Preservation/Restoration of Moton Field

Phase II

THE JAEGER COMPANY



Tuskegee Airmen
National Historic Site
Tuskegee, Alabama

Historic Structure Report
Hangar Number One

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Executive Summary

Tuskegee Institute (now Tuskegee University) was the only institution during World War II that provided primary military flight training for African-American pilot cadets in the United States Army Air Corps. Tuskegee Institute constructed Moton Field in Tuskegee, Macon County, Alabama, from 1941 to 1945 and used it as the principal facility of their contract primary flying school. The airfield was named for the second president of Tuskegee Institute, Robert Russa Moton. Most Tuskegee Airmen received their first military flight training at Moton Field.

The Tuskegee Airmen were the first African-American soldiers to complete their pilot training successfully and enter the Army Air Corps. Military leaders were at first hesitant to use the Tuskegee Airmen in combat. Eventually the airmen saw considerable action in Europe and North Africa. Their accomplishments in the air proved conclusively that African Americans could fly and maintain sophisticated combat aircraft and ultimately paved the way for full integration of the United States military.

The Southeast Regional Office of the National Park Service (NPS) prepared the *Moton Field/Tuskegee Airmen Special Resource Study* in October 1998 to evaluate the potential of adding Moton Field to the National Park System and to define the significance of the site with regard, specifically, to its association with the Tuskegee Airmen during World War II and, in general, to its role in the history of military aviation. The airfield complex at Moton Field was designated as the Tuskegee Airmen National Historic Site in November 1998 and was subsequently programmatically listed in the National Register of Historic Places.

This Historic Structure Report (HSR) has been prepared as part of Phase II of the Moton Field Preservation/Restoration project. Phase II includes the production of a Cultural Landscape Report (CLR) and fifteen Historic Structure Reports for nine extant structures and six non-existing structures. The CLR addresses the Moton Field site as a whole and contains the complete historic context for the site; each HSR contains an abbreviated historic context that focuses on building history. Following is a list of the fifteen structures for which HSRs have been prepared.[1]

EXTANT STRUCTURES

Hangar Number One
Skyway Club
Control Tower
Bath and Locker House
Warehouse/Vehicle Storage Building
Dope Storage Shed
Oil Storage Shed
Fire Protection Shed
Entrance Gate

NON-EXISTING STRUCTURES

Hangar Number Two
Cadet Class and Waiting Room
Army Supply Building
Physical Plant Warehouse
Vehicle Maintenance Shed
Guard Booth

A *Moton Field Structure Nomenclature* table clarifying the name of each structure for purposes of the CLR and HSRs follows the Executive Summary.

To prepare the Historic Structure Reports and the Cultural Landscape Report, research was done at a number of repositories and on site. Research included on-site field inspections; interviews of persons associated with the site before, during, and after the construction of Moton Field; and review of primary and secondary sources related to the social and physical history of Moton Field, including NPS files compiled during the preparation of the *Special Resource Study* and selected transcripts from the ongoing NPS Tuskegee Airmen Oral History Project. A list of repositories visited and the primary materials that were reviewed at each is located in the bibliography of the Cultural Landscape Report.

Major research findings resulting from the research phase of the project included the location of a number of primary sources yielding information about the construction and operation of Moton Field. This primary information included original architectural drawings and site plans for the airfield and its expansions throughout the war years; historic photographs of the airfield complex and the flight training activities that took place there; written histories chronicling the airfield's construction and day-to-day operations; information on the building contractor and landscape architect involved in the complex's design and construction; and the history of the site before and after its war-era use for primary flight training.

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[1] The Phase II scope of work originally included a seventh non-existing structure, the Shed/Pump House, for which an HSR was to be prepared. After the research phase, however, no specific information had been found on the location or design of a shed/pump house on the Moton Field site. Because of this, the building was dropped from the list of non-existing structures.

The period of significance for the interpretation of Moton Field has been established as 1941 to 1945, the period during which Moton Field was constructed and the Tuskegee Airmen were trained by the contract primary flying school. 1945 will be the date of restoration for the field's extant buildings and site features; the date of reconstruction for Hangar Number Two, the only non-existing building at the field that will be re-created; and the date of interpretation for the remaining non-existing buildings and site features. 1945 is the date by which all the buildings and site features at the airfield that were associated with the flying school had been constructed.

Built in 1941, Hangar Number One was the first building to be constructed at Moton Field. It was used during the World War II era to provide hangar space for airplane repairs and maintenance as well as to house various functions associated with the primary flying school's operation. Based on historical research, a thorough investigation of the building and its relationship to the site as a whole, and the building's significance to the site's interpretation, the Ultimate Treatment and Use Recommendation for Hangar Number One is **Restoration of the building's exterior and interior.** System requirements for restoration of the building will include a new heating system of gas-fired unit heaters suspended from the ceiling; period plumbing fixtures that are not usable (if perimeter rooms are furnished); a new electrical system with components matching originals as closely as possible; restoration and re-use of existing lighting fixtures; replication of missing light fixtures; a new wet-pipe sprinkler system and notification fire alarm system; a monitored security system; and a new communications system. Hangar Number One is the most significant extant building at Moton Field today, and its restoration will be a critical component in the interpretation of the airfield to the public.

MOTON FIELD STRUCTURE NOMENCLATURE

EXTANT STRUCTURES

***Use Structure Name in Bold Italics*

Original Name[1]	Common/Later Name	NPS Name
Hangar Number One		
Civilian Recreation Bldg.	*Skyway Club*	All Ranks Club
Control Tower		
Bath and Locker House Mechanics' Bath & Locker Bldg.		Administration/Locker Bldg.
Warehouse, Maintenance Bldg., Vehicle Storage		*Warehouse/Vehicle Storage Bldg.*
Dope Storage		*Dope Storage Shed*
Oil House		*Oil Storage Shed*
Fire Protection		*Fire Protection Shed*
Entrance Gate		Entrance Gate

NON-EXISTING STRUCTURES

Original Name	Common/Later Name	NPS Name
Hangar Number Two		
Cadet Class & Waiting Room (Cadet Waiting House)	Flight Command Office	Flight Command Office
Supply Building	Army Supply Building	*Army Supply Building*
Physical Plant Warehouse		Physical Plant Storage
Vehicle & Maintenance Shed		*Vehicle Maintenance Shed*
Guard House		*Guard Booth*

[1] Based on architectural drawings, written histories, or other original documentation.

Administrative Data

Locational Data

Building Name: Hangar Number One
Building Location: Moton Field, Tuskegee Airmen National Historic Site, Chief Anderson Drive, Tuskegee, Macon County, Alabama.

Real Property Information

Acquisition Date: November 1998
Total Improvement/Modification Costs to Date: $810,855 (total construction cost to date for stabilization at Moton Field)

Size Information

Total Floor Area: 13,128 SF
First Floor Area: 12,208 SF
Additional Floor Area: Mezzanine – 920 SF
Roof Area: 7,782 SF
Perimeter Length: 499 feet
Number of Stories: One (1)
Number of Rooms: 21 (based on historic floor plan)
Number of Bathrooms: 3 (based on historic floor plan)

Building Code Information

Applicable Codes:
Building /Dwelling Code: 1997 Standard Building Code
Structural Code: 1997 Standard Building Code
Plumbing Code: 1997 Standard Plumbing Code
Mechanical Code: 1997 Standard Mechanical Code
Electrical Code: 1996 National Electric Code
Fire/Life Safety: 1994 Standard Fire Protection Code, 1997 NFPA 101

Seismic Hazard Exposure Group 8- No seismic requirements for architectural, mechanical and electrical systems. There are some minor structural requirements.

Analysis of Hangar Number One is based on the complete restoration of the facility.
Building area is approximately 13,545 sf.

1997 Standard Building Code:
Assembly Occupancy - Group A
Construction Type V unprotected
Fire sprinklered

Maximum allowable building height is 55'
Two stories are allowed.
Maximum area 24,000 sf

The facility will be able to meet the area and height requirements.

NFPA 101
Assembly Occupancy

Proposed Treatment

Proposed Treatment for Hangar Number One: Restoration of the exterior and interior

Related Studies

Moton Field/Tuskegee Airmen Special Resource Study, National Park Service, Southeast Regional Office, Atlanta, Georgia, 1998.

Cultural Resource Data

Hangar Number One is a contributing resource in the Moton Field complex which was programmatically listed in the National Register of Historic Places as a historic site unit of the National Park Service on November 6, 1998 with the approval by President Bill Clinton of Public Law 105-355 which established the Tuskegee Airmen National Historic Site.

The period of significance for Moton Field has been established as 1941 – 1945, the period during which Moton Field was constructed and served as the principal facility of the primary flying school for the training of the Tuskegee Airmen.

Moton Field is nationally significant for its association with the historic contexts of African-American History and Military/Aviation History. In both African-American and Military/Aviation history, the airfield complex is significant for its role as the only primary flight training facility for African-American pilot cadets in the Army Air Corps during the World War II era. The accomplishments of the Tuskegee Airmen in military air combat in both European and North African theaters of operation helped pave the way for the full integration of the United States military and future civil rights advancements.

Recommendations for Documentation, Cataloging, and Storage of HSR Materials

A copy of research materials specifically documenting Hangar Number One is located within the body or in *Appendix A* of this HSR. A copy of research materials documenting Moton Field as a whole may be found with the Cultural Landscape Report. Pre-stabilization photographs and other photographs taken during and after stabilization work of the Moton Field structures and site will remain with the project architectural firm until the completion of final construction drawings and specifications required for the preservation/restoration work.

Part I – Developmental History

Historical Background & Context

Chronology of Development & Use

Physical Description

Historical Background & Context

Formally approved as Tuskegee Airmen National Historic Site on November 6, 1998, Moton Field is of national importance for its association with the training of the Tuskegee Airmen during World War II. Moton Field, constructed between June 1941 and March 1945, was the only primary military flight training facility for African-American pilot candidates in the United States Army Air Corps during the war. The field, named in honor of Robert Russa Moton, the second president of Tuskegee Institute (now known as Tuskegee University), symbolizes the entrance of African-American pilots into the Army Air Corps under a policy of segregation that was mandated by the military and institutionalized in the South. The buildings that remain at Moton Field have changed little over the years and the historic setting of the 1940s is still discernible.

Context

Opportunities for African-American participation in the United States military were always limited and controversial. Quotas, exclusion, and discrimination based on race reinforced the prevailing attitude in both the military and the general public that African Americans did not possess the intelligence or ability to be successful in the military. This perception carried into the 1940s when military officials still believed that African Americans could not become successful pilots in the Army Air Corps. The Air Corps decided to train a small number of African-American pilot candidates under segregated conditions and in January 1941, chose Tuskegee Institute as a civilian contractor to operate a primary flying school at a location in Tuskegee, Alabama, that would become known as Moton Field. This was the only primary

military flight training facility for African-American pilot candidates in the U.S. Army Air Corps during World War II. The facility symbolizes the entrance of African-American pilots into the Air Corps, although on a segregated basis.

War-Era Construction at Moton Field

Building construction at Moton Field can be divided into three major phases of construction. These construction phases are modern descriptive terms and are not historic nomenclature. The justification for the three phases is based on actual dates of construction as well as the source of funding for each. The primary flying field was not officially known as Moton Field until its dedication in April 1943.

Phase One, beginning in June of 1941 and lasting through December of that same year, consisted of the initial establishment of the airfield (grading and clearing) as well as the construction of Hangar Number One and the Fire Protection Shed. Tuskegee Institute contributed $20,000, but the major funding source was a $130,000 loan from the Julius Rosenwald Fund.

Phase Two began in the summer of 1942 and lasted almost a year. Tuskegee Institute's Board of Trustees initially authorized $15,000 for construction of the Cadet Class and Waiting Room and the Army Supply Building.[2] Hangar Number Two and the Control Tower, the Bath and Locker House, several small sheds for oil and dope storage, and an addition to Hangar Number One were completed with a $150,000 loan from the institute's general funds.[3]

Phase Three began in early spring of 1944 and extended through the summer of the following year. It is believed that Tuskegee Institute funded this third phase of construction as well, but documentation has not been located to support or disprove this. During this phase the Vehicle Maintenance Shed and the Physical Plant Warehouse were constructed and the enlargement of the asphalt parking mat and paving of roadways in the building area were completed. The ground was graded south of Hangar Number One for a civilian recreation building, later known as the Skyway Club, that was not started until 1945.

Phase One Construction (June-December 1941)

Following the final contract negotiations with the Julius Rosenwald Fund, the United States Army, and Samuel Mizel (S.M.) Eich, the owner of the farm land on which the primary flying field would be built, construction of the airfield got underway in the early summer of 1941. "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama" states that the contract was signed on June 6, 1941 and construction of the airfield started about the same time.[4] Archie A. Alexander, a prominent African-

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[2] Julius Rosenwald Fund (JRF) Box 359, Folder 5. General Correspondence.
[3] JRF Box 359, Folder 5. General Correspondence.
[4] "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section I," p.1.

American contractor from Iowa, was recruited to supervise the initial phase of airfield construction.

By the end of 1941 the first phase of construction was complete. Hangar Number One was constructed for $44,134, which was included in the total cost of $148,506.98. The final construction costs were as follows:

Payment in full of contract	$112,900.00
Extra work by contractors	1,389.50
Purchase of land	33,500.00
Cutting trees	500.00
Allowances for crop damages	217.48
	$148,506.98[5]

Phase Two Construction (June 1942-May 1943)

The Tuskegee training program expanded per orders of the Army, and the facilities originally constructed for a smaller number of cadets soon became inadequate. By the end of May 1942 plans were underway to construct one new supply building and one cadet waiting house. Hangar space formerly used for supply was converted to a link trainer room and empty office space was nonexistent at the field.[6] The Tuskegee Institute Board of Trustees authorized special expenditures of $15,000 to finance these improvements, which were completed by late July 1942.

That fall, when it became necessary to expand the facilities at the field again because of another increased quota of students per class, financing once again was an issue. A request to the Julius Rosenwald Fund for an additional loan was rejected. In addition, they offered no leniency for loan repayment should Tuskegee be able to secure a loan from another source. Ultimately, $150,000 was secured through a loan from the general funds of Tuskegee Institute to complete the second phase of construction.

In addition to the expansion work completed by July 1942, the following construction was completed during Phase Two. Hangar Number Two was built with lean-to space for a Cadet Ready Room, five link trainers, and space for parachute maintenance, issue, storage, and drying. The Control Tower, a pump house containing chlorination units, the Dope Storage Shed, the Oil Storage Shed, and Bath and Locker House were also part of this phase.[7] Women began to apprentice as mechanics, due to the manpower shortage during the War that necessitated separate facilities for men and women. Although initial construction had failed to anticipate women workers at the primary flying field, toilet and locker facilities were incorporated into the plans of the Bath and Locker House to remedy the need for women's facilities.[8]

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[5] JRF Box 359, Folder 5. General Correspondence.
[6] "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section II," p. 4.
[7] Ibid, p. 5.
[8] George L. Washington, *The History of Military and Civilian Pilot Training of Negroes at Tuskegee, Alabama, 1939-1945* (Washington, D.C.: George L. Washington, 1972), pp. 306-307; 310-311.

A School Facilities and Civilian Personnel Report dated October 27, 1942 details the status of the construction project with Hangar Number Two including the Control Tower at 7% complete; the Bath and Locker House at 25%; and the Oil Storage Shed at 90% complete. Progress to date on the main field was 20% complete.[9]

During construction it became difficult to obtain some building materials due to the shortage caused by the war. Even with a high priority rating obtained from the Air Force, locating materials often lengthened construction time. This was especially true with regard to the 100-foot span trusses and metal truss ties for Hangar Number Two. Ultimately, David A. Williston, the Landscape Architect at Tuskegee Institute who was responsible for the landscape design at the primary flying field, scoured the campus for suitable trees for cutting and milling the trusses. Construction on the hangar came to a virtual stopping point for two months until truss ties could be located.[10]

On November 10, 1942, 35% progress was reported on the main field. Construction on the Oil Storage Shed was complete and Hangar Number Two had reached 35% completion while the Bath and Locker House was 60% complete.[11] By November 25, the Hangar progressed to 60% completion and the Bath and Locker House to 75% complete.[12]

In December construction began on the Warehouse/Vehicle Storage Building and a Vehicle Maintenance Shed. The shed, which was located at the east extremity of the building complex, housed trucks and ambulances overnight as well as miscellaneous lumber used for maintenance. The warehouse was a concrete block building located east of where the Physical Plant Warehouse was soon completed.[13] The December 10, 1942 report boosted the Hangar to 70% completion, the Bath and Locker House to 80%, and the Warehouse/Vehicle Storage Building was 20% complete. Although the main field had been in use over a year, it was only 45% completed as of this report.[14]

Despite being only 95% complete in March 1943, offices in Hangar Number Two were occupied in order to relieve office congestion in Hangar Number One. May 1943 marked the completion of the second building phase at the airfield. The Bath and Locker House, Warehouse/Vehicle Storage Building, improvements to the landing field and Hangar Number Two were finished. At this time the Intelligence Office was moved from Hangar Number One to Hangar Number Two, which allowed space for the Intelligence Library. As the Cadet Ready Room was also moved to the second hangar, it allowed trainees free access to the reading materials. The Intelligence Office was a military office that provided secure as well as general information about war activities. The office included an Intelligence Library

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9 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section II," Appendix III.
10 Washington, pp. 301-303.
11 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section II," Appendix IV.
12 Ibid, Appendix V.
13 Washington, p. 312.
14 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section II," Appendix VI.

with reading materials such as magazines, newspapers and intelligence summaries, and a War Room with additional reading materials, models of aircraft, ships, and tanks, and maps of various theaters of operations, all of which were kept updated as the war progressed. Aviation cadets were encouraged to spend a few minutes each day in the Library and War Room to keep themselves informed. The Parachute and Link Trainer Departments also moved into larger spaces in Hangar Number Two. This left more space in Hangar Number One for Engineering and Operations.[15]

The airfield was named Moton Field in honor of Tuskegee Institute's second president Robert Russa Moton. In preparation for the official dedication ceremony on April 4, 1943, a brick entrance gate was constructed along the main road to the west of the building complex. The south wall contained a niche that featured a bust of Robert Moton.[16]

In July of 1943, Tuskegee Institute made its final payment on the loan to the Julius Rosenwald Fund. Tuskegee Institute president Dr. Frederick D. Patterson summed up this special partnership with the following words:

> I think it is safe to say that were it not for the wisdom and generosity of the Rosenwald Fund, in its willingness to make an exception to its stated policy, this favorable accomplishment probably would not be a matter of record today. I am sure also that the action of the Rosenwald Fund encouraged our own trustees to take the larger portion of our free funds to make possible the expansion and promotion of this development. We now have a total investment of approximately $350,000, and aviation has been developed to the point where I am sure it will be a permanent feature of the work of Tuskegee Institute. When we consider the importance of aviation as a vocation today and what it will in all probability mean in the post-war world, we can see that a contribution of lasting importance has been made.[17]

Phase Three Construction (Spring 1944-Summer 1945)

During the first half of 1944, Moton Field experienced yet another program expansion. In March a new Physical Plant Warehouse was completed, which provided additional office and storage space used by the primary flying school contractor, Tuskegee Institute, to better oversee activities at the airfield.[18]

A year later construction finally got underway on the civilian recreation building, later known as the Skyway Club. This building was to serve as a recreational facility for employees who worked at Moton Field. Built as a cooperative project, Tuskegee Institute supplied the materials while the employees were expected to contribute most of the labor. "Solo," a

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15 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section III," pp. 1-2; "History of the 2164th AAF Base Unit (CPS.P)(Formerly 66th AAFFTD), Tuskegee Institute, Alabama: Section IV," p. 39; "Solo." 10 March 1945, p. 9.
16 Washington, p. 310.
17 JRF Box 359, Folder 5. General Correspondence.
18 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section IV," p. 1.

locally distributed newsletter at Moton Field, suggested that an appropriate motto for the new building project was, "[t]he harder we work, the sooner we get to play."[19]

The final installment of the History of the 2164th AAF Base Unit, Tuskegee Institute, Alabama covered September through November 1945. This period marked the final phase of primary flying training of African-American personnel at Moton Field. By the end of November all trainees had either graduated, been discharged, or transferred to Tuskegee Army Air Field.[20]

Post War (1946-1998)

The close of the Army Air Corps contract flying school in November 1945 brought a change in the activity at Moton Field. Charles Alfred "Chief" Anderson, who was a flight instructor at the field for the Army Air Corps, continued to offer private flying lessons from Moton Field. Even though primary flight training operations had ceased at the airfield, the Skyway Club continued to operate as a night club open to the general public during this time. According to Bill Childs, who worked as a mechanic at Moton Field, a private business, Tuskegee Aviation Corporation, formed soon after the end of primary flight training. This corporation used the Moton Field facilities to repair and maintain planes and convert military planes for civilian use. In addition, the corporation operated a G. I. flight school through the G. I. College Bill, and Tuskegee Institute offered a degree in Aircraft Mechanics using the corporation and Moton Field for training. The corporation operated for approximately two years after the war ended.[21] According to Mr. Childs, the City of Tuskegee attempted to levy Tuskegee Aviation Corporation for a total of four million dollars in taxes, the amount for which the Moton Field property was insured. Rather than pay the taxes, the corporation decided to shut down. The government's first attempt to tax Tuskegee Institute for the property failed because the school was tax exempt and refused to pay the taxes.[22]

After the corporation dissolved, Macon County used the hangars for storage of surplus food and as a distribution center for welfare recipients.[23] During this time, several of the support buildings were turned into housing for employees of Tuskegee Institute. The bare minimum was spent on upkeep of these "cottages" as they were known, and residents did general repairs on the buildings themselves. Bill Childs remembers the Skyway Club serving as a dormitory for male students shortly after the war. The G. I. Bill increased student enrollment, and, while campus dorms were being renovated, the Skyway Club's original open space was subdivided into smaller sleeping quarters. The building may have been in use as a dormitory until the early 1950s.[24]

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19 "Solo." 10 March 1945, p. 9.
20 "The History of the 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama: Section XII," p. 2.
21 Telephone Interview of Bill Childs by Debbie Curtis Toole, December 2001.
22 Ibid.
23 Ibid.
24 Ibid.

All activity, with the exception of housing Tuskegee Institute employees in the cottages, ceased by the mid-1950s, and Tuskegee Institute put little money into the maintenance and upkeep of the buildings and grounds at Moton Field. According to Ed Pryce, landscape architect and superintendent of grounds and maintenance from 1955-1969, the only official upkeep at the field was occasional mowing and maintaining the water and sewer lines. No official use was given to the hangars or sheds during this time. With this lack of maintenance, the buildings and landscape deteriorated.

In the 1960s, the Tuskegee Institute School of Veterinary Medicine began to use the airfield for animal research. The area to the east of the field's building complex contained numerous cattle pens. The school renovated Hangar Number Two into a large animal operating and research lab in the early 1970s, which involved subdividing the large hangar space into operating rooms while the original office and classroom areas were converted into laboratories.[25] A fire destroyed the hangar in 1989, and the remaining walls were leveled to the ground. Based on a 1964 floor plan of the Skyway Club, this building may also have been used by the Veterinary School. In the mid-1970s, the school renovated the Warehouse/ Vehicle Storage Building into a Swine Research Center.

In 1972, a tract consisting of 325 acres of the original Moton Field was deeded to the City of Tuskegee for development of a municipal airport. Bids for the contract were opened in April of 1972, and construction began a year later by the Dubose Construction Corporation in March of 1973. The Municipal Airport was constructed to the north of the building complex. The new paved runways occupy the southern portion of cleared land where the original grass runways were located.

Creation of Tuskegee Airmen National Historic Site

President Bill Clinton approved Public Law 105-355 on November 6, 1998, which established the Tuskegee Airmen National Historic Site at Moton Field in Tuskegee, Alabama. The site was created to commemorate and interpret the heroic actions of the Tuskegee Airmen during World War II and was established as a unit of the National Park System. With this approval, Moton Field was also programmatically listed in the National Register of Historic Places. Establishment of the site included the acquisition by the National Park Service from Tuskegee University of approximately forty-four acres known as Moton Field.[26] This forty-four acre tract includes the nine extant historic structures as well as the former sites of the six non-existing structures. In addition, the tract includes an overlook area that might eventually be the site of a proposed interpretative center. NPS land does not include the grass runways, a portion of the historic taxiway, or a portion of the historic tarmac.

Because of its creation as a contract school, Moton Field facilities have not faced the adaptation or conversion typically experienced by other World War II pilot training facilities. Although deterioration has occurred to the historic fabric, the surviving buildings have not

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[25] Oral Interview of Booker Conley by The Jaeger Company, September 26, 2001.
[26] Public Law 105-335. 112 Stat. 3254-3258.

undergone significant alterations. When considered in the larger historic setting, the buildings and surviving landscape features express the field's historic function as a flight training facility. Moton Field retains a high level of integrity for interpretation of the training and activities of the Tuskegee Airmen.

For a complete historical overview and developmental history of Moton Field see the Cultural Landscape Report (CLR) for Moton Field, Tuskegee, Alabama.

Chronology of Development & Use

Hangar Number One at Moton Field was constructed from approximately June to August 1941 as part of the new airfield complex built by Tuskegee Institute to provide a training field for their contract primary flying school program.[27] Construction of the hangar and airfield was done by a private contractor hired by Tuskegee Institute. The construction contractor was Archie A. Alexander, an African-American engineer whose engineering firm was located in Des Moines, Iowa. Alexander was a well-known design and construction engineer whose work included significant projects in Washington, D.C., Iowa, and Michigan.[28] (See *Figure 1.*)

Design of the first hangar and the airfield appears to have been done largely by George L. Washington, head of the Department of Mechanical Industries, Division of Aeronautics at Tuskegee Institute. Mr. Washington apparently had difficulty obtaining design plans and specifications for facilities needed for a contract primary flying school from the Army Air Corps. Washington conferred with officials at Maxwell Field in Montgomery, Alabama, and visited the Darr Aero Tech primary flying school then under construction at Albany, Georgia, to understand the design and construction needs of such a facility. Washington and Alexander together visited other facilities at Camden, South Carolina, and Americus,

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[27] "History of 66th AAF Flying Training Detachment, Moton Field, Tuskegee Institute, Alabama, Section I – to 7 December 1941." Compiled by 1st Lt. Joseph W. Hensley. 234.821, in Moton Field Collection, AFHRA, pp. 8-9, 19.

[28] Ibid, p. 8. *Archibald Alexander: Design and Construction Engineer, Faces of Science: African-Americans in the Sciences*. Internet Web Site.

Georgia. Washington was then able to make tentative sketches of the building facilities needed, and Alexander estimated the cost. The Moton Field contractor was provided with a "brief descriptive specification and layout design", and Washington and Alexander worked out details as construction progressed. The new hangar and airfield were completed enough for use around September 1, 1941.[29]

Hangar Number One was the first of two hangars to be built at Moton Field for use by the primary flying school. From its construction in 1941 until Tuskegee Institute's contract with the Army Air Corps was ended in November 1945, the hangar was used for the maintenance and repair of airplanes flown by aviation cadets in the primary flying school. According to architectural drawings of the hangar, rooms constructed around the exterior of the large hangar space were utilized for offices, cadet waiting and ready room, locker and lavatory, repair shop, parachute folding area, and mechanical and storage needs. (See *Figures 2-4.*) When Hangar Number Two was constructed in 1942-1943, a number of functions originally housed in Hangar Number One, including the cadet ready room, parachute drying and folding areas, and the Intelligence Office were moved to the second hangar. This provided additional space in Hangar Number One for management offices.

The earliest architectural drawing of Hangar Number One found to date is entitled "Civil Elementary Army Training School, Tuskegee, Alabama, Building Facilities at Airfield" and is dated May 7, 1941. (See *Figure 5.*) The drawing shows a floor plan, front facade elevation, and proposed location of the building with respect to a 2800-square-foot takeoff and landing area. The floor plan is very similar to the plan constructed, with only minor variations in the room arrangement in the building's northwest corner. This drawing is most likely one of G. L. Washington's sketches for the hangar.[30]

Three other architectural drawings that appear to be from the same period show a building floor plan and utilities for the hangar. Only one of the three drawings is dated— July 13, 1941. Two of the drawings illustrate electrical layouts for the hangar, and the third illustrates a plan for the building's utilities, including sewer, water, telephone, and electrical lines as well as the placement of fire extinguishers. One of the electrical layout drawings also provides room names and uses and most closely matches the constructed floor plan. (See *Figure 6.*)[31] While only one drawing is dated, all three of these drawings likely date to the time of the hangar's original construction.[32] According to G. L. Washington's history of the training program, the balcony in the hangar space was not original to the construction of the hangar but was added in 1942 or 1943 to provide more room for parachute maintenance. A 1944 photograph of the hangar interior at night shows the balcony in place. Before the parachute tower in the Control Tower was constructed, the parachutes were hung from the roof trusses in Hangar Number One.[33]

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[29] "History, Section I," pp. 2-3, 8-9, 19, 29.
[30] "Building Facilities at Airfield," May 7, 1941.
[31] Architectural drawings not illustrated as figures are included in Appendix A.
[32] "Electrical Layout," no date; "Electrical Layout," July 13, 1941; "Plan of Utilities," no date.
[33] G. L. Washington, *The History of Military and Civilian Pilot Training of Negroes at Tuskegee, Alabama, 1939-45*, p. 307.

In June of 1942, a second phase of construction of Moton Field facilities serving the primary flying school began. Besides the construction of other support buildings at the field, an addition was made to the south side of Hangar Number One that included a lunch/tea room, an office, and a supply room. An architectural drawing dated June 6, 1942 and prepared by architect Edward C. Miller, head of the Tuskegee Institute architecture department, and G. L. Washington illustrates a floor plan, elevation, and section of the proposed addition. A drawing of lunch room booth details may also date from the same time. Two later drawings, prepared in August 1942, also illustrate the lunch room addition, but with minor alterations to the first plan. On the floor plan, the rooms are identified as tea room, chief of maintenance office, and supply room. This floor plan appears to match the plan that was constructed. (See *Figure 7.*) The second drawing provides a proposed equipment arrangement for the lunch room.[34] Historic photographs also document the lunch/tea room addition, including one interior photograph.(See *Figures 8, 9.*)

At a later date, circa 1943-1944, additional office space was constructed on the west side of the hangar. Three offices and an extension to the boiler room were added. Architectural drawings (no date) prepared by Edward C. Miller and G. L. Washington illustrate the addition almost exactly as it was constructed. (See *Figure 10.*) The exceptions were in the boiler room extension, where a single exterior door and window shown on the plan were replaced with a set of double doors, and the original exterior wall of the boiler room was not removed to form one large room as proposed in the drawing. Several windows on the west facade of the original perimeter rooms and one on the north facade were replaced with doors. (See *Figure 11.*)

Historic aerial photographs from the World War II era provide good views of Hangar Number One as it was constructed and used. (See *Cultural Landscape Report.*) Numerous other vintage photos document both the exterior and interior of the building.[35] (See *Appendix A.*)

After World War II and the close of the Army Air Corps' contract primary flying school in November 1945, the hangar continued to be used at least for a short time for aviation. A private corporation named Tuskegee Aviation was formed by mechanics and other former workers at Moton Field. The corporation continued to offer flight training and aircraft maintenance for approximately two years after the close of the contract school.[36] The hangar was also used to store private aircraft, including that of flight instructor Charles Alfred "Chief" Anderson, who maintained an office in the hangar and reportedly lived for a short time in one of the two buildings to the west of Hangar Number One.

According to Ed Pryce, landscape architect and superintendent of grounds maintenance at Tuskegee Institute from 1955-1969, there was little money to maintain Moton Field during

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[34] "Proposed Alterations to Air Corps Primary School," June 6, 1942; "Booth Details for Lunch Room," no date; "Airport # 2 Additions," August 3, 1942; "Proposed Equipment Arrangement, Lunch Room," August 11, 1942.

[35] c.1944 Aerial Photograph, Historic Photograph Collection, Howard University. c.1945 Aerial Photograph, Historic Photograph Collection, NPS Curatorial Storage Facility, Tuskegee Institute NHS. Historic Photograph Collection, AFHRA, Maxwell AFB.

[36] Interview with Bill Childs, December 2001.

the 1950s and 1960s, and the airfield and its buildings deteriorated. Apparently, the office in Hangar Number One used by Chief Anderson was the only office at the time that was relatively dry and did not have roof leaks.[37]

Photographs of Hangar Number One from the 1970s show a vacant and deteriorating building.[38] (See *Figure 12.*) The roofs of the rooms surrounding the hangar space appear to be largely gone by this time.

Architectural drawings were prepared in 1980 for renovation of the hangar, but there is no physical evidence that any of this renovation work was done.[39]

Hangar Number One remained in this deteriorated condition until stabilization work was begun in 2001. A new metal roof has been put onto the large hangar space, while the perimeter rooms remain without roofs at this point. A detailed description of the existing building and the recent stabilization work is found in the *Physical Description* section.

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[37] Ed Pryce, Interview by Christine Trebellas.
[38] Booker Conley's Files, Physical Plant, Tuskegee University.
[39] "Hangar Renovation, Moton Field," Millkey and Brown Associates, 1980.

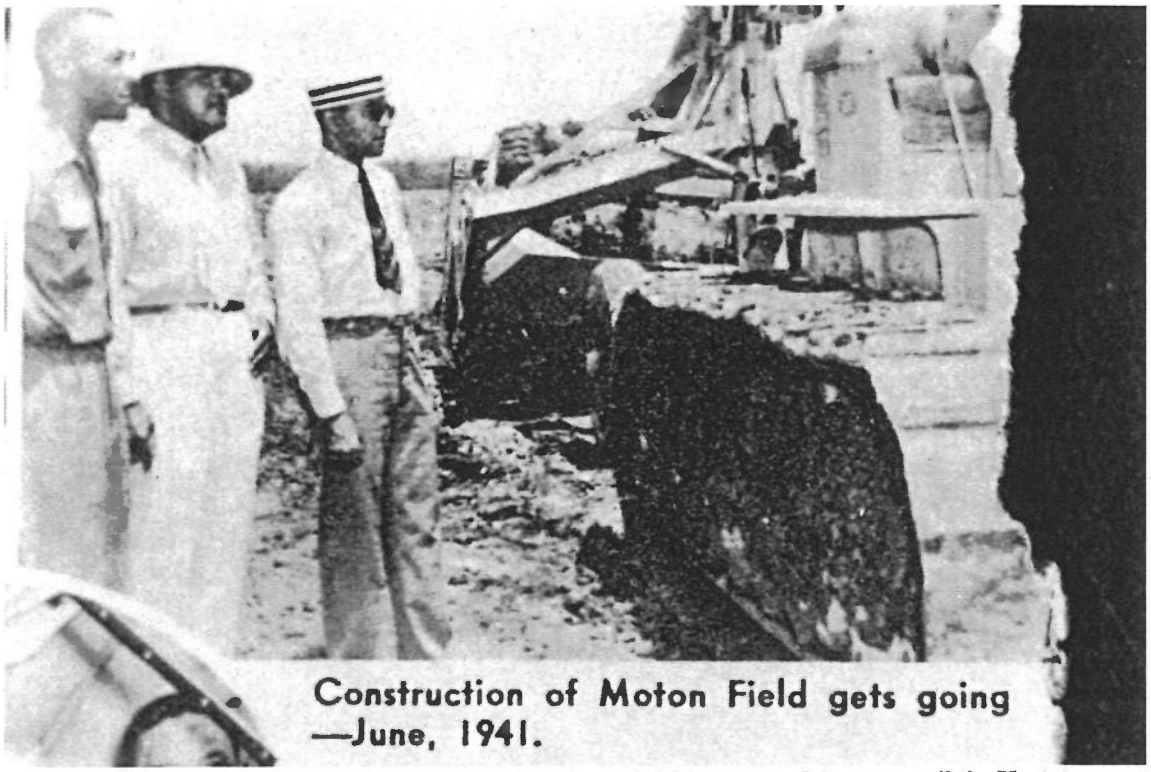


Figure 1: Photo of initial construction at Moton Field in June 1941. From *Pilot Training School, Tuskegee Institute, Tuskegee, Alabama.* U.S. Army Air Forces Training Edition, May 1944. AFHRA, Maxwell AFB.



Figure 2: Photo of Hangar Number One in use before the 1943-1944 office addition. Historic Photograph Collection, Howard University.

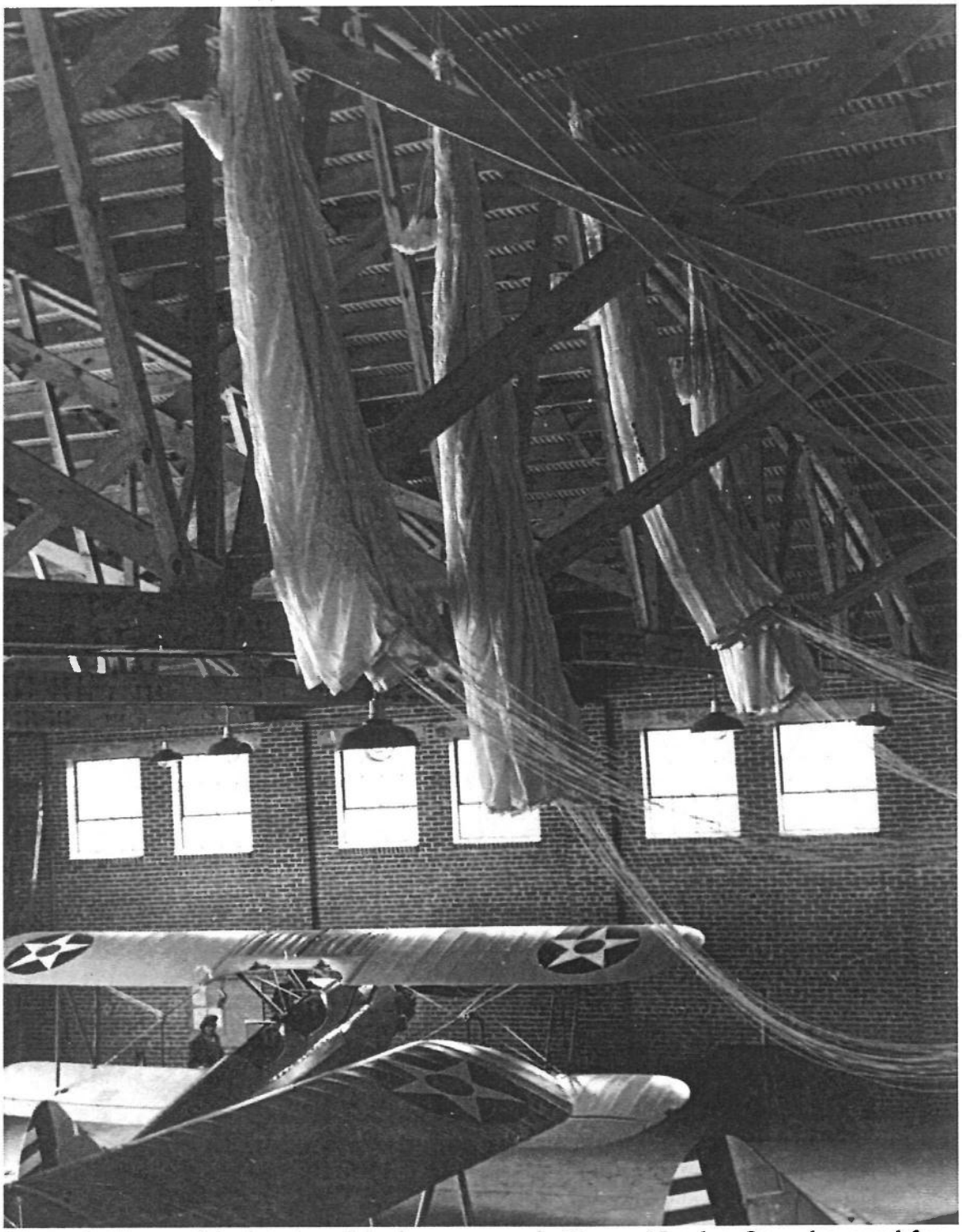


Figure 3: Photo of the interior of the hangar space in Hangar Number One when used for drying parachutes. Historic Photograph Collection, Howard University.

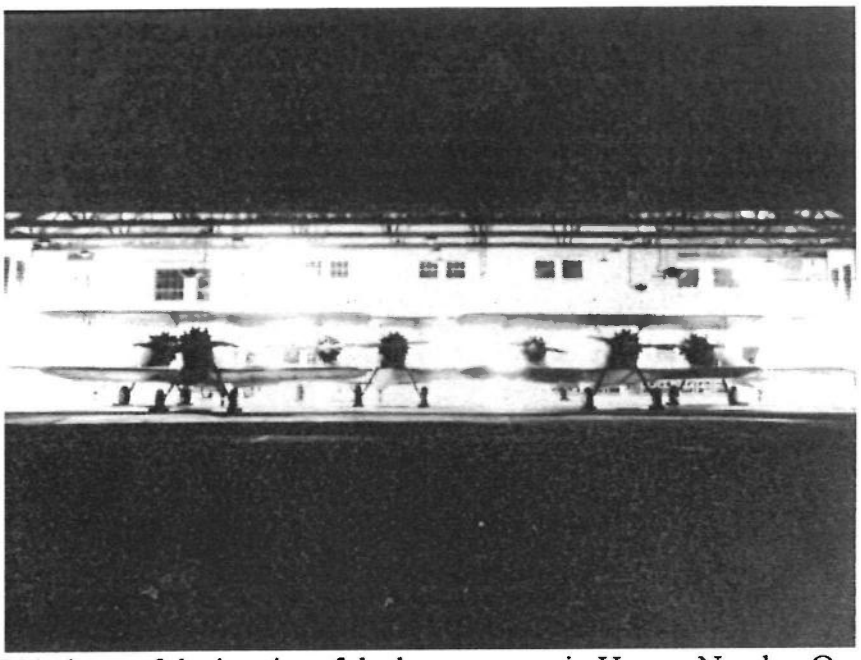


Figure 4: 1944 photo of the interior of the hangar space in Hangar Number One at night. Historic Photograph Collection, AFHRA, Maxwell AFB.

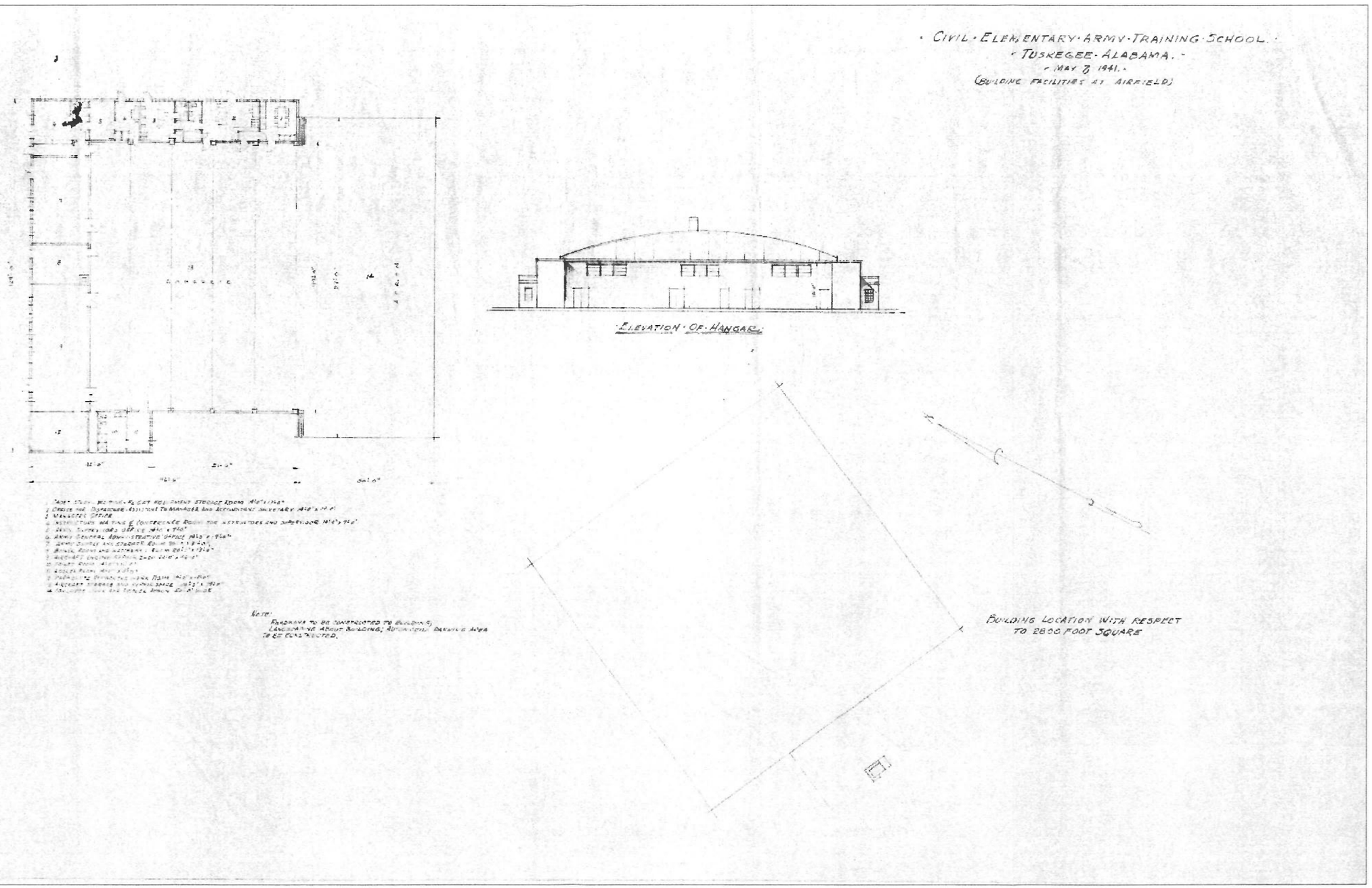


Figure 5: Earliest architectural drawing found to date of Hangar Number One, dated May 7, 1941.
Physical Plant, Tuskegee University.

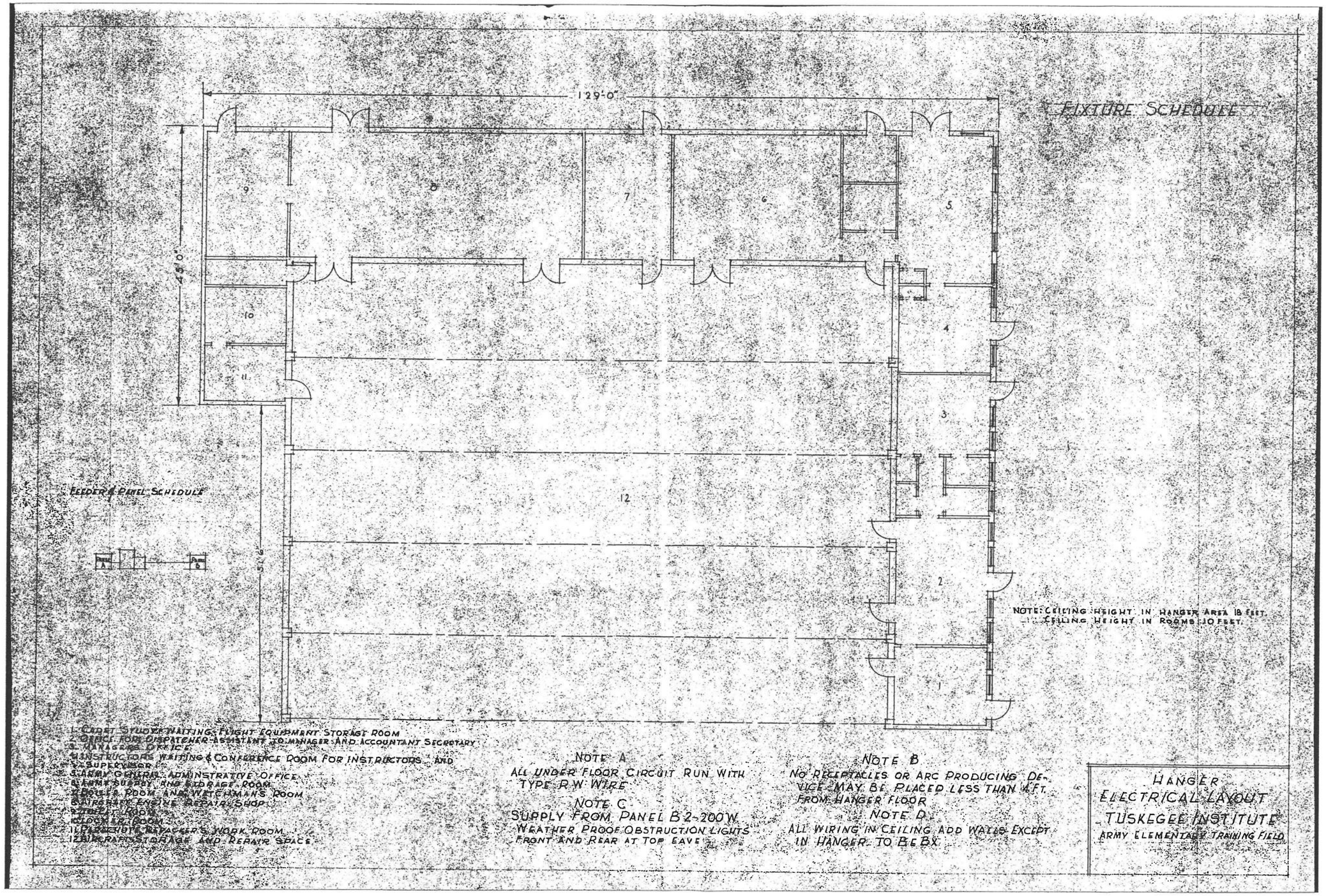


Figure 6: Early plan of Hangar Number One showing electrical information and room names and uses.
Physical Plant, Tuskegee University.

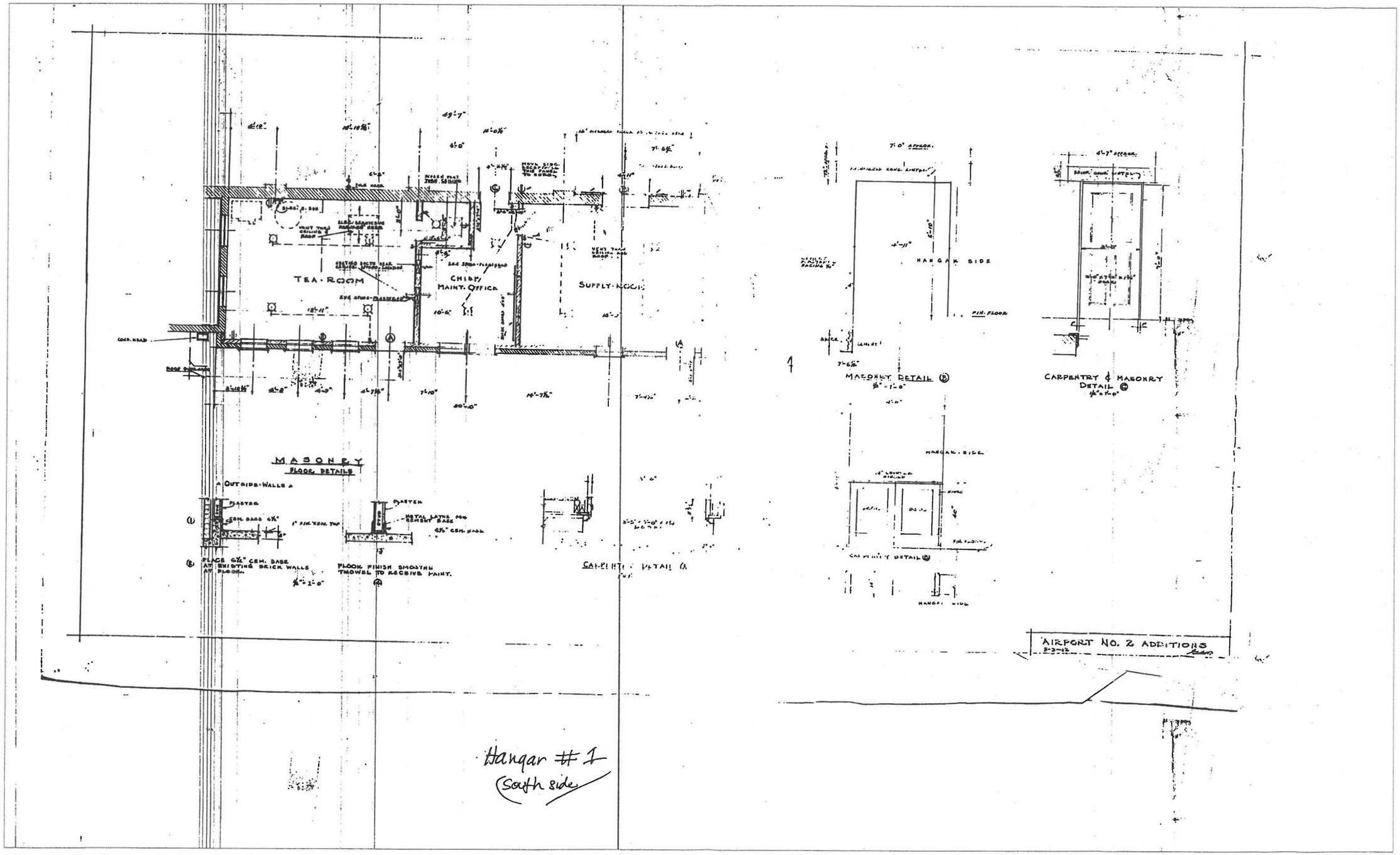


Figure 7: Plan and details of 1942 lunch/tea room addition as constructed. Physical Plant, Tuskegee University.



Figure 8: Photo showing the lunch/tea room addition on the south facade of Hangar Number One. Historic Photograph Collection, Howard University.



Figure 9: Photo of the interior of the lunch/tea room in Hangar Number One. Historic Photograph Collection, AFHRA, Maxwell AFB.

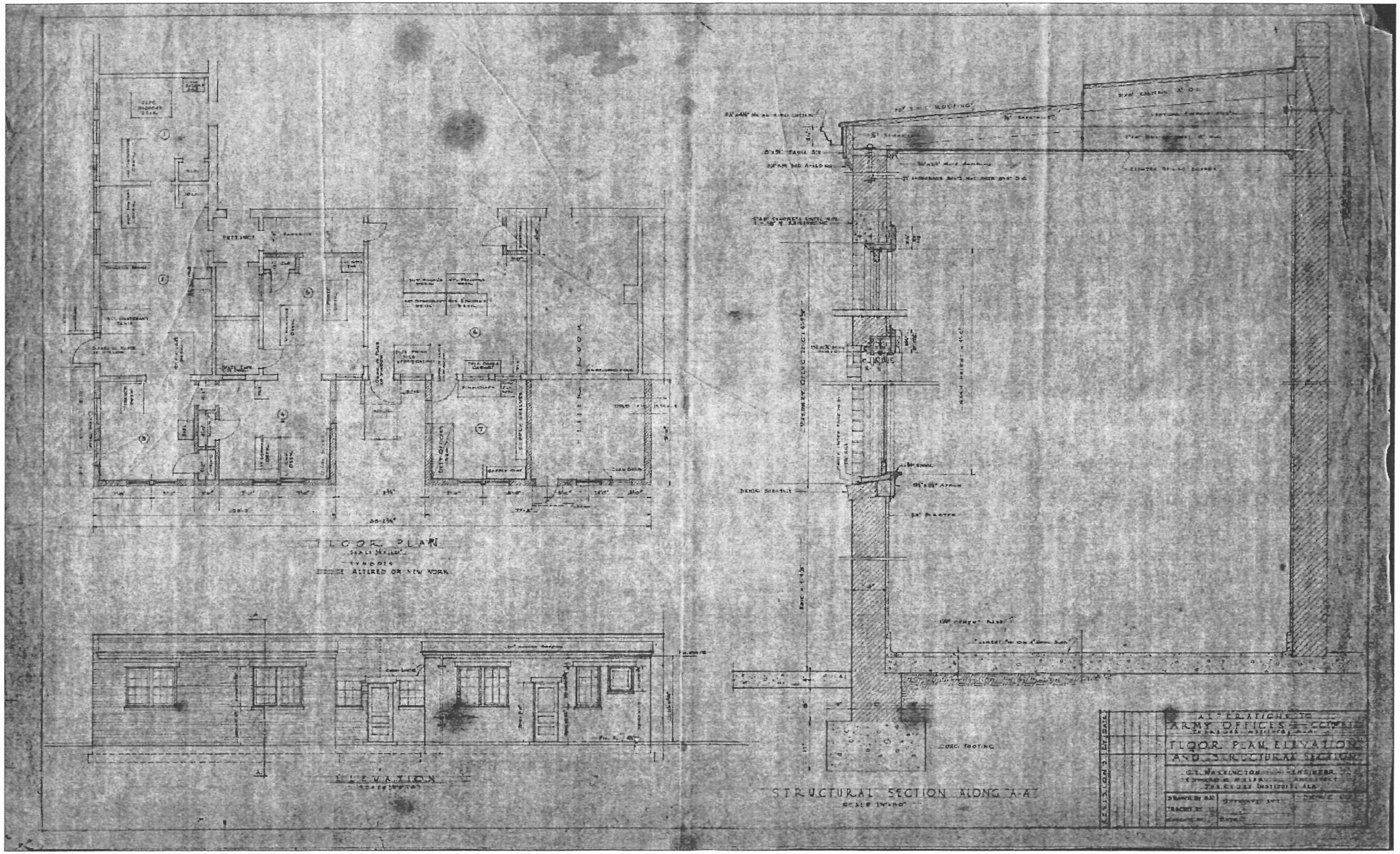


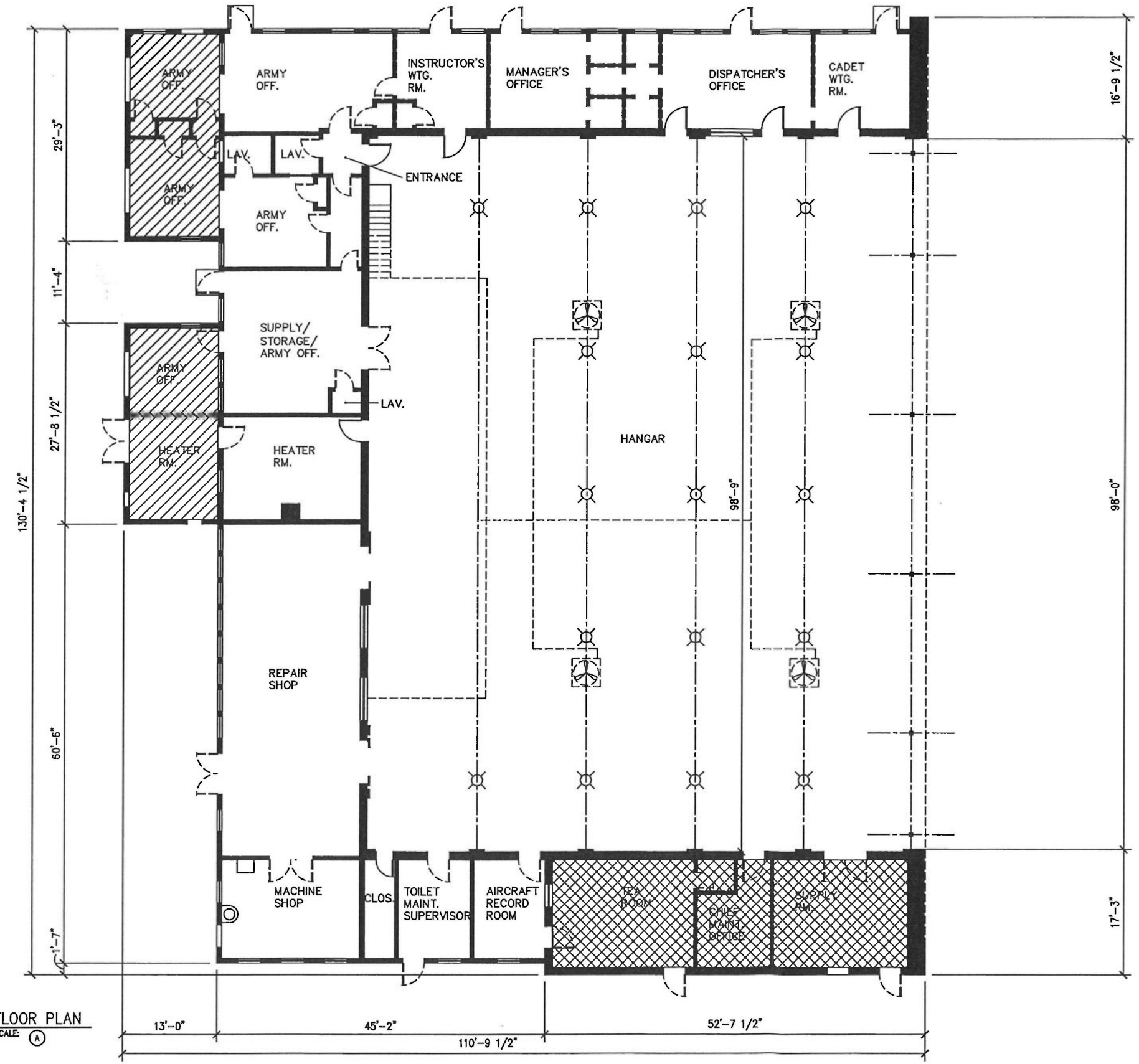
Figure 10: Plan, elevation, and details of 1943-1944 office addition.
Physical Plant, Tuskegee University.



Figure 11: Photo of the construction of the 1943-1944 office addition on the west facade of Hangar Number One. Historic Photograph Collection, Howard University.



Figure 12: 1970s photo of Hangar Number One. **Booker Conley's Files, Physical Plant,** Tuskegee University.



1942 LUNCH/TEA ROOM ADDITION

1943–44 OFFICE ADDITION

LEGEND

- EXISTING WALL
- WALL MISSING
- EXISTING DOOR
- DOOR MISSING
- EXISTING SUSPENDED LIGHTING FIXTURE
- HEATING UNIT

SCALE (A)

8 0 8 16

SCALE: 1/8" = 1'-0"

A1 / A1 A1 FLOOR PLAN SCALE: (A)

THE JAEGER COMPANY

BOND & company
Architects & Engineers
2635 Century Parkway
Suite Eight Hundred
Atlanta, Georgia 30345
(404)633-8995
Fax: 325-8458

HANGAR NO. 1
FLOOR PLAN EVOLUTION

MOTON FIELD STABILIZATION
TUSKEGEE AIRMEN NAT'L HISTORIC SITE
TUSKEGEE, ALABAMA

FIGURE 13



Figure 14: Existing east front facade.



Figure 15: Existing sliding hangar doors.



Figure 16: Existing south side facade showing rebuilt wall of lunch/tea room addition.



Figure 17: Existing north side facade with temporary shoring.



Figure 18: Existing west rear facade with water cistern.



Figure 19: Existing office addition on west rear facade.

Physical Description

Hangar Number One is a brick and structural clay tile masonry structure constructed in 1941, with additions in 1942 and circa 1943-1944. The hangar consists of a 75-foot by 98-foot hangar space used for airplane maintenance and repair. Around this hangar space is a one-story perimeter of rooms originally used for offices, cadet ready and waiting room, parachute folding area, and other repair, mechanical, and storage spaces needed for the primary flying school at Moton Field. (See *Figure 13.*)

The large hangar space at the center of the structure is constructed on three sides with brick masonry walls. The fourth wall consists of two sets of sliding hangar doors that slide back from the center to the side parapet walls and open the hangar space to the exterior. (See *Figures 14, 15.*) Around three sides of the hangar space are one-story perimeter rooms, most of which were originally constructed with the hangar space. A shed-roofed addition containing a lunch/tea room, office, and supply area was made to the south side facade in 1942. (See *Figure 16.*) The north side facade faces the airfield, and the north row of rooms were the original location of the cadet and instructors waiting and ready rooms. (See *Figure 17.*) The west rear rooms were the location of office and mechanical spaces, including a 1943-1944 office addition at the northwest corner. (See *Figures 18, 19.*)

Following is an extensive description of the existing features and materials of Hangar Number One based on field inspection and supported by original architectural drawings and historic photographs. A *Conditions Assessment/Features Inventory* detailing the conditions of

each of the following features is located in *Appendix C.* A detailed *Paint Analysis* and *Mortar Analysis* are located in *Appendix D.*

Masonry Walls

The large hangar space is constructed on three sides with brick masonry walls that rise above the surrounding perimeter rooms. These walls are exposed and unfinished on the interior and the upper portion of the exterior. Originally the lower portions of the exterior of the hangar space walls within the perimeter rooms were covered with plaster. (See *Interior Finishes.*) On the interior of the hangar space, brick piers are placed at regular intervals along the north and south walls to support the ends of the roof trusses. The three masonry walls of the hangar space are punctuated with windows that provide light into the space.

The east front facade of the hangar space is flanked on either side of the hangar doors by tall brick masonry parapet walls that rise above the edge of the hangar roof and extend across the east ends of the perimeter rooms. These solid masonry walls are strengthened on each outer side by a brick pier that extends forward from the wall and are topped with concrete caps.

The brick of the hangar walls is laid in a common bond pattern of one header row and six stretcher rows. The historic brick masonry units are smooth red brick that measure 8¼ inches in length by 2¼ inches in height by 3¾ inches in depth. These bricks were manufactured commercially at a brick plant. According to the *Mortar Analysis* report, the mortar is a cement mortar composed of a portland cement, lime, and siliceous sand mixture. The mortar is generally intact, competent, and not easily scratched with a metal chisel. Softer mortar was observed in isolated areas of the hangar. The mortar appeared to have a higher lime content at some places than the other mortar observed on site. The mortar inside the hangar ranged from soft (easily scratched with a metal chisel) around the structural clay tile to medium hard around the brick. Based on a mortar sample taken from the hangar's south interior wall, the mortar is ASTM C270 Type M. (See *Mortar Analysis* in *Appendix D.*)

The majority of the exterior and interior walls of the perimeter rooms are constructed of brick and structural clay tile. The brick masonry units and mortar are the same or very similar to those in the walls of the hangar space. (See *Mortar Analysis* in *Appendix D.*) The structural clay tile units measure approximately 12 inches by 12 inches by 4 inches in depth. The brick and tile are laid in varying patterns from wall to wall and provide the wall structure. Some of the interior walls in the perimeter rooms are constructed largely of structural clay tile with only a few rows of brick laid along the top of the walls. The exterior walls are finished on the outside with a brick veneer in the same common bond as the hangar space walls. All of the exterior perimeter room walls original to the hangar's construction have a soldier course of stretchers extending around their upper portion and are topped with a concrete parapet cap. The brick walls of the additions on both the south and west facades do not have wall caps (with the exception of the north wall of the office addition) but were sheltered with shed roofs.

The exception to the brick and structural clay tile construction in the perimeter rooms was in the 1942 lunch/tea room addition on the south facade. The exterior wall of the addition was constructed of 2x4 frame finished on the exterior with brick veneer. The interior walls were frame. (See *Interior Frame Walls.*)

The building's masonry walls remain largely intact without loss of structural integrity although exposure to weather and lack of maintenance have caused some deterioration. This deterioration can mainly be seen in the walls of the perimeter rooms where the roofs have been missing for a number of years. Portions of the masonry along the tops of many of the perimeter room walls have fallen off, and the structural clay tile is damaged in some areas. Masonry damage also exists around some of the doorways. Based on architectural drawings and evidence of their original locations on the floor, some of the masonry interior walls in the perimeter rooms are missing entirely. These missing walls were located in the perimeter rooms along the north and west sides and in one of the 1943-1944 office additions. The footprints of these walls can still be largely seen on the existing concrete floors. (See *Existing Conditions Drawings.*)

Efflorescence is visible in several locations, particularly on the north facade of the perimeter rooms. Rising damp can be seen around the bases of the brick walls in many places. Minor deterioration and discoloration of the masonry from excessive moisture caused by the lack of a roof and the presence of vegetation on and around the building can also be seen. Minor cracks caused by settlement are visible in the exterior brick walls of the perimeter rooms near the southwest and northwest corners. Some bricks are loose and missing from the front facade parapet walls where the steel tracks of the hangar doors are anchored into the masonry. Pipes from the water cistern into the building at the southwest corner have caused several holes to be punched into the masonry wall and window sill. In general, however, the brick masonry walls are in sound condition, particularly the walls of the large hangar space.

Recent stabilization work (2001) has been done to maintain the integrity of the masonry walls. The exterior wall of the 1942 lunch/tea room addition on the building's south facade had partially collapsed. The wall was reconstructed with an interior structural wall of concrete block finished on the exterior with brick veneer. The use of concrete block plus a brick veneer has made the rebuilt wall thicker than the original 2x4 frame and brick veneer wall. The reconstructed wall is approximately 11 inches thick as compared to the original wall thickness of approximately 9½ inches. (See *Interior Frame Walls.*) The existing brick veneer was retained where it was still intact, and new brick veneer was added to cover the remainder of the wall. The new brick masonry units used in the new brick veneer are 7½ inches in length by 2¼ inches in height by 3½ inches in depth as compared to the original bricks which are 8¼ by 2¼ by 3¾ inches. The new bricks are shorter in length than the originals, causing the vertical mortar joints between the ends of the bricks to be wider than the original mortar joints. According to the *Mortar Analysis* report, the new mortar used is a masonry cement mortar that is ASTM C270 Type S. The new mortar is compatible in composition with the existing mortar but is much whiter in color. A brown-colored smear coat has been placed over the white mortar to disguise its white color. (See *Mortar Analysis* in *Appendix D.*)

Several sections of brick were missing near the top of the exterior brick wall of the perimeter rooms on the north facade. The holes were infilled with new brick masonry. As in the south facade wall, the new brick masonry units are shorter in length than the original bricks, causing the vertical mortar joints to be wider than the original joints. Also, the new mortar is whiter in color and a brown-colored smear coat has been placed over it to disguise its white color. One portion of the concrete parapet cap that was missing was replaced in kind with new concrete. The entire north facade wall of the perimeter rooms has been braced from the exterior with temporary wood braces.

Repointing of brick masonry joints has been done in several other locations using the same white-colored mortar. These areas include the top of the north facade wall of the hangar space and on the interior of the hangar space walls at each front corner where the roof truss rests on the masonry wall.

Interior Frame Walls

The walls of the lunch/tea room addition, constructed in 1942 on the hangar's south facade, were 2x4 and 2x6 frame walls. The exterior wall consisted of a 2x4 frame finished on the exterior with brick veneer and on the interior with plaster. The interior walls consisted of a 2x6 frame finished on either side None of the interior frame walls remain today, although their locations can still be seen on the concrete floor.

The exterior wall of the addition was largely reconstructed in the recent stabilization work. The 2x4-frame and brick-veneered wall was replaced, however, with a concrete block and brick-veneered wall, making the wall thicker than its original width. The reconstructed wall is approximately 11 inches thick as compared to the original wall thickness of approximately 9½ inches based on original architectural drawings of the lunch/tea room addition. (See *Figure 7.*) Portions of the original brick veneer remain on the wall's exterior.

Roof

The segmentally arched roof of the hangar space is constructed of wood trusses covered with corrugated metal roofing. Six wood trusses are evenly spaced from the east front facade to the west rear facade of the hangar space. Five of these trusses are identically constructed while the sixth truss at the west rear wall is more simple in design. The five identical trusses are composed of a horizontal bottom chord of two large 4x10s spaced apart and bolted to the vertical web members; a segmentally arched upper chord of two rows of eight 2x4s bolted together with the two rows spaced apart and bolted to the vertical web members; and 4x4 vertical and diagonal web members placed in triangular arrangements to provide a rigid framework. At each end of the bottom chord, steel plates on either side of the chord are bolted together with long bolts. The ends of the 4x10s of the bottom chord are sandwiched with 4x10 blocks, all of which are bolted together with long bolts. The ends of these five trusses rest on the brick masonry walls of the north and south facade of the hangar space. Brick piers protrude from the walls at these points to support the roof trusses.

The sixth truss rests on top of the west wall of the hangar space. The horizontal bottom chord is a single 4x10 resting on top of the masonry wall. The segmentally arched top chord is composed of two 2x10s bolted together. Web members are 4x4 vertical supports. This truss is simpler in design due to its support by the masonry wall.

Four sets of cross braces made of single 2x8s are located between each of the six trusses. The cross braces are nailed to the vertical web members of the trusses.

Supporting the roofing material are 2x8 rafters running east-west in direction and resting on top of the roof trusses, where the rafter ends are overlapped and nailed. The rafters are braced with 2x4 cross braces between each rafter. The roofing material consists of corrugated metal sheets attached to the rafters. Each end wall of the arched roof is also finished with corrugated metal sheets fastened to horizontal 2x4s that are attached to the roof trusses.

A pent roof extending across the hangar's east front facade above the hangar doors protects the sliding tracks at the top of the doors. The roof is constructed of wood framing members covered by corrugated metal sheets and finished with 1x8 wood soffit and fascia boards.

The frame roof structures of the perimeter rooms have been gone for a number of years and only remnants of frame plates and roof lines remain. The perimeter rooms original to the hangar's construction had sloped roofs encircled by brick parapet walls. Pockets for the roof rafters where the sloped roofs were attached to the brick walls of the hangar space can be clearly seen. Remnants of wood plates remain attached to the brick walls in some areas. The sloped roof lines can also be seen along the back sides of both front facade parapet walls. Based on field measurements, these roof slopes were minimal. The north side perimeter rooms had a roof slope of 2 inches from the exterior of the hangar wall to the interior of the outside perimeter room wall— a distance of 13 feet. The west side perimeter rooms had a roof slope of 3 inches over a distance of 19 feet from the hangar wall to the outside perimeter room wall. The original south side perimeter rooms had a roof slope of 2½ inches over a distance of 13 feet 5 inches from the hangar wall to the outside perimeter room wall. Based on the location of roof rafters still visible in the masonry walls, the roof over the west side perimeter rooms was higher than the roofs over the north and south side perimeter rooms. The distance from the floor to the bottom of the roof rafters on the west side is 11 feet 2 inches. On the north and south sides, this distance is 9 feet 8½ inches.

The roofing material of the original perimeter rooms is not known for certain, although the material was most likely roll roofing, built-up roofing, or shingles. Remnants of green shingles along with tar and pieces of metal flashing can be seen in several places where the perimeter room roofs joined the masonry hangar wall.

Both the lunch/tea room addition and the office addition had shed roofs without parapet walls. Based on architectural drawings and historic photographs, the shed roof of the lunch/tea room addition extended out past the brick wall to form a wide overhang. The June 1942 drawing of the lunch/tea room addition (which has a different plan from what was built) shows the roof constructed of 2x6 rafters and ceiling joists covered with wood

sheathing and 90-lb. roll roofing. Based on field measurements, the lunch/tea room addition had a steeper roof slope than the original perimeter rooms— 1 foot 3 inches over a distance of 14 feet 8 inches from the hangar wall to the outside perimeter room wall. Remnants of tar and metal flashing can still be seen on the brick walls of the hangar space.

Architectural drawings for the office addition show a shed roof constructed with 2x6 rafters and ceiling joists and covered with wood sheathing and 90-lb. roll roofing. The roof had only a slight overhang finished with a fascia board and bed molding. Based on field measurements, the office addition had a 1 foot 1 inch roof slope from the exterior of the perimeter room wall to the interior of the outside office addition wall. On top of the brick walls of the office addition, the bolts that held the top plates are still in place. The paint lines of the fascia boards are also visible along the side walls.

In recent stabilization work, the building's original corrugated metal roofing and wood rafters have been reconstructed with in-kind materials. Both the original and replacement metal roofing sheets measure 26¼ inches by 144 5/8 inches. Wood members of the first roof truss at the east front facade have been replaced in kind due to deterioration. At each end of the truss, members of the upper and bottom chords have been replaced. In the middle of the truss, members of the upper chord and several vertical web members have been replaced. New bolts and washers have replaced old fasteners where needed. The cross braces between the first and second trusses nearest the east facade have also been replaced in kind.

The wood structure of the pent roof over the hangar doors on the front facade is in poor condition due to moisture decay. A number of the wood fascia boards are missing, and many of the remaining boards are warped. The corrugated metal is rusted but appears to be in fair condition.

Downspouts that diverted water from the sloped roofs of the original perimeter rooms were located at intervals along the perimeter rooms' exterior brick walls. Only one original downspout remains, and it is located at the southwest corner of the building. Former locations of other downspouts in the parapet walls can be seen. The locations of two downspouts on the north facade of the perimeter rooms, visible in historic photographs, have been infilled with new brick masonry during recent stabilization work. Gutters and downspouts were originally included on the edge of the shed roof of the office addition.

Foundations

The foundations of Hangar Number One consist of concrete footings on which the exterior brick masonry walls were constructed and the concrete floor slabs were poured. The footings are located underground and are not visible. The size of the concrete footings for the hangar's original construction is not shown on architectural drawings found to date. Concrete footings are shown on the drawings for the two additions.

The hangar's concrete foundations appear to remain in good condition due to a minimum of settling. Only minor cracks can be found in a few locations in the masonry walls.

Floors

The original floors of both the hangar space and the perimeter rooms are concrete and remain intact. The concrete slab floor in the hangar space was poured in six sections. Two circular floor drains near the center of the hangar space allowed water to drain from the area. The concrete slab into which the steel tracks for the hangar doors are embedded was poured separately from the hangar space slabs. The concrete floor of the hangar space is in good condition.

The concrete floors of the perimeter rooms were also poured separately from the hangar space. Remnants of floor tile added at a later date in the perimeter rooms along the north facade can still be seen. The concrete floors of the perimeter rooms have been exposed to the weather for many years and are beginning to show signs of deterioration. Vegetation is growing through cracks in the concrete floor in a number of locations. An area of concrete slab in the lunch/tea room addition is buckling up and cracking.

Windows

Windows throughout the hangar are metal industrial sash in metal frames. The windows in the large hangar space consist of two sections. The upper two-thirds of the windows consists of an eight-pane section that opens outward from the bottom. The lower, four-pane section of the windows is fixed. The panes in these windows measure 12¼ inches by 17¼ inches. The smaller windows in the perimeter rooms are a single metal awning sash with six panes that opens outward from the bottom. The panes in the perimeter room windows are the same size as those in the hangar space. All of the windows in the hangar have concrete lintels and brick sills, with the exception of the lunch/tea room addition which has brick lintels.

Exterior window openings in the west wall of the 1943-1944 office addition are missing their original window frames and sash. According to original architectural drawings for the addition, the windows were six-over-six, double-hung wood windows set in wood frames.

Three openings with wood frames open from the hangar space into the perimeter rooms. Two of these openings are located in the hangar space's west wall, and one is located in the north wall. It is not known if these were windows with sash or pass-through openings from these rooms into the hangar space. The opening in the north wall has a wood shelf supported with wood brackets on the hangar space side. According to an early plan of the hangar, the opening in the north wall would have opened into the Office for the Dispatcher, while the two openings in the west wall would have opened into the Aircraft Engine Repair Shop.

The majority of the hangar's windows remain intact, although their metal frames and sash have rusted and many of their glass panes are broken. The original metal locks remain on the windows but most are likely inoperable due to rust. The windows in the west wall of the office addition are missing. All of the windows have been covered with plywood on the

exterior for protection from further exposure and vandalism. Vertical wood supports have been placed in all the window openings.

Doors

The east front facade of the hangar contains two sets of four large hangar doors that open the hangar space to the exterior. The doors are constructed of a steel frame covered on the exterior with corrugated metal sheets fastened to the steel frame with bolts. The steel frames are imprinted with the "Gulf Steel" company or brand name. Steel plates are bolted together at the bottom corners to reinforce the frame. The doors slide back from the center to each side of the facade on large steel rails set into the concrete floor and on steel tracks at the top of the doors. Each door is set out progressively farther from the side to the center so that they all can slide to the same location at each side parapet wall. This system allows the hangar space to be opened almost completely to the exterior. Within the sliding door at each end is a small hinged door constructed of a wood frame covered with corrugated metal to match the sliding door. These hinged doors allowed easy access into the hangar space when the sliding doors were closed.

The hangar doors are in fair condition. The steel frames and much of the corrugated metal appear to be sound. However, rusting of the bottom rails of the steel frame, the steel plates, and the corrugated metal at the bottoms of the doors has caused deterioration of these materials. The bottom rails are full of dirt and debris, making it difficult to slide the doors. A temporary frame and plywood entrance constructed at the center of the hangar doors during stabilization work allows entrance into the hangar space without disturbing the hangar doors.

The original interior doors leading from the hangar space into the perimeter rooms were metal with metal frames. Several of the metal doors and all of the metal frames remain intact but a number of them are missing. The upper half of these doors contains a four-pane sash while the lower half is solid. The single doors are hinged, and the double doors are sliding doors fastened to a track along the top of the doorway. Several of these doors also have wood door frames located on the perimeter room side of the door, perhaps for a wood-frame screened door. All of the remaining metal doors are very rusted, and their glass panes are missing. Some of them have been bent.

Doors added between the hangar and the 1942 lunch/tea room addition appear to have been wood with wood frames. Remnants of the wood door frames remain in the doorways into the former supply room and chief maintenance office.

None of the doors in the perimeter rooms are intact. Remnants of wood door frames and a portion of a wood door remain in several doorways in the northwest corner. According to historic photos, the exterior doors on the original perimeter rooms were wood doors with a single pane of glass in the upper half and three horizontal wood panels in the lower half. On the exterior the doors were sheltered with a shed-roofed canopy made of a wood frame covered with either roll roofing or asphalt shingles. Some of the windows in the west facade of the original perimeter rooms were replaced with doors when the 1943-1944 office addition was made.

The doors in the brick masonry walls of the hangar space and in the exterior walls of the perimeter rooms have concrete lintels. Doors within interior walls in the perimeter rooms have structural clay tile lintels.

Balcony

The balcony in the hangar space is constructed between the west rear masonry wall and the next adjacent roof truss. The cantilevered, self-supporting balcony is supported by the roof truss and by floor joists resting on 2x12s bolted to the masonry wall. The floor is constructed of 2x10 joists covered with 1x8 floor boards. Ceiling joists are 2x8s and span between the two trusses. The walls are framed with 4x4s and 2x4s and are covered on the exterior with a thin fiberboard with wood battens over the joints. Large pieces of the fiberboard are missing. Temporary 4x4 vertical supports have been added under the east edge of the balcony floor.

The interior of the balcony walls appear to have been largely unfinished. The ceiling was covered with fiberboard nailed to wood lath attached to the ceiling joists. Remnants of the wood lath and fiberboard remain intact. A portion of an interior wall subdividing the balcony space also remains intact. It is constructed of 2x4 framing and covered with flush 1x12 boards on one side of the wall. Portions of a doorway frame remain in the wall. The original pattern of partitions within the balcony is not known.

The balcony is reached by a wood stairway leading up from the hangar space floor. The stairway is constructed of wood stringers with 2x10 treads and open risers. Approximately one-third of the way up the stairway is a landing. The bottom section of the stair below the landing is currently missing. The stairway is supported by 2x8 supports placed diagonally from the stairway to the masonry wall where they are bolted to the wall. Temporary supports have been added to the landing during stabilization work. (A new stairway has since been constructed in the location of the existing stairway.)

Windows in the balcony are located in the east wall. Originally there were three pairs of windows but only two sash now remain. The windows are six-pane wood sash set into wood tracks to allow them to slide open. The wood sash are 34 inches in width by 32 inches in height; window panes measure 9¾ inches by 13¾ inches. Wood moldings were simple 1x6s and 1x10s; only portions of these remain. One door remains at the top of the stairway. It is constructed of 2x4 framing covered on the exterior with 1x6 vertical boards. The molding around the doorway is 1x6.

The balcony structure is in fair condition. The wood members of the floor have deteriorated so that the joists are spongy and portions of the wood flooring are rotten. Much of the exterior fiberboard is missing and remainder is in bad condition. Only portions of the ceiling structure remain intact.

Interior Floor Plan

Hangar Number One's interior floor plan appears to have been altered from its original plan only by the 1942 lunch/tea room addition and the 1943-1944 office addition. When the lunch/tea room addition was made in 1942, doors were added in the south wall of the hangar space and the east wall of the original perimeter rooms to provide access to the new addition.

When the office addition was made in 1943-1944, several windows in the west and north facades of the original perimeter rooms were replaced with doors, providing interior access into the new offices. Likewise, one of the doors was infilled. Also, a wall and closet were added in one of the existing army offices to provide a passage to the adjacent office. A closet was also added in the adjacent office.

A number of interior walls in the perimeter rooms are now missing. These include the interior frame walls of the lunch/tea room addition; several interior walls in the army offices area in the northwest corner of the original perimeter rooms; interior walls between two of the offices in the office addition; and all of the interior walls in the north row of perimeter rooms. The footprints of these walls can still be seen on the concrete floor.

Interior Finishes

The interior of the brick masonry walls of the hangar space has always been exposed brick. This remains so today. The interior surfaces of the walls of the perimeter rooms were originally finished with plaster. The architectural drawings for the lunch/tea room addition and the office addition specify plaster walls. Because of exposure to the weather due to the lack of a roof, the wall plaster in the perimeter rooms has severely deteriorated and disappeared in most locations. Remnants of plaster remain in most of the perimeter rooms, in some places in only a few patches.

The wall plaster in the perimeter rooms generally consists of several coats— a coarse base layer, a middle layer, and a finer finish coat. The base layer in the office addition appears to be more similar to a concrete finish than a plaster base coat. The plaster appears to have been applied directly to the brick and clay tile masonry walls except at window and door openings where the plaster was applied over wire lath.

The ceilings of the original perimeter rooms may have had the same plaster finish as the walls but this is not known at this point. None of the perimeter room ceilings remain. The architectural drawings for the office addition specify "celotex ceiling boards" with a cove molding for the ceilings in the addition but it is not known what material was used.

The majority of interior surfaces— plaster walls, window and door moldings, window frames and sash, and doors and door frames— appear to have been painted. (See *Paint Analysis* in *Appendix D.*)

Mechanical/Electrical/Plumbing Systems

Many components of the hangar's mechanical, electrical, and plumbing systems are intact in the building, although they are no longer functional and many have deteriorated. The heating system within the building remains fairly intact and includes the boiler, air handler, piping system, ceiling heaters in the hangar space, and remnants of ductwork and vents in the perimeter room walls. A brick chimney stack that vented the heating system remains intact in the boiler room area of the west perimeter rooms. The chimney appears to be in sound condition with only minor repair needs.

Much of the original electrical conduit and wiring remain but these are in poor condition. Switch boxes are intact on the walls in the hangar space and in the perimeter rooms. Original lighting fixtures remain in the hangar space. Many receptacles and switches are also intact.

Piping for some of the plumbing in the hangar remains but all plumbing fixtures are gone. Only a built-in shower in the former maintenance supervisor's toilet remains.

Fire extinguishers were located throughout the building in strategic locations in case of fire associated with the airplane maintenance activities that took place in the hangar. On the interior of the hangar space, locations of fire extinguishers can still be seen on the masonry walls by a painted outline, stencilled instructions, and in several locations the original metal brackets. Based on field observations of the hangar space, fire extinguishers were placed in three locations on the interior of the south wall. Metal brackets that supported the extinguishers remain in two of these locations. On the interior of the west wall, extinguishers were placed in two locations; one of the metal supporting brackets remains. On the interior of the north wall, extinguishers were placed in one location; the metal supporting bracket remains intact. Two fire extinguishers may also have been located on the balcony on the interior of the west wall. The locations of any fire extinguishers that may have been placed in the perimeter rooms has been lost due to the loss of the plaster wall finishes.

More information on the existing mechanical, electrical, and plumbing systems of Hangar Number One can be found in the *Conditions Assessment/Features Inventory* in *Appendix C*.

Part II - Treatment & Use

Ultimate Treatment & Use

Requirements for Treatment

Alternatives for Treatment

Ultimate Treatment & Use

Three potential treatments based on the standard historic preservation treatments defined in *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* have been considered for Hangar Number One. These three treatments are (1) Restoration, (2) Preservation, and (3) Rehabilitation of the perimeter rooms. The Ultimate Treatment And Use Recommendation for Hangar Number One is **Restoration of both the exterior and interior**. This recommendation is evaluated based on the Criteria for Determining Treatment. The evaluation is followed by a summary of the steps needed to realize the treatment and a summary recommendation based on the practical feasibility of the treatment, the treatment's impact on historic materials, and its effect on the historic character of Moton Field as a whole.

The **Period of Significance** for interpreting the history of Moton Field is 1941-1945, the period during which the buildings and landscape at Moton Field were constructed and the Tuskegee Airmen were being trained in the primary flying school. 1945 is the **Restoration Date** identified for the restoration of extant buildings. 1945 is the date by which the entire complex at Moton Field associated with the training of the Tuskegee Airmen and the operation of the flying school had been constructed.

ULTIMATE TREATMENT AND USE RECOMMENDATION

The Ultimate Treatment and Use Recommendation for Hangar Number One is

Restoration of both the exterior and interior based on existing materials and features, historic photographs, and original architectural drawings.

Restoration will conserve the building's existing historic fabric and restore its missing fabric. It will also allow the building to serve as an authentic museum exhibit that will illustrate to visitors the design and construction of the original airfield hangar, the hangar's significance to the site, and its use by the primary flying school.

Criteria for Determining Treatment

Following are the criteria that have been used in determining the recommendation for the ultimate treatment of the historic structures at Moton Field. An explanation of how Hangar Number One meets each criterion for the treatment of restoration is provided.

• Significance and Value to the Site's Interpretation

Hangar Number One is the most significant extant structure at Moton Field today. Both historically and architecturally, the building represents the site's history more clearly than any other remaining structure. Hangar Number One was the first building to be constructed on the site and was the primary structure around which flight training activities took place. Throughout the years of the use of Moton Field as the site of primary flight training, Hangar Number One continued to be one of the most significant structures in the operation of the site.

Hangar Number One is critical to the public interpretation of Moton Field's aviation history. The hangar is currently the most intact extant building at the site and most clearly represents the historic activities that took place there. The physical presence of the airfield's original hangar will provide authenticity to the visitor's experience.

• Existing Condition and Material Evidence

Hangar Number One is in sound structural condition despite the loss of the perimeter room roofs. The masonry walls of the large hangar space are in very good condition with only minor deterioration. The walls of the perimeter rooms have suffered deterioration and damage largely due to exposure to the weather but their construction is still sound.

The hangar's existing original materials and features provide the most concrete documentation of the building's original construction and its additions. Few alterations have been made to the hangar. The majority of the building's historic materials, features, and floor plan remain intact. The large hangar space is the most intact part of the structure. Due to the loss of the perimeter room roofs, much of the interior fabric of the perimeter rooms is now gone, although remnants of the interior finishes remain. The sound condition of the hangar and the information provided by existing materials and features will facilitate an accurate restoration.

• Archival Documentation

Historic documentation of Hangar Number One exists in the form of architectural drawings, historic photographs, and written histories. Architectural drawings found to date include plans for the hangar's original construction and plans and details for the two additions. These drawings document the building's floor plan, elevations, and exterior and interior features and materials. Minor variations to what was actually constructed exist in some of the drawings, so the drawings must be used in concert with other documentation and existing material evidence to get a true picture of the hangar's original construction and later additions.

Historic site plans also document the building's construction and relationship to other buildings at the site from the time of the hangar's construction, through the 1940s war era, and into the 1970s. Numerous historic photographs show the building and the activities that took place there throughout the significant years of its use for primary flight training. Later photographs document the building's deterioration from the 1970s to the present. The photographs are the most authentic form of archival documentation available for the hangar. Written accounts of the airfield's history also provide valuable information about the initial construction, later additions, and historic activities of the hangar.

Less information has been found to date to document the building's interior finishes and furnishings during the period of significance. A few photos have been found of the interior of the large hangar space. While a number of other historic interior photographs at Moton Field have been found to date, only one is known with certainty at this time to be of the inside of Hangar Number One's perimeter rooms. This exception is a photograph in the interior of the lunch/tea room. Two of the most concrete pieces of information found to date on the hangar's perimeter room furnishings are the architectural drawings for the 1942 lunch/tea room addition and for the 1943-1944 office addition. The lunch/tea room drawing shows a proposed equipment arrangement for the lunch/tea room; however, the lunch counter in the drawing does not appear to match the counter in the photograph. The office addition drawing shows the placement of desks, chairs, and other furniture within the perimeter rooms in that part of the building, as well as the name of the officer occupying the office at the time.

With the combination of original architectural drawings and historic site plans, historic photographs, and the existing building, the restoration of Hangar Number One could be accomplished. Ample documentation exists to restore the large majority of the building's exterior, but further research would be needed to replicate all of the interior finishes and the interior furnishings of the perimeter rooms. Additional photographs or other documentation of the hangar's interior will be necessary for a complete interior restoration.

Restoration of Hangar Number One

Restoration of the exterior and interior of Hangar Number One will seek to return the building to its historic appearance in 1945. This will conserve the building's existing historic fabric as well as restore its missing fabric and will allow visitors to view and experience the

building as it was constructed and used by the primary flying school during the World War II era.

Restoration of the hangar will include repairing existing materials and features and replacing missing materials and features. Recent stabilization work has already replaced some of the deteriorated structural elements, features, and materials. Those items that were replaced in kind should be retained. Following are items that should be addressed in the restoration. These items are not listed in order of importance or how they should be accomplished. A detailed work plan should be developed to establish an appropriate order and detailed specifications for accomplishing the restoration work.

Masonry and Frame Walls

- Clean heavily soiled areas of the masonry with the gentlest method possible to remove dirt and stains; remove all vegetation; remove the nonhistoric paint from the brick walls of the lunch/tea room addition; do not remove historic indicators on masonry walls such as stenciling at the location of fire extinguishers; do not remove historic fasteners or other hardware on masonry walls until the historic purpose of the fasteners is known.
- Replace missing and damaged bricks and clay tile blocks with masonry units matching existing units in size, color, and texture; reset loose bricks and blocks. These areas include the perimeter room walls and the front facade parapet walls of the hangar space.
- Repoint masonry joints as needed using a mortar similar in composition to the existing mortar; tool joints to match existing; remove recent incompatible repointing and replace with compatible mortar. (See Conclusions in the *Mortar Analysis* in *Appendix D* for recommended compatible mortar.)
- Reconstruct missing portions of the perimeter room walls to their original height using brick and clay tile block that match existing units and mortar that matches existing mortar.
- Reconstruct interior masonry and frame partition walls that have been removed from the perimeter rooms based on physical evidence, pre-stabilization documentation, and original architectural drawings. The missing masonry walls were located in the perimeter rooms along the north and west sides and in one of the 1943-1944 office additions. The missing frame walls were located in the 1942 lunch/tea room addition on the hangar's south side. (See *Existing Conditions Drawings*.)
- Remove areas of new masonry and mortar constructed during stabilization work; replace with masonry units and mortar that match the original masonry work; leave spaces for downspouts in their original locations. These include five areas in the north wall of the perimeter rooms where missing masonry has been replaced; and the top of the north facade wall of the hangar space and on the interior of the hangar space walls at each front corner where new mortar has been used for repointing.
- Remove the new concrete block wall constructed at the south wall of the lunch/tea room; remove areas of new brick veneer; retain areas of original brick veneer; reconstruct a frame wall structure with brick veneer exterior to match the wall's original construction based on historic and pre-stabilization documentation.
- Stabilize the temporarily braced north wall of the perimeter rooms as needed (reconstruction of the shed roof will contribute to the stabilization of the wall).
- Clean all concrete parapet caps and repair as needed.

Roof

- Repair the existing corrugated metal sheets on each of the end walls of the main roof structure; if replacement is required, use in-kind materials.
- Repair the existing pent roof over the hangar doors; repair the existing corrugated metal roofing or replace in kind as necessary; repair the existing wood frame, soffit, and fascia boards or replace in kind as necessary.
- Reconstruct the shed roofs of the perimeter rooms based on physical evidence and historic documentation; re-create wood fascia boards and eave details to match originals.
- Repair the existing downspout at the building's southwest corner; duplicate other downspouts from the existing example and replace them in their original locations based on physical evidence and historic documentation; replicate gutters and downspouts originally located along the shed roof of the office addition; make sure that drainage from the roof is appropriately routed away from the building.

Hangar Doors

- Remove the temporary frame entrance into the hangar constructed during stabilization work.
- Repair the steel frame of the hangar doors; repair or replace deteriorated bottom rails, portions of the frame, and steel plates and fasteners with in-kind materials.
- Repair the existing corrugated metal sheets; replace deteriorated sections as needed with in-kind materials; check fasteners that hold the sheets to the steel frames and replace as needed.
- Replace the webbing along the vertical edges of the doors.
- Remove all dirt and debris from the steel floor rails and repair as needed so the doors will be fully operable; repair the steel tracks at the top of the doors, making sure they are securely mounted at each end in the masonry walls.
- Repair the frame and metal hinged man doors within the larger hangar doors.

Windows

- Remove vented plywood and opening supports added during stabilization work from window openings; stabilize any openings that are in unstable condition.
- Repair the existing metal window sash and frames in the hangar space and perimeter rooms; replace sash and frame elements too deteriorated for repair with in-kind materials; paint the frames and sash based on information from the *Paint Analysis*.
- Replace missing and broken glass panes with glass matching the existing as closely as possible.
- Repair window hardware to make the windows operable; replace hardware too deteriorated for repair with in-kind materials.
- Repair the existing wood frames of interior windows in the hangar space's west wall and replace deteriorated wood members in kind; reconstruct missing windows based on physical evidence and historic documentation.
- Reconstruct missing window frames and sash of the double-hung windows originally located in the walls of the office addition.

- Re-plaster window sills where they were plaster originally in conjunction with re-plastering interior walls.
- Replicate window screens and hardware based on historic photographs and physical evidence.

Exterior and Interior Doors

- Repair the existing metal doors and frames in the hangar space; repair existing hardware, including hinges, handles, and sliding tracks; replace deteriorated elements as necessary with in-kind materials; replace missing glass panes.
- Replicate missing metal doors in the hangar space based on existing hinged and sliding doors and on physical evidence of door locations and swings.
- Reconstruct missing wood-frame screened doors on the outside of doors leading from the hangar space to the perimeter rooms if documentation or physical evidence can be found to substantiate their design.
- Repair existing wood door frames and moldings in the south wall of the hangar space and in the perimeter rooms; replace deteriorated elements as needed with in-kind materials.
- Reconstruct missing wood doors, frames, and moldings in the hangar space and perimeter rooms based on physical evidence and historic documentation.
- Reconstruct frame canopies over exterior doors of the perimeter rooms where canopies originally existed based on physical evidence and historic documentation. After the 1943-1944 addition of office space on the hangar's west facade that altered the number of exterior doors, frame canopies were located over five single doors on the north facade, one single door and one double door on the west facade, and one single door on the south facade. Evidence of a canopy over the double doors leading from the expanded heater room on the west facade is uncertain.

Floors

- Remove all vegetation from in and around the concrete floors.
- Repair cracked and buckling areas with in-kind materials.
- Remove remnants of floor tile added at a later date to the concrete floor in some of the perimeter rooms. (Note: This floor tile may contain asbestos.)
- Remove all debris from the floors and clean them.

Balcony

- Repair the cantilevered structure so that it will once again be capable of supporting itself; replace deteriorated or weakened floor joists and sills, ceiling joists, and wall framing and supports with in-kind materials; remove the temporary vertical supports.
- Replace deteriorated wood flooring with in-kind materials.
- Replace the existing fiberboard around the balcony's exterior with new fiberboard matching the original; cover joints with wood battens matching the originals; replace wood corner boards and ceiling and floor trim boards in kind.
- Repair existing wood window sash, tracks, and moldings; replace missing window elements in kind.
- Replace missing ceiling lath to allow fiberboard to be attached; replace missing fiberboard ceiling based on remnants of ceiling fiberboard.

- Repair existing door and moldings; replace missing elements in kind.
- Leave intact the portion of interior wall and doorway frame that subdivided the space.
- Replace existing wood stairway railing with one that meets safety requirements; base railing design on the original railing.

Interior Finishes

- Evaluation of the remnants of interior wall plaster in the perimeter rooms should be done by a professional familiar with historic plasters before any of the plaster is removed or the walls are re-plastered.
- Remove the remnants of interior wall plaster that are loose and/or deteriorated.
- Replace missing and deteriorated wire lath around window and door openings based on physical evidence of where the lath was originally used.
- Re-plaster the interior walls of the perimeter rooms based on the findings from the professional evaluation; replicate the composition, texture, color, and application of plaster coats as closely as possible.
- Paint the interior walls of the perimeter rooms based on the findings of the *Paint Analysis*.
- Replace missing ceiling finishes and ceiling moldings (if present) in the perimeter rooms.

Mechanical/Electrical/Plumbing Systems (See *Systems Requirements Based on Use*)

- Repair and re-paint the existing heating equipment in the heater room and leave in place for interpretation purposes only.
- Make any needed repairs to the brick chimney stack using in-kind masonry materials and mortar that is compatible to the existing mortar. (See *Mortar Analysis*.)
- Install a new heating system that will be compatible to existing equipment; repair the existing heating fans in the hangar space so that the fan blades turn and they appear to be operating.
- Replace the existing electrical system with a new system; run electrical conduit and place switches and receptacles in the same locations as original; use new switches and receptacles that match originals.
- Repair the existing light fixtures to be operable.
- Replace missing plumbing fixtures with fixtures that match the originals; further research will be needed to verify the design of missing plumbing fixtures.

Additional Documentation Required for Restoration

In order to accomplish a complete restoration of Hangar Number One, documentation needs still exist in some areas. Historic research done to date has provided a great deal of information about both the building's exterior and interior. However, some of the interior finishes and features, and particularly interior furnishings, have not been documented to date. Following is a list of items for which documentation is needed in order to complete the building's restoration.

- Type and style of wood-frame screened doors on the outside of doors leading from the hangar space to the perimeter rooms

- Type and style of doors and windows on the exterior of the 1943-1944 office addition and 1942 lunch/tea room addition
- Type and style of exterior window screens and hardware
- Material of ceiling finishes and the presence of ceiling moldings in the perimeter rooms
- Type and style of plumbing fixtures in the toilets in the perimeter rooms
- Interior furnishings in the hangar space and the perimeter rooms

Interior Space and Use Recommendations

The restoration of Hangar Number One will allow visitors to Moton Field a significant interpretative experience within an original structure. The use of the building's interior spaces will depend on how the building is interpreted. Following are recommendations for use of the building's interior based on hierarchy of interior spaces and requirements for proposed uses.

Hierarchy of Interior Spaces

- The large, open hangar space that makes up the core of Hangar Number One is the building's most significant interior space. More documentation of the interior of the hangar space exists than for other rooms in the building. The hangar space should be restored and always remain an open space where its original use can be interpreted.
- The perimeter rooms surrounding the hangar space are lower in the hierarchy of spaces than the hangar space itself. However, the perimeter rooms and their floor plan are significant to the understanding of the hangar and how it was originally used. The perimeter rooms may be either restored or re-used for other purposes. The floor plan should be re-created and remain unchanged.
- Within the perimeter rooms themselves is another hierarchy of spaces based on level of documentation. More documentation exists for the lunch/tea room than for the other perimeter room spaces, putting it at the top of the perimeter room hierarchy.

Interpretation and Use of the Building

- The large hangar space should always remain an open space. The space should be completely restored and furnishings added in order to interpret the use of the space for aircraft repair and maintenance.
- The perimeter rooms could be used and interpreted in a variety of ways but the floor plan should be restored to its original configuration and not altered. There are two restoration options for the perimeter rooms:

  Option 1: Completely restore the rooms along with furnishings and interpret them as they were being used in 1945, the date of restoration; information about their use throughout the period of significance, 1941 – 1945, could be displayed to help visitors understand the changing uses of the hangar spaces as the airfield expanded.

  Option 2: Restore the interior finishes of the rooms and interpret the spaces without furnishings.

Systems Requirements Based on Use
(Systems requirements for the hangar's restoration may vary depending on the use determined for the hangar space and the perimeter rooms. Following are general systems requirements based on the recommendations for interpretation and use of the building.)

HVAC Systems

- Hangar Space – A new system of heating utilizing as much of the original system as possible is recommended. Where parts of the system have to be replaced in order to operate, the new parts should replicate the old as closely as possible. The space should not be air-conditioned but ventilation should be provided by opening the hangar doors and the windows in the hangar space walls.
- Perimeter Rooms – Option 1: A new system of heating utilizing the design of the original system should be installed. The space should not be air-conditioned but ventilation should be provided by opening the exterior doors and windows and the doors into the hangar space. Screened doors and window screens will provide protection from insects. If furnishings are historic and sensitive to temperature changes, a complete HVAC system utilizing the design of the original system should be installed to provide climate control to protect the furnishings.
- Perimeter Rooms – Option 2: A new heating system utilizing the design of the original system should be installed. The space should not be air-conditioned but ventilation should be provided by opening the exterior doors and windows and the doors into the hangar space. Screened doors and window screens will provide protection from insects.
- A series of gas fired unit heaters, suspended from the ceilings, would be the most unobtrusive and cost effective method of providing heat to the hangar and perimeter spaces. Each unit heater would require a vent through the roof. Approximately eight unit heaters would be required. Total heat requirement would be about 350 MBH. The existing fans should be repaired and would aid in circulating air in summer and winter.

Plumbing/Toilet Facilities

- Hangar Space – No plumbing or toilet facilities will be installed in the hangar space.
- Perimeter Rooms – Option 1: Period plumbing fixtures should be installed in their original locations but would not be operable.
- Perimeter Rooms – Option 2: Period plumbing fixtures would not be installed.

Electrical Power

- A new electrical system will have to be installed to provide the needed electricity to the space. The existing 120/240 volt single phase electrical service needs to be replaced. The new electrical service should be provided from new overhead power poles to match the original locations on the site from the historic site photographs. New pole mounted transformers will need to be provided to serve the buildings. The existing electrical service entrance to Hangar One needs to be replaced. The existing conduits that are still intact can be re-used. Other new RGS conduits will need to be provided in locations to match original construction. All new panelboards and disconnect switches will need to be provided to serve the building loads. A new 120/240 volt, single phase, 2-pole, service entrance rated panelboard will need to be provided. A new ground rod will need to be provided for service entrance ground. All new grounded branch circuits will need

to be provided to each of the buildings devices. New wiring installed should be THHN/THWN copper conductors. New receptacles and light switches shall be installed to match original devices in style and color as much as possible, while still providing the needed functionality of the electrical system. New outlet and switch coverplates shall be provided to match the original construction.

Lighting

- The overhead pendant lights in the main space of Hangar One should be restored to an operable condition and the missing ones should be replicated. Missing globes from fixtures should be replicated to match original conditions. The perimeter rooms' lighting fixtures should be replaced with fixtures that resemble the original and existing fixtures as much as possible. Battery back-up exit lights should be provided in all areas as required by NFPA 101 for exit marking. Emergency egress lighting should be provided by battery back-up fixtures in the perimeter rooms. Battery back-up power should be provided for the fixtures in the main hangar room.

Fire Protection

- A wet-pipe sprinkler system will be provided to protect the building. A fire alarm system should be provided to notify fire department/park personnel of a fire condition in the building. Provide a complete fire alarm system that will include a fire alarm control panel with an automatic dialer for notification. Provide a tamper and flow switch at the new sprinkler riser to notify water has been released or valve has been tampered. Provide notification devices in inconspicuous locations such as horns and strobes in ceiling area to alert visitors of a fire condition. Provide manual pull stations at all exit doors as required by NFPA 72. Provide all devices with surface mounted boxes and RGS conduit to match other conduits being provided. Provide battery back-up power for the fire alarm system.

Security System

- A monitored security system should be installed to provide notification of an intruder during closed hours. The security system should consist of motion detectors to be placed as inconspicuous as possible in each space. Monitored doors and windows are not recommended due to the historic nature of the items and the disruptive installation necessary for these items. Provide battery back-up power for the security system.

Communications

- A telephone outlet should be provided in a location to be used by park personnel. The telephone outlet is not a replication of a historical item therefore there is no need to attempt to provide a historic type item. New telephone outlet should be a typical category 3 RJ11 outlet with category 3 wiring and should be installed in a non-publicly viewable space. The telephone wiring should be routed to the new telephone service in Hangar Two. New communication wiring should also be installed for fire alarm and security, devices and monitoring circuits.

ADAAG Accessibility

- The historic layout of Hangar Number One did not accommodate current accessibility requirements. While it is desirable to accommodate handicapped individuals, certain areas, due to their historic configuration, will not be accessible. It should be noted that a combined effort between the NPS and the Architectural firm will be undertaken to establish a route in the facility to maximize accessibility to as many areas as possible. Areas that are beyond the accessible route should have an interpretive display indicating the use and historic functions of the areas. Additionally, we do not recommend installing an elevator or lift system to provide handicap accessibility to the balcony level due to the negative impact this will have on the historic nature of the structure.

Summary Recommendation

Restoration of Hangar Number One will preserve this significant extant building and provide an authentic place of interpretation for telling the story of Moton Field to the public. Hangar Number One is the most significant building remaining at Moton Field today and best represents the training of the Tuskegee Airmen, making its conservation and interpretation of utmost importance. Recent stabilization work has halted deterioration of much of the hangar's historic fabric. Even though there has been a loss of historic fabric, particularly in the perimeter rooms, enough survives that the majority of original exterior and interior features and materials can be accurately restored. Therefore, restoration is the Recommended Ultimate Treatment.

Requirements for Treatment

Legal mandates and policy directives restrict treatment of Hangar Number One. The NPS's Cultural Resources Management Guideline (DO-28) requires planning for the protection of cultural resources "whether or not they relate to the specific authorizing legislation or interpretive programs of the parks in which they lie."

Section 106 of the National Historic Preservation Act (NHPA) mandates that federal agencies, including the NPS, take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places and give the Advisory Council on Historic Preservation a reasonable opportunity to comment.

To help guide compliance with the statutes and regulations noted above, the Secretary of the Interior's *Standards for the Treatment of Historic Properties* have been issued along with guidelines for applying those standards.

Issues of human safety, fire protection, and handicap accessibility are addressed in the Administrative Data and Ultimate Treatment and Use sections. Proper abatement of any hazardous materials will be addressed in the construction phase of the project.

Alternatives for Treatment

Two alternatives for treatment have been considered for Hangar Number One and are presented here. They are (1) **Preservation** and (2) **Rehabilitation of the perimeter rooms in conjunction with the restoration of the exterior and hangar space**. These alternatives are evaluated based on the Criteria for Determining Treatment. This evaluation is followed by a summary of the steps needed to realize the treatment and a summary recommendation based on the practical feasibility of the alternative, the alternative treatment's impact on historic materials, and its effect on the historic character of Moton Field as a whole.

The **Period of Significance** for interpreting the history of Moton Field is 1941-1945, the period during which the buildings and landscape at Moton Field were constructed and the Tuskegee Airmen were being trained in the primary flying school. 1945 is the date identified during the period of significance by which the entire complex at Moton Field associated with the training of the Tuskegee Airmen and the operation of the flying school had been constructed.

ALTERNATIVE FOR TREATMENT: PRESERVATION

One alternative for treatment of Hangar Number One is **Preservation** of the hangar as it now exists to prevent further deterioration and insure the building is safe for visitors. This would include more complete stabilization work to secure materials and features. The preserved building would allow visitors to experience an original structure in its current state after many years of use.

Criteria for Determining Treatment

Following are the criteria that have been used in determining the alternatives for treatment of the historic structures at Moton Field. An explanation of how Hangar Number One meets each criterion for the treatment of preservation is provided.

• Significance and Value to the Site's Interpretation

Hangar Number One is the most significant existing structure remaining at Moton Field today. Preservation of the existing building would retain and protect the structure's remaining historic fabric and allow for its use as an interpretive exhibit.

The building's interpretation is critical to understanding the site. The hangar is the most intact extant building currently at the site and most clearly represents the historic activities that took place there.

• Existing Condition and Material Evidence

The existing building is in good structural condition but additional stabilization and preservation work would be needed to make the building safe for visitors and to protect the building's remaining historic fabric from further deterioration.

• Archival Documentation

Historic documentation in the form of architectural drawings, historic site plans, and historic photographs may be used to determine original features and materials as well as alterations that have taken place so that the interpretation of the building as it now exists will be as accurate as possible.

Preservation of Hangar Number One

Preservation of Hangar Number One would involve stabilizing and repairing existing materials and features to preserve the remaining historic fabric and keep it from deteriorating further and to make the building safe for visitors. Stabilization/preservation work should be clearly differentiated from historic materials. Following are items that should be addressed in the preservation work. These items are not in order of importance or how they should be accomplished. A detailed work plan should be developed to establish an appropriate order and detailed specifications for accomplishing the preservation work.

Masonry Walls

- Clean heavily soiled areas of the masonry with the gentlest method possible to remove dirt and stains; remove all vegetation; do not remove historic indicators or hardware on masonry walls such as stenciling or brackets at the location of fire extinguishers.
- Replace missing and damaged bricks and clay tile blocks within the existing masonry walls with masonry units matching existing units in size, color, and texture; reset loose bricks and blocks.

- Repoint masonry joints as needed using a mortar similar in composition to the existing mortar; tool joints to match existing. (See *Mortar Analysis* in *Appendix D.*)
- Reconstruct missing portions of the existing perimeter room walls to their original height using brick and clay tile block that match existing units and mortar that matches existing mortar.
- Stabilize the temporarily braced north wall of the perimeter rooms; check all perimeter room walls for stability.
- Construct a cap of concrete along the top of exposed perimeter room walls to keep moisture out of the wall.
- Remove areas of new masonry and mortar constructed during stabilization work; replace with masonry units and mortar that match the original masonry work; remove recent incompatible repointing and replace with compatible mortar.
- Remove the new concrete block wall constructed at the south wall of the lunch/tea room; remove areas of new brick veneer; retain and stabilize areas of original brick veneer.
- Clean all concrete parapet caps and repair as needed.

Roof

- Repair the existing corrugated metal sheets on each of the end walls of the main roof structure; if replacement is required, use in-kind materials.
- Repair the existing pent roof over the hangar doors; repair the existing corrugated metal roof sheets or replace in kind as necessary; repair the existing wood frame and fascia boards or replace in kind as necessary.
- Repair the existing downspout at the building's southwest corner; replace other downspouts as needed to make sure that water drainage is appropriately routed away from the building.

Hangar Doors

- Remove the temporary frame entrance into the hangar constructed during stabilization work.
- Repair the steel frame of the hangar doors; repair or replace deteriorated bottom rails, portions of the frame, and steel plates and fasteners with in-kind materials.
- Repair the existing corrugated metal sheets; replace deteriorated sections as needed with in-kind materials; check fasteners that hold the sheets to the steel frames and replace as needed.
- Replace the webbing along the vertical edges of the doors.
- Remove all dirt and debris from the steel floor rails and repair as needed so the doors will be fully operable; repair the steel tracks at the top of the doors, making sure they are securely mounted at each end in the masonry walls.
- Repair the frame and metal hinged doors within the larger hangar doors.

Windows

- Remove vented plywood and opening supports added during stabilization work.
- Repair the existing metal window sash and frames; replace sash and frame elements too deteriorated for repair with in-kind materials; paint the frames and sash to prevent further deterioration.

- Replace missing and broken glass panes with glass matching the existing as closely as possible.
- Repair existing window hardware.
- Repair the existing wood frames of interior windows and replace deteriorated wood members in kind; paint the wood frames to prevent further deterioration. (See *Paint Analysis* in *Appendix D.*)

Exterior and Interior Doors

- Repair the existing metal doors and frames; replace deteriorated areas and elements as necessary with in-kind materials; repair existing hardware, including hinges, handles, and sliding tracks; replace missing glass panes.
- Repair the wood frames of the now missing screened doors on the outside of doors leading from the hangar space to the perimeter rooms; paint the frames to prevent further deterioration.
- Repair existing wood door frames and moldings and replace deteriorated elements as needed with in-kind materials.

Floors

- Remove all vegetation from in and around the concrete floors.
- Repair cracked and buckling areas with in-kind materials.
- Remove remnants of floor tile added at a later date to the concrete floor in some of the perimeter rooms. (Note: This floor tile may contain asbestos.)
- Remove all debris from the floors and clean them.

Interior Finishes

- Remove the remnants of interior wall plaster and metal lath that are loose and/or deteriorated and preserve to provide future documentation of interior finishes.

Mechanical/Electrical/Plumbing Systems

- Repair and re-paint the existing heating equipment and leave in place for interpretation purposes only.
- Replace the existing electrical system with a new system to provide electricity to the building; repair lighting fixtures; run electrical conduit and place switches and receptacles in the same locations as original; use new switches and receptacles that match originals.

Interpretation and Use Recommendations

- Visitors should be allowed to walk through the building.
- Interpretive displays should show historic photographs, original architectural drawings, and illustrations to convey to visitors the building's original design and use and the historic activities of the primary flying school that took place there.

Summary Recommendation

Preservation of Hangar Number One would preserve the hangar's remaining historic fabric and allow safe access for interpretation. Recent stabilization work has halted deterioration of much of the hangar's historic fabric. More complete preservation/stabilization work could be easily done to prevent further deterioration of the existing structure and to make the building safe for visitation and interpretation. The cost of this approach would be substantially lower than that for restoration or rehabilitation, making this a cost-effective alternative. However, given the fact that Hangar Number One is the most significant building remaining at Moton Field today and that its restoration would allow conservation and interpretation of the hangar appropriate to the building's importance to the site, preservation of its structure as it now exists is not the Recommended Ultimate Treatment.

ALTERNATIVE FOR TREATMENT: REHABILITATION

A second alternative for treatment of Hangar Number One is **Rehabilitation of the perimeter rooms in conjunction with the restoration of the exterior and hangar space.** This would include rehabilitation of the perimeter rooms to provide usable space for one of two options:

Option 1: Adapt the rooms for use as climate-controlled exhibit space open to the public. Finish the interiors with modern but compatible materials.

Option 2: Adapt the rooms for park operation functions such as offices and storage spaces, finish the interiors with modern but compatible materials, and close them to the public. Interpretive displays could convey to visitors the original use and appearance of the perimeter rooms.

In both options, the original floor plan of the perimeter rooms should be restored. The restored hangar space would be used for exhibits.

Criteria for Determining Treatment

Following are the criteria that have been used in determining the alternatives for treatment of the historic structures at Moton Field. An explanation of how Hangar Number One meets each criterion for the treatment of rehabilitation of the perimeter rooms is provided.

• Significance and Value to the Site's Interpretation

Hangar Number One is the most significant existing structure remaining at Moton Field today. Rehabilitation of the perimeter rooms would preserve these important components of the hangar while allowing for their use as functional space in the interpretation of the complex.

The interpretation of the hangar could be accomplished through the use of exhibits within the original hangar space. Interpretation of the perimeter rooms could be accomplished

through exhibits and interpretive displays located either within the perimeter rooms or in the hangar space.

• Existing Condition and Material Evidence

The existing building is in good structural condition but rehabilitation work is needed to make the perimeter rooms usable. Much of the materials of the perimeter rooms remains intact and could easily be rehabilitated for functional space while restoring the floor plan for interpretation.

• Archival Documentation

Historic documentation in the form of architectural drawings, historic site plans, and historic photographs may be used to determine original features and materials of the perimeter rooms as well as alterations that have taken place so that the rehabilitation of the spaces will be compatible with the historic structure.

Rehabilitation of Hangar Number One's Perimeter Rooms

Rehabilitation of Hangar Number One's perimeter rooms would involve rehabilitating the rooms' interiors so that they are compatible with the historic structure yet usable for either modern exhibit space or park operation functions. The hangar's exterior, including the walls, roof, windows, doors, and other exterior features of the perimeter rooms, would be restored. (See *Ultimate Treatment and Use Recommendation.*) Following are steps that would be required to accomplish the alternative treatment of rehabilitation of the perimeter rooms. A detailed work plan should be developed to establish an appropriate order and detailed specifications for accomplishing the rehabilitation work.

Interior Masonry Walls
- Repair and rebuild missing portions of the interior masonry walls using like materials.
- Rebuild missing interior walls to re-create the original floor plan.

Interior Finishes
- Repair existing interior finishes, such as the concrete floors, where possible.
- Replace missing interior wall and ceiling finishes with compatible materials.

Interior Doors
- Replace missing interior doors with doors compatible to but different from restored exterior and hangar space doors.

Interior Space and Use Recommendations

The perimeter rooms may be utilized for one of the following two options:
Option 1: Climate-controlled exhibit space open to the public.
Option 2: Park operation functions such as offices and storage spaces closed to the public. In either case, the rooms' original floor plan should be restored.

Systems Requirements Based on Use
(Systems requirements will be based on the use option chosen.)

HVAC Systems

- Option 1: If the perimeter rooms are adapted for use as climate-controlled exhibit space, new heating and air conditioning systems appropriate to such spaces should be installed.
- Option 2: If the perimeter rooms are adapted for use as office space and other park needs, a modern HVAC system should be installed.

Plumbing/Toilet Facilities

- Option 1: If the rooms are adapted as climate-controlled exhibit space, operable restrooms with modern plumbing fixtures may be installed if not available elsewhere in the complex. If alternate restroom facilities are available, the restrooms may be restored to their original appearance to add to the exhibit experience.
- Option 2: If the rooms are adapted for modern office use, modern operable restrooms should be installed.

Lighting/Electrical

- Option 1: If the rooms are adapted for exhibit spaces, a new electrical system with modern lighting and electrical fixtures that provide needed lighting for exhibits should be installed.
- Option 2: If the rooms are adapted for modern office use, a modern system with modern fixtures should be installed.

Summary Recommendation

Rehabilitation of the perimeter rooms in conjunction with the restoration of the hangar's exterior and hangar space would provide usable space for modern exhibits or park operation functions while also restoring the rooms' original floor plan. Recent stabilization work has halted deterioration of much of the hangar's historic fabric. Rehabilitation of the perimeter rooms to reflect their original floor plan yet provide for modern use could be easily accomplished utilizing the rooms' remaining materials. However, given the fact that Hangar Number One is the most significant building remaining at Moton Field today and that its restoration would allow conservation and interpretation of the hangar appropriate to the building's importance to the site, rehabilitation of the perimeter rooms for modern uses in conjunction with exterior restoration is not the Recommended Ultimate Treatment.

Appendices

Appendix A

**Appendix A is located in a separate notebook that contains the supplemental archival documents, photographs, and architectural drawings for all Historic Structure Reports and the Cultural Landscape Report.

- Archival Documents
- Photographs
- Architectural Drawings

Appendix B

- Bibliography

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World War II-era Aerial Photograph of Moton Field, c.1945. Historic Photograph Collection, NPS Curatorial Storage Facility, Tuskegee Institute NHS, Tuskegee, Alabama.

Appendix C

- Conditions Assessment/ Features Inventory

Historic Rating Designations

U - Undetermined	(The historic significance of the feature has not been determined)
H - Historic	(The feature has historic significance)
T - Treat as Historic	(The feature should be treated as if it has historic significance)
N - Not Historic	(The feature does not have historic significance)

All Estimable Items

Materials: $253,999.00 **Labor:** $52,793.00 **Total =** **$306,792.00**

EXTERIOR	4110	Exterior Wall Surface	Brick

Feature Description: North elevation exterior office wall has gaps.

Feature Notes: There are five areas ranging from 6 bricks high by 12 across to 7 high by 16 across where original brick was missing and has been replaced. Each missing section includes soldier course area.

Feature Condition: Poor **Total Inventory:** (5) ~20SF

Historic Rating: H **Priority:** Critical/ Historical

Deficiency Brick has deteriorated in some areas, cause large holes in the wall.

Recommendation: Remove areas of new masonry and replace with masonry units and mortar to match original masonry work.



Approx. 7 brick high x 13 across



Approx. 6 brick high x 15 across



Approx. 7 brick high x 11 across





Approx. 7 brick high x 16 across
(plus concrete wall cap)

Approx. 6 brick high x 12 across

Materials: $51,875.00 **Labor:** $16,141.00 **Quantity:** **Total =** **$68,016.00**

EXTERIOR	4110	Exterior Wall Surface	Brick

Feature Description: West elevation exterior office wall.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 40 L.F.

Historic Rating: H **Priority:** Critical/ Historical

Deficiency: Missing one row of brick over windows at office extension areas.



Recommendation: Reconstruct missing portion to original height using brick and mortar to match original masonry work.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(See previous item)

EXTERIOR	4110	Exterior Wall Surface	Brick

Feature Description: East elevation exterior hangar wall.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 2 S.F.

Historic Rating: H **Priority:** Critical



Deficiency: Broken and deteriorated bricks at the corners of the hangar doors

Recommendation: Remove broken brick and replace with brick and mortar to match original masonry work. Re-point as needed to match original masonry.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

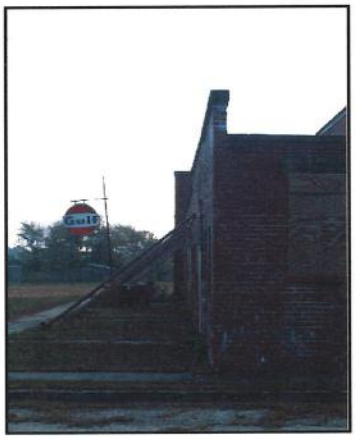
EXTERIOR	4111	Exterior Wall Structure	Masonry

Feature Description: North elevation exterior office wall.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 108 L.F.

Historic Rating: H **Priority:** Serious



Deficiency: Wall is leaning out away from structure. Presently being held in place with 2x4 shoring

Recommendation: Reinforce wall internally to stabilize wall and correct alignment.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4110 - Exterior Wall Surface)

EXTERIOR	4111	Exterior Wall Structure	Masonry

Feature Description: An exterior wall at the south elevation at the Tea Room, Chief Maintenance Room, and Supply room was mostly deteriorated.

Feature Notes: This area has been stabilized and replaced with a CMU and brick system. Original construction had been wood 2x4 stud wall w/ 3 1/2" brick exterior.

Feature Condition: Fair **Total Inventory:** ~320SF

Historic Rating: H **Priority:** Serious/ Historical

Deficiency: Wall had crumbled to 2'-0" high.



Recommendation: Remove new concrete masonry wall and new brick veneer. Reconstruct frame wall and brick veneer to match original construction.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4110 - Exterior Wall Surface)

EXTERIOR	4113	Exterior Wall Trim/ Cap	Concrete

Feature Description: Concrete wall cap

Feature Notes: Was replaced with non-matching material during stabilization

Feature Condition: Poor **Total Inventory:** 12 lin. ft.

Historic Rating: H **Priority:** Serious/ Historical

Deficiency: Missing approx. 12 ft. section



Recommendation: Remove new concrete and replace with concrete to match original construction. Clean all concrete caps.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4110 - Exterior Wall Surface)

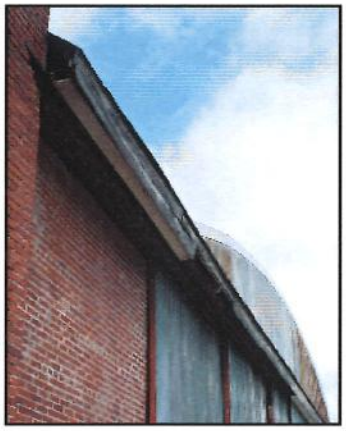
EXTERIOR	4117	Eave/ Soffit	Wood

Feature Description: Soffit/ fascia at east elevation at hangar door track.

Feature Notes: Constructed of (2) 1 x 8 wood members on fascia and (1) 1x8 wood member on soffit.

Feature Condition: Poor **Total Inventory:** 118 L.F.

Historic Rating: H **Priority:** Critical



Deficiency: Wood fascia/ soffit deteriorated

Recommendation: Repair and replace all deteriorated wood at fascia and soffit to match original construction.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4150 - Exterior Door Unit-Hangar Doors)

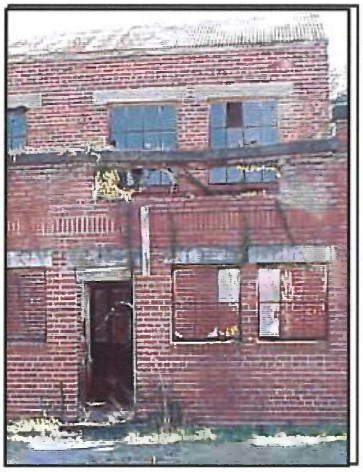
EXTERIOR	4140	Exterior Window Unit	Metal

Feature Description: 6-pane windows, with openings measuring approximately 3'-2" x 3'-2", Pane size 12 1/4" x 17 1/4".

Feature Notes: The openings have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 11

Historic Rating: H **Priority:** Serious



Deficiency: There are (11) openings that are missing entire frames and glass, (2) on the west, (4) on the north, and (5) on the south.

Recommendation: Remove vented plywood. Replicate and install missing metal window frames and glass. Install with plaster sills to match original construction.

Materials: $108,999.00 **Labor:** $5,955.00 **Quantity:** **Total =** $114,954.00

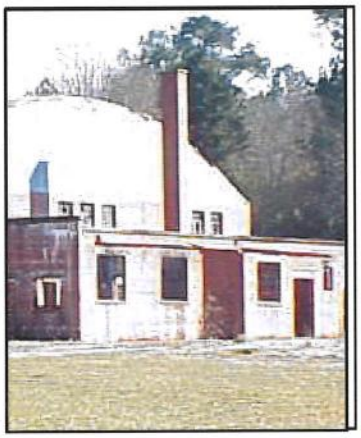
EXTERIOR	4140	Exterior Window Unit	Metal

Feature Description: Openings, measuring approximately 6'-1" x 5'-10" at West elevation. Double hung 6 over 6 paired units. (based on original drawings).

Feature Notes: The openings have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 3

Historic Rating: H **Priority:** Serious



Deficiency: The window frames and glass are missing.

Recommendation: Remove vented plywood. Replicate and install missing metal window frames and glass. Install with plaster sills to match original construction.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

EXTERIOR	4140	Exterior Window Unit	Metal

Feature Description: (1) Opening, measuring approximately 3'-0" x 5'-1", located at the South Elevation.

Feature Notes: The opening has been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:** Serious

Deficiency: Window frame and glass are missing.



Recommendation: Remove vented plywood. Replicate and install missing window frames and glass. Install with plaster sills to match original construction.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

EXTERIOR	4140	Exterior Window Unit	Metal

Feature Description: (1) Opening, measuring approximately 3'-9" x 1'-10", located at the West elevation.

Feature Notes: The openings have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:** Serious

Deficiency:
Window frame and glass are missing.



Recommendation: Remove vented plywood.
Replicate and install missing window frames and glass.
Install with plaster sills to match original construction.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

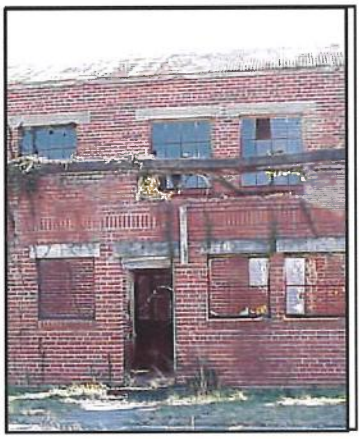
EXTERIOR	4141	Exterior Window Frames	Metal

Feature Description: 12-pane windows, with openings measuring approximately 4'-1" x 5'-0", located up high at the north and south elevations.
Pane size 12 1/4" x 17 1/4".

Feature Notes: The windows have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 20

Historic Rating: H **Priority:** Critical



Deficiency: Window frames are rusted and contain broken glass.

Recommendation: Remove vented plywood. Clean and repair existing frames. Replace sash,glass and other missing elements as necessary.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4140 - Exterior Window Units)

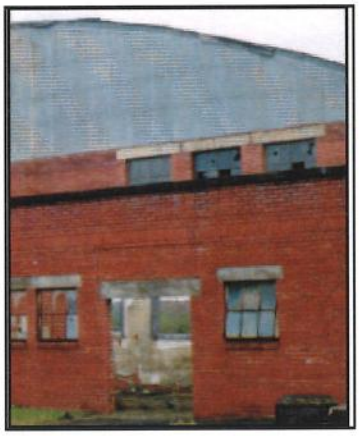
EXTERIOR	4141	Exterior Window Frames	Metal

Feature Description: 12-pane windows, with openings measuring approximately 3'-10" x 5'-10", located at the west elevation.
Pane size 12 1/4" x 17 1/4".

Feature Notes: The windows have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 9

Historic Rating: H **Priority:** Critical



Deficiency: Window frames are rusted and contain broken glass.

Recommendation: Remove vented plywood. Clean and repair existing frames. Replace sash,glass and other missing elements as necessary.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4140 - Exterior Window Units)

EXTERIOR	4141	Exterior Window Frames	Metal

Feature Description: 6-pane windows, with openings measuring approximately 3'-2" x 3'-2",
Pane size 12 1/4" x 17 1/4".

Feature Notes: The openings have been stabilized with vented plywood.

Feature Condition: Poor **Total Inventory:** 29

Historic Rating: H **Priority:** Critical



Deficiency: Window frames are rusted and contain broken glass

Recommendation: Remove vented plywood. Clean and repair existing frames. Replace sash,glass and other missing elements as necessary.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4140 - Exterior Window Units)

EXTERIOR	4144	Exterior Window Hardware	Metal

Feature Description: Exterior window hardware - fastening latches for operable sections
Operable portions are 2/2 tilt-out sections in center and top of 12 pane units
Entire 6 pane units operable tilt-out units.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 58

Historic Rating: H **Priority:** Serious

Deficiency: Rusted and most inoperable



Recommendation: Repair window hardware for operartion. Replicate as necessary. Paint to match original color.

Materials: **Labor:** **Quantity:** **Total =** $0.00
(Refer to 4140 - Exterior Window Units)

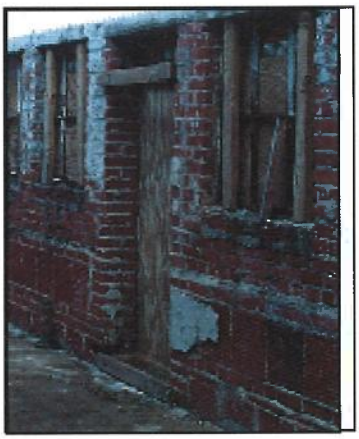
EXTERIOR	4150	Exterior Door Unit	Metal

Feature Description: Exterior doors and frames.

Feature Notes: There are (9) single doors and (2) pair of double doors missing

Feature Condition: **Total Inventory:** 11

Historic Rating: **Priority:**



Deficiency: Doors are missing

Recommendation: Remove vented plywood. Replicate and install missing doors and frames.

Materials: $16,392.00 **Labor:** $396.00 **Quantity:** **Total =** $16,788.00

EXTERIOR	4150	Exterior Door Unit-Hangar Doors	Metal

Feature Description: Metal sliding hanger doors. Each sliding unit 12'-5 1/2" wide.

Feature Notes: Central area of doors has been recently constructed with a wood frame and plywood covering to provide a temporary man door entrance.

Feature Condition: Fair **Total Inventory:** 8

Historic Rating: H **Priority:** Serious

Deficiency: Doors are damaged and rusted, but slide open and closed.

Recommendation: Remove temporary frame entrance. Repair steel door panels.



Materials: $33,430.00 **Labor:** $10,898.00 **Quantity:** **Total =** $44,328.00

EXTERIOR	4150	Exterior Door - Man Doors	Metal

Feature Description: Metal doors in sliding hanger doors
Approx. 30" x 84"

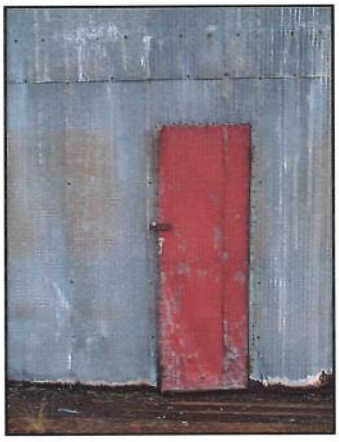
Feature Notes: Central area of doors has been recently constructed with a wood frame and plywood covering to provide a temporary man door entrance.

Feature Condition: Fair **Total Inventory:** 2

Historic Rating: H **Priority:** Serious

Deficiency: Doors are corroded

Recommendation: Repair/ replace corroded steel door panels with in-kind material.



Materials: (See previous item) **Labor:** **Quantity:** **Total =** $0.00

EXTERIOR	4154	Exterior Door Hardware	Steel

Feature Description: Door hardware for metal sliding doors

Feature Notes: 16 steel door guides, 118 L.F. ground rails, 118 L.F. top rails, top door hanger hardware.

Feature Condition: Poor **Total Inventory:** see above

Historic Rating: H **Priority:** Serious

Deficiency: Hardware is rusted and corroded.



Recommendation: Clean, repair and paint to restore for operation.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4150 - Exterior Door Unit-Hangar Door)

EXTERIOR	4310	Roof Surface/ Cover	Metal

Feature Description: Corregated metal hanger roof
Each metal section is 26 1/4" wide x 144 5/8" long

Feature Notes: Hanger roof was replaced during stabilization.

Feature Condition: Fair **Total Inventory:** 7144 S.F.

Historic Rating: H **Priority:** Minor

Deficiency: Some areas of rusting on corregated metal surface



Recommendation: Repair or replace as necessary with in-kind material at rust areas.

Materials: $9,239.00 **Labor:** $1,871.00 **Quantity:** **Total =** $11,110.00

EXTERIOR	4310	Roof Surface/ Fascia	Metal

Feature Description: Corregated metal at roof fascia

Feature Notes: Original metal to facility

Feature Condition: Poor

Total Inventory: 236 S.F. fascia roof
920 S.F. curved fascia

Historic Rating: H

Priority: Serious

Deficiency: Some areas of rusting on corregated metal surface



Recommendation: Repair or replace as necessary with in-kind material at rust areas.

Materials:

Labor: (See previous Item)

Quantity:

Total = $0.00

EXTERIOR	4311	Roof Structure	Wood

Feature Description: Wood roof at perimeter rooms

Feature Notes: Truss connection rafter pockets are visible around structure.

Feature Condition: Missing

Total Inventory: 5282 S.F.

Historic Rating: H

Priority: Serious



Deficiency: Roof is missing at all perimeter room areas



Recommendation: Reconstruct wood shed roof at all perimeter room areas.

Materials: $34,064.00

Labor: $17,532.00

Quantity:

Total = $51,596.00

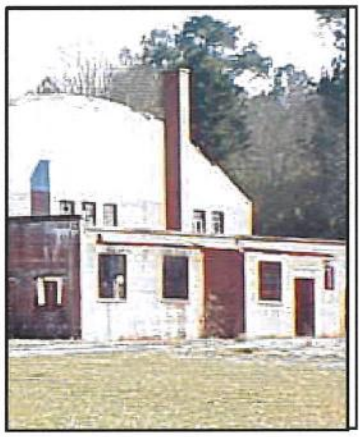
EXTERIOR	4330	Chimney	Masonry

Feature Description: Brick masonry chimney

Feature Notes:

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: H **Priority:** Historic



Deficiency:

Recommendation: Clean masonry and repoint as necessary to correct areas of deterioration. Match original masonry work.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(Refer to 4110 - Exterior Wall Surface)

Historic Rating Designations

U - Undetermined	(The historic significance of the feature has not been determined)
H - Historic	(The feature has historic significance)
T - Treat as Historic	(The feature should be treated as if it has historic significance)
N - Not Historic	(The feature does not have historic significance)

All Estimable Items

Materials: $303,522.00 **Labor:** $105,163.00 **Total =** **$408,685.00**

INTERIOR | 4210 | Interior Wall Surface | Plaster

Feature Description: Interior walls appear to originally have had one to three coats of a plaster material.

Feature Notes: This condition applies to all existing interior walls that are still standing in the areas comprising rooms that wrap around the main hangar area.

Feature Condition: Poor **Total Inventory:** 11,400 S.F.

Historic Rating: H **Priority:** Critical



Deficiency: Time has caused the majority of the finish material to chip off the walls and expose the structural blocks through out.

Recommendation: Evaluate existing plaster and re-plaster based on expert evaluation.
Re-paint based on expert evaluation.

Materials: $50,672.00 **Labor:** $43,299.00 **Quantity:** **Total =** **$93,971.00**

INTERIOR	4210	Interior Wall Surface / Cover	Fiberboard

Feature Description: Mezzanine level walls made from wood framing and fiber board/ plastered wall system.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 450 S.F.

Historic Rating: H **Priority:** Critical

Deficiency: Walls are damaged/ missing: approx. 250 s.f. on front, 80 s.f. on right side, and 120 s.f. on left side. Remaining finish is in poor condition.

Recommendation: Repair with in-kind material. Re-finish and paint to match original color.



Materials: $11,872.00 **Labor:** $4,994.00 **Quantity:** **Total =** **$16,866.00**

INTERIOR	4211	Interior Wall Structure	Masonry

Feature Description: Interior walls constructed of 12" x 12" x 4" masonry tile blocks.

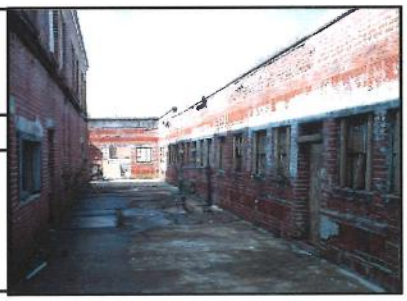
Feature Notes:

Feature Condition: Poor **Total Inventory:** 268 L.F.

Historic Rating: H **Priority:** Critical

Deficiency: Significant portions of the interior walls are missing: north wing - approx 118 lin. ft., west wing - approx. 107 lin. ft., south wing - approx. 43 lin. ft.

Recommendation: Reconstruct interior masonry walls to match original configuration and construction.



Materials: $15,490.00 **Labor:** $10,426.00 **Quantity:** **Total =** **$25,916.00**

INTERIOR	4215	Interior Column	Wood

Feature Description: Interior 4 x 4 wood columns supporting mezzanine structure

Feature Notes: Columns added during stabilization.

Feature Condition: Fair **Total Inventory:** 4

Historic Rating: N **Priority:** Minor



Deficiency: Columns are without finish covering

Recommendation: Repair cantilever structure for proper support without added columns as per original construction.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(Refer to 4231 - Interior Floor Structure)

INTERIOR	4221	Interior Ceiling Structure	Fiberboard

Feature Description: Fiberboard ceiling in elevated mezzanine area

Feature Notes:

Feature Condition: Poor **Total Inventory:** 740 s.f.

Historic Rating: H **Priority:** Critical

Deficiency: Most of the ceiling is missing approx. 740 s.f.



Recommendation: Replace missing ceiling furring and fiber board/ plaster system with in-kind material.

Materials: $13,722.00 **Labor:** $11,725.00 **Quantity:** **Total =** **$25,447.00**

INTERIOR	4230	Interior Floor Surface	Wood

Feature Description: 1 x 8 wood floor surface in mezzanine

Feature Notes:

Feature Condition: Fair **Total Inventory:** 740 s.f.

Historic Rating: H **Priority:** Serious



Deficiency: In very poor condition

Recommendation: Replace deteriorated wood floor with in-kind material and refinish.

Materials: $36,410.00 **Labor:** $9,965.00 **Quantity:** **Total =** **$46,375.00**

INTERIOR	4230	Interior Floor Surface	Concrete

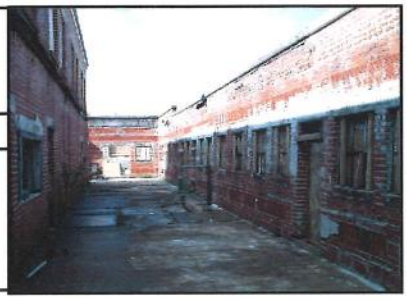
Feature Description: Concrete floors

Feature Notes:

Feature Condition: Fair **Total Inventory:** 10,000 S.F.

Historic Rating: H **Priority:** Critical

Deficiency: Areas of broken and cracked concrete.



Recommendation: Clean and remove all debris, soil, and vegitation. Repair cracks and broken areas with concrete to match original material.

Materials: $14,478.00 **Labor:** $7,359.00 **Quantity:** **Total =** **$21,837.00**

INTERIOR	4231	Interior Floor Structure	Wood

Feature Description: Mezzanine floor structure

Feature Notes:

Feature Condition: Fair **Total Inventory:** 740 s.f.

Historic Rating: H **Priority:** Minor



Deficiency: The underside is open to the hanger area with the wood structure exposed and unprotected.

Recommendation: Repair and/ or replace weakened joists to allow structure to cantilever support as originally constructed.

Materials: $12,000.00 **Labor:** $12,551.00 **Quantity:** **Total =** **$24,551.00**

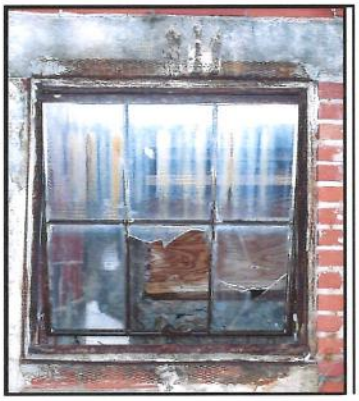
INTERIOR	4240	Interior Window Unit	Glass

Feature Description: 6-pane windows, with openings measuring approximately 3'-2" x 3'-2",

Feature Notes:

Feature Condition: Poor **Total Inventory:** 5

Historic Rating: H **Priority:** Critical



Deficiency: Frames are rusted and missing glass

Recommendation: Repair existing windows as possible. Replicate missing or deteriorated elements. Paint to match original color scheme.

Materials: $12,638.00 **Labor:** $690.00 **Quantity:** **Total =** **$13,328.00**

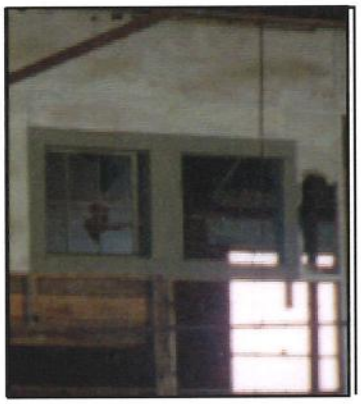
INTERIOR	4240	Interior Window Unit	Glass

Feature Description: (3) pairs of 34" x 32" windows (6 pane) at mezzanine
Pane size 9 3/4" x 13 3/4"

Feature Notes:

Feature Condition: Poor **Total Inventory:** 3 pair

Historic Rating: H **Priority:** Serious



Deficiency: 4 units are missing, the two remaining units have broken glass panes.

Recommendation: Repair existing wood window sash, tracks, and moldings. Replicate missing elements as necessary.

Materials: **Labor:** **Quantity:** **Total =** $0.00
(See previous item)

INTERIOR	4240	Interior Window unit	Glass

Feature Description: (1) Opening, measuring 66 1/2" x 31 1/2", located at the hanger interior north elevation.

Feature Notes:

Feature Condition: Missing **Total Inventory:** 1

Historic Rating: H **Priority:** Serious



Deficiency: Opening is missing frame and glass.

Recommendation: Replicate and install missing window and frame.

Materials: **Labor:** **Quantity:** **Total =** $0.00
(See previous item)

INTERIOR	4243	Interior Window Trim	Wood

Feature Description: 4" wood trim at (3) pairs of 34" x 32" windows (6 pane) at mezzanine

Feature Notes:

Feature Condition: Poor **Total Inventory:** 66 L.F.

Historic Rating: H **Priority:** Serious



Deficiency: Trim seems to be intact, wood in need of repair and painting.

Recommendation: Repair and repaint window trim to match original color.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(Refer to 4240 - Interior Window Unit)

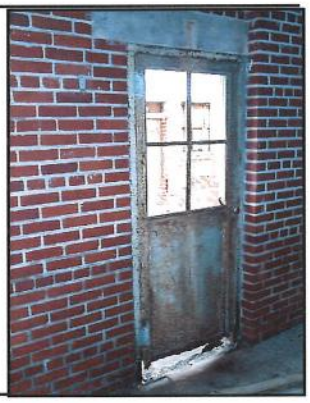
INTERIOR	4250	Interior Door Unit	Metal

Feature Description: Interior metal doors and frame units.

Feature Notes:

Feature Condition: Missing/ Poor **Total Inventory:** 45

Historic Rating: H **Priority:** Serious



Deficiency: See attached list for missing door sizes.

Recommendation: Repair and repaint existing door units. Replicate and install missing doors as necessary

Materials: $125,240.00 **Labor:** $1,647.00 **Quantity:** **Total =** **$126,887.00**

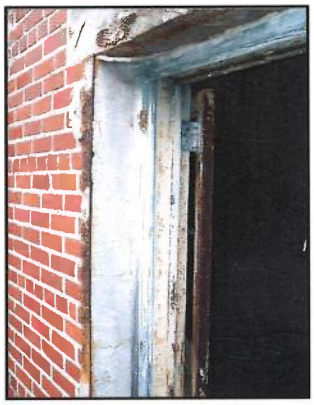
INTERIOR	4251	Interior Door Frames	Metal

Feature Description: Metal frames

Feature Notes:

Feature Condition: Missing/ Poor **Total Inventory:** 44

Historic Rating: H **Priority:** Critical



Deficiency: Missing most doors frames - see attached list for locations.

Recommendation: Repair and repaint existing door frames. Reconstruct/ replicate missing door frames.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(Refer to 4250 - Interior Door Unit)

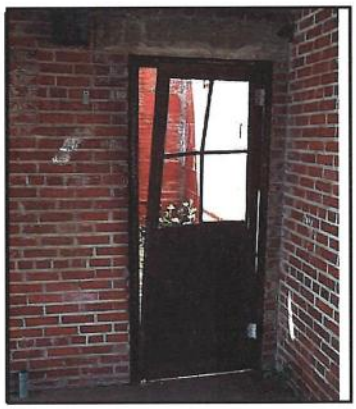
INTERIOR	4252	Interior Doors	Metal

Feature Description: Interior metal doors

Feature Notes:

Feature Condition: Poor **Total Inventory:** 7

Historic Rating: H **Priority:** Critical



Deficiency: See attached list for locations.

Recommendation: Repair and repaint existing doors & frames. Replicate missing/ heavily damaged units. Reconstruct missing wood frame screen doors leading into hangar space.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(Refer to 4250 - Interior Door Unit)

INTERIOR	4253	Interior Door Trim	Wood

Feature Description: Mezzanine door

Feature Notes:

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:** Serious



Deficiency: Trim intact on interior of mezzanine, trim is missing on door on exterior of mezzanine

Recommendation: Repair existing and replicate missing door trim.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4250 - Interior Door Unit)

INTERIOR	4254	Interior Door Hardware	Metal

Feature Description: Interior metal door hardware

Feature Notes:

Feature Condition: Poor **Total Inventory:** 8

Historic Rating: H **Priority:** Serious





Deficiency: The hardware on the remaining doors is rusted/ corroded and in poor condition.

Recommendation: Repair and repaint existing door hardware. Replace with replicated hardware where missing or deteriorated beyond restoration.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 4250 - Interior Door Unit)

INTERIOR	4271	Interior Stair Structure	Wood

Feature Description: Interior stair to mezzanine level
8" rise and 9" run

Feature Notes:

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: H **Priority:** Minor



Deficiency: Missing section of stair has been replaced during stabilization.

Recommendation: Rebuild stairs to meet current building code and safety requirements.

Materials: $6,500.00 **Labor:** $2,007.00 **Quantity:** **Total =** **$8,507.00**

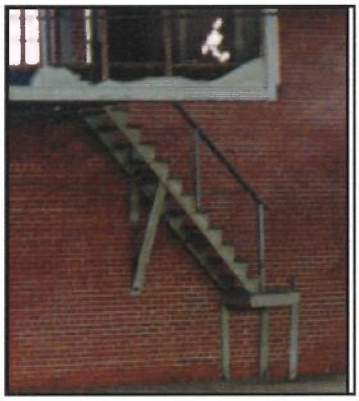
INTERIOR	4271	Interior Stair Railing	Wood

Feature Description: Interior stair to mezzanine level

Feature Notes:

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: H **Priority:** Minor



Deficiency: Railing will not meet safety requirements

Recommendation: Rebuild stairs to meet current building code and safety requirements.

Materials: (See previous item) **Labor:** **Quantity:** **Total =** **$0.00**

INTERIOR	4311	Roof Structure	Wood

Feature Description: Hangar roof

Feature Notes: The metal hangar roof was replaced during stabilization. The wood rafters have been replaced during stabilization. The wood trusses are original (several members have been replaced during stabilization.)

Feature Condition: Good **Total Inventory:** 7144 S.F.

Historic Rating: N **Priority:** Minor

Deficiency:

Recommendation: Utilize as restored.



Materials:	Labor:	Quantity:	Total =	$0.00

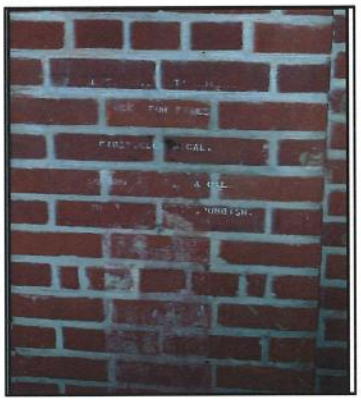
INTERIOR	4756	FS Extinguisher	

Feature Description: Fire extinguisher locations

Feature Notes:

Feature Condition: Fair **Total Inventory:** 5

Historic Rating: H **Priority:** Minor



Deficiency: Extinguishers removed, stenciling difficult to read.

Recommendation: Leave existing stenciling in place. Replicate extinguishers and holders.

Materials: $4,500.00 **Labor:** $500.00 **Quantity:** **Total =** $5,000.00

(Part of Fire Protection Allowance Estimate)

INTERIOR	4310	Roof Surface/ Cover	Wood

Feature Description: Hangar roof

Feature Notes: The galvanized aluminum corrugated metal roof sections were replaced during stabilization. The sections were replaced with equal size sections at 26 1/4" wide x 144 5/8" long, 24 gauge, 7/8" corrugation, by Berridge.

Feature Condition: Good **Total Inventory:** 7144 S.F.

Historic Rating: N **Priority:** Minor

Deficiency:



Recommendation: Utilize as restored.

Materials: **Labor:** **Quantity:** **Total =** $0.00

FEATURE INVENTORY: EXTERIOR - MECHANICAL SYSTEMS

Hanger 1

All Estimable Items

Materials: $500.00 **Labor:** $2,000.00 **Total =** **$2,500.00**

MECHANICAL 5851 Boiler

Feature Description: Steam heating boiler.

Feature Notes: Boiler is not functional.

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:**



Deficiency: Boiler is rusted badley, doors are not operational.

Recommendation: Clean, repair and repaint in existing location. Leave in place for interpretive purposes only.

Materials: $250.00 **Labor:** $1,000.00 **Quantity:** **Total =** **$1,250.00**

(Refer to HVAC Allowance in estimate)

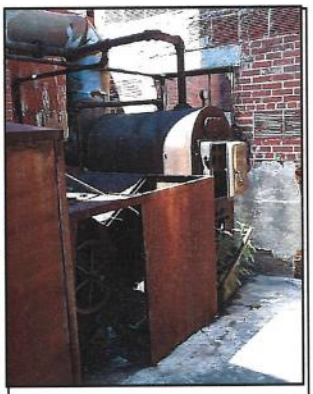
MECHANICAL 5871 Air Handling Unit

Feature Description: Hot air furnace with steam to air heat exchanger.

Feature Notes: Furnace is no longer functional.

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: U **Priority:**



Deficiency: Unit is badley rusted and panels are missing.

Recommendation: Clean, repair and repaint in existing location. Leave in place for interpretive purposes only.

Materials: $250.00 **Labor:** $1,000.00 **Quantity:** **Total =** **$1,250.00**

(Refer to HVAC Allowance in estimate)

HARDWARE

Door No.	Door Size	M.O.	Hardware			Door				Location	Screen	Frame		Notes
			Knob	Latch	Rusted	Existing	Lights	Glass	Rusted	Corroded	Door	Existing	Size	
1	32"	36 3/8"	missing			X	4	missing	X	bottom	X	X	36 3/8" x 83"	
2	32"	36 3/8"	missing			X	4	missing	X		X	X	36 3/8" x 83"	
3	32"	36 3/8"	intact		X	X	4	missing	X	bottom	X	X	36 3/8" x 83"	
4	32"	36 3/8"	missing			X	4	missing	X			X	36 3/8" x 83"	
5	32"	36 3/8"	intact		X	X	4	missing	X		X	X	36 3/8" x 83"	
6		59" x 83"	missing			missing						missing		left wood door jamb
7	31 1/2"		missing			missing						missing		
8		59" x 83"	N/A	missing		X	8	missing	X	bottom		missing		slides hard
9		59" x 83"	N/A			missing						missing		wall brackets only
10	31 1/2"		missing			X	4	missing	X			X		door bent
11	31 1/2"		missing			missing						X		
12	36"		missing			missing						missing		wood jambs & head
13	55 1/2"		missing			missing						missing		wood jambs & head
14	37 1/2"	41"	missing			missing						missing		
15	37 1/2"	41"	missing			missing						missing		
16		23"												on floor (no walls)
17		38 1/4"	missing			missing						missing		
18		37"	missing			missing						missing		
19		37"	missing			missing						missing		
20		70 1/2"	missing			missing						missing		
21		66 1/2"	missing			missing						missing		
22		34 1/2"	missing			missing						missing		
23		75 1/2"	missing			missing						missing		
24		32"												on floor (no wall)
25		37 1/2"	missing			missing						missing		
26		38"	missing			missing						missing		
27		u/a	missing			missing						missing		
28		u/a	missing			missing						missing		
29		u/a	missing			missing						missing		
30	29 1/2"		missing			missing						missing		partial wood frame
31	30 1/2"		missing			missing						missing		partial wood frame
32		32 1/2"	missing			missing						missing		partial wall
33	34"		missing			missing						missing		partial wood frame
34		67"												designed as opening
35		32 1/2"												on floor (no wall)
36		32 3/4"												on floor (no wall)
37		32 3/4"												on floor (no wall)
38		32"												on floor (no wall)
39		35"	missing			missing						missing		
40		38"	missing			missing						missing		
41		u/a	missing			missing						missing		
42		u/a	missing			missing						missing		
43		u/a	missing			missing						missing		
44		34"												
45		34"	missing			missing						missing		
46		34"				missing						missing		
47		34 1/2"				missing						missing		
48		66"				missing						missing		
49		32"												on floor (no wall)
50		32"												on floor (no wall)
51		28"												on floor (no wall)
52		32"												on floor (no wall)

FEATURE INVENTORY: EXTERIOR ENVELOPE

Hangar 1

Historic Rating Designations

U - Undetermined	(The historic significance of the feature has not been determined)
H - Historic	(The feature has historic significance)
T - Treat as Historic	(The feature should be treated as if it has historic significance)
N - Not Historic	(The feature does not have historic significance)

All Estimable Items

Materials: $124,464.00 **Labor:** $86,453.00 **Total =** **$210,917.00**

EXTERIOR 5831 **Incoming Service**

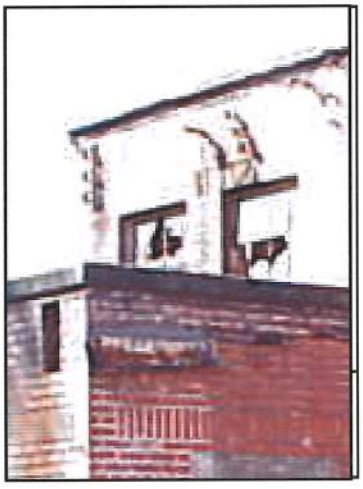
Feature Description: The insulators and weather head from the original 120/240V single-phase overhead service. Located on the south wall of the hangar.

Feature Notes: Based on existing photographs overhead power lines crossed the road on the south side of the hangar building. Secured to the building by ceramic insulators, they entered the building through a raintight service entrance "weatherhead".

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:**

Deficiency: Electrical wiring is lost. The overhead transformer and power poles that show on the historal site photographs are lost.



Recommendation: Install new electrical service in area of old service insulators.

Materials: $36,607.00 **Labor:** $30,513.00 **Quantity:** **Total =** **$67,120.00**

INTERIOR	5832	Distribution Panel	

Feature Description: Original 120/240V single-phase, two- pole,service disconnect switch and 24 breaker, circuit breaker distribution panel located on the south wall of the hangar. Conduits leaving the bottom of the panel enter the floor slab below apparently serving the duplex receptacles located around the building.

Feature Notes: The condition of this equipment makes it impossible to determine the manufacturer and current carrying capacity.

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:**



Deficiency: Conduit between the disconnect switch and the panelboard is lost, as is all wiring. Cover is lost from panel board. Interiors are damaged. There is no panelboard schedule indicating which circuits were served by the breakers.

Recommendation: Replicate cover, fix in place, and paint - for interpretive uses only. Install new panels for for new electrical service requirements.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to 5831 - Incoming Service)

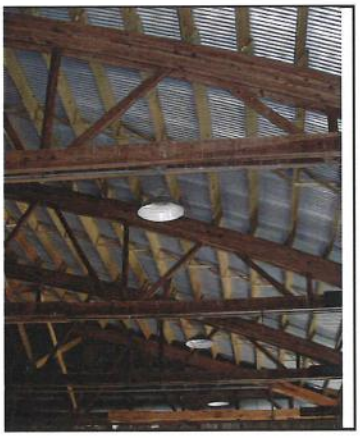
INTERIOR	5834	Interior Light Fixture	

Feature Description: Pendant-mounted incandescent light fixture in hangar.

Feature Notes: Conduit running from the distribution panel is still intact. It appears that three of the fixtures were relocated to make room for the mezzanine on the west end of the hangar.

Feature Condition: Good **Total Inventory:** 17

Historic Rating: H **Priority:**



Deficiency: Fixture bulb is lost.

Recommendation: Repair and repaint to match original. Install replicated bulb.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(Refer to Lighting Equipment in estimate)

INTERIOR	5835	Electrical Equipment	

Feature Description:	60A General Electric fused disconnect switch located on the south wall of the hangar.

Feature Notes:	This switch was used to control electrically powered equipment that is lost. The nature of the equipment served is unknown. Conduit leaving the switch terminates outside the building at a weatherhead.

Feature Condition: Poor **Total Inventory:** See dwg and table

Historic Rating: H **Priority:**

Deficiency:	Wiring is lost.

Recommendation:	Clean and repaint. For interpretive purposes only. Install new panels and switches for new electrical service requirements.



Materials: $87,857.00 **Labor:** $55,940.00 **Quantity:** **Total =** **$143,797.00**

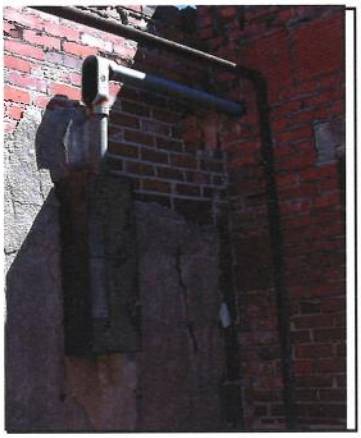
INTERIOR	5835	Electrical Equipment	

Feature Description: Electrical Disconnect switch and conduit located on the east wall of the machine shop.

Feature Notes:

Feature Condition: Poor **Total Inventory:** See dwg and table

Historic Rating: H **Priority:**



Deficiency: Door, wiring, conduit and internal components are lost.

Recommendation: Clean and repaint. For interpretive purposes only. Install new panels and switches for new electrical service requirements.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

INTERIOR	5835	Electrical Equipment	

Feature Description: Surface-mounted duplex receptacle, brown.

Feature Notes: Conduit runs under the slab from the main distribution panel to receptacle outlets located around the perimeter of the hanger and in the rooms located off of the hangar.

Feature Condition: Poor **Total Inventory:** See dwg and table

Historic Rating: H **Priority:**



Deficiency: This receptacle is in tact, however, portions of the circuit wiring is no longer extant.

Recommendation: Remove and use to replicate new devices for use with new electrical service in facility. Locate new devices in existing locations.

Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

INTERIOR	5835	Electrical Equipment	

Feature Description: Fused-disconnect switch of unknown manufacturer and Allen-Bradley starter located on the north wall of the machine shop.

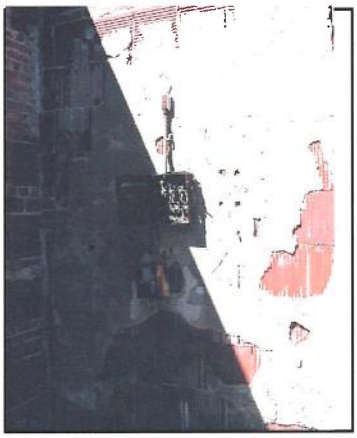
Feature Notes:

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: H **Priority:**

Deficiency: Cover missing from disconnect switch. Nature of equipment served is unknown.

Recommendation: Replicate cover, fix in place, and paint - for interpretive uses only. Install new panels for for new electrical service requirements.



Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

INTERIOR	5835	Electrical Equipment	

Feature Description: Outlet boxes located on the east wall of the shop.

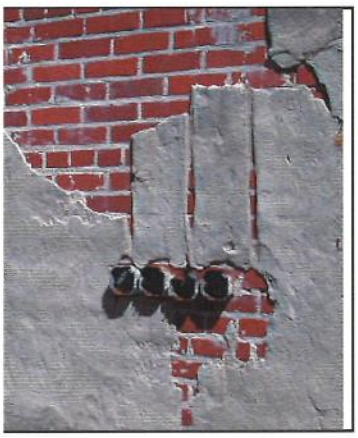
Feature Notes: Purpose of these boxes is unknown

Feature Condition: Poor **Total Inventory:** See dwg and table

Historic Rating: H **Priority:**

Deficiency: Covers, devices, conduit and wiring are lost

Recommendation: Remove. Install new for new electrical service.



Materials: **Labor:** **Quantity:** **Total =** $0.00

(See previous item)

EXTERIOR | 5835 | Electrical Equipment

Feature Description: Miscellaneous 30A fused-disconntect switches located on the south wall of the hangar.

Feature Notes: Because of the rusted condition of the boxes the manufacturer cannot be determined. The equipment served by these switches is lost and there is no indication of its nature.

Feature Condition: Poor

Total Inventory: See dwg and table

Historic Rating: H

Priority:

Deficiency: Conduit, wiring and equipment served by the disconnect switches are lost.

Recommendation: Clean and repaint. For interpretive purposes only. Install new panels and switches for new electrical service requirements.

Materials: (See previous item)

Labor:

Quantity:

Total = $0.00

INTERIOR | 5835 | Electrical Equipment

Feature Description: Conduit, and duplex receptacle located on the south wall of the hangar

Feature Notes:

Feature Condition: Good

Total Inventory: See dwg and table

Historic Rating:

Priority:



Deficiency:

Recommendation: Remove and install new devices for new electrical system.

Materials: (See previous item)

Labor:

Quantity:

Total = $0.00

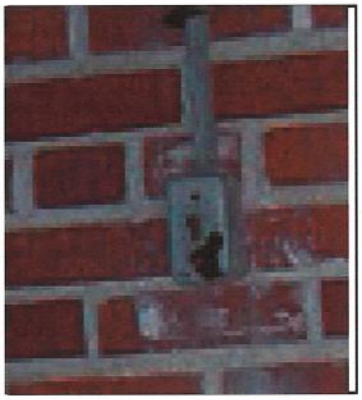
INTERIOR	5835	Electrical Equipment	

Feature Description: Conduit, outlet box and switch located on the south wall of the hangar.

Feature Notes:

Feature Condition: Fair **Total Inventory:** See dwg and table

Historic Rating: H **Priority:**



Deficiency:

Recommendation: Remove and use for replication. Install new devices in existing locations for new electrical system.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(See previous item)

Exterior	5835	Electrical Equipment	

Feature Description: Three conduit riser with weatherheads located at the east end of the supply room. The purpose of these conduits is unknown they go down the wall and disappear into the concrete slab floor.

Feature Notes:

Feature Condition: **Total Inventory:** 1

Historic Rating: **Priority:**



Deficiency: Electrical wiring is lost

Recommendation: Leave as existing for interpretive purposes only.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(See previous item)

INTERIOR	5835	Electrical Equipment	

Feature Description: Conduit, outlet box and switch located on the south wall of the hangar. South elevation.

Feature Notes:

Feature Condition:

Total Inventory: See dwg and table

Historic Rating:

Priority:



Deficiency:

Recommendation: Leave in place for interpretive purposes only.

Materials: (See previous item)

Labor:

Quantity:

Total = $0.00

INTERIOR	5835	Electrical Equipment	

Feature Description: Westinghouse 30A safety switch. Catalog number CF 321 1 Style 1183547C, 3HP, two poles, non-fused. Located on the south wall of the hangar.

Feature Notes:

Feature Condition: Poor

Total Inventory: See dwg and table

Historic Rating:

Priority:



Deficiency:

Recommendation: Clean and repaint - leave in place for interpretive purposes only.

Materials: (See previous item)

Labor:

Quantity:

Total = $0.00

INTERIOR	5835	Electrical Equipment	

Feature Description: 30A, enclosed circuit breaker, manufactured by Wadsworth Electric Manufacturing Co. Located on the south wall of the hangar.

Feature Notes:

Feature Condition: Poor **Total Inventory:** 1

Historic Rating: **Priority:**

Deficiency: Cover is bent, conduit and wire are missing.

Recommendation: Clean, repair and repaint -leave in place for interpretive purposes only.



Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(See previous item)

INTERIOR	5835	Electrical Equipment	

Feature Description: Cutler-Hammer on-off slide switch. Located on the south wall of the hangar.

Feature Notes:

Feature Condition: **Total Inventory:** 1

Historic Rating: **Priority:**

Deficiency: Conduit, wire and equipment served by switch are lost.

Recommendation: Clean, repair and repaint -leave in place for interpretive purposes only.



Materials: **Labor:** **Quantity:** **Total =** **$0.00**

(See previous item)

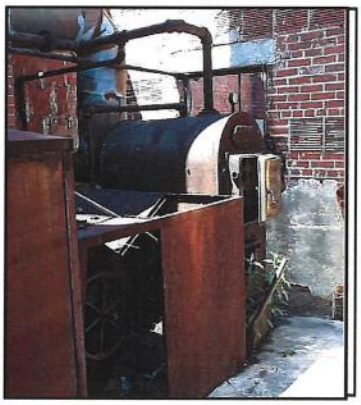
INTERIOR	5835	Electrical Equipment	

Feature Description: Boiler equipment.

Feature Notes:

Feature Condition: **Total Inventory:** 1

Historic Rating: **Priority:**



Deficiency: Disconnect switch that served this equipment is lying on top. been lost.

Recommendation: Clean and repaint - leave in place for interpretive purposes only.

Materials:	Labor:	Quantity:	Total =	$0.00
	(See previous item)			

No.	Description		Complete	Cover missing	Receptacle missing	Wiring only	Outlet box only	Flush-mounted	Original Equipment	Notes	Condition	No.
1	1-1/2" Conduit Stub-up	Supply Room - east wall									P	1
2	Three 1-1/2"conduits with weatherheads	Supply Room - east wall									P	2
3	Receptacle location	Aircraft record room - east wall		X					X		P	3
4	Receptacle location	Aircraft record room - south wall		X					X		P	4
5	Receptacle location	Aircraft record room - west wall	X						X		P	5
6	Junction box (probably for light Switch)	Aircraft record room - north wall					X		X		P	6
7	Receptacle location	Toilet Maint. Supervisor - east wall		X		X			X		P	7
8	Disconnect Switch	closet- east wall							X		VP	8
9	Disconnect Switch	Machine Shop - east wall							X		VP	9
10	Receptacle location	Machine Shop - south wall	X						X		P	10
11	Junction box	Machine Shop - west wall					X		X		VP	11
12	Starter	Machine Shop - north wall							X		P	12
13	Receptacle location	Machine Shop - north wall	X						X		P	13
14	Disconnect Switch	Machine Shop - north wall							X		P	14
15	Receptacle location	Shop - south wall		X					X		P	15
16	Junction box	Shop - east wall					X		X		VP	16
17	Junction box	Shop - east wall					X		X		VP	17
18	Junction box	Shop - east wall					X		X		VP	18
19	Junction box	Shop - east wall					X		X		VP	19
20	Switch location	Shop - east wall		X		X	X		X		VP	20
21	Receptacle location	Shop - north wall		X		X		X	X		P	21
22	Receptacle location	Shop - north wall		X		X		X	X		P	22
23	Disconnect Switch	Heater room							X	1	VP	23
24	Switch location	Heater room - east wall	X						X		P	24
25	Receptacle location	Heater room - north wall	X						X		P	25
26	Receptacle location	Heater room - north wall	X						X		P	26
27	Disconnect Switch	Heater room - north wall							X		P	27
28	Switch location	unnamed space 1 - west wall	X						X		P	28
29	Receptacle location	unnamed space 2 - south wall	X					X	X		P	29
30	Receptacle location	unnamed space 2 - east wall		X					X		P	30
31	Switch location	unnamed space 2 - east wall	X						X		P	31
32	Junction Box	unnamed space 2 - east wall				X			X		VP	32
33	Receptacle location	unnamed space 2 - west wall	X						X		P	33
34	Receptacle location	Army office - 1 - south wall	X						X		P	34
35	Receptacle location	Army office - 1 - south wall	X						X		P	35
36	Receptacle location	Army office - 2 - north wall	X						X		P	36
37	Outlet Box	Army office - 2 - north wall	X						X		P	37
38	Receptacle location	unnamed space 3 - south wall	X						X		P	38
39	Receptacle location	unnamed space 3 - west wall	X						X		P	39
40	Conduit Stub-up	unnamed space 3 - north wall							X		VP	40
41	Switch location	unnamed space 3 - east wall					X		X		P	41
42	Conduit Stub-up	unnamed space 4 - south wall							X		VP	42
43	Receptacle location	unnamed space 4 - west wall	X						X		P	43
44	Receptacle location	unnamed space 4 - north wall		X					X		P	44
45	Switch location	unnamed space 4 - east wall	X						X		P	45
46	Switch location double-gang	Army office 3 - west wall	X						X		P	46
47	Receptacle location	Army office 3 - south wall	X						X		P	47
48	Receptacle location	Army office 3 - south wall	X						X		P	48
49	Receptacle location	unnamed space 5 - south wall	X						X		P	49
50	Switch location	unnamed space 5 - south wall					X		X		P	50
51	Receptacle location	unnamed space 6 - south wall		X					X		P	51
52	Receptacle location	unnamed space 6 - south wall	X						X		VP	52
53	Switch location	Hangar - north wall	X						X		P	53
54	Junction Box	Hangar - north wall	X						X		P	54
55	Receptacle location	Hangar - north wall				X			X		P	55
56	Switch location	Hangar - north wall				X			X		P	56
57	Receptacle location	Hangar - north wall				X			X		P	57
58	Receptacle location	Hangar - north wall				X			X		F	58
59	Receptacle location	Hangar - west wall	X						X		F	59
60	Receptacle location	Hangar - west wall	X						X		P	60
61	Receptacle location	Hangar - west wall				X			X		P	61
62	Junction box	Hangar - west wall	X						X		F	62
63	Junction box	Hangar - west wall	X						X		F	63
64	Receptacle location	Hangar - west wall	X						X		F	64
65	Receptacle location	Hangar - west wall	X						X		F	65
66	GRS Conduit	Hangar - south wall							X		F	66
67	GRS Conduit	Hangar - south wall							X		F	67
68	Junction box	Hangar - south wall							X		F	68
69	Junction box	Hangar - south wall							X		F	69
70	GRS Conduit	Hangar - south wall							X		F	70
71	Disconnect Switch	Hangar - south wall							X	5	P	71
72	GRS Conduit	Hangar - south wall							X		F	72

No.	Description		Complete	Cover missing	Receptacle missing	Wiring only	Outlet box only	Flush-mounted	Original Equipment	Notes	Condition	No.
73	Disconnect Switch	Hangar - south wall							X	5	P	73
74	GRS Conduit	Hangar - south wall							X		F	74
75	Disconnect Switch	Hangar - south wall							X	5	P	75
76	GRS Conduit	Hangar - south wall							X		F	76
77	Disconnect Switch	Hangar - south wall							X	5	P	77
78	GRS Conduit	Hangar - south wall							X		F	78
79	GRS Conduit	Hangar - south wall							X		F	79
80	GRS Conduit	Hangar - south wall							X		F	80
81	GRS Conduit	Hangar - south wall							X		F	81
82	Disconnect Switch	Hangar - south wall							X	4	P	82
83	Flexible Conduit	Hangar - south wall							X		F	83
84	Flexible Conduit	Hangar - south wall							X		F	84
85	Service Disconnect Switch	Hangar - south wall							X		P	85
86	GRS Conduit	Hangar - south wall							X		F	86
87	Main Distribution Panel	Hangar - south wall							X		P	87
88	Enclosed Circuit Breaker	Hangar - south wall							X	6	P	88
89	GRS Conduit	Hangar - south wall							X		F	89
90	Junction box	Hangar - south wall							X		F	90
91	GRS Conduit	Hangar - south wall							X		F	91
92	GRS Conduit	Hangar - south wall							X		F	92
93	GRS Conduit	Hangar - south wall							X		F	93
94	On/Off Slide Switch	Hangar - south wall							X	8	P	94
95	Disconnect Switch	Hangar - south wall							X	7	P	95
96	GRS Conduit	Hangar - south wall							X		F	96
97	GRS Conduit	Hangar - south wall							X		F	97
98	GRS Conduit	Hangar - south wall							X		F	98
99	GRS Conduit	Hangar - south wall							X		F	99
100	Switch location	Hangar - south wall							X		P	100
101	GRS Conduit	Hangar - south wall							X		F	101
102	Junction box	Hangar - south wall							X		F	102
103	Receptacle location	Hangar - south wall				X			X		P	103
104	Switch location	Hangar - south wall	X						X		F	104
105	Receptacle location	Hangar - south wall	X						X		F	105
106	Junction box	Hangar - south wall							X		F	106
107	GRS Conduit	Hangar - Ceiling							X		F	107
108	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	108
109	GRS Conduit	Hangar - Ceiling							X		F	109
110	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	110
111	GRS Conduit	Hangar - Ceiling							X		F	111
112	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	112
113	GRS Conduit	Hangar - Ceiling							X		F	113
114	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	114
115	GRS Conduit	Hangar - Ceiling							X		F	115
116	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	116
117	GRS Conduit	Hangar - Ceiling							X		F	117
118	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	118
119	GRS Conduit	Hangar - Ceiling							X		F	119
120	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	120
121	GRS Conduit	Hangar - Ceiling							X		F	121
122	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	122
123	GRS Conduit	Hangar - Ceiling							X		F	123
124	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	124
125	GRS Conduit	Hangar - Ceiling							X		F	125
126	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	126
127	GRS Conduit	Hangar - Ceiling							X		F	127
128	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	128
129	GRS Conduit	Hangar - Ceiling							X		F	129
130	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	130

No.	Description		Complete	Cover missing	Receptacle missing	Wiring only	Outlet box only	Flush-mounted	Original Equipment	Notes	Condition	No.
131	GRS Conduit	Hangar - Ceiling							X		F	131
132	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	132
133	GRS Conduit	Hangar - Ceiling							X		F	133
134	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	134
135	GRS Conduit	Hangar - Ceiling							X		F	135
136	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	136
137	GRS Conduit	Hangar - Ceiling							X		F	137
138	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	138
139	GRS Conduit	Hangar - Ceiling							X		F	139
140	Pendant-Mounted Light fixture	Hangar - Ceiling							X	2	P	140
141	Conduit Stub-up	Unnamed room 6							X		P	141
142	Conduit Stub-up	Unnamed room 6							X		P	142
143	Conduit Stub-up	Unnamed room 6							X		P	143
144	Conduit Stub-up	Unnamed room 6							X		P	144
145	Conduit Stub-up	Unnamed room 6							X		P	145
146	Disconnect Switch	Hangar - south wall							X	3	P	146
147	3/4" GRS Conduit	Hangar - south wall							X		F	147
148	3/4" GRS Conduit	Hangar - south wall							X		F	148
149	1/2" GRS Conduit	Hangar - south wall							X		F	149
150	GRS Conduit	Hangar - south wall							X		F	150
151	Flexible Conduit	Hangar - south wall							X		F	151
152	GRS Conduit	Hangar - south wall							X		F	152
153	Junction Box - for light fixture	Hangar ceiling over mezzanine							X		F	153
154	Junction Box - for light fixture	Hangar ceiling over mezzanine							X		F	154
155	GRS Conduit	Mezzanine							X		F	155
156	Conduit Stub-ups	Hangar - south wall							X		P	156
157	GRS Conduit	Hanger- south wall							X		F	157
158	Switch location	Hangar - west wall	X						X		F	158
159	Junction Box	Exterior wall - northeast corner							X		P	159
160	Junction Box	Exterior wall - northeast corner							X		P	160
161	Metal box	Exterior wall - north							X		P	161
162	Junction Box	Exterior wall - north							X			162
163	Weatherhead	Exterior wall - west							X		P	163
164	GRS Conduit	Exterior wall - west							X		P	164
165	Weatherhead and insulators	Exterior wall - west							X		P	165
166	Insulators	Exterior wall - south							X		P	166
167	Metal box	Exterior wall - south							X		P	167
168	Weatherhead and insulators	Exterior wall - south							X		P	168
169	Armored cable	Hangar - east wall							X		F	169

Notes:

1 Disconnect switch and associated conduit is loose and lying on the heating equipment.
2 Fixture is missing globe.
3 General Electric, 60 Amp, 2 pole, fused disconnect switch.
4 Non-fused disconnect switch, size and manufacturer unknown.
5 30 amp non-fused disconnect switch, manufacturer unknown.
6 Box for enclosed circuit breaker, by Wadsworth Elec Mfg Co.,50 amp, 125-250 volt, cat. No.4B, 2-pole.
7 Westinghouse safety switch, 30 amp, cat no. CF 321 1, Style 1183547C, 3hp, 2-pole, non-fused.
8 Cutler-Hammer on-off slide switch.
9 Raceway for lighting branch circuit.
10 To weatherhead on outside of building

Conditions

G = Good
F = Fair
P = Poor
VP = Very Poor

Appendix D

- Materials Analysis
  - Paint Analysis
  - Mortar Analysis

PAINT ANALYSIS
OF
HANGAR NUMBER ONE
MOTON FIELD
TUSKEGEE, ALABAMA

PREPARED
FOR
THE JAEGER COMPANY

BY
MARYELLEN HIGGINBOTHAM
PRESERVATION/DESIGN CONSULTANT
September 2002

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- List of Figures
- List of Samples
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INTRODUCTION

In the summer of 1941, Tuskegee Institute began the development of Moton Field in Tuskegee, Alabama. The extant historic buildings/structures at Moton Field are unique examples of facilities needed for basic flight training during the 1940s. The African-American pilots who trained here made a considerable contribution to the United States flight operations during World War II. After the war, the civilian uses of these buildings/ structures included civilian aviation, recreation, and housing in addition to Tuskegee Institute programs. Most of the buildings were vacant and deteriorated by the 1980s.

According to research conducted by the National Park Service and The Jaeger Company, construction of the main buildings/structures at Moton Field began in spring of 1941, with Hangar Number One, and concluded in the summer/fall of 1945, with the Skyway Club. These buildings/structures were constructed in Three Phases and all within five years. The nine extant historic buildings/structures are Hangar Number One, Entrance Gate, Control Tower, Bath and Locker House, Warehouse/Vehicle Storage Building, Dope Storage Shed, Oil Storage Shed, Fire Protection Shed, and Skyway Club.

SCOPE OF WORK

Paint analysis of the paint histories of the nine extant historic buildings/structures at Moton Field has been conducted in two phases. The project began at the request of Amy Kissane, Senior Preservation Planner at The Jaeger Company and is a part of The Jaeger Company's Moton Field Project for the National Park Service. The objective of the first phase of the paint analysis was a survey of the exterior/interior paint history for each of the nine buildings/structures to aid in the development of a restoration and interpretation plan for the site.

Phase One began with a site visit and a review of Moton Field maps, architectural drawings and photographs provided by The Jaeger Company. The site visits were coordinated with Debbie Toole, Architectural Historian for The Jaeger Company. Three days were spent on site at Moton Field. Multiple paint samples were taken from the main architectural elements on the exterior and interior rooms of the buildings or structures. An initial microscopic study of selected paint samples was conducted on site. During the study, more than 200 paint samples were examined under a lighted, 40X stereo microscope. Construction materials and finishes were also considered as tools in understanding the buildings'/structures' paint histories. Pigment analysis and spectrophotometric color matching were not included in this survey.

The objective of Phase Two was to determine, where possible, the paint schemes for the nine extant historic buildings/structures during the designated period of significance "1945". Nineteen paint samples from six buildings/structures were sent to Frank S. Welsh, an Architectural Coating Specialist, for specific color matching to Sherwin Williams Color Swatches. These samples were taken from buildings built just before and during World War II, a period when building materials were expensive and in short supply. Because it was felt that emphasis was on building and not repainting, Mr. Welsh was requested to color match to the original colors on each paint sample. Findings of Mr. Welsh and of the paint survey have been used to recommend, where possible, the color schemes for the nine extant historic buildings/structures at Moton Field.

This written presentation of the paint analysis of the extant buildings/structures at Moton Field includes a brief introduction, scope of work, general summary; paint histories material and color samples; and Mr. Welsh's report. Chromo-chronologies, paint layer sequencing, of each building/structure are presented when possible.

GENERAL SUMMARY

The paint histories of the extant buildings/structures at Moton Field are incomplete puzzles of paint, color, and materials. Time and the elements have not been kind to the original materials remaining in these buildings. In many cases, original materials are missing or so altered as to be unreadable. Paint was often applied thinly and inconsistently within rooms making some paint histories difficult to determine. No paint schedules were located to confirm paint colors. However, colors and paint mediums do provide a general paint history in each building/structure.

Construction materials contributed greatly to the exterior and interior decorative schemes of the buildings/structures. Colors used during the war years reflect the scarcity and cost of paint materials. Although Moton Field was not officially a military facility, the original paint colors found on the site's buildings/structures resemble the gray colors of military facilities of the era. Wooden buildings at Moton Field were painted varying shades of gray with gray to white trim. Building interiors were also painted grays but they became more colorful as the building uses changed over time.

Each building/structure will be discussed chronologically by period of construction and the rooms will be presented according to the POND Architectural Plans. When possible, original paint colors for main architectural elements on buildings and in rooms will be given.

PAINT ANALYSIS
HANGAR NUMBER ONE

Hangar Number One was constructed in the summer of 1941. An addition of four rooms was added on the south side in 1942 and a second addition of four rooms was added on the west side between 1943 and 1944. Stabilization of the building had already been completed at the time of this analysis. Some original materials had been replaced or removed from original locations. Paint samples were obtained from as many spaces and original materials as possible.

POND EXISTING CONDITIONS HANGAR NUMBER 1 FLOOR PLAN will be used for building/room information orientation. (See Figure 1)

EXTERIOR

Construction materials determined the original exterior decorative scheme of Hangar Number One just as it does today. The original decorative scheme was composed of red brick; brown colored concrete; painted wood trim; metal windows and doors; and a corrugated metal roof and hangar doors. Rust and deterioration of the metal and wood materials altered the original colors of some of these materials. The second story was not accessible during survey site visits. It is recommended that when the deteriorated fascia board is removed that a part of it be saved and examined to determine the second color.

INTERIOR

HANGAR SPACE ROOM 101

Paint analysis indicates that the interior of the hangar has a limited paint history and was largely unpainted.

Roof
Original unpainted wood trusses support a new, corrugated metal roof.

Walls
Original red brick walls were and are unpainted.

Second-Story Windows
All second-story windows have concrete lintels and sills. Only second-story balcony windows were accessible for sampling. Metal frames and sashes have only two paint colors before being covered with thick plaster. The first color on the metal, a dark gray, appears to be the same dark gray color Frank Welsh color matched for Room 125 metal door. (See Sample 3)

First-Story Windows
First-story windows are interior windows into the perimeter rooms. Their concrete lintels were probably originally unpainted. The interior window on the north wall opens into Room 124. It has wood framing and a wood shelf. The wood framing and shelf have been painted at least 9 times. The first color is a grayish white very close to Sherwin Williams #1004. (See Sample 1) The second color visually appears close to Sherwin Williams light gray #1001. (See Sample 2) Most of the later colors (greens) relate more to Room 124 than to the hangar.

The interior windows on the west side open into Room 109. The wood frames have been painted only 3 times—white, gray, and gray. These three colors are the same as the first three colors of the north interior window.

Doors
The doors on the north, west, and south sides have concrete lintels. The original color on the metal doors and framing into Room 125 has been color matched by Frank Welsh as being very close to Sherwin Williams # 2117. (See Sample 3) The second color is a medium gray, visually matched to Sherwin Williams # 2113. (See Sample 4)

The wood framing of the small east façade doors is very weathered. They appear to have only two layers of paint—light gray, visually matched to Sherwin Williams #1001 (See Sample 1) and a medium gray color not matched.

Floors
The floors are gray concrete.

BALCONY
The balcony was added to Hangar Number One in 1942 or 1943. It was built to provide more space for parachute maintenance. It is not known if the balcony was originally open or enclosed. The balcony support structure is unpainted.

Ceiling
Balcony ceiling at the time of the paint survey was a thick fiberboard with a white finish. (See Sample 5)

Walls
Balcony north, east, and south walls are constructed of a thin fiberboard. (See Sample 6) The fiberboard has a buff finish on the inside and a gray finish on the outside and was probably originally unpainted. On the interior side, the fiberboard has a buff finish and has been painted at least once with a thin layer of light buff paint. This buff color appears close to Sherwin William #1361. (See Sample 7) The interior woodwork is also painted the same buff color. (See Sample 8) This buff color appears as a post-war color on woodwork in the Skyway Club. The hangar side of the fiberboard has one or two thin layers of light chalky gray paint.

The west wall is unpainted brick.

Windows
The brown concrete lintels and window surrounds have a white plaster finish layer. The metal frames and sashes were originally painted a dark gray close to Sherwin Williams #2117. (See Sample 3) The second gray color is close to Sherwin Williams #2115. (See Sample 4) At some point in time, the frames and sashes were covered with a thick white plaster that has twice been painted a dark gray.

Wood interior window frames are painted a buff color close to Sherwin Williams #1361. (See Samples 7 & 8). Wood exterior window frames are painted inconsistently. The first paint layer is a gray first layer, similar to Sherwin Williams #1001, (See Sample 2) then another gray. Some frames have the thin light chalky gray third layer that appears on the exterior side of the fiberboard.

Door
Wood doorframe has two layers of gray paint consistent with the exterior window frame. Date of first application of paint has not definitely been determined.

Stair Railing
It was not possible to establish a paint sequence for the stair railing. There appears to be only one layer of a very light gray on the top of the railing. Several light to dark grays were visible underneath the railing.

Stairs
It was not possible to establish a paint sequence for the steps. Although several medium to dark gray colors were visible, the steps could have been unpainted during the war years.

PERIMETER ROOMS

Perimeter rooms in Hangar Number One were constructed in three difference phases between 1941 and 1944. Most of the perimeter rooms were built in Phase One. Rooms 102, 103, and 104 were built in Phase Two. And Rooms 111, 112, 117, and 120 were built in Phase Three. Changes in construction materials reflect these phases. All perimeter room roofs and most interior perimeter wall finishes are missing. Many years of exposure to the weather have removed most of the interior finishes. No complete wall "sandwich" remains in any room making it difficult to determine complete wall color histories. Pieces of a rocky plaster are present in almost every perimeter room. Given this existing wall evidence, it appears that the original wall finish in all rooms, with the possible exception of Rooms 111, 112, 117, and 120, were plaster. This plaster was composed of three coats; a rocky base coat, a white rocky middle coat, and a smooth white finish coat. It would be important to have the project masonry consultant to address the gray concrete layers in Rooms 112, 117, and 120 and also in the Control Tower rooms.

Paint analysis indicates that the perimeter rooms have a paint history of generally three time periods. Period One was the 1940s when there appears to have been only two or

three paintings of white and gray colors. Period Two reflects the popular green and blue green colors of the 1950s to early 60s. The darker colors, especially some of the dark grays were most likely used from the 1960s into the 1970s. The Jaeger Company has copies of photographs from the1970s that show Hangar Number One as being unoccupied and deteriorated.

Paint analysis also indicates that the original color of most woodwork was close to Sherwin Williams grayish white #1004. This white color was color matched by Frank Welsh from a paint sample from the door frame of Room 102; a paint sample from a door frame in Room 121; and also from a paint sample from the Skyway Club exterior window frame. (See Sample 1) This white is most likely composed of white lead and linseed, which gives it a light cream or buff appearance under the microscope. It was initially thought to be a primer but a dirt layer is visible on some of the paint samples. Frank Welsh color matched the original color for the exterior metal door of Room 125 as being close to Sherwin Williams #2117. (See Sample 3) This dark gray color is also present on all metal doors and windows. The original wall finish appears to be a white, smooth or rocky plaster.

The second color visible on almost every architectural element is a light gray close to Sherwin Williams #1001. (See Sample 2) This light gray color was color matched by Frank Welsh from a paint sample from the exterior of the Bath and Locker House.

Perimeter room paint histories will be presented using the POND EXISTING CONDITIONS HANGAR NUMBER 1 FLOOR PLAN for room orientation ---beginning on the north side with the offices built in 1941. (See Figure 1)

Room 125

Room 125 was labeled "Director of Training and Ground Commander" on a January 10, 1943 architectural drawing of the building.

Walls

West interior wall is missing. Only remnants of wall plaster remain. A small piece of plaster found on the east wall has a rocky white finish coat followed by fragments of white, light grays, and blue green paint. (See Sample 10) If this plaster is part of the original wall finish, then the original wall color would probably be Sherwin Williams #1004 (See Sample 1) and the second color Sherwin Williams #1001. (See Sample 2) A sample from the north wall was sent to Frank Welsh for possible color matching. He described the sample he received as a patch of relatively new plaster.

Windows

Gray lintels have a white layer then metal lathe. Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color. The fronts of the concrete sills are covered with clay tiles.

Doors
The first layer on the metal frame is a dark gray that appears close to Sherwin Williams #2117. (See Samples 4 & 11) Additional colors are listed in Room 125 chromo-chronology.

The first color on the wood doorframe appears to be a light gray close to Sherwin Williams #1001. (See Sample 2) Additional colors are listed in Room 125 chromo-chronology.

Room 124

Room 124 is labeled "General Managers Office" on a 1943 plan of the building.

Walls
East and west walls are missing. A plaster sample from the north wall was sent to Frank Welsh for color matching. He commented that the plaster was very degraded and did not seem to be very old. He identified the first color as a grayish white. He also identified another color on the sample as a faded and degraded green oil paint close to Sherwin Williams #1197. (See Sample 12) This color also appears as one of the colors on the metal and/or wood door frames in Rooms 102, 103, 105, 109, 121, 122, 123, 124 & 125.

Windows
Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Wood window opening and shelf has been painted at least 9 times. (See Sample 13) The first layer is a thick white layer-- probably white lead with linseed oil. The next two layers are light grays. Remaining colors are listed in Room 124 chromo-chronologies.

Doors
White is the first color found on the metal doorframe. (See Sample 1) The paint is thick—probably white lead and linseed oil. The remaining colors are similar to the metal doorframe in Room 125.

The wood doorframe also has the same colors as those found on Room 125 wood doorframe. The additional colors are listed in Room 124 chromo-chronology. The fronts of the concrete sills are covered with clay tiles.

Toilet Room between Rooms 123 and 124

Windows
Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color. Dark gray, blue green and buff colors were found on the white plaster on the metal windows. These blue green and buff colors are two of the last colors found on the doors in Rooms 124 & 125.

Room 122

Room 122 is labeled "Commander Officer" on the 1943 plan of the building.

Walls

Fragments of light and medium gray were found on the plaster above the south door opening. (See Samples 14 & 15) Blue green paint is visible running down the bricks beside the north door opening. It appears to be close to the first blue green color found on the doorframes.

Windows

Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Room 121

Room 121 is labeled "Army Office" on both the POND and the 1943 plans of the building.

Windows

Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Doors

Fragments of light gray and blue green paint were found on the wood doorframe between Room 121 and Room 115. The same colors were also found on the Room 115 side of the frame. A frame sample was sent to Frank Welsh for color matching. He described the first layer as a white close to Sherwin Williams #1004. (See Sample 1) He referred to two other colors as aqua and medium blue-green.

Room 120

Room 120 is labeled "Army Office" on the 1943 plans of the building.
It was built between 1943-1944 during the Third Phase of Hangar One construction.

Walls

The brick walls in these rooms are finished in the same manner as the walls in Rooms 117 and 112. They are covered with at least two coats of gray before a three-coat plaster layer. The second concrete is applied with a black adhesive. (See Figure 2 and Sample 16 from Room 112)

Windows

Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Room 117

Room 117 is labeled "Army Office" on the 1943 plans of the building.
It was built between 1943-1944 during the Third Phase of Hangar One construction.

Walls
Wall finishes are the same as those in Room 120 and Room 112. (See Figure 2 and Sample 15 from Room 112)

Room 116
Room 116 is labeled "Army Office" on the POND plan of the building.

Walls
Only small remnants of plaster remain on the brick walls.

Room 115
Room 115 is a passageway.

Doors
A sample of the east doorframe shows light grays, white, green and two dark grays similar to those found on balcony steps. Some of the dark gray latex paint is still gooey.

Room 114
Room 114 is a closet.

Room 113
Room 113 is labeled "Army Office" on the 1943 plans of the building.

Room 112
Room 112 is not labeled on the Pond plan of the building. It was built during the Third Phase of construction and is finished in the same manner as Rooms 120 and 117. (See Figure 2 and Sample 16)

Room 111
Room 111 is not labeled on the Pond plan of the building. It was built during the Third Phase of hangar construction and is an extension of Room 110 Heater Room. The walls are brick and tile.

Room 110
Room 110 is labeled "Heater Room" on the POND plan of the building.

Walls
Only fragments of the plaster coats remain.

Doors
Traces of dark gray, cream, light gray, gray, blue and medium gray paint were found on the metal doorframe into this room. The cream color is thick and possibly a primer to cover rust.

Room 109

Room 109 is labeled "Shop" on the POND plan of the building.

Walls

Traces of white, gray, gray, blue, dark blue-gray, blue green and buff are visible on the concrete around the door into the hangar.

Windows

Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Wooden windows opening into the hangar are painted white (See Sample 1), light gray (See Sample 2), and then another light gray.

Doors

Metal doors are painted dark gray, red brown, white, gray, light gray, blue green, blue green, and buff.

Room 108

Room 108 is labeled "Machine Shop" on the POND plan of the building.

Windows

Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color. Colors found around the exterior window frame are white, light gray, gray, gray, and four or five layers of white.

Room 107

Room 107 is labeled "closet" on the POND plan of the building.

Walls

Walls are brick.

Room 106

Room 106 is labeled "Toilet Maintenance Supervisor" on the POND plan of the building.

Walls

Plaster walls appear to have several coats of plaster. A light green color is visible before the existing plaster layer. The existing layer is painted white, light gray, and medium gray. Shower walls are smooth concrete.

Room 105

Room 105 is labeled "Aircraft Record Room" on the POND plan of the building.

Walls
A gray skim coat of concrete and a later white plaster is visible in this room. A bright green color is also visible over the wood doorframe.

Windows
Metal windows and sashes have two dark gray paint layers on the metal before being covered with a thick layer of plaster. See Sample 3 for the first gray color.

Doors
Metal doorframe shows a thick buff layer over rust, then three or four gray layers before blue green and buff. These same colors have been seen in several other rooms.

Room 104

Room 104 is labeled "Tea Room" on the POND plan of the building. It was built in 1942, during Phase Two of Hangar One construction.

Walls
Original wood frame walls are missing.

Room 103

Room 103 is labeled "Chief Maintenance Office" on the POND plan of the building. It was built in 1942 during Phase Two of Hangar One construction.

Walls
The deteriorated frame walls have been removed. Plaster remnants remain on the concrete door surrounds in Room 103. (See Figure 3)

Doors
Concrete lintel and door surround were covered with plaster. (See Figure 3) The wood door frame has been painted white, grays, blue green, and light blue. The frame sample sent to Frank Welsh showed at least two layers of white close to Sherwin Williams #1004 (See Sample 1) and a medium blue green color.

Room 102

Room 102 is labeled "Supply Room" on the POND plan of the building. It was also built during the Second Phase of Hangar One construction

Walls
Original frame walls have been removed. (See Figure 4) Final wall finish is rocky plaster.

Doors
Paint sample of the wood doorframe showed white, gray, yellow green, light gray, dark blue gray, blue green and buff colors. These have been seen in other rooms.

CHROMO-CHRONOLOGIES

Chromo-chronologies are presented for those exterior and interior surfaces where there is sufficient substrate and/or paint evidence to determine a paint sequence for that surface.

The original paint layer in the chromo-chronology charts of Rooms 101, 105, 106, 107, 108, 109, 110, 113, 114, 115, 116, 118, 119, and Rooms 121-125 relates to the building's original construction date of 1941.

The original paint layer in the chromo-chronology charts of Rooms 102, 103, and 104 relates to the lunch/tea room addition construction date of 1942.

The original paint layer in the chromo-chronology charts of Rooms 111, 112, 117, and 120 relates to the office addition construction date of 1943-1944.

HANGAR NUMBER ONE
ROOM 101

Paint Colors	Roof	Walls	Metal Windows	Frame Window Room 109	Frame Window Room 125
Original	corrugated metal	red brick	dark gray SW #2117	white SW #1004	white SW #1004
Paint 2				light gray SW #1001	light gray SW #1001
Paint 3			med gray ?	gray	light gray
Paint 4					yellow green
Paint 5					blue green
Paint 6					green
Paint 7					blue green
Paint 8					light gray
Paint 9					buff

HANGAR NUMBER ONE
ROOM 101

Paint Colors	Metal Door Room 109	Metal Door Room 125	Frame Door Room 102	Frame Doors East Wall
Original	dark gray	dark gray SW #2117	white SW #1004	
Paint 2			light gray SW #1001	light gray SW #1001
Paint 3	red brown	light gray	light gray	gray
Paint 4	gray	gray		
Paint 5	gray	gray	yellow green	
Paint 6	dark gray	dark gray	dark gray	
Paint 7	blue green	blue green	blue green	
Paint 8	light gray	light gray	light gray	
Paint 9	buff	buff	buff	

HANGAR NUMBER ONE
Balcony

Paint Colors	Ceiling	Interior Walls	Exterior Walls	Metal Windows	Interior Frame Window	Exterior Frame Window	Door
Original	white	buff fiberboard	gray fiberboard	dark gray SW #2117		light gray SW #1001	light gray SW #1001
Paint 2		buff SW #1361		med gray ?	buff SW #1361	gray	gray
Paint 3		buff SW #1361			buff SW #1361	very light gray	

HANGAR NUMBER ONE
Room 125

Paint Colors	Walls	Metal Window	Metal Door	Frame Door
Original	white	dark gray SW # 2117	dark gray SW #2117	white SW #2117
Paint 2	light gray SW #1001		light gray SW #1001	light gray SW #1001
Paint 3	light gray	med gray ?	light gray	light gray
Paint 4			gray	yellow green
Paint 5			blue green	blue green
Paint 6			gray	green
Paint 7			blue green	blue green
Paint 8			gray	gray
Paint 9			buff	buff

HANGAR NUMBER ONE
Room 124

Paint Colors	Walls	Metal Window	Frame Window	Metal Door	Frame door
Original	white SW #1004	dark gray SW #2117	white SW #1004	dark gray SW #2117	white SW #1004
Paint 2	light gray SW #1001		light gray SW #1001		light gray SW #1001
Paint 3	light gray	med gray	light gray	med gray	light gray
Paint 4			gray	gray	
Paint 5	blue green		blue green	blue green	
Paint 6			green	green	green
Paint 7			blue green	blue green	blue green
Paint 8			light gray	light gray	light gray
Paint 9			buff	buff	buff

HANGAR NUMBER ONE
Toilet Room between Rooms 123 & 124

Paint Color	North Window
Original	dark gray SW # 2117
Paint 2	
Paint 3	med gray
Paint 4	
Paint 5	
Paint 6	plaster dark gray
Paint 7	blue green
Paint 8	light gray ?
Paint 9	buff

HANGAR NUMBER ONE
Room 102

Paint Color	North Door
Original	white SW #1004
Paint 2	light gray
Paint 3	light gray
Paint 4	?
Paint 5	yellow gray
Paint 6	dark gray
Paint 7	blue green
Paint 8	light gray
Paint 9	buff

PAINT RECOMMENDATIONS
HANGAR NUMBER ONE

By 1945, the period of significance for Moton Field interpretation, Hangar Number One would have been only four years old. During those four years, the mission at Moton Field was building and training; not repainting. Thus, due to the site expansion and the scarcity and cost of paint materials during those four years of WWII it is unlikely that Hangar Number One would have been painted more than twice.

Approximately one year after construction began on Hangar Number One, the "tea room" addition was begun and completed. A year later construction was begun and in some cases completed, on Hangar Number Two, the Control Tower, two sheds, a Warehouse/ Vehicle Storage Building, the Bath and Locker House, and four additional rooms to Hangar Number One.

The first three or four paint findings in the "tea room" addition correspond to the paint findings in the original perimeter rooms. This raises the possibility of either the woodwork in the original perimeter being unpainted during the first year or, that the first paint color, white, was originally intended to be more of a primer than a finish. The substrates in Rooms 111, 112, 117, and 120 are so deteriorated that they lend little information as to their original finishes other than the first gray concrete layer was possibly a finish coat.

The exact date of the second painting can not be determined but it more than likely was implemented by 1945. The original color on the Bath and Locker House exterior was color matched by Frank Welsh as being very close to Sherwin Williams #1001. (See Sample 2) The second paint color found on woodwork and several walls in Hangar Number One perimeter rooms appears to be the same light gray color. The third paint color found in the perimeter rooms was a similar gray color.

Paint findings on Hangar Number One metal doors, windows & sashes suggest that the original dark gray color, matched by Frank Welsh to be close to Sherwin Williams #2117, was still being used during the second paint period.

Architectural evidence, paint evidence and the above considerations indicate that for Hangar Number One during the 1945 period of significance the appropriate color for perimeter walls and woodwork would be light gray, Sherwin Williams #1001. The appropriate color for the metal windows during the 1945 period of significance would be dark gray, Sherwin Williams #2117.

The colors would be applied in the following manner:

Room 101

First-floor frame windows and doors	Sherwin Williams #1001
First-floor metal doors	Sherwin Williams #2117

Second-floor metal windows	Sherwin Williams #2117

Balcony

Interior woodwork	Unpainted
Interior walls	Unpainted or Sherwin Williams #1001
Exterior woodwork	Sherwin Williams #1001
Exterior walls	Sherwin Williams #1001
Staircase railing	Unpainted or Sherwin Williams #1001
Steps	Unpainted or possibly Sherwin Williams #1006

Perimeter Rooms

Woodwork	Sherwin Williams #1001
Walls	Sherwin Williams #1001
Metal doors & windows	Sherwin Williams #1001

APPENDIX

LIST OF FIGURES

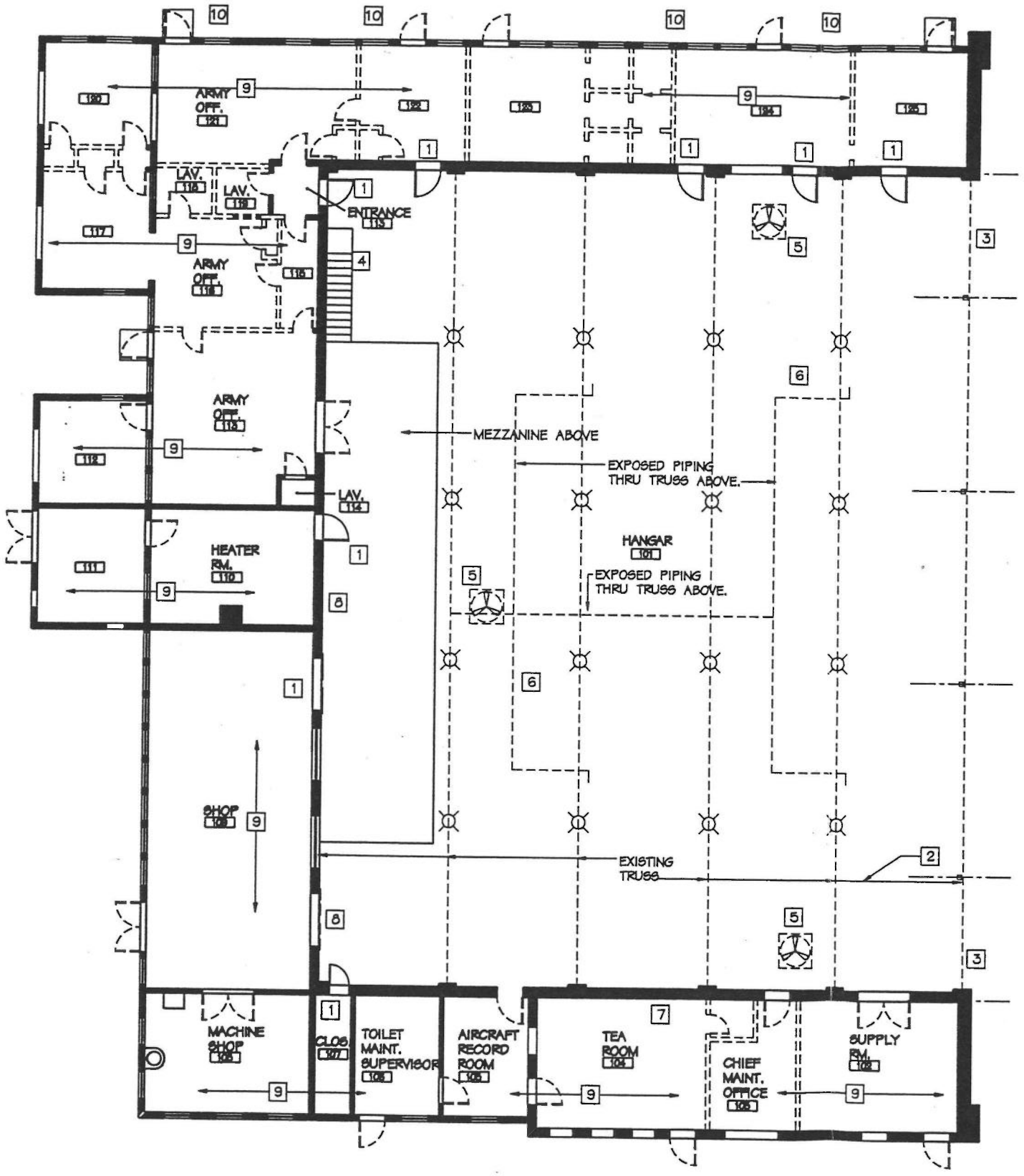
Figure 1
POND EXISTING CONDITIONS HANGAR NUMBER 1 FLOOR PLAN

Figure 2
Room 120: three plaster coats

Figure 3
Room 103: plaster over concrete lintel and surround

Figure 4
Room 102: existing conditions

Figure 1



FLOOR PLAN
SCALE: 1/16" = 1'-0"

SCALE: 1/8" = 1'-0"

LEGEND

- EXISTING WALL
- WALL MISSING
- EXISTING DOOR
- DOOR MISSING
- EXISTING HANGING LIGHTING FIXTURE
- HEATING UNIT
- EXISTING SLID DOORS
- MISSING SLID DOORS

KEY NOTES

1. DOOR DAMAGED
2. TRUSS BROKEN/ DAMAGED WAS REPAIRED DURING STABILIZATION PHASE
3. HANGAR DOORS DAMAGED, PANELS RUSTED
4. SECTION OF STAIR MISSING.
5. EXISTING CEILING FAN (DAMAGED)
6. EXPOSED PIPING THRU TRUSS ABOVE
7. EXISTING ROOF LEDGE ABOVE, BROKEN
8. EXPOSED ELECTRICAL CONDUITS ALONG WALL
9. ROOF MISSING
10. SECTION OF WALL MISSING ABOVE (SEE SHEET A4A)- BRICK HAS BEEN ADDED DURING STABILIZATION PHASE.

MM/DD/YY • HH:

DESIGNED:	DRD
DRAWN:	DRD
TECH. REVIEW:	RAS
DATE:	[illegible] January XX

SUB SHEET NO. A1

TITLE OF SHEET
EXISTING CONDITIONS
HANGAR NUMBER ONE
FLOOR PLAN
MOTON FIELD STABILIZATION
TUSKEGEE AIRMEN NAT'L HISTORIC SITE
TUSKEGEE, ALABAMA

DRAWING NO. XX.XXX
PKG. NO. —
SHEET 2 OF 55

Figure 2
Room 112: three plaster coats



Figure 3

Room 103: plaster over concrete lintel and surround

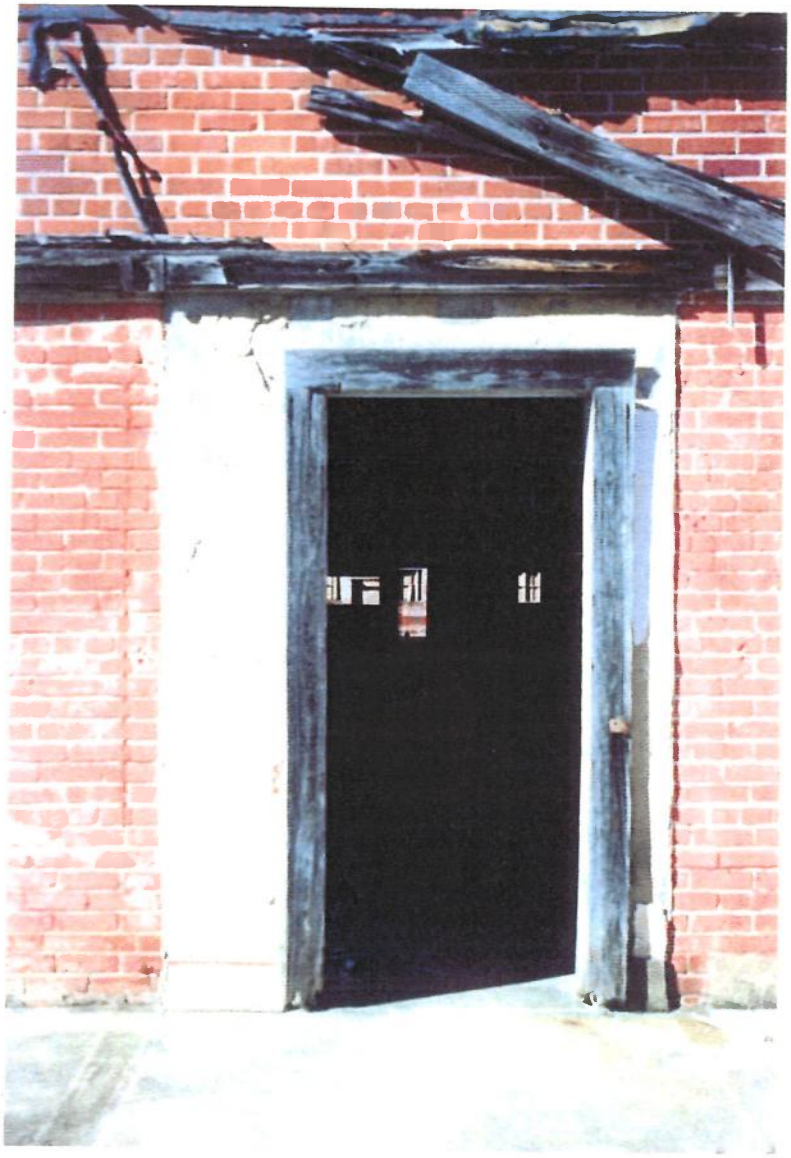
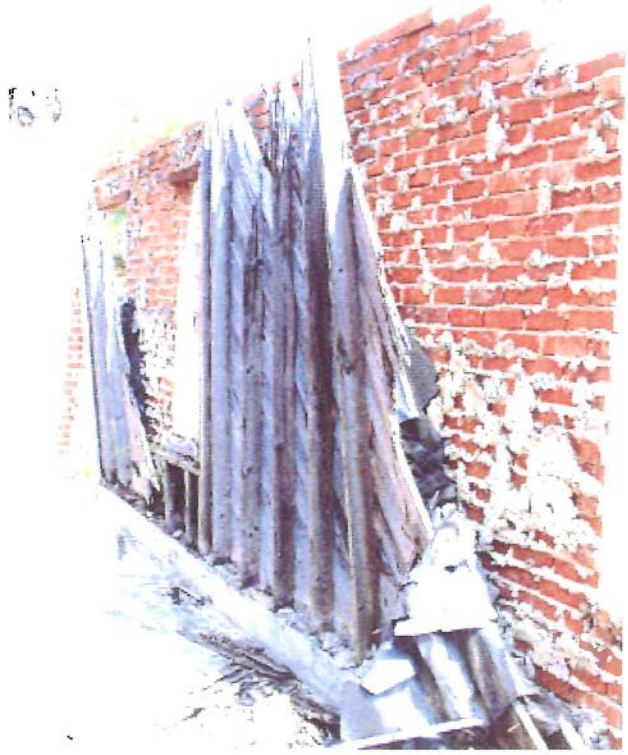


Figure 4
NATIONAL PARK SERVICE
MOTON FIELD HISTORIC STRUCTURES
STABILIZATION STATUS JULY 2001
BUILDING: HANGER ONE



BEFORE



PRESENT

LIST OF SAMPLES

Sample 1
Sherwin Williams #1004

Sample 2
Sherwin Williams #1001

Sample 3
Sherwin Williams #2117

Sample 4
Sherwin Williams #2117 color strip

Sample 5
Balcony ceiling

Sample 6
Balcony fiberboard wall

Sample 7
Sherwin Williams #1358 color strip

Sample 8
Balcony interior woodwork

Sample 9
Balcony exterior woodwork

Sample 10
Room 125: plaster

Sample 11
Room 125: metal door

Sample 12
Sherwin Williams #1197 color strip

Sample 13
Room 124: south window

Sample 14
Room 122: door plaster

Sample 15
Room 122: door plaster

Sample 16
Room 122: wall plaster

PRELIMINARY LABORATORY DATA

PROJECT	DATE OF ANALYSIS
MOTON FIELD TUSKEGEE, ALABAMA	7/22/02
SPACES	**ANALYST**
EXTERIORS	Frank S. Welsh

EQUIPMENT

- Bausch & Lomb stereomicroscope (10 - 105x)
- Nikon SKE polarized light microscope
- Schott halogen fiber-optic illuminator (3200K)

DESCRIPTION OF PRESENTATION OF LABORATORY DATA FROM THE ANALYSIS

- The following pages contain all of the requisite information found on each sample gathered during the preliminary laboratory analysis of the historically significant coatings.
- The information on these pages is the data upon which additional research and analyses can be based.
- Illustrations diagramming the locations from which the samples were taken are included in the Field Note - Sample Location sheets.

KEY TO THE ABBREVIATIONS USED IN THE LABORATORY DATA SHEETS

For Layer/Coat:

- P = prime or sealer coating
- I = intermediate or second prime
- Gr = ground or base coating for marbling or graining
- F = finish for final coating

For Color Name:

- W = white
- YW = yellowish white
- YG = yellowish gray
- GY = grayish yellow
- MRB = moderate reddish brown
- MOY = moderate orange yellow
- POY = pale orange yellow
- LT = light
- MED = medium

For Type of coating:

- O = oil
- D = distemper or calcimine
- Wsh = whitewash
- Vrn = varnish
- Stn = stain
- Pb = lead content

For Age:

- orig = original
- er = early
- md = middle
- lt = late
- c = century

PRELIMINARY LABORATORY DATA SHEETS

Sample Number	Location/ Description	Layers and Comments
1	Hangar One, Hangar side of metal door into Room 1A.	There is only one layer of old paint on this sample. It is a dark gray, close to Sherwin Williams color # 2117. Above the gray are only 3 layers of new (1st and last coats) paints.
2.	Hangar One. Plaster from interior north wall - Room 1A.	Sample taken at a patch - relatively new.
3.	Hangar One, Plaster from window, north wall, Room 1B.	This plaster is very degraded. It does not appear to be very old. It is grayish white and has only one layer of faded + degraded green oil paint on its surface. The color of the green is close to S.W. Color # 1197
4	Hangar One, Paint from South door frame - Room 3 (wood)	The paint evidence is extremely degraded on this sample and almost impossible to evaluate w/ any accuracy. The first finish appears to be white, close to SW Color # 1004. The second layer is an aqua color. On another sample in the same envelope there is a second layer that is a Medium Blue-Green.
5	Hangar One Paint from wood door frame - hangar side into Room 17	The paint evidence on this sample is very degraded. There appears to be two layers of white oil paint - Color close to SW # 1004 followed by a Medium Blue Green.

PRELIMINARY LABORATORY DATA SHEETS

Sample Number	Location/ Description	Layers and Comments
6	Dope Storage Shed. Paint from exterior door & frame	No old paint evidence is on this sample. There are only several layers of newer white paint.
7	Entrance gate. Concrete from niche	Very little substrate. There are only 2 or 3 layers of new white paint on this sample
8.	Tower. Concrete interior wall	There are no paints on this sample.
9	Bath & Locker building, paint from exterior siding.	There are approximately 5 finish coats of light gray oil paint on this sample. The first is a lead-based oil paint whose color is very close to S.W. # 1001.
10	Bath & Locker building - exterior trim.	There are 5 layers of paint on this sample. They are: Lt Gray, Dark Gray, Lt Grays & White. The original light gray is the same as on #9.: SW Color # 1001.
11	Bath & Locker building, plaster north wall Men's Locker Room.	All but one plaster sample in the envelope have a medium gray oil paint as the first finish: It is close to SW Color # 2120 One piece of plaster has a lighter gray as the first finish. Its color is close to SW # 2121 Above these first finish coats on all samples are several newer whites + tans.
12	Bath & Locker building - window frame - Women's Locker Room.	There are no old paints on this sample There are only several new layers of white + Tan.

PRELIMINARY LABORATORY DATA SHEETS

Sample Number	Location/ Description	Layers and Comments
13.	Skyway club exterior siding.	There are 5-to-6 finish coats of medium-to-Light Gray oil paint on this sample of siding The first finish is close to S.W. Color # 1232
14	Skyway Club. Exterior trim	There are 5-to-6 layers of degraded white paint on this sample. The first finish coat is close to SW Color # 1004
15	Skyway Club Room 108- North wall	- Newer gypsum board
16	Skyway Club baseboard Rm 108	No paint is on this tiny sample.
17	Skyway Club Room 108- Ceiling	Fiber board.- a grayish white surface with a lot of mica.
18	Skyway Club. Rm 121 gypsum board on North wall.	There are 4 layers of paint on this sample. The first is buff and close to SW # 1358 The next 3 are light and medium greens.
19.	Skyway Club fiberboard north wall- Rm 124	The first finish paint on this sample is a buff, close to SW Color # 1625. There are 4 layers above it. A grayish white, light gray and 2 greens.

LAW
RESOURCES CREATING SOLUTIONS

March 28, 2002

Ms. Debbie Toole
The Jaeger Company
119 Washington Street
Gainesville, GA 30501

Subject: **Moton Field Mortar Evaluation, Revision**
Moton Field Stabilization, Tuskegee Airmen National Historic Site
Tuskegee, Alabama
LAW Project No. 50157-1-4754-01-602

Dear Ms. Toole:

Law Engineering and Environmental Services, Inc. (LAW) has completed the mortar evaluation as authorized by your company on September 4, 2001. The purpose of this evaluation was to obtain samples of mortar from approximately nine buildings/structures, perform analysis of the mortar to determine its composition and to describe the aggregates. A visual condition survey of the buildings was not a part of the scope of work. This report is a revision of the report submitted on November 1, and the report submitted November 19, 2001. This report has been revised to reflect changes regarding the names of buildings and description of specimens.

Background Information

LAW understands there are a total of nine historical buildings/structures that were built as part of a World War II training facility (1941-1945) and are in the process of being restored. They include Hangar No. 1, Control Tower, Bath and Locker House, Warehouse/Vehicle Storage, Skyway Club, Dope Storage Shed, Oil Storage Shed, Fire Protection Shed and the Entrance Gate. We understand The Jaeger Company is assisting Pond & Company with renovation/restoration design of the facility.

LAW Engineering and Environmental Services, Inc.
396 Plasters Avenue, N.E. • Atlanta, GA 30324
404-873-4761 • Fax: 404-817-0175

Evaluation Procedures and Results

Site Work

LAW representatives, Mr. Mark Leeman and Ms. Marian Strukel, met with Jaeger Company's Ms. Debbie Toole at the subject site on September 28, 2001. The buildings/structures were observed and samples were taken. Selective sampling of existing masonry mortar and wall plaster materials were taken above-grade and at heights able to be accessed from standing on the ground; no ladders or manlifts were used. Samples were taken from interior and exterior walls. Five buildings/structures were sampled (a total of 10 samples were taken). Two samples of raw sand were taken, one from the road east of the Dope Storage Shed and one from the vicinity of Hangar No. 2. Sand was sampled for comparison purposes. We wanted to compare the sand sampled, both chemically and with respect to gradation, to the sand observed in the mortar.

Mortar samples were not taken from each building at the site. The mortar was observed to be fairly consistent throughout the site. A determination was made in the field that if the mortar was hard and competent then a sample may not have been taken for a particular building if the mortar was consistent with other buildings at the site. This was the case for the mortar at the Entrance Gate, the Skyway Club and the Warehouse/Vehicle Storage buildings. The mortar was judged to be hard and competent; therefore was not sampled for proportions.

Samples were taken at the following locations:

Sample	Construction	Location
1	Brick Mortar	Control Tower - exterior
2	Block Mortar	Control Tower - exterior
3	Brick Mortar	Dope Storage Shed - interior
4	Parge Coat	Hangar No.1 - interior
5	Brick Mortar	Hangar No. 1 - interior
6	Brick Mortar	Hangar No. 1 - exterior
7	Brick Mortar	Fire Protection Shed - interior
8	Brick Mortar	Fire Protection Shed - exterior
9	Plaster	Bath and Locker - interior
10	Gypsum Board and Paper	Bath and Locker - interior

Photographs of the buildings/structures and the samples taken at each location can be found attached to this report.

The masonry units of the structures observed were similar in appearance and were in satisfactory condition. We observed both clay brick masonry and concrete masonry. Deterioration in the form of cracks was not observed. Significant efflorescence staining was not observed on the masonry units. Areas of re-pointing were observed on the Control Tower. We understand this was a part of recent stabilization work.

The mortar observed was intact, competent and not easily scratched with a metal chisel. The mortar joints were well tooled and concave in shape. Several mortar joint surfaces had undergone weathering which resulted in sand particles being exposed on the surface. The mortar was well bonded to the masonry units. The mortar was strong and required significant effort to break out samples from the constructed masonry. In general, our selective sampling indicated the mortar was strong, but occasionally areas of softer mortar were observed. Since softer mortar was encountered infrequently, we did not consider it a representative condition and did not intentionally sample it.

A visual survey of the Skyway Club was performed, but samples were not taken. The mortar observed at this structure was similar to the others and competent. Ms. Toole informed LAW that the block used for the Skyway Club was made with local materials and called "Tuskegee Block". The parge coat mortar taken from Hangar No. 1 was intact, but could be broken easily. The sand particles on the surface of the parge coat were exposed and poorly bonded (Photo 11).

Softer mortar was observed in isolated areas of Hangar No. 1. The mortar appeared to have a higher lime content at some places than the other mortars observed. This determination was made by observation of the mortar color and the hardness of the mortar. The mortar inside Hangar No. 1 ranged from soft (easily scratched with a metal chisel) around the structural clay tile to medium hard around the brick. A section of the exterior south face of this building was re-constructed the summer of 2001. The white colored mortar with a brown surface smear coat was observed (Photo 12). The brown smear coat was applied for aesthetic reasons to match the new mortar to the existing one.

Laboratory Evaluation

Evaluation of the mortars was conducted in accordance with ASTM C1324 "Standard Test Method for Examination and Analysis of Hardened Masonry Mortar". Chemical evaluations and petrographic examinations were made of the mortars. No thermal analysis or x-ray diffraction was performed on the mortars.

Chemical evaluation results can be found in Table 1. The chemical results and petrographic evaluations indicated the mortars were similar in composition. The percentage of insoluble residue, soluble calcium oxide and soluble silica contents were similar in the samples analyzed.

Determination of the mortar composition was performed in accordance with the calculations of ASTM C1324, assuming a portland cement, lime, siliceous sand mixture. Chunks of lime were observed in several samples of the existing mortar, indicating this assumption is reasonable. However, if information becomes available to indicate the mortar was made using masonry cement, the proportion calculations can be adjusted. A package of masonry cement was observed at the project near the new brick construction. This indicates this mortar was made with masonry cement.

This is supported by the chemical evaluations; the proportions calculated are presented in Table 2. The use of non-masonry cement versus masonry cement are two means of achieving the same mortar after construction. The primary difference occurs with material selection and the amount of work performed by the on-site masons during construction. Chemical analysis indicated the mortars ranged from Type M to Type O using ASTM C270 Proportion Specifications. The mortars were generally Types S and N, but an occasional Type M and O were observed. In general, the mortars were hard and the classifications based on the chemical evaluations were in general agreement with our field observations.

The petrographic evaluations indicated the mortars were made with a natural sand. The sand particles were mostly quartz and other hard siliceous minerals. The particles ranged in size from ½ to 1½ millimeters (mm) and were subangular in shape. The sand particles were mostly clear to opaque, tan to smokey gray in color with less than approximately 10 percent of the particles dark in color. No significant component of calcareous aggregate was observed in the sand. The minerology of the sand indicated it was a local material. The mortars had an estimated air content of 10 to 20 percent. A lower air content of 5 to 10 percent was observed in the newer mortar located on the exterior wall of Hangar No. 1. The air voids observed in the samples were spherical in shape and evenly distributed in the mortar. The mortar color ranged from light gray to medium gray, except for the new mortar observed outside Hangar No. 1 which was white. This mortar was made with white portland cement. The mortars were hard to medium hard when scratched with a sharp metal instrument. Isolated particles of unhydrated lime were observed in the sample taken from the Fire Protection Shed (exterior, south face).

Freeze-thaw damage was not observed in the samples. Carbonation was observed in the samples taken from the Tower Building (mortar from block), Dope Storage Shed (interior), Hangar 1 (parge coat and interior) and the Fire Protection Shed (interior). The presence of carbonation was not unusual considering the age and exposure conditions of the structures.

The plaster sample analyzed from the Bath and Locker House was a gypsum-based material (Photos 20 and 21). This is typical plaster material. The gypsum board sample was analyzed similar to the mortars. There was an indication that gypsum was present, but it was not quantified.

The gypsum board was analyzed chemically and was determined to be a lime and sand mixture, with a binder to sand ratio of approximately 1 to 0.7.

Conclusions

The masonry units of the structures observed were similar in appearance and were in good condition. Deterioration in the form of cracks was not observed. Significant efflorescence staining was not observed on the masonry units.

The mortars observed were competent and did not crumble or break easily. The mortar was difficult to excavate at most locations. The mortar was intact in most locations and was not easily scratched with a metal chisel. The mortar observed was light gray to medium gray in color. The sand observed was a natural sand composed of quartz and other hard siliceous minerals. The mortar joints were well tooled and concave in shape. Freeze-thaw damage was not observed.

New mortar was observed on the exterior wall of Hangar No. 1. The mortar was white in color and had a brown smear coat applied to the surface. The brown coating provided a means of matching it to the existing mortar. LAW understands this area was re-constructed in the summer of 2001. The new masonry work appeared to be in good condition.

Petrographic evaluations and field observations indicated the mortars were similar in composition. Chemical analysis indicated the mortars ranged from a Type M to Type O based on ASTM C270 Proportion Specifications. The mortars were generally Types S and N, but an occasional Type M and O were observed. If re-pointing of the existing masonry is performed in the future, it is LAW's opinion that a reasonably strong mortar can be used without damaging the units. Softer mortars may result in increased watertightness in the mortar and better bond to the masonry units. A Type N mortar would be appropriate for most pointing purposes at the site.

The plaster sample analyzed from the Bath and Locker House was a gypsum-based material. This is typical plaster material. The gypsum board sample was analyzed similar to the mortars. There

was an indication that gypsum was present, but it was not quantified. The gypsum board was determined to be a lime and sand mixture, with a binder to sand ratio of approximately 1 to 0.7.

LAW appreciates the opportunity to have worked with you on this project. If you have any questions about this report, please do not hesitate to contact the undersigned.

Sincerely,

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Marian D. Strukel by MLS w/permission
Project Engineer

Mark E. Leeman, P.E. (Georgia)
Principal Engineer

Attachments: Photographs
Moton Field Layout
Table 1 – ASTM C1324 Chemical Evaluation Results
Table 2 – Calculated Mortar Proportions

File: g:/lab/mstrukel/moton



Photo 1. Control Tower Building

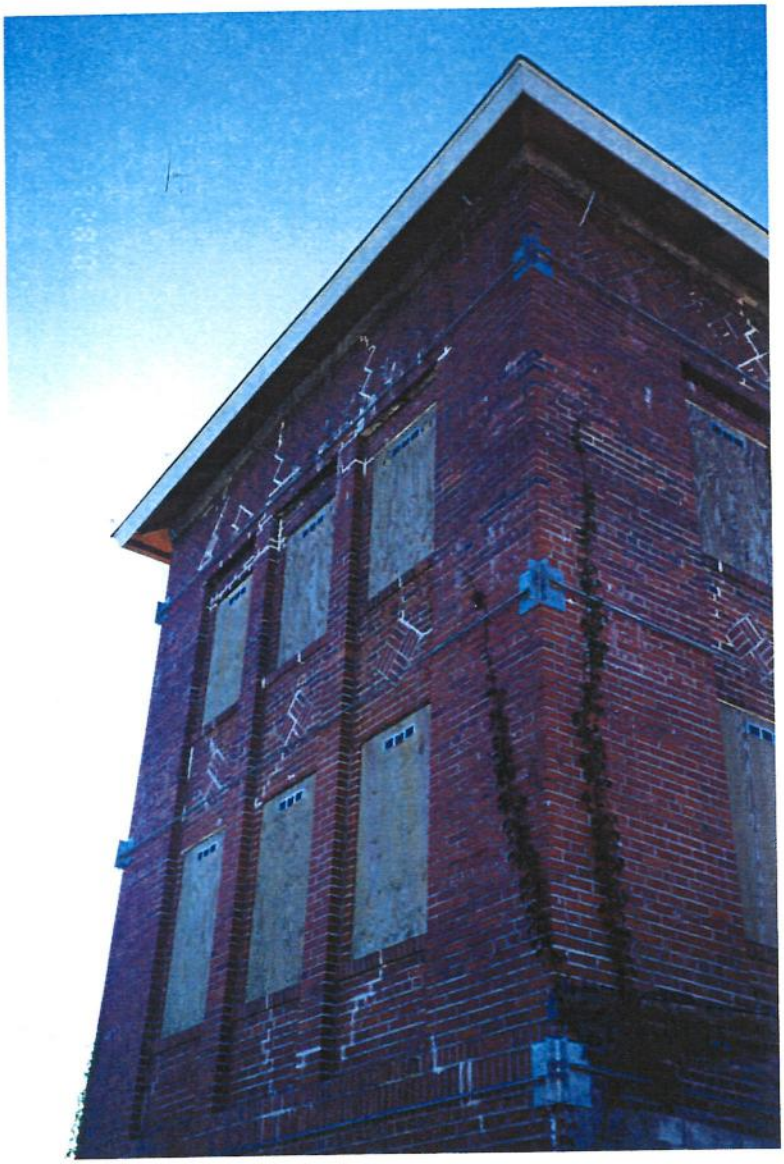


Photo 2. Control Tower Building – West Face

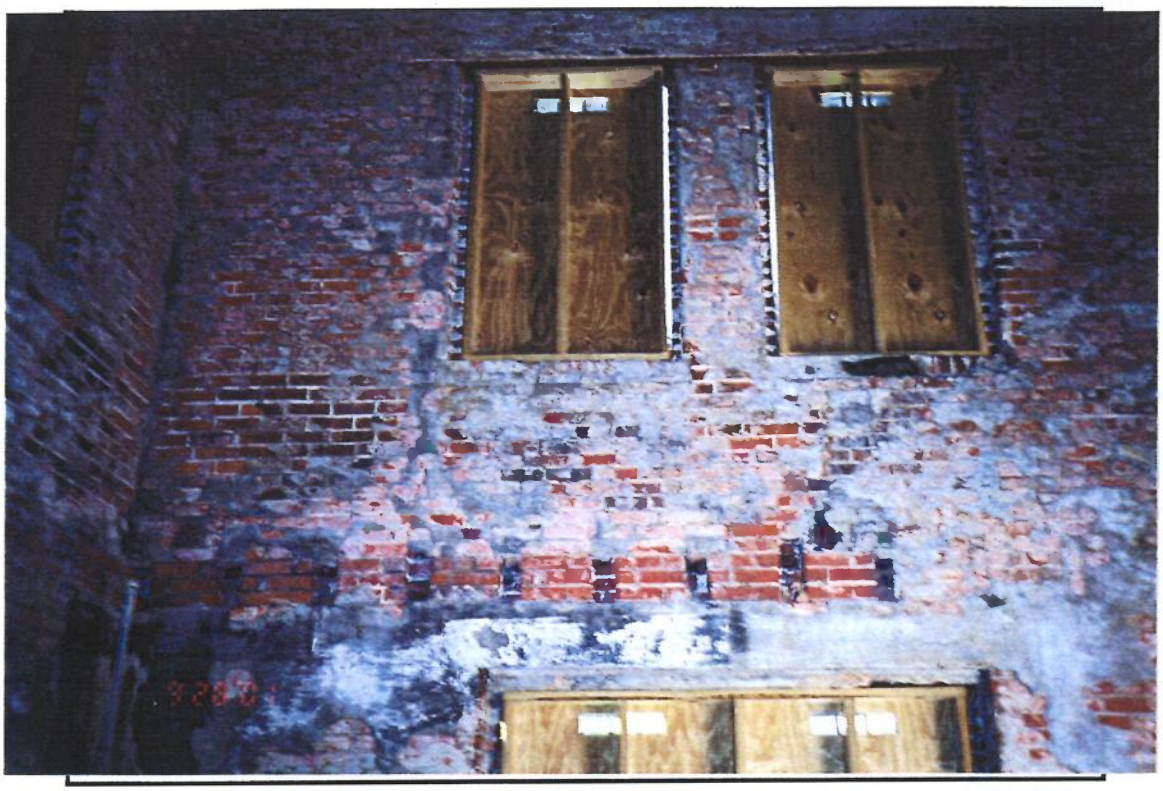


Photo 3. Control Tower Building – Interior North Face

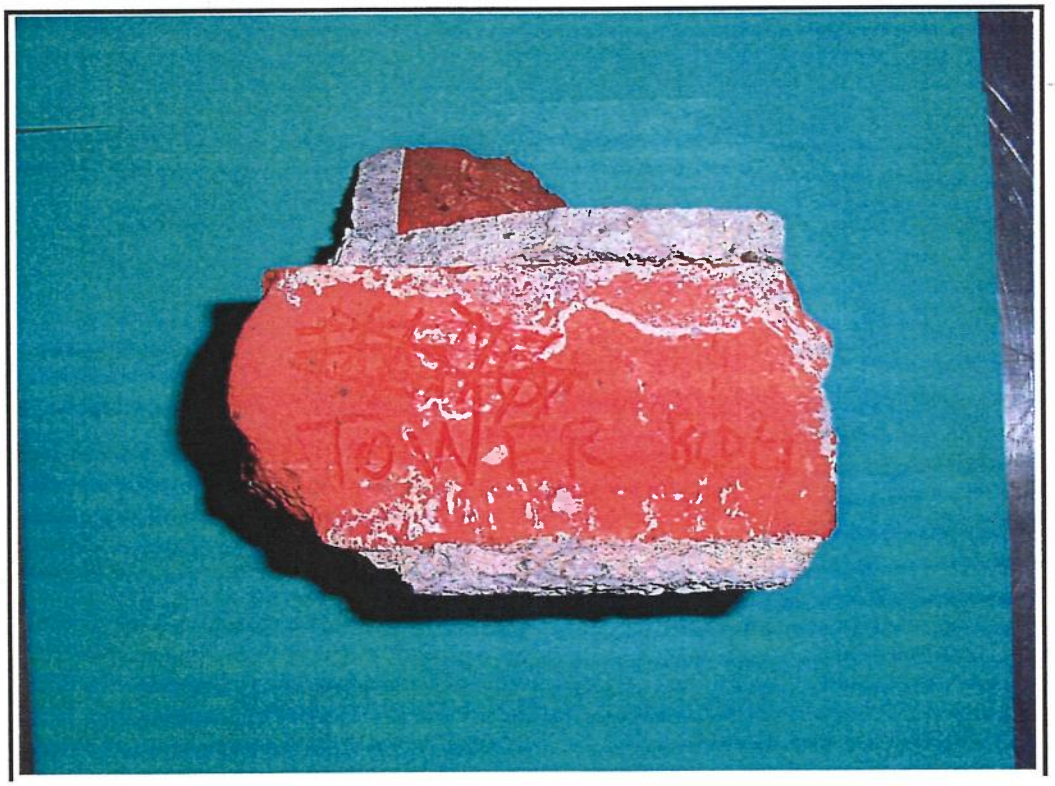


Photo 4. Brick/Mortar sample taken from exterior of Control Tower Building

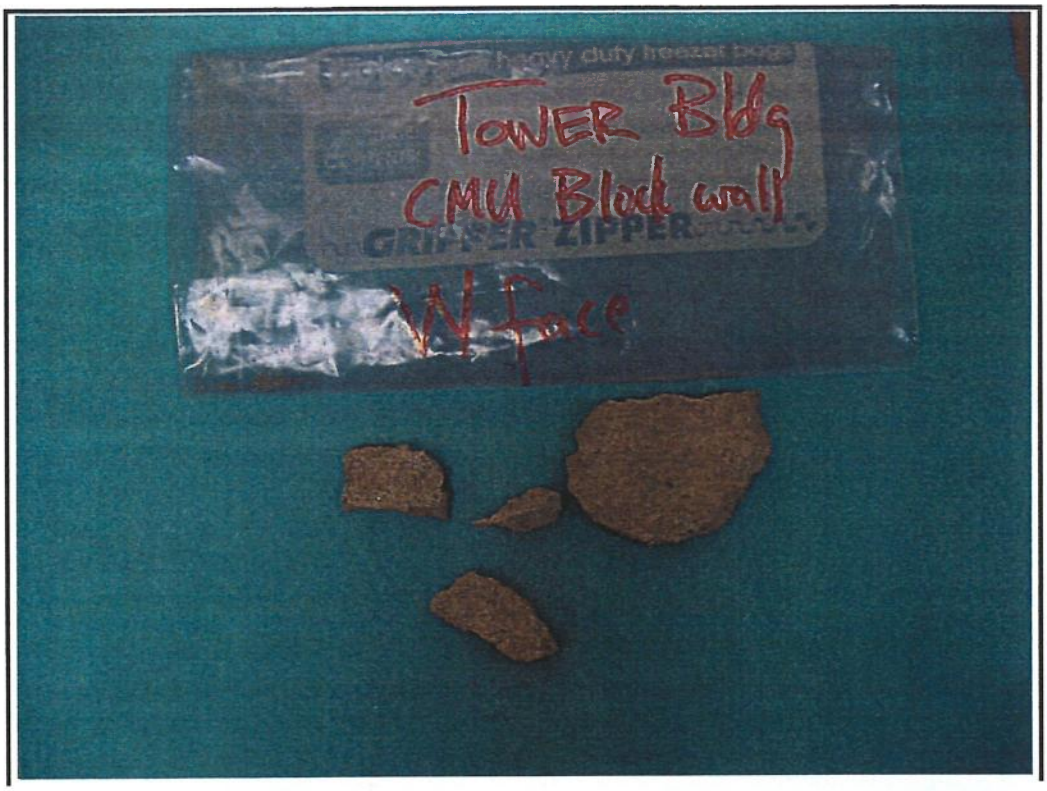


Photo 5. Mortar samples from Control Tower – exterior west face of building

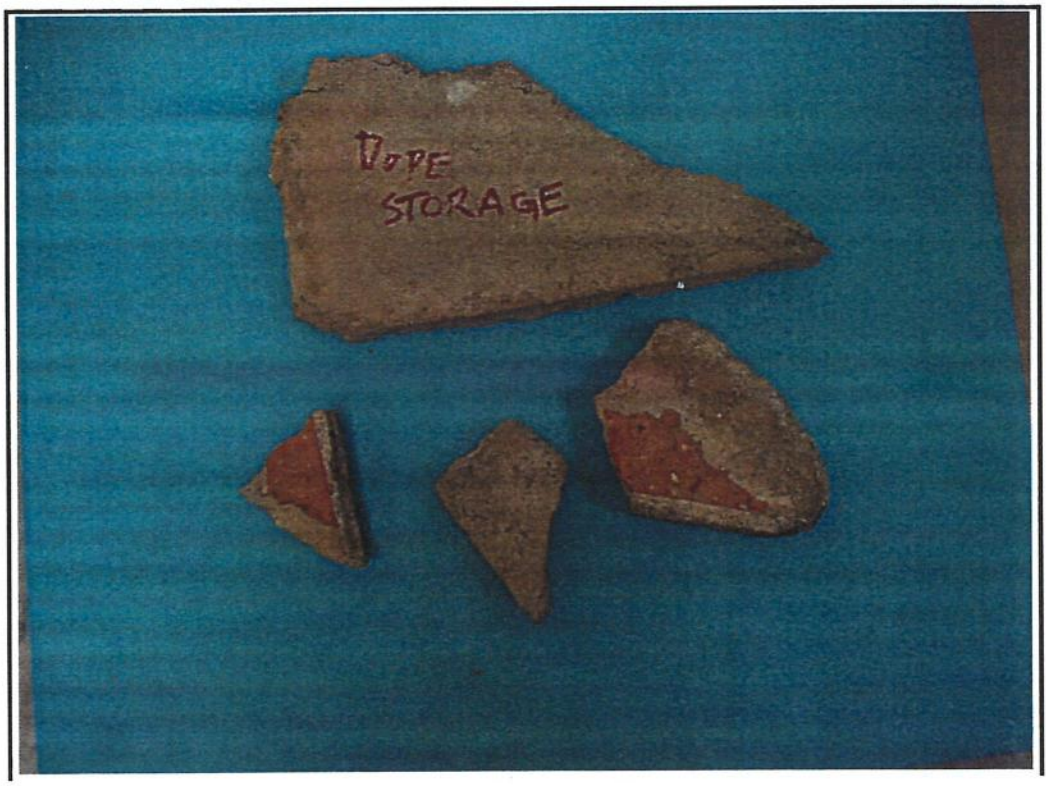


Photo 6. Mortar/Brick samples taken from interior of Dope Storage Shed

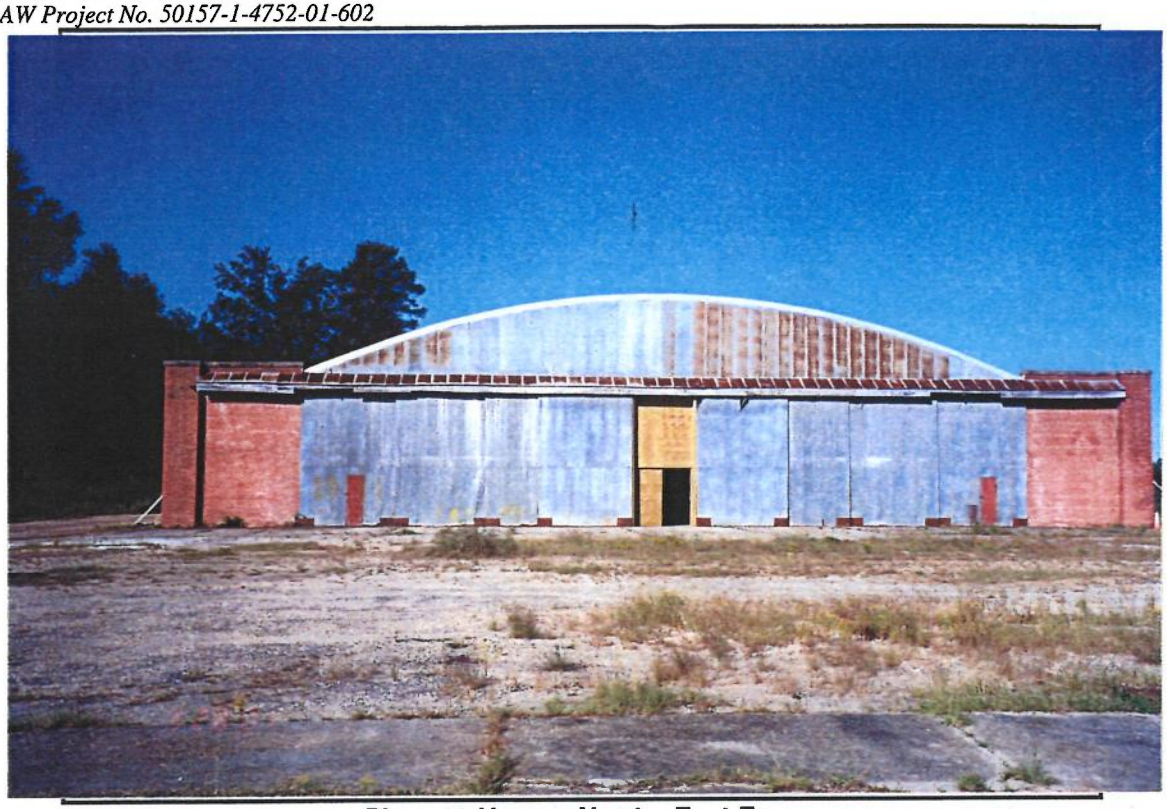


Photo 7. Hangar No. 1 – East Face

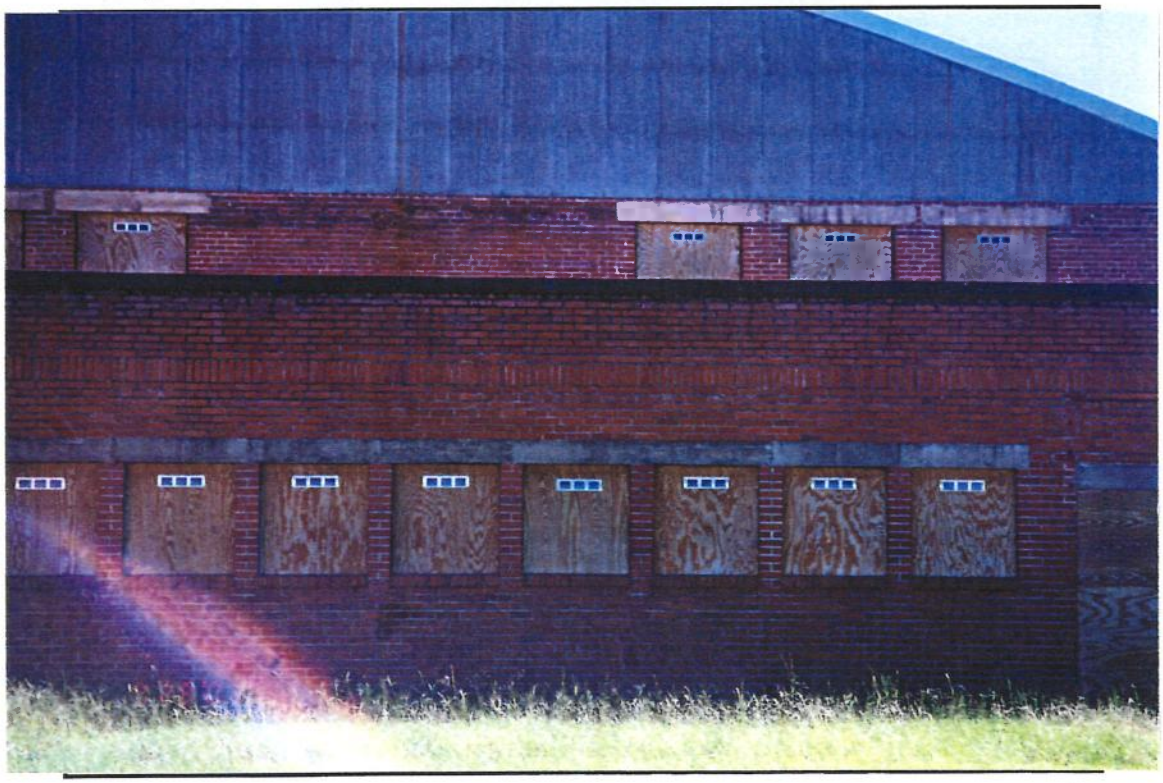


Photo 8. Hangar No. 1 – West Face



Photo 9. Hangar No. 1 – South Face



Photo 10. Hangar No. 1, Interior – Parge coat mortar observed on structural clay tile and masonry surfaces.



Photo 11. Hangar No. 1, Interior – Parge coat mortar observed. Note sand particles on surface poorly bonded to mortar.

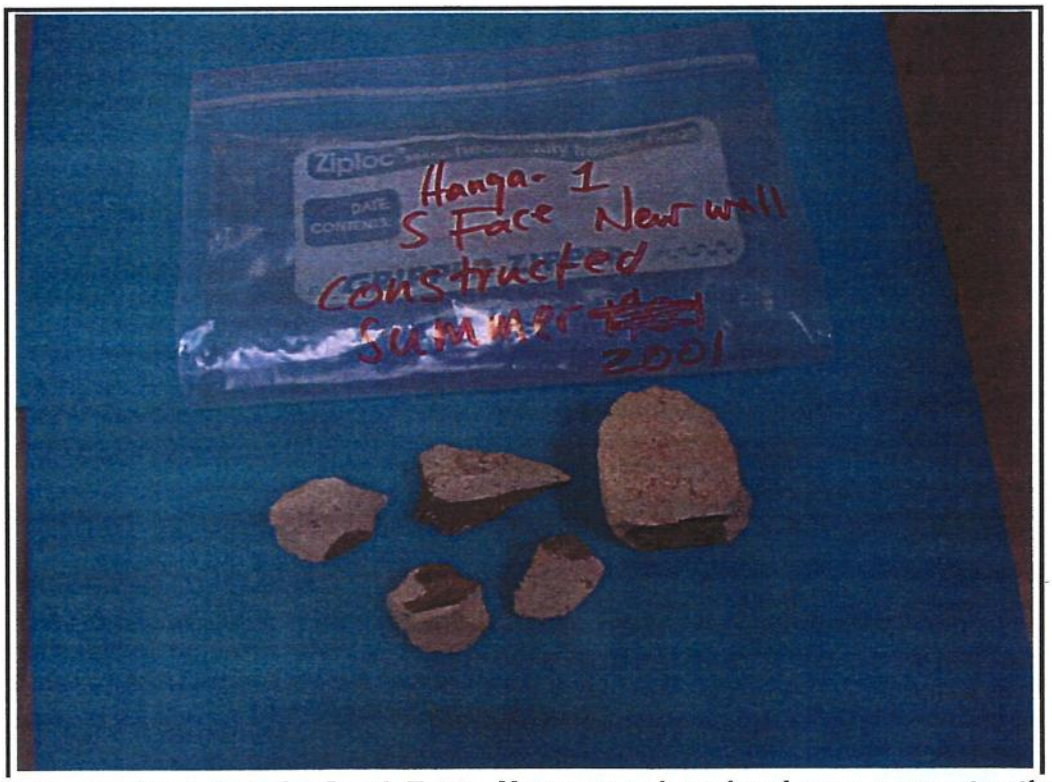


Photo 12. Hangar No. 1, Exterior South Face – Mortar samples taken from new construction. Note white mortar color (A) and brown smear coat (B) on tooled joint surface.

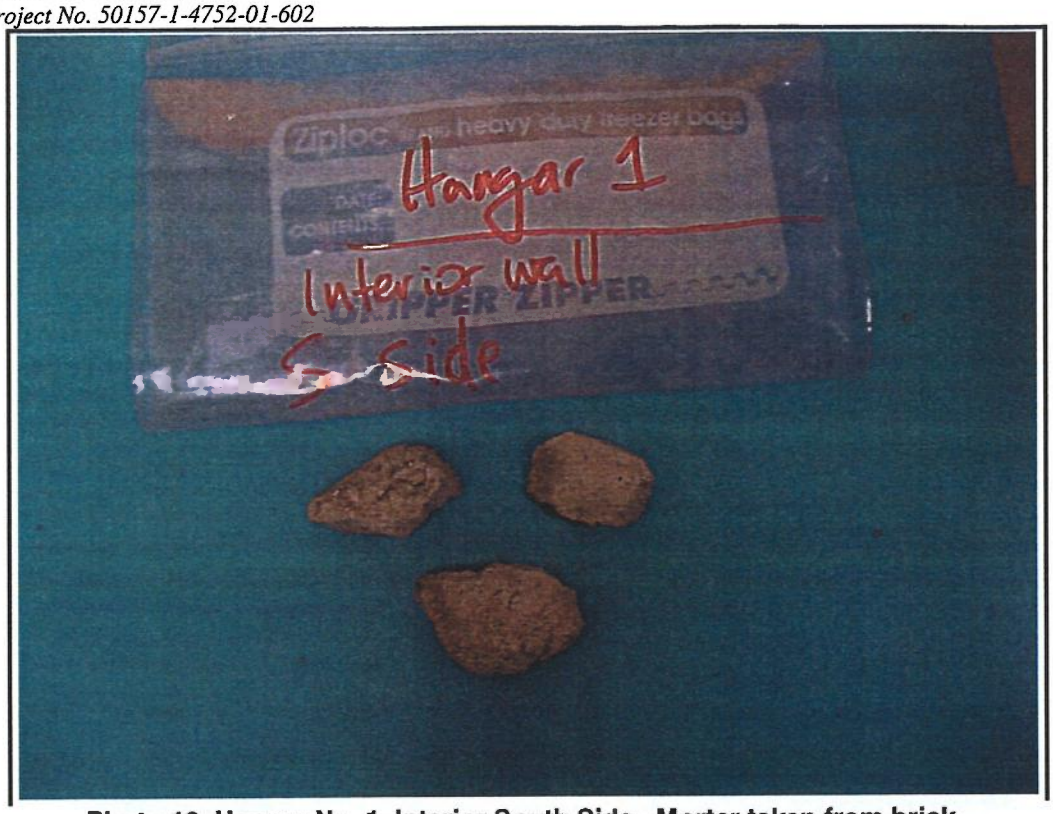


Photo 13. Hangar No. 1, Interior South Side– Mortar taken from brick



Photo 14. Fire Protection Shed – East Face

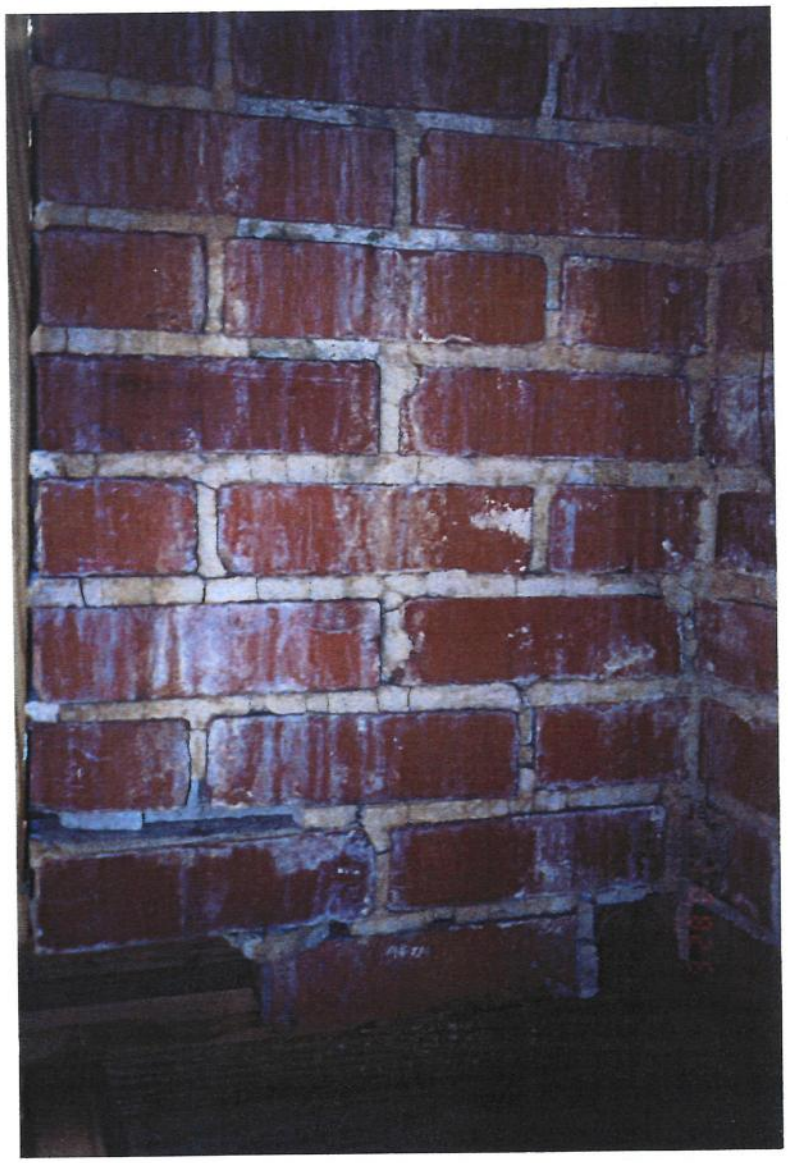


Photo 15. Fire Protection Shed – Interior face beside door. Note cracked mortar.

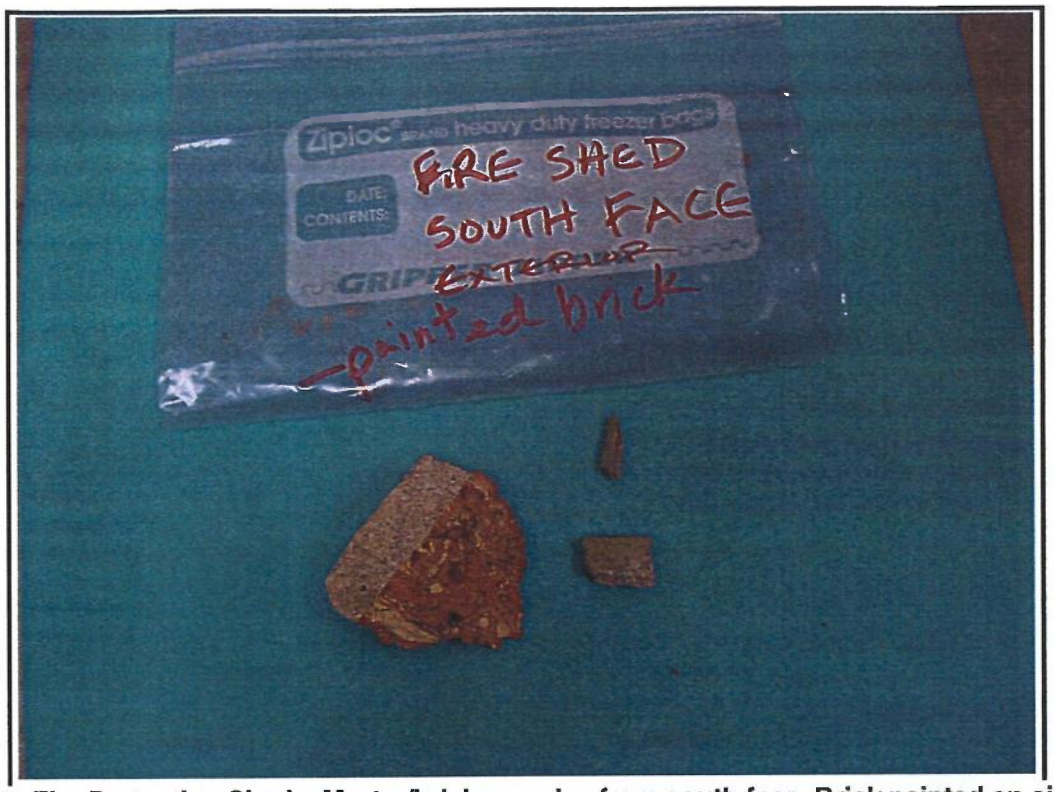


Photo 16. Fire Protection Shed – Mortar/brick samples from south face. Brick painted on side not shown.

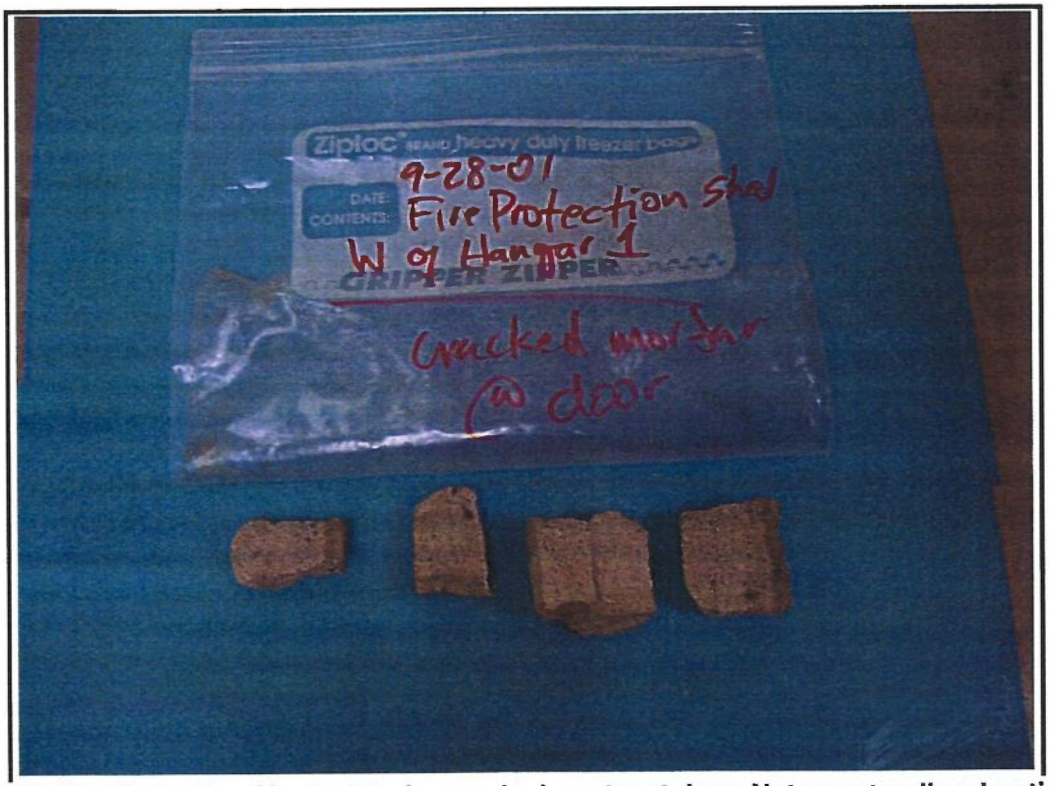


Photo 17. Fire Protection Shed – Interior cracked mortar at door. Note mortar discoloration at surface (extending approximately ¼ inch from surface).



Photo 18. Bath and Locker House – East Face



Photo 19. Bath and Locker House – West Face

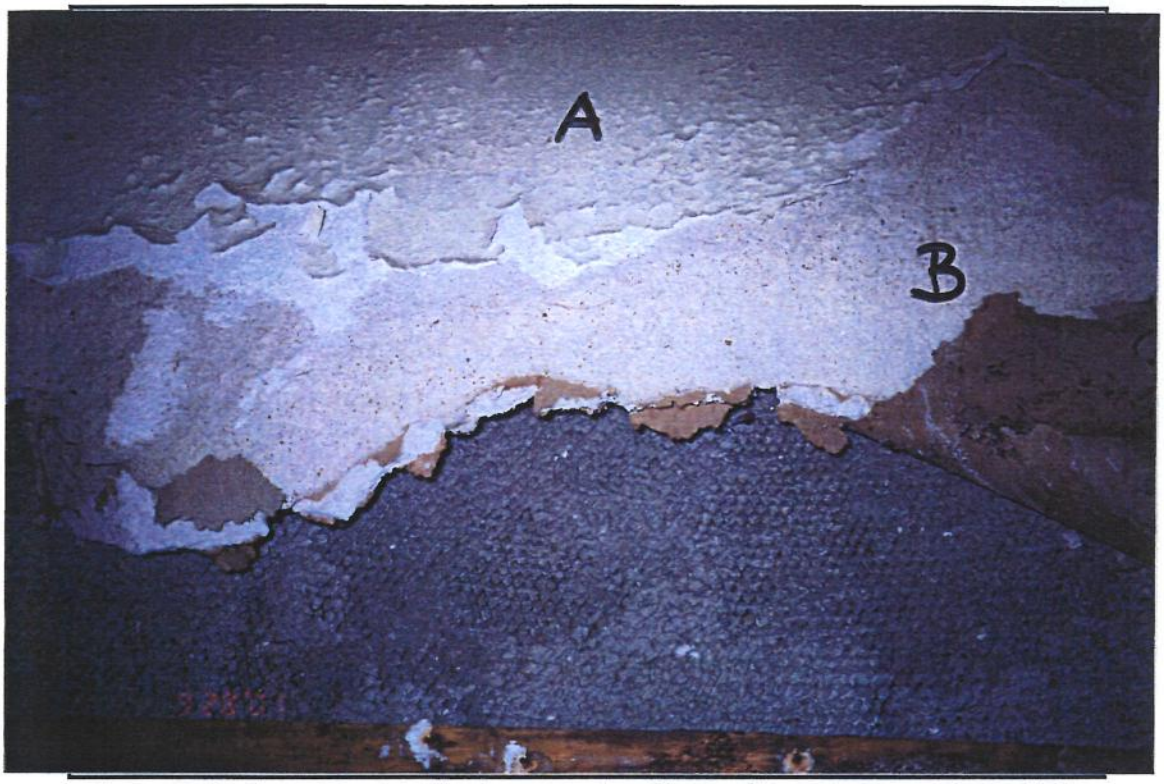


Photo 20. Bath and Locker House – Interior, Plaster (A) and gypsum board (B)

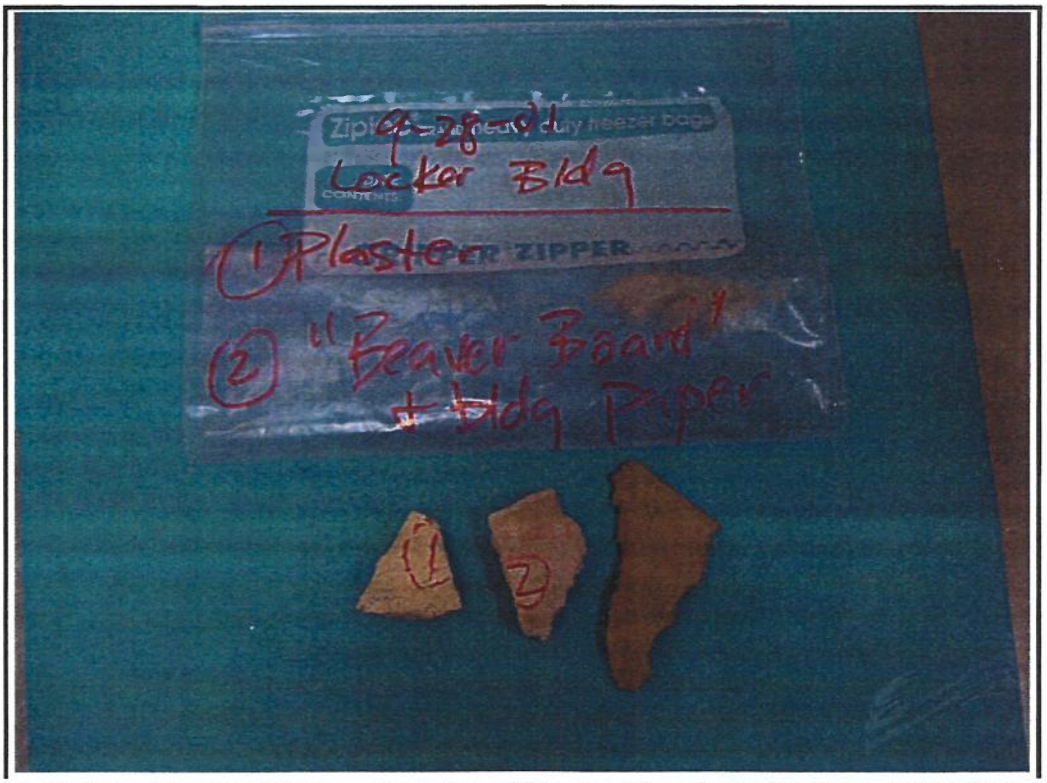


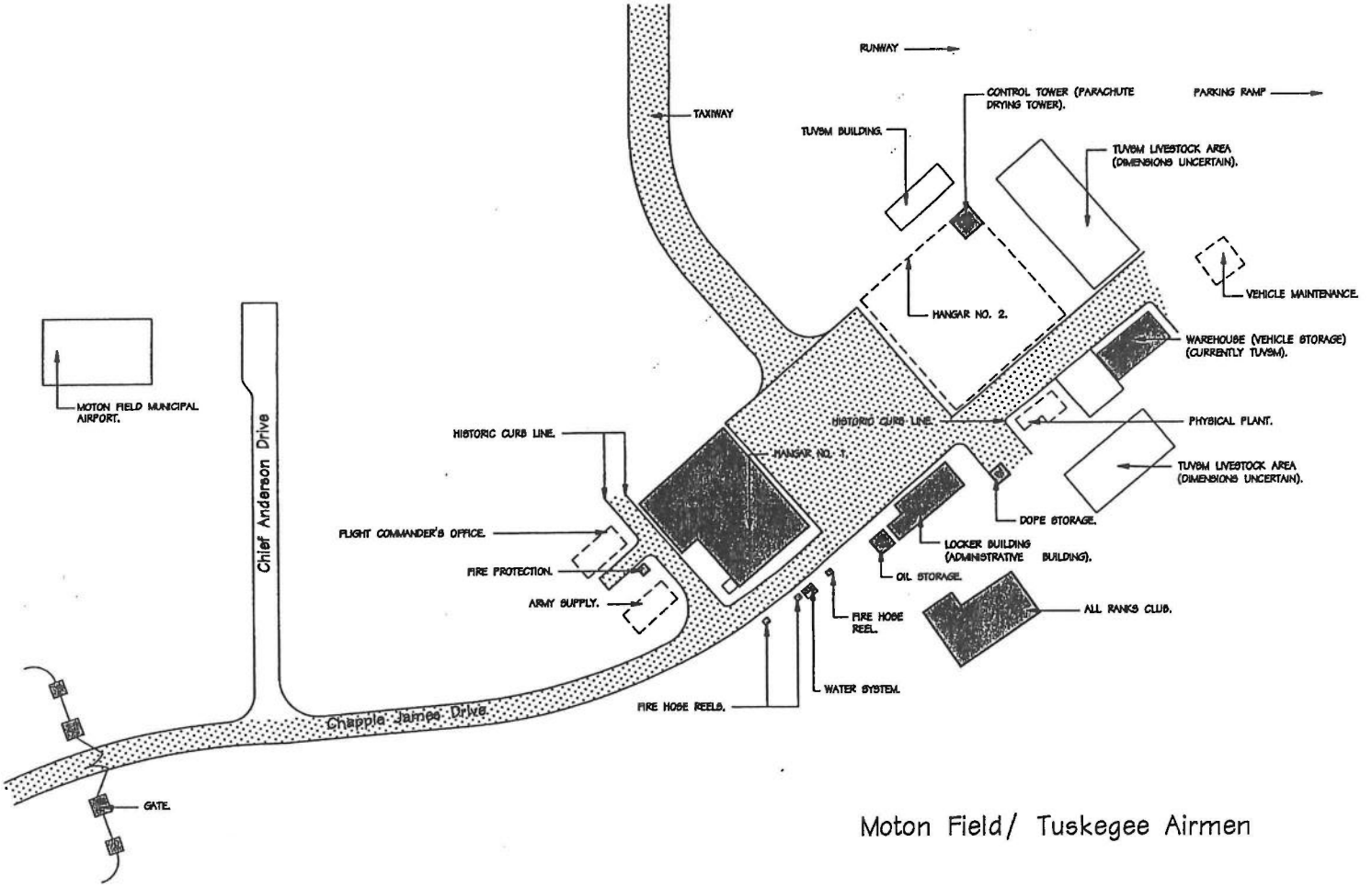
Photo 21. Bath and Locker House – Samples of Plaster (1) and gypsum board (2) with building paper (3)



Photo 22. Skyway Club – East Face

GENERAL NOTES

1. REMOVE VINES FROM ALL HISTORIC STRUCTURES AND ALL TREES, SHRUBS, OVERGROWTH WITHIN 5'-0" OF HISTORIC STRUCTURES.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS INCLUDING BUT NOT LIMITED TO, MATERIALS, SIZES, AND EXISTING CONFIGURATIONS. NOTIFY THE CONTRACTING OFFICER OF MAJOR DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.
3. ALL NEW AND EXISTING WOOD SHALL BE TREATED WITH A BORATE SPRAY.



Moton Field/ Tuskegee Airmen

SITE PLAN
SCALE: N.T.S.

LEGEND

- EXTANT HISTORIC REBOURCE
- NON-EXTANT HISTORIC RESOURCE
- EXTANT NON-HISTORIC REBOURCE
- EXTANT HISTORIC LANDSCAPE FEATURE
- NON-EXTANT HISTORIC LANDSCAPE FEATURE
- EXTANT NON-HISTORIC LANDSCAPE FEATURE

SEAL

BOND Company
Architects & Engineers
3560 Chamblee Tucker Road
Suite 200
Atlanta, Georgia 30341
(770) 455-8555
Fax (770) 455-5460

DESIGNED: DRD
CADD: DRD
TECH. REVIEW: RAS
DATE: 03/15/00

SUB SHEET NO. C1

TITLE OF SHEET
SITE PLAN

MOTON FIELD STABILIZATION
TUSKEGEE AIRMEN NAT'L HISTORIC SITE
TUSKEGEE, ALABAMA

DRAWING NO. 459 80,016
PKG. NO.
SHEET 2 OF 52

Drawing location: M:\DWG\NATPARKS\20071\DWG\A00.dwg Date Plotted:05-APR-2001 4:24:05 PM

Table 1: ASTM C1324 Chemical Evaluation Results

Chemical Analysis (%)	Dope Strg Int. Wall	Hangar 1 New Const	Hangar 1 S. Int.wall	Locker Blg Beaver Brd	Locker Blg Plaster	Fire Shed W.of Hang 1	Fire Shed S. Exterior	Tower Blg Ext. W.Face
Soluble SiO2	3.36	4.28	4.99	0.26	0.84	3.87	2.85	3.83
Soluble CaO	18.32	22.15	15.6	26.15	15.82	14.36	13.62	15.24
Soluble MgO	1.02	0.66	0.74	1.65	2.92	0.45	0.8	2.49
Insoluble	62.25	63.73	65.95	46.61	64.75	67.01	68.72	65.2
Total Solids	84.95	90.82	87.28	74.67	84.33	85.69	85.99	86.76
LOI 110C (free water)	0.87	3.24	0.89	2.01	1.75	0.86	0.7	1.02
LOI 550C (combined water)	2.63	3.65	2.27	19.29	7.23	2.53	4.11	4.28
LOI 950C (carbonates)	10.23	4.79	8.6	2.01	3.82	7.95	8.54	6.57
Total	98.68	102.5	99.04	97.98	97.13	97.03	99.34	98.63
ASTM C1218M Water Soluble Sulfate (SO4)					11.79			

Table 2: Calculated Mortar Proportions

Constituent	Volume by Parts							
	Dope Strg Int. Wall	Hangar 1 New Const	Hangar 1 S. Int.wall	Locker Blg Beaver Brd	Locker Blg Plaster	Fire Shed W.of Hang1	Fire Shed S. Exterior	Tower Blg Ext. W.Face
portland cement	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
lime	1.6	1.4	0.1	63.6	10.3	0.4	1.1	0.6
sand	4.6	3.7	3.3	44.2	19.0	4.3	5.9	4.2
total cemetitious	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
sand	1.8	1.5	3.1	0.7	1.7	3.0	2.8	2.6
ASTM C270 Type	O	S*	M			S	N	N

* Based on masonry cement