

BETHLEHEM TOWNSHIP

ARCHIBALD JOHNSTON MANSION STABILIZATION STUDY

JANUARY 2016



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INTRODUCTION

ACKNOWLEDGMENTS | EXECUTIVE SUMMARY

ACKNOWLEDGMENTS

The team would like to acknowledge the contributions of the Township of Bethlehem officials, staff, and their consultants that aided with this project.

Bethlehem Township Board of Commissioners:

D. Martin Zawarski
Michael Hudak
Felix Barnard
Thomas Nolan
Patrick Breslin
Malissa Davis (2016)
Kim Jenkins (2016)

Janet Johnston Housenick and William D. Housenick Memorial Foundation:

Timothy Brady
William Leeson
Judge Stephen Baratta

Township Staff:

Melissa Shafer
Doug Bruce
Stephen Hunsberger
Richard Grube
Richard Kanaskie
Nathan Jones
Frank Krempasky
Angela Kelly
Abraham Hoffner
James Eppler

Project Consultant:

Paul Weiss

Engineer:

Arro Consulting Inc.

Construction Management:

Boyle Construction Management

EXECUTIVE SUMMARY

Spillman Farmer Architects was awarded the opportunity to work with the Township of Bethlehem on a building stabilization study for the Archibald Johnston mansion. The team from Spillman Farmer Architects included Russ Pacala, Vanessa dela Torre, Sal Verrastro, Blaine Summitt, and Barry Pell.

The building of study is a Georgian-revival style mansion that was completed in 1923. It was designed by Curtis Lovelace for Archibald Johnston, the first vice-president of Bethlehem Steel Corporation and the first mayor of the City of Bethlehem. The mansion, along with the 55 acres upon which it sits, was gifted by his grand-daughter, Janet Johnston Housenick, to the Township of Bethlehem in 2005. The building has sat vacant for a few decades.

The team was tasked with providing recommendations to the Township, for the immediate preservation of the Archibald Johnston mansion. The goals of the Township included repairs and modifications that would stabilize the mansion from further decay and potentially provide groundwork for a future use; as well as exploring the possibility of a portion of the mansion serving an immediate use as a public restroom. Working in conjunction with Edward P. Refsnider and Karen Cooney Duerholz from Boyle Construction, the team has provided the Township with recommendations and their associated costs. Consultations have been provided by the Township's Physical Plant and Public Works departments, as well as Lehigh Valley Engineers, and researcher, John Marquette.

Prior to making recommendations, the team was able to review reference materials that were made available by the Township and consultants. The original design drawings for the mansion and other historical images and information was made available by the researcher, John Marquette. In addition, the Township shared the Master Concept Plan, completed in October 2011 by MKSD Architects and Pennoni Associates. This document provided the groundwork for this study, and the basis of assumptions concerning possible uses of the mansion and the development of the surrounding park.

The team surveyed the Archibald Johnston Mansion on 16 December 2014. With the aid of a bucket lift, Sal Verrastro was able to get a closer view of the roof conditions and photographic documentation. The stucco facade was reviewed from the ground, as well as the fenestrations from the exterior and interior. This resulting document suggests many treatments for improving the circumstances of the roof, facade, and openings, for the ultimate protection of the interior and the building as a whole. The treatments range from high priority repairs that are low-cost and low intensive, to entire replacements of a system. They vary, as well, in their sensitivity to historic integrity. The result is a comprehensive list of detailed treatment options from which to choose as the budget and building program is defined.

The Township additionally charged the team with exploring the possibilities of locating a public restroom on the ground floor of the servant's quarters. After surveying the space and existing utilities, the team has provided a potential layout and an estimate for a resilient and utilitarian facility, appropriate for a public park restroom. Due to the increased risk to the remainder of the building and the high cost to provide updated and adequate infrastructure for the new use, the team has also provided an estimated cost to construct a new stand-alone building to house public restrooms, as a preferred alternate.

Consideration for public restroom facilities in the existing building has brought in to question the condition and capacity of the existing services. In order to predict potential future loads, the team explored scenarios for potential building uses. The Township's Physical Plant and Public Works departments, in turn, have explored appropriate approaches to providing adequate infrastructure to the restrooms, as well as the future needs of the building. The necessity of identifying programming for the Archibald Johnston Mansion has proven to be paramount.

This document will help guide the Township in making decisions regarding the long-term stability of the Archibald Johnston mansion. As circumstances change and take shape, a combination of the treatments presented may be selected to provide a holistic approach to the building's preservation.

NARRATIVE

PURPOSE AND GOALS OF STUDY | SITE HISTORY | BUILDING DESCRIPTION

ILLUSTRATIVE MASTER PLAN EXHIBIT



The master plan presented by MKSD Architects and Pennoni Associates provides for visitor arrival; new hiking and multi-purpose trails; new pavilions and rest areas; areas designated for conservation; and new signage throughout.

PURPOSE AND GOALS OF STUDY

The Township of Bethlehem awarded Spillman Farmer Architects with the task of providing a plan that lays the groundwork for the future of the Archibald Johnston mansion. Since the Township has acquired the property, the mansion has stood vacant in a secluded area off of Christian Springs Road in Northampton County. The isolation, along with the regular supervision and maintenance of Township staff, has largely protected the structure from vandalism and loss. In anticipation of the surrounding land's development as the Janet Johnston Housenick and William D. Housenick Memorial Park, the team was commissioned to price methods of securing the building for the long-term. Additionally, as new public restrooms are proposed for the park, this document outlines the associated costs of potentially fitting-out the first floor of the servants' quarter for this purpose.

The Janet Johnston Housenick and William D. Housenick Memorial Park is located on 55 acres off of Christian Springs Road and Santee Mill Road. When the land and mansion was passed on to the Township, the wishes of Janet Johnston Housenick were adopted to:

“Preserve the Johnston Estate for the Citizens of Bethlehem Township and beyond in order to foster the reconnection of our community to the natural world while providing experiences through education and the arts that lead to greater understanding and appreciation of our environment and local history”¹

In October 2011, MKSD Architects and Pennoni Associates conducted a thorough Master Concept Plan for the area's development as a passive recreational park and associated facilities. The priorities of the master plan included: improving visitor access and parking; providing infrastructure for passive recreation, including trails, gathering spaces, and water access for fishing; and fostering education with natural features.² While much of the master plan remains a plan, since 2011, some recommendations have taken place, such as the implementation of signage and parking.

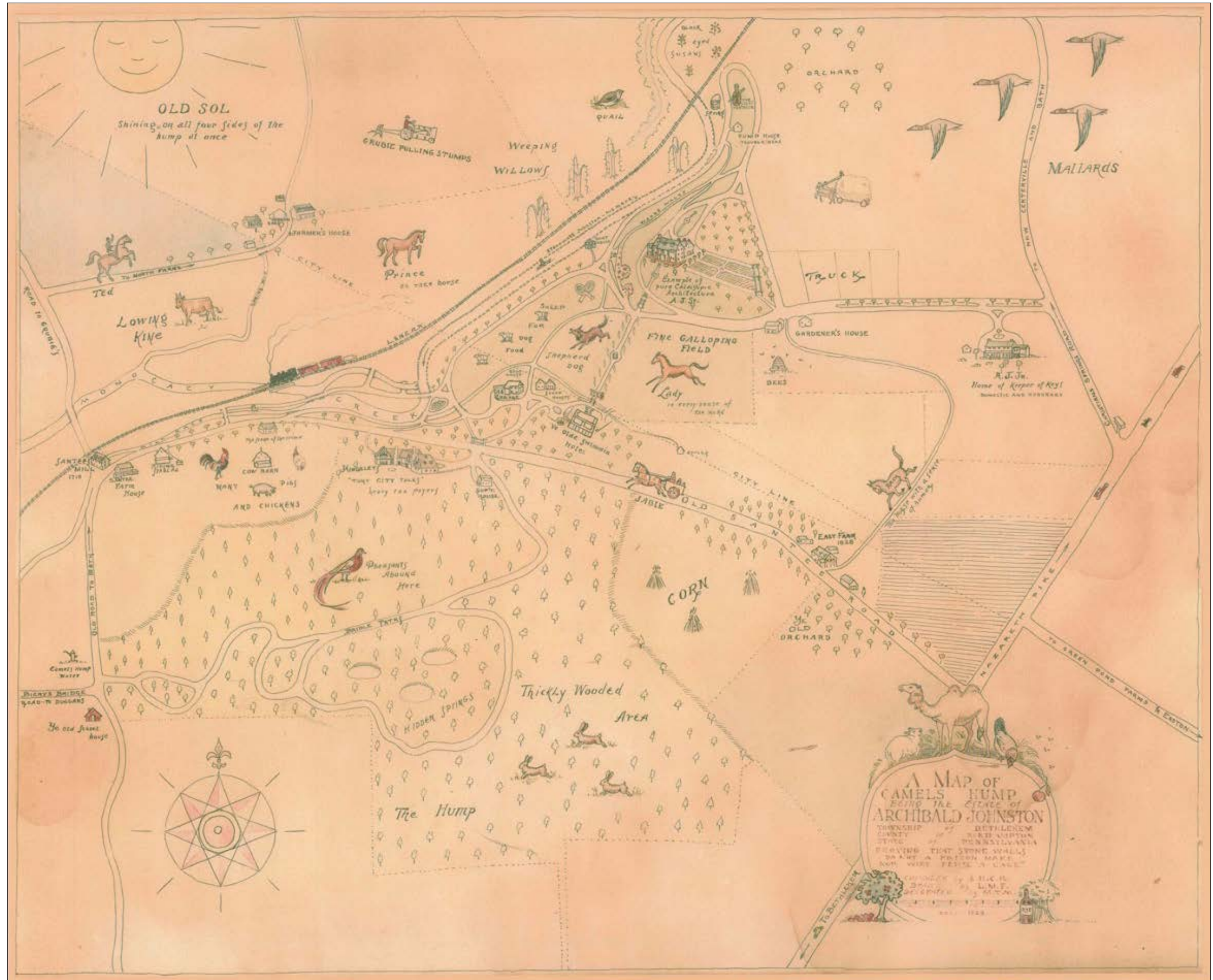
As the master plan unfolds around the Archibald Johnston mansion, the structure can be impacted by its increased exposure. On one hand, the increased foot traffic and events taking place on the adjacent grounds will increase potential risks to public safety and to the structure. While the mansion remains vacant, it is susceptible to vandalism and accelerated deterioration. It is the goal of the Township and this document to plan to reduce these potential risks by stabilizing the exterior of the mansion, until a permanent building-use and tenant can be identified.

¹ Pennoni Associates Inc. and MKSD Architects, 4.

² Pennoni Associates Inc. and MKSD Architects, 31.

On the other hand, the structure may potentially serve the park visitors. The master plan study completed an initial exploration of possible uses for the mansion. The study compiled cost comparisons for converting the mansion in to a variety of mixed-uses.³ With neither a tenant nor the funds for the adaptive reuse of the mansion, implementation of building conversion has been postponed for the long-term future. One partial use that was suggested by the master plan study, however, overlapped with the immediate needs of the park development. Locating public restrooms in the mansion could be utilized by park goers, eliminating the need to build a new structure. The master plan study identified the first floor of the servant area as an ideal location for such facilities, and the team was asked to propose a scheme and cost estimate for the work.

³ Pennoni Associates Inc. and MKSD Architects, 133.



right - From the family of George P. Kingsley Jr.; done for Archibald Johnston; by artist (TBD)

opposite page - aerial photograph of Archibald Johnston mansion; date unknown; image from the collections of John Marquette.

SITE HISTORY

In 1864, Archibald Johnston was born in Phoenixville, Pennsylvania. His father, Joseph Johnston, worked for the Bethlehem Iron Company while Archibald attended school. He studied mechanical engineering at Lehigh University, and graduated in 1889. Following his father’s lead, he also worked for the Bethlehem Iron Company, rising in status as the company later became Bethlehem Steel Company, and finally Bethlehem Steel Corporation. Archibald Johnston achieved the prestigious status of being the first vice-president of Bethlehem Steel Corporation, when the company came to be formed in 1904.⁴

During his time as vice-president, Archibald Johnston led a campaign to consolidate the boroughs of Bethlehem, South Bethlehem and Northampton Heights, and create the modern city of Bethlehem. He served one term as the newly incorporated city’s first mayor, from 1917 to 1921.

In 1919, Archibald Johnston began acquiring land from local farmers in the northern parts of Bethlehem and Bethlehem Township, encompassing areas along the Monocacy Creek known as “Quaker Hill”. His land, that eventually grew to the size of 900 acres, was renamed “Camel’s Hump Farm”. It was here that he built a home for his wife Estelle Borhek, son Archibald B., and daughter Elizabeth, in which they took residence after his term as mayor, in 1923. The home was designed by Curtis Lovelace, a young architect at the time, having just completed his architecture studies in 1914 from the Rhode Island School of Design and the University of Pennsylvania. Archibald Johnston took an active role in the design of the grounds, which included a system of paved roads and bridges, tennis court, swimming pool complex, boat house, and orchard. Archibald Johnston died at his estate in 1948.

Archibald B. Johnston Jr. and his wife raised their three daughters at “Camels Hump”. The estate was divided amongst the daughters, Elizabeth Johnston Prime, Janet Johnston Housenick, and Amanda Leckonby. The mansion and 91 acres of surrounding land belonged to Janet Johnston Housenick and William D. Housenick. The couple, in 1986, donated 36 acres of their land to Northampton County, for the creation of the Archibald Johnston Conservation Area. Janet Johnston Housenick and her husband did not reside in the mansion, itself, but in a separate house located on the estate that was lost in a fire that claimed her life in 2005.

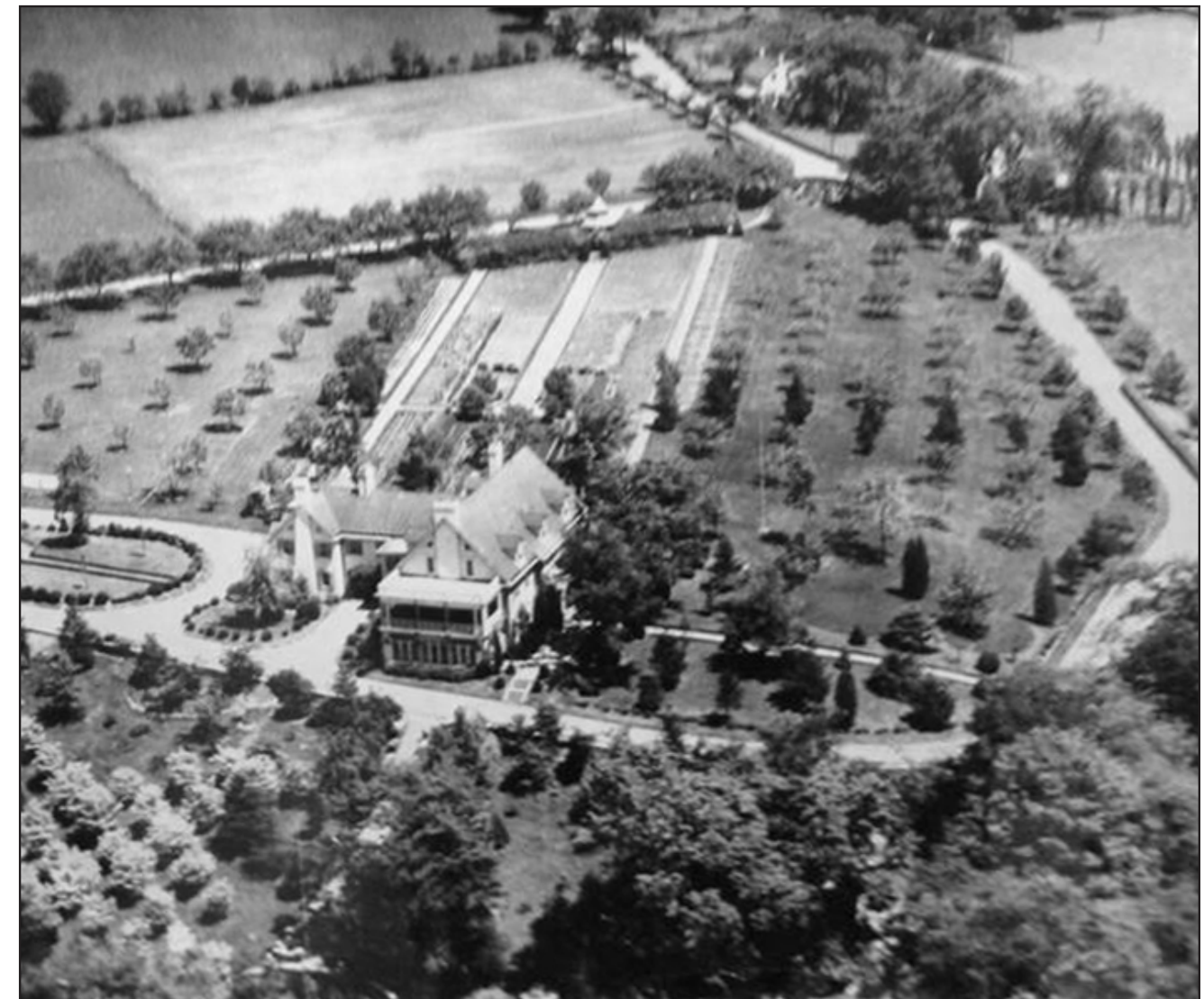
Upon Janet Johnston Housenick’s death, she donated the remainder of the 55 acres and mansion to Bethlehem Township, for the creation of the Janet Johnston Housenick and William D. Housenick Memorial Park. It was her intention for the land to be consolidated into a single park, and to be maintained with the aid of a charitable trust in which was vested approximately two million dollars. In 2010, the Township commissioned a master plan study by Pennoni Associates Inc. and MKSD Architects in order to guide the development of the park. Passive park trail markers were added in 2013, and a paved parking area in 2015.

⁴ “Archibald Johnston”

The last known resident of the mansion was Timothy Brady. He resided in the servant areas of the mansion until the 1990’s, and currently occupies a three-acre lot within the estate.⁵ His property, which will revert to the Township upon his death, encompasses the original drive to the mansion from Christian Springs Road.

Since the estate and mansion has come under the care of the Township of Bethlehem, the mansion is regularly monitored and managed by Township staff. It is currently in a mothballed state, with neutralized utilities and on-going patching of the exterior envelope. There is currently no plan for the future use of the mansion.

⁵ Nicole Radziewich, “Patron of the land...”





left - historic photograph of the Archibald Johnston mansion; Weiner Jr., William, and Karen M. Samuels, pg 94.

opposite page - Township of Bethlehem, Janet Johnston Housenick & William D. Housenick Memorial Park, overall site layout plan background; from T&M Associates

BUILDING DESCRIPTION

The Archibald Johnston mansion was historically approached from the south via a prominent walkway through the estate grounds, on axis with the primary facade's central entrance. The main drive approached from Christian Springs Road, and created a loop around the mansion. Today, much of the walkways are overgrown, and the main drive has been interrupted by Timothy Brady's residence, whose property now encompasses the drive. Visitors to the mansion now approach from the back end of the loop, passing around what was once an orchard, arriving at the rear of the mansion and are greeted by the servants' wing. This path has access to the kitchen and larder, which once provided quick and convenient delivery to the serving zones.

Curtis Lovelace designed the 3-story mansion in the Georgian Revival style, with Neo-Adamesque influence. Not surprisingly, steel columns and beams by Bethlehem Steel provide major support within a largely wood-framed structure. The exterior material is primarily stucco on metal lath, with brick quoining on the primary building form, and a slate roof.

The primary facade of the mansion is, for the most part, rectangular and symmetrical with central features that are typical of the Georgian Revival Style. Except for a sun porch attached to the west facade, the features on the primary, or south facade, are symmetrically balanced to either side of the central main entrance. This central area is emphasized with a quoined projection, and encapsulates an ornate entrance, portico, and second-story palladian window. The Adamesque influences are evident in the general lightness in the architecture that is evoked through the slender proportions of the columns, windows, and detailing; and also in the use of curves and arches in the elevation. Fanlights, arches, and the portico are semi-elliptical, and the dormers feature semicircular arched windows.

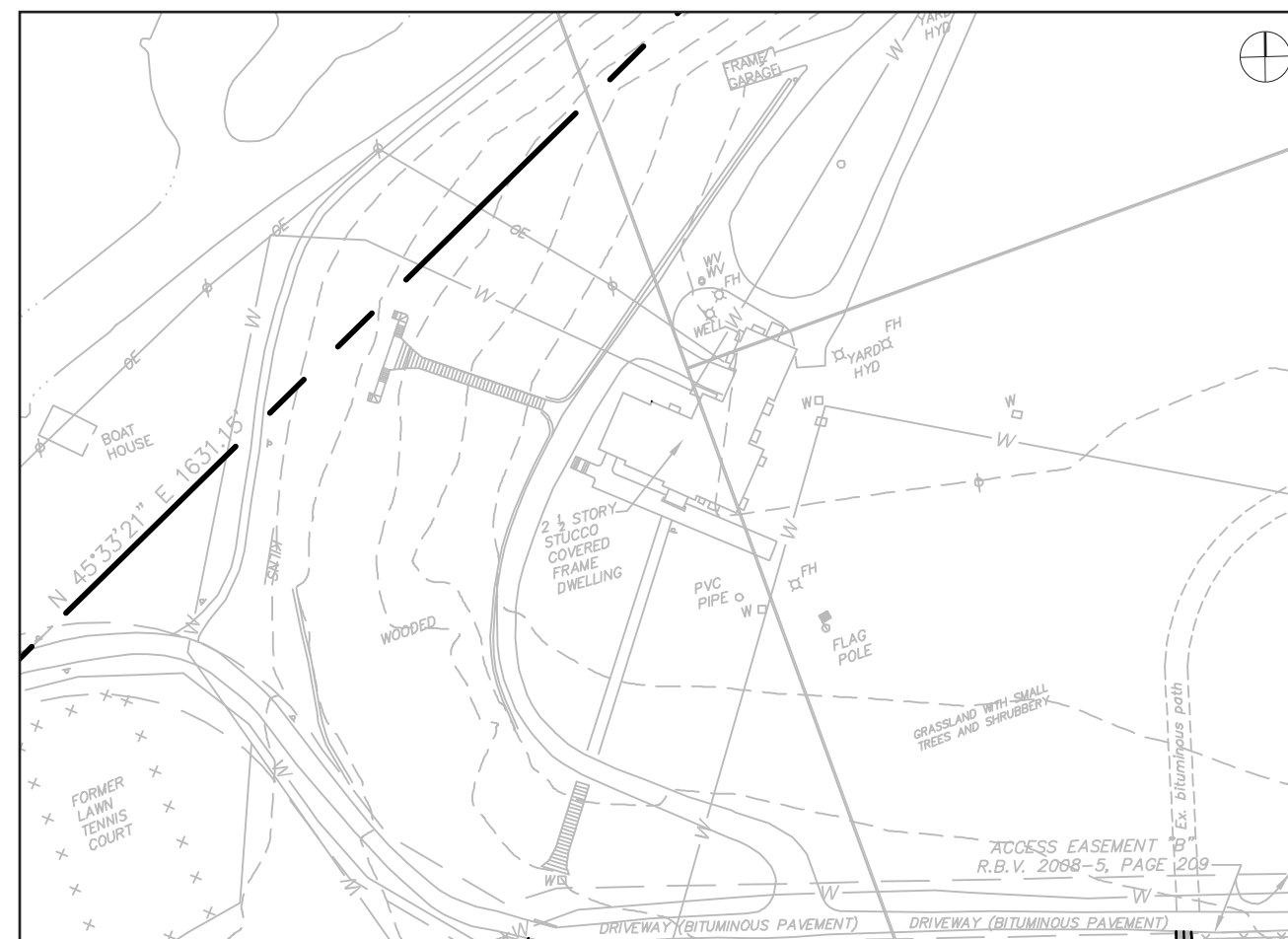
The mansion is approximately 6000 square feet and has 22 rooms. The footprint of the building is in the shape of an "L", the dominant rectangular form being the primary living spaces for the Johnston family. The main entrance opens into a central hall that features a grand staircase. The hall opens to a dining area on the right, and to a living room on the left, adjoining the sun porch. The two-story hall is encircled by a balcony that connects the master living quarters on the second floor. All rooms feature original woodwork and finishes, and the bathrooms' fixtures appear to be original, as well. A door off of the hall leads to a small staircase up to the third floor. The third floor was the location of Archibald Johnston's library and study.

A wing off of the back is comprised of service spaces, including the living quarters for the servants, the kitchen, and the laundry areas. The service wing connects to the primary mansion on two floors and has a separate staircase and entrances. The first floor is connected to the dining area through the pantry, larder, and kitchen areas. The second floor of the service area is the living quarters for the servants, providing multiple bedrooms of a much smaller size and a single bathroom.

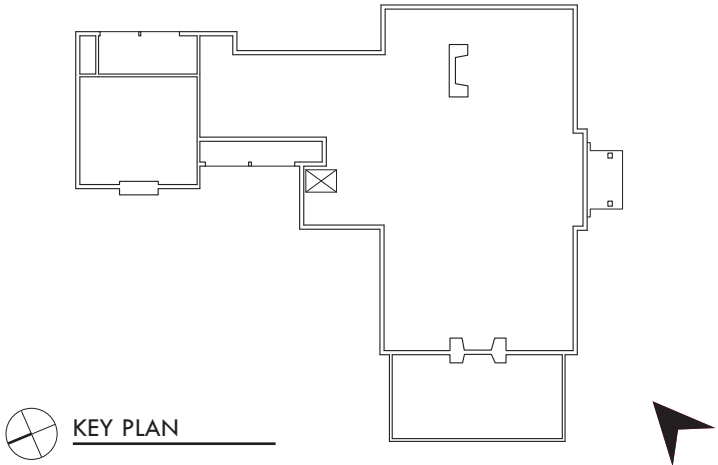
The mansion has remained largely unchanged from its original configuration. Previous owners have not altered the appearance of the mansion much further beyond the installation of an elevator; and despite the subsequent vacancy, the mansion suffered very little loss throughout the years. The most significant loss has been the second and third stories of the sun porch, that can be seen in the historic photograph.

The high level of material integrity is due in large part to the mansion's high quality of construction and materials; its relative seclusion and security measures; and timely reactive maintenance to the building envelope. It is for these reasons that, among other things, the original windows, doors, and shutters remain intact. The high-quality wood details have survived, despite prolonged exposure to the sun and moisture, as the paint finish has long faded. Few features would require reconstruction to return the mansion to its original form; such work would include the upper stories of the sun porch, the portico columns, the exterior stucco, and the chimneys.

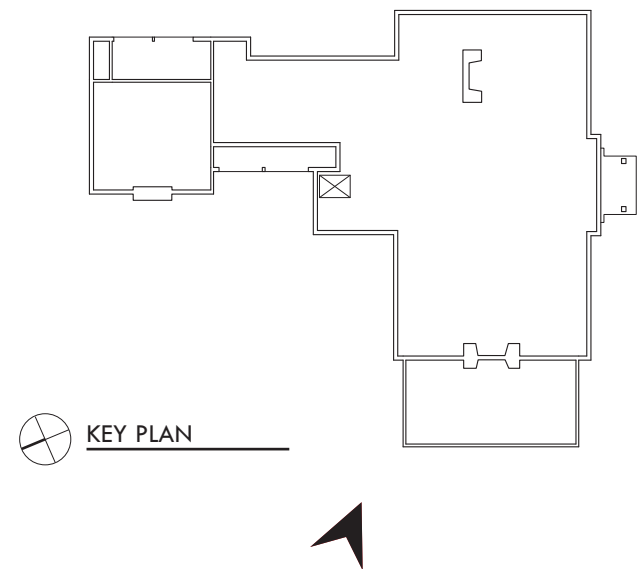
While practically all of the original features have survived, and the envelope system has largely protected the structure and interior, decades of deferred maintenance has caught up to the mansion. As time has gone on, the mansion has become increasingly outdated and many, if not all, of the large building systems have reached the end of their life expectancy. For the purpose of stabilizing the exterior, this document focuses on the systems that comprise the envelope: the roof, stucco, and openings. The utility infrastructure, however, is a significant replacement cost that will be necessary to the mansion's future use.



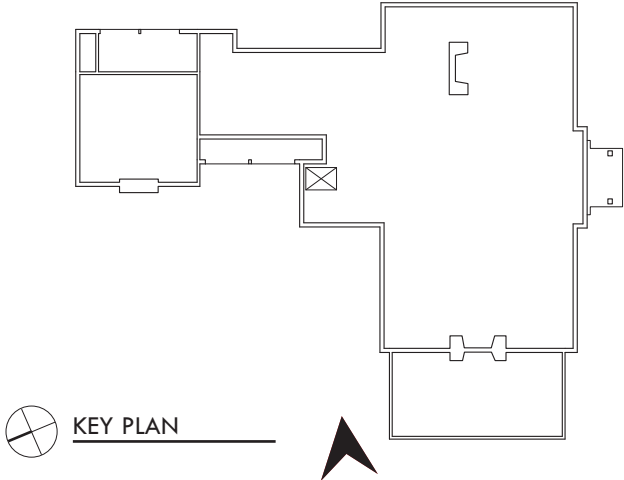
SOUTH FACADE



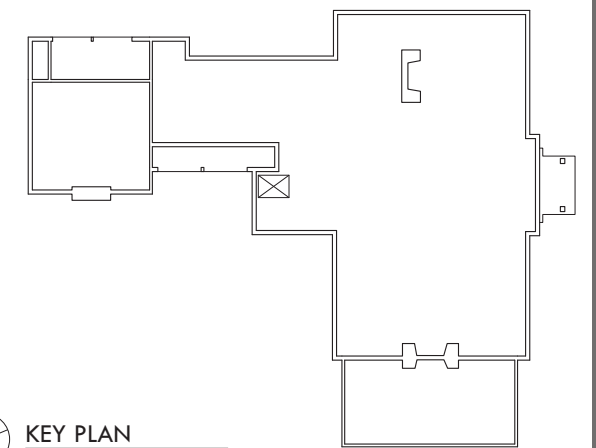
SUN PORCH



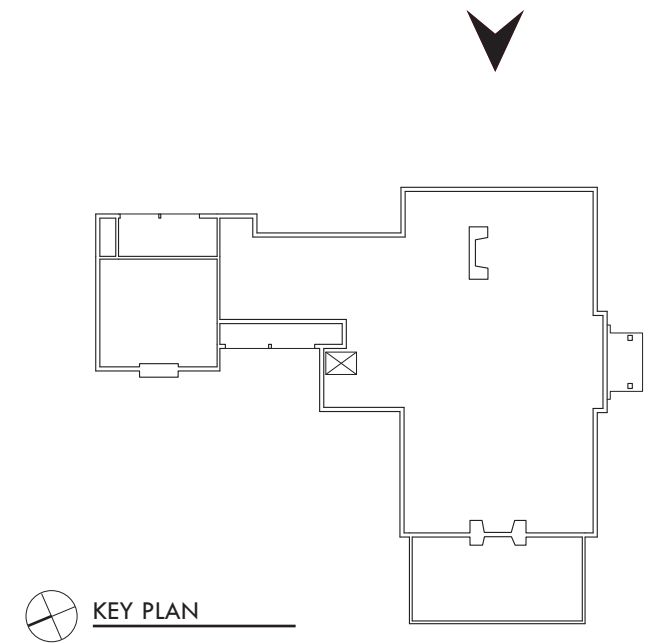
WEST FACADE



NORTH FACADE



EAST FACADE



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TREATMENTS

TREATMENT SUMMARY | ROOF TREATMENTS | FACADE TREATMENTS | OPENINGS' TREATMENTS | NEW PUBLIC RESTROOMS | NEXT STEPS

TREATMENT SUMMARY

Roof Treatments				
Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost
IA	Ridge flashing	Provide continuous copper metal ridge	231 LF	\$10,890
IB	Repair metal roof accessories	Replace flat roof areas with EPDM; repair roof edge flashing, gutter lining, soffit and modillions	1330 LF	\$26,620
IC	Line gutter in EPDM	Line the existing copper gutter in EPDM	300 LF	\$14,520
ID	Temporary chimney repair	Kill vegetation and temporarily cap chimneys with EPDM.	4 CHIMNEYS	\$7,260
IE	Chimney repair	Clearing chimney openings and securing from future biological growths; partial demolition and restoration; patch with stucco	500 SF	\$14,520.00 / chimney
IF	Shingle replacement	Individually or by area, replace damaged and failing slate shingles in-kind	50 SHINGLES	\$3,025
IG	New asphalt roof	Entire roof replacement with asphalt shingle system; where necessary, patch sheathing, reinforce structure, and replace flashing	6100 SF	\$108,900
IH	New composite roof	Entire roof replacement with composite shingle system; where necessary, patch sheathing, reinforce structure, and replace flashing	6100 SF	\$217,800
II	New slate roof	Entire roof replacement with new slate roof; where necessary, patch sheathing, reinforce structure, and replace flashing	6100 SF	\$272,250

Facade Treatments				
Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost
IIA	Sealant at trim	Providing sealant at seams along brick and wood in contact with stucco	3000 LF	\$38,115
IIB	Flashing along brick	Providing flashing at stucco seams along brick grade course	430 LF	\$7,805
IIC	Patch and resurface stucco	Provide compatible stucco mixture and replace lath and stucco where necessary; provide new finish coat on all existing stucco	1520 SF (to be patched)	REPLACEMENT REQUIRED
IID	Repaint exterior	Stucco; wood trim; sun porch; and soffit.	8500 SF	\$99,958
	Repaint exterior wood	Wood features only; ie. trim, sunporch, soffit, etc.		\$60,000
IIE	Re-stucco entire facade	Replace entire stucco facade; replace lath where necessary; provide necessary flashing	6500 SF	\$153,700
IIF	Replace stucco with alternative material: Synthentic stucco	Replace entire stucco facade with a synthetic stucco system, providing flashing where necessary	6500 SF	\$153,700
IIG	Secure porch entry	Provide necessary flashing and support for existing porch		\$8,785
IIH	Misc. woodwork repairs	Repair areas of damaged exterior wood; including soffits, corbels, trim, etc.		\$30,250

Openings' Treatments				
Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost
IIIA	Glass replacement	Replace broken glass	3 OPENINGS	\$1,500
IIIB	Restore all windows and doors	Re-glaze and fix all windows and counterweights as necessary; strip and paint all sashes, muntins, jambs, headers, sills, and trim.	88 OPENINGS	\$68,820
IIIC	Add missing storm windows and doors	Install storm windows on unprotected windows and doors with glass panels	27 OPENINGS	\$14,250
IIID	New custom storm windows and doors	Provide compatible storm windows and doors of custom size	86 OPENINGS	\$44,500
IIIE	Window and door replacement	Provide new custom windows and doors	88 OPENINGS	\$220,220
IIIF	Shutter restoration	Restore shutter functions and place in closed position; secure from the inside; replace shutters where necessary	85 SHUTTERS	\$33,275

Restroom Outfit in Servants' Area				
Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost
IVA	Servants' area retro-fit	Provide all new fire protection, plumbing and fixtures, HVAC, electric, and finishes within the existing first floor servants' area of the mansion, to support 2 public restrooms.		\$144,600
IVB	New structure	Provide new structure for public restrooms.		\$55,000

I. ROOF TREATMENTS

SUMMARY OF EXISTING CONDITIONS

1. The building's roof is a Pennsylvania slate, black-gray in color. Original drawings call out 1" sheathing boards.
2. The roof structure appears to be stable overall with only one section that may need to be explored by exposing the underside of the structure.
3. The slates appear to be the original slates and are beginning to deteriorate (spall). This deterioration is normal for this type of slate, however the deterioration of the slates will continue. Fig A
4. There are a few slates missing and several slates cracked. In addition, many slates have been replaced. Some of the roof slate repairs were done using steel sheets which have corroded. Fig. B
5. The slate ridge appears to be a "Comb Ridge" style which was common for that period. It is not necessarily a very watertight detail. We are certain that this ridge is allowing moisture to enter the roof assembly at this point; daylight can be seen from the interior through the ridge of the primary roof. Rendering this detail watertight is critical. Fig. C
6. The open valley flashing is copper; likely 16 oz.
7. The eave flashing is copper.
8. The integral metal gutters are also 16 oz copper with solder seams. Figs. D and E
9. The snow guards appear to be galvanized steel. Fig. A
10. The chimney tops are in extremely poor condition, and are allowing large amounts of moisture into the building. Fig. F
11. The flat areas of the roof are flat seamed copper, with solder joints. Figs. G and H
12. The flat seam roofing sections appear to be in fair condition. But soldered seams can have pin holes which allow moisture to penetrate causing damage which is undetected from the exterior.
13. There is some critical roof edge flashing sections missing on the flat roof area. Fig. I
14. The drip edge on the flat roof area is not conducive to shedding the water away from the wood trim immediately below the roof. Fig. I



Fig. A

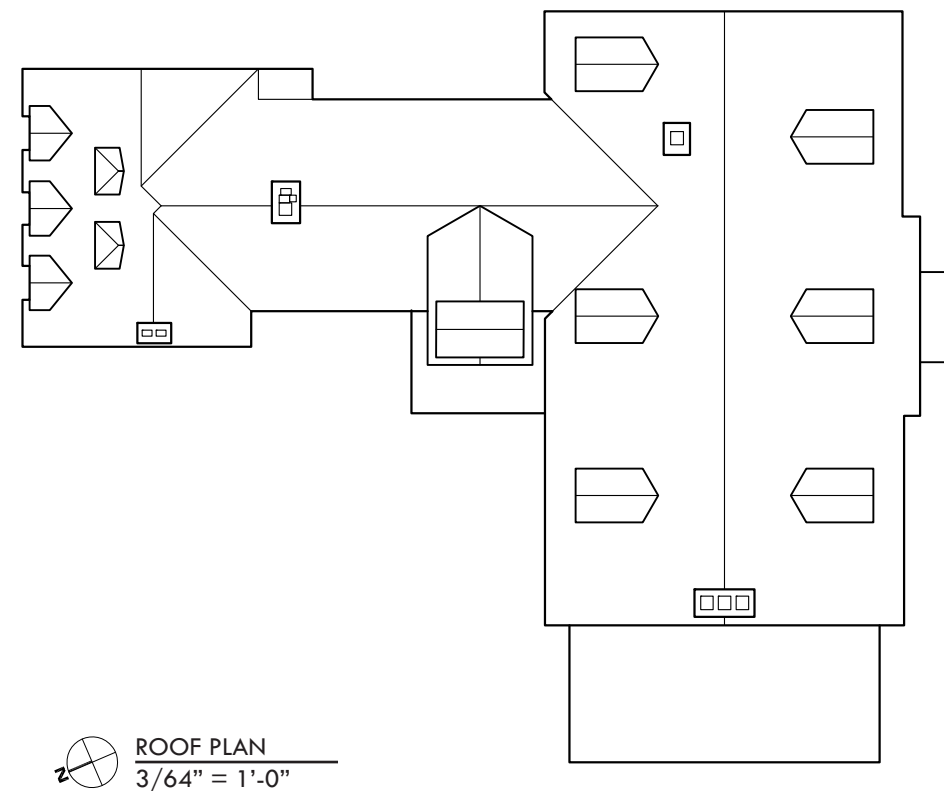






Fig. F



Fig. G



Fig. H



Fig. I

A. Copper Ridge Flashing & Individual Slate Shingle Replacement

1. Description

The slate roof utilizes a “comb ridge” that is devoid of flashing and underlayment. The ridge is protected from water infiltration by only the slight overhang of one slate that extends over the ridge and a bead of asphalt cement, to which the opposite slate abuts at its underside. This detail is not watertight, and is providing water entry directly to the interior. In portions of the primary roof, daylight can be viewed through the ridge.

Prior to addressing the ridge, any damaged or missing slate shingles, approximately 50 in count, should be replaced. In order to prevent water infiltration through the ridge, a copper ridge cap can be used to replace the “comb ridge” without replacing the roof. The combing slates along the ridge would first be removed, and a copper ridge cap would be installed in their place. The basis of design is B&B Sheet Metal, straight ridge cap.

An alternate solution may be to provide metal flashing beneath the “comb ridge,” as a back-up system. Remove the combing slates; apply the metal ridge flashing to the next layer of shingles; and re-install new combing slate shingles. This option would maintain the existing historic appearance of the roof.

2. Estimated Quantity of Work

Approximately 231 linear feet of ridge capping

3. Proposed Methods of Renovation

- a. Replace any damaged or spalling slate shingles.
- b. Installation by a skilled and experienced slate roofer
- c. The roofer shall use large head slaters’ solid copper nails, 1 1/2 inch or longer for field, and 2 inch for slates on hips and ridges. Nails should adequately penetrate the existing roof deck.
- d. The roofer shall use approved waterproof elastic slaters’ cement, color to match slate.
- e. The roofer shall use 16oz. copper flashing.
- f. Use a straight ridge cap to minimize the profile, in lengths no shorter than 8’, minimum of 16 oz copper.
- g. Verify roof membrane terminations and base flashings are in place, sealed, and secure.
- h. Coat dissimilar materials in contact with sheet metal: concrete and masonry with one coat of bituminous paint, and wood with two coats of aluminum paint.
- i. Do not allow sheet metal to come in contact with dissimilar materials.
- j. Do not install bent, twisted, or scratched sheet metal. Install plumb and level with no bulges or waves. Make corners square and all surfaces true and straight.

k. Provide for expansion and contraction of sheet metal.

l. Secure sheet metal in place using concealed fasteners. Lap and seal all joints. Exposed fasteners shall be covered with sealant.

m. Protect finishes of exposed to view sheet metal fabrications. Avoid gouging, scratching, and denting. Use cotton gloves when handling and installing unprotected sheet metal in order to avoid soiling exposed to view surfaces.

n. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

o. Exercise care in removing mortar, cementitious materials, and sand from ornamental sheet metal roofing specialties. Do not wipe surfaces in order to avoid scratching.

p. Wash exposed surfaces with solution of mild detergent applied with soft cloth. Wipe surfaces clean.

q. Another option is to provide metal flashing beneath the “comb ridge”, as a back-up system. Remove the Combing slates and wood nailers; apply the metal ridge flashing to the sheathing; and re-install new combing slate shingles. This option would maintain the historic appearance of the roof.

4. Details

01. Existing “Comb ridge” detail
02. Ridge cap detail
03. Alternate – Flash “comb ridge”

5. Pros

- a. Immediate prevention of water infiltration through the roof ridge.

6. Cons

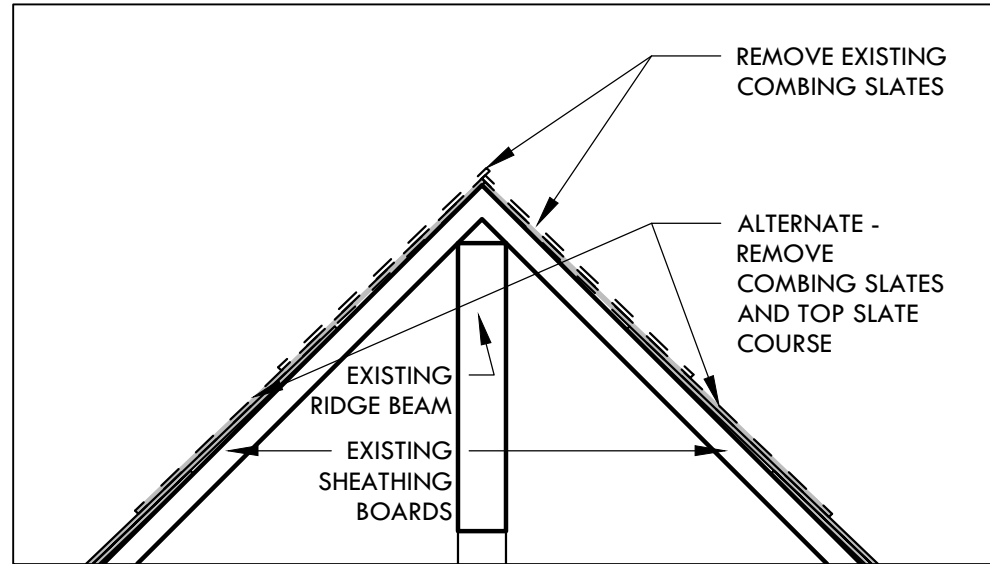
- a. Replacing the ridge detail with a copper ridge cap will alter the original appearance of the roof from all views. The alternate is an option that would maintain the historic appearance and accomplish
- b. Lifetime and Maintenance

7. Lifetime and Maintenance

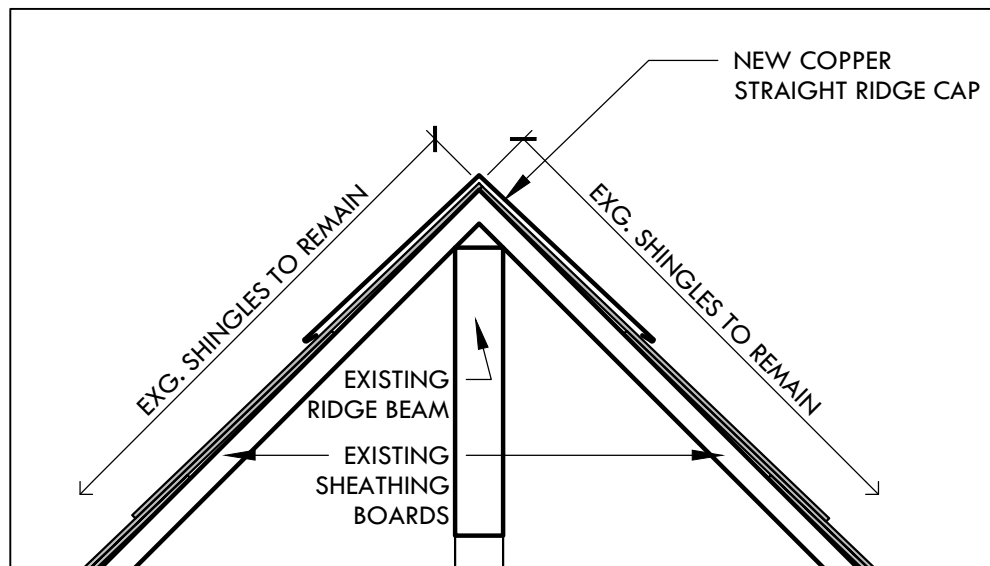
- a. Ridge cap does not require maintenance, and has a life expectancy of 100 years.

8. Cost - \$10,890

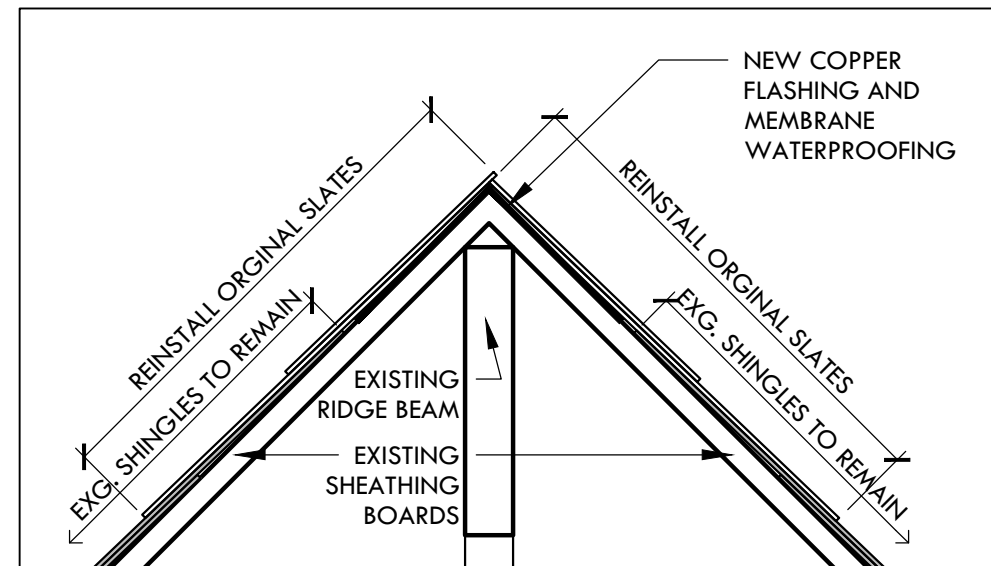
9. Priority - High



1 I.A. EXISTING "COMB RIDGE" DETAIL
 1 1/2" = 1'-0"



2 I.A. RIDGE CAP DETAIL
 1 1/2" = 1'-0"



3 I.A. ALTERNATE - FLASH "COMB RIDGE"
 1 1/2" = 1'-0"

B. Repair Metal Roof Accessories

1. Description

The roof suffers from a lack of ongoing maintenance. Repairs have primarily been reactive in nature, without a comprehensive maintenance plan. At the least, it is recommended that all points of failure in the flat roof, including the metal drip edge; flashing; gutter linings; and soffits be repaired.

It is recommended that the flat seam copper roof areas be replaced, whether in-kind, or alternately in EPDM.

2. Estimated Quantity of Work

350 LF of roof flashing; 300 LF of gutter; 72 LF of flat roof edge; 608 LF of soffit; 200 SF of flat roof area

3. Proposed Methods of Renovation

- a. Repair soldered seams of flat roof areas
- b. Repair flashing
- c. Repair gutter; or line gutter in another material
- d. Repair soffits
- e. Replace any existing metal edge sections that are missing or damaged.

4. Details N/A

5. Pros

- a. Addressing these issues will immediately prevent water infiltration, and stabilize the interior environment.

6. Cons

- a. The repairs will not prevent the continued deterioration of the slate shingles.

7. Lifetime and Maintenance

- a. Such repairs will need constant monitoring, and may need to be repeated at regular intervals.

8. Cost - \$26,620

9. Priority – Medium to High

C. Line Gutter in EPDM

1. Description

An alternative gutter treatment, other than to spot repair or replace in full, is to line the gutter in an impervious material. A lining of EPDM will provide a continuous surface over the aging copper, ensuring water sheds from the shingles and is carried directly to the downspouts.

2. Estimated Quantity of Work

300 LF of gutter

3. Proposed Methods of Renovation

- a. In order to provide sufficient lining to the gutters, the bottom course of slate shingles must be removed.
- b. Patch and clean and dry copper gutters.
- c. Coat the gutter with a thin layer of primer.
- d. Apply EPDM in a continuous layer from the shingles, along the gutter, to the opposite edge.
- e. Heat weld seams and laps.
- f. Install new drip edge system.
- g. Re-install slate shingles.

4. Details

01. Gutter section detail

5. Pros

- a. Addressing these issues will immediately prevent water infiltration, and stabilize the interior environment.

6. Cons

- a. Labor intensive.
- b. Alters appearance of roof.

7. Lifetime and Maintenance

- a. Low maintenance.

8. Cost - \$14,520

9. Priority – Medium to High

D. Temporary chimney repair

1. Description

The mansion has four masonry chimneys that are rendered in stucco. The masonry, behind the stucco of the chimneys, has become exposed in many places, and vegetation has grown to a significant size from inside of the openings. If left to grow, the weight of the trees and the pressure of the roots will eventually compromise the chimney structures. As a temporary treatment, it is recommended to at least kill the existing vegetation, and to temporarily cap the chimneys in EPDM. All work may be completed from a lift, eliminating the immediate need for scaffolding.

2. Estimated Quantity of Work

4 chimneys

3. Proposed Methods of Renovation

- a. Cut vegetation as close to the roots as possible, and treat to prevent any future growth.
- b. Form a fitted structure of 1" plywood, lined in EPDM. Cap each chimney.

4. Details (see E.3. Chimney detail)

5. Pros

- a. Immediate prevention of water infiltration through the chimneys.
- b. Scaffolding is not necessary to complete work.

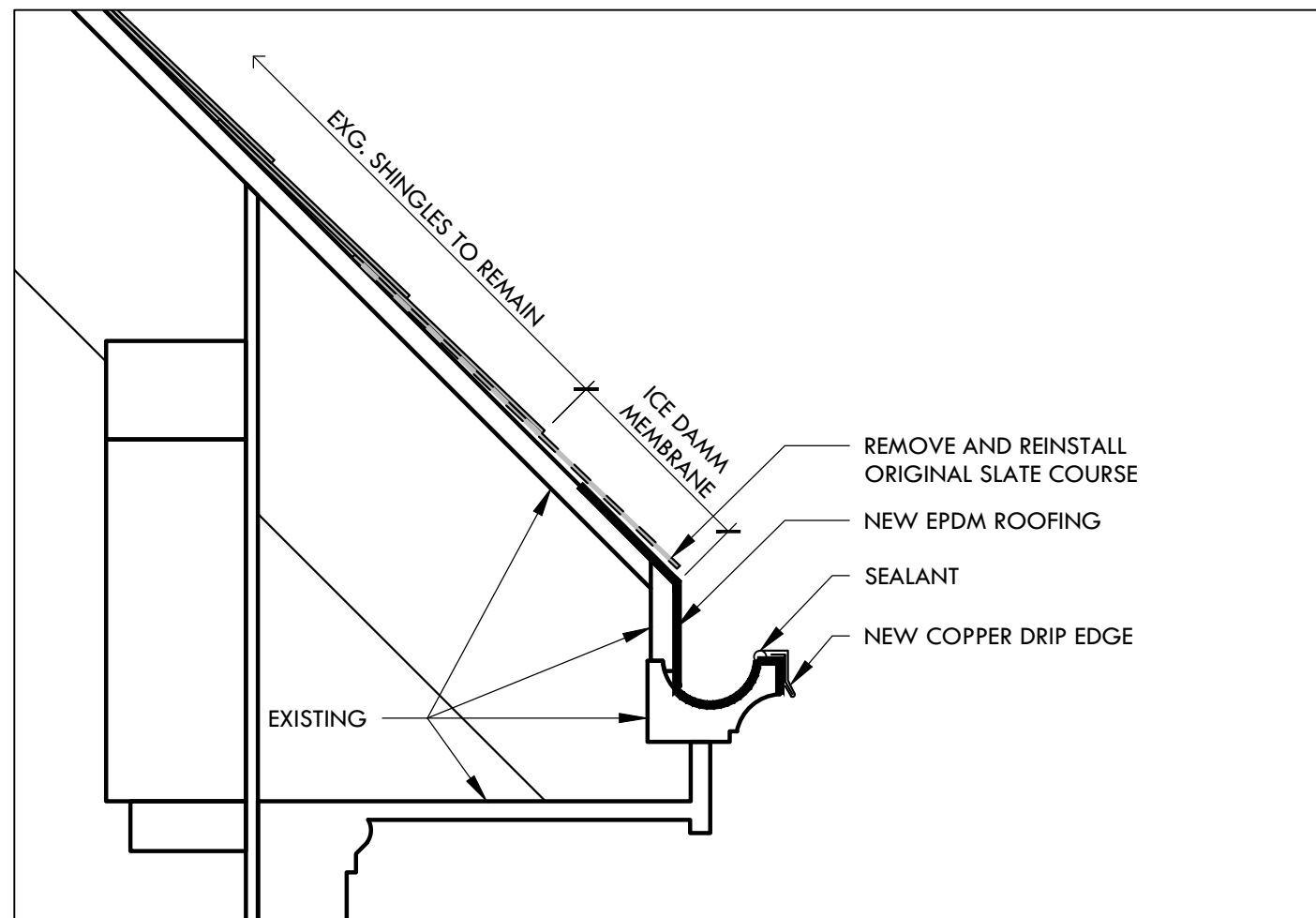
6. Cons

- a. Meant only as a temporary solution, as the result will be obtrusive to the historic appearance and will require maintenance.

7. Lifetime and Maintenance

8. Cost - \$7,260

9. Priority – Extremely High



1 I.C. GUTTER LINING
1 1/2" = 1'-0"

E. Chimney repair

1. Description

The mansion has four masonry chimneys that are rendered in stucco. The masonry, behind the stucco of the chimneys, has become exposed in many places, and vegetation has grown to a significant size from inside of the openings. If left to grow, the weight of the trees and the pressure of the roots will eventually compromise the chimney structures. Through the process of removing the vegetation, it may be necessary to partially demolish the chimney stacks, and to restore the masonry before re-stuccoing the surface. Each chimney should be reconstructed and sealed permanently or capped to prevent future plant growth and deterioration of the chimney interior. Additionally, the flashing at the base of each chimney should be checked for proper installation.

2. Estimated Quantity of Work

4 chimneys; approximately 500 SF of masonry

3. Proposed Methods of Renovation

- a. Remove existing stucco from the chimney.
- b. Remove the chimney cap.
- c. Remove any remaining vegetation or plant growth. Kill any roots that cannot be removed.
- d. Repair or replace the masonry backup forming the chimney as required to render the chimney structurally sound.
- e. Coat the masonry backup with a waterproof membrane: IE: Liquid Perm-a-barrier by W.R. Grace
- f. Provide a new exterior plaster system or EIFS to the existing masonry backup
- g. Provide a new solid chimney cap: IE: Copper.

4. Details

- 01. Chimney cap detail

5. Pros

- a. The structural stability of the chimneys will no longer pose a threat to the roof and the rest of the mansion.
- b. Repairing the chimneys will prevent the large amounts of moisture that they are currently allowing into the building, and is damaging to the interior.

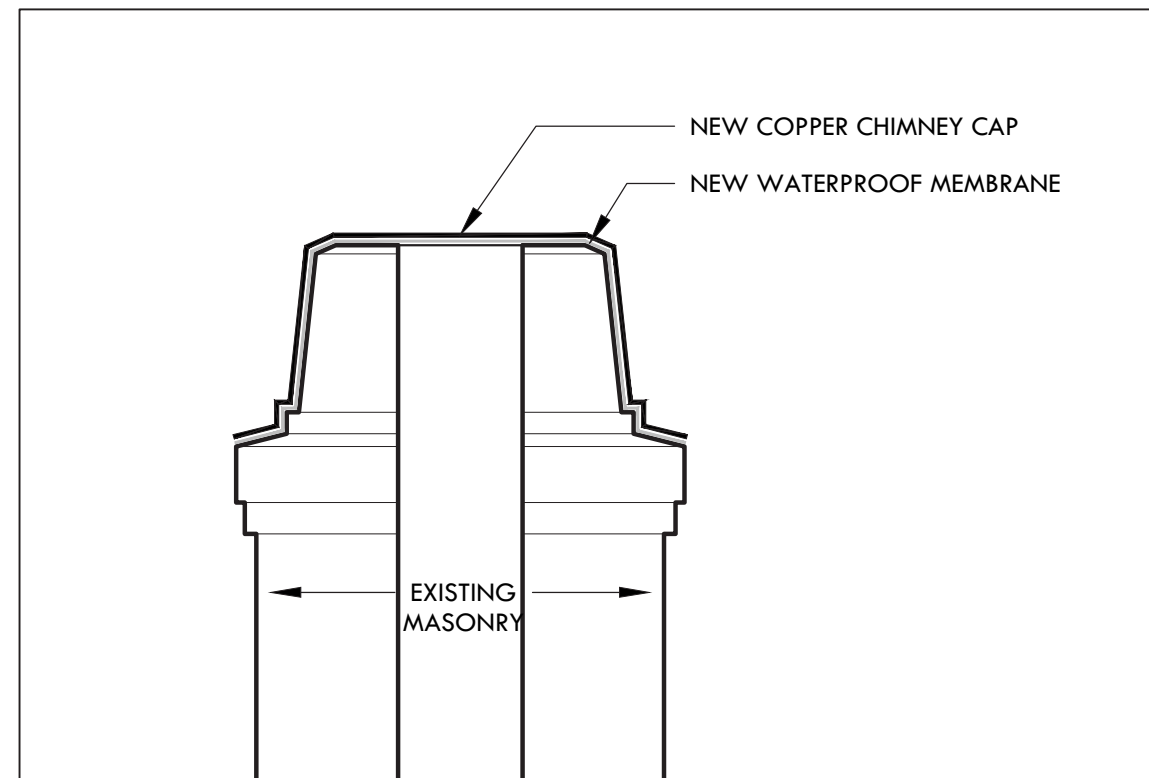
6. Cons

- a. The initial cost is high, due to the demolition required and the difficult access to the chimneys.

7. Lifetime and Maintenance

8. Cost - \$14,520 per chimney

9. Priority –High



1 I.E. CHIMNEY CAP
1/2" = 1'-0"

F. Slate Shingle Replacement by Individual or Area

1. Description

The overall roof condition is stable; however, many of the individual slates are advanced in their deterioration. The shingles will continue to fail, leaving the roof vulnerable to water infiltration. It is recommended to replace spalling shingles as soon as possible, with those that match the existing in thickness and color. Partial replacement of slate roof shingles is only recommended when the amount to be replaced is less than 20% of the existing roof, and the rest of the roof has a relatively long serviceable life. The basis of design for shingle replacement is Vermont Slate Co., S-1 Slate quality.

2. Estimated Quantity of Work

Approximately 50 slate shingles.

3. Proposed Methods of Renovation

- a. Installation by a skilled and experienced slate roofer
- b. The roofer shall use large head slaters' solid copper nails, 1 1/2 inch or longer for field, and 2 inch for slates on hips and ridges. Nails should adequately penetrate the existing roof deck.
- c. The roofer shall use approved waterproof elastic slaters' cement, color to match slate.
- d. The roofer shall use 16oz. copper flashing.

4. Details

01. Slate replacement detail

5. Pros

- a. The initial cost of the repairs will be lower than entire roof replacement.
- b. The historic character of the house will be maintained, and the maximum amount of original materials will be retained.

6. Cons

- a. Replacement of individual slate is a continuous maintenance issue, and the roof should be inspected and repaired every year.

7. Lifetime and Maintenance

- a. The life of the new slate areas
- b. Roof inspections should be carried out by maintenance on a regular basis, replacing damaged and

missing shingles immediately. As the existing slate shingles near the end of their lives, continuous replacement will be required.

- c. Professional roof inspections should be carried out as often as every 5-7 years.

8. Cost - \$3, 025

9. Priority - Medium

G. Replacement with New Asphalt Roof

1. Description

The original slate shingles are nearing the end of their projected life-time, and it is apparent in the overall condition of the roof. As the shingles continue to age, their replacement may occur too frequently, making the approach of a total roof replacement a more feasible option. Additionally, replacing the entire roof will include installation of a ridge vent; replacement of copper flashing, gutters, and drip edges; and chimney repair.

In terms of initial cost, replacing the slate shingles with an asphalt roof will cost the least. The basis of design is CertainTeed "Highland Slate." (Alternate products include GAF Slateline)

2. Estimated Quantity of Work

6100 square feet of roof area; 350 LF of roof flashing; 300 LF of gutter; 705 LF of roof edge; 608 LF of soffit; 200 SF of flat roof area; 4 chimneys (approximately 500 SF of masonry)

3. Proposed Methods of Renovation

- a. Prior to any physical work, the existing roof should be fully documented.
- b. Prior to installation of new roof – all chimney restoration should be completed.
- c. After the old slate has been removed, survey the condition of the roof deck and structural members. Replace and reinforce as necessary.
- d. If the roof doesn't have a solid wood deck, remove all existing roof battens and replace with solid wood decking – 3/4" thick tongue and groove plywood
- e. Repair and replace copper flashing and gutter linings, in-kind.
- f. Provide new metal edging at all eaves and roof edges.
- g. Provide ridge ventilation.
- h. Provide "ice & water" shield membrane on entire roof.
- i. Provide new copper snow guards.

4. Details

01. Ridge vent detail

5. Pros

- a. 50-year transferable warranty
- b. Low initial cost in terms of replacement roof costs

6. Cons

- a. Loss of historic character

7. Lifetime and Maintenance

- a. Low maintenance solution

8. Cost - \$108,900

9. Priority – Medium to High

H. Replacement with New Composite Shingle Roof

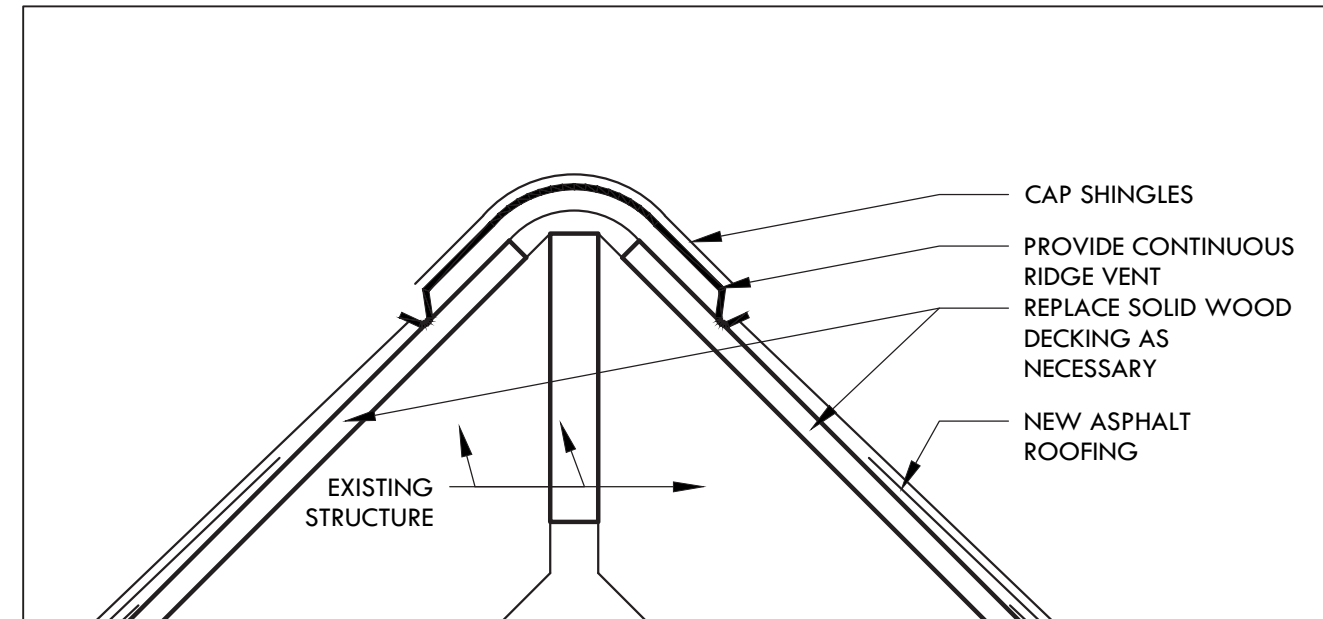
1. Description

Another option for replacing the roof is with a composite slate tile roof, a less expensive alternative to a natural slate roof, while providing more historic character than an asphalt shingle roof. The basis of design is EcoStar's Majestic Slate, a product manufactured from post-industrial recycled rubber and plastic.

Additionally, replacing the entire roof will include installation of a ridge vent; replacement of copper flashing, gutters, and drip edges; and chimney repair.

2. Estimated Quantity of Work

6100 square feet of roof area; 350 LF of roof flashing; 300 LF of gutter; 705 LF of roof edge; 608 LF of soffit; 200 SF of flat roof area; 4 chimneys (approximately 500 SF of masonry)



1 I.G. ASPHALT ROOF RIDGE VENT
1 1/2" = 1'-0"

3. Proposed Methods of Renovation

- a. Prior to any physical work, the existing roof should be fully documented.
- b. Prior to installation of new roof – all chimney restoration should be completed.
- c. Salvage snow guards for reinstallation, when possible, or provide new copper ones to match.
- d. Existing roofing material must be removed and a clean substrate free of foreign material must be provided prior to installation.
- e. After the old slate has been removed, survey the condition of the roof deck and structural members. Replace and reinforce as necessary.
- f. If the roof doesn't have a solid wood deck, remove all existing roof battens and replace with solid wood decking – 3/4" thick tongue and groove plywood.
- g. Repair and replace copper flashing and gutter linings.
- h. Provide metal edging at all eaves and roof edges.

- i. Provide continuous ridge ventilation.
- j. Store materials in dry protected area at temperatures no lower than 45 degrees.
- k. The composite slate roof system shall be applied over 5/8" plywood decking properly gapped for expansion.
- l. Provide underlayment.

4. Details (see I.I. Slate roof ridge)

5. Pros

- a. 50-year material and labor warranty
- b. Installation costs are lower than a slate roof due to significantly lighter material and easy application.
- c. More accurate imitation of natural slate shingles in coloring and size, compared to asphalt.
- d. "Class A" fire rating, "Class 4" impact resistance, and up to 110 mph wind resistance.

6. Cons

- a. Greater cost than asphalt shingles
- b. Less historically accurate than natural slate shingles

7. Lifetime and Maintenance

- a. Less maintenance than a true slate roof.

8. Cost - \$217,800

9. Priority – Medium to High

I. Replacement with New Slate Roof

1. Description

In order to maintain the mansion's historic look and accuracy, the replacement slates should match the existing in size, thickness and color. The basis of design is Vermont Slate Co. (Alternate products include Buckingham Slate – Quality – S1 Slates)

Additionally, replacing the entire roof will include installation of a ridge vent; replacement of copper flashing, gutters, and drip edges; and chimney repair.

2. Estimated Quantity of Work

6100 square feet of roof area; 350 LF of roof flashing; 300 LF of gutter; 705 LF of roof edge; 608 LF of soffit; 200 SF of flat roof area; 4 chimneys (approximately 500 SF of masonry)

3. Proposed Methods of Renovation

- a. Prior to installation of new roof – all chimney restoration should be completed.
- b. Salvage snow guards for reinstallation, when possible, or provide new copper ones to match.
- c. After the old slate has been removed, survey the condition of the roof deck and structural members. Replace and reinforce as necessary.
- d. Repair and replace copper flashing, gutter linings, flat roofing, drip edge, and soffit. Use a minimum of 160z. copper.
- e. Installation by a skilled and experienced slate roofer
- f. Provide a 40 mil Ice and Water shelf membrane over entire roof.
- g. The roofer shall use large head slaters' solid copper nails, 1 1/2 inch or longer for field, and 2 inch for slates on hips and ridges. Nails should adequately penetrate the roof deck.
- h. The roofer shall use approved waterproof elastic slaters' cement, color to match slate.
- i. Because roofing slate varies in terms of color shade, texture and weathering characteristics, the roofer shall draw slates from several pallets at once (shuffle) so as to blend the material on the roof.
- j. All penetrations such as pipes and ventilators shall have slate neatly fitted around them, and flashed.
- k. The roofer shall build in, and place, all flashing pieces. Each course of slate shall have copper step-flashing neatly woven into the slate
- l. Provide a vented ridge

4. Details

01. Ridge vent detail for slate.

5. Pros

- a. Historically accurate
- b. Will render the roof watertight, immediately, with low maintenance

6. Cons

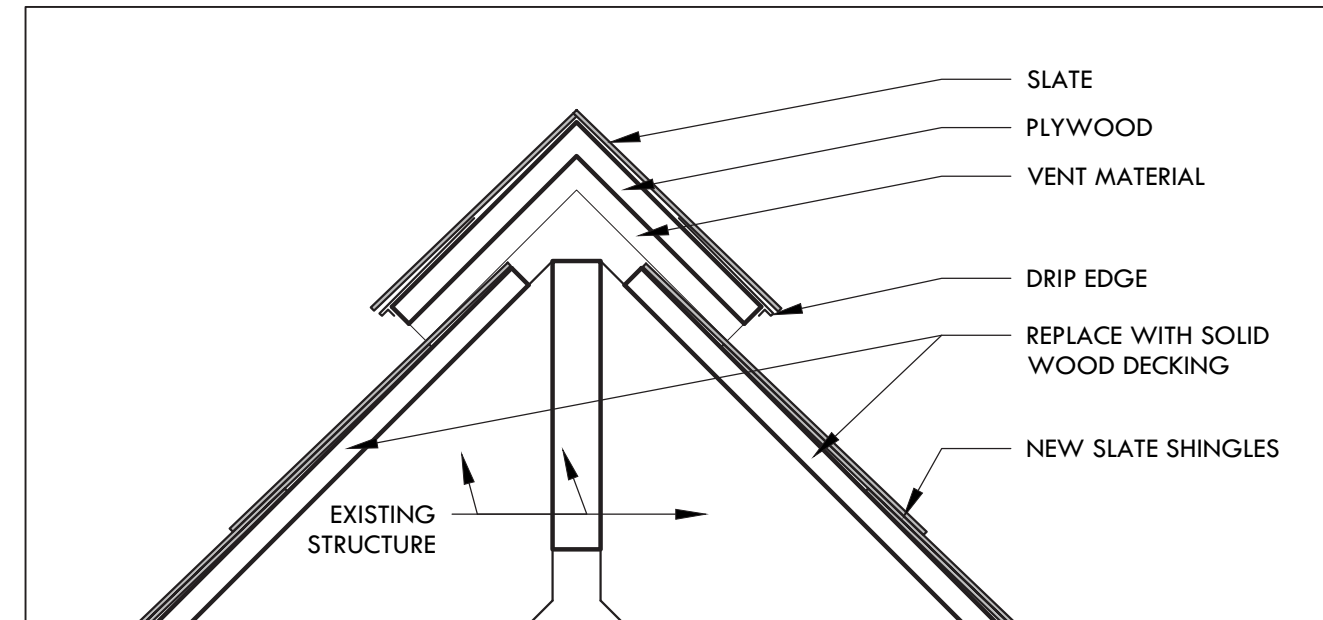
- a. Option with the highest initial cost

7. Lifetime and Maintenance

- a. Relatively maintenance free for 50-70 years.
- b. Roof inspections should be carried out by maintenance on a regular basis, replacing damaged and missing shingles immediately.
- c. Professional roof inspections should be carried out as often as every 10 years.

8. Cost - \$272,250

9. Priority – Medium to High



1 I.I. SLATE ROOF RIDGE VENT
1 1/2" = 1'-0"

II. FACADE TREATMENTS

SUMMARY OF EXISTING CONDITIONS

1. The brick veneer masonry is in good condition overall. All of the bricks are hand molded brick with frogs.
2. The stucco on the building appears to be a three coat, (scratch, brown & finish) cement plaster system on metal lath and is in very poor condition. It illustrates all conditions: biological growth, blistering, cracking, delamination, disaggregation, flaking, and loss. FIG A
3. Both the brick veneer and the stucco have been installed in direct contact with the wood trim on the building including doors and windows. The contact between the dissimilar materials has produced cracks from the variances in expansion and contraction. These areas are allowing water to infiltrate the façade. FIG B and C
4. Stucco failures have been patched either with sheet metal, plywood, or cement plaster, preventing rodent infiltration and some water infiltration. The result is an irregular surface and varied appearance. FIG D and E
5. Despite patching, the stucco continues to erode and crack, exposing the undercoats to moisture. The metal lath is visible in several locations, and is corroding. FIG F
6. The detail at the brick grade course at the base of the building where the exterior stucco terminates at the bottom of the wall, is allowing a great deal of water to enter the exterior wall and foundation systems. This appears to be one of the major reasons for the water intrusion into the basement. FIG G
7. The exterior wood components appear to be in good condition, despite exposure as any paint or sealer has almost completely worn. The wood components include window trim and sills; doors, trim and jambs; shutters; the sun porch; the main entry door, pilasters, entablature, and wainscot; back entrance pergola; and loggia arches. FIG H and I





Fig. C



Fig. D



Fig. E



Fig. F



Fig. H



Fig. G



Fig. I

A. Sealant at Trim

1. Description

Locations where the stucco is in direct contact with wood trim provide a poor detail that fosters stucco failure. The areas of failure allow water infiltration behind the stucco, and can eventually lead to wood rot. A simple measure would be to provide a caulk joint between the stucco and wood. The joint would allow the wood and stucco to expand and contract at different rates, and maintain a watertight seal. The basis of design is Tremco Single Component Nonsag Urethane Sealant, Vulkem 116.

2. Estimated Quantity of Work

3000 LF around the perimeter of the openings, and along soffit and quoining

3. Proposed Methods of Renovation

- a. Clear joint, between stucco and wood, of loose debris.
- b. Prime surface.
- c. Provide a continuous bead of sealant around openings and trim.

4. Details

01. Plan detail through stucco and wood trim seam.

5. Pros

- a. Will immediately prevent water from entering façade.
- b. Minimal initial cost.

6. Cons

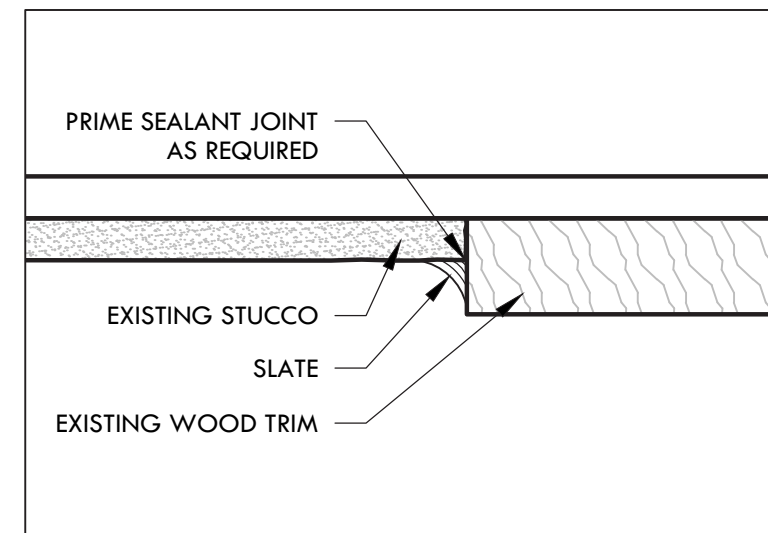
- a. Constant maintenance item.

7. Lifetime and Maintenance

- a. 10-15 years

8. Cost - \$38,115

9. Priority - High



1 II.A. SEALANT AT TRIM
3" = 1'-0"

B. Flashing Along Brick

1. Description

A significant oversight in the original construction of the mansion is seen in the manner in which the stucco meets and terminates the brick grade course and quoining. The stucco is in direct contact with the brick, and stepped back to create a ledge. This leaves a horizontal area of brick exposed on which water can rest and infiltrate the materials. Especially along the grade course, this is a major area of stucco failure, evidenced by the amount of patching that has been done. In order to prevent water infiltration along this seam, it is recommended to install metal flashing between the materials. The flashing would return up behind the stucco and protect the horizontal surface of the brick. In this area, the stucco would have to be removed prior to flashing, and subsequently patched.

2. Estimated Quantity of Work

430 LF if completed along the entire perimeter of the building.

3. Proposed Methods of Renovation

- a. Remove an 8" high horizontal band of stucco and lath above the brick grade course.
- b. Area of repair should be squared off with a butt joint.
- c. Install 16 oz. copper flashing, attached to the exterior sheathing and protects the horizontal face of the brick course. Secure flashing to wood sheathing and tape joint.
- d. Provide replacement 3-coat stucco, of a compatible Portland cement mixture, at the base of the wall and terminating at the flashing.

4. Details

- 01. Flashing detail

5. Pros

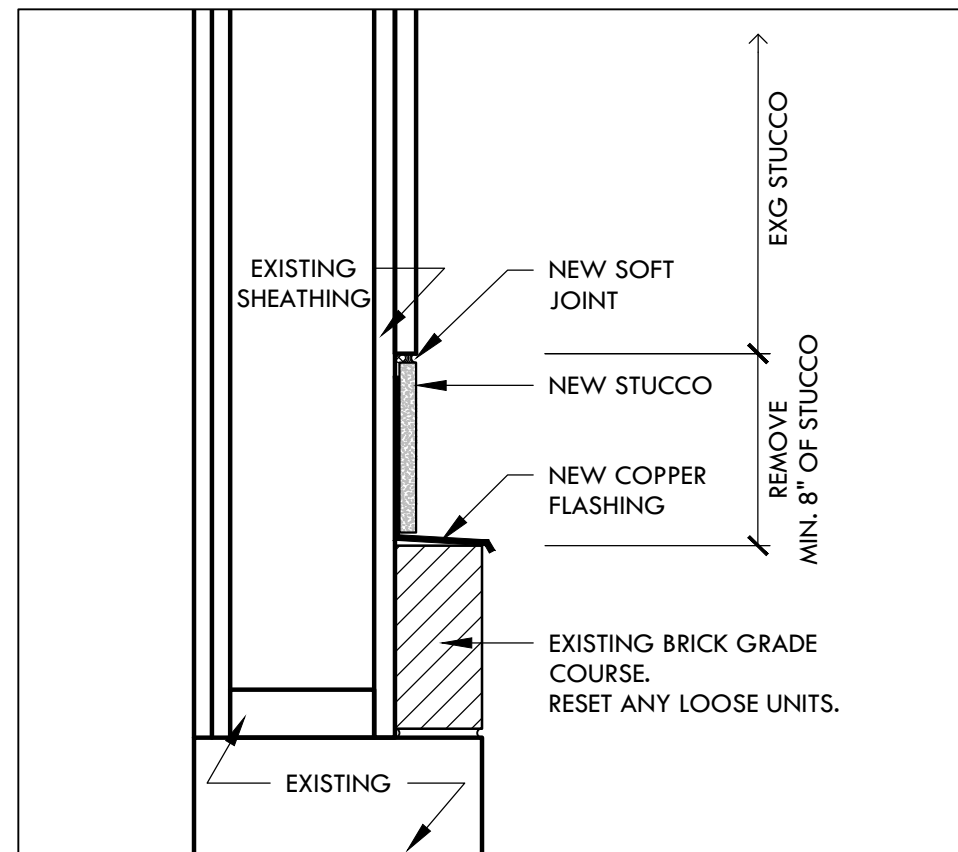
- a. Will immediately stop water infiltration

6. Cons N/A

7. Lifetime and Maintenance

8. Cost - \$7,805

9. Priority - High



1 II.B. BRICK FLASHING
1 1/2" = 1'-0"

C. Patch and Resurface Stucco

1. Description

The stucco has not been receiving the routine maintenance that the system requires and appears to have been roughly patched in a variety of manners. As a result, it continues to fail in some locations, and is eroding throughout. It is recommended that the stucco be patched in areas of loss and where the metal lath has been exposed and is corroding. Additionally, due to the advanced erosion and other conditions, a comprehensive resurfacing of all of the stucco is recommended. The basis of design is California Stucco Products Corp, Ready-mixed finish-coat plaster.

In some cases, however, patching is not recommended if 40-50% of the stucco surface must be patched. Upon further inspection of the mansion, consultants do not suggest patching and resurfacing due to the extensive instability of the metal lath. The treatment is included for informational purposes, but a cost has not been provided.

2. Estimated Quantity of Work

710 LF of flashing along brick grade course and opening headers; 1520 SF of stucco to be patched and replaced; 5000 SF of stucco to be resurfaced

3. Proposed Methods of Renovation

- a. Work shall be completed by a professional plasterer.
- b. All deteriorated, severely cracked, and loose stucco should be removed down to the lath.
- c. Remove corroded metal lath and install new.
- d. Areas to be patched should be cleaned of all debris, plant growth, dirt, loose paint, oil, etc.
- e. Area of repair should be squared off with a butt joint.
- f. A compatible Portland cement stucco mixture should be used.
- g. Provide copper cap flashing on all woodwork, above all window and door openings. Provide metal flashing for non-vertical or low slope projections.
- h. Provide flashing at the bottom of the stucco system, along the brick grade course.
- i. Terminate stucco system using minimum 1/2" wide casing bead around perimeters of windows and doors.
- j. Existing stucco that will be resurfaced must be prepped to take a new finish coat; chip the stucco approximately every 3"-4".
- k. Apply a thin coat of bonding agent to the existing stucco surface.
- l. Apply finish coat of stucco.
- m. Maximum area of plaster/stucco without an expansion joint is 100 SF.

4. Details (see II.B. Brick flashing, and II.E. Flashing at openings)

5. Pros

- a. Monolithic façade.
- b. Render the façade watertight.

6. Cons

- a. Lifetime and Maintenance

7. Cost N/A - Replacement is recommended by consultants

8. Priority N/A

D. Repaint Exterior

1. Description

The paint finish of the building's exterior has long worn. While the paint may serve cosmetic purposes for the stucco, the lack of paint on the exposed wood details may lead to its decay as it continues to weather.

The basis of design for paint on the stucco is one coat of Sherwin Williams, S-W Loxon masonry conditioner plus one coat S-W Loxon XP Exterior Waterproofing system. The basis of design for the wood trim is one coat of primer plus two coats A-100 Exterior Latex.

2. Estimated Quantity of Work

6500 SF of stucco area; 900 SF of wood trim; 200 SF of sun porch woodwork; 900 SF of soffit

3. Proposed Methods of Renovation

- a. If the stucco is intended to be painted in its current condition, the surface must be prepared for repainting. Any loose paint or coating not firmly adhered must be removed by hand-scraping natural bristle brushes, and the surface cleaned.
- b. The new paint must be compatible with the existing coating or paint.
- c. The wood shall be prepped for painting by hand-scraping any loose paint.
- d. Replace any rotted wood, in kind. (None was initially observed on site)

4. Details – N/A

5. Pros

- a. Provide a continuous appearance to the patched stucco.
- b. Protects the wood from weathering and deterioration.

6. Cons N/A

7. Lifetime and Maintenance N/A

**8. Cost - \$99,958 (entire exterior including all stucco and wood)
\$60,000 (wood features only, including trim, sunporch, and soffit)**

9. Priority – High (Repaint wood trim); Low (Repaint stucco)

E. Re-Stucco Facade

1. Description

Due to the wide-spread and advanced deteriorating conditions of the stucco, it is recommended to remove all stucco and apply new. During this process, it is possible to remedy the contact between the stucco and wood trim. Replacement of the stucco will include flashing at the brick grade course and all opening headers; and sealant at brick and wood trim seams.

2. Estimated Quantity of Work

6500 SF of stucco area; 710 LF of flashing; 3000 LF of sealant

3. Proposed Methods of Renovation

- a. Provide copper cap flashing on all woodwork, above all window and door openings. Provide metal flashing for non-vertical or low slope projections.
- b. Provide flashing at the bottom of the stucco system.
- c. Provide fabric air-barrier.
- d. Apply traditional stucco system of a mixture of Portland cement and lime for scratch, brown, and finish coats.
- e. Install expanded metal self-furring lath, galvanized, weight ---
- f. Terminate stucco system using minimum 1/2" wide casing bead around perimeters of windows, doors, etc.
- g. Provide sealant joints at all penetrations.

4. Details

- 01. Window head flashing
- 02. See II.B. Brick flashing

5. Pros

- a. Long-term solution
- b. Historically accurate

6. Cons N/A

7. Lifetime and Maintenance

- a. With regular and expert maintenance, the stucco will last a long time.

8. Cost - \$153,700

9. Priority - Medium

F. Replace Stucco with Alternate material

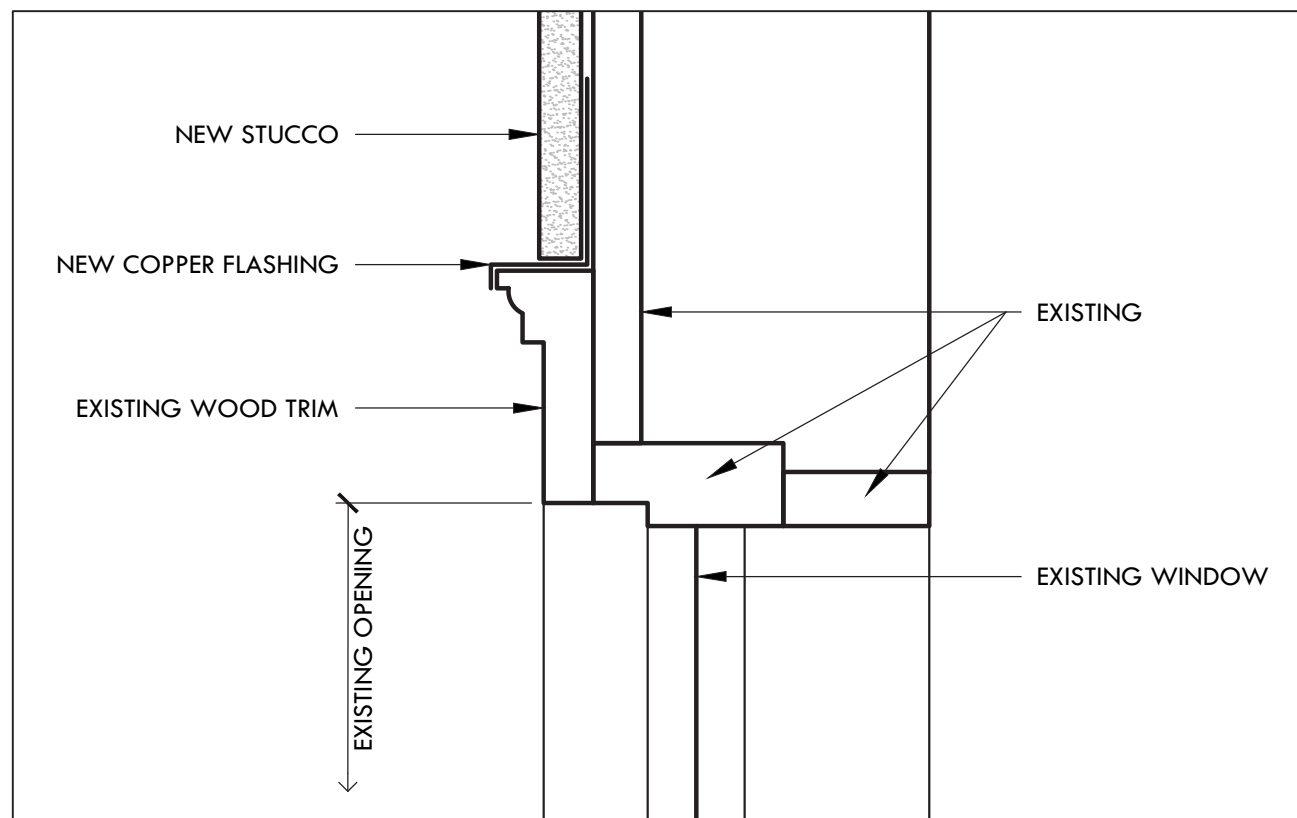
1. Description

A method of reducing the ongoing maintenance of a stucco façade is by removing the existing stucco and lath and replacing with an exterior insulation finishing system (EIFS), or a synthetic stucco system. A synthetic stucco system will be required to maintain the shallow depth of the existing natural stucco system. The basis of design is Sto Premier NExT System, by Sto Corp.

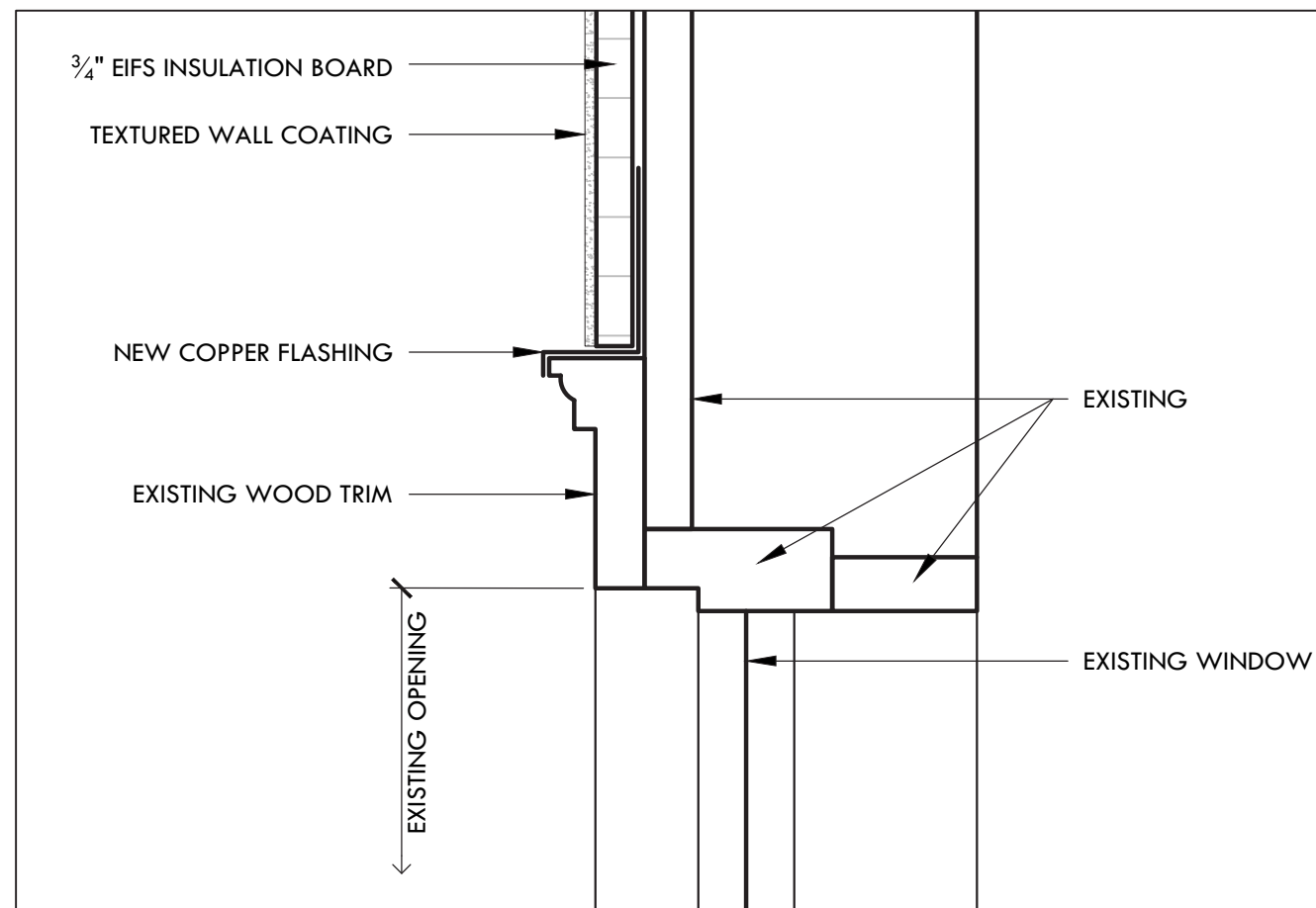
Additionally, replacement of the stucco will include flashing at the brick grade course and all opening headers; and sealant at brick and wood trim seams.

2. Estimated Quantity of Work

6500 SF of stucco area; 710 LF of flashing; 3000 LF of sealant



1 II.E. FLASHING AT OPENING HEAD
3" = 1'-0"



1 II.F. FLASHING AT OPENING HEAD
3" = 1'-0"

3. Proposed Methods of Renovation

- a. Work to be completed by a contractor experienced in EIFS installation and is certified by the manufacturer.
- b. Remove entire stucco system, down to sheathing.
- c. Repair damaged sheathing.
- d. Provide air barrier system.
- e. Provide flashing above window and door heads, and along brick grade course.
- f. Adhere insulation board to sheathing.
- g. Apply base coat; reinforcing mesh; primer; and finish coat.
- h. Design min. 1/2" wide sealant joints at all penetrations.
- i. Provide min. 3/4" wide expansion joints.

4. Details

- 01. Above window/door flashing

5. Pros

- a. Adds additional insulation – if possible
- b. Less maintenance than traditional stucco

6. Cons

- a. Deviates from historical construction method.
- b. May have an impact on interior conditions, requiring additional ventilation systems prior to building occupancy.

7. Lifetime and Maintenance

- a. Weather tight warranty period: 10 years

8. Cost - \$153,700

9. Priority - Medium

G. Secure Porch Entry (on south facade)

1. Description

The existing porch on the south façade is unstable, and could eventually become a hazard to the public. Restoring the porch immediately will prevent further deterioration and loss of original materials.

2. Estimated Quantity of Work

3. Proposed Methods of Renovation

- a. Provide sufficient flashing around the roof projection, at the roof/wall intersection.
- b. Repair porch roof.
- c. Replace plaster ceiling of the porch.
- d. Manufacture historically appropriate columns.
- e. Support roof for installation of new columns.

4. Details

- a. Flashing at roof/wall intersection

5. Pros

- a. Securing the porch will provide security for the public, and maintain protection for the entrance.

6. Cons

7. Lifetime and Maintenance

- a. No maintenance

8. Cost - \$8,785

9. Priority - High

H. Miscellaneous Woodwork Repairs

1. Description

2. Estimated Quantity of Work

3. Proposed Methods of Renovation

4. Details - N/A

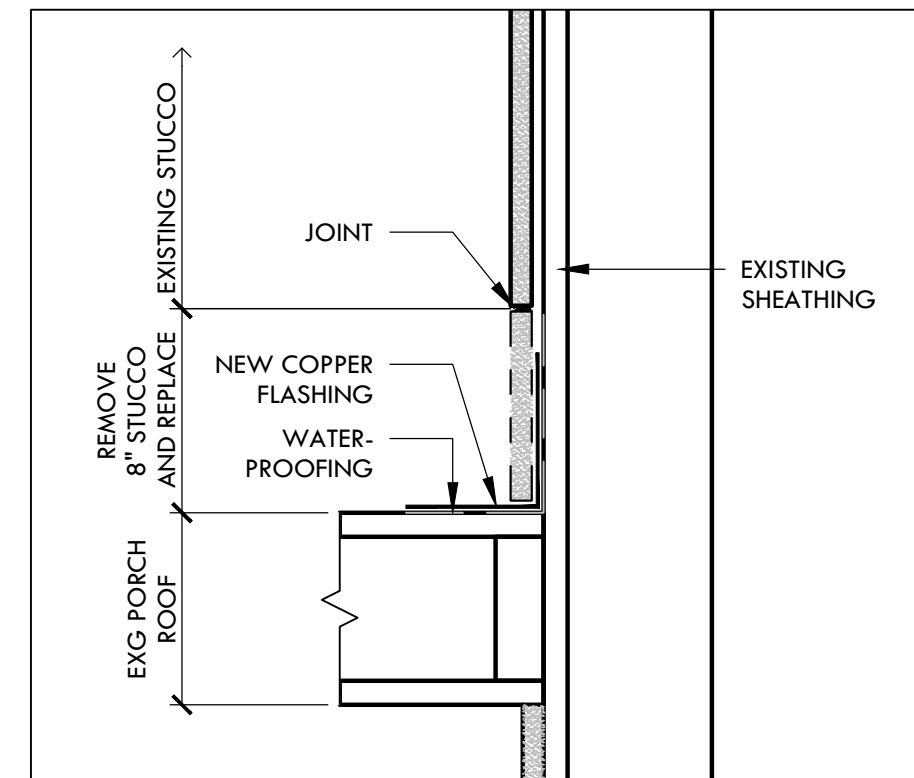
5. Pros

6. Cons

7. Lifetime and Maintenance

8. Cost - \$30,250

9. Priority - Low



1 II.G. FLASHING AT PORCH ROOF
1 1/2" = 1'-0"

III. OPENINGS' TREATMENTS

SUMMARY OF EXISTING CONDITIONS

1. The doors and windows are wood. Their overall condition is good.
2. Paint has faded from all woodwork, and the wood is beginning to weather.
3. The type of wood is unknown. Given its condition, however, it is speculated to be a high quality wood that should be identified and repaired in-kind, if possible.
4. There are approximately 18 window types, the majority being double hung and counterweighted. All are single pane glass.
5. The windows have not been checked for operability.
6. Ground floor windows are currently protected by the existing shutters, or boarded with plywood from the outside.
7. Remaining windows are either unprotected, shuttered, boarded, or have a storm window installed from the outside.
8. There are approximately 6 door types, including paneled, glass paneled, and French doors.
9. The doors have not been checked for operability,
10. Few windows have broken glass panes.







EXTERIOR OPENINGS						
		NUMBER	WIDTH IN.	HEIGHT IN.	TYPE	
FIRST FLOOR	WINDOW TYPES	1	8	40	66	DOUBLE HUNG; 8 OVER 8
		2	2	34	46	DOUBLE HUNG; 6 OVER 6
		3	3	34	30	6 PANE FIXED
		4	9	34	46	DOUBLE HUNG; 6 OVER 6
		5	3	24	46	DOUBLE HUNG; 4 OVER 4
		A1	1	84	22	ARCHED TRANSOM
		A2	2	12	56	RECTANGULAR SIDELIGHT
		A3	2	14	56	RECTANGULAR SIDELIGHT
		D1	2	72	22	ARCHED TRANSOM
	DOOR TYPES	A	1	48	84	WOOD PANEL
		B*	4	36	84	WOOD WITH GLASS PANEL
		C	1	30	84	WOOD PANEL
		D*	1	72	108	WOOD WITH GLASS PANEL
SECOND FLOOR	WINDOW TYPES	6	6	40	60	DOUBLE HUNG; 8 OVER 8
		7	2	34	60	DOUBLE HUNG; 6 OVER 6
		8	1	34	60	DOUBLE HUNG; 6 OVER 6
		9	15	34	54	DOUBLE HUNG; 6 OVER 6
		10	1	24	54	DOUBLE HUNG; 4 OVER 4
		11	1	96	72	3 PART; 6 OVER 6; CASEMENT
		12	1	72	78	2 PART; 6 OVER 6; CASEMENT
	13	1	98	66	3 PART PALLADIAN WINDOW	
DOOR TYPES	E*	2	48	84	DOUBLE DOORS; GLASS PANEL	
THIRD FLOOR	WINDOW TYPES	14	2	31	54	DOUBLE HUNG; 6 OVER 6
		15	2	36	34	9 PANE FIXED
		16	6	54	66	SINGLE HUNG; ARCHED; 8 OVER 12
		17	6	48	48	QUARTER ROUND; 9 PANE; FIXED
	18	1	72	78	2 PART; 3 PANE; ARCHED; CASEMENT	
DOOR TYPES	F*	2	48	84	WOOD WITH GLASS PANEL	

TOTAL DOORS 11
TOTAL WINDOWS 77
TOTAL OPENINGS 88

SHUTTER COUNT						
	TYPE	SHUTTERS	# FACES	LENGTH IN.	HEIGHT IN.	SF
FIRST FLOOR	1	18	2	20	65	325
	2	16	2	18	46	184
	3	8	2	18	46	92
	4	4	2	16	28	25
SECOND FLOOR	5	18	2	20	60	300
	6	4	2	20	60	67
	7	11	2	18	54	149
THIRD FLOOR	8	4	2	16	54	48
	9	2	2	12	46	15

TOTAL # OF SHUTTERS 85

A. Glass Replacement

1. Description

The quickest way to secure the interior is to repair any broken panes of glass. It will prevent potential access to the interior from intruders, animals, and driving rain. Additionally, it will help control the interior environment, especially if temporary heat is introduced.

2. Estimated Quantity of Work

It is observed that at least one pane of glass is broken in 3 total windows/doors: (1) Type 1 window, (1) Type 17 window, (1) Type E door

3. Proposed Methods of Renovation

- a. Remove sash containing broken pane of glass.
- b. Manually remove putty, the glazing points, and finally the broken pane of glass.
- c. Scrape out back putty.
- d. Replace muntins, in wood type and profile, as necessary.
- e. Reglaze with a bead of putty along the rabbet of the muntin, and press the new pane of glass into place.
- f. Provide glass pane of similar size, thickness, color, and transparency.
- g. Replace door glazing with tempered safety glass.
- h. Insert glazing points and a final seal of putty that is beveled around the edge of the glass.

4. Details N/A

5. Pros

- a. Immediately secure the building envelope.

6. Cons N/A

7. Lifetime and Maintenance

- a. Single pane wood windows will require on-going maintenance. If left unprotected, glass replacement may happen more frequently.

8. Cost - \$1,500

9. Priority - High

B. Restore all windows and doors

1. Description

In preparation for a building use, it is an option to fully restore all of the windows. It will return the double-hung windows to full operability; maintain the security and weather-tightness of the existing glass; and stabilize the hazards of lead paint.

2. Estimated Quantity of Work

11 total exterior doors (see Exterior Openings chart); 77 total windows (see Exterior Openings chart)

3. Proposed Methods of Renovation

- a. Remove window sashes.
- b. Repair broken panes of glass, as necessary, and re-glaze.
- c. Replace door glazing with tempered safety glass, 1/8".
- d. Replace counterweight ropes, as necessary.
- e. Remove loose paint, and strip of lead paint (all window and door woodwork and trim). No torches or heat guns.
- f. Repaint.

4. Details – N/A

5. Pros

- a. Protect window and door woodwork from further deterioration.
- b. Restore windows and doors to full operability in preparation for building use.
- c. Remove lead paint hazards.

6. Cons

- a. Labor intensive

7. Lifetime and Maintenance

a. Single pane wood windows will require on-going maintenance.

8. Cost- \$68,820

9. Priority - Low

C. Add Missing Storm Windows and Doors

1. Description

The mansion will remain vacant for an unknown number of years, while its exposure to park users will increase. It is desirable to keep the windows protected, without inviting vandalism. Security measures have been taken, but often boarded windows give the message that the building is not monitored. It may be preferable to protect the windows with shutters and storm windows, only. Storm windows provide an advantage by contributing thermally to the windows in the winter, and still allowing for venting in the summer. A base option would be to continue adding storm windows to all unprotected windows, those currently without storm windows or shutters, as well as replacing plywood boards with storm windows. The basis of design is Harvey Industries, Tru-Channel Storm Windows.

2. Estimated Quantity of Work

27 unprotected windows; 9 unprotected doors with glass panels

3. Proposed Methods of Renovation

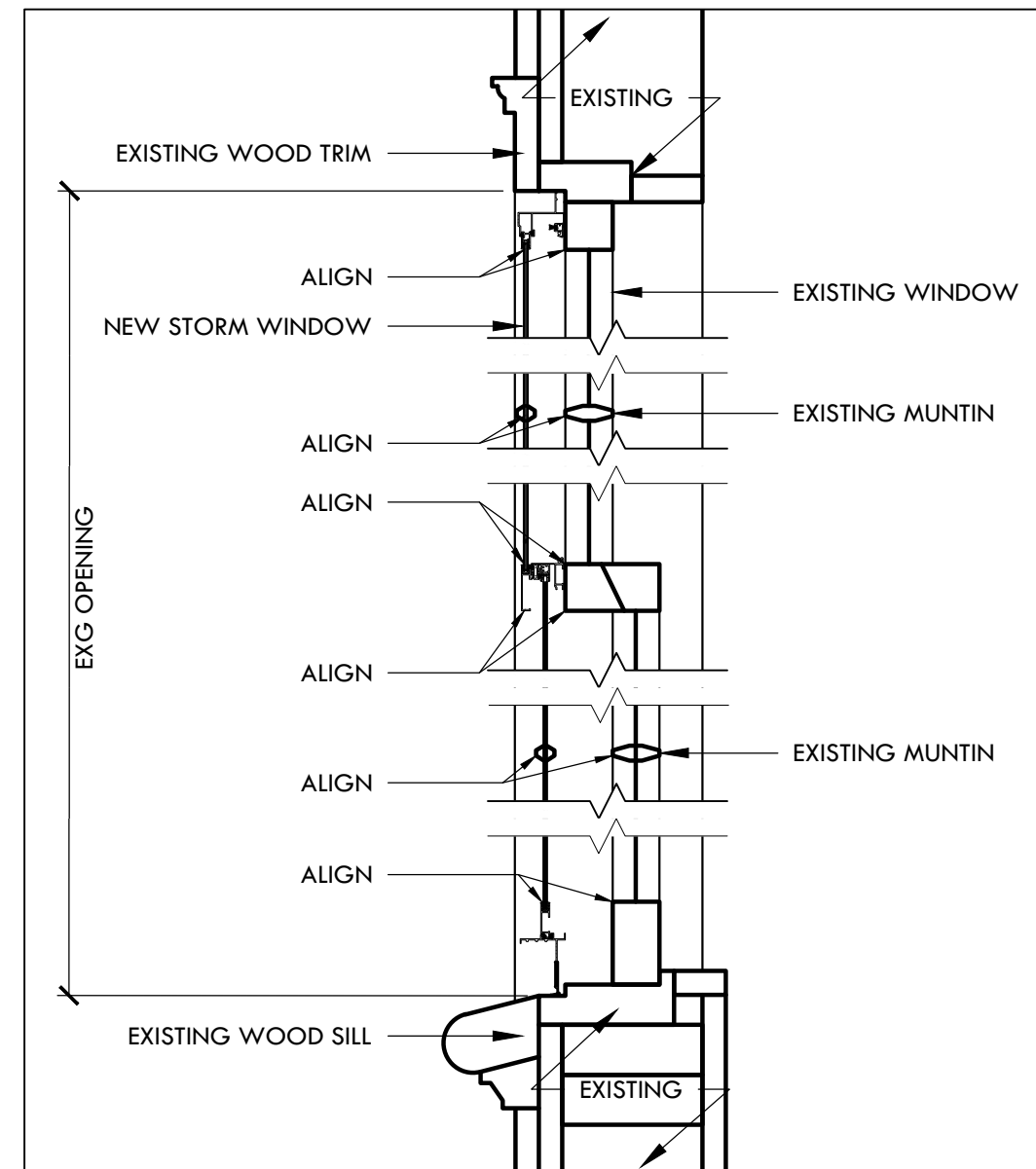
- a. Size and fit storm windows to exterior of existing windows.
- b. Design storm windows in a manner that is most appropriate with the protected window.
- c. Provide corresponding operable storm windows with all operable windows.
- d. Install storm windows within the opening, as close to existing window as possible.

4. Details

01. Storm window, head and sill details

5. Pros

- a. Provide additional thermal efficiency.
- b. Protects original windows, and glass.
- c. Long-term solution that can be utilized with the building is occupied.



1 III.C. STORM WINDOW
1 1/2" = 1'-0"

- 6. **Cons - N/A**
- 7. **Lifetime and Maintenance - N/A**
- 8. **Cost - \$14,250**
- 9. **Priority - Medium**

D. **New Custom Storm Windows and Doors**

1. **Description**

The need may exist to provide custom storm windows that match the historic appearance for all of the existing windows; whether for thermal efficiency for building users, or pressures from funding sources. In this case, a comprehensive installation plan is developed for all windows. All existing storm windows are removed. The new custom storm windows are designed to appropriately reflect the proportions of the window behind, and are installed in a manner that doesn't disrupt the exterior. The basis of design is Harvey Industries, Tru-Channel Storm Windows.

2. **Estimated Quantity of Work**

9 doors with glass panels; 77 total windows

3. **Proposed Methods of Renovation**

- a. Remove existing storm windows and plywood boards.
- b. Window restoration/painting should take place prior to, or concurrently with installation of storm windows.
- c. Size and fit storm windows to exterior of existing windows, within the sill, head, and jamb. Match muntin placement and profile.
- d. Design storm windows in a manner that is most appropriate with the protected window. Match location, widths, and profiles of original window muntins and rails.
- e. Provide corresponding operable storm windows with all operable windows.
- f. Install storm windows within the opening, as close to existing window as possible.

4. **Details (see III.C. Storm window detail)**

- 5. **Pros**
 - a. Provide additional thermal efficiency.
 - b. Protects original windows, and glass.
 - c. Long-term solution that can be utilized with the building is occupied.
 - d. Most historically appropriate solution.

6. **Cons - N/A**

7. **Lifetime and Maintenance - N/A**

8. **Cost - \$44,500**

9. **Priority - Low**

E. **Comprehensive Window and Door Replacement**

1. **Description**

Single paned glass is not as efficient as modern windows. While recent studies have shown that single paned glass in combination with a storm window is comparably as thermally efficient, it may be determined that a comprehensive window replacement is desired. A full window replacement will render window restoration and storm window installation unnecessary. The basis of design is Pella, Architect Series.

2. **Estimated Quantity of Work**

11 total exterior doors (see Exterior Openings chart); 77 total windows (see Exterior Openings chart)

3. **Proposed Methods of Renovation**

- a. Custom size each window, and design to historical likeness, including: window shape, profile, muntin size and spacing, sash sizes, and color.
- b. Provide integral muntins to preserve the historic character of the original windows.

4. **Details – N/A**

- 5. Pros**
 - a. Improved energy efficiency
 - b. Less maintenance
- 6. Cons**
 - a. High initial cost
- 7. Lifetime and Maintenance - N/A**
- 8. Cost - \$220,220**
- 9. Priority - Low**

- 5. Pros**
 - a. Operable shutters provide security.
 - b. Reduce loss of historic fabric by maintaining these features.
- 6. Cons - N/A**
- 7. Lifetime and Maintenance - N/A**
- 8. Cost - \$33,275**
- 9. Priority – Low**

F. Wood Shutter Restoration

1. Description

The existing shutters are in fair shape, and in some cases are successfully continuing to serve their original purpose. This is evidence that the shutter hardware, such as the “S” tiebacks, hinges, and locks, are also in fair condition. Not only are the shutters functionally significant, but they are also historically significant, the second story shutters featuring the crest of the Johnston family. In order to preserve

2. Estimated Quantity of Work

85 total shutters (see Shutter Count chart)

3. Proposed Methods of Renovation

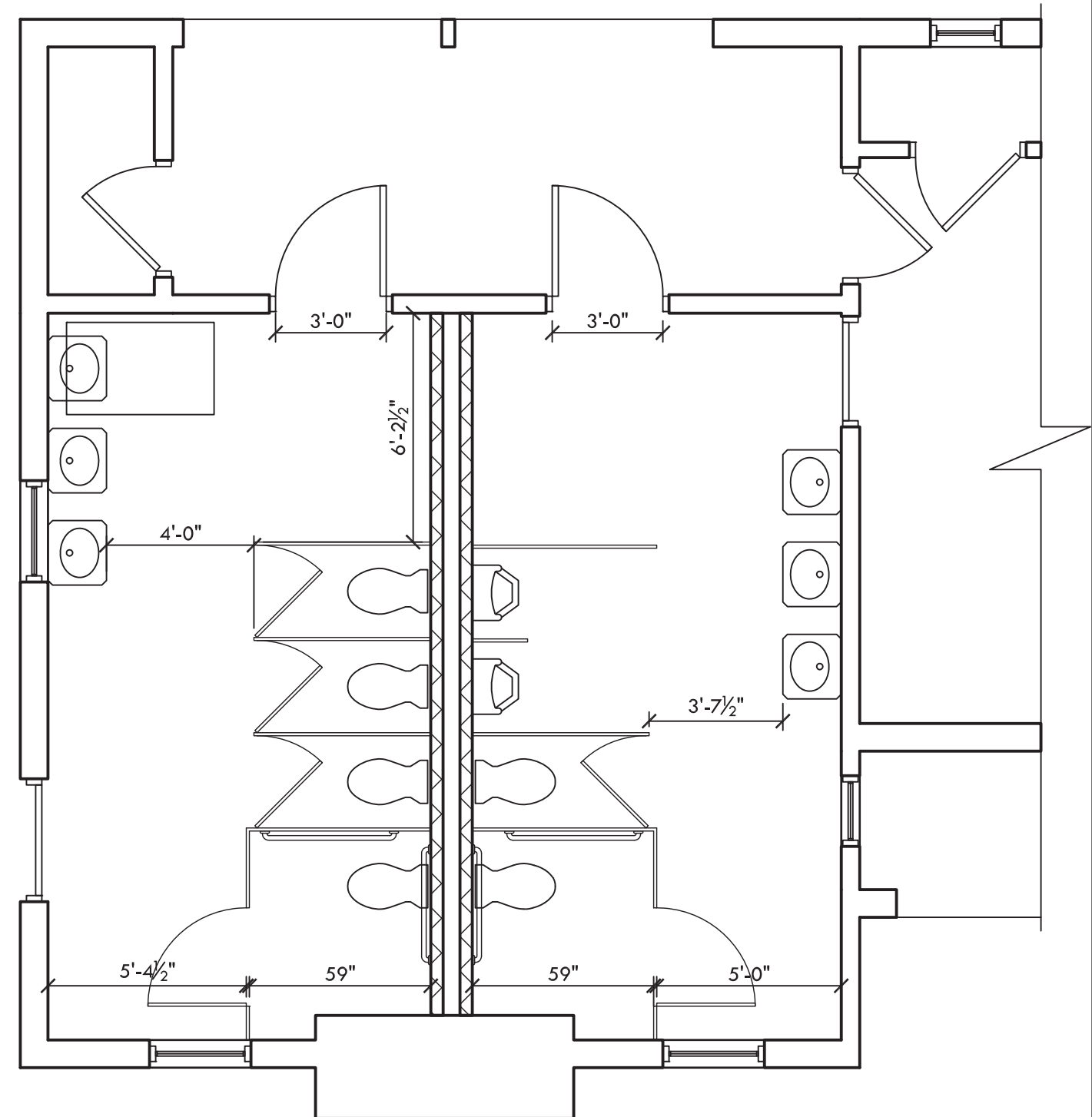
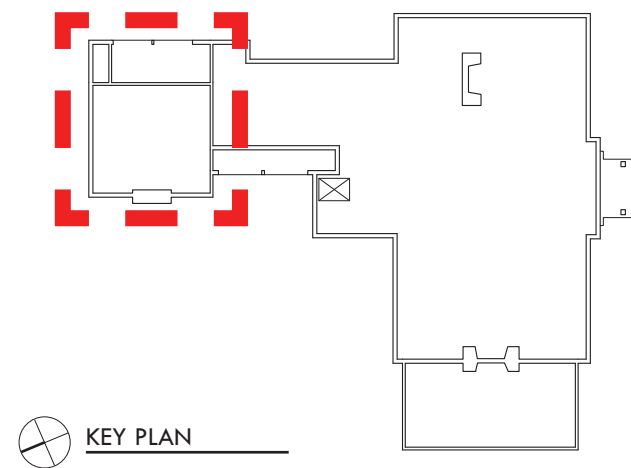
- a. Catalogue and remove shutters, ensuring correct re-installation.
- b. Restore and/or replace existing hardware, as necessary.
- c. Restore wood shutters as necessary. (off-site)
- d. Strip lead paint, and repaint shutters.
- e. Reconstruct missing shutters, as necessary. Provide ground floor shutters where none exist, for security purposes. Remove any plywood boards.

4. Details – N/A

IV. NEW PUBLIC RESTROOMS

SUMMARY OF EXISTING CONDITIONS IN SERVANTS' AREA

1. The servants' area is located in a wing off of the primary house, separated by the kitchen and service areas. It is a secondary space.
2. The area proposed for restrooms is the ground floor of the servants' quarters. It was originally used for laundry and dining for the servants, and remains a relatively open space.
3. The entire ground floor of the servants' area is approximately 21'-6" by 19'-9". The ceiling is approximately 8'-9".
4. The ground floor of the servants' area has access directly to the exterior, as well as into the servants' hall, which connects it to the rest of the house.
5. The finishes of the space include plaster ceiling and walls; partial interior wall of gypsum wall board; and vinyl flooring.



1 PROPOSED SERVANT QUARTER RESTROOMS
1/4" = 1'-0"

A. Servants' Area Retro-fit

1. Fire Protection

a. Description

Allowing the public to have partial occupancy to the vacant building will put the rest of the structure in potential danger in the case of fire. The mansion is wood frame and is located in a relatively secluded area. Implementing smoke detection that immediately notifies the fire department will reduce the amount of loss in such a situation.

b. Cost - \$1,815

2. Plumbing

a. Description

Provide new water, sanitary and drain piping to accommodate new fixtures. Estimated cost only provides for services to just outside of the building. Estimates for water and sewer services to the building have been obtained by the Township through Arro Consulting Inc.

b. Cost - \$38,720

3. HVAC

a. Description

Provide forced air. Install air handling unit in basement and duct up to toilet room ceilings. Return low in walls. Provide heavy duty grilles. Provide an in-line exhaust fan for each room. Duct discharge to brick vent on exterior wall. Interlock exhaust fan to operate with lighting.

b. Cost - \$23,595

4. Electrical

a. Description

Provide new electrical service and distribution infrastructure. Locate panel in basement. Provide new heavy duty, LED lighting. Provide outlets as required by code. Provide weatherproof exterior lighting at exit doors.

b. Cost - \$11,230

5. Restroom Fixtures

a. Description

This study assumes that the primary users of the restrooms will be park users. Therefore, it is recommended that the fixtures (toilets, lighting, lavatories, urinals, etc.) be basic models with emphasis on high durability. The restrooms will be used on occasion, and will be locked in the evenings and during the winter.

b. Cost - \$24,530

6. Restroom Finishes

a. Description

The finishes for the restrooms will be of durable materials. The existing flooring will be removed down to the original planks. Cement board (1/2" thick) will be placed on the existing floor boards, on which ceramic tile will be installed, with soft joints at least every 5'-6'. The walls will be of 1/2" plywood, 1/2" drywall, and finished with fiberglass reinforced panels, FRP. The ceiling will be of abuse resistant gypsum wall board; and the toilet partitions will be of high density polyethylene plastic, HDPE.

b. Cost - \$44,710

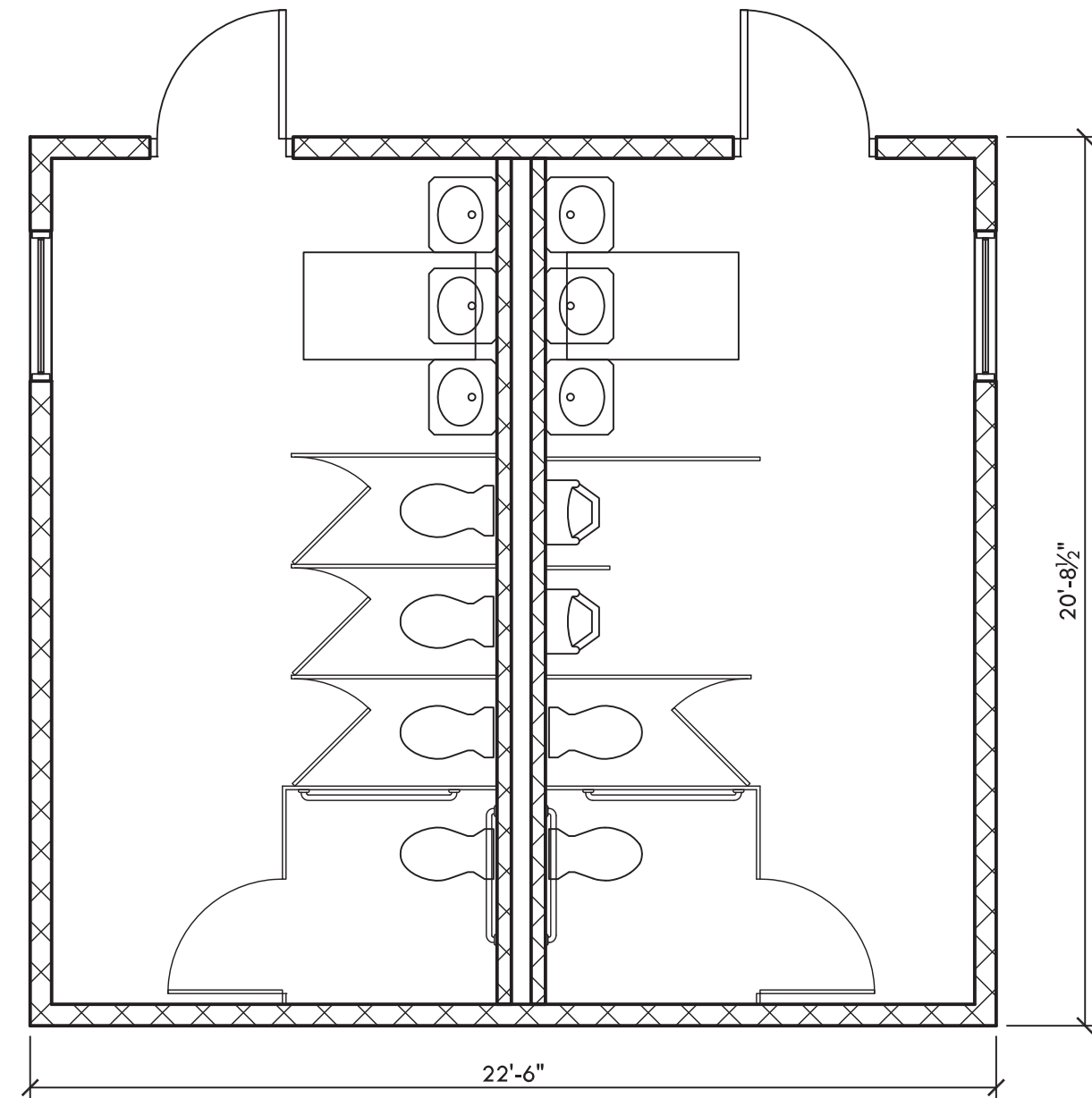
Total Cost - \$144,600

B. New Structure

1. Description

The new restroom structure will be stand-alone in an undetermined location in the park. The floor will be slab-on-grade, polished concrete; the structure will be exposed concrete block; and the roof will be wood framed, gable pitched, standing seam, metal panels that are exposed on the interior. The fixtures (toilets, lighting, lavatories, urinals, etc.) will be basic models with emphasis on high durability. The structure will utilize natural ventilation and be winterized for the off-season. Cost estimate does not include utilities beyond the building.

Total Cost - \$55,000



1 PROPOSED NEW RESTROOM STRUCTURE
1/4" = 1'-0"

NEXT STEPS

Interior and Infrastructure Treatments

SUMMARY OF EXISTING CONDITIONS

1. The interior is generally in fair condition, with the exception of few areas that have been rendered unsafe from the neglect that has come with not being occupied.
2. There is evidence of moisture infiltration that has deteriorated finishes, mostly ceiling finishes. The most deteriorated area is the landing in the main hall.
3. There is evidence of animal infiltration. A bird carcass was observed on the first floor, and bat excrement is present on the third floor from the attic space. Patching on the exterior is preventing further infestation.
4. The original electrical infrastructure remains, is obsolete and in poor condition. Current building operators occasionally tap into this service for temporary portable lighting and for dehumidification in the basement.
5. The building was originally heated by a steam boiler with cast iron radiators. The boiler was replaced in 2003 and could possibly be reused. The breeching and piping distribution system, however, is deteriorated. The condition of the chimney is unknown. There is currently no source of heat in the building.
6. There is currently no active source of ventilation in the building. There is natural air movement through the construction of the building, as well as operable windows with vented shutters.
7. The building did not appear to have any form of fire or smoke detection.
8. The building has remnants of an original stand pipe system. Fire hose cabinets are distributed around the facility. It is reported that there is an underground storage tank. In general, the infrastructure is deteriorated and should not be used.
9. A waterline was installed in 2002 that runs from a meter pit on Santee Mill Road and splits between the Archibald Johnston mansion and the Brady Residence. The line to the mansion is currently shut-off. A possibly functioning well also exists on the property, that was installed in 1993. It was the replacement for the original system (now shut-off and abandoned) that served the entire estate.
10. It is reported that there is a septic system onsite. The condition of the septic system is unknown.

A. Removal of Hazardous Materials

The removal of hazardous materials will contribute to the safety of building operators and visitors, as well as prepare the interior for a potential use. Professionals that specialize in hazardous material removal must be used to ensure that toxins do not become airborne, and are disposed of in an appropriate manner. Removal of animal feces is recommended in the attic and third floor areas.

B. Clear interior of building debris

The removal of building debris will contribute to the safety of building operators and visitors, as well as prepare the interior for a potential use. In several areas, primarily the landing of the main hall, the ceiling has failed due to moisture infiltration.

C. Passive Summer Ventilation

When mothballing a building, it is vital to ensure that the building is properly ventilated to prevent deterioration of interior finishes. Because the building is not occupied, and is therefore not conditioned in the summer, humidity and condensation can become an issue. The current method of ventilation has been passive. The building is naturally drafty, and the windows can be opened during the summer and still be protected by vented shutters.

This method is ideal because it doesn't require electricity to force air movement. On the other hand, this method requires the labor to manually open and close windows as necessary, and to regularly check the security of the shutters.

As evidence of the fair condition of the interior, this method has proven sufficient in the past. However, a large portion of the ventilation comes from the drafty construction of the building. If the exterior envelope is altered to a modern form of construction, passive ventilation may not be sufficient. For example, a new roof with sheathing instead of purlins; an EIFS exterior; modern windows; and the addition of storm windows, will all reduce the air movement between the interior and exterior. In this case, an active system should be considered.

D. Fire/Smoke Detection

In an unoccupied building, especially in a secluded area, it is recommended to have fire/smoke detection that will directly notify authorities. Minimal surveillance will decrease the chances that a fire will be promptly reported, and will therefore not be distinguished in a timely manner. A larger amount of building fabric, if not the entire building, can be lost.

E. Infrastructure

Upgrading the utilities within the mansion will be a significant and costly undertaking, and is not likely to happen without a tenant or function for the building. In preparation for a tenant, however, the Township can update the water and sewage systems that serve the mansion. Such discussions have been initiated and further explored by the Township's Public Works Department and Physical Plant, and further outlined in a Conceptual Opinion of Probable Construction Cost assembled by Arro Consulting Inc. (Appendix C).

The likely choice to provide sewer to the mansion is to connect to the public sewer system, over an on-lot or holding system. Advantages include: taking advantage of scheduled sewer line work, providing service to additional nearby properties, and allowing for maximum flexibility of park and mansion use. For a detailed description, see Appendix C.

a. Estimated Cost of Extending Public Sewer: \$284,000

Two possible options are being considered to supply potable water to the house. One would be a well system and the second would be to extend public water to the property.

A well system has the potential to be the option with the lower initial cost. The existing well, dependent upon testing, may be suitable for domestic water use. Additional costs would include a water treatment system and piping, as well as an annual maintenance cost. Many unknown factors, however, can quickly increase the cost of the well system. If the existing well is unsuitable, a new well would have to be drilled. Additionally, a fire protection (sprinkler) system may be required by code, or desired by the Township, for the existing house when an occupant type and load is determined. This would require a water storage tank, pumps, emergency generators, possibly a small equipment building, etc., on top of the cost of the sprinkler system. This would significantly increase the cost of using an on-site well.

b. Estimated Cost of Domestic Water System (Existing Well): \$8,000 to \$12,000 (+annual maintenance)

c. Estimated Cost of Domestic Water System (New Well): \$18,000 to \$24,000 (+annual maintenance)

d. Estimated Cost of Domestic Water System with Fire Protection (Existing Well): \$380,000 to \$490,000 (+annual maintenance)

e. Estimated Cost of Domestic Water System with Fire Protection (New Well(s)): Add \$10,000+/-, per new well

Alternately, extending the public water from an existing water main along Route 191 has been explored. While this option is significantly more expensive than the initial well system scenarios, it could be comparable if maximum flexibility is desired, without requiring annual maintenance. For a detailed description, see Appendix C.

a. Estimated Cost of Extending Public Water System: \$537,000

F. Determine New Use

It is recommended that priority be placed on exploring new uses for the Archibald Johnston mansion. Determining and implementing a new use for the mansion has the potential to provide:

- an occupancy type and load for which to design, regarding utility, code, and ADA requirements,
- a partnership with which the Township can pool resources,
- a stable source of income to support the Janet Johnston Housenick and William D. Housenick Memorial Foundation and the sustainability of the mansion,
- and routine occupancy of the structure, with the mansion being monitored and maintained on a regular basis.

RECOMMENDATIONS

ASSUMPTIONS | RECOMMENDATIONS

ASSUMPTIONS

Providing the Township with recommendations for the stabilization of the Archibald Johnston mansion would not be possible without making a few assumptions. Many critical decisions are facing the Township, that have the potential to impact the course forward. In order to provide a meaningful plan of action, the team, along with the steering committee, has developed a set of assumptions on which the recommendations are supported.

- The mansion is to remain vacant for an indefinite amount of time. Provisions for a building-use or tenant will not be implemented in the near future.
- The intent remains that the mansion will one day be occupied. Consideration has been made for the aesthetic, functional, and long-term needs of a future building occupant and tenant.
- The Janet Johnston Housenick & William D. Housenick Memorial Park will continue to develop around the mansion.
- The Janet Johnston Housenick and William D. Housenick Memorial Foundation exists to provide grants to Bethlehem Township to promote, protect, preserve, conserve, maintain and enhance the Janet Johnston Housenick and William D. Housenick Memorial Park. It is the intent of the Foundation that the interest accrued annually be shared between the park and the mansion.

RECOMMENDATIONS

The Archibald Johnston mansion has suffered from years of neglect and will continue to deteriorate if high priority items are not addressed. At the same time, crucial building systems have reached the end of their lives, requiring replacement if the building is intended to one day be occupied. Because the future use of the building and funding availability are yet to be determined, three plans for stabilization have been developed: Minimal short-term stabilization, Full stabilization (Economical), and Full stabilization (Historically preferable).

Minimal short-term stabilization

The plan for minimal short-term stabilization represents all of the recommended items to be completed if the Township only wishes to buy the building time. Many of these items are not included in the subsequent plans for full stabilization, because roof, chimney, and facade replacement would eliminate the need for such repairs.

This may be the course of action if the Township determines that the alternate plans can not be feasibly completed within 10 years, or if there is a future partnership that will contribute to the full stabilization of the mansion.

Recommendations - Minimal short-term stabilization							
	Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost	Phase Cost	3% Per year Cost index
Phase 1	IA	Ridge flashing	Provide continuous copper metal ridge	231 LF	\$10,890	\$262,978	N/A
	IB	Repair metal roof accessories	Replace flat roof areas with EPDM; repair roof edge flashing, gutter lining, soffit and modillions	1330 LF	\$26,620		
	IC	Line gutter in EPDM	Line the existing copper gutter in EPDM	300 LF	\$14,520		
	ID	Temporary chimney repair	Kill vegetation and temporarily cap chimneys with EPDM.	4 CHIMNEYS	\$7,260		
	IF	Shingle replacement	Individually or by area, replace damaged and failing slate shingles in-kind	50 SHINGLES	\$3,025		
	IIA	Sealant at trim	Providing sealant at seams along brick and wood in contact with stucco	3000 LF	\$38,115		
	IIB	Flashing along brick	Providing flashing at stucco seams along brick grade course	430 LF	\$7,805		
	IID	Repaint exterior	Stucco; wood trim; sun porch; and soffit.	8500 SF	\$99,958		
	IIG	Secure porch	Provide necessary flashing and support for existing porch		\$8,785		
	IIH	Misc. woodwork repairs	Repair areas of damaged exterior wood; including soffits, corbels, trim, etc.		\$30,250		
	IIIA	Glass replacement	Replace broken glass	3 OPENINGS	\$1,500		
	IIIC	Add missing storm windows and doors	Install storm windows on unprotected windows and doors with glass panels	27 OPENINGS	\$14,250		

Total estimated cost (not phased)=

\$262,978

Full stabilization (Economical)

It may be determined that the funds are available to complete a full stabilization of the building, but the emphasis is on securing the envelope economically rather than historic continuity. This plan would be desirable if the Township determined that the higher level of historic and aesthetic quality would not be worth the extra costs.

Both full stabilization plans recommend that the roof and stucco facade, the two major systems that have reached the end of their lives, be replaced. The chimneys, front porch entry, woodwork, and openings would be repaired and made secure. The economical plan, however, allows for a lower cost roof system and a temporary repair for damaged windows.

Because the appropriate amount of funding is not likely to be immediately available, both full stabilization plans are organized for phased work. For cost estimating purposes, a cost index of 3% per year is applied, and assumes a 3 year gap between phases.

Recommendations - Full stabilization (Economical)							
	Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost	Phase Cost	3% Per year Cost index *
Phase 1	IH	New composite roof	Entire roof replacement with composite shingle system; where necessary, patch sheathing, reinforce structure, and replace flashing	6100 SF	\$217,800	\$261,360	N/A
	IE	Chimney repair	Clearing chimney openings and securing from future biological growths; partial demolition and restoration; patch with stucco	500 SF	\$14,520 / chimney		
Phase 2	IIE	Re-stucco entire facade	Replace entire stucco facade; replace lath where necessary; provide necessary flashing	6500 SF	\$153,700	\$162,485	\$177,109
	IIG	Secure porch	Provide necessary flashing and support for existing porch		\$8,785		
Phase 3	IIH	Misc. woodwork repairs	Repair areas of damaged exterior wood; including soffits, corbels, trim, etc.		\$30,250	\$139,275	\$164,345
	IIIA	Glass replacement	Replace broken glass	3 OPENINGS	\$1,500		
	IIIC	Add missing storm windows and doors	Install storm windows on unprotected windows and doors with glass panels	27 OPENINGS	\$14,250		
	IIID	Repaint exterior wood	Wood trim; sun porch; and soffit.	2000 SF	\$60,000		
	IIIF	Shutter restoration	Restore shutter functions and place in closed position; secure from the inside; replace shutters where necessary	85 SHUTTERS	\$33,275		

Total estimated cost (not phased)= \$563,120

Full stabilization (Historically preferable)

Due to the high historic value and architectural qualities of the Archibald Johnston mansion, it is recommended to respect the original characteristics and to restore or replace-in-kind when possible. This would be the desired course if the Township has any plans to showcase the building in some historic capacity. Regardless of its future use, the mansion will be a prominent feature of the park.

This plan varies from the economical plan by recommending a new slate roof rather than composite, and restoration of all doors and windows, rather than glass repair only where necessary. While initially more expensive, longevity and aesthetics are taken into consideration beyond simply securing the exterior.

Recommendations - Full stabilization (Historically preferable)							
	Section #	Treatment	Description	Estimated scope of work	Estimated Initial Cost	Phase Cost	3% Per year Cost index *
Phase 1	II	New slate roof	Entire roof replacement with new slate roof; where necessary, patch sheathing, reinforce structure, and replace flashing	6100 SF	\$272,250	\$315,810	N/A
	IE	Chimney repair	Clearing chimney openings and securing from future biological growths; partial demolition and restoration; patch with stucco	500 SF	\$14,520.00 / chimney		
Phase 2	IIE	Re-stucco entire facade	Replace entire stucco facade; replace lath where necessary; provide necessary flashing	6500 SF	\$153,700	\$162,485	\$177,109
	IIG	Secure porch	Provide necessary flashing and support for existing porch		\$8,785		
Phase 3	IIH	Misc. woodwork repairs	Repair areas of damaged exterior wood; including soffits, corbels, trim, etc.		\$30,250	\$206,595	\$243,782
	IIID	Repaint exterior wood	Wood trim; sun porch; and soffit.	2000 SF	\$60,000		
	IIIC	Add missing storm windows and doors	Install storm windows on unprotected windows and doors with glass panels	27 OPENINGS	\$14,250		
	IIIB	Restore all windows and doors	Re-glaze and fix all windows and counterweights as necessary; strip and paint all sashes, muntins, jambs, headers, sills, and trim.	88 OPENINGS	\$68,820		
	IIIF	Shutter restoration	Restore shutter functions and place in closed position; secure from the inside; replace shutters where necessary	85 SHUTTERS	\$33,275		

Total estimated cost (not phased)= \$684,890

* Cost shown represents 3-years from the previous phase: Phase 2 reflects a 9% increase, Phase 3 reflects an 18% increase.

APPENDIX

A. BOYLE CONSTRUCTION INC. BUILDING TREATMENT COST INFORMATION

B. NPS PRESERVATION BRIEF 31: MOTHBALLING HISTORIC BUILDINGS

C. ARRO CONSULTING INC. CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST

