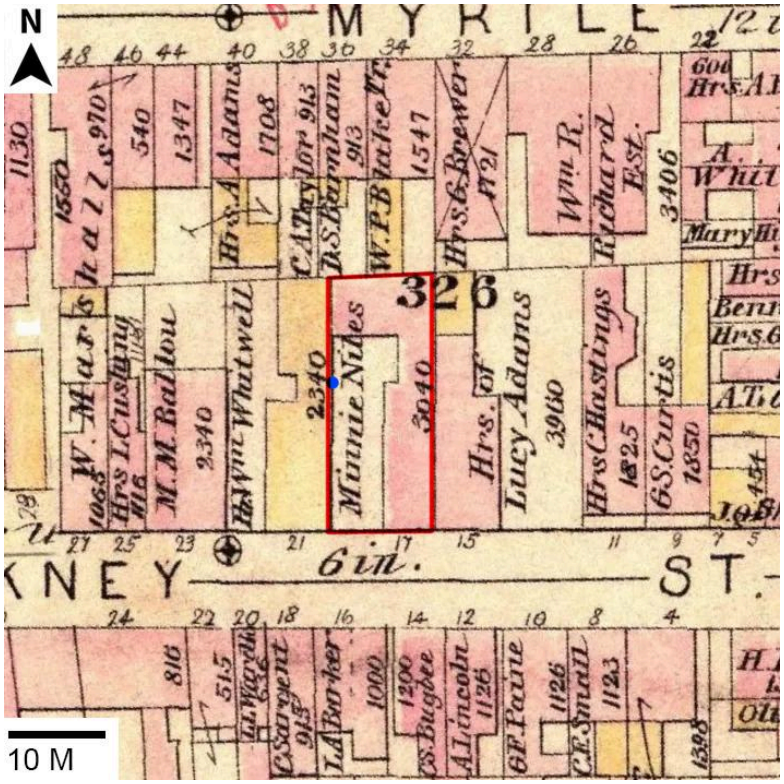

Figure 10- 1883 map of 17-19 Pinckney with Minnie Niles indicated as owner. Well marked in blue.

The property passed through multiple owners in the 20th and 21st centuries, with little modification to the overall property size, shape, and building layout. (Figures 11-14)

Figure 11- 1902 Bromley atlas with property marked in red. Well marked in blue.

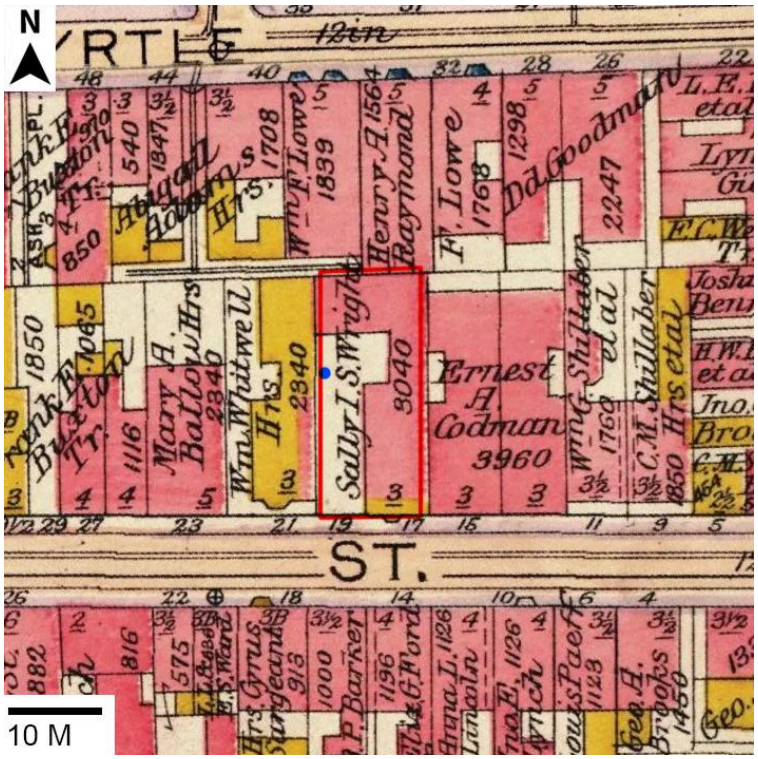

Figure 12- 1917 Bromley atlas with property marked in red. Well marked in blue.

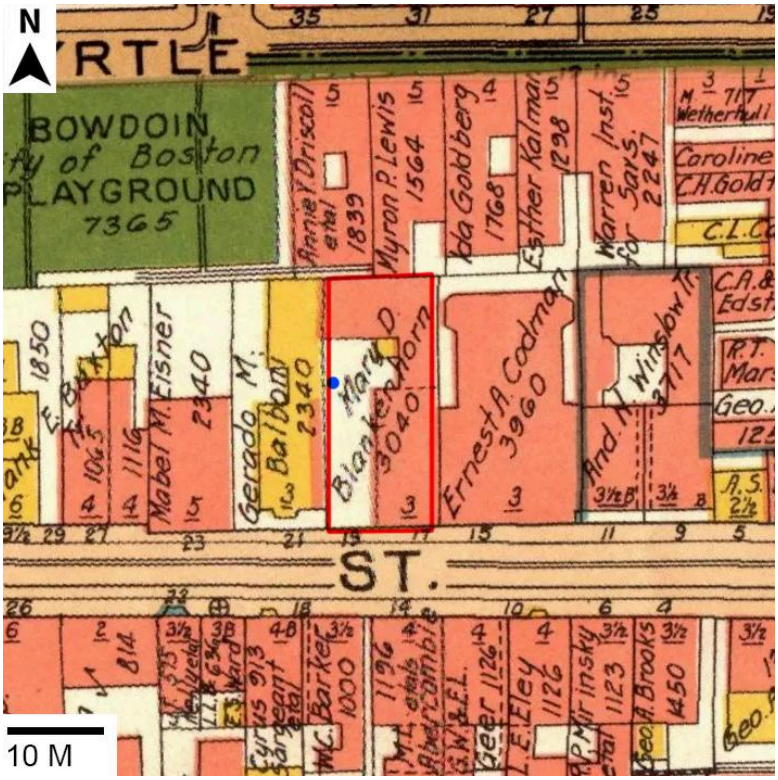

Figure 13- 1938 Bromley atlas with property marked in red. Well marked in blue.

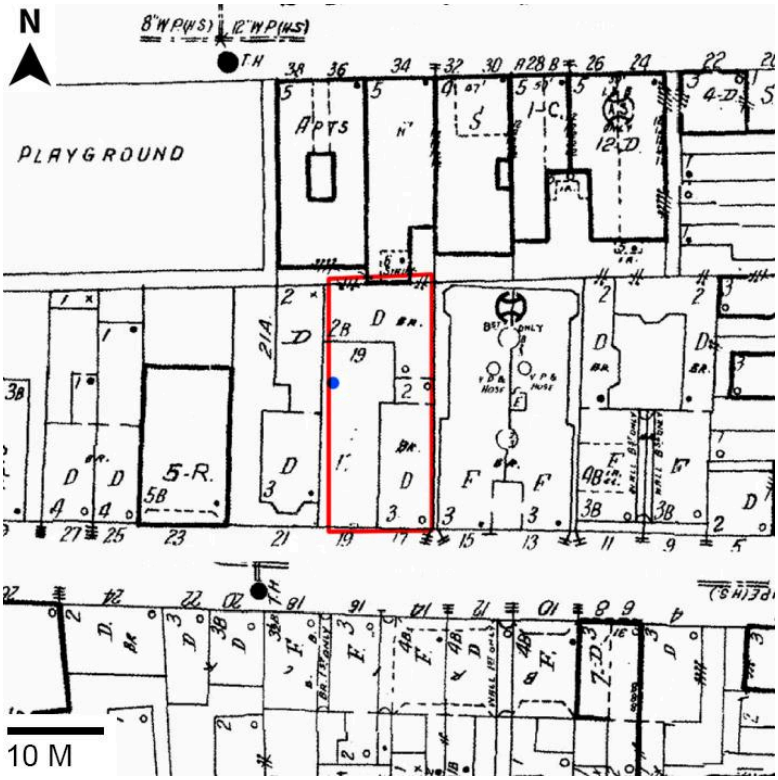

Figure 14- 2002 Sanborn atlas with property marked in red. Well marked in blue.

Boston and Beacon Hill Waterworks History

Boston was founded in 1630 when Winthrop's 1629 settlement in Charlestown moved south in search of better sources of freshwater. Water has always been a concern in Boston as it is nearly surrounded by brackish or salt water, yet its numerous hills supply fresh water in the form of springs. Shawmut, the Massachuset name for Boston, may refer to the fresh water available in the small peninsula.

The following historical summary provides a context within which to examine a single private well on Beacon Hill. It is important to note that for the purposes of this report, the water supply and sewer systems are separated, as wells would have been related, exclusively, to water procurement, not wastewater systems. This historical summary will focus exclusively on freshwater procurement history in Boston.

Underground water sources consist primarily of minute pore spaces between sediment, therefore gravel, and coarse sands produce reliable water as opposed to the smaller porosity of fine sand, silt, and clay (Kaye 1976, 14).

While many Bostonians had their own wells, some used the town well and town spring (Kaye 1976, 15). The town well was located 50 feet from the intersection of Washington, State, and Court Streets, today the pedestrian area between the Old State House and City Hall (Kaye 1976, 15). The town well location is approximately marked by a circular pattern of concrete and bricks in the walkway (Figure 15).

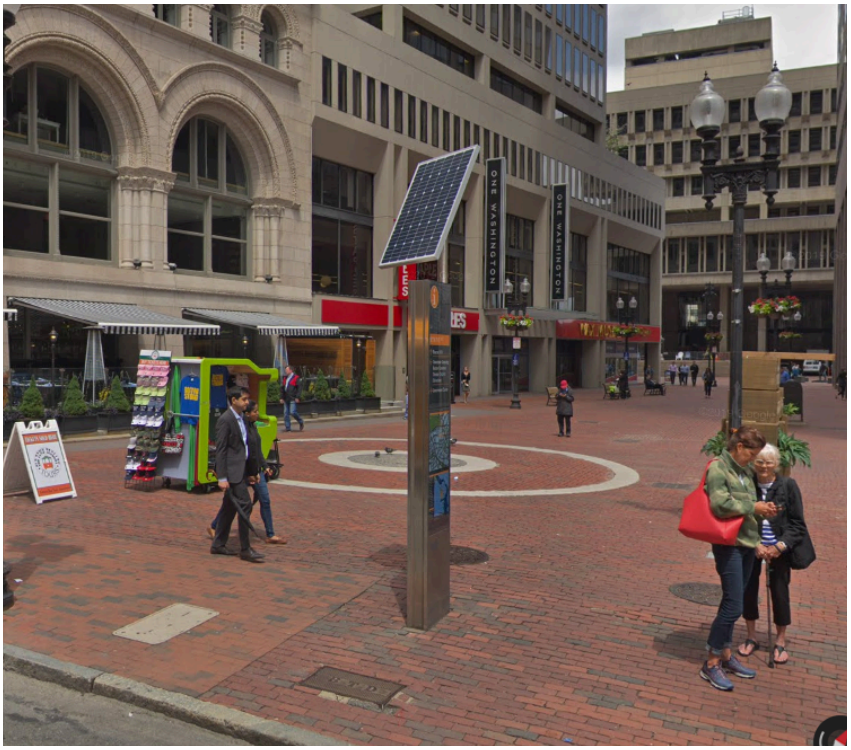

Figure 15- Approximate location of the town well marked in brick and concrete in Washington Mall, City Hall in the background View to the north. Photo: Google.com

The town spring was located on Spring Lane, around 500 feet south of the town well, and Blackstone's c. 1625 spring was located near Acorn Street and Louisburg Square on Beacon Hill (Kaye 1976, 15).

Kaye states that the best quality well water would have been on Beacon Hill, where deeply excavated wells would not be impacted by infiltration of salt waters stating that multiple wells have been exposed during construction projects on Beacon Hill (Kaye 1976, 15). The deeply buried thick bands of coarse gravel in the glacial deposits of Beacon Hill interlayered or under clay and till (Kaye 1976, 15).

Kaye describes states of well construction with early wells being made of local rock, later they were made from large cobbles lined with vertical wooden sheathing (Kaye 1976, 15). This was followed by double wooden sheathing with cobbles in between the wooden layers, and finally brick-lined wells (Kaye 1976, 15). It is not clear if Kaye is referring specifically to Boston wells or wells in general.

Kaye continues by describing pumps found in some wells in Boston. These were hollowed logs with a "moving wooden piston fitted with a wooden flap-valve" at the bottom (Kaye 1976, 15). The valve was activated via a hand pump at the surface. He describes log pipes as being 20 foot long with tapered ends inserting into the next open end of the pipe, each between 10 and

12 inches in diameter, hexagonal in cross section, with interior holes measuring between 3-4 inches (Kaye 1976, 16).

Beacon Hill was notable in early histories as containing large numbers of springs. Besides Blackstone's spring already mentioned, there were others including a spring located on the western part of Beacon Hill opposite Charles Street Meeting House (70 Charles Street) on the flat of the hill, which appeared in three locations (Whieldon 1876, 84). Another large spring was located on Howard Street on the northeast slope of Beacon Hill (Whieldon 1876, 84).

The spring water of Beacon Hill was believed to be inexhaustible, with the 1800 memoir of John Lathrop stating that the water should be protected with religious respect (Whieldon 1876, 85). That was not so, however, as the well to supply the 1795-1798 Massachusetts State House on Beacon Hill was dug to 96 feet in depth, just 7 feet above sea level at its bottom and subject to tidal influences (Whieldon 1876, 85)

One of Boston's earliest fresh water waterworks systems was created in 1795 and consisted of 40 miles of wooden pipes carrying water downslope from Jamaica Pond in Jamaica Plain (Kaye 1976, 19). This provided fresh water for a fee to some residents of Boston, but Beacon Hill residents were too far uphill for the gravity-fed system to supply them leading to the need for wells after 1795 (Kaye 1976, 16). The Boston Aqueduct Corporation (BAC) produced around 50,000 gallons of water to Boston per day from Jamaica pond (Hayward 1839).

The BAC was authorized to bring water from Roxbury into Boston (COB 1893, 3). This was accomplished through piping water from Jamaica Pond through four main pipes of pitch pine logs, each with bores of 3 or 4 inches in diameter and lateral pipes of 1.5 inch diameter (COB 1893, 4). These pipes extended 15 miles from Jamaica Pond reaching as far as Franklin street (Downtown Crossing today), and extending east into what is the Downtown and Chinatown Boston neighborhoods including Congress Street and Broad Street. Westward, they extended to Charles Street (between Boston Common and the Public Garden) to Massachusetts General Hospital in today's West End (COB 1893, 4). This indicates that the North End and Beacon Hill as well the areas directly along the coastline were without access to water from Jamaica Pond. (Figure 16)

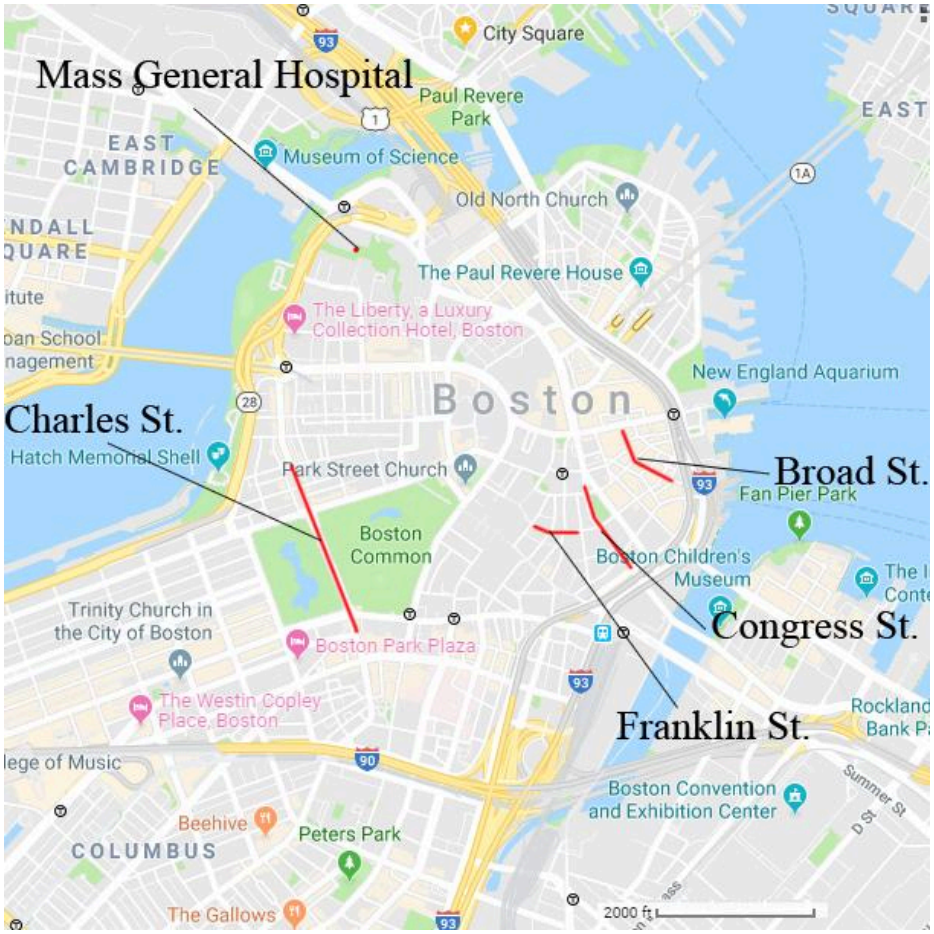

Figure 16- End-points of the Boston Aqueduct Corporation water pipes

The Jamaica Pond water source was problematic. Its main source of water was springs feeding directly into the pond with no natural rivers flowing into the pond and no natural outlet (Baldwin 1835b, 4). This meant that there were no seasonal increases in the pond's levels by melting snow or rainfall, so as the pond was used for town water supply, it gradually lowered its level. The pipe system from Jamaica Pond was gravity-fed, so any point above the height of the pond levels would be inaccessible to water pipes from the pond. While higher points in Boston including Beacon Hill, Copps Hill, and Fort Hill, increased pipe capacity was necessary by 1835 in order to have enough water pressure to counteract the decreasing levels of Jamaica Pond and to allow for water to be pumped into a reservoir at the top of these higher places (Baldwin 1835b, 4).

Baldwin in his 1835 study of water in Boston defines four methods of freshwater obtainment in urban centers: rainwater collection, common wells, artesian wells, and aqueducts (Baldwin 1835a, 2).

Cisterns were commonplace throughout Boston as has been shown at archaeological sites throughout the city. Common wells differ from artesian wells in that they are shallow and rely on

excavated holes into saturated land where water can pool in a man-made spring. Artesian wells are excavated into deeply buried saturated strata which provide clean filtered water less impacted at surface levels. Aqueducts require the greatest engineering, planning, and expense, to transport water over great distances to urban centers.

In 1825, Mayor Josiah Quincy formed a committee to begin the process of determining how to provide Boston with a source of freshwater (Smith 2013, 27). The primary impetus for this study was for producing reliable sources of water for fire suppression. Quincy also stated that the many wells in Boston were brackish and lead to poor health.

In 1830, Boston planners estimated that Boston's 61,000 residents would consume 1.6 million gallons of fresh water per day (Baldwin 1835a, 47). Baldwin's report included a well census taken by Ebenezer A Lester in 1834. He found there to be 2,767 wells in Boston of which 682 (24.6%) were not of drinkable quality. Of the 2,767 wells counted, only 33 of them were bored or artesian wells.

Lester's survey noted that on warm days, brackish and unclean water was consumed by Boston residents (Baldwin 1835a, 75). He also states that all wells dug on made land were of undrinkable quality and specifically notes shoreline streets including Broad, India, Water, Kilby, State, Merchant's Row, Dock Square, Union, and Ann Streets as all being without drinkable water (Baldwin 1835a, 76). Pumps were often locked to prevent water theft with keys sold to families for 3-6 dollars per year (Baldwin 1835a, 77).

Baldwin describes artesian wells in Boston as being problematic as deeply excavated well shafts can encounter streams of saltwater and freshwater, especially in near-shore environments (Baldwin 1835a, 50). He states that excavations at Charlestown's Dry Dock in the Navy Yard reached 40 feet in depth when they encountered a fresh water spring. Just feet away from the fresh water spring, a salt water spring arose. Excavations where these two sources were both present would result in a brackish well. Baldwin concludes that the only means to provide more than two million gallons of water per day to Boston would be via aqueduct from freshwater ponds or lakes nearby (Baldwin 1835a, 50).

A reliable source of freshwater became a political movement. In 1838, Mayor Samuel A. Eliot stated that introducing an abundant supply of water was the most important issue before City Council (Smith 2013, 13).

During the early 1840s, large debates arose around piping water from Spot or Long Ponds to Boston (Smith 2013, 30) eventually choosing Long Pond 19 miles west of Boston in Natick and Framingham and breaking ground there in 1846 (Smith 2013, 34). Long Pond was later renamed Lake Cochituate.

In 1848, water from Lake Cochituate was transported via aqueduct to Boston (Kaye 1976, 16). On Beacon Hill, a large retaining reservoir was built in 1849 where the annex to the State House

is now located (Figure 17). This reservoir would have provided fresh drinking water to Beacon Hill.

The Boston Aqueduct Corporation requested that the city purchase the Jamaica Pond aqueduct in 1848 (COB 1893, 5). Several offers were rejected and in 1856, the Cochituate Water Board decided to sell the Jamaica Pond Aqueduct under the condition that it no longer supply water within the city limits (COB 1893, 5). When Roxbury was annexed into Boston in 1868, this eliminated the ability of the Jamaica Pond aqueduct to sell water within the previously independent town of Roxbury, and again the infrastructure of the aqueduct was offered for sale to the City of Boston, which was rejected as were multiple sale offers in the 1870s and 1880s, finally selling for a much-reduced price in 1892 (COB 1893, 6-7). These pipes were incorporated into the town water system.

Figure 17- 1874 Hopkins Atlas showing reservoir on Beacon Hill and project area in red.

Field Results

Site Conditions

Upon arrival at the site, the project area was observed to be the western-most edge of the property (Figure 18) protected by several sheets of plywood and a segment of chain link fence.

Figure 18, site of well discovery under plywood at western edge of property. View to the north. Fence segment is five feet tall.

The well was located adjacent to the western edge of the property, likely abutting the actual property line of 19 and 21 Pinckney Street. It was located between 2 and 3 meters south of the western/northern addition to 17 Pinckney Street, a white wooden structure today numbered 19 Pinckney Street. Today, the courtyard to the west of 17 Pinckney and south of 19 Pinckney Street is owned by 19 Pinckney Street owners but the two properties would have been historically the same owner during the period of the presumed use of the well (Figure 19).

Figure 19- Property map showing ownership of 17-19 Pinckney Street at time of survey. 17 Pinckney street property indicated in green outline, 19 in blue, and 17-19 in red. Well (yellow) shown to scale (4 feet wide) on property of 19 Pinckney St.

Surface Features

When the protective cover was removed, the well was visible as a vertical depression in sandy fill ending in a nearly-octagonal opening 12” wide (Figure 20). It is believed that the cover on the opening either collapsed or was never present and there was a cave in of soils leading to the foot and leg of the landscaper falling to below the level of the octagonal opening.

The distance from the current surface to the well cover/opening is approximately 1 meter, all appearing to be sandy fill.

Figure 20- View pointing straight down from the surface of the opening of well. Octagonal opening is 12” wide (30 cm). Note consistent sandy fill above the opening. White dot in black void is the sun-lit octagonal opening reflected in water at the bottom of the well.

Survey Method

Due to the narrow opening of the well, the single day during which the survey was possible, and limited equipment options due to this being the first well documented by the City Archaeology Program, improvisations in field methodology were necessary.

Figure 21 illustrates the equipment assembled to document the well. This included LED flashlights, measuring tapes, rope, tape, cell phone (not photographed), and paint roller.

Figure 21- Equipment used to document well.

Conceptually, the goal was to assemble a recording device that could record the conditions of the well, remotely, while also providing lighting and flexibility to the surveyor.

The main recording device was a standard IPhone's video camera.

Lighting came in the form of multiple plastic battery-operated LED flashlights.

A paint roller was used to provide a mount for the camera and flashlight. The pivot point of the paint roller would allow for the weight of the camera to rotate the roller and always point the camera downward.

Tape allowed for the assembly of the recording apparatus and for "locking" the paint roller into desired angles.

Two overall layouts of camera/lighting/roller were utilized. It was determined that the broad field of light provided by the flashlights arrayed around the camera (Figure 22) in four directions did not allow for enough light to focus in the area of the camera's focus. The second arrangement focused all lighting devices, forward (Figure 23), provided better overall lighting conditions for the overall narrow view afforded by the camera approximately 2 feet from the wall of the 4-foot wide well.

Figure 22- Initial arrangement of camera and lighting device for the well.

Figure 23- Preferred arrangement of camera and lighting device for the well.

A standard white braided nylon rope was tied to the end of the recording assembly and lowered by hand into the well while the camera on the phone was recording video. Slight rotations in the rope allowed for the camera to be pointed within the well in different directions. Measurements were estimated, overall, based on observable data, and the overall depth of the well was determined by lowering the camera to just above the water level then measuring the length of rope needed to reach the depth.

In total, seven videos were recorded from the interior of the well totaling over 10 minutes of footage. These videos, which provide far better and more complete data than is possible to represent in a printed document, can be found at http://tiny.cc/pinkneywell or via email at archaeology@boston.gov

Douglas Magners of Scansure LLC brought a 3D point-cloud recorder, which was lowered into the well via a rope (Figure 24). The scanner required motion, so it was shaken via the rope within the well.

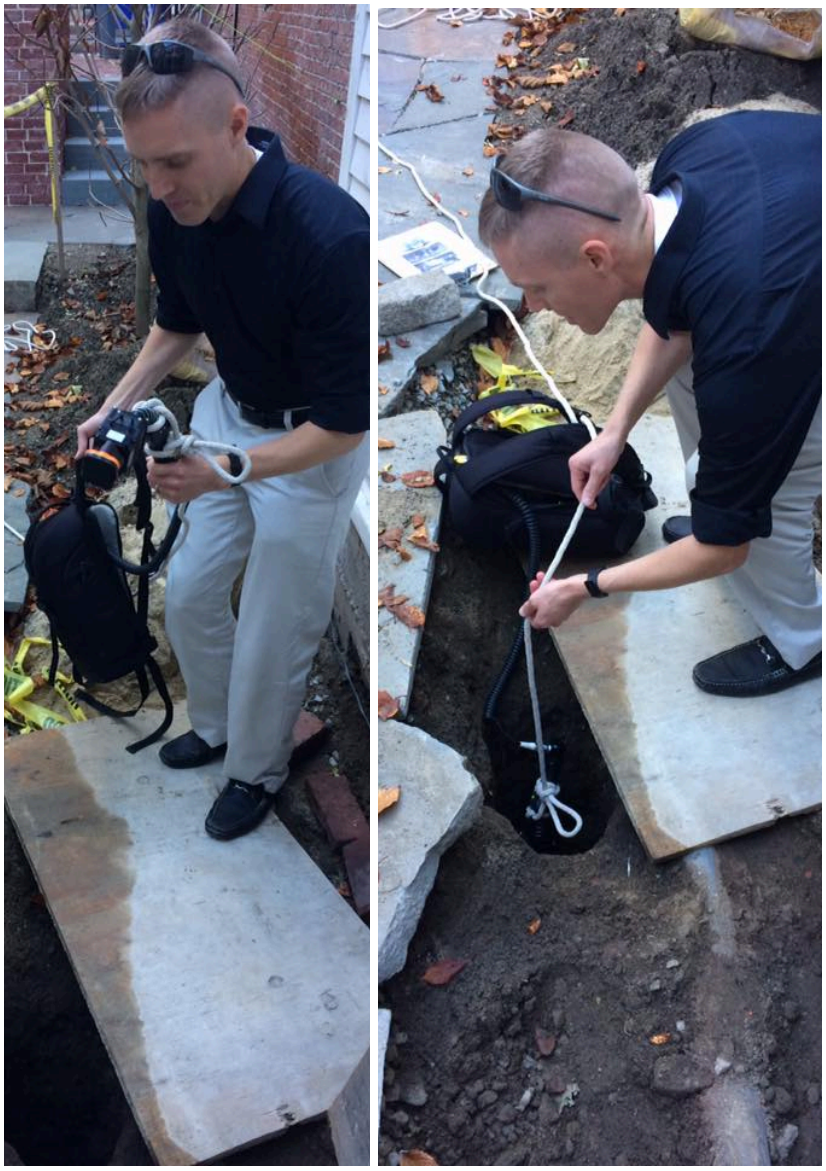

Figure 24- Douglas Magners of Scansure LLC attaching and lowering 3D scanner into well via rope.

3D results

Unfortunately, the lack of consistent light within the well did not produce readable results from the 3D scanner, which utilizes laser measurements to produce a point cloud. In future usage of 3D scanning, additional stationary lighting would be necessary

Well Cover Description

A video was recorded of the underside of the well cover by placing the camera pointing in an upwards direction and rotating it while suspended below the cover at a depth of approximately 1 meter below the cover.

From the video, a series of screen grabs were recorded and overlapped digitally to produce a mosaic view of the well cover's underside (Figure 25). From this image, a plan drawing of the well cover was created (Figure 26).

The granite slabs visible on the edge of the hole appear to be approximately 6 inches thick (15 cm).

It appears that the overall construction design consisted of three slabs of granite each measuring 12 inches by at least four feet, placed across the surface of the well, with a foot-wide gap left near the center of the well, which was filled with shorter segments of granite to form a rough circular opening 1x1 foot in size. This opening was further reduced by placing granite and brick fragments in the corners to produce an octagonal opening through which the pump pipe from the well protruded and above which the hand pump mechanism stood.

An approximately 2" wide iron strip about .25" thick is visible in the northwest portion of the well cover. It is not known if this is for structural support or if it aided in the construction of the well.

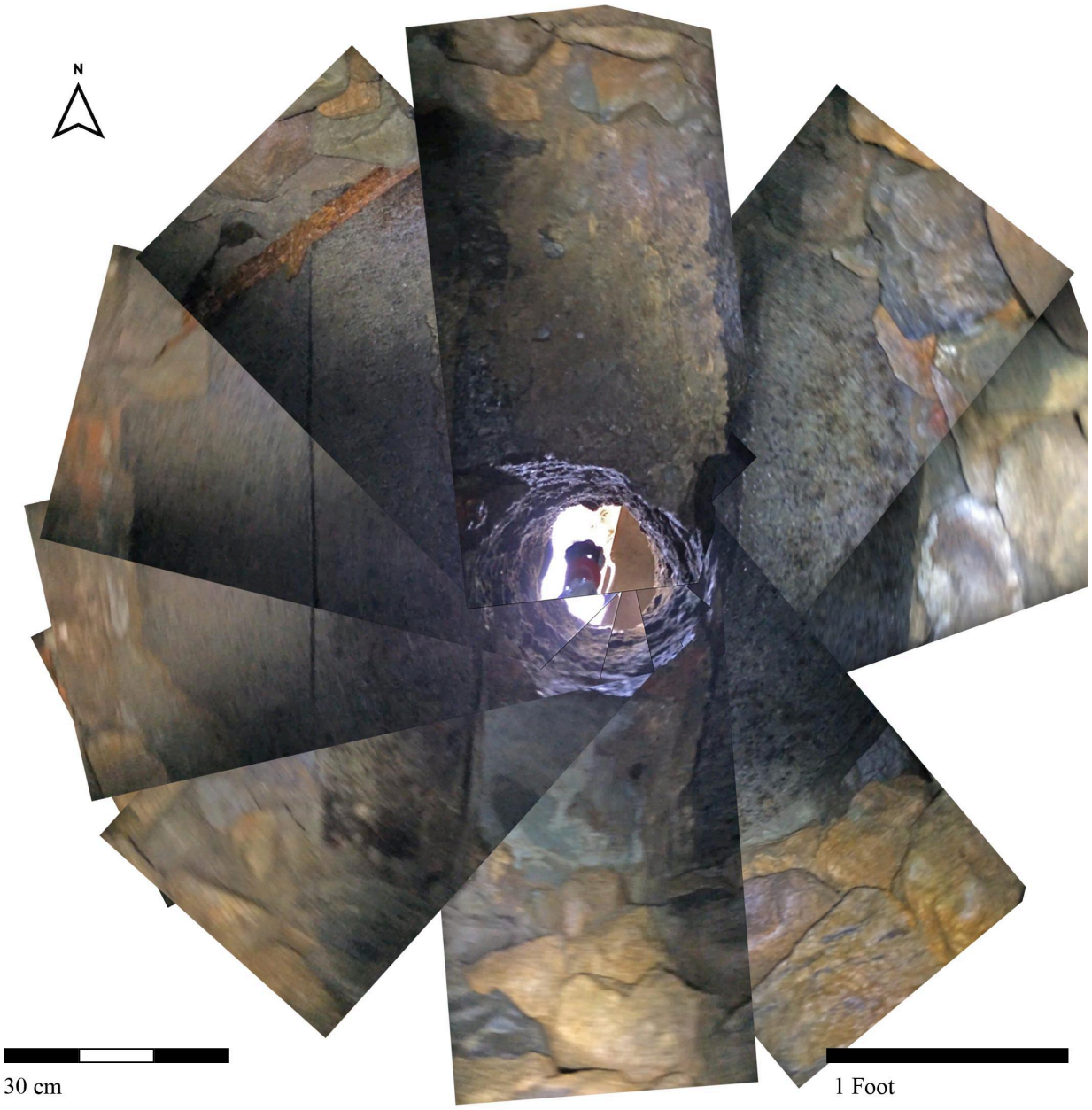

Figure 25- Composite mosaic view of the underside of the well cover from video footage

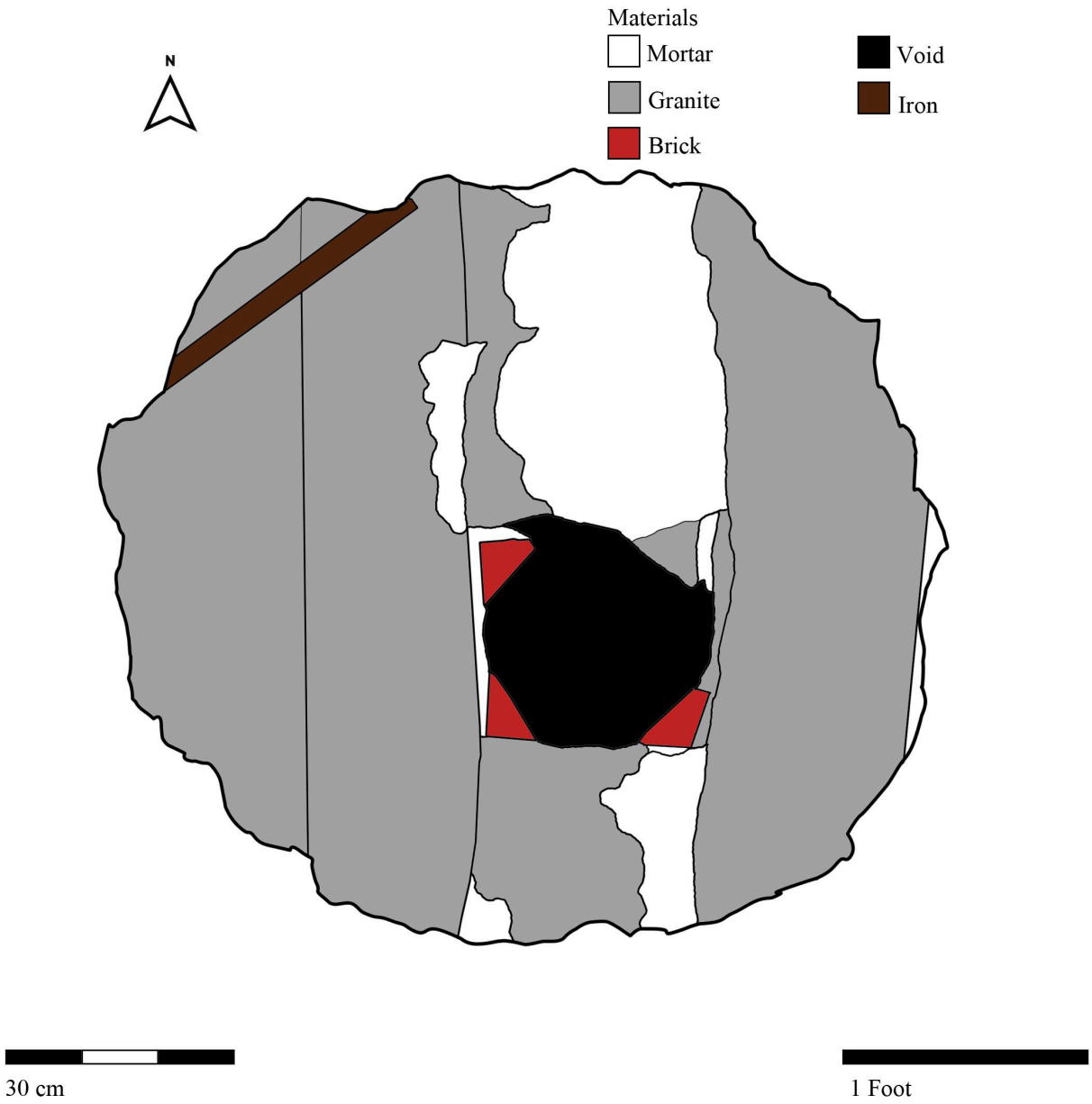

Figure 26- Materials drawing of the underside of the well cover from composite image

Well Shaft Description

The well appears to open to its full width immediately below the well cover (Figure 27-28). The entirety of the well appears to be made from both glacially smoothed and angular stone, and there is no apparent mortar except for the stones nearest the well cap (Figures 27-31). The stone materials appear to be predominantly granite, with some argillite visible. It is interesting to

note that there are no granite outcrops on Beacon Hill, and granite overall is often found south of Boston suggesting these were either found in glacial till or carted to the hill from the South for the purpose of constructing the well. It is possible that the need for stone in wells was so great that it was not possible to rely on existing stone in a well dig to line the well after excavation, and well digging companies may have brought their own stone to the site as part of their services. This would suggest the well company was located to the south of Boston or sourced their stone materials from areas south of Boston. Each stone is approximately 8-12 inches wide and of a variety of shapes and sizes.

Figure 27- Well cap (top) and stones of well showing only areas where mortar is used near the surface of the well. Width of view is approximately 1 foot.

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Figure 28- Video still of the well shaft just below the well cap. View shows pump pipe in the lower right. Width of view is approximately 4 feet.

Figure 29- Video still showing stones in well structure. Note lack of mortar. View is approximately 2 feet wide.

Figure 30- Video still of interior wall of well showing materials used in its construction. View is approximately 2 feet wide.

Figure 31- View near bottom of well showing water pooling at the bottom. Green string fell in from recent landscape work, as did the fall leaves (Photo taken in October). Pipe is visible in extreme lower right of image. View is approximately 3 feet wide.

The well does not appear to differ in width from top to bottom measuring approximately 4 feet wide. The distance from the well cap to the surface of the water was measured at 34 feet in depth, though that is just to the surface of the water, which is cloudy (Figure 32), and is therefore possibly deeper.

Figure 32- Video still of the water at the bottom of the well showing its lack of transparency. Pipe to the left.

Pump Description

The original wooden pump pipe was still present within the well. It appeared approximately 10 feet below the well cap, and continued into the pool at the bottom of the well. The upper-most portion of the pipe that was visible appears to have broken, perhaps at a coupling place given the metal ring present at the break. It is likely that each pipe segment consisted of a flat, open end, with a bored hole, and an end that was tapered to fit into the subsequent bore hole of the next pipe.

The pipe consists of two pipe segments. The first/top segment begins approximately 6-8 feet (2m) below the well cap. The uppermost most appears to have fragments of the former third still remaining at the joint, but the uppermost segment is not visible (Figures 33-34). It is possible that the upper pipe fragment was removed prior to sealing or it is entirely under water. The transition to the second, lower, pipe is flush, with a metal band around the joint.

Visible bumps (Figure 35-36) down the shaft of the pipe suggest the presence of former branches, and the overall roundness of the pipe suggests minimal post-processing of the lumber after felling.

The exterior of the pipe is dark brown with white elements suggesting mold, salt, sediment, or other accumulation of material on the surface of the wood. The pipe appears to be round, but may have been faceted at one point, if elements of the exterior of the pipe have fallen off.

Figure 33- Full view of upper coupling. View facing slightly downward in well. Pipe is approximately 10 inches wide.

Figure 34- Detailed view jagged upper/top end of pipe segment with iron band remaining, but hanging off of the broken element. Green string from landscapers. Pipe is approximately 10 inches wide. View facing approximately horizontal in well.

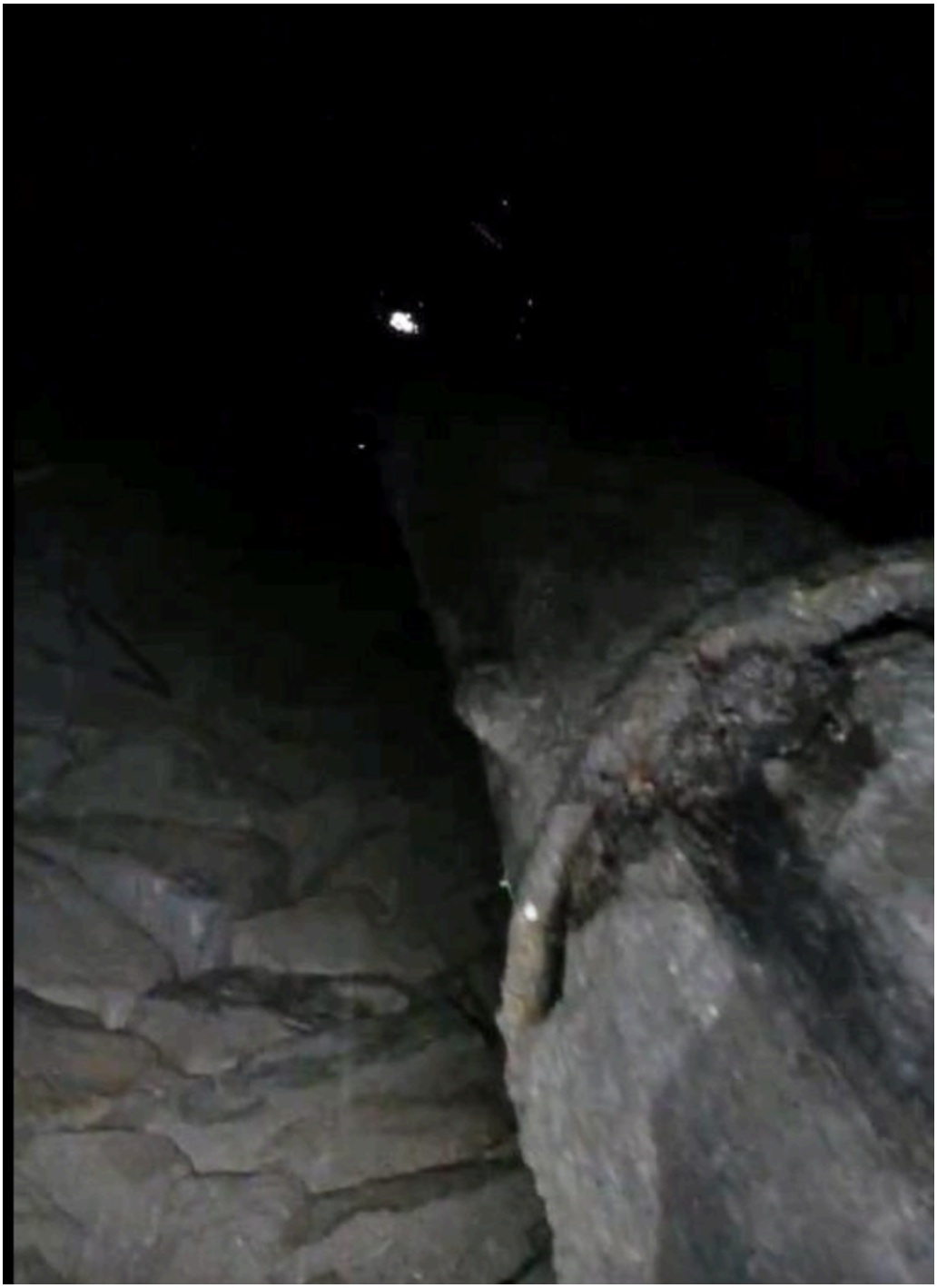

Figure 35- Banded coupling between the lower and upper pipe segment. Pipe is approximately 10 inches wide. View facing downward.

Figure 36- Possible remnant of a branch on exterior of pipe. Pipe is approximately 10 inches wide. View facing downward.

Discussion/Conclusions

On October 13, 2016, a team from the City Archaeology Program had a rare opportunity to document a nearly intact well on Beacon Hill located at 17-19 Pinckney Street (Figure 37).

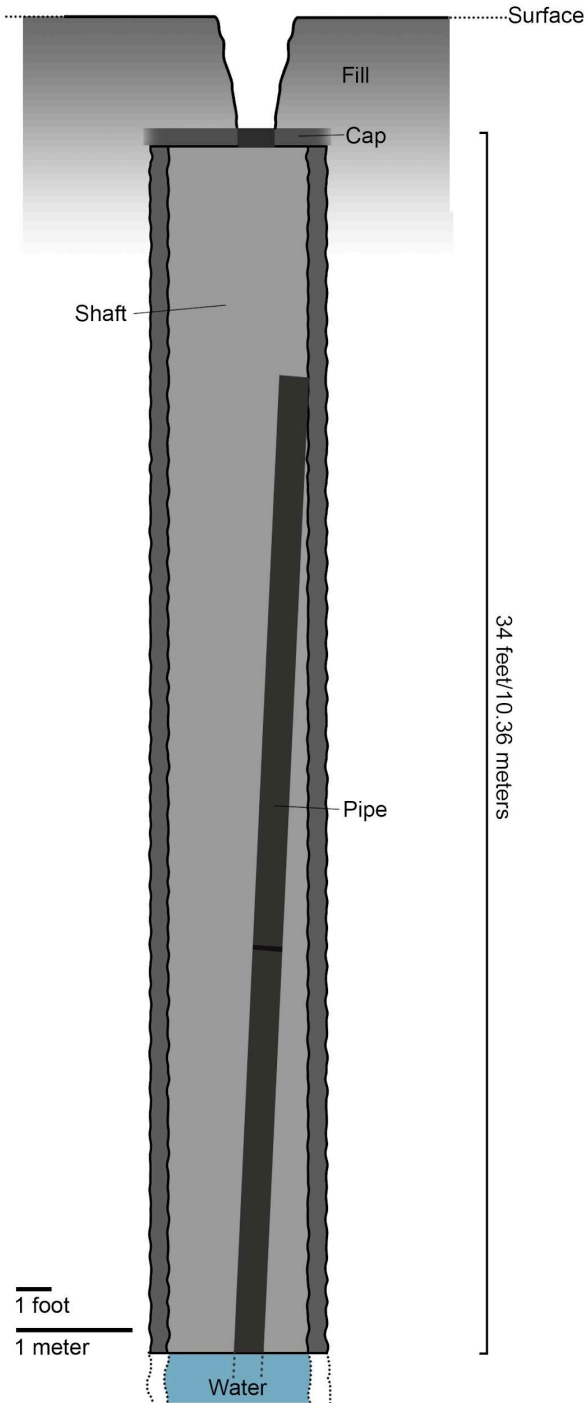

Figure 37- A profile of the c. 1800 well at 17-16 Pinckney Street, Beacon Hill.

Based on historic maps, documents, and research, it appears that the well was built between 1798 and 1845. Prior to 1798, there were no structures on the property and it is unlikely that this location would have been selected for a well for nearby rope walks. The current building located at the address was built between 1798 and 1800. From that period until the installation of the Beacon Hill Reservoir in 1849, residents of the home would have needed nearby freshwater access via well. It is most-likely that the well is contemporaneous to the building of the house; therefore, it is likely that this well was built between 1798 and 1800. This date correlates to Kaye's description of early wells being predominantly stonework, without wooden linings.

The well extended to at least 34 feet in depth, based on current water levels, reaching an aquifer in the glacially-deposited gravels in Beacon Hill. It is constructed out of 8-10 inch cobbles and boulders of Quincy-like granite with a small minority of other local stones around 8-10 inches in size. No mortar was used in the construction of the well shaft except for small stones just below the well cap. The presence of granite suggests an origin of the stones in the area around Quincy where large amounts of natural granite outcrop. There is little bedrock in Boston, with most local stones being puddingstone or argillite/mudstone. These are either not present or very rarely used in the construction of this well.

The water was transported from the bottom of the well to the surface through a series of interconnected hollowed logs, likely of pitch pine, each around 10 inches across with an approximately 3 inch bore. These pipes traversed the bottom of the well to a cap where it met a hand pump on the surface of the yard. The uppermost segment of this pipe was not found and may have decomposed, was removed, or fell into the well and sunk to the bottom. If this is the case, the well extends at least 6 feet further in depth.

The cap was constructed out of three slabs of granite with a hole between two slabs outlined with more granite fragments. The opening of the well cap was octagonal with two walls formed by the large granite slabs, and the remaining six walls being made of brick, granite, and mortar. The construction elements of the cap were mortared together.

No artifacts beyond the high-visibility cord were visible within the well, having been dropped down into the well by construction crews exploring the depth of the well prior to the arrival of archaeologists. The water in the bottom of the well was opaque, and no contents were visible.

It is likely that the well was abandoned around 1850 when its use was no longer necessary, but it may have been kept during the period of time it took to extend pipes from the Beacon Hill reservoir

It is not known what the current conditions of the well are, but it is believed to be capped. The owners of the property were last exploring costs to fill the well with gravel. The owners had no intention of attempting to modify or remove the well, only re-seal the opening at the top and

potentially fill it with sterile material in order to ensure nobody could fall into the otherwise open shaft.

Recommendations

It is possible that more of these wells are present, given the thousands documented in the 19th century, despite the presence of piped water available to some residents at the time. These are rare features to discover in Boston, with no wells documented by archaeologists in Boston in the 21st century. If found, future wells should be similarly documented, with greater care given to additional lighting. Digital records are valuable archaeological tools. The videos recorded for this survey cannot be accurately portrayed in the print version of the report but provide a valuable and necessary component of the recording and reporting of this data. 3D and video recording of such discoveries will become more effective and affordable in the future. Archival copies and backups are necessary for all digital records.

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