Exterior Restoration of the
OLD GUILFORD COUNTY COURTHOUSE

Greensboro, North Carolina

ASSESSMENT AND RECOMMENDATIONS

November 9, 2016

Prepared for
Robert McNiece, Director
Facilities and Parks
Guilford County

DRAFT

Exterior Restoration of the

OLD GUILFORD COUNTY COURTHOUSE

Greensboro, North Carolina

PNP Design Group

111 Paisley Street | Greensboro, NC 27401 | 336.378.1812

CONSULTANTS:

Historic Preservation:

HARRIS ARCHITECTS PLLC
33 West Probart Street
Brevard, NC 28712
828.883.5535

Masonry Restoration and Construction:

MMI Midwest Maintenance Inc.
101 Fox Drive - P.O. Box 1203
Piqua, OH 45356
937.773.9236

Structural Engineering:

Barlow Engineering PC
6512 Six Forks Road, Suite 2038
Raleigh, NC 27615
919.845.1600

Waterproofing:

Fincastle Engineering, Inc.
6213 Horseshoe Drive
Summerfield, NC 27358
336.643.9719

Exterior Restoration of the
OLD GUILFORD COUNTY COURTHOUSE

Greensboro, North Carolina

SUMMARY

Purpose: The Old Guilford County Courthouse was constructed in 1920 and is currently in need of exterior repairs to halt and reverse deterioration and weathering. The purpose of this project is to study and assess existing conditions and make recommendations for a proposed Scope of Work for Construction and an Opinion of Probable Costs. All proposed work is in keeping with the historic character of the building, which is listed on the National Register of Historic Places.

Process: The study process has included detailed observation, documentation and physical investigation of the exterior envelope of the building. Access to upper areas of the walls with a lift allowed observation of areas at close range and construction workers aided in the investigation. The walls, decorative features, windows, doors, and roofing were all studied to make recommendations for repair and replacement. A section of failing terra cotta at the parapet was dismantled to investigate the interior of the wall assembly and other areas of the exterior were tested to determine the extent of water infiltration and deterioration. Samples of terra cotta and mortar were removed for analysis that will be used in the development of detailed specifications.

Findings: The project team found the exterior to generally be in good structural condition, considering the age of the building and numerous misguided previous repair efforts. There are areas of failing materials and water infiltration that need to be corrected to halt deterioration and repair the original appearance and service of materials. The proposed Scope of Work for Construction includes cleaning, repair and replacement of materials that will ensure the continued use of this important local landmark for the future.

Recommendations: A summary of the Scope of Work for the project includes the following work items. This is outlined in detail with associated costs and descriptions of existing conditions in the full report.

Masonry Restoration
- Granite repairs and repointing at walls, entrance steps and landscape walls
- Terra Cotta unit and system repairs, replacement and repointing
- Brick repair and repointing
- Cleaning

Metals
- Clean, galvanize & paint original cast iron louvers
- Repair & paint railings at basement window wells

Moisture Protection
- Replace catwalk membrane at the 4th floor
- Replace roof drains, collars & pipe at the catwalk
- Repair and reline the built-in gutter at the main roof
- Replace copper roofing at the north and south entrance pediments
- Install membrane at balconies and repair balcony drains
- Install sealants at skyward facing masonry joints, between dissimilar materials

Doors and Windows

- Replace entrance doors & transoms to match original
- Replace aging windows with new units that are compatible with the appearance of the original windows
- Install new outside air intake louvers with reworked ductwork coordinated with windows to minimize appearance

Electrical

- Replicate missing original light fixtures at the east and west entrances
- Paint existing fixtures on the north and south entrances
- Reinstall or replace automatic door opener at the west entrance

PROPOSED SCOPE OF WORK FOR CONSTRUCTION

The following proposed Scope of Work for Construction is the result of extensive close-up observation of existing conditions, physical investigation of assemblies, testing of materials and analysis of findings. The project team consists of architects and consultants with expertise in historic preservation, masonry restoration, construction, structural engineering and waterproofing.

The proposed scope of work is outlined along with descriptions of existing materials, an assessment of their existing condition and changes made to the building over time.

I. GENERAL REQUIREMENTS: The principal goal of the project is to (1) halt the process of deterioration and (2) repair or replace damaged or missing original materials and assemblies.

A. All work shall be undertaken with materials and methods that protect and cause no damage to existing building materials to remain in place. Retain of as much existing original material as possible; repairs are preferred over wholesale replacement where possible.

B. The building is listed on the National Register of Historic Places and while regulatory review of the project is not required (unless state or federal funds are utilized), the intent is to follow current Historic Preservation guidelines.

C. Under the provisions of the North Carolina Existing Building Code (2015), the “repair and replacement of existing materials with original or like materials . . .”.is allowed as the building is an historic structure listed on the National Register of Historic Places. Alterations to the building that replace elements such as roofing, doors and windows, must meet the current requirements for wind loading and energy conservation.

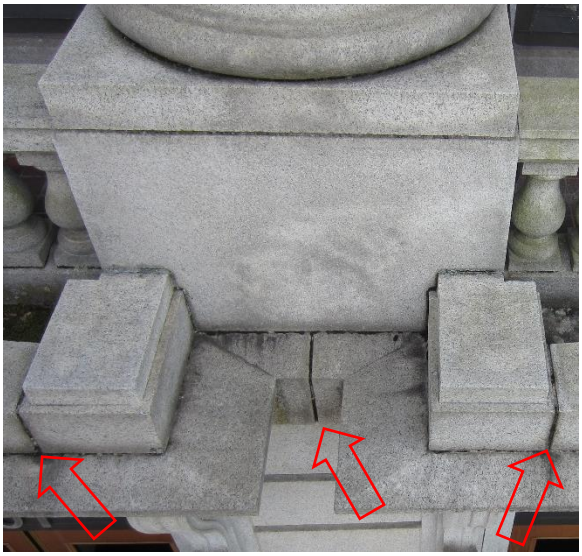
D. Features that have been replaced and are not original, such as windows, doors, and lighting shall be replaced to match the overall appearance and dimensions of the original feature as closely as possible. Materials may vary somewhat from the original as windows and doors must meet current code and function requirements.

E. Materials and methods to be as specified or approved by the Architect. Field sample panels of all work shall be prepared by the Contractor for approval by the Architect prior to undertaking the work.

F. GC shall establish safeguards and procedures to prevent worker fatigue with repetitive tasks that may led to damage or poor workmanship.

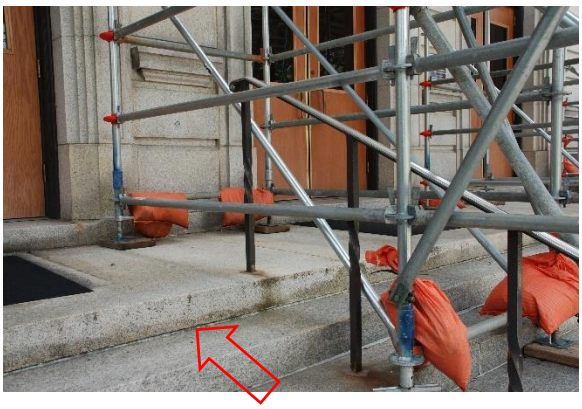
II. MASONRY RESTORATION: The exterior walls of the building are constructed of a load bearing system of granite and brick with cast concrete floor slabs. Decorative elements including panels, pediments, column capitals, and a deep cornice and balustrade are architectural terra cotta that is finished to match the granite. Fourth floor walls are built of structural terra cotta clad with decorative terra cotta.

A. Stone: Granite walls, entrance steps, decorative features, and landscape walls.



Most of the granite is in excellent condition with a limited number of spalls and cracks including two window lintels. Mortar joints are in poor condition with hairline cracks that could allow moisture to enter the walls if not corrected. These have been repointed three or four times and the mortar is not consistent in composition or color. Other joints that are more open to the weather have completely failed.

Based on sample areas, the depth of joint deterioration on the walls is limited while skyward facing joints are in worse condition, with many areas of missing mortar or sealant.



The entrance steps and flanking walls on the north and east facades have many open joints that need to be raked and repointed as well. Note the failing mortar joint at the base of the top step in the photo, which is typical of other areas.

Low stone walls surround the lawn areas on the north and east sides of the building and are also in need of repair. Many of the slab caps need to be reset as they are loose and not in proper alignment.

1. Joint replacement (walls, decorative features, and entrance steps)
   - Rake mortar or sealant from joints, to a depth of 1”, or depth of deterioration, whichever is greater.
   - Removal can be by abrasive wheel and right angle grinder after approval of field samples.
   - Extreme care is to be taken for the utmost control in removal of sealant or mortar to eliminate all opportunity of damage to the terra cotta glaze.
   - Install new mortar to match existing in color, texture, and compressive strength based on testing of the original mortar.
   - Installation of new mortar shall follow preservation guidelines including post wetting mortar to maintain a moist condition for 48-72 hours.
   - Fill skyward facing joints with sealant in lieu of mortar.
   - Fill unions with dissimilar materials with sealant material to compensate for different coefficients of movement
2. Repair stone
   - Loose small shards shall be removed, cleaned and epoxied back into place.
   - Spalls shall be tooled to remove distinctive edges or repaired with granite Dutchman patches.
   - Repair cracked granite with injected resins.
3. Landscape walls surrounding the north and east lawns: Reset top caps with pins and mortar, repair walls and clean.

B. Terra Cotta: Decorative elements including wall panels, column capitals, cornice and parapet balustrade above the third floor, and the walls of the fourth floor.

From close observation and investigation, most of the terra cotta and its steel anchoring systems appears to be in very good condition condition.

The condition of the terra cotta units varies from excellent to severely deteriorated at limited areas. Units with minor cracks, damaged edges, and spalls that can be repaired in-place, while some pieces will require replacement.

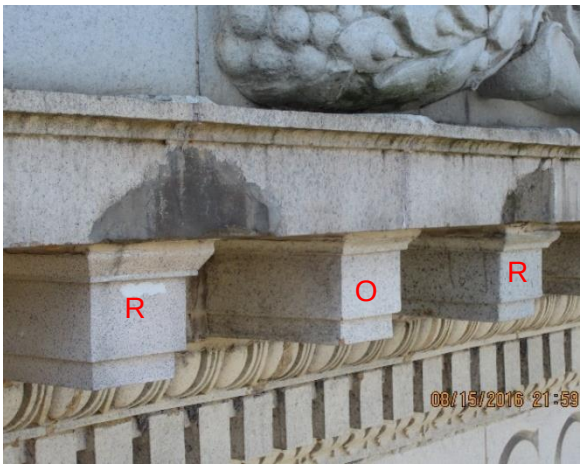
Approximately 35 linear feet of the north parapet wall has failed due to water infiltration through open joints and the effect of expansion and contraction during freeze/thaw cycle. This area has severe to moderate damage, with the most damage at the western end. (This 35 foot section is 7% of the total length of 494 linear feet.)

The area of terra cotta, shown in the picture above, was opened to investigate the interior of the terra cotta clad parapet. The interior of the wall was very wet and many of the terra cotta units were quite deteriorated. Despite the condition of the terra cotta cladding, the wall itself is structurally sound and the terra cotta can be repaired or replaced.

The cracked terra cotta unit to the right is the same unit that is marked "I" in the previous photo. Moisture in the structure has caused expansion and contraction with freeze thaw cycles that has split the terra cotta.

Northwest corner of the cornice with missing terra cotta, leaving some of the interior steel supports and anchors exposed. The metal that was exposed during investigation was corroded (rusted), but there was not significant loss of material. The steel can be treated and left in place without additional support added.

Joints are in poor condition and many have been filled with copious quantities of poorly installed sealant that is failing. Some joints have as many as 3 to 4 layers of sealants that were added at various times and there are other joints that have sealant that is not needed.



Under the cornice at the base of the parapet wall, decorative modillions hang on steel hooks. Due to water infiltration, many of these modillions are damaged and approximately 77 of a total of 328 modillions were previously replaced with fiberglass units attached with wood nailers. In addition, a number of original modillions are not in good condition and need repairs.

R marks previously replaced modillions and O marks an original one still in place. Note the spalled face of the terra cotta above the replaced units.

4. Joint Replacement
   - Remove mortar or sealant from joints, to a depth of 1”, or depth of deterioration, whichever is greater.
   - Remove mortar with abrasive wheel and right angle grinder. Remove sealant with knives.
   - Extreme care is to be taken for the utmost control to prevent damage to the terra cotta glaze.

- Install new mortar to match existing in color, texture, and compressive strength based on testing of the original mortar.
- Installation of new mortar shall follow preservation guidelines including post wetting mortar to maintain a moist condition for 48-72 hours.
- Fill skyward facing joints with sealant in lieu of mortar.
- Fill unions with dissimilar materials with sealant material to compensate for different coefficients of movement.

5. Unit Repair – general
   - Inspect all pieces for solid connection, proper alignment and general condition.
   - Remove units that are loose, shifted or bulged from original alignment by more than 5%. Salvage as many units as possible.
   - Remove previously replaced fiberglass modillions and their wood anchorage.
   - Establish guidelines for types of repair and replacement based upon the degree of deterioration.
   - Inspect balusters in parapet wall for structural integrity. Reset in mortar, repair or replace as specified for other units.
   - Install all removed or replaced units in a fresh bed of mortar and tool to match original joints.
6. Unit Repair - surface deterioration
   - Remove all glaze or surface deterioration that is failing or exfoliating from the bisque base using nonmetallic implements. Remove to sound, well attached material.
   - Remove any loose or deteriorated clay bisque foundation using mild aggression and nonmetallic implements.
   - Repair clay foundation with a proprietary terra cotta patching material that contains no polymer additives.
   - Apply chemical replacement glaze to repaired terra cotta and cover existing glaze not more than ¼" past repair area. Match appearance of original glaze.
   - Scrub/screed terra cotta glaze into significantly crazed terra cotta glaze surfaces. Wipe off excess material leaving only the 'cracks' filled with new glaze.
7. Unit Repair – fragmented units
   - Remove units, clean and repair with adhesive. Repair surface of unit as specified under surface deterioration.
8. Unit Replacement – missing units or units deteriorated beyond repair
   - Replace with manufactured terra cotta units matching the size, profile, and finish of existing matching units.
   - Replace previously replaced and deteriorated modillions.
   - All anachronistic patches installed in terra cotta are to be removed and replaced with a new terra cotta unit or proprietary repair material depending on size of unit.
9. Anchors and Hangers
   - Replace any severely deteriorated or missing anchors and hangers with galvanized steel that are exposed during the work.
   - Remove corrosion of any exposed steel to clean metal, treat with corrosion inhibitor, and paint with corrosion resistant epoxy paint.

C. Brick:

(See also the section on moisture protection.) The existing TPO covering on the back of the parapet walls has caused deterioration to the brick. The brick units are in good condition, but the mortar joints have deteriorated to a depth of 2/3 of the joint.

Basement window wells are constructed of brick with stone caps. Most of the brick needs repair.

1. Clean adhesives from the surface: Use a proprietary cleaning system based upon testing and evaluation, using the gentlest means possible.
2. Rake and repoint brick: See descriptions under stone and terra cotta for similar methods.

D. Cleaning: General atmospheric soiling of all exterior walls and decorative features.

1. Clean all masonry, after the completion of repairs, with a proprietary cleaning system based upon testing and evaluation, using the gentlest means possible.

III. METALS: Existing original cast iron air intake vents and railings at areaways and window wells.

Original cast iron fresh air vents remain on the exterior and are highly corroded and are staining the stone below.

Pipe guardrails at the basement window wells.

A. Repair, cleaning and refinish.

1. Cast iron louvers: Remove, clean, galvanize, paint and reinstall in sealant.
2. Handrails: Repair, clean, prep, and paint.

IV. Moisture Protection: Areas include the catwalk between the parapet walls and the exterior walls of the fourth floor; the built-in gutter at the perimeter of the main roof; copper roofing at the top of the pediments over the main entrances; and the floor of the balconies at the base of the columns of the north and south facades. Perimeter sealants for doors, windows, and other penetrations, as well as skyward facing masonry joints, need sealants and are included in other sections. (Work on the main roof is not included in this project.)

The 4th floor catwalk is covered with a TPO membrane that is generally in good condition, but is creating problems as it extends up the back of the parapet walls and is trapping moisture inside the wall. This moisture is contributing to the deterioration of the parapet. The membrane should to be removed from the wall and the brick should be cleaned of adhesive and repointed.

The catwalk has 6 drains - one at each corner and one opposite the pediments at the main entrances. The one at the southeast corner is probably causing water damage to the former courtroom below. Investigation revealed that the drain system includes a 3" diameter pipe from the roof deck that extends into a larger drainage pipe and the two are not sealed. Both the capacity of the smaller pipe and the connection could be allowing water to enter the structure.

The built-in gutter at the perimeter of the main roof needs to be repaired as it does not properly seal the exterior edge of flashing to the terra cotta underneath it.

The pediments are covered with copper roofing that is in moderate condition. Considering its condition and adjacent work to the parapets, replacement is recommended.

The balconies over the north and south entrances are floored with original clay tile and the outer two areas drain through a scupper to the center area, with a single drain. The ceilings of the vestibules underneath show evidence of long-term water damage. Water testing of the drain on the north side revealed that water is entering the outer stone wall due to open joints and that the drain pipe leaks below the 1st floor level.

A. Roofing and Waterproofing

1. Catwalk membrane
   - Remove membrane and replace after completion of adjacent work
2. Built-in gutter
   - Remove, peel back carefully, extreme outer portion of existing roof membrane to gain access to metal over wood nailer.
   - Remove metal flashing to a point that will expose wood and determine if any damage exists requiring repair.
   - Metal is originally designed to come down and cover wood and meet with top edge of masonry.
   - Bring flashing metal down to intended location, or replace metal so that it will meet as intended.
   - Seal this joint created when metal is in proper position.
   - Replace roofing membrane into proper position and secure.
3. Standing seam copper roof and flashings
   - Remove existing copper roof and flashings at the top of the north and south pediments.
   - Reinstall new copper roofing and flashing with improved detailing for drainage.
4. Balconies
   - Install membrane over existing tile
   - Replace drains and piping

B. Sealants

1. Remove all sealant from perimeter openings, including windows, doors, louvers and penetrations.
2. Install new urethane or silicone sealant to all prepared and cleaned joints.
   - Masonry joints facing skyward.
   - Door and window perimeter joints.
   - Unions of dissimilar materials

V. DOORS: The original entrance doors on all elevations were painted wood with wood frames. Decorative cast iron grilles covered the transoms and wrought iron grilles were on the doors. These are well documented on the original drawings and in archival photographs. (see also Appendix A)

These were first replaced around 1950 with new metal frames with wood doors and transoms. The door panels and hardware were later replaced again with the current doors. These changes resulted in a significant change in appearance from the original design.

Note that the earliest photos indicate that the doors and frames were painted the same color. The color scheme changed sometime after 1930 and before 1942 when the frames and windows were painted a lighter color. See section VIII for paint color information.

A. Replace door systems

1. Replicate the details of the original doors including frames, doors, transoms, iron grilles and detailing as closely as possible, while meeting current code requirements.
2. Install new compatible hardware.
3. Install automatic opener on east door. (see electrical)

"Community Chest," ca. 1930 (portion). (Greensboro Historical Museum)

"Guilford Camp Reunion," 1930 (portion). (Greensboro Historical Museum)

"Carol W. Martin--Gen. Kennedy Decoration Award," August 1943(portion). (Greensboro Historical Museum)

VI. WINDOWS: Original wood austral (tilting) windows were replaced c.1980 with single hung aluminum windows with fixed transoms and insulated glass. The fourth floor windows appear to have been replaced separately from the windows on the lower floors as these vary in detail and were made by different manufacturers. The lower floor windows are by Traco, the upper windows are not labeled.

These existing windows are technically dated and need repair. Most of the operational mechanisms have broken, making it quite difficult to open them, and the exterior finish is highly weathered. These windows were installed over the original wood frames, encapsulating wood with aluminum, and it is very likely that the wood is now rotten.

The glazing on the existing windows is insulated, but the air space between the panes is quite narrow, about 1/4" on the fourth floor and about 3/16" on the lower floors. While they probably meet code requirements at the time they were installed, they do not meet current energy conservation requirements.

In addition, these windows do not replicate the original windows in detail and they have changed the overall appearance of the exterior of the building. Other changes to the windows and the exterior of the building include HVAC louvers and units as well as conduit and condensate lines.

Several options for repair and replacement were studied and the details of these options are below.

Undated, probably 1960s.
(Greensboro Historical Museum)

Undated, before 1943.
(NC State Preservation Office)

Original windows are shown in the historic photographs above and can be compared to the existing windows above.

VII. ELECTRICAL: Original decorative pole light fixtures flank the north entrances. These are in good condition, but have replacement globes. The east and west entrances were originally flanked by similar wall-hung "torch" lights. These were removed and replaced when the plaza was constructed, but two of the original fixtures were installed at the south entrances.

Orginal wall light from one of the side entrances, now relocated ot the South entrance. The globe has been replaced and it was originally painted the same color as the windows and the doors.

Replacement fixtures currently on the east and west facades.

A. Lighting: Replicate wall-hung fixtures and install at the east and west entrances.

B. Paint existing and new fixtures to match original color.

VIII. PAINT COLORS: Historic photographs indicate that the windows, doors, and light fixtures were probably originally painted the same color, which appears to be quite dark.

Study of remaining window elements using historic finish analysis techniques and magnification indicates that the original color was a dark, slightly purplish brown matching Munsell Color 7.5YR 2/2, similar to Benjamin Moore Appalachian Brown 2115-10.

OPINION OF PROBABLE CONSTRUCTION COSTS

This Opinion of Probable Construction Cost (OPCC) is for budgetary purposes only. It is based on observation and investigation of existing conditions, recommendations for repair, and the cost of building materials and labor at the time of the cost projection. A contingency has been added to cover unforeseen conditions and design contingencies.

The areas of work are labeled as outlined in the narrative of this report, with corresponding line items. Areas I through IV (General Site Conditions, Masonry Restoration, Metals and Moisture Protection) list construction tasks that will repair damaged and weathered exterior walls and roofs. These items are interdependent and need to be undertaken at the same time. With a contingency, general conditions, bond, insurance and design fees this portion of the work totals approximately $3 million in construction.

Additional work areas, including Doors, Windows, and Electrical fixtures are presented as Alternates. The intent of this work is to restore the appearance of original features as closely as possible. Further information about Door and Window options is included in Appendices.

The following list of notes are referenced in the following spreadsheet:

1. Landscape work could be performed under a separate contract or by County personnel.
2. Sidewalk work is not included.
3. Lump sum for repair and replacement of all deteriorated terra cotta units.
4. Alternate: Modify and repair membrane rather than replace - $35,000.
5. Includes cost of replicating original doors. See Appendix A for details and alternatives.
6. Alternate: Modify and repair membrane rather than replace - $35,000.
7. Final A/E Fees will be negotiated once the complete Scope of Work is finalized.

OPINION OF PROBABLE CONSTRUCTION COSTS

	qty	unit	cost	subtotal		notes
I. General Site Conditions						
Scaffolding, ladders and lifts	1	ls	$275,000	$275,000		
Site protection and barricades	1	ls	55,000	$55,000		
Landscaping (tree & bush trimming for access, lawn & planting restoration after construction)	1	ls	40,000	$40,000		1
subtotal					$370,000	
II. Masonry Restoration						
Stone - Granite						
Joint replacement	21,463	lf	12	$257,556		
Wall repairs	1	ls	45,000	$45,000		
Repair entrance stairs	1	ls	14,500	$14,500		
Repair landscape walls at north & east lawns	468	lf	45	$21,060		
Terra Cotta						2
Joint replacement	11,262	lf	23	$259,026		
Repair units	90	ea	175,000	$175,000		3
Replace deteriorated units	56	ea				
Replace modillions	77	ea				
Remove & reset units	210	sf				
Replace or treat anchors, supports & hangers	1	ls	35,000	$35,000		
Brick						
Repair and repoint back of parapet	2,125	sf	14	$29,750		
Repair basement window wells	1	ls	50,000	$50,000		
Clean granite & terra cotta	43,250	sf	2.42	$104,665		
subtotal					$991,557	
III. Metals						
Clean, galvanize & paint original cast iron	30	ea	150	$4,500		
Repair & paint railings	123	lf	35	$4,305		
subtotal					$8,805	
IV. Moisture Protection						
Remove existing & replace catwalk	1,640	sf	35	$57,400		4
Replace catwalk drains, collars & pipe	6	ea	6,350	$38,100		
Built-in gutter	450	lf	366	$164,700		
Copper roofing	432	sf	95	$41,040		
Install membrane at balconies	1	ls	3,000	$3,000		
Repair balcony drains (2)	50	lf	250	$12,500		
Sealants			incl			
subtotal					$316,740	
Subtotal					**$1,687,102**	
Contingency				15%	$253,065	
Subtotal					**$1,940,167**	
General Conditions				12%	$232,820	
Overhead and Profit			$2,172,987	15%	$325,948.11	
Performance Bond				2%	$ 38,803	
Insurance				1%	$ 19,402	
TOTAL BASE CONSTRUCTION					**$2,557,141**	
Soft Costs						
Architectural & Engineering Fees Including Reimbursables					$ 432,712	7
Contractor for Investigation & Consulting					$ 50,000	7
Geotechnical Testing					$ 20,000	7
TOTAL BASE PROJECT COSTS					**$3,059,853**	

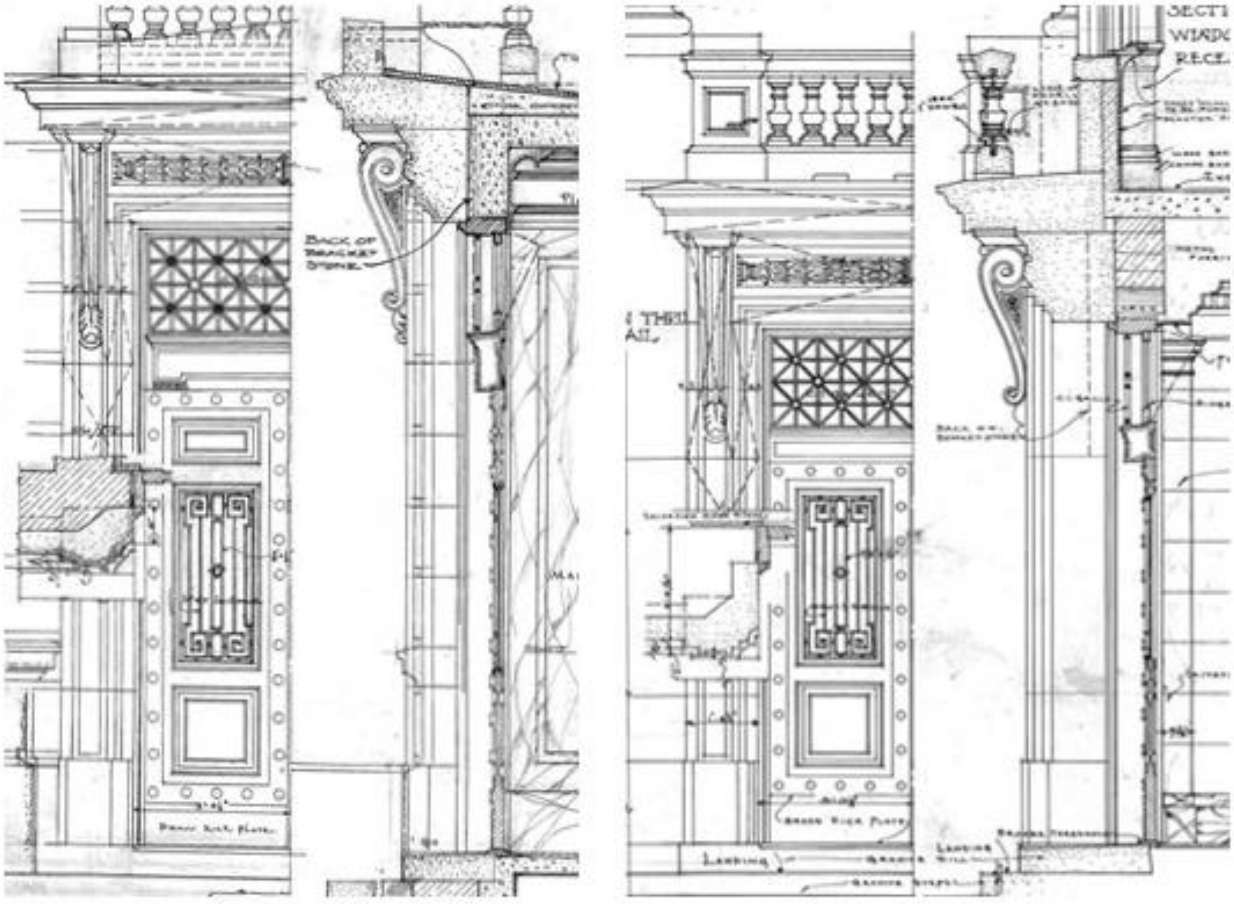
ALTERNATES:							
Note: Construction costs and related design fees for all Alternates assume that the work will be undertaken at the same time as the base project. Performing the construction as separate projects will result in significantly higher costs due ot the cost of General Requirements and other factors.							
		qty	unit	cost	subtotal		notes
V.	**Doors**						5
	Replace entrance doors & transoms- north &	6	EA	30,500	$183,000		
	Replace entrance doors & transoms- east &	2	ea	28,500	$57,000		
	Iron grilles	8	ea	7,225	$57,800		
	Remove existing, prep openings &	8	ea	9,445	$75,560		
	subtotal					$373,360	
	Contingency				15%	$56,004	
	Subtotal					**$429,364**	
	General Conditions				12%	$51,524	
	Overhead and Profit			$480,888	10%	**$48,088.77**	
	Performance Bond				2%	$ 8,587	
	Insurance				1%	$ 4,294	
	Subtotal Doors					**$ 541,857**	
	Soft Costs						
	Architectural & Engineering Fees					$ 54,186	7
	TOTAL DOORS					**$596,043**	
VI.	**Windows**						6
	Replace windows	1	ls	570,000	$569,325		
	Remove existing, prep openings &	164	ea	4,750	$779,000		
	HVAC louvers - coordinate with new windows	14	ea	1,200	$16,800		
	Rework ductwork to accommodate new	14	ea	1,800	$25,200		
	subtotal					$1,390,325	
	Contingency				15%	$208,549	
	Subtotal					**$1,598,874**	
	General Conditions				12%	$191,865	
	Overhead and Profit			$1,790,739	10%	**$179,073.86**	
	Performance Bond				2%	$ 31,977	
	Insurance				1%	$ 15,989	
	Subtotal Windows					**$ 2,017,779**	
	Soft Costs						
	Architectural & Engineering Fees					$ 201,778	7
	TOTAL WINDOWS					**$2,219,557**	
VII.	**Electrical**						
	Replicate missing original fixtures	4	ea	3,000	$12,000		
	Paint existing fixtures	4	ea	1,200	$4,800		
	Install automatic opener at east entrance	1	ea	2,000	$2,000		
	subtotal					$18,800	
	Contingency				15%	$2,820	
	Subtotal					**$ 21,620**	
	General Conditions				12%	$2,594	
	Overhead and Profit			$24,214	10%	**$2,421.44**	
	Performance Bond				2%	$ 432	
	Insurance				1%	$ 216	
	Subtotal Electrical					**$ 27,284**	
	Soft Costs						
	Architectural & Engineering Fees					$ 2,728	7
	TOTAL ELECTRICAL					**$30,013**	
GRAND TOTAL						**$5,905,465**	

APPENDIX A – ENTRANCE DOORS

Comparison of Door Replacement Options

The recommended option is to replicate the original wood doors based upon historic photos and original construction documents. Several revisions to original details will need to be made to meet current code requirements as the doors must swing out and have panic hardware. The doors at the east entrance will continue to have automatic openers to meet accessibility standards.

.

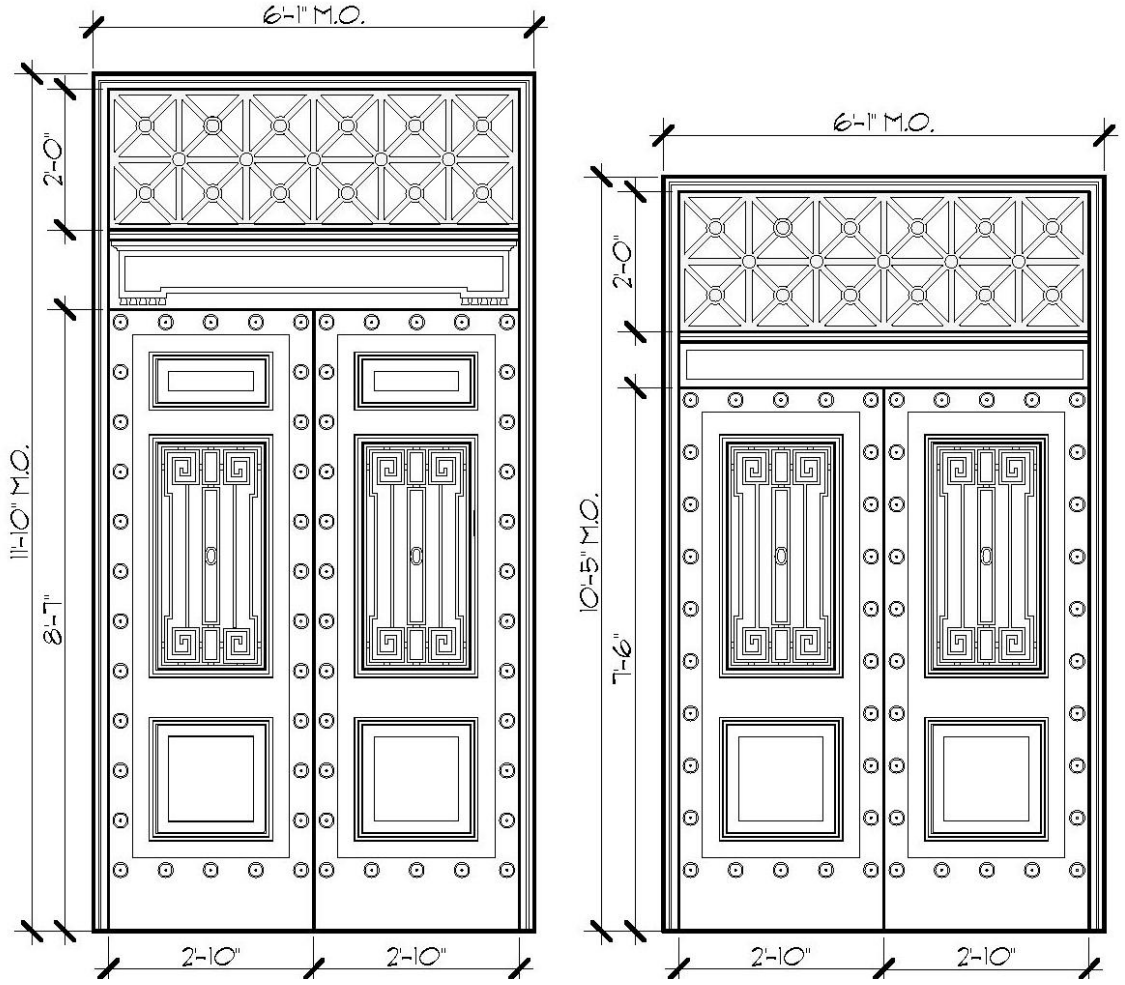


North and South Doors *East and West Doors*

Details of the entrance doors from the original construction drawings. The doors and frames were wood with cast iron grilles at the transomes and wrought iron grilles on the doors.

Option A – (included in Opinion of Costs, best option for period detail replication)
Replicated custom wood doors with iron grilles.

- Doors: quoted by Stull Woodworks Inc., Ludlow Falls, OH
- Glazing: clear insulated low E glass.
- Painted to match original brown
- Grilles: quoted by Robinson Iron Works, Alexander City, AL



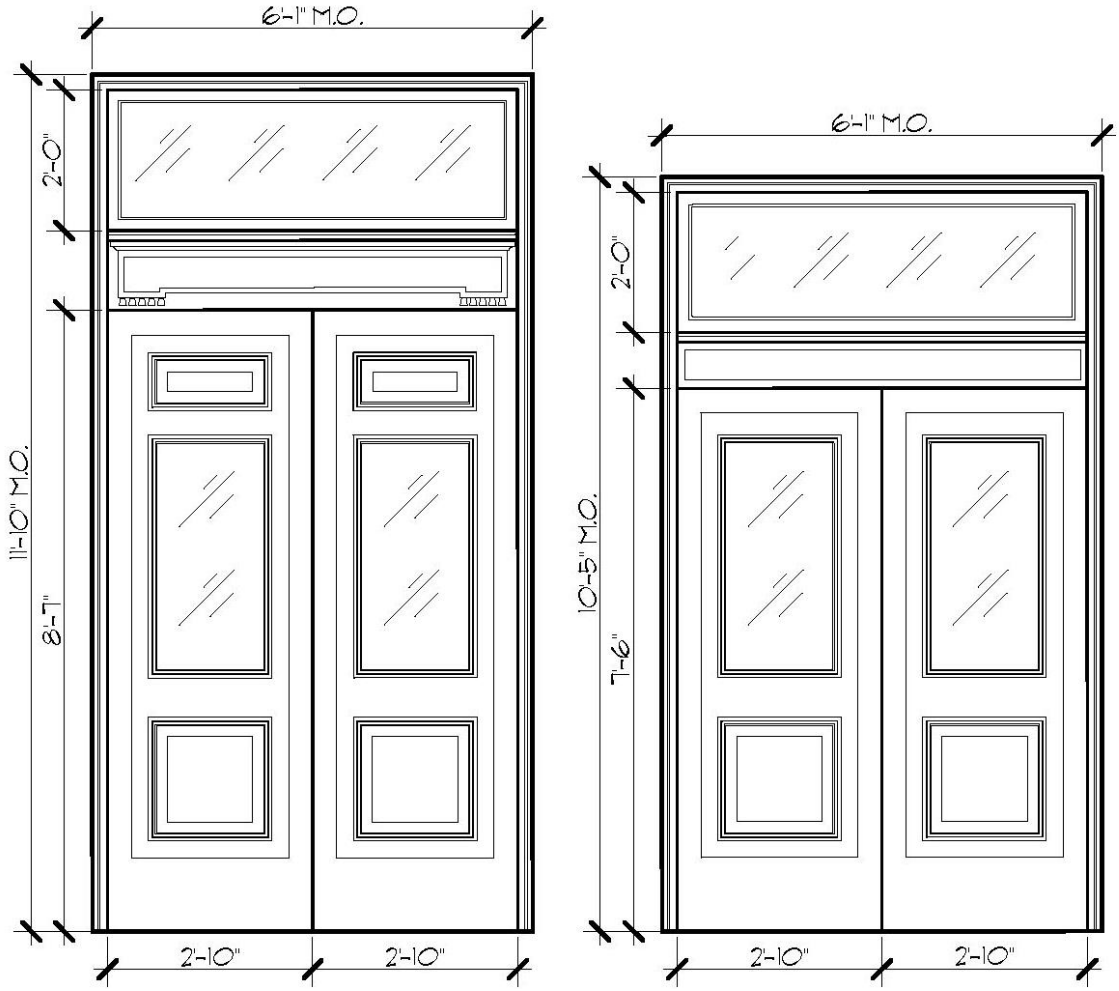
North and South Doors. *East and West Doors*

Details of proposed replicated doors with cast iron grilles at the transoms and wrought iron grilles on the doors.

Option B–

Replicated custom wood doors without iron grilles.

- Doors: quoted by Stull Woodworks Inc., Ludlow Falls, OH
- Glazing: clear insulated low E glass.
- Painted to match original brown
- Savings of $57,800



North and South Doors. *East and West Doors*

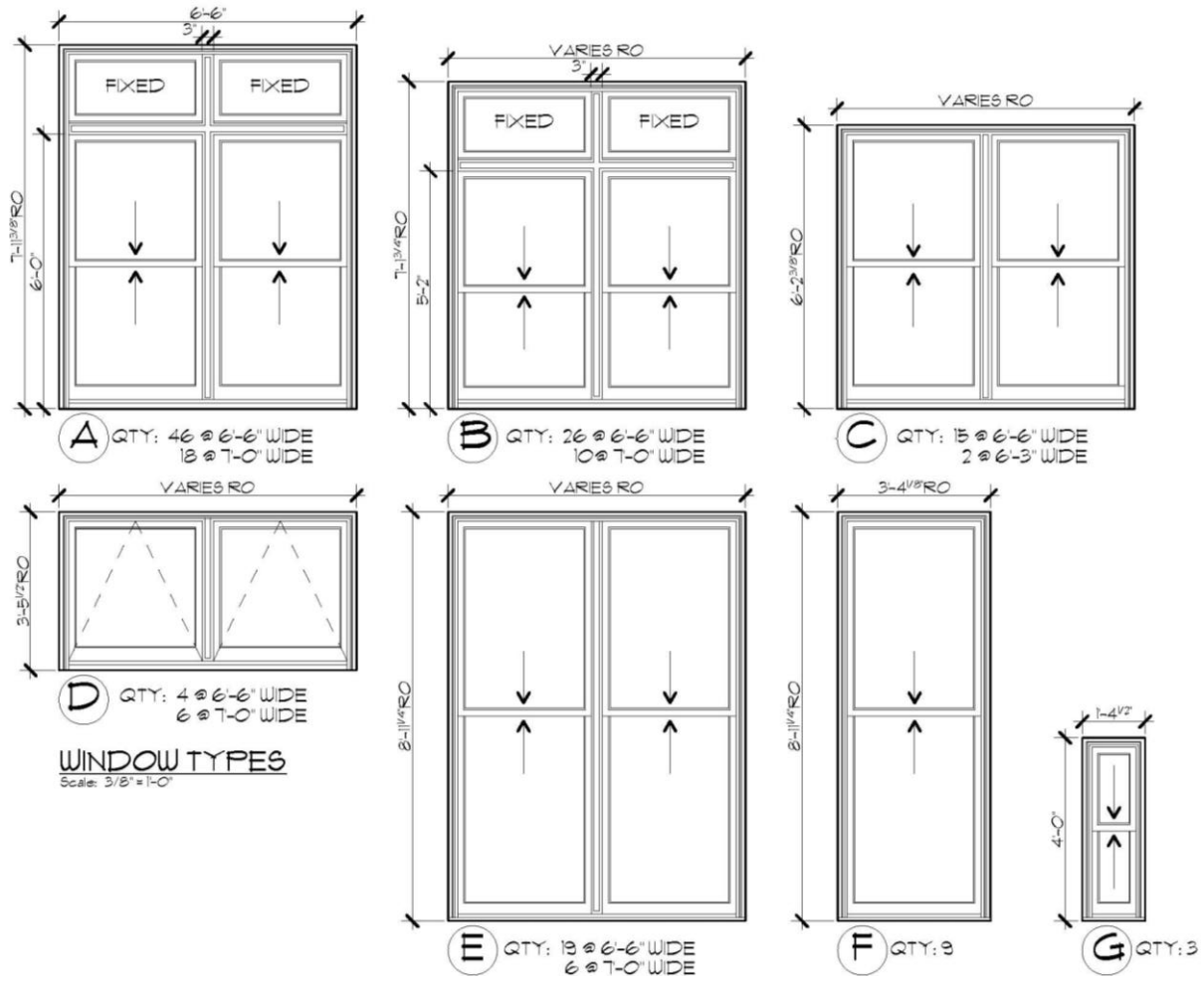
Details of proposed replicated, but simplified doors without iron grilles.

APPENDIX B - WINDOWS

Comparison of Window Replacement Options

Multiple options for replacement windows that replicate the appearance of the original windows were researched with the criteria listed below. Budget pricing for each option was provided by either the window company or sales representative based on 164 masonry openings and 7 types of windows. While specific detailed information was requested for each option, the type of information received varied considerably and additional information will be needed to determine the best manufacturer for this project. A commercial grade aluminum window with details that mimic the original windows is recommended, with the following criteria.

- Sight lines that mimic the original windows
- Simulated putty glazing
- Mullions with paneled recess
- Brick molding
- Custom sizes to fit existing conditions
- Color and finish selections
- Warranties
- Energy efficiency



Option A – (included in Opinion of Costs, best option for quality and period detail replication)
Commercial grade aluminum windows

- Graham Window Company, Series 2200H single hung with 1400H fixed transoms.
- Glazing: 1/4" Clear Temp LoE 366 x 1" air space x 1/4" Clear Temp 1" insulated low E glazing.
- Finish quoted: AAMA 2605 two-coat non-exotic, non-metallic painted finish, which the warranty could be extended depending on the color chosen (other finishes available)
- Warranty: Standard (can be upgraded) 1 year; 10 year on finishes and glass
- Price includes custom trim and panning to mimic original windows.
- Priced by square footage. 7,815 sf of window x $72.85/sf = $569,325
- Company has considerable experience with historic buildings including several at UNC Chapel Hill

Option B
Commercial grade aluminum windows.

- EFCO Window Company, EFCO 670 DH with AW PG55H fixed transoms.
- Glazing: clear insulated low E glass.
- Finish: Standard color, 70% kynar
- Warranty: 10 year warranty on all materials:
- Price includes custom trim and panning to mimic original windows.
- Priced by window types and quantities at $450,000.

Option C (not recommended)
Commercial grade aluminum clad wood windows.

- Pella Window Company, Architect Series Reserve (new line available early 2017 with historically accurate detailing.
- Glazing: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon
- Finish: Standard color
- Warranty: 10 year warranty on all materials:
- Priced by window types and quantities at $430,688.

Option D (not recommended)
Commercial grade aluminum clad wood windows.

- Weathershield Window Company, Signature Series
- Glazing: Insulated low E
- Finish: Standard color
- Warranty: 20 year warranty on all materials:
- Priced by window types and quantities at $399,000

Option E
Custom, all wood window

- Stull Woodworking, custom to match original windows
- Glazing: Insulated low E
- Finish: Paint, with 20 year warranty
- Priced by window types and quantities at $679,700