

PRESERVATION ASSESSMENT OF THE LYNNHAVEN HOUSE CEMETERY, VIRGINIA BEACH, VIRGINIA



Chicora Research Contribution 554

Preservation Assessment of the Lynnhaven House Cemetery, Virginia Beach, Virginia

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Tidewater Chapter of the National Society of the Colonial Dames of America

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MANAGEMENT SUMMARY

This study was funded in part by a grant from the Tidewater Chapter of the National Society of the Colonial Dames of America to the City of Virginia Beach. The work was conducted by Chicora Foundation on July 25 and 26, 2013 and involved two-days on-site and a meeting with representatives of the City's Department of Museums involved in the preservation of the Lynnhaven House Cemetery.

The study examines a small family cemetery associated with and directly south of the Lynnhaven House situated in the northwest corner of the city. The origin of the vernacular brick structure known as the Lynnhaven or Wishart House is difficult to ascertain. While the Historic American Building Survey placed its construction ca. 1680 and the National Register nomination suggests a date from the latter half of the seventeenth century, the City's Department of Museums places a more conservative ca. 1725 date for its construction, corresponding with the acquisition of the property by Francis Thelaball. In 1784 the property was acquired by William Boush. The earliest marked grave, that of William Boush, dates from 1818.

The property passed through the Boush and Oliver families, eventually being acquired by the Association for the Preservation of Virginia Antiquities (APVA). In 2006 the City began operating the site and in 2008 took over ownership of the property. The Virginia Department of Historic Resources holds a preservation easement on the property.

This assessment examined a broad range of issues that affect burial grounds, including access, security and safety, the landscape, maintenance practices, the condition of the stones, among other topics. As a result of the assessment this study proposes a range of preservation activities and provides budget estimates where appropriate.

This report classifies all of the identified needs into three broad categories:

- Those issues that are so critical – typically reflecting broad administrative issues, health and safety concerns, and issues that if delayed will result in significantly greater costs – that require **immediate** attention. These actions should be accomplished either in what remains of 2013 or 2014.
- Those issues that, while significant and reflecting on-going deterioration and concerns, can be spread over the next several years (i.e., 2015-2016). This allows some budgeting flexibility, but this flexibility should not be misconstrued as a reason to ignore the seriousness of the issues.
- Finally, those issues that represent on-going maintenance and preservation issues. These costs can be spread over the following two years (i.e., 2018-2019). Like the Second Priority issues, this budgetary flexibility should not be interpreted as allowing these issues to slide since further delay will only increase the cost of necessary actions.

Priority 1 activities are estimated to cost about \$23,900. Most of this funding is recommended for ground penetrating radar to determine the location of below grade vaults and the creation of a pathway to the cemetery that will promote better public interpretation. Other major Priority 1 activities include the replacement of the boundary fence, as well as other critical landscape maintenance activities.

Priority 2 actions account for \$11,200. Most of this is allocated for conservation activities, including the repair of the brick box tomb and maintenance of the iron fence – both associated with the Walke monument.

Priority 3 tasks are estimated to cost about \$44,500. The major costs here include additional archaeological investigations to better document the unmarked burials associated with the cemetery, as well as the installation of cameras. The latter activity should be based on evidence that the potential for significant vandalism remains a threat.

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Introduction

The Project

In mid-May 2013 the City of Virginia Beach Department of Museums and Historic Sites requested proposals for a conservation assessment of the cemetery associated with their Lynnhaven House, as well as condition assessments and treatment recommendations for the stones in the cemetery. The proposed study was being partially funded by the Tidewater Chapter of the National Society of the Colonial Dames.

Chicora responded with a proposal dated May 31, 2013, which was subsequently approved by City with Purchase Order FLHO-13-0015, dated June 18, 2013.

The cemetery assessment was conducted on July 25 and 26, 2013 by the authors, Michael Trinkley and Debi Hacker. The work involved two days in Virginia Beach conducting interviews, assessing the cemetery and its setting, conducting the stone-by-stone assessment, and recording the extant stones.

Virginia Beach is an independent city located in the Hampton Roads metropolitan area of the Commonwealth of Virginia, on the Atlantic Ocean at the mouth of the Chesapeake Bay. It is Virginia's most populous city and ranks 39th in the United States. The city is perhaps best known as a resort city with miles of

beaches and a thriving tourist destination along its oceanfront.

When the modern city of Virginia Beach was created in 1963, by the consolidation of the 253 square miles Princess Anne County with the 2 square mile City of Virginia Beach, the new jurisdiction was divided into seven boroughs: Bayside, Blackwater, Kempsville, Lynnhaven, Princess Anne, Pungo, and Virginia Beach. The Lynnhaven House Cemetery is situated in the Bayside Planning District.

The area incorporates a diverse land use development pattern that includes large areas of

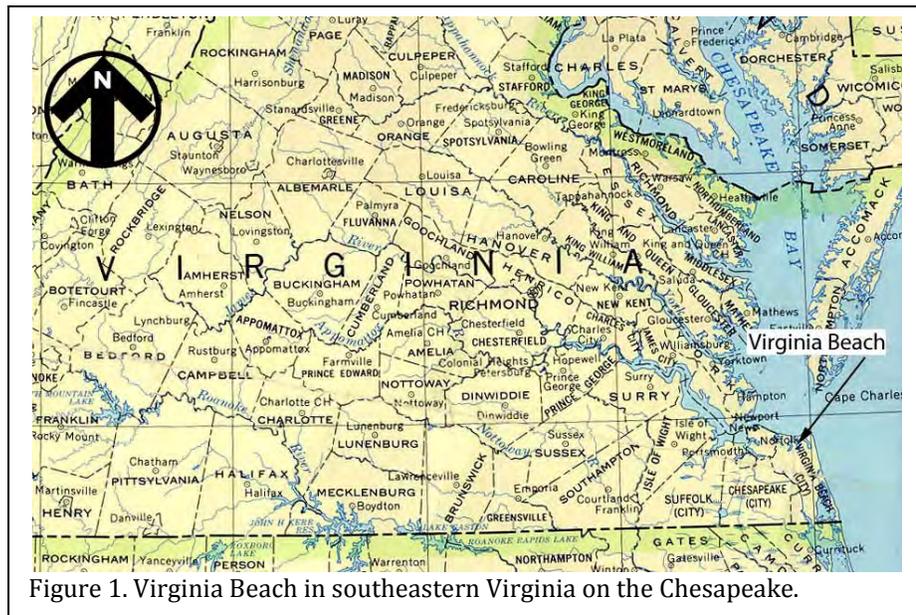


Figure 1. Virginia Beach in southeastern Virginia on the Chesapeake.

single family residential ringed by clusters of multi-family and commercial land uses located along the planning area's major transportation corridors, including nearby Independence Boulevard. Development has resulted in the older, more established neighborhoods being located in the eastern half of the planning area, in the

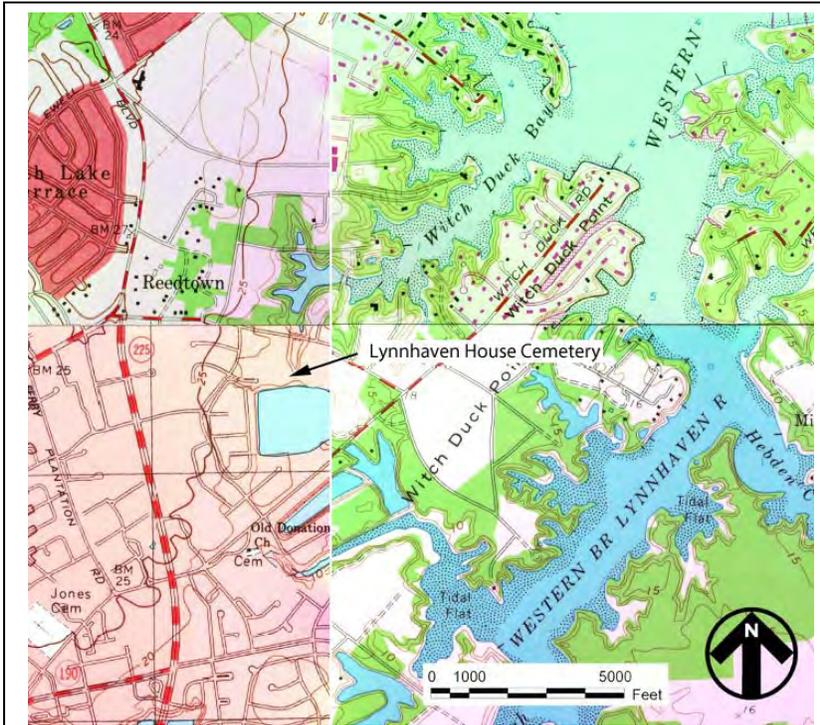


Figure 2. Portions of the Cape Henry 1964, Kempsville 1994, Little Creek 1964, and Princess Anne 1965 USGS topographic maps showing the location of the Lynnhaven House Cemetery in Virginia Beach, Virginia.

vicinity of the Lynnhaven House and its cemetery.

Immediately to the west and south there is considerable commercial development (Figure 2).

The cemetery (Figure 3) is reported to be 1 square rood, presumably based on deed research. A rood is an Old English unit of area, equal to one quarter of an acre. This boundary has not, however, been confirmed through archaeological investigations.

Preservation Fundamentals

Preservation is not an especially difficult concept to

grasp, although the key principles are not always clearly articulated. The fundamental concepts are well presented in the Secretary of the Interior's Standards for Preservation (see Table 1). While the City had done an admirable job remaining faithful to these standards, it is still worthwhile to talk about the Standards in the context of a cemetery.

The Secretary of the Interior Standards remind us – at least at a general level – of what caregivers need to be thinking about as they begin a cemetery preservation plan. Those responsible for the care of the Lynnhaven House cemetery should be intimately familiar with the eight critical issues it outlines.

For example, all other factors being equal, a cemetery should be used as a cemetery – not to walk dogs, not as a playground, not to store equipment, and not as a park. And until the



Figure 3. Lynnhaven House Cemetery looking south.

caregivers are able to do what needs to be done, it is their responsibility to make certain that the site is preserved – it must not be allowed to suffer damage under their watch.

Caregivers must work diligently to understand – and retain – the historic character of the cemetery. In other words, they must look at the cemetery with a new vision and ask themselves, “what gives this cemetery its unique, historical character?” Perhaps it is the landscape, the rural setting, or the markers. It may simply be that it is a unique representation of a cemetery type rarely seen in a rapidly developing urban setting. Whatever it is, those undertaking its care and preservation become the guardians responsible for making certain those elements are protected and enhanced (whether they are particularly appealing to the caregivers or not).

Whatever conservation efforts are necessary must be done to the highest professional standards; these conservation efforts must be physically and visually compatible with the original materials; these conservation efforts must not seek to mislead the public into thinking that repairs are original work; and the conservation efforts must be documented for future generations. If the caregivers aren’t conservators, it is their responsibility as the stewards of the property to retain a conservator appropriately trained and subscribing to the Code of Ethics and Standards of Practice of the American Institute for Conservation (AIC).

Table 1. Secretary of the Interior’s Standards for Preservation	
1.	A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2.	The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3.	Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4.	Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5.	Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6.	The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.
7.	Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8.	Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

The Secretary of the Interior reminds those responsible for the resources that each and every cemetery has evolved and represents different styles and forms. It is the responsibility of care-givers to care for all of these modifications and not seek to create a “Disney-land” version of the cemetery, tearing out features that don’t fit into their concept of what the cemetery “ought” to look like.

Likewise, caregivers are reminded that there will be designs, monuments, and other features that characterize the cemetery – and the caregivers are responsible for identifying these items and ensuring their preservation. Caregivers must be circumspect in any modifications, ensuring that they are not destroying what they seek to protect.

Before acting, those responsible for

preservation are required as good and careful stewards to explore and evaluate the property, determining exactly what level of intervention – what level of conservation – what level of tree pruning – is actually necessary. And where it is necessary to introduce new materials – perhaps a pathway – into the cemetery, they must do their best to make certain these new elements are not only absolutely necessary, but also match the old elements in composition, design, color, and texture. In other words, if the cemetery has brick pathways, they would be failing as good stewards if they allowed concrete pathways – especially if the only justification was because concrete was less expensive.

Where conservation treatments are necessary, the Secretary of the Interior tells stewards that they must be the gentlest possible. However phrased – less is more – think smart, not strong – caregivers have an obligation to make certain that no harm comes to the resource while under their care. And again, one of the easiest ways to comply is to make certain that caregivers retain a conservator subscribing to the ethics and standards of AIC.

Finally, the caregivers must also recognize that the cemetery is not just a collection of monuments and the associated landscape – the cemetery is also an archaeological resource. They must be constantly thinking about how their efforts – whether to repair a monument, put in a parking lot, or resurface a path – will affect the archaeological resources – archaeological resources that are the remains of people buried at the cemetery by their loved ones.

These are especially critical issues for the Lynnhaven House cemetery. The cemetery is not only being operated by the city’s Department of Museums and Historic Sites, but is also listed on the National Register of Historic Places. There are few local descendants of those buried in the cemetery, so the City of Virginia Beach is a guardian of their interests, balancing cost-effective preservation with the recognition that the property is not simply a historic site, but also a burial ground.

Our first recommendation, therefore, is that those assuming care for the cemetery become thoroughly familiar with the Secretary of the Interior’s Standards for Preservation and reaffirm their responsibility as stewards of this historical resource to ensure that future preservation efforts are consistent with sound preservation principles and practices. These standards must become “talking-points” for all future discussions and decisions made concerning the cemetery.

The Cemetery, Its Setting, and Context

The Lynnhaven House Cemetery is located in Census Tract and Block 041600.03. The cemetery is situated on a 2.6 acre parcel (GPIN 14787601390000, 14786694870000, and 14787622210000) at 4405 Wishart Road. The property is owned by the City of Virginia Beach and includes a relatively new education center, the historic house, the cemetery, and other structures.

The Lynnhaven House is operated by the City of Virginia Beach’s Department of Museums and Historic Sites. The tract owned by the city is the remnant of a once much larger historic farm. The three remaining parcels are rectangular and are bounded by Wishart Road to the north, church properties to the east and west, and a man-made lake (Wishart Lake) to the south (Figure 4).

Looking at current land use, the area around the cemetery is primarily single family detached residential. In the area around the Witchduck Road and Independence Boulevard intersection there is also multi-family residential land use.

Zoning in the immediate area is R-20, a residential district that requires larger minimum lot sizes in areas where lower residential densities are necessary.

Figure 4 reveals that the museum property consists of ridges at elevations of about 18 feet above mean sea level (AMSL) on the east and west edges of the property. There is a

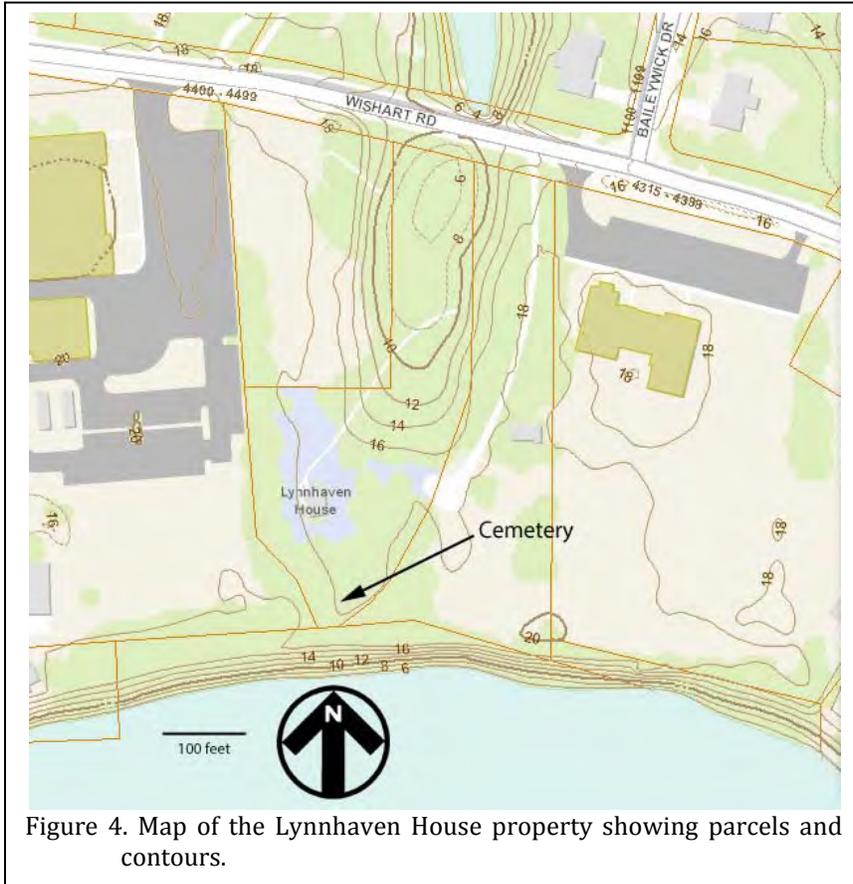


Figure 4. Map of the Lynnhaven House property showing parcels and contours.

remnant slough running through the property to Witchduck Bay, with elevations depressed to about 5.5 feet AMSL. The cemetery is on a south point at an elevation of about 18 feet AMSL, as is the Lynnhaven House itself. City-wide, topographic relief consists of three primary north-south ridges separated by low-lying flats with elevations ranging from 18-21 feet in the east to over 30 feet AMSL at the western-most ridge.

The cemetery is situated on Tetotum loam, while the slough and lake front consists of Rumford fine sandy loams. Most of the soils in the immediate area are generally clays and silt loams and are moderately to well drained.

The Tetotum soils are moderately well drained and formed from moderately fine textured fluvial or marine sediments underlain by stratified coarse to medium textured sediments. A typical profile consists of an Ap horizon about 0.8

foot in depth of dark grayish brown (10YR 4/2) fine sandy loam. This rests on a Bt1 horizon of dark yellowish brown (10YR 4/4) sandy clay loam to about 1.2 feet. The Bt2 horizon extends to nearly 2 feet and consists of a yellowish brown (10YR 5/4) clay loam. The Bt3 horizon is a yellowish brown (10YR 5/8) clay loam to about 2.5 feet. The Bt3 horizon extends to 3.2 feet and consists of a variegated yellowish brown (10YR 5/8), gray (10YR 6/1), and red (2.5YR 4/8) clay loam

Although today associated with sloughs, the Rumford soils are found on marine terraces and tend to be well drained. They have an Ap horizon of dark brown (10YR 3/3) sandy loam.

Compared to Virginia as a whole, Virginia Beach is somewhat less affluent. The per capita income for the city is \$31,589 compared to \$33,040 for the state. In the vicinity of the cemetery census tract, however, the per capita income is \$45,856 – significantly higher than either that of the state or the city as a whole. In Virginia Beach as a whole, 7.1% of the residents fall below the poverty level, compared to 10.7% statewide. Only 4% of those in the census tract surrounding the cemetery have incomes below the poverty level.

The median age for Virginia Beach is about 34 years, while in cemetery census tract it is about 49 years. While only 10.6% of the Virginia Beach residents are 65 years or older, nearly a quarter of those living around the cemetery are 65 or over. Over two-thirds of the city is white, with 82% in the cemetery’s census tract being listed as white.

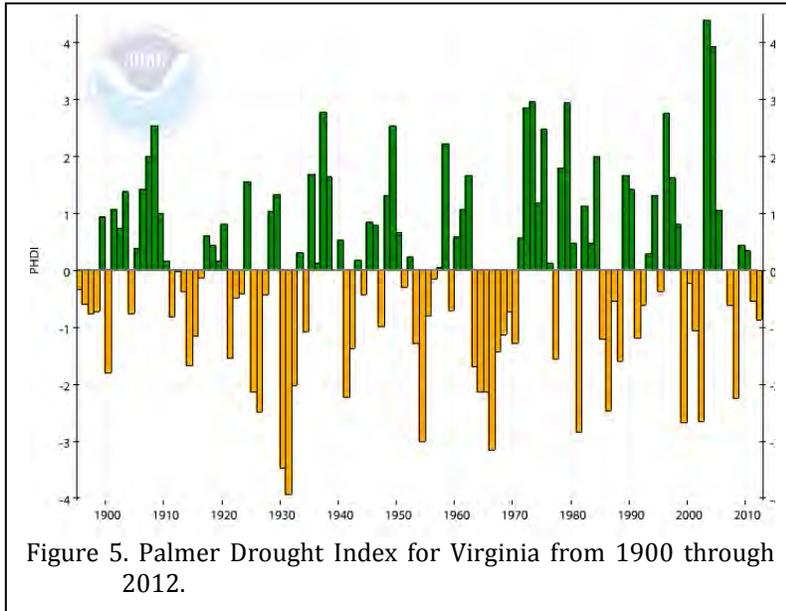


Figure 5. Palmer Drought Index for Virginia from 1900 through 2012.

Unemployment (June 2013) was 5.7% for Virginia Beach. This is far less than the 7.8% national rate and slightly lower than the 6% state-wide rate for Virginia.

The home ownership rate in Virginia Beach is 65.9%, slightly lower than Virginia's state-wide rate of 68.4%. The median value of Virginia Beach homes, however, is higher than the state-wide average, \$276,500 compared to \$254,600. The median value in the cemetery census tract is still higher - \$332,500.

While an affluent community, with older residents, the area around the Lynnhaven House Cemetery doesn't have especially deep ties. For example, only a third of the homes in census tract 416 were occupied by their current owner since at least 1989. An additional third of the current owners purchased in 2005 or more recently.

Curiously, while the residents around the cemetery are more affluent than those in the remainder of the city, they are not necessarily better educated. While about a third of the city residents have a college education, only about a fifth of those in Census Tract 416 have a B.A. degree or higher.

Crime rates have declined in Virginia Beach since 2006, although this doesn't necessarily mean that the cemetery is safer from vandalism and damage. For example, in 2011 there were 5,005 reports of property crimes city-wide. In 2012 the number increased to 5,178. Within the past year there have been six property crimes in the Wishart Cove neighborhood area; only two have occurred this year.

Factors Affecting the Landscape Character

Virginia Beach is situated in the Coastal Plain Province, Lowland Subprovince. This is an area of flat, low relief along the major rivers near the Chesapeake Bay. Elevations are below 60 feet AMSL. The area's geology consists of unconsolidated sands, clays, and marl.

Groundwater is abundant, but its use is high. Early efforts to identify water were of only minimal success. For example, an 1890 well, drilled to nearly 400 feet, produced limited water that would rise only to sea level. By the turn of the century most wells were dug from 5 to 30 feet and produced water of "fair quality."

The upland forests that originally covered much of the Virginia Coastal Plain have been extensively cleared or altered, making it difficult to identify the natural communities original common. Küchler identified the potential natural vegetation of the Virginia Beach area to be his Oak-Hickory-Pine forest. Today the small areas of forest remaining consist of successional or silvicultural stands of loblolly pine (*Pinus taeda*), and secondary pine-hardwood forests that have developed after repeated cutting or agricultural abandonment. The most mature remnant stands on mesic uplands are characterized by associations of American beech (*Fagus grandifolia*), oaks (*Quercus* spp.), and American holly (*Ilex opaca* var. *opaca*). In many areas an urban forest has developed and this seems to be

the case around the Lynnhaven House cemetery, where trees include oak (*Quercus* spp.), sycamore (*Platanus occidentalis*), hickory (*Carya* spp.), persimmon (*Diospyros virginiana*), dogwood (*Cornus florida*), and cherry laurel (*Prunus caroliniana*).

The earliest photographs we have identified are from the mid-1970s, at which time the vegetation is similar to that today, although far more overgrown. While there are earlier photographs, they do not provide much detail regarding the cemetery. It seems safe to assume, however, that the cemetery has been overgrown since at least the early to mid-twentieth century.

Virginia Beach has an “oceanic” climate, being moderated by its proximity to the Atlantic Ocean and Chesapeake Bay. It is also classified as humid subtropical. Summers are long, but temperate; winters are mild with few days below freezing.

The average winter temperature is 42°F, with an average daily minimum of 33°F. In summer the average temperature is 77°F and the average daily maximum is 85°F. Humidity can be high, averaging about 78% at dawn. Annual precipitation is 45 inches, with a little over half occurring during the growing season from April through September.

Storms out of the northeast occur frequently during fall, winter, and spring and can result in localized flooding and shoreline erosion. During the summer there are numerous thunderstorms with strong winds and heavy rains. While Virginia Beach has historically been north of hurricane tracks,

the City has been struck infrequently.

The Lynnhaven House and cemetery are in FEMA Flood Zone X, lying outside areas of likely flooding. The area, however, may be flooded by a Category 3 or larger hurricane.

Figure 5 reveals that for the past several years there has been a rainfall deficit resulting in minor droughts. It also reveals that droughts are not uncommon, occurring in cycles of 2 to 6 years.

The average growing season for Virginia Beach is 273 days. We should note that the average length of the growing season has increased by about two weeks since the beginning of the twentieth century. A particularly large and steady increase occurred over the last 30 years.

Figure 6 shows that Virginia Beach is within Planting Zone 8a with average annual minimum extremes being between 10 and 15°F. Even since this “new” planting zone map was released the zones have shifted northward.

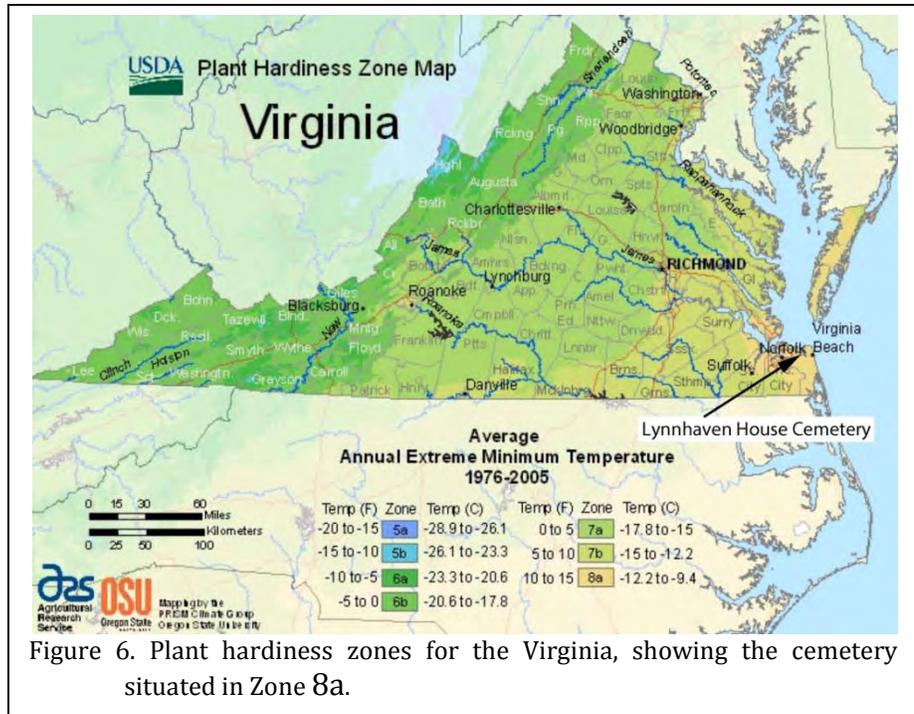
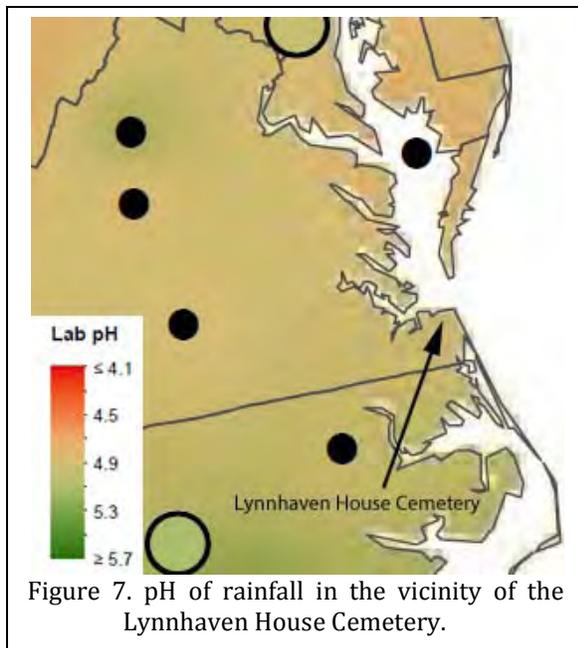


Figure 6. Plant hardiness zones for the Virginia, showing the cemetery situated in Zone 8a.

Virginia is usually considered a transition zone between the warm and cool season grasses. Bermuda and centipede are among the more common grasses specified for the Virginia Beach area. The former is a fast grower with excellent recuperative potential, but it does not tolerate shade. Centipede has greater shade tolerance and requires little maintenance, although it does not withstand traffic.

A factor not only affecting the landscape but also stone preservation is the level of pollutants. Based on monitoring in the region, the annual mean of NO_2 is 0.051 ppm and the annual mean of SO_2 is 0.063 ppm. These pollutant levels result in significant quantities of acid rain and deterioration of marble and many sandstones. Figure 7 shows the impact of these pollutants on rainfall, with pH averages of about 4.8.



Although seemingly residential, within a mile of the cemetery there are at least six sources of hazardous waste or waste generators and one source of air-borne emissions identified by the EPA. Most of these cluster along Independence Boulevard and may pose only a minor risk to the cemetery.

Recommendations

All decisions regarding modifications, alterations, additions, or other actions affecting the Lynnhaven House cemetery should be carefully evaluated against the Secretary of the Interior's Standards for Preservation.

Special care should be taken to protect all remaining historic fabric and the context.

Historic Synopsis

The Lynnhaven House (including the cemetery) is listed on the National Register of Historic Places (NRHP; Lena McDonald, personal communication 2013) and the structure itself was also documented by the Historic American Buildings Survey (HABS No. VA-77). The property was also the subject of an archaeological investigation by Herbert Fisher with the Virginia Historic Landmarks Commission (today the Virginia Department of Historic Resources) in June 1983. Otherwise, there are brief historical overviews, largely focusing on the structure, in a variety of publications; not all of these are especially accurate although they are widely circulated.

This assessment was not tasked with conducting any historical research, so this brief overview relies primarily on secondary sources. Its primary contribution is to document and explore some of the less well known twentieth century history of the property.

The structure appears to have first caught public attention in 1931 with the brief account provided by Sadie Scott Kellam and V. Hope Kellam in *Old Houses in Princess Anne Virginia*. They (erroneously) attribute the construction of the house to James Wishart (d. 1679/80) and relying on a reference to “old house” trace the supposed ownership through the Wishart family. Their study provides a brief description of the “unpretentious” house and two undated photographs.

The primary contribution of the Kellams, at least to our study, is their description of the cemetery in 1931:

On the right of the house nearby under cedar trees lies buried several of Boushes whose home

this had been. The tombs are going rapidly to decay. Here is the tomb of William Boush, 1759/1854, and by his side Mary, his wife, 1764-1822. Here also is the gravestone of Wm. F. M. Boush who died in 1816 at the age of twenty-five years. There is an elaborate inscription on this marble, all of which, for the most part is illegible. From a word decipherable here and there the impression is gotten that he was a most distinguished person. Here also lies buried Eliza J.S. Walke, widow of David Walke, daughter of William and Mary Boush. She died in 1884 at the age of eighty-two years. There is one other brick vault. The slab is gone, a large tree is growing out (Kellam and Kellam 1931:52-53).

Not too much can be made of this description. For example, while they correctly report the birth of William Boush as 1759, the death date is actually 1834, not 1854; and William F.M. Boush died in 1818, not 1816. Moreover, virtually the entire inscription is legible, containing an elaborate prayer he uttered shortly before his death.

It is interesting that the Kellams report the cemetery to be in cedars, since none remain today. Likewise, it is interesting that they document the now missing box tomb.

In 1936 the house was documented by HABS, providing plan and façade drawings of the structure at that time. Historic research, however, was limited to that provided by the Kellams. The owner at the time was listed as W.W. Oliver.

Relying on incorrect historical documentation and an incomplete understanding of the architecture, the HABS survey reported the house's construction to have occurred prior to 1700.

Only two exterior photographs were taken and neither show the area south of the house where the cemetery was located (see, for example, Figure 8). What can be seen to the southwest is a fenced chicken house and what appear to be open fields.

In 1969 what was then called the Wishart-Boush House was listed on the National Register of Historic Places. The nomination, typical of those from this period, provides little detail, reiterating the belief that the structure dated from the seventeenth century and failing to provide an accurate record of ownership. While the document failed to provide accurate boundaries for the nomination, these have been subsequently clarified to reflect that the entire parcel, including the cemetery, is listed (Lena



Figure 8. HABS photograph of the Lynnhaven (Wishart) House looking southwest (HABS VA,77-LYNHA.V,2-4).

Chewning (2006:115) reports that Sarah Walke lived in the house from 1939 through 1945 and Mary Eliza Smith resided there from 1945 through 1950. The house apparently remained occupied into the 1970s, when it and the surrounding acreage were acquired by the Association for the Preservation of Virginia Antiquities (Association for the Preservation of Virginia Antiquities 1972; Grosfils 1985).

McDonald, personal communication 2013).

A series of photographs dated July 1975 reveal the cemetery to be in ruins. They reveal dense, but scrubby or second growth vegetation covering the burial area. The marble box tombs are all disassembled, broken, and scattered across a 30 to 40 foot area. The cemetery appears to have suffered extraordinary vandalism, although we



Figure 9. Condition of the Lynnhaven House Cemetery in July 1975. The upper photograph shows the cemetery, probably after clearing, looking south toward the man-made Lake Wishart. The lower photograph shows the cemetery looking east (City of Virginia Beach Department of Museums).



Figure 10. Condition of the brick box tomb and fence in July 1975. The upper photograph is looking north toward the house (in the background). The lower photograph is a close-up of damage (City of Virginia Beach Department of Museums).

are told that a great deal of fill, likely from the construction of Lake Wishart, was placed around

12). The photo reveals that the marble box tombs were still stacked up and only the brick box tomb



Figure 11. Mason restoring the box tomb of Eliza J.S. Walke in July 1975 (City of Virginia Beach Department of Museums).

had been restored. There was no landscaping in the cemetery area, with only a narrow path leading to the cleared area.

Between 1972 and 1974, Colonial Williamsburg archaeologist Neil R. Frank, Jr. conducted excavations at the Lynnhaven House, although we have not been able to identify any resulting report. The artifacts, however, are apparently stored at Jamestown.

In September 1982 archaeologist Herbert G. Fisher conducted 10 weeks of excavations at the Lynnhaven House (44VB62) under contract with the Association for the Preservation of Virginia

the Lynnhaven House yard. A portion of the remnant drainage to the south of the cemetery has also been filled in, likely to allow transport of the fill into the yard area. Consequently, some of the damage to the cemetery may have occurred during the construction of the lake.

Antiquities. Goals of the excavation were apparently to locate outbuildings, as well as early occupation at the structure.

Additional photographs from this early period show the iron fence is about the same condition as it is found today, with damage to the south rails, likely the result of tree fall. Only small portions of the brick box were extant at the time.

Unfortunately, the research revealed that the yard area had been continuously modified and only two trash pits were identified, both of which dated not from the seventeenth century, but the last quarter of the eighteenth century. No outbuildings were identified. Toward the end of the project attention shifted to the cemetery area, which he described as:

A photograph from the same July 1975 set shows a mason and his helper “restoring” the brick box tomb (Figure 11). The other tombs have been stacked up to the south and appear to be waiting their restoration.

Partially wooded and . . . overgrown with brush. Initially, no testing was planned at this location; however, midway through the field season a faint circular ground depression was observed in this area. This depression located about 70’ south of the house was probed

The restoration of the cemetery was not completed by August 21, 1975 when the Lynnhaven House was opened by the Association for the Preservation of Virginia Antiquities (Figure

revealing the presence of brick. Suspecting a possible well or icehouse, the yard between the cemetery and the fence [a modern pale fence south of the house] was cleared and a test unit VB62/84 was placed over the depression (Fisher 1983:33).

A series of three units were excavated in the cemetery area. The largest, mentioned above, was Unit 84-86, consisting of multiple excavations combined to total 68 square feet.

Fisher described the results, focusing on the encountered brick:

This test encountered a wall of very soft orange brick bonded with shell mortar 5" below the surface. The unit was excavated 9" below the first course revealing other courses and additional brickwork abutting on either side of the originally discovered wall. A much larger unit, VB62/86, was opened which extended from unit VB62/84 to the cemetery pathway.

As more of the brickwork was exposed it became obvious that the excavation had uncovered a series of subterranean burial crypts constructed of brick. At least five of these chambers were partially excavated, each chamber seemingly using brick of different textures and colors, indicating individual periods of



Figure 12. August 1975 photograph of the cemetery showing that the brick box tomb had been restored, but work had not yet begun on the other monuments (City of Virginia Beach Department of Museums).

construction. Interestingly, these burial crypts or vaults were built incorporating an existing crypt wall in construction. It was not determined in what sequence each crypt was built. Based on the shell mortar found throughout the walls and the artifactual debris found on top of the crypts, these burials likely date to the eighteenth century.

Because of the unusual configuration of these crypts, one was excavated further to document that these were indeed human burials and not a structural feature. Once a human femur was identified, further excavation of the crypts was discontinued and the test backfilled. In the single burial that was partially exposed, no evidence of a coffin for the interment was discovered (Fisher 1983:33-34).

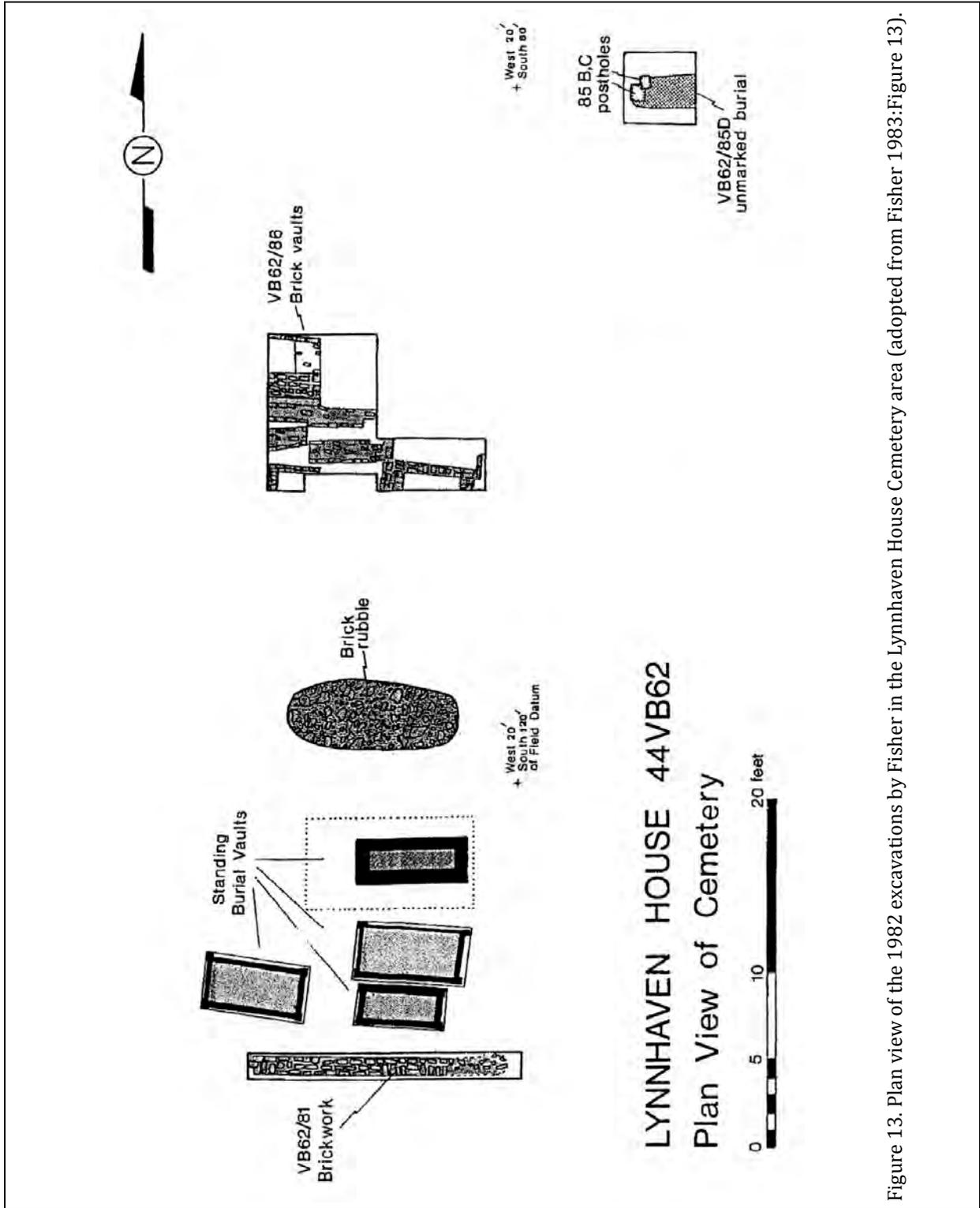


Figure 13. Plan view of the 1982 excavations by Fisher in the Lynnhaven House Cemetery area (adopted from Fisher 1983:Figure 13).

Field notes reveal that not one, but both the right and left femurs were exposed in the excavations, 17.5 inches below the top course of bricks. While the catalog was not consulted, the field notes also indicate that creamware ceramics were recovered over the vaults; this does not, however, provide particularly secure dating (44VB62 field notes, Virginia Department of Historic Resources).

For reasons that remain uncertain, Fisher misidentified crypt fragments as individual crypts, even through the fragments were far too narrow to allow a burial to be enclosed. Consequently, while he suggested seven burials (six in Units 84-86 and one in Unit 85), there are actually only four crypts identified in Units 84-86. Moreover, there is no good evidence that any crypt was built using the wall(s) of an earlier crypt. This confusion was a result of his failure to appreciate the construction of these features and adequately read the soil and the remains present.

Unit 85 was randomly located “to reveal the soil stratigraphy between the existing cemetery yard and the house. While drawings indicate a 4 by 4 foot unit, the field notes describe it as a 3 foot square. This unit apparently produced evidence of a burial. The report indicates that “no brick vault was encountered” (Fisher 1983:34), although the associated field notes indicate that “bricks in place & brick rubble” were encountered. The field drawing, however, shows no evidence of bricks. The interpretation of a burial seems to be based on the presence of two “coffin nails” on either side of what appears to be the top of a square coffin. The plan view of the unit reveals that a portion of the “coffin fill” was removed, although no mention of this is made in the notes, nor is there any information concerning the depth of the test or what was found.

Unit 81 was a 1.5 by 15 foot unit that exposed a brick wall:

located between the existing burial markers and the gully on the south side [part of a small drainage, today dry]. The wall is

one and one-half bricks wide (10”), two to three courses deep, and approximately 15’ long. The foundation is oriented east-west in the same axis of the house with the east end of the wall located exactly 103’ due south of the southeastern house corner. Based on the sand mortar observed in the foundation, this feature appears to represent a cemetery enclosure built during the nineteenth century (Fisher 1983:38).

No information is available in the field notes to document how deeply buried this wall section was, but only “soil [on] top of brick work was removed” (44VB62 field notes, Virginia Department of Historic Resources).

Fisher contends that no other sections of the wall could be found, but fails to document what effort was spent in an effort to identify either intact walls sections or evidence of a robbed wall. We suspect that nothing more than a surface inspection was made.

Thus, this reanalysis reveals that in addition to the four marked burials restored in 1975, there were four additional brick crypts or vaults, plus one burial that may, or may not, have been placed in a brick vault. Taken together Fisher was able to document nine burials at the cemetery, covering an area about 60 feet north-south by 35 feet east-west.

Briefly mentioned in Fisher’s field notes is the comment that the father of Pete Rose built the brick vault for Eliza J.S. Walke in 1885, a year after her death. There is also a cryptic note that there was “no coffin stain,” perhaps a reference to the mason not recalling any soil stain as the brick box tomb was built. Neither the absence of a distinct stain or the construction a year after the burial is a surprise.

In September 1984 the Association for the Preservation of Virginia Antiquities contemplated

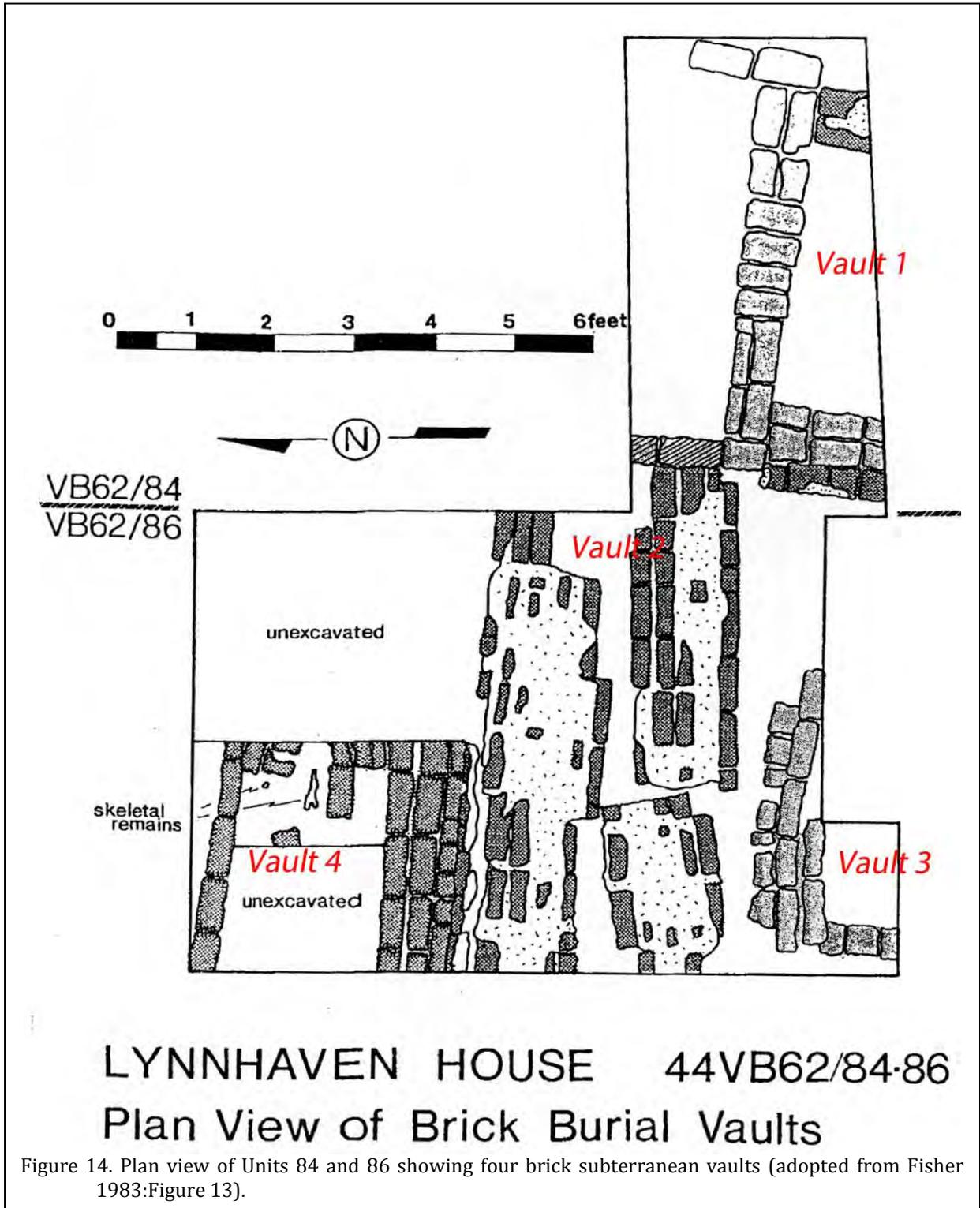


Figure 14. Plan view of Units 84 and 86 showing four brick subterranean vaults (adopted from Fisher 1983:Figure 13).

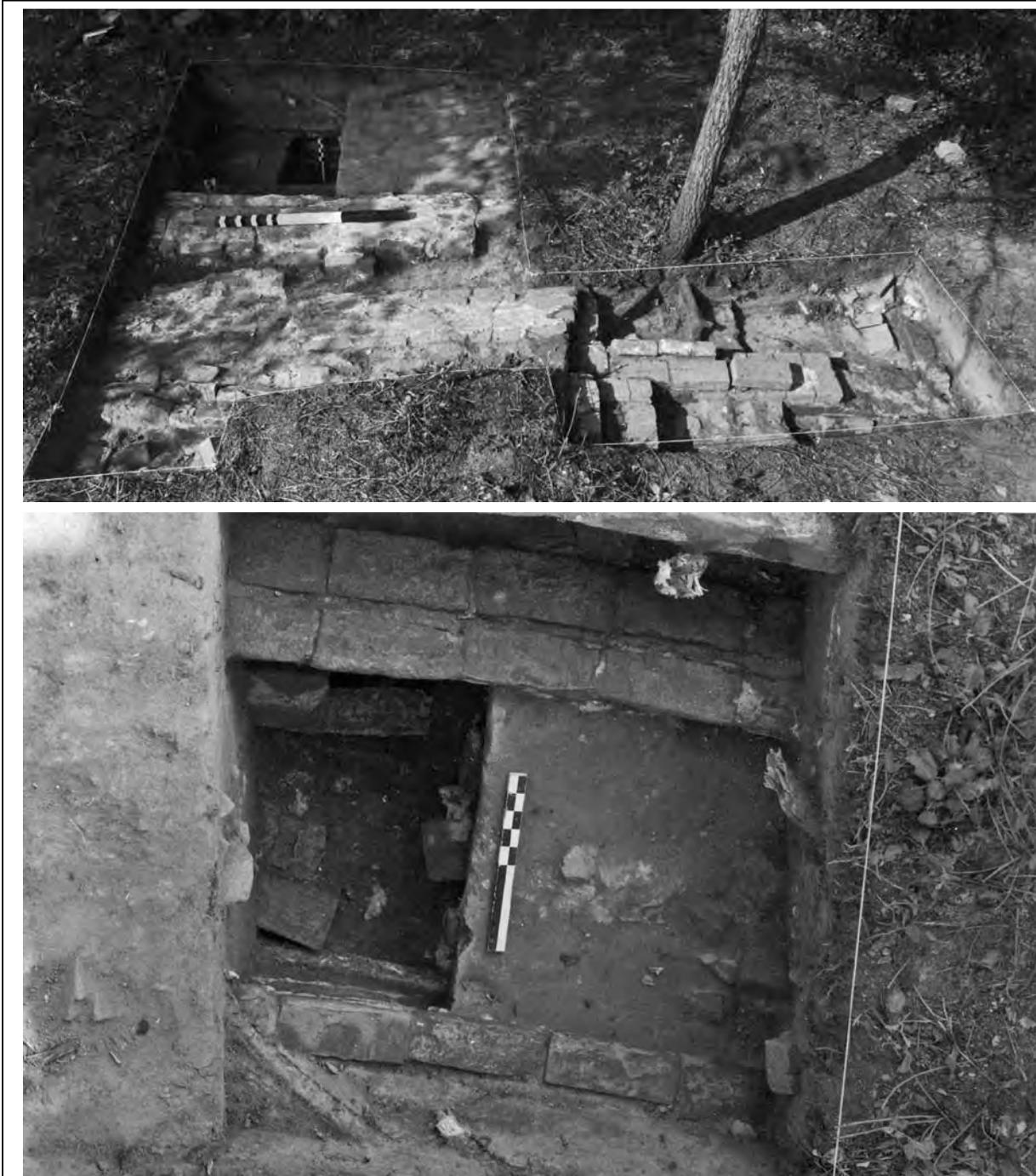


Figure 15. Units 84-86. The upper photograph shows the four crypts or vaults exposed by the excavation, looking to the north. The lower photograph shows the one vault in the NW corner that was partially excavated to reveal human remains, looking down on the excavation (north is at the bottom of the photo) (courtesy Virginia Department of Historic Resources).

moving the markers from the Lynnhaven House Cemetery to the nearby Old Donation Episcopal Church. The church approved the move, as long as “no bones or remains are to be moved, thus precluding legalities involved in the moving of a grave and, further, that any expenses incurred would be borne by the Association for the Preservation of Virginia Antiquities” (letter from Emilie O. Peabody, Registrar Old Donation Episcopal Church to Littleton W. Parks, Association for the Preservation of Virginia Antiquities dated October 1, 1984).

Boush Walke inherited the property, selling it to George and Joseph Smith, retaining the graveyard. Turner (1984:76-77) provided partial inscriptions for the four ledgers from the cemetery, although there are numerous errors. By 1984 the DAR plaque had already been placed on the William Boush box tomb.

Records held by the City of Virginia Beach Department of Museums indicate that in 1991 cast stone slabs were acquired – presumably the same slabs present today. It may be that prior to this time the granite vaults had been left open. Alternatively, it may be that the ledgers were in better condition, not being replaced until 1991.

Regardless, the slabs were likely installed by the Boush Annual DAR Day in April 1992. It was during this meeting that the additional brass plaques with the ledger transcriptions were placed on the granite boxes.

In October 2007 one of the box tombs was vandalized by the removal of the ledger. Surprisingly, the ledger was moved without breakage or other significant damage and City staff was able to replace the ledger. This sort of vandalism is not uncommon as many people believe that human remains are interred within the box.

Recommendations

There is no cohesive history of the property readily available to the public, either as a brochure or on-line. Such a history should be prepared.

While the archaeological examination was able to identify four vaults and one burial that may not have been vaulted, there was no intensive examination to determine the total number of burials. Ground penetrating radar should be used in an effort to determine where all burials are situated so they can be avoided by future interpretative



Figure 16. Vandalized tomb of William Boush looking east, October 2007.

In 1984 Florence K. Turner added to the published documentation of the Lynnhaven House, observing that the Boush family lived at the house for three generations. In 1859 Eliza

activities.

Ground penetrating radar should also be used in an effort to identify additional wall segments that may have surrounded the cemetery.

Investigations to exhume and study remains found in below grade brick vaults and in unvaulted burials would provide significant bioanthropological information concerning these individuals and might assist in determining who they are.

Roads and Pedestrian Issues

Access and Circulation

Vehicular access to the cemetery is via Wishart Road, a two-lane paved highway running west from Independence Blvd (VA 225) to North Witchduck Road, a distance of about 0.75 mile. Each travel lane is about 10 feet in width. The most recent traffic count for Wishart Road dates to 2004 when the ADT (Average Daily Traffic) count was 1,443. In comparison, traffic on Independence Blvd. is about 42,000 to 45,000. The lower count is consistent with Wishart being an arterial road for a variety of neighborhoods.

Access to the Lynnhaven House interpretative center is on a straight-way, although the entrance sign is discrete and easy for first-time visitors to miss.

The interpretative center's parking lot is unpaved crush-run. While parking spots are not marked, there is space for approximately 17 cars. The open parking along the west side of the lot is likely most often used by school buses. The circular design of the lot should allow relatively easy access in and out of the facility.

With the exception of maintenance vehicles, there is no access directly to the cemetery. Maintenance vehicles would access the property about 300 feet east of the main entrance on an unmarked, one-lane gravel road leading to a subsidiary structure (a caretaker's house). From there it is possible to access the cemetery by crossing a one-lane bridge and driving on grassed areas.

Virginia Beach is serviced by the Hampton Roads Transit System. The closest routes (1 and 22) are along Independence Blvd. None extend to the Lynnhaven House, about 0.4

mile from the nearest stop.

There is a well-defined boardwalk and shell pathway from the interpretative center to the front (west side) of the Lynnhaven House. There is currently no defined access to the cemetery. Once at the cemetery there is no obvious circulation system, nor is there any signage to interpret the cemetery. There is a poorly defined social trail leading from the cemetery to the fence that separates the city property from that of Wishart Lake.

Pedestrian Access, Sidewalks, and Pathways

While the Lynnhaven staff does not specifically track pedestrian traffic, it is believed that relatively few visitors arrive as pedestrians.

Sidewalks are present on the north side of Wishart Road for about 800 feet east of Independence Blvd. and pick up again about 760 feet west of the North Witchduck Road intersection. On the south side of Wishart, sidewalks extend from Independence Blvd. to North Witchduck uninterrupted. In spite of this, only limited pedestrian traffic was observed during this assessment.

A boardwalk extends from the elevated interpretative center to ground level where a compacted shell path about 6 feet in width directs visitors to the house entrance.

Access to the cemetery is not defined and thus far visitation is so low that there are no discernible wear patterns in the grass from social pathways.

A very well defined pathway exists from



Figure 17. Pedestrian access. The upper photograph shows the shell pathway leading from the interpretative center to the Lynnhaven House. To the left is the pathway from the caretaker's house used by maintenance vehicles. The lower photograph shows the grassed area between the Lynnhaven House and cemetery.



Figure 18. Social path from the cemetery southward to the property fence and Wishart Lake.

the fence south of the cemetery to the cemetery itself. The reason for the pathway, and its clear definition, is unknown.

Topography is generally level or very gradually sloping and should present no serious impediments for the elderly or handicapped.

It is important to extend a pathway to the cemetery, clearly marking the access route for pedestrians, directing them to appropriate signage, and ensuring that they avoid areas of below ground vaults. It is also important to eliminate the social pathway leading to the fence. This can perhaps be achieved by a combination of repairing the existing property fence and placing an obstacle such as a log along the route to discourage its use, changing pedestrian behavior.

Universal Access

The Americans with Disabilities Act of

1990 (ADA) is generally not interpreted to apply to cemeteries by the Department of Justice. The City's Lynnhaven House, however, is more than "just" a cemetery and as an educational facility may be subject to ADA requirements.

Regardless, we are an aging population. Many who visit historic sites and cemeteries are elderly and therefore may have impairments associated with older age such as visual problems, reduced range of joint motion, reduced endurance, and decreased agility or stability.

In addition, the 2010 census reveals that one in five Americans have a disability (nearly half of all citizens 65 years or older have a disability). Mobility impairments include the use of wheelchairs, scooters, crutches, canes, walkers, orthotics, and prosthetic limbs. Sensory impairments include vision loss, requiring many to use canes or guide dogs.

While ADA compliance may not be required, the goal should be to ensure that any needed additions or modifications to the cemetery are as accessible as possible. In addition, existing obstacles to access should be removed wherever possible.

As previously mentioned, there are few naturally limiting factors for ADA compliance or universal access. The topography is relatively flat and there is much open space.

It is questionable that the current shell path meets the Americans with Disabilities Accessibility Guidelines (ADAAG) standard for an accessible surface, defined as "firm, stable, and slip resistant." The pathway is compacted and the City may wish to obtain a clarification on this issue.

Paths should be at least 5'7" in width to accommodate wheelchair users and people with visual impairments assisted by a sighted person or guide dog. A path of this width will also allow an adult and child to walk together. The existing path meets this requirement.

We recognize that extensive modifications are out of character - changing the appearance of the historic landscape. Even the existing shell pathway, however, would not have been

historically found in the cemetery. Thus, there is some latitude with regard to pathway design and materials.

There are three options. The most obvious is to extend the existing shell pathway since it would be consistent with what already exists. This option should be selected only if the pathway is verified as meeting ADAAG standards.

The second option is to use a soil, shell, or stone pathway that has been stabilized to meet ADA requirements. Examples of stabilizers

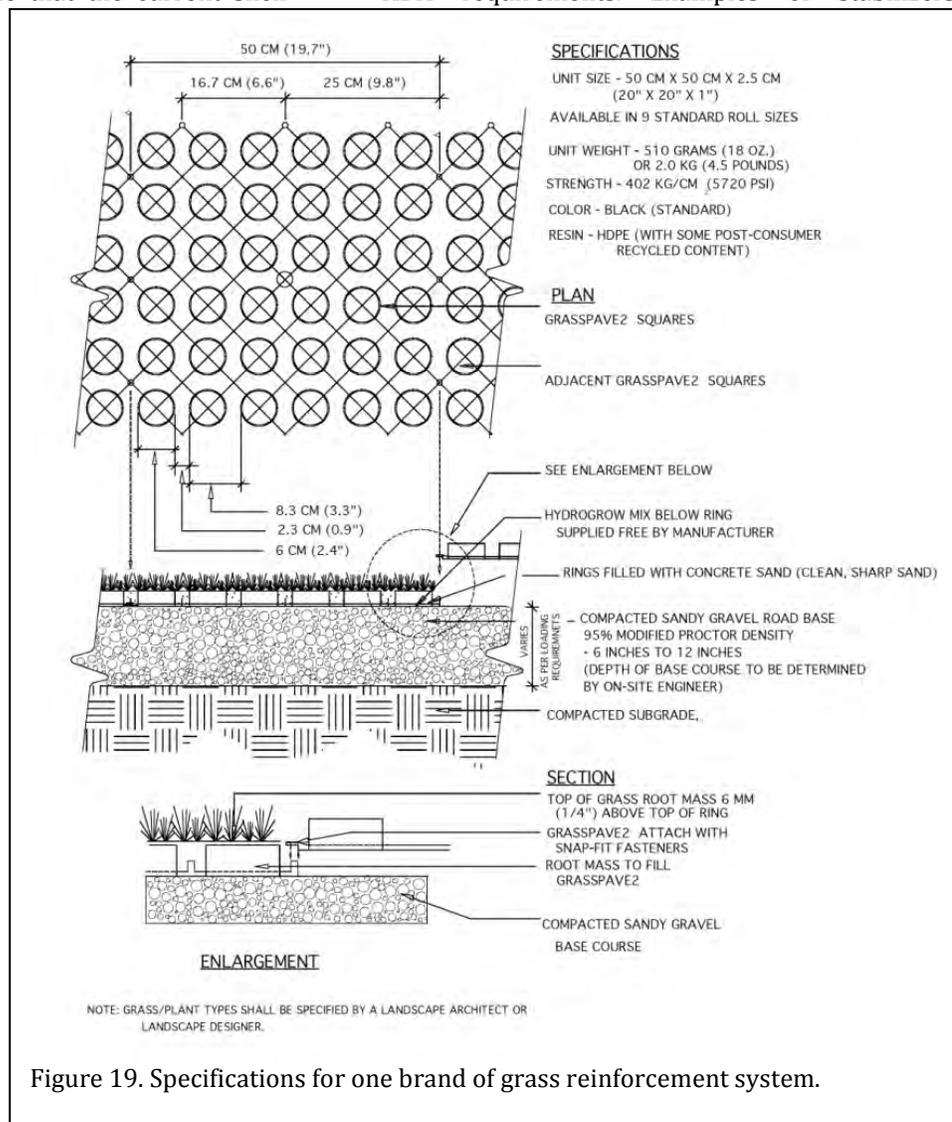


Figure 19. Specifications for one brand of grass reinforcement system.

suitable for this purpose can be found at <http://www.ncaonline.org/products-directory/categories/surfaces/soil-stabilization-products/index.shtml>.

The third option is the use of grass tracks underlain by a reinforcing system to provide a firm, but free draining layer on which vegetation can grow. One grass reinforcement system is the Grasspave² porous pavement by Invisible Structures, Inc. (<http://www.invisiblestructures.com/grasspave2.html>). This system has the added benefit of having been approved for ADA use (Figure 19).

There are, of course, additional issues in achieving universal access, such as the use of appropriate signage and even the selection of routes in the cemetery.

Recommendations

The social trail leading from the cemetery to the property fence should be eliminated by repairing the fence and placing an obstacle, such as a log, in the path.

The City should determine if the existing shell pathways meet ADAAG accessibility standards.

Once ground penetrating radar has identified below grade burials, a pathway should be established from the Lynnhaven House to the cemetery. This pathway should meet ADAAG accessibility standards.

Other modifications at the cemetery should be evaluated to achieve the highest level of accessibility possible without significant alteration of the historic fabric.

Lighting and Security Issues

Vandalism

At the time of our assessment we observed no evidence of vandalism and staff is not familiar with any events since October 2007 when one of the ledgers was shifted off a box tomb



Figure 20. Dilapidated fence at the boundary between the cemetery and Wishart Lake. This fence should be replaced.

(Figure 16). We have noted that the effort to look inside box tombs is rather common since many believe the coffin is within the box, not buried below the box.

The caregivers report no vagrancy or homelessness problems, although they comment that as public property homeless individuals could not be excluded.

While being homeless is not a crime,

many kinds of public conduct are illegal and should be reported to the Virginia Beach Police Department. These include being intoxicated, loitering, prowling, fighting, trespassing, aggressive panhandling, soliciting, urinating and defecating, consuming alcoholic beverages in public, camping or sleeping in public areas, littering, disturbing the peace by loud and unreasonable noises, using offensive words, behaving in a threatening manner, etc.

The property should have regulatory signage identifying the hours the property is open and informing visitors that anyone on the property after these posted hours will be arrested for trespass. This signage should also establish rules of conduct for use of the Cemetery, including the prohibition of

loitering, drinking alcoholic beverages, use of drugs, etc. The signage should state that persons engaged in prohibited acts will be asked to leave the Cemetery and that failure to cease the conduct or leave will result in arrest.

The presence of a social path leading from the cemetery to Wishart Lake (Figure 18) may be the only suggestion that individuals from outside the park are making their way through the cemetery.

Fencing

The Lynnhaven House property is very porous. There is no fence along its north, east, and west sides. In fact, there is no chain or gate that can be locked when the interpretative center is closed.

There is a wire fence at the rear of the cemetery, where the City's property borders Wishart Lake. This fence, however, is dilapidated (Figure 20). The wire is torn down and the fence posts themselves are leaning and unstable.

This fence should be replaced, both as a visual boundary of the City's property and as a deterrent to those seeking a short-cut through the cemetery.

If replaced in-kind, we recommend the use of pressure treated 4-inch posts (a 4-inch post has twice the strength of a 3-inch post). The line posts should be set a minimum of 2½ feet below grade, although a depth of 3 to 3½ feet might be appropriate given that the fence has been routinely breached. Assuming a 4 foot fence, posts would need to be 6½ to 7½ feet in length depending on the depth of burial.

The current wire is welded 2x4 inch mesh. This is satisfactory and difficult, although not impossible to climb. Of greater importance is the diameter or gauge of the wire, as well as the weight of the galvanized protection.

We recommend that the wire has what is known as Class III coating. This should prevent corrosion for 15 to 20 years and is the heaviest coating commonly available. We recommend the use of 9 gauge for top and bottom wires. Intermediate wires may be 11 gauge, although 9 gauge here is also preferred.

The wire is normally fastened to posts using 1½ to 2-inch staples. These should be placed no more than about 6-inches apart considering that the old fence has been so heavily damaged.

City liability concerns will likely prevent

the use of barbed wire, although if allowed it can be an additional deterrent.

Although chain link fencing is an alternative option, it doesn't seem worth the additional expense. If desired, however, we recommend the use of 9 gauge wire and 1-inch mesh size since this is affordable, but difficult to cut or climb. The top rail should be omitted since this also makes climbing more difficult.

Lighting

Lighting is sometimes seen as reducing vandalism. There is no consensus on whether well-lit areas or "dark" locations are superior in terms of crime prevention. Cemeteries were not lighted historically. Thus, the introduction of lighting detracts from the historical integrity of the properties, changing the historic fabric. Another issue to be considered is that lighting is only useful if there is someone guarding the property, using the lighting to identify problems. This is not the case in most cemeteries, including Lynnhaven.

We do not recommend that any lighting be installed.

Other Vandalism Deterrent Activities

The cemetery is remote, making police patrols unlikely. There are no nearby residences, making a "neighborhood" watch also unlikely.

The use of camera monitoring is possible. Low cost wildlife cameras are one option, although quality and convenience are issues.

An alternative is the Flashcam by Q-Star Technology (<http://www.qstartech.com>). This self-contained digital system is motion activated; a photograph is taken (a flash unit allows night photographs at 100 feet), and a customized recorded announcement is played. Units are solar powered, eliminating the need for electrical connections. Photographs are high resolution and time/dated stamped. Units can be downloaded

wirelessly. Although not inexpensive (they are about \$7,000), they are among the most affordable solutions for cemeteries facing on-going vandalism and theft problems. They are also used by an increasing number of cities, including park departments, to deter vandalism.

We are not certain that such an expense is appropriate at this point, with the last reported vandalism occurring in 2007. Nevertheless, the investment may be worth considering as a preventive effort given the isolation of the cemetery.

Regardless, it is essential that City staff proactively inspect the cemetery every morning. Any off-normal events should immediately be reported to law enforcement. We anticipate that such an inspection is already being conducted of the Lynnhaven House; thus, extending the walk-through to the cemetery represents little additional time.

It is equally important that every act of vandalism be recorded by the staff and be immediately reported to the Virginia Beach Police Department. The vandalism should be investigated by law enforcement and additional patrols should be requested if vandalism occurs.

We are told that the City does carry insurance to cover damage to city property, but the cemetery is not scheduled on the policy. Given the cost of repairing cemetery vandalism, including the cemetery in the list of scheduled properties would be prudent.

Recommendations

The damaged fence should be replaced to establish a physical barrier. The fence should be designed to deter efforts at climbing or breaking through.

City staff should make a visual inspection of the cemetery daily, reporting any off-normal events to local law enforcement.

All vandalism should be recorded on a specific

form designed for that purpose and should be reported to local law enforcement.

The City should ensure that the Lynnhaven House Cemetery is listed as a scheduled property in their insurance policy.

Camera surveillance is an option worth considering as a preventative measure, given the isolation of the cemetery and absence of neighbors.

Landscape Maintenance

Maintenance Operations

The City contracts out landscape maintenance at the Lynnhaven House property and we were provided with the specifications for this work. These specifications represent good practice and discuss a broad range of topics, including soil testing, fertilization, lime application, mowing, tree pruning, etc. There is even a provision for work inspection.

In spite of this there is general agreement that the cemetery area receives minimal landscape maintenance attention. Trees and other vegetation have been allowed to “naturalize.” There is no mulching, no weed control (other than mowing), and no pruning of trees. Thus, while there are good landscape maintenance specifications they do not appear to be extended into the cemetery.

The only reason that we can identify for the cemetery being excluded from routine maintenance (again excepting mowing) is that the cemetery is not viewed as not being “used” in the traditional sense by citizens or visitors. This is reflected in the absence of formal tours, signage for self-guided tours, or even a walkway to direct visitors to the cemetery. Thus, the minimal maintenance may be the result of the cemetery appearing to have minimal interpretative, historical, or cultural importance.

These discussions will evaluate landscape issues both in the context of good cemetery maintenance practices, as well as in the context of the specifications. However, it is impossible to separate the maintenance of the cemetery from its perceived value. To achieve more consistent maintenance it is important that the caregivers more fully integrate the cemetery into the overall

interpretative program and this will be discussed in a following section.

Cemetery Trees

Cemeteries, in general, have historically been dominated by large deciduous trees, although evergreens such as cedar are also very common. They provide a distinctly inviting image for visitors and passersby. These trees also provide some visual separation from adjacent buildings. Trees may be an especially important resource since they can dominate the landscape and may represent very large and old varieties. Ideally the trees selected should be historically appropriate and should not compound maintenance issues.

The trees in and around the cemetery today do not appear to have been specifically planted; most are rather recent second growth introductions. As such many of these trees have no cultural significance, although they do soften the overall cemetery appearance. Identified trees include sycamore, oak, hickory, dogwood, persimmon, mulberry, and cherry laurel.

Of these, the sycamore, oaks, and hickories are the largest (with diameters ranging from 13 to 27 inches) and most worthy of preservation.

Research is suggesting that trees, especially older mature trees, improve in health when vegetation is removed under the branch spread and mulch is applied at a depth not exceeding 3 to 4-inches. This is a practice that could be productively employed at the cemetery. Thus, we recommend that vegetation under the tree be removed and mulch installed to the tree’s drip line. This would benefit the tree, provide a more rustic appearance, and would reduce

LANDSCAPE MAINTENANCE

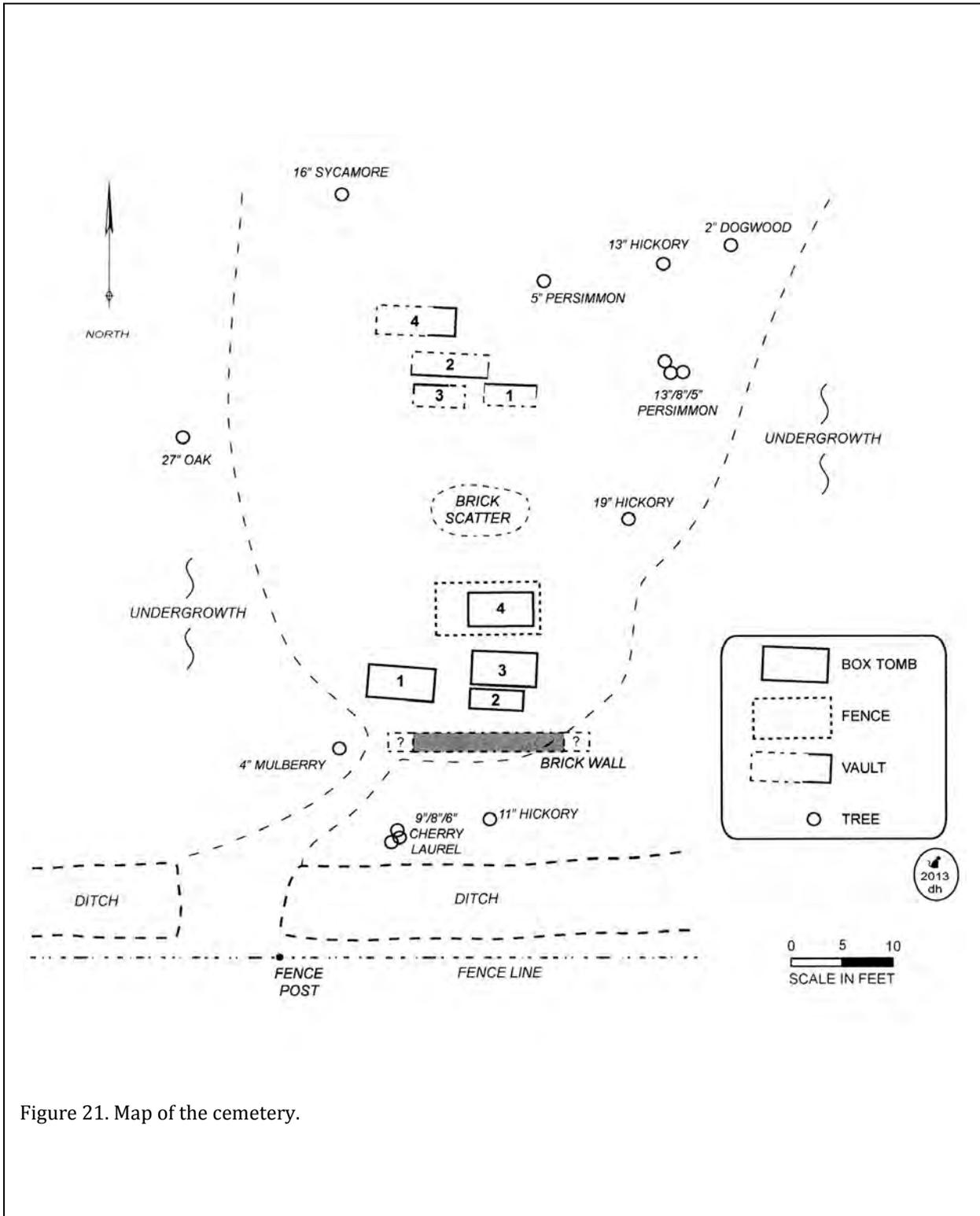


Figure 21. Map of the cemetery.



Figure 22. Tree problems. The upper photographs show deadwood and the need for pruning. Lower left photo shows a hickory that requires removal. Lower right photograph shows trees south of the cemetery overtaken with vines. These trees, predominately cherry laurels, should be removed.

maintenance of the turf.

Maintenance Issues

It is also crucial in a cemetery context that trees be periodically inspected and pruned. Neither has occurred at the Lynnhaven House cemetery.

While the current specification identifies trees with 8-inch diameters are to be pruned during two 10-day maintenance cycles, it appears that the cemetery trees are not viewed as part of the maintained landscape and have therefore been ignored.

This has resulted in many of the trees exhibiting dead wood, cross branches, and other problems. One tree is so diseased that little live wood remains. Many of the trees would benefit from pruning for either thinning or cleaning. Thinning is a technique of pruning that removes selected branches to increase light and air movement through the crown. This also decreases weight on heavy branches. The natural shape of the tree is retained and its overall health is improved. In cleaning, the pruning removes branches that are dead, dying, diseased, crowded, broken, or otherwise defective.

In pruning, branches should always be cut just beyond the branch collar (an extension of the main stem) and not flush with the trunk. Large branches should be removed with three cuts to prevent tearing of the bark, which can weaken the tree and lead to disease. All pruning within the cemetery should be performed by an ISA Certified Arborist.

Trees should be pruned to preserve the natural character of the plant and in accordance with ANSI A300 (Part 1) - 2001 standards.

The trees should be pruned to remove potentially hazardous dead wood on a yearly basis, but safe pruning every 5 years by a certified arborist is acceptable. We also recommend that the trees be routinely inspected by a certified arborist for potential threats to monuments, as well as general health. Ideally the inspection

should be made yearly and after any storm where the winds exceed 55 mph.

Tree Removal

We also recommend that a number of the smaller trees be removed. In particular, the dogwoods, persimmons, and cherry laurels should all be removed. Any diseased trees should be removed. This will allow additional room for the larger trees, open the cemetery to reduce biological growth on the monuments, and improve the overall appearance.

Removals should be conducted by ISA Certified Arborists with care to ensure that no tombs are damaged. Stumps should not be ground, but simply allowed to decay naturally.

The removed trees may be chipped on-site, providing mulch for the landscape trees.

Replacement Trees

Although the need for replacement trees is not immediate, replacements should be planted in time to allow them to begin to mature and fill in anticipated vacant spots. This will help prevent the cemetery from appearing denuded.

While there are many possible replacements, one that is appropriate for small burial grounds, while at the same time exhibiting few negative features, is the Eastern red cedar (*Juniperus virginiana*). Red cedar is an evergreen growing 40 to 50 feet tall in an oval, columnar, or pyramidal form and spreading 8 to 15 feet when given a sunny location. It has no significant litter problem, requires little pruning, and surface roots are not generally a problem. The tree may have breakage issues so should be located where it is not likely to damage stones.

The sugar maple (*Acer saccharum*) has a variety of good qualities including its resistance to breakage (the Blair Maple (*A. saccharum* 'Blair') is reported to be stronger branched) and absence of surface roots. It provides excellent colors through all seasons and is frequently used for ornamental plantings. It is moderately drought resistant and



Figure 23. Vegetation requiring removal from around the cemetery. These photographs show the vegetation on the south, east, and west sides that should be pushed back to open the cemetery, giving it a more pleasing and attractive appearance to visitors.

can tolerate partial shade. The tree grows 50 to 80 feet in height and has a spread of 35 to 80 feet.

All replacement trees should be of at least 1-inch caliper and meet the minimum requirements of the American Nursery and Landscape Association's American Standard for Nursery Stock (ANSI Z60.1-2004).

The current landscape specifications require staking and guying. Research has shown that few trees require staking and that staking produces a small caliper, less trunk taper, a reduced root system, and causes more tipping or breakage after the staking is removed. About the only trees that require staking are bare root trees, trees grown in small containers, or large conifers. Otherwise, we encourage the City to avoid staking replacement trees at the cemetery.

It is unlikely that the caregivers for the cemetery will be able to routinely water newly planted trees. While relying on rainfall after initial planting is typically acceptable, the possibility of summer droughts make it imperative that water is provided over the first year. A good choice is the use of water rings or bladders for the newly planted trees. These typically store about 20 gallons of water, gradually releasing it over 48 hours or longer. These bladders are relatively inexpensive and should be provided to all new trees.

Shrubbery and Ground Cover

While it is possible that the cemetery originally contained heirloom plants, no evidence of any plantings was observed during this assessment. Colonial and antebellum cemeteries typically contained no plantings, although by the late nineteenth century burial grounds were being adorned with spiraea (*Spiraea* spp.), nandina (*Nandina* sp.), multiflora rose (*Rosa multiflora*), privet (*Ligustrum* spp.), and other plants. Bulbs of daffodils (*Narcissus* spp.), snowbells (*Styrax* spp.), and snowdrops (*Galanthus* spp.) are also common. Two common ground covers are English ivy (*Hedera helix*) and periwinkle (*Vinca minor*). Both,

however, are considered invasive today.

In many respects the caregivers at Lynnhaven are fortunate that shrubbery and ground covers are not present since many are difficult to maintain and the City is likely not prepared to deal with the issues they present.

We do not recommend any shrubs or ground covers at this time.

Extending the Cemetery Landscape

There is abundant ground cover, including noxious weeds, vines, and other herbaceous growth on the south, east, and west edges of the cemetery. We recommend that the cemetery boundaries be extended southward to the ditch. Boundaries to the east and west should be extended about 20 feet, squaring up the open area and creating a more welcoming appearance for visitors.

Much of this work can be accomplished using a small bush hog, although the amount of clearing is so small that even hand work does not represent a significant labor investment.

As much of the cut vegetation as possible should be chipped to use as mulch under the larger trees. Otherwise, the vegetation should be taken as close to the ground as possible in order to allow the gradual infilling by turf. Care in removing the vegetation will also allow routine mowing to maintain this additional open space.

Turf

Although the cemetery is dominated by "grass" it is composed almost entirely of different broadleaf weeds with some Bermuda turf. The invasion of broad leaf weeds is especially noticeable (Figure 24). Because of the shade the turf is sparse, with many areas of open soil, especially around the tombs.

The problem with weedy turfs like that at Lynnhaven is that it grows at a variety of speeds



Figure 24. Sparse, weedy turf around the cemetery.

to a variety of heights, and has a broad range in color. It is not attractive and it requires above average mowing in order for the turf to appear “neat.” Many cemeteries cannot easily afford this additional maintenance.

There is some benefit to gradually improving the turf through periodic application of pre- and post-emergent broadleaf weed control. A problem is that the City would need to implement this strategy on the entire Lynnhaven tract; otherwise weeds would simply re-establish themselves in the cemetery.

It may be that as portions of the cemetery are mulched, relatively few turf areas will remain. This would be of special benefit among the tombs, where grass is very sparse and there is much splash-back of soil on the tombs.

In addition to mowing, nylon trimmers are used around monuments. This is an acceptable practice, but it is critical that a very light weight line be used – along with worker attention – to minimize damage to tombs. The maximum line diameter for use in the Cemetery should be 0.065 inch. Thicker lines, such as the 0.095 inch discarded in the cemetery, will cause unnecessary damage to the tombs. Another benefit of careful mulching is that use of heavy string trimmer lines around the box tombs can be eliminated.

Soil Testing

Since it was reported that no soil sampling was being conducted at the cemetery, Chicora collected two samples – one from within the cemetery and a second from the yard area to the north of the cemetery. Both were submitted to A&L Eastern Laboratories for standard macro and micronutrient testing, as well as testing for soluble salts. The results are shown in Figure 25.

For soils that have not been amended, both samples reveal relatively high levels of essential macronutrients such as potassium (K) and phosphorus (P). While plants prefer soil pH between 5.5 and 7.0, nutrients are most readily accessible between pH 6 and 6.5. Thus, the soil pH at Lynnhaven is slightly acidic and the soil would benefit from an application of 30-50 pounds of lime per 1,000 square feet (the lower amount is suitable within the cemetery, the higher amount is

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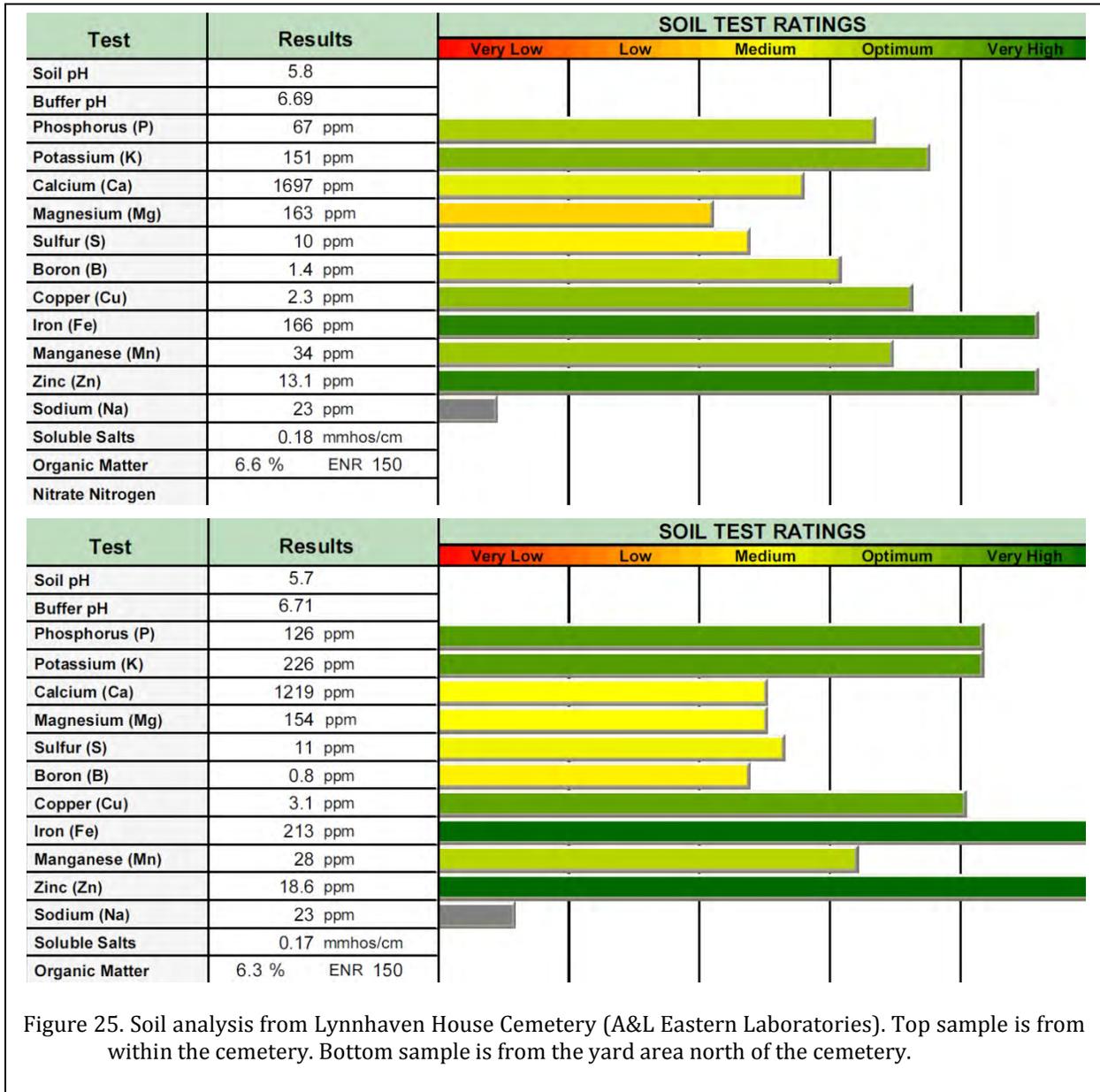


Figure 25. Soil analysis from Lynnhaven House Cemetery (A&L Eastern Laboratories). Top sample is from within the cemetery. Bottom sample is from the yard area north of the cemetery.

appropriate in the yard area). These applications are designed to raise the pH to about 6.2.

The soils have relatively low cation exchange capacity (between 12.8 meg/100g within the cemetery and 10.2 in the yard). This level would likely be significantly higher if the soils contained more organic matter.

Soluble salts are found in virtually all

commercial fertilizers. They can affect not only the plants, but also the stone tombs at the cemetery. Soluble salt levels were between 0.17 and 0.18 mmhos/cm. These levels are considered low, but suggest that at some point in the past commercial fertilizers may have been used on the property.

The yard area would benefit from the addition of about 6 pounds of nitrogen per 1,000 square feet. No other nutrients are suggested. The

cemetery area may be fertilized with about 12 pounds of 10-0-20 per 1,000 square feet.

The application of fertilizer, however, will increase the growth rate of the grass and this may be counterproductive, requiring more frequent mowing. Thus, the City may wish to simply monitor conditions and not apply fertilizers until soil nutrients are further depleted.

If fertilizer is to be applied, we recommend that salt uptake by the stones be minimized through the use of slow release organic fertilizers, rather than commercial inorganic fertilizers. An excellent source explaining the differences between organic and inorganic fertilizers is <http://www.cmg.colostate.edu/gardennotes/234.pdf>. The publication at http://www.caes.uga.edu/applications/publications/files/pdf/C%20853_3.PDF provides information on converting traditional inorganic fertilizer recommendations to safer organic recipes.

For example, using blood meal (12-1.5-0.6) to supply the nitrogen demand at the rate of 12 pounds per 1,000 square feet 10 pounds will be required. Sulfate of Potash Magnesia will meet the K₂O demand at a rate of 9 pounds per 1,000 square feet.

Recommendations

Of the trees in the immediate cemetery vicinity, the larger sycamore, oaks, and hickories should be preserved as important to the cultural landscape. These trees should be inspected and pruned by an ISA Certified Arborist.

Trees being retained should be re-inspected at least every 5 years and more often in the event of a major storm with winds in excess of 55 mph.

The area under the drip line of the major trees being retained should have the grass removed and replaced with no more than 4 inches of

mulch. This will promote the health of the tree and eliminate some of the maintenance.

The smaller trees, including dogwoods, mulberry, cherry laurels, and persimmons should be removed and chipped to provide mulch. Stumps should not be ground, but allowed to decompose gradually.

Replacement trees should be selected for their historical use, avoiding selections with problems, such as overly weak branches, surface roots, or excess debris. Replacement trees should be planted early to allow them to begin to blend into the landscape.

The cemetery boundaries should be extended. Clearing should extend to the southern ditch and should extend east and west by at least 20 feet. Vegetation should be chipped and used to mulch trees.

Weedy turf should be replaced by mulching around the trees and the various box tombs in the cemetery. This will reduce the need for mowing and use of nylon trimmers around the monuments.

Where nylon trimmers are required, the line weight should not exceed 0.065 inch.

Soil testing reveals that macro- and micro-nutrients are generally satisfactory. Soluble salt levels are low. The soils are acidic and would benefit from liming.

If fertilization is conducted in the cemetery, only organic fertilizers should be used because of their lower salt indices.

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Other Maintenance Issues

Trash

During this assessment we observed virtually no trash in the cemetery. It seems likely that the very limited trash is the result of both the neighborhood setting and the limited visitation, although the City likely also periodically cleans the cemetery.

Given the limited trash we observed and the limited visitation, we don't recommend establishing any trash cans on site. This would simply further tax the City's limited resources.

We did observe trash in the ditch south of the cemetery, including tires and bottles (Figure 26).



Figure 26. Ditch showing trash and dense vegetation. View to the east.

As part of the efforts to reduce vegetation, we recommend that the ditch be cleaned. Trash should be removed and vegetation should be brought under control. Making this area look better and increasing visibility will also help reduce the potential for vandalism.

Signage

During our assessment the only signage we observed was a "No Trespassing Dusk to Dawn" and "All Dog Litter (Feces) to be Removed by Container." Neither were located specifically at the cemetery and the cemetery lacks any sort of signage (except for the brass plaques attached to the granite box tombs).

From a cemetery preservation perspective, signage is of four basic types: identification, regulatory, informational, and interpretative. They are generally recommended in this same priority.

Identification signage might include the name of the cemetery and might also include the cemetery's date of founding and historic significance (i.e., listed on the National Register). The cemetery requires this type of signage, at a minimum; it may be useful, however, to incorporate this



Figure 27. Existing signage fails to specifically address cemetery issues.

information with interpretative signage, discussed below.

Regulatory signage specifies laws, regulations, or expected standards of behavior. There is no regulatory signage at the cemetery and this should receive a very high priority. We recommend the following items be included in the regulations affecting the cemetery:

- The cemetery is open from 8am to 5pm Sunday - Saturday except for holidays. Any individual in the cemetery at other times is subject to arrest for trespass.
- Many of the stones in this cemetery are very old and may be easily damaged. Consequently, absolutely no gravestone rubbings will be allowed.
- Please refrain from leaning, sitting, or climbing on any monument. All children must be accompanied by a responsible adult.
- Grass and mulch may be slippery when wet. Please exercise caution while visiting this cemetery.

- Absolutely no alcoholic beverages, fireworks, or fire arms are allowed in the cemetery. Proper conduct is expected at all times.

- No pets are allowed in the cemetery. Service animals are allowed.

- For additional information concerning maintenance issues, please contact the _____ at _____. In case of emergency contact _____.

This signage should be erected at the entrance to the cemetery, perhaps at the terminus of the proposed pathway to the graves.

The last two types of signage are informational (for example, directional signs) and interpretative (information on historic people buried in the cemetery).

We recommend the addition of interpretative signage, especially if guided tours are not going to routinely incorporate the cemetery. At least two panels are appropriate, but focusing on those buried in the cemetery is unlikely to attract much public interest and thus is not likely the best use of the City's funds. It is probable that the public will be more interested in the known history of the cemetery (which can certainly incorporate brief biographical notes about the burials), as well as mortuary practices from the eighteenth and nineteenth centuries.

This signage should mention the archaeological investigations (and hopefully the recommended ground penetrating radar work will be completed and can be included). A map of the above and below grade burials should be included.

This signage, with the previously recommended regulatory signage, should be installed at the terminus of the pathway. This will encourage the public to view the cemetery from a discrete distance, reducing the potential for accidental damage to the monuments.

We also recommend that the City develop an interpretative brochure. This is a relatively inexpensive device that could serve to promote the resource, as well as provide information to those visiting the site.

to visitors of appropriate – and inappropriate – actions.

Stone Fragment Storage

The fragments of the broken ledgers from the cemetery are being stored in the locked Lynnhaven House basement. This provides safe and secure storage and the City has even placed plastic under the stones to minimize their uptake of ground moisture. This storage location is satisfactory.



Figure 28. Example of ledger stones stored in the house basement.

Such a brochure, however, should avoid focusing only on local history. Instead, the brochure should focus on a wide variety of interests, such as a history of the cemetery, mortuary customs, information on why box tombs were used, a discussion of the below grade burials, and the probability that the cemetery was at one time surrounded by a brick wall. The brochure may include cemetery regulations as a reminder

Care must be taken, however, to prevent damage to the stones should repairs or other maintenance be required in the basement.

Recommendations

While there is no trash in the cemetery, the ditches to the south of the cemetery require cleaning to remove old tires and other debris.

During this cleaning effort the vegetation should also be brought under control.

The cemetery requires regulatory signage (perhaps combined with identification signage) and we recommend placement at the terminus of the proposed pathway.

At least two interpretative panels should also be installed, especially if the cemetery is not to be incorporated into the guided tour.

The City should develop a brochure for the cemetery.

Storage of damaged ledgers in the house basement is satisfactory, although care must be taken to prevent additional damage during house maintenance activities.

Conservation Issues

In the introduction to this plan we briefly discussed a variety of preservation issues, including how preservation and restoration differ and introducing the reader to the Secretary of Interior's Standards for Preservation. Readers may want to refer back to those discussions since they form a foundation for our discussion of the conservation needs at this property.

Standards for Conservation Work

The City of Virginia Beach is the steward of this cemetery, holding what belonged to past generations in trust for future generations. As such the organization bears a great responsibility for ensuring that no harm comes to the property during its watch.

One way to ensure the long-term preservation of the cemetery is to ensure that all work meets or exceeds the Secretary of the Interior's Standards for Preservation, discussed on pages 2-4 of this study.

Another critical requirement is that the City ensure that any work performed in the cemetery be conducted by a trained conservator who subscribes to the Guidelines for Practice and Code of Ethics of the American Institute for Conservation of Historic and Artistic Works (AIC) (http://www.nps.gov/training/tel/Guides/HPS1022_AIC_Code_of_Ethics.pdf).

These standards cover such issues as:

- Respect the original fabric and retain as much as possible – don't replace it needlessly.
- Ensure that the treatment chosen is suitable for the object, recognizing

that at times no treatment is the best option.

- Choose the gentlest and least invasive methods possible.
- Make certain that the treatment is reversible or minimally that it won't prevent future retreatment.
- Don't use a chemical without understanding its effect on the object and future treatments.
- Don't falsify the object by using designs or materials that imply the artifact is older than it is.
- Replication and repairs should be identified as modern so that future researchers are not misled.
- Use methods and materials that do not impede future investigation.
- Document all conservation activities and ensure that documentation is available.
- Use preventative methods whenever possible – be proactive, not reactive.

The AIC Code and Guidelines also require a professional conservator provide clients with a written, detailed treatment proposal prior to undertaking any repairs; once repairs or treatments are completed, the conservator must provide the client with a written, detailed treatment report that specifies precisely what was done and the materials used. The conservator must ensure the suitability of materials and methods – judging and evaluating the multitude of possible treatment options to arrive at the best recommendation for a particular object.

These Guidelines of Practice and Code of Ethics place a much higher standard on AIC conservators than individuals or commercial monument companies that offer "restoration

services.” This higher standard, however, helps ensure that the Lynnhaven House Cemetery receives the very best possible care and that the treatments conducted are appropriate and safe.

Assessment of the Cemetery Monuments

As part of this assessment, each of the monuments in the cemetery, along with iron fence, was assessed. These complete forms are found as Appendix 1, but are briefly summarized here.

Extensive Use of Portland Cement Mortar

All of the monuments were “restored” in 1975 using materials, such as ordinary Portland cement (OPC), which would never be used today. In this example, OPC is a very hard mortar with a 28-day compressive strength of at least 750 psi (Type N mortar) up to 2,500 psi (Type M mortar). In comparison, the average 28-day compressive strength of lime putty is 128 psi, topping out at about 320 psi in about a year. The compressive strength of natural hydraulic lime (NHL) 3.5 is about 500 psi.

Beyond being very hard, mortars based on Portland cement are not readily permeable, while lime mortars readily allow the movement of moisture out of structures. Lime-based mortars, if applied correctly have very low shrinkage rates and are self-healing.

The very hard, inflexible OPC mortars are not sacrificial, causing damage to softer stone and brick. Being relatively impermeable, they force moisture to exit through the brick or stone, causing additional deterioration.

Consequently, Portland cement mortars are a poor choice today for any preservation work; nevertheless, they are found throughout the Lynnhaven monuments. The ledgers are set using Portland cement mortar; the sandstone box tombs have cracks and breaks repaired using Portland

cement mortars; and where the sandstone is damaged, infills have been created using the Portland cement mortar.

Looking at the sandstone that comprises the box tombs, the compressive strength, while untested, is perhaps about 2,900 psi or less, especially where there is erosion and spalling. The Jahn sandstone repair mortar M-70 has a compressive strength of between 2,800 and 3,200 psi. While this preferred repair material is nearly as hard as the sandstone, it has a low coefficient of expansion, and a modulus of elasticity and porosity that closely matches sandstone. It is a far better match than Portland cement mortars.

Nevertheless, efforts to remove Portland cement mortars and infills often cause extensive damage to the stone and generally if repairs are stable, it is better to leave them in place than attempt removal.

Loss of Ledgers

By 1975 all of the ledgers for the box tombs, with the exception of the most recent ledger for Eliza J.S. Walke, had been lost or heavily fragmented. The remnants were placed in storage and blank cast stone ledgers were placed on the restored boxes.

This approach can’t be criticized since repair techniques were not sufficiently refined to allow appropriate resetting. The use of ledgers with no carving, however, resulted in considerable aesthetic loss, changing the overall appearance of the cemetery.

In an effort to minimize this impact, brass plaques were applied to the historic sandstone box tombs – an approach which caused further damage, altering yet more of the remnant historic fabric. In addition, the plaques are poorly placed, difficult to read, and fail to convey the artistry of the original work. In fact, not all of the inscriptions are fully transcribed.

As with any effort to remove the Portland cement repairs, any effort to remove the plaques is likely to cause additional damage to the sandstone box tombs. The plaques should be



Figure 29. Conservation issues. Upper left photo shows a crack or break repaired with hard OPC mortar. Upper right photo shows OPC used as a patch. Middle left photo shows inappropriate mounting of plaques to the original sandstone box tomb. Middle right photo shows replacement cast stone ledger devoid of carving or artistry. Lower left photo shows spalling at the base of an end panel. Also visible is a repair using OPC of the support leg. Lower right photo shows poor brickwork.

tolerated until such time as they fail and alternative interpretative techniques can be considered.

It is possible to place at least two of the original ledgers on the cast stone ledgers, providing the public with the opportunity to see at least some portion of the original artistry. Taking this step requires that the City be certain it is able to appropriately care for the ledgers and ensure their security.

Reattaching the original fragments on the existing cast stone ledgers and infilling lost areas with a compatible infill material such as Jahn M-120 marble mortar can be achieved for the William Boush and William F.W. Boush ledgers.

Spalling Sandstone

Sandstones usually can be identified by their coarse, granular, sandy texture. They are sedimentary rocks that consist of consolidated sand grains (mainly quartz and feldspar) cemented together with a variety of minerals (silicates, iron oxides, limonite, calcite and clays). It is largely these cementing materials that affect the longevity of one sandstone over another. Sandstones containing silica are quite hard, strong and decay resistant, whereas those containing calcite resemble limestone in their susceptibility to acid damage, and those containing clay absorb water and deteriorate more easily.

Based on our limited, and macroscopic inspection, the sandstone in these box tombs appears to be very fine grained, almost a siltstone or freestone lacking distinct bedding planes. The sandstone appears cemented with clay and perhaps iron oxides – thus it is possible the sandstone exhibits deterioration not only from the absorption of water, but also perhaps from the deterioration of the iron oxides.

One significant difference worth mentioning is that ASTM C 616 – 08, Standard Specification for Quartz-Based Dimension Stone, reveals that the maximum absorption of sandstone is 8% by weight – far more than either marble or granite. Sandstone is an especially

porous stone and it is well known to exhibit severe spalling when face bedded (sedimentary stone has beds or layers; when these are set parallel to the face of the wall or vertical it results in the layers spalling off; generally stones should be edge bedded). Otherwise, deterioration typically results from one (or more) of three actions: salt crystallization, attack by acid gases (pollution), and frost action.

The exact actions present at the Lynnhaven House Cemetery are not known, but since much of the spalling occurs at the base of the panels, we suspect that the proximate cause of deterioration is moisture uptake.

There are essentially four repair approaches with sandstone. These are briefly reviewed below.

1. Replace damaged sandstone with new material. This may involve either the replacement of the entire block or a Dutchman repair where only a small portion is removed. Problems with this approach include the difficulty in finding suitable replacement material that will match the old stone, as well as craftsmen able to make the repairs appropriately. This is an approach that is also not reversible – once conducted the repair is permanent and often intrusive. Moreover, the large number of repairs necessary would result in a patchwork of new material and this is likely to be aesthetically inappropriate.

2. Retool the surfaces. This involves taking away the surface delaminated material and retooling to make it appear as it was originally. Unfortunately the deterioration is often variable in depth and retooling is not possible. Good stone must also not be removed in order to make the repair appear more “natural.”

3. Scaling off the loose pieces. This is an inexpensive option and it is often an acceptable action, especially if the loose material is limited to the surface. If there are loose fragments, they will come off sooner or later.

4. Patching. Often patching is the most appropriate course. Original profiles can be restored and the patching material can very closely match the (cleaned) color of the sandstone. An appropriate patching mortar is Jahn M70 from Cathedral Stone. Patching is reversible and it can dramatically slow natural deterioration. Significantly, when patching is done correctly, you won't make problems worse and will enhance the appearance of the box tomb.

While there are options for the treatment of the spalling present on the box tombs at the cemetery, none of the damage is at present bad enough to warrant intervention. We would, instead, recommend on-going monitoring. Removal of vegetation and biologicals that hold moisture may also have a positive benefit.

Brickwork

The brickwork in the Eliza J.S. Walke box tomb is poor. Inappropriate mortar was used, as previously discussed. Bricks were poorly laid with no effort taken to properly integrate new work with the old or to follow correct bonding rules.

For example, the bond should be set out by working in from each end of the wall to the center, resulting in the end bricks being symmetrical. Even where it becomes clear that bonding patterns cannot be maintained and broken bond will result, good workmanship requires modifications. For example, no brick should be cut to less than a half-bat that appears on the wall face and closures should never be built in the wall face except next to quoins or stopped-end headers. For those interested in these rules, they are extensively discussed by Gerard Lynch (1994:202-254). Rudimentary information is also available in building trades handbooks (International Correspondence Schools 1905).

Changing the bonding pattern, however, would require all of the 1975 work on the box to be torn down and rebuilt. It would likely be very difficult to remove the OPC mortar adhering to the bricks and it would be necessary to find "new" brick minimally matching in color and size. It does

not seem necessary, at this point, to engage in that dramatic an effort.

Of greater concern is the damage to the southwest corner, where bricks are out of alignment and there is some loss of bricks. At present this damage has not affected the structural integrity of the tomb, but it is likely that repair will be necessary within the next several years.

Biologicals and Cleaning

The tombs all exhibit dense biologicals, primarily moss and algae, although lichen (a symbiotic association typically between fungus and green algae) are also present.

While sometimes viewed as only an aesthetic issue, there are occasions where the lichen and other biologicals become so thick that the carving on the stone becomes illegible or the stone is otherwise disfigured. These biologicals may damage stone in a variety of additional ways. As lichen and other plants grow, they can exert pressure on the mineral grains, weakening the intergranular structure. Some organisms produce acid compounds that dissolve the calcium carbonate. Some can even etch granite. Many of the lichen and algae allow water to migrate into cracks and crevices of the stone, leading to freeze-thaw damage.

While cleaning is often recommended, inappropriate cleaning can result in a significant amount of damage. A common cleaning technique is the use of a bleach product – probably because bleach (either sodium hypochlorite or calcium hypochlorite) is widely available and inexpensive. It is, nevertheless, unacceptable for historic monuments since it creates an artificially white marble and, over time, will cause erosion and yellowing of the stone.

Table 2 lists problems with a variety of "common" stone cleaning processes widely used by commercial firms and the public. This information is important to the City since it can help prevent inappropriate cleaning that will cause additional damage to the cemetery.

A suitable biocide for cleaning stones is D/2 Biological Solution (<http://d2bio.com/>) available from a variety of conservation suppliers. Stones should always be prewetted prior to application of D/2; after dwelling for a few minutes, gentle scrubbing assists in removing biologicals. Afterwards the D/2 and biologicals should be flushed from the stone using potable water.

Assessment of the Cemetery Fence

The Eliza J.S. Walke monument is surrounded by an iron fence that is, overall, in excellent condition. It does, however, require maintenance in order to ensure its long-term preservation.

The single best protection of ironwork is maintenance — and this revolves around painting.

Since no paint remains on any of this ironwork, we recommend wire brushing to release obvious scale and corrosion, then the use of a rust converter as a primer.

Of the three rust converters that were successfully tested by the Canadian Conservation Institute, Rust Oleum's Rust Reformer is the least expensive and most readily available (it is available, for example, from Grainger's Industrial Supply for about \$80/gallon). We recommend one coat of Rust Reformer. This can be applied over stable corrosion and the

Table 2.
Comparison of Different Cleaning Techniques

Cleaning Technique	Potential Harm to Stone	Health/Safety Issues
Sand Blasting	Erodes stone; highly abrasive; will destroy detail and lettering over time.	Exposure to marble dust is a source of the fatal lung disease silicosis.
Pressure Washers	High pressure abrades stone. This can be exacerbated by inexperienced users. Pressures should not exceed 90 psi.	None, unless chemicals are added or high temperature water is used.
Acid Cleaning	Creates an unnatural surface on the stone; deposits iron compounds that will stain the stone; deposits soluble salts that damage the stone.	Acids are highly corrosive, requiring personal protective equipment under mandatory OSHA laws; may kill grass and surrounding vegetation.
Sodium Hypochlorite & Calcium Hypochlorite (household and swimming pool bleach)	Will form soluble salts, which will reappear as whitish efflorescence; can cause yellowing; some salts are acidic.	Respiratory irritant; can cause eye injury; strong oxidizer; can decompose to hazardous gasses.
Hydrogen Peroxide	Often causes distinctive reddish discolorations; will etch polished marble and limestone.	Severe skin and eye irritant.
Ammonium Hydroxide	Repeated use may lead to discoloration through precipitation of hydroxides.	Respiratory, skin, and eye irritant.
D/2 Architectural Antimicrobial	No known adverse effects, has been in use for nearly 15 years.	No special precautions required for use, handling, or storage.

product does an excellent job of converting the corrosion into a stable base for a top coat of alkyd paint.

Following the Rust Reformer we recommend a first coat of flat white. If coverage is not complete, the Rust Reformer will show through this white paint, providing a visual indicator that additional work is necessary.

Next should be the top coat of flat or semi-gloss black. The white undercoat will immediately reveal any area where the black top coat has failed to provide adequate coverage. The use of these alternating colors helps ensure thorough coverage. The paint coatings should not be applied thickly, as thick coats hide detail, cure poorly, and will often prematurely fail.



Figure 30. Conservation issues. The top row photos show extensive biologicals on both brickwork and the sandstone box tombs. These require cleaning with a biocide such as D/2. The bottom left photo shows the bottom rail of the Walke fence in the soil. This requires resculpting of the soil to provide additional clearance. The bottom right photo shows an absence of paint and pitting of the ironwork. This fence should be immediately painted to provide protection against additional corrosion.

Generally painting should be by brush – if sprayers are used, all nearby monuments and shrubbery must be carefully wrapped in tarps to prevent overspray.

Another problem observed is the burial of the bottom fence rail in soil. In such cases moisture is held against the ironwork, promoting extensive corrosion.

When the fence is buried in the soil all that needs to be done is to resculpt the ground, lowering it below the bottom rail. This can not only resolve the corrosion problem, but can also promote better drainage away from the ironwork.

Recommendations

All repair work in the cemetery should be conducted by trained conservators who subscribe to the Code of Ethics and Standards of Practice of the American Institute for Conservation of Historic and Artistic Works (AIC). This should be the minimum level of competency required by the city on all projects.

Some maintenance activities, such as cleaning and painting can be conducted by City staff if they are closely supervised.

Within the next several years, repair of the

brick box tomb focusing on the southwest corner will be required. This should be conducted by a skilled preservation mason or conservator.

The monuments should be cleaned using a biocide such as D/2 Biological Solution in order to remove algae, lichen, and moss. Cleaning should not occur more than every two years.

Soil should be removed from contact with the bottom rail of the iron fence around the Walke box tomb.

The iron fence around the Walke box tomb should have Rust Reformer applied, followed by two top coats of a high quality alkyd paint.

Priorities and Funding Levels

Recommended Priorities

Table 3 lists the recommendations offered throughout this assessment, classifying them as a *first, second, or third priority*. All of the actions are designed to be accomplished as part of a five year plan. We believe that after about five years it is appropriate to consider the progress made, review this assessment, and determine what modifications may be necessary.

First priorities are those we recommend undertaking immediately, either during what remains of 2013 or during 2014. Some are issues that have the potential to affect the safety of site visitors and consequently require immediate attention. Others are planning issues that require immediate attention to “set the stage” for future actions. We strongly believe that most cemetery projects fail through inadequate or inappropriate planning – thus, we recommend in the strongest possible terms that the City continue the planning that they have begun with this assessment to help ensure success.

Second priorities are those that should be budgeted for over the following 2 years (2015-2016). They represent urgent issues that, if ignored, will result in both major and noticeable deterioration of cemetery as a significant historic resource.

Third priorities are those that may be postponed for 2017-2018. They are issues that can wait for appropriations to build up to allow action. Some actions are also less significant undertakings that require other stages to be in place in order to make them feasible or likely to be successful. Although they are given this lower priority they should not be dismissed as trivial or unimportant.

Budget Estimates

Table 3 also provides some budget projections for the recommendations, using 2013 dollars. There are significant differences by location, especially in services such as tree inspections, pruning, and other activities. In some cases the budget will depend on the precise activity undertaken. For example, a wire fence is less costly than an industrial grade poly-clad chain link fence. And finally, the cost of some activities, such as the creation of path or mulching, will depend on whether the work is conducted in-house or contracted out. Nevertheless, the figures should provide guidance in terms of establishing a budget for the work recommended to the City.

The total estimate for Priority 1 through 3 activities is a minimum of \$79,700. While this is a sizable sum, the priorities allow the activities to be spread over five years, significantly reducing the annual outlay.

Priority 1 activities are estimated to cost about \$23,900, with the bulk of this (\$11,000) budgeted for ground penetrating radar to determine the location of below ground brick vaults and burials so they can be avoided by future development, as well as the cost of establishing a formal pathway from the house to the cemetery. Other significant costs include replacement of the boundary fence (\$2,500) and a variety of landscape activities.

Priority 2 actions account for about \$11,200. Of this, \$8,000 is allocated to the repair of the brick box tomb and the maintenance of the iron fence – essentially conservation-related activities at the cemetery.

PRIORITIES AND FUNDING LEVELS

Table 3.
Prioritization of Recommendations

Priority	Action	Cost Estimate
First - 2013-2014	1.1 All decisions regarding modifications, alterations, additions, or other actions affecting the Lynnhaven House cemetery should be carefully evaluated against the Secretary of the Interior's Standards for Preservation.	n/c
	1.2 Special care should be taken to protect all remaining historic fabric and the context.	n/c
	1.3 The social trail leading from the cemetery to the property fence should be eliminated by placing an obstacle, such as a log, in the path.	\$500
	1.4 The damaged fence should be replaced to establish a physical barrier. The fence should be designed to deter efforts at climbing or breaking through.	\$2,500
	1.5 The City should determine if the existing shell pathways meet ADAAG accessibility standards.	n/c
	1.6 While the archaeological examination was able to identify four vaults and one burial that may not have been vaulted, there was no intensive examination to determine the total number of burials. Ground penetrating radar should be used in an effort to determine where all burials are situated so they can be avoided by future interpretative activities.	\$6,000
	1.7 Ground penetrating radar should also be used in an effort to identify additional wall segments that may have surrounded the cemetery.	\$500
	1.8 Once ground penetrating radar has identified below grade burials, a pathway should be established from the Lynnhaven House to the cemetery. This pathway should meet ADAAG accessibility standards.	\$5,000
	1.9 City staff should make a visual inspection of the cemetery daily, reporting any off-normal events to local law enforcement.	n/c
	1.10 Of the trees in the immediate cemetery vicinity, the larger sycamore, oaks, and hickories should be preserved as important to the cultural landscape. These trees should be inspected and pruned by an ISA Certified Arborist.	\$1,500
	1.11 Trees being retained should be re-inspected at least every 5 years and more often in the event of a major storm with winds in excess of 55 mph.	\$2,000 (every 5 years)
	1.12 The area under the drip line of the major trees being retained should have the grass removed and replaced with no more than 4 inches of mulch. This will promote the health of the tree and eliminate some of the maintenance.	\$500
	1.13 The smaller trees, including dogwoods, mulberry, cherry laurels, and persimmons should be removed and chipped to provide mulch. Stumps should not be ground, but allowed to decompose gradually.	\$800
	1.14 The cemetery boundaries should be extended. Clearing should extend to the southern ditch and should extend east and west by at least 20 feet. Vegetation should be chipped and used to mulch trees.	\$1,000
	1.15 While there is no trash in the cemetery, the ditches to the south of the cemetery require cleaning to remove old tires and other debris. During this cleaning effort the vegetation should also be brought under control.	\$1,500

PRESERVATION ASSESSMENT OF THE LYNNHAVEN HOUSE CEMETERY

Table 4, cont.
 Prioritization of Recommendations

Priority	Action	Cost Estimate
First - 2013-2014, cont.	1.16 The cemetery requires regulatory signage (perhaps combined with identification signage) and we recommend placement at the terminus of the proposed pathway.	\$800
	1.17 Storage of damaged ledgers in the house basement is satisfactory, although care must be taken to prevent additional damage during house maintenance activities.	n/c
	1.18 Repair work in the cemetery should be conducted by trained conservators who subscribe to the Code of Ethics and Standards of Practice of the American Institute for Conservation of Historic and Artistic Works (AIC). This should be the minimum level of competency required by the city on all projects.	n/c
	1.19 Some maintenance activities, such as cleaning and painting can be conducted by City staff if they are closely supervised.	n/c
	1.20 The monuments should be cleaned using a biocide such as D/2 Biological Solution in order to remove algae, lichen, and moss. Cleaning should not occur more than every two years.	\$1000
	1.21 Soil should be removed from contact with the bottom rail of the iron fence around the Walke box tomb.	\$300
	Second - 2015-2016	2.1 Modifications at the cemetery should be evaluated to achieve the highest level of accessibility possible without significant alteration of the historic fabric.
2.2 All vandalism should be recorded on a specific form designed for that purpose and should be reported to local law enforcement.		n/c
2.3 The City should ensure that the Lynnhaven House Cemetery is listed as a scheduled property in their insurance policy.		n/c
2.4 Replacement trees should be selected for their historical use, avoiding selections with problems, such as overly weak branches, surface roots, or excess debris. Replacement trees should be planted early to allow them to begin to blend into the landscape.		n/c
2.5 Weedy turf should be replaced by mulching around the trees and the various box tombs in the cemetery. This will reduce the need for mowing and use of nylon trimmers around the monuments.		\$300
2.6 Where nylon trimmers are required, the line weight should not exceed 0.065 inch.		n/c
2.7 Soil testing reveals that macro- and micro-nutrients are generally satisfactory. Soluble salt levels are low. The soils are acidic and would benefit from liming.		n/c
2.8 If fertilization is conducted in the cemetery, only organic fertilizers should be used because of their lower salt indices.		n/c
2.9 At least two interpretative panels should also be installed, especially if the cemetery is not to be incorporated into the guided tour.		\$3,000
2.10 Within the next several years, repair of the brick box tomb focusing on the southwest corner will be required. This should be conducted by a skilled preservation mason or conservator.		\$4,000
2.11 The iron fence around the Walke box tomb should have Rust Reformer applied, followed by two top coats of a high quality alkyd paint.		\$4,000

PRIORITIES AND FUNDING LEVELS

Table 4, cont.
Prioritization of Recommendations

Priority	Action	Cost Estimate
Third – 2017-2018	3.1 There is no cohesive history of the property readily available to the public, either as a brochure or on-line. Such a history should be prepared.	\$6,000
	3.2 Investigations to exhume and study remains found in below grade brick vaults and in unvaulted burials would provide significant bioanthropological information concerning these individuals and might assist in determining who they are.	\$20,000
	3.3 Camera surveillance is an option worth considering as a preventative measure, given the isolation of the cemetery and absence of neighbors.	\$15,000
	3.4 The City should develop a brochure for the cemetery.	\$3,500

An additional \$3,000 is recommended for the preparation of interpretative panels at the cemetery.

Priority 3 work accounts for an estimated \$44,500. This cost represents additional archaeological investigations at the cemetery, estimated at \$20,000, and installation of cameras, estimated at \$15,000. The former activity is certainly optional, but would significantly improve public interpretation and would provide the opportunity for additional site activities, such as the involvement of students from local schools. The installation of cameras may become unnecessary if the City is convinced that the likelihood of vandalism is extremely low. Otherwise, Priority 3 activities involve additional historical research and the preparation of a brochure that focuses on the cemetery.

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Appendix 1. Stone-by-Stone Assessment

APPENDIX 1. STONE-BY-STONE ASSESSMENT

CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 1

Name: William Boush

Dimensions: L = 5'10" W = 2'10" TH = 3"

Photographs: before 1975 restoration, at time of 2007 vandalism, during this assessment

Brief Condition Report

Sandstone box set on four granite supports standing about 2'10" above grade. Cast stone (OPC) ledger replacement (measurements above). Box was entirely reconstructed using original fragments in 1975. Replacement ledger added 1991. Plaque added April 1992 during Annual DAR Day. Replacement ledger removed in October 2007 by vandals and reinstalled by City. Top 2/3s of the original ledger in three fragments and stored in house basement (correct inscription below; earlier published inscriptions include errors, most notably a 1750 birth date and an 1804 death date – correct dates are 1759 and 1834).

Replacement ledger has biologicals overall, various chips on edges, but is otherwise in good condition. It is set on the sandstone box using OPC mortar. The granite supports are relatively level and appear stable. They are reset using an OPC mortar, most of which is deteriorated. There is damage at the SE corner. There is evidence that the sandstone has been set on these granite piers using an unknown adhesive.

The original marble ledger has a width of 3'1½", noticeably wider than the replacement. Carving is distinct. The breaks are clean and what remains of the ledger is sound with no appreciable sugaring or deterioration.

Sacred / to the Memory of / William Boush / who was born on the 18th of Feby A.D. 1759 / & expired at Lebanon on the 6th of Jany 1834 / He was an eminently useful member of Society / in all the relations of life, his heart glowed / with benevolence to his fellow beings, & he lived / in the practice of the precepts of the Gospel & / of those graces & virtues which exhalt the hu- / man character, & whose motto ever was: / "Deal justly, love mercy, and walk humbly before thy God."

East side of box has had bronze DAR plaque installed, possibly using either epoxy or a silicone adhesive (no evidence of material used). There is staining flowing downward from the plaque. The NE and SE corner posts are intact, but worn and chipped. SE corner post has a small area missing at the top.

The north side of the box has extensive and very dense biologicals along the lower quarter of the panel. There are multiple areas of spalling. The NW corner is broken and has been repaired using OPC mortar. The repair appears stable. The NW leg is spalling.

The south side of the box appears to have been in at least five fragments and was repaired using OPC mortar and perhaps additional products. All repairs are stable at the present time. The SW leg was broken and has been poorly repaired using an adhesive materials clearly visible in the repair joints. The leg is also not plumb. In spite of these problems, it appears stable.

The west side of the box shows extensive spalling. The NW repaired leg evidences some gaps being used by carpenter ants, suggesting a colony within the tomb.

Maintenance Recommendations

Cleaning

Biologicals (lichen, algae, moss) should be removed since they disfigure the monument. They also hold moisture against the sandstone; the enzymes these release may damage the stone; and their “roots” cause deterioration of the stone.

An appropriate treatment can be applied by maintenance staff using the following protocols and cautions.

The monument should be thoroughly wetted to prevent dry stone from absorbing large amounts of the biocide. D/2 Biological Solution (<http://d2bio.com/>) should be applied full strength as a spray and allowed to dwell on the stone for 5-10 minutes. The biocide should not be allowed to dry on the stone, additional applications of D/2 may be necessary. The monument should be lightly brushed using soft bristle brushes, Large masses of biologicals may be removed manually using wooden tongue depressors or plastic putty knives (no metal tools may be used). Afterwards the monument should be thoroughly rinsed with low pressure water.

Under no circumstances may a pressure washer be used. No chemicals, such as bleach (sodium hypochlorite or calcium hypochlorite) or acid cleaners should be used. No products other than D/2 should be used without first consulting with a conservator.

Cleaning should not occur more than yearly and every 2-3 years is preferred. Cleaning frequency will be reduced by removing vegetation and opening the cemetery to more sunlight.

The Safety Data Sheet for D/2 is available at http://d2bio.com/sites/default/files/MSDS_D2_102012.pdf.

Herbicide Usage & Nylon Trimmers

All herbicides (e.g., Round-Up®, Garlon®, etc.) contain large quantities of salts. If applied in proximity to the monuments these salts will migrate into the stone, being carried up, especially into the sandstone, by capillary action. As capillary action can't carry the salt-laden moisture higher the moisture evaporates and the salts crystallize in the pores of the stone. A hard crust is formed which spalls off, leaving very soft stone below the surface.

Consequently, herbicides should not be used within the immediate area of the stone monuments.

Nylon trimmers are also capable of causing extensive damage to stone and masonry. They should only be used if it is practical to use line weights no greater than 0.095 inch. Even with this very light weight line careful attention is required to prevent damage to the support blocks.

A combination of weed block and hand work is a better approach, ensuring that the monuments do not receive further mechanical damage.

Treatment Recommendations

Although the monument exhibits previous repairs using materials no longer recommended, these old repairs are currently stable and no efforts to modify them are recommended at present.

There is also spalling of the sandstone. Removal of the loosened material, consolidation, and infilling is possible, but does not seem warranted at this time.

It is possible to place the original ledger on the OPC replacement ledger, embedding it in a high-lime mortar, such as a 1:2.5 mix of NHL 3.5 and sand. Additional attachment using a small amount of a hi-mod, moisture

insensitive structural epoxy may be considered. Damage at breaks should be infilled with Jahn M-120 Marble repair mortar. Such treatment should only be considered if the City is certain of its ability to protect the ledger, preventing future vandalism.

At a minimum, we recommend that this condition report and associated photographs be used for yearly monitoring to verify that there is no significant change in condition that might warrant treatment options to be reconsidered. This monitoring may be done by staff, but should be reviewed by a stone conservator.

Appearance of the cemetery in July 1975 showing that the William Bosch monument was not standing:



East side:



Marker 1, William Boush

West side:



North side:



South side:



Spalling on north face:



Spalling on west face:



East side, upper south corner:



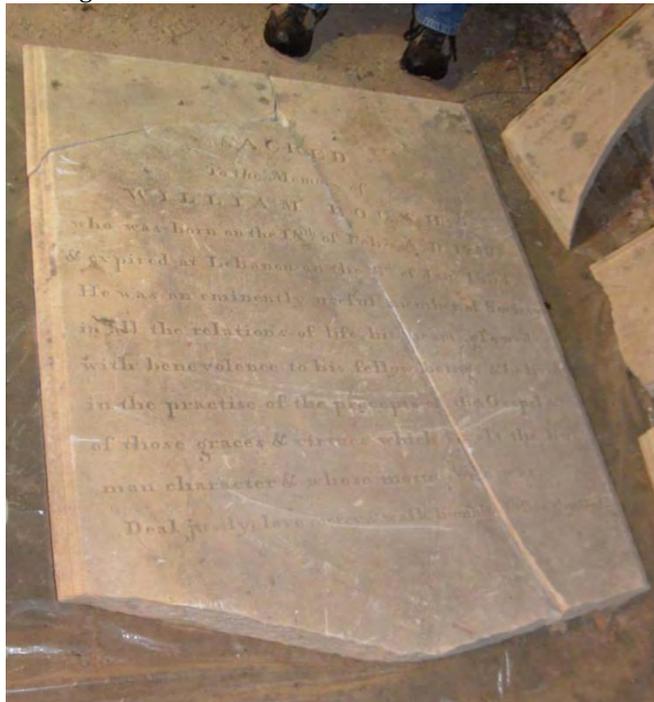
Spalling on northwest leg:



Old break on southwest leg:



Remnants of William Boush ledger:



CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 2

Name: William F.W. Boush

Dimensions: L = 5' W = 2'8" TH = 3"

Photographs: before 1975 restoration, during this assessment

Brief Condition Report

Sandstone box set on four sandstone supports standing about 2'6" above grade. Cast stone (OPC) ledger replacement (measurements above). Box was entirely reconstructed using original fragments in 1975. Replacement ledger added 1991. Plaque added April 1992 during Annual DAR Day. About 7/8ths of the original ledger in two fragments is stored in house basement (correct inscription below; earlier published inscriptions include errors, most notably the wrong death month and dropping the hymn at the base).

Replacement ledger has biologicals overall, minor chips on edges, but is otherwise in good condition. It is set on the sandstone box using OPC mortar. The sandstone supports are relatively level but evidence extensive deterioration with abundant OPC infill representing perhaps two different periods. Deterioration of these supports is likely the result of moisture migration, causing spalling and stone loss.

The original marble ledger has a width of 2'8½", just slightly wider than the replacement. Carving is distinct. The break is clean and what remains of the ledger is sound with no appreciable sugaring or deterioration. There is extensive chipping and loss along the R edge, although this does not affect the inscription.

In Memory of / Wm F.W. Boush / a citizen of Princess Anne / of which county he was a
Justice of the Peace / and a delegate of the Assembly / In private life without reproach; / In
public attentive to his duty; / a Christian in heart and deed / he lived by faith and died in
hope / on the 19th of February 1818 / in the 25th year of his age. // About three hours
before his death, he sang with an / audible voice the following HYMN / I charge to [] I have;
/ A God to glorify; / A never dying soul to sa[ve] / and fit it for the sky; / To serve the present
age; / My calling to fulfill; / O may it all my powers engage / To do my Masters will. // Arm
me with jealous care, / As in thy sight to live; / And O thy servant, Lord, prepare / A strict
account to give; / Help me to watch and pray, / And on thyself rely; / Assur'd if my trust
betray, / I shall forever die. /// J. Christie Fecil, Norfolk

West end of box has had bronze inscription plaque installed, possibly using either epoxy or a silicone adhesive (no evidence of material used). There is extensive spalling below this plaque, with an area at least 3-4" square involved.

The north side cannot be thoroughly assessed since it abuts monument 3. What can be seen, however, reveals extensive erosion, but no spalling. There is a biological film and briars are growing in this.

The south side of the box reveals spalling in several locations. The SW leg exhibits cracking at the base, while the SE and SW legs exhibits loss at the upper corners. The SE leg is either set in OPC or the OPC has been used to infill losses in the sandstone base.

The east side of the box exhibits spalling on both the legs and the end panel. The lower NE leg been replaced with an OPC repair. At the corner this repair appears to be failing, although it is still stable.

Maintenance Recommendations

Cleaning

Biologicals (lichen, algae, moss) should be removed since they disfigure the monument. They also hold moisture against the sandstone; the enzymes these release may damage the stone; and their “roots” cause deterioration of the stone.

An appropriate treatment can be applied by maintenance staff using the following protocols and cautions.

The monument should be thoroughly wetted to prevent dry stone from absorbing large amounts of the biocide. D/2 Biological Solution (<http://d2bio.com/>) should be applied full strength as a spray and allowed to dwell on the stone for 5-10 minutes. The biocide should not be allowed to dry on the stone, additional applications of D/2 may be necessary. The monument should be lightly brushed using soft bristle brushes, Large masses of biologicals may be removed manually using wooden tongue depressors or plastic putty knives (no metal tools may be used). Afterwards the monument should be thoroughly rinsed with low pressure water.

Under no circumstances may a pressure washer be used. No chemicals, such as bleach (sodium hypochlorite or calcium hypochlorite) or acid cleaners should be used. No products other than D/2 should be used without first consulting with a conservator.

Cleaning should not occur more than yearly and every 2-3 years is preferred. Cleaning frequency will be reduced by removing vegetation and opening the cemetery to more sunlight.

The Safety Data Sheet for D/2 is available at http://d2bio.com/sites/default/files/MSDS_D2_102012.pdf.

Herbicide Usage & Nylon Trimmers

All herbicides (e.g., Round-Up®, Garlon®, etc.) contain large quantities of salts. If applied in proximity to the monuments these salts will migrate into the stone, being carried up, especially into the sandstone, by capillary action. As capillary action can't carry the salt-laden moisture higher the moisture evaporates and the salts crystallize in the pores of the stone. A hard crust is formed which spalls off, leaving very soft stone below the surface.

Consequently, herbicides should not be used within the immediate area of the stone monuments.

Nylon trimmers are also capable of causing extensive damage to stone and masonry. They should only be used if it is practical to use line weights no greater than 0.095 inch. Even with this very light weight line careful attention is required to prevent damage to the support blocks.

A combination of weed block and hand work is a better approach, ensuring that the monuments do not receive further mechanical damage.

At this specific monument attention should be directed to cutting the briars as close to the ground as possible and then, using a paintbrush, an herbicide should be applied to the cut stem, being careful to avoid any application to the sandstone box.

Treatment Recommendations

Although the monument exhibits previous repairs using materials no longer recommended, these old repairs are currently stable and no efforts to modify them are recommended at present.

There is also spalling of the sandstone, somewhat more extensive on this box than on monument 1. Removal of the loosened material, consolidation, and infilling is possible, but does not seem warranted at this time.

It is possible to place the original ledger on the OPC replacement ledger, embedding it in a high-lime mortar, such as a 1:2.5 mix of NHL 3.5 and sand. Additional attachment using a small amount of a hi-mod, moisture insensitive structural epoxy may be considered. Damage at breaks should be infilled with Jahn M-120 Marble repair mortar. Such treatment should only be considered if the City is certain of its ability to protect the ledger, preventing future vandalism.

At a minimum, we recommend that this condition report and associated photographs be used for yearly monitoring to verify that there is no significant change in condition that might warrant treatment options to be reconsidered. This monitoring may be done by staff, but should be reviewed by a stone conservator.

Appearance of the cemetery in July 1975 showing that the William F.W. Bosch monument was not standing:



East side:



Marker 2, William F.W. Boush

South side:



West side:



Marker 2, William F.W. Boush

East side, southeast corner showing OPC repair:



South side, southeast leg, set in OPC:



South side, southwest corner showing crack in corner support and spalling (note also vegetation):



Spalling west side base:



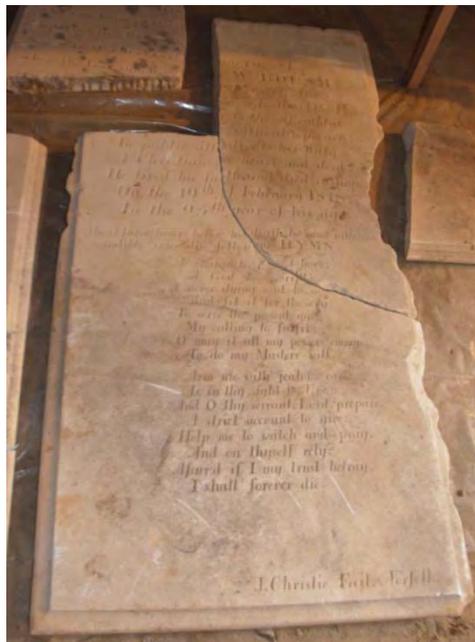
East side, northeast leg, OPC repair:



South side, southwest leg showing OPC:



Remnants of William F.W. Boush ledger:



Marker 2, William F.W. Boush

CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 3 **Name:** Mary Boush

Dimensions: L = 5'10" W = 3' TH = 3"

Photographs: before 1975 restoration, during this assessment

Brief Condition Report

Sandstone box set on four granite supports standing about 3' above grade. Cast stone (OPC) ledger replacement (measurements above). Box was entirely reconstructed using original fragments in 1975. Replacement ledger added 1991. Plaque added April 1992 during Annual DAR Day. About a third of the original ledger in three fragments is stored in house basement (correct inscription below; earlier published inscriptions include errors, most notably incorrect and missing phrases).

Replacement ledger has biologicals overall, minor chips on edges, but is otherwise in good condition. It is set on the sandstone box using OPC mortar. The granite supports are not level and tilt the entire box about 4½" to the south (toward #2). The reason for the severe tilt could not be determined, although the granite supports appear stable at present. OPC mortar between these supports has cracked and joints are open.

The original marble ledger has a width of 3', the same as the replacement. Carving is distinct. The breaks are clean and what remains of the ledger is sound with no appreciable sugaring or deterioration. There is, however, extensive loss of the ledger below the inscription and many portions of the inscription remain uncertain because of the breaks.

Sacred / /to the memory of / Mary Boush [wife of] / Wm Bou[sh] / who was born on the 3[] / & departed this life on the [] / She was of a broken & [] & / when the last summons came, with serenity / of []ely took leave of her / [] & with unfeigned faith / [] Lord Jesus. ///Robt. Dalrymple / Norfolk

West end of box has had bronze inscription plaque installed, possibly using either epoxy or a silicone adhesive (no evidence of material used). There is extensive spelling below this plaque. There is also extensive chipping and loss along the edge of the R support on the west end, and of the L support at the top.

The north side exhibits extensive spalling and an old break at the eastern third of the side panel. There is some remnant OPC repair, but it appears that the bulk of the repair has failed. There does not, however, appear to be any shifting of the panel (although it was repaired at a slight angle along the basal granite supports). There are also some exposed cracks along the L or NE support. It is not possible to determine whether these are new or original to the 1975 repairs. There is evidence of OPC between the north panel and the granite support in some areas.

Vegetation (primarily briars) is found coming out from under the cast stone ledger along the north side.

There has been loss of the eastern third of the south side and this loss has been infilled with OPC. Wood form lines are still clearly visible where OPC was used to fill the void. This repair is at present stable. There is extensive chipping and spalling on the southeast support.

The east side of the box exhibits spalling on both the legs and the end panel. The upper NE panel corner has been replaced with an OPC infill. The SE support bottom was similarly repaired with a massive OPC repair. Both are stable at present.

Maintenance Recommendations

Cleaning

Biologicals (lichen, algae, moss) should be removed since they disfigure the monument. They also hold moisture against the sandstone; the enzymes these release may damage the stone; and their “roots” cause deterioration of the stone.

An appropriate treatment can be applied by maintenance staff using the following protocols and cautions.

The monument should be thoroughly wetted to prevent dry stone from absorbing large amounts of the biocide. D/2 Biological Solution (<http://d2bio.com/>) should be applied full strength as a spray and allowed to dwell on the stone for 5-10 minutes. The biocide should not be allowed to dry on the stone, additional applications of D/2 may be necessary. The monument should be lightly brushed using soft bristle brushes, Large masses of biologicals may be removed manually using wooden tongue depressors or plastic putty knives (no metal tools may be used). Afterwards the monument should be thoroughly rinsed with low pressure water.

Under no circumstances may a pressure washer be used. No chemicals, such as bleach (sodium hypochlorite or calcium hypochlorite) or acid cleaners should be used. No products other than D/2 should be used without first consulting with a conservator.

Cleaning should not occur more than yearly and every 2-3 years is preferred. Cleaning frequency will be reduced by removing vegetation and opening the cemetery to more sunlight.

The Safety Data Sheet for D/2 is available at http://d2bio.com/sites/default/files/MSDS_D2_102012.pdf.

Herbicide Usage & Nylon Trimmers

All herbicides (e.g., Round-Up®, Garlon®, etc.) contain large quantities of salts. If applied in proximity to the monuments these salts will migrate into the stone, being carried up, especially into the sandstone, by capillary action. As capillary action can't carry the salt-laden moisture higher the moisture evaporates and the salts crystallize in the pores of the stone. A hard crust is formed which spalls off, leaving very soft stone below the surface.

Consequently, herbicides should not be used within the immediate area of the stone monuments.

Nylon trimmers are also capable of causing extensive damage to stone and masonry. They should only be used if it is practical to use line weights no greater than 0.095 inch. Even with this very light weight line careful attention is required to prevent damage to the support blocks.

A combination of weed block and hand work is a better approach, ensuring that the monuments do not receive further mechanical damage.

At this specific monument attention should be directed to cutting the briars as close to the ground and cast stone ledger as possible and then, using a paintbrush, an herbicide should be applied to the cut stem, being careful to avoid any application to the sandstone box.

Treatment Recommendations

Although the monument exhibits previous repairs using materials no longer recommended, these old repairs are currently stable and no efforts to modify them are recommended at present.

There is also spalling of the sandstone, somewhat more extensive on this box than on monument 1. Removal of the loosened material, consolidation, and infilling is possible, but does not seem warranted at this time.

It is possible to place the original ledger on the OPC replacement ledger, embedding it in a high-lime mortar, such as a 1:2.5 mix of NHL 3.5 and sand. Additional attachment using a small amount of a hi-mod, moisture insensitive structural epoxy may be considered. Damage at breaks should be infilled with Jahn M-120 Marble repair mortar. Such treatment should only be considered if the City is certain of its ability to protect the ledger, preventing future vandalism. Moreover, relatively little remains of the original ledger and the result may not be particularly aesthetic.

At a minimum, we recommend that this condition report and associated photographs be used for yearly monitoring to verify that there is no significant change in condition that might warrant treatment options to be reconsidered. This monitoring may be done by staff, but should be reviewed by a stone conservator. Of particular concern is the crack in the north side of the box panel.

Remnants of William F.W. Boush ledger:



West side:



Marker 3, Mary Boush

East side:



North side:



Marker 3, Mary Boush

Spalling on north side, center panel and right support leg:



Repair of broken north side panel:



East side, SE leg repair using OPC:



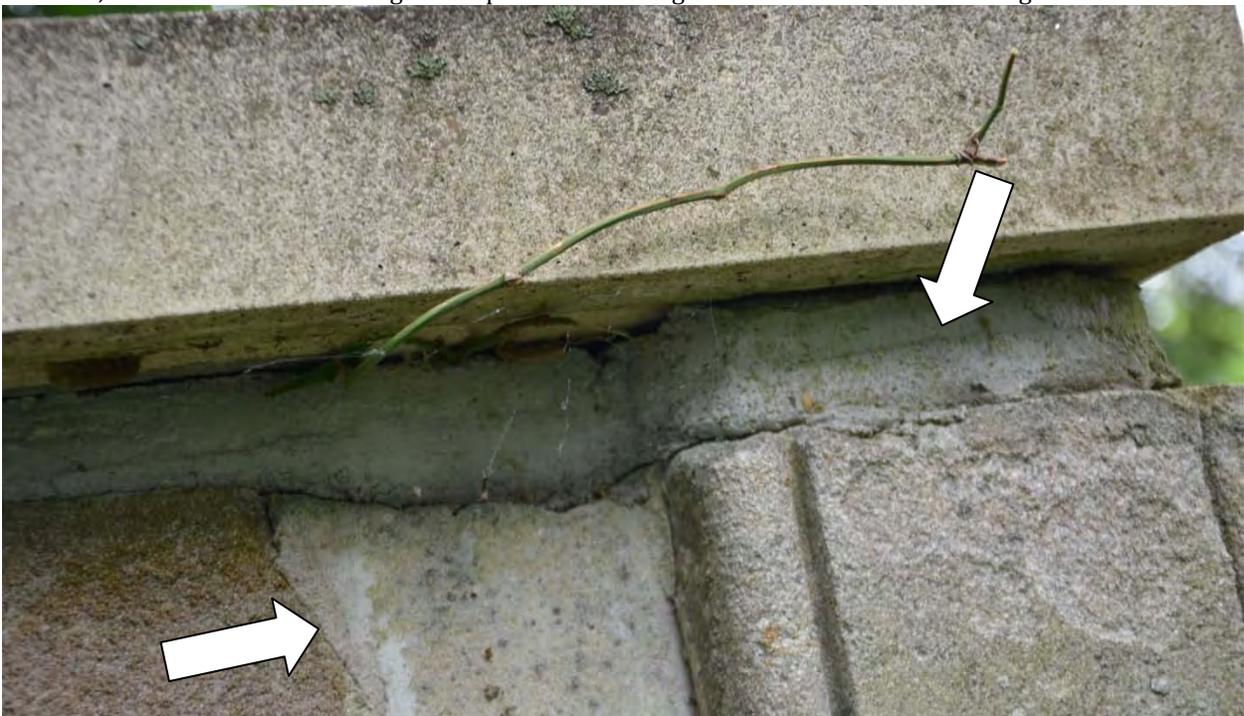
South side, board impressions in cast OPC repair:



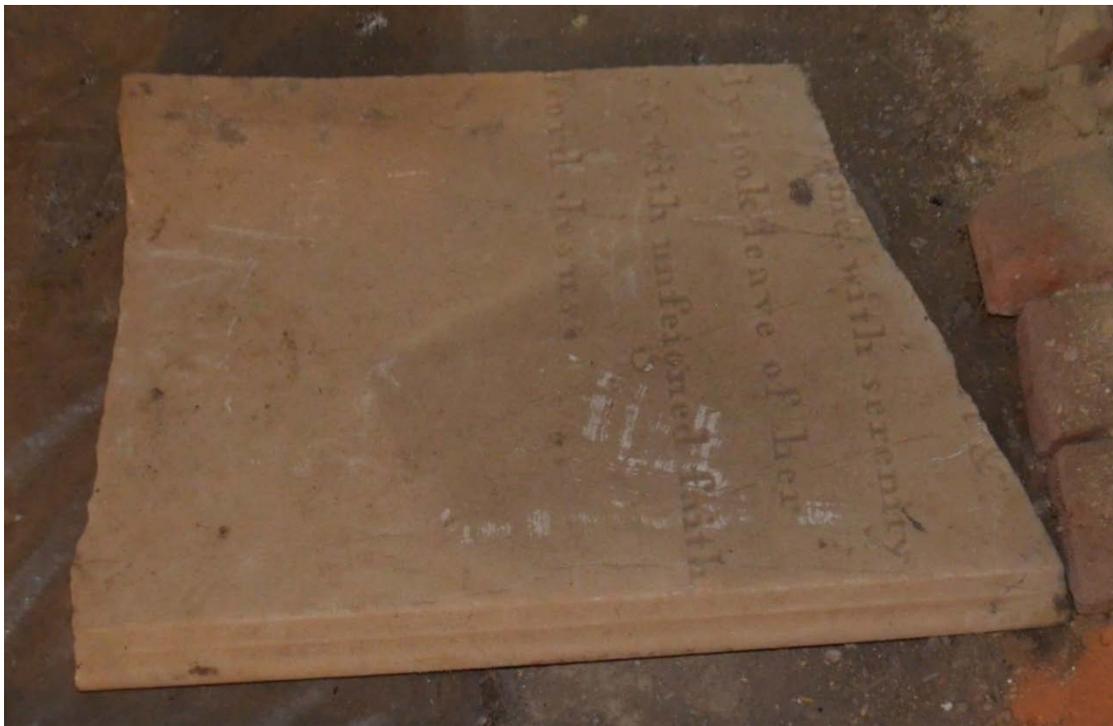
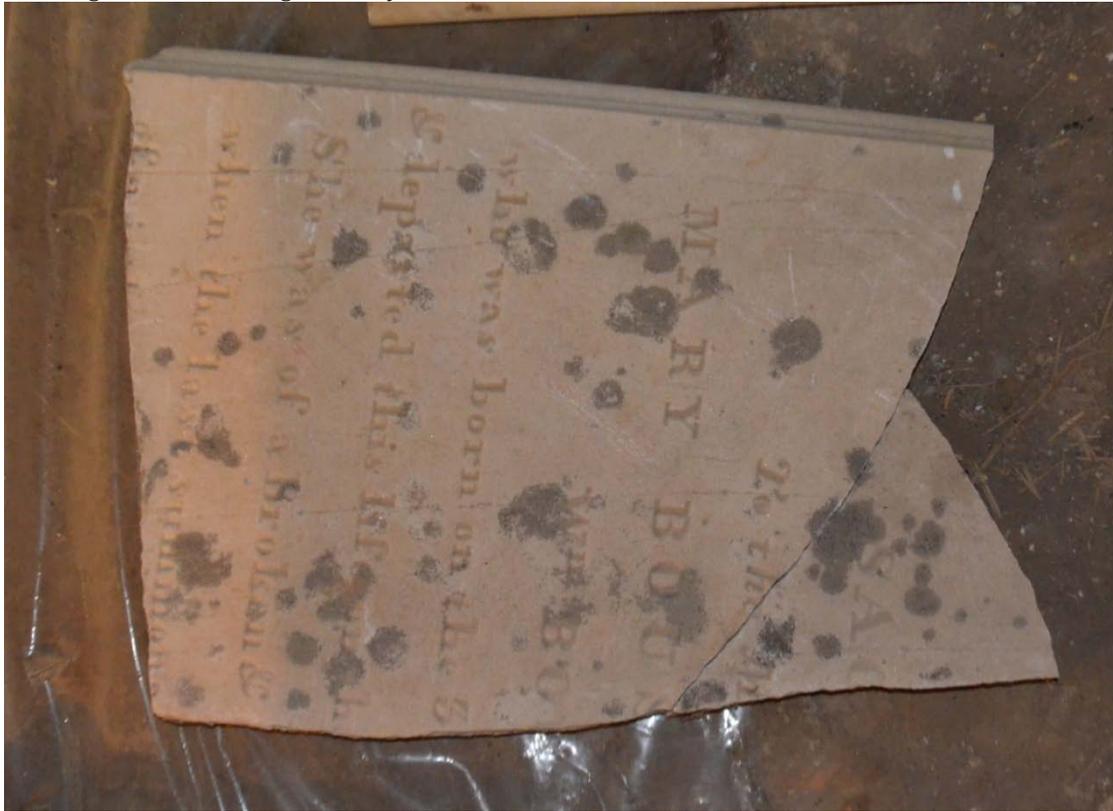
East side, southeast leg with spalling:



East side, northeast corner showing OPC repair and cast ledger set on thick OPC for leveling:



Two fragments of the original Mary Boush stone:



Marker 3, Mary Boush

CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 4

Name: Eliza J.S. Walke

Dimensions: L = 6'1.5" W = 3' TH = 3.5"

Photographs: before 1975 restoration, during this assessment

Brief Condition Report

Brick box with no evidence of foundation construction standing about 2.9' above grade. Marble ledger (measurements above). Box was entirely reconstructed in 1975. Corrected inscription is provided below (minor discrepancies in words, with final verse and carver information not previously reported). Carving is still distinct and in good condition.

Ledger has biologicals overall (the gray color may be the result of atmospheric soiling), minor chips on edges and damage to the corners. There are at least three cracks, all on the north edge. The largest is about 1/16". The remainder are significantly less. The ledger is noticeably off-center, shifted to the south. While originally set on OPC mortar, gaps visible on the north face suggest it may no longer be attached.

Sacred / to the Memory of / Eliza J.S. Walke / widow of / David M. Walke / and daughter of
/ Wm & Mary Boush / Who departed this life / on the 9th day of June 1884 / in the 82nd
year of her age. // Blessed are the dead who die in the Lord /// J.P. Hall / Norfolk

There appears to have been very little of the original brick box extant at the time of the 1975 restoration and it is reported that there was a tree growing inside the box. Photos suggest some portion of north and east walls were standing, with some of the north wall detached and falling to the north. It is uncertain how much of the original brickwork survived restoration.

There are areas of soft, sandy mortar (no evidence of shell or limestone fragments visible), presumed to be original. Most, however, is very hard OPC mortar. Bricks are poorly laid and repairs are not tied into original brickwork. Overall workmanship is poor. All bricks appear to be either original or at least period correct. It is unclear if they were salvaged from the original monument or if they may have incorporated bricks salvaged from elsewhere on the site.

There is today a 1/8" crack running vertically on the north face. It extends through bricks, not simply along joints, suggesting that it resulted from foundation failure. Portions of the cracks have been poorly pointed using OPC mortar. It is unclear if this crack existed during the 1975 restoration or has opened since. We cannot determine stability based on this assessment.

There is what appears to be relatively recent damage on the south face. The bottom two courses of brick, beginning at the SW corner and extending about three-quarters of way to the SE corner, have been pushed northward, into the box. Brick above are hanging freely, but are still stable and attached. This damage is problematical since it undermines support for the SW corner of the box.

All faces of the box are heavily covered with moss. There are also ferns growing from cracks and areas of mortar loss.

Maintenance Recommendations

Cleaning

Biologicals (lichen, algae, moss) should be removed since they disfigure the monument. They also hold moisture against the stone, brickwork and mortar; the enzymes these release may damage the stone and masonry; and their “roots” cause deterioration of the bricks and mortar joints.

An appropriate treatment can be applied by maintenance staff using the following protocols and cautions.

The monument should be thoroughly wetted to prevent dry brick from absorbing large amounts of the biocide. D/2 Biological Solution (<http://d2bio.com/>) should be applied full strength as a spray and allowed to dwell on the monument for 5-10 minutes. The biocide should not be allowed to dry on the marble ledger or masonry; additional applications of D/2 may be necessary. The monument should be lightly brushed using soft bristle brushes, Large masses of biologicals may be removed manually using wooden tongue depressors or plastic putty knives (no metal tools may be used). Afterwards the monument should be thoroughly rinsed with low pressure water.

Under no circumstance may a pressure washer be used. No chemicals, such as bleach (sodium hypochlorite or calcium hypochlorite), acid cleaners, or products other than D/2, should be used.

Cleaning should not occur more than yearly and every 2-3 years is preferred. Cleaning frequency will be reduced by removing vegetation and opening the cemetery to more sunlight.

The Safety Data Sheet for D/2 is available at http://d2bio.com/sites/default/files/MSDS_D2_102012.pdf.

Herbicide Usage & Nylon Trimmers

All herbicides (e.g., Round-Up®, Garlon®, etc.) contain large quantities of salts. If applied in proximity to the monuments these salts will migrate into the brick, being carried up by capillary action. As capillary action can't carry the salt-laden moisture higher the moisture evaporates and the salts crystallize in the pores of the brick. A hard crust is formed which spalls off, leaving very soft clay below the surface.

Consequently, herbicides should not be used within the immediate area of the monument.

Nylon trimmers are also capable of causing extensive damage to stone and masonry. They should only be used if it is practical to use line weights no greater than 0.095 inch. Even with this very light weight line careful attention is required to prevent damage to the support blocks.

A combination of weed block and hand work is a better approach, ensuring that the monuments do not receive further mechanical damage.

At this specific monument attention should be directed to cutting the ferns as close to the brick or mortar joints as possible and then, using a paintbrush, an herbicide should be applied to the cut stem, being careful to avoid any application to the brick box.

Straightening the Ledger

Maintenance crews may be able to reposition the marble ledger using soft 2x4s as pry bars along the south edge of the monument. The work should be performed very slowly and with great care so as not to either shift the ledger too far or to cause additional damage to the north edge. If the ledger does not readily shift northward the effort should be abandoned since there may be either adhering OPC or the ledger has become hung up on some old mortar.

Treatment Recommendations

Although the monument exhibits previous repairs using materials no longer recommended, these old repairs are currently stable and no efforts to modify them are recommended at present.

We recommend that this condition report and associated photographs be used for yearly monitoring to verify that there is no significant change in condition that might warrant treatment options to be reconsidered. This monitoring may be done by staff, but should be reviewed by a stone conservator. Of particular concern is the crack in the north side of the brick box, the damage to the SW corner of the box, and the cracks along the north edge of the marble ledger.

It is almost certain that the south wall will require repair within the next 2-3 years and this work should be performed prior to any additional damage to the box. The repair work should use either lime putty (if the work is conducted allow at least six months prior to freezing weather) or a 1:2.5 mix of NHL 3.5 and sand. Both have low compressive strength because of their high lime content and would be appropriate for the soft brick of the box.

Appearance of the Eliza J.S. Walke monument in July 1975 showing the condition of the remnant box and repair efforts:



Marker 4, Eliza J.S. Walke

North side:



East side:



Marker 4, Eliza J.S. Walke

West side:



South side:



West side, southwest corner showing damage:



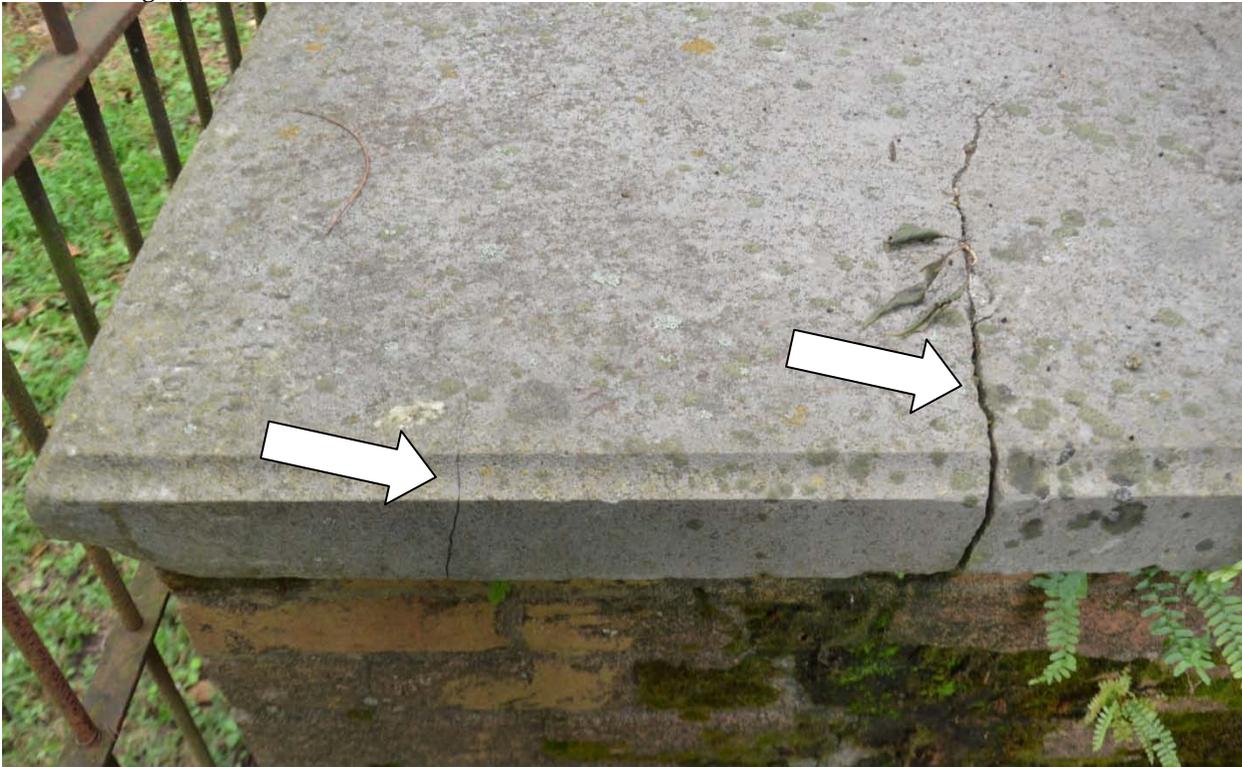
Southwest corner showing displacement, damaged brick, and very poor workmanship:



Ledger looking west:



Cracks in ledger, north side:



CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 4 fence **Name:** Eliza J.S. Walke

Dimensions: L=9' W=5'4" HT=3'3"

Photographs: at time of 1975 restoration, during this assessment

Brief Condition Report

Wrought bow and hairpin style fence with two rails. The four 1" square corner posts are set on four granite corner blocks. Elements are attached using bolts and slip joints. The supports for the corner posts are set into the granite blocks using lead. The bow and hairpin elements are ½" in diameter and are set on 3¾" centers.

All connectors are in good condition and firmly attached. All corner posts are plumb and solidly set. All of the bottom rails except for the one at the north are several inches above grade and in good condition. The northern rail is at grade and the bow and hairpin elements at the bottom rail exhibit extensive corrosion damage from previous burial. They were apparently exposed, but soil has begun to again accumulate along the north.

The fence exhibits no evidence of past paint and there is light corrosion overall. There is not, however, any appreciable corrosion damage and only light flaking was found on the underside of the rails. Corrosion of ground burial on the north bottom rail has been previously mentioned.

Along the south side the rails are slightly bent outward (i.e., to the south) and two of the bows are bent downward, as though something has fallen on the fence (perhaps the tree identified as growing in the box). The damage, while clearly visible, is cosmetic and has caused no structural damage.

Maintenance Recommendations

Grading

Soil at the north bottom rail should be removed to a level at least 2-3" below the rail, sloping the ground away (not toward) the brickwork. This may require minor modifications to the remaining three sides in order to ensure that water is not directed at the brickwork.

After grading the area should receive landscape fabric and mulch.

Painting

The best possible preservation option for this fence is ensuring that it receives routine painting. These procedures can be performed by a conservator or by city staff, following these recommendations and cautions.

The fence should be lightly cleaned with small wire brushes to remove flaking metal, especially under the rails and around the four corner post attachments to granite blocks. Cleaning must not expose bare metal, but only remove flaking corrosion.

One coat of Rust-Oleum® Rust Reformer®

(http://www.rustoleum.com/~media/DigitalEncyclopedia/Documents/RustoleumUSA/TDS/English/IBG/High%20Performance/3575_System_Rust_Reformer_RO99_2017990.ashx) is recommended. This is a corrosion converter that has been tested by the Canadian Conservation Institute and that Chicora has used extensively in fence treatments. A single light coat will stabilize the corrosion and serve as a primer. The safety data sheet is available at <http://www.rustoleum.com/MSDS/ENGLISH/3575402.PDF>.

After curing, we recommend two top coats of a high quality Rust-Oleum® flat paint. The first coat should be white since this allows the black Rust Reformer® to show through if any areas have been missed. After the white has cured, a final top coat of flat black should be applied.

Treatment Recommendations

The fence is stable and no treatments (other than the maintenance actions outlined above) are recommended.

Appearance of the Eliza J.S. Walke fence in July 1975 showing its condition at the time (view to the north):



East side of fence:



North side, fence bottom rail buried in soil:



Displaced and disconnected center fence support:



Bend in south side of fence:



Fence for Marker 4, Eliza J.S. Walke

CONDITION REPORT CEMETERY MARKERS



Chicora Foundation, Inc.
PO Box 8664
Columbia, SC 29202
803-787-6910

Location: Lynnhaven House Cemetery

State: VA

Site No.:

Marker #: 5

Name: unknown

Dimensions: unknown

Photographs: during this assessment

Brief Condition Report

This monument is today identified only as a grassed rubble pile. During the 1983 archaeological investigations at the cemetery by Herbert G. Fisher a “shallow pile of brick rubble 9’ long and 4’ wide located about 3’ east of the burial crypt of Eliza Walke” (#4 in this assessment) was found. No attempt was made to remove the brick rubble in order to identify evidence of the original brick box tomb foundation. No mention was made of any associated ledger fragments. Kellam and Kellam in their *Old Houses in Princess Anne, Virginia*, published in 1931, mention “one other brick vault. The slab is gone, a large tree is growing out.” Between 1931 and 1985 the tree must have been removed and the remains collapsed.

Today the brick pile is visible in the grass and the pile is about a foot above the surrounding grade.

Maintenance Recommendations

Care must be exercised to prevent landscape damage to these remains. Specifically, the placement of a pathway to the cemetery must avoid this area. It would be appropriate to incorporate this into mulching in order to prevent further mower or nylon trimmer damage to the rubble pile.

Treatment Recommendations

It would be appropriate, as funding is identified, to conduct an archaeological excavation in this area to remove the overlying soil and brick rubble in an effort to identify remnant foundations. These foundations would identify the precise location of the box tomb, as well as its dimensions. Excavations may also reveal remnants of the ledger.

If remains of the box can be found below grade, after their documentation we recommend that a lime mortar (while lime putty could be used, a natural hydraulic lime would be more appropriate given the below grade location) be placed down and suitable brick be used to extend the box ca. 6” (about 2 courses) above grade. This would provide a visual indicator to the public of this missing box tomb and allow more meaningful public interpretation.

If remains of the box cannot be found, we recommend that the archaeological investigations continue until the grave shaft is clearly identified. After full documentation it would be possible to create a suitable box surrounding the grave shaft to achieve the same goal as above.

Appearance of the brick mound indicating the presence of grave 5 today, looking west:



Close-up of the brick scatter:



Marker 5, unidentified

Cemetery Preservation Plans

Historical Research

**Identification of Grave Locations
and Mapping**

Condition Assessments

Treatment of Stone and Ironwork



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