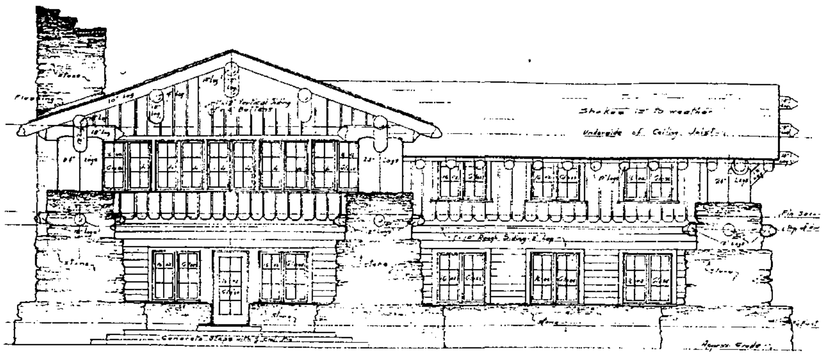
South Rim Ranger Operations Building
Historic Structure Report

Grand Canyon National Park, Arizona



NORTH SIDE ELEVATION
Scale ¼"=1'-0"

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I. EXECUTIVE SUMMARY

The historic Park Headquarters Building of 1929 (now commonly known as the Ranger Operations Building, and, for consistency, referred to as such throughout this document) at the Grand Canyon National Park is an outstanding example of rustic style architecture developed during National Park Service expansion and growth in the 1920s. Designed under the direction of National Park Service landscape architect Thomas Chalmers Vint, the building was constructed in 1929 to serve as Grand Canyon's second Park Headquarters, superseding a 1921 structure located nearby. Within the context of the development of the rustic style, the Ranger Operations Building best exemplifies the fusion of the American log cabin and the European chalet.

The building is a representative example of the Park Service's desire for a singular and aesthetically appropriate architecture for the National Park system. Vint's Ranger Operations Building reflects his philosophy of incorporating elements of the natural landscape into building design. Vint purposely chose oversized stones and logs which reflected the Kaibab limestone boulders and mature Ponderosa pines found throughout the surrounding landscape. Consequently, the building features have a distinctly rustic air: massive stone piers topped by peeled logs at the corners, exterior wood siding, and log outlookers to support the extended eaves. Exhibiting an intimate scale and complementary materials, the Ranger Operations Building compares favorably with the architecture of the elaborate structures built in the Grand Canyon Village by the Atchison, Topeka & Santa Fe Railway in conjunction with a concessionaire, the Fred Harvey Company. While, over time, alterations to the building and to the general plan of the Grand Canyon Village have resulted in changes to the structure and to the arrival roads and traffic circulation around it, the Ranger Operations Building retains an overall high degree of historical and architectural integrity.

The information presented herein provides the basis for evaluating future alterations that may be proposed for the Ranger Operations Building and will aid in the rehabilitation and stabilization of this significant park structure. As this building has been well-documented in the past for National Register and National Historic Landmark eligibility, no significant new information regarding the architectural significance of the building has been found. The project team has developed a more thorough analysis of the structure's place within the context of rustic architecture. Additionally, the previous documentation did not focus on the importance of a Park Headquarters' building to support the everyday function of the Grand Canyon National Park; this report expands upon that aspect of the building's history.

The contents of this Historic Structure Report (HSR) are:

- a concise historic context associated with the building and its architect;
- a detailed chronology of building development including alterations and maintenance through time,

together with a drawing illustrating construction chronology;
- a re-evaluation of the period of significance, historic integrity, and historic significance of the structure;
- an evaluation of building conditions;
- a list of character-defining features;
- updated existing conditions drawings;
- plans that identify the primary, secondary and tertiary spaces with the building; and,
- a copy of the Pre-Design Study, December, 1999, including conceptual use plans and cost estimates.

The historical research portion of the report is based primarily on existing historical source material at the Grand Canyon National Park Archives and other materials made available by NPS. Several NPS staff members of the Engineering and Maintenance divisions of the Grand Canyon National Park were consulted regarding the maintenance history of the building. Additional secondary research was conducted using materials within the libraries of the University of California at Berkeley, the library at the Grand Canyon National Park, the library at the San Francisco office of the National Park Service, at significant Bay Area research collections, and in the ARG library. The level of research requested for this report was "thorough" — one of three levels of investigation (exhaustive, thorough, and limited) as described by NPS Director's Order - 28. "Thorough" research is defined by DO-28 as follows:

> For historical studies this means research in selected published and documentary sources of known or presumed relevance that are readily accessible without extensive travel and that promise expeditious extraction of relevant data, interviewing all knowledgeable persons who are readily available, and presenting findings in no greater detail than required by the task directive.[1]

Major issues identified in the task directive for the Ranger Operations Building include: minor stone repointing; repair of siding; repair of log outlookers and roof brackets; interior rehabilitation; upgrade of mechanical, electrical and telecommunications systems; rehabilitation of wood windows, including installation of double-glazing; and the addition of attic ventilation. The proposed treatment of the structure is rehabilitation that is consistent with *The Secretary of the Interior's Standards for the Treatment of Historic Properties.*

While, since its construction, the building has always contained an office for the park's Chief Ranger, it has, over time, alternated between public uses and secured office space. Originally, the lobby, complete with masonry fireplace, log details and flagstone floor, was designed to welcome the public. An information sign stood in front of the building. **(Figure 1)** In 1957, public use of the building was diminished due to the construction of a new Mission 66-funded Visitor Center. It is not clear to what degree the Ranger Operations Building has remained accessible to the public since 1957 while functioning as the rangers' homebase and other uses. As of June 2000, the front door is open and a public information desk is located in the lobby, staffed to answer visitor inquiries. Since 1957, this building has been used primarily as the center for the Branch of Ranger Operations for the Grand Canyon National Park, together with other departments, offices and users who have come and gone. Ranger Operations will remain the building's principal user after the rehabilitation. As such, a number of key treatments are required to accommodate the identified use more effectively. These include ADA compliance; mechanical, electrical and telecommunications upgrades; code upgrades; fire protection; as well as interior and exterior rehabilitation of finishes and materials.

Administrative Data

Historic Name: Grand Canyon National Park - Second Park Headquarters Building
(references to the Administration Building on original drawings and documents)
Common Name: Grand Canyon National Park Ranger Operations Building
Park Structure Number: Building 103
Location: South Rim, Grand Canyon National Park, Coconino County, Arizona
USGS Map - Williams Quadrangle
UTM easting 397600 northing 3990490

Source: GCNPA Photograph number 17735.

Figure 1: View looking northeast shortly after completion in 1929. Note two casement windows at lower story of south elevation, original casements on the principal facade before installation of the second-floor awning and information sign indicating the building's public function.

A pre-design report for the rehabilitation of the South Rim Ranger Operations building at Grand Canyon National Park was completed by Architectural Resources Group in December 1999. A copy of that document is included as Appendix H to this Historic Structure Report.

Cultural Resource Data

The Ranger Operations Building was nominated to the National Register of Historic Places in 1975, and obtained National Historic Landmark Status in 1986. In the publication *National Historic Landmarks*, the National Park Service states:

> National Historic Landmarks are visual reminders of the events, persons, places, and objects which have affected the broad patterns of American history, illustrated man's craftsmanship and artistry, and reflected America's evolving culture.[2]

The Ranger Operations Building meets this definition as both a reflection of the expanded services offered by the National Park Service within its park system during the 1920s and as the development of suitable park architecture. Additionally, the building is a contributing structure within the National Register-listed Grand Canyon Village Historic District. In 1997, the Grand Canyon Village was made a National Historic Landmark District; the nomination form states "one of the most important buildings in the entire village, … [Ranger Operations] projects a powerful image representing the civic administration of the park".[3]

The original drawings for this building are on microfiche at the NPS Denver Service Center. If there is not a copy of the drawings in the Grand Canyon National Park Archives at the South Rim, a copy should be placed with that collection. There are a number of historic photographs of this structure within the collection of the Park Archives. This collection also includes several items of memorabilia relating to the building. The Park Archives collection is an appropriate location for these items.

The original drawings for the Ranger Operations Building are included in this document as Appendix A.

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II. Historical Background

Historical Background and Context

This section of the HSR outlines the people, events, and historic contexts associated with the structure. Historic contexts are broad patterns of historical development in a community or a region that may be represented by historical resources. Historic contexts can be identified through consideration of the history of individual properties or groupings of properties within the surrounding area. The establishment of historic contexts provides the foundation for decision-making concerning the planning, identification, evaluation, restoration, registration, and treatment of historic properties, based upon comparative significance. Historic contexts can be developed for all types of resources including, but not limited to, buildings, structures, objects, sites and historic districts. The methodology for developing contexts does not vary greatly with the different types of resources, and contexts may relate to any of the four National Register criteria. At the core of historic contexts is the premise that resources, properties, or happenings in history do not occur in a vacuum, but rather are part of larger trends or patterns.

The Canyon's First Inhabitants

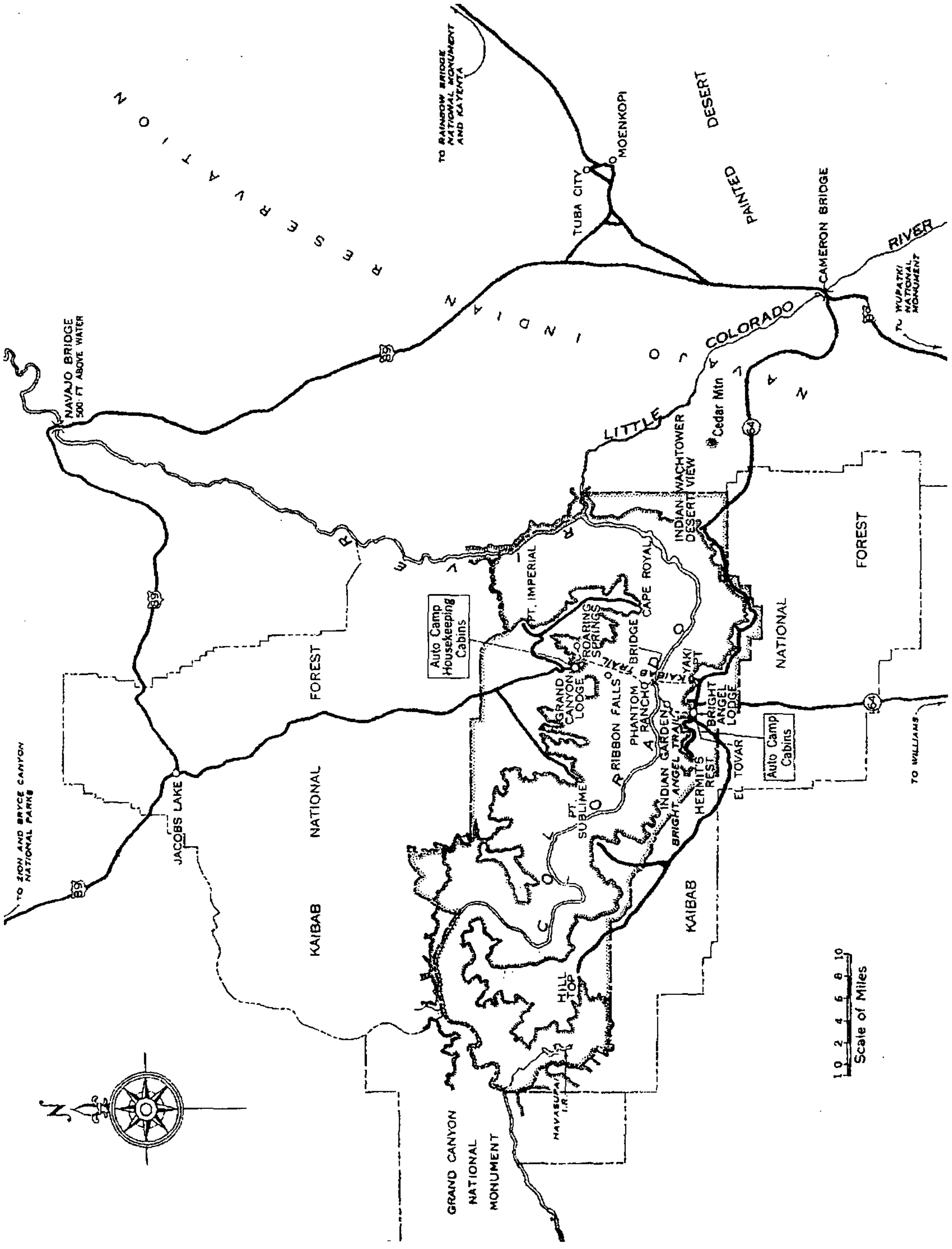
The Grand Canyon, the major chasm of the Colorado River and its tributaries, has been known to humans for thousands of years.[4] Native tribes discovered, explored, hunted, farmed and likely lived inside the Canyon for the last 10,000 years. The two tribes most intimately associated with the Canyon are the Havasupai and the Hualapai hunters, gatherers and planters living in the region as early as the twelfth century. Both spiritually and physically, the Canyon remains of great importance to the local native peoples: it is a holy place, an object of pilgrimages, a symbol of legends, and a home place. Today, the reservations of the Hualapai, Havasupai, and Navajo tribes include parts of Grand Canyon National Park; the Paiute and Hopi reservations are nearby. Each of these tribes is linked to the history of the Canyon, from early times to present day involvement.

European Exploration

During the early Spanish period, both the Hualapai and Havasupai were relatively unaffected by the Spanish soldiers and explorers.[5] The first European to encounter the Canyon was Francisco Vasquez de Coronado, who stumbled upon it during his overland expedition of 1540. After this initial foray, the Spaniards left the Canyon and its surrounding plateau lands to native tribes for more than one hundred years. The Spanish were concerned with charting the New World and understanding the geography of the region; they were awed by the Canyon as a barrier, not for its scenic beauty, and focused instead on more easily habitable regions. **(Figure 2)**

American Westward Expansion

More than three hundred years later, American trappers, fur traders, and frontiersmen scouted the area in the early nineteenth century, but tended to avoid the treacherous, unforgiving and still uncharted depths



Source: GCNPA files.

Figure 2: An overview of the geography of the area and the layout of the Grand Canyon National Park.

of the Canyon. Like the Spanish before them, they saw the Canyon as an impediment to their hunting and trapping activities. In 1848, much of the territory was still unexplored. The course of the Colorado River had never been surveyed and the Canyon did not have an established name. In 1869 Major John Wesley Powell, a geologist and explorer from Illinois, organized several expeditions to charter the river that cut through the Canyon. Powell's expedition appears to have been the first organized expedition of white men to successfully navigate the Colorado River through the Canyon and opened the way for further settlement.

Despite Powell's success, the American frontier came late to the Canyon. Rugged topography and a hot, arid climate deterred settlers. Consequently, those who came were mostly men without families in search of wealth: ranchers, settlers, and mining prospectors. These men arrived in Arizona in the 1870s in such huge numbers that the population quadrupled. Hundreds of mining claims were staked in the Canyon, but mining meant overcoming prohibitive difficulties: such as, lack of water; insufficient trails; packing out the ore on burros; and, finally, paltry deposits. Some mining prospectors saw that their trails and land had greater value in tourism than in mining. This realization coincided with escalating settlement of the Southwest and railroad expansion, particularly the Atlantic and Pacific Railroad, which pushed across northern Arizona.

Tourism Reaches the Canyon

While the extension of the railroad to northern Arizona made the Canyon more accessible in the last quarter of the nineteenth century, it was not until 1901 that visitors could arrive directly to the Canyon's South Rim by rail. **(Figure 3)** Until then, hardy visitors withstood the laborious journey by horse-drawn stagecoach lines or wagons. In the early 1880s, Captain John Hance built the first hotel, in the form of a small cabin, on the Canyon's rim near today's Grandview Point. Hance was a storyteller, tourist guide, trial builder, and miner who discovered that tourists were a source of greater profits than mining activities.

The arrival of rail service spawned the transformation of the small Canyon village into a more sophisticated resort under the aegis of a concessionaire, the Fred Harvey Company, which was allied with the Atchison, Topeka & Santa Fe Railway. Fred Harvey established resorts to accommodate rail travelers throughout the west. The Fred Harvey facilities at the South Rim ranged from the luxurious to the economical, from the sumptuous El Tovar Hotel (1905) to the Bright Angel tent cabins (no longer extant). The

Source: Manns, T., A Guide to the Village.

Figure 3: Trains arriving at the Grand Canyon Village.

lodgings spawned other tourist-related businesses and structures, such as the Hopi House (1905),Verkamp's Canyon Souvenir Shop (1905), Mule Barns (1907), Rail Station building (1907), and the Lookout Studio (1914), creating a bustling arrival point for Canyon visitors. **(Figure 4)**

After the completion of the El Tovar, designed by architect Charles Whittlesey, Fred Harvey hired architect Mary Elizabeth Jane Colter to design many of the Grand Canyon village buildings listed above. Colter, a native of Minnesota, received her architectural training in San Francisco in the 1880s. She became a designer and decorator for Fred Harvey in 1902, working into the 1940s. Colter's buildings reflected both the natural resources of the vicinity, including stone, and the building traditions of Native Americans linked to the Canyon. Her work was innovative in that it resulted in buildings that were in harmony with the surrounding landscape, a philosophy that came to dominate the early designs of the National Park Service as well. Over time, the South Rim village developed into a natural locus for visitors.

An Appropriate Style of Architecture for the National Park System

When the Grand Canyon officially became a National Park in 1919, the National Park Service Landscape Engineering Department teamed up with the Santa Fe Railroad and the Fred Harvey

Source: GCNPA files.

Figure 4: Early view of Grand Canyon Train Station and with the El Tovar at the canyon rim behind.

Company to plan development in the park. Concessionaires like the Fred Harvey Company had created structures in a variety of architectural styles, from buildings inspired by native construction techniques to those that evoked the imposing European chalet tradition. The early National Park Service architects and landscape architects, by contrast, pursued an architectural style that provided greater harmony with the natural surrounding and employed a generally smaller scale. From its inception in 1916, the National Park Service sought to define an appropriate architecture for buildings constructed within parks, some of the most scenic locations in the United States. The first directive issued by the new agency stressed that "particular attention must be devoted always to the harmonizing of these improvements with the landscape." [6]

The directive also stated that the employment of "trained engineers who either possess a knowledge of landscape architecture or have a proper application of the esthetic value of park lands" was a key item in all programs in park development.[7] Curiously, none of the Park Service staff had a background in this type of contextual design. As architects, they had been trained to build notable structures that stood out in the landscape. But under the direction of men like Daniel R. Hull, Thomas C. Vint and Charles P. Punchard, the Park Service architects and landscape architects reconsidered their approach to formal buildings and instead designed structures that merged with the environments. The designers working for the Park Service "integrated the principles and practices of their profession with the fundamental conservationist philosophy of Park Service directors Stephen T. Mather and Horace M. Albright."[8] This new style of architecture, now referred to as "parkitecture," more fully reflected the goals of the Service: the preservation and enhancement of America's natural heritage. **(Figure 5)**

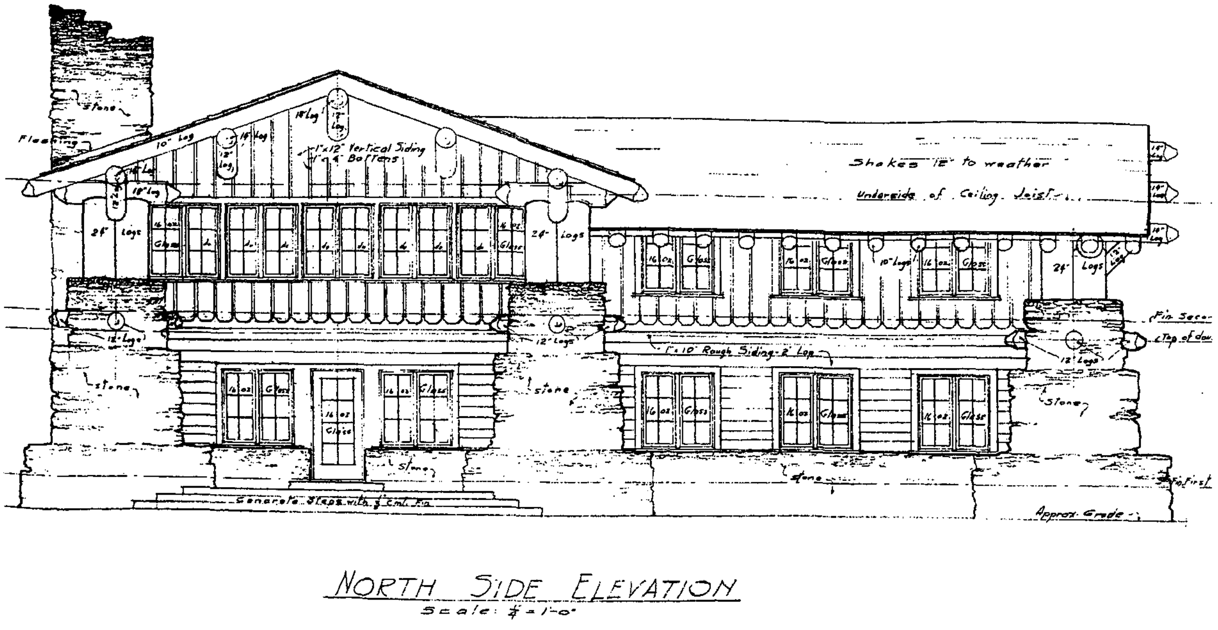


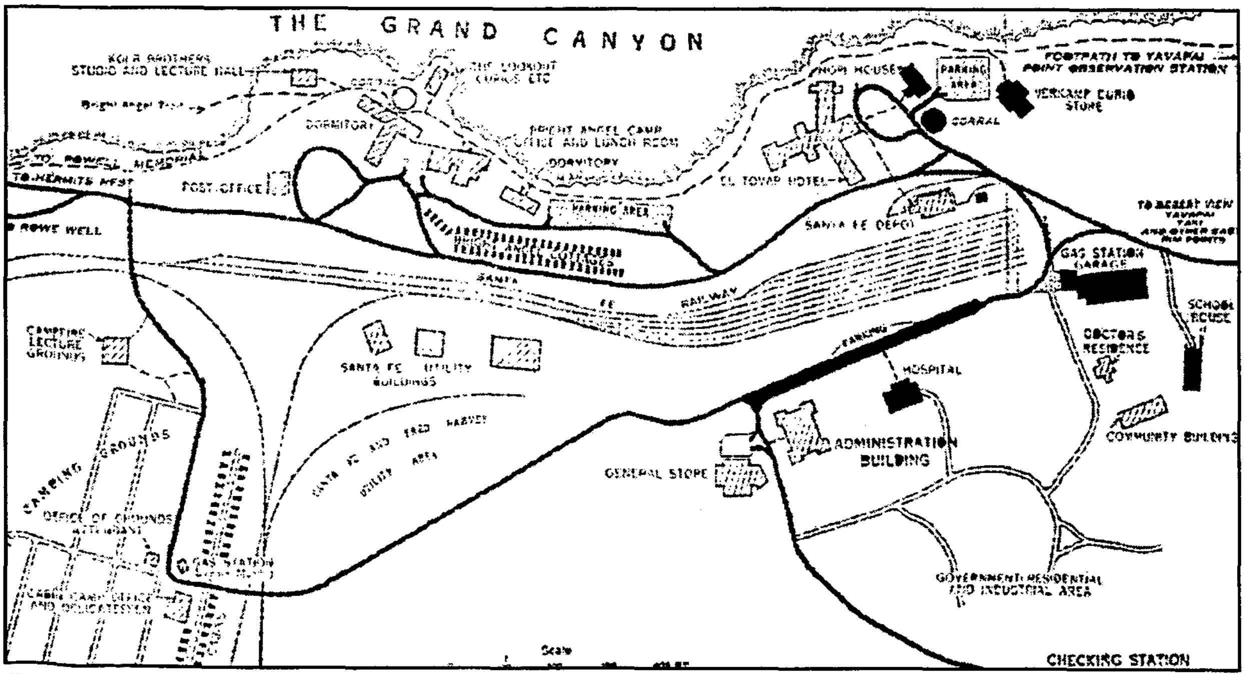
Figure 5: Principal elevation of the Ranger Operations Building reflecting early Park Service design philosophy, 1928.

At the same time, Park Service architects relied heavily upon their educational training and the principles established by earlier designers such as A. J. Downing, Frederick Law Olmsted, Henry Hubbard, Samuel Parsons, and Frank Waugh. Further, they looked to the rustic architectural tradition established in the great camps of the Adirondacks, and to innovative late nineteenth century California designers such as Charles and Henry Green, Bernard Maybeck, Ernest Coxhead and others. With these models, the early Park Service landscape engineers and architects began to formulate their own architectural vocabulary.

Grand Canyon Village and the General Plan

Ranging in date from the 1890s to the mid-1930s, the structures that comprise the Grand Canyon Village Historic District stretch along the South Rim extending from the Canyon edge into the ravines and hills to the south. The Grand Canyon Village was first established in the 1880s as a stop serviced by horse-drawn stagecoaches, and over time developed into a natural focal point for visitors. Rugged and rustic, the historic district retains a cohesive architectural character, consistent with the early twentieth century establishment of the park.

Shortly before the Grand Canyon officially became part of the United States Department of the Interior's National Park Service, a 1918 statement of policy of the National Park Service called for planning before design and construction.[9] Beginning in 1918, the National Park Service hired landscape architects to plan and design park villages, campgrounds, road and trails, and facilities and to provide advice on issues affecting the scenery of the parks. **(Figure 6)** Frank Albert Waugh, a professor of



Source: GCNPA files.

Figure 6: Map of the Grand Canyon Village, 1918. Map also illustrates proposed sites including that of the Ranger Operations Building more than a decade before its construction.

landscape gardening at Massachusetts Agricultural College and consultant to the Park Service, promoted a style of design based on imitation of natural forms and the use of native vegetation. [10] An advocate of advanced town planning techniques in the design of the park villages, Waugh was commissioned by the Forest Service to draft a plan for the Grand Canyon National Park Village. The key elements of his 1918 plan were new streets that conformed to the gentle slope of the site and a civic center, which formed "a grassy park-like public square" in front of the Fred Harvey Garage near the end of the railroad spur. Waugh's plan was important as it introduced the concept of a public square surrounded by key buildings, specifically an administrative building. This public square concept was later developed by Daniel Hull, Chief Landscape Architect of the National Park Service, as the village plaza, site of the future Ranger Operations Building.

Hull's 1924 site plan for the Grand Canyon Village, like Waugh's, attempted to impose order upon the village and to create a more pronounced town focal point, organized around a central civic space, the plaza. **(Figure 7)** Hull's vision for the Village was both limited and shaped by the railroad spur, natural topography and vegetation and a distinctive architectural identity defined by a number of existing buildings in a variety of styles and eras. Hull sought a solution that would preserve the "wonderful landscape beauty but provide adequately for the large number of visitors there".[11]

As early as 1922, Hull probably already decided to relocate the town's plaza to its present location, now a parking lot. [12] The plaza served as a key arrival point for automobiles, terminating the southern approach road, the principal vehicle entrance to the park and allowing visitors to disembark in front of the Park Headquarters building. Completed in 1926, the plaza and the entrance road leading into it were hailed as exemplary design. The second Park Headquarters (the Ranger Operations Building) was one of a group of important public buildings around the village plaza, together with the post office, the Babbitt general store and a planned, but unrealized, museum. The plan for the siting of the Ranger Operations Building gave it greater stature than it has today. This vicinity on the plaza, in close proximity to the train depot and lodgings was, in 1929, a logical choice as the most prominent location of a new Park Headquarters Building.

Although the building at present retains its footprint in its original location, extraneous changes have detracted from its setting. The plaza was never used as Hull or Waugh foresaw. Its perimeter was reduced and even at an early date it became a prime parking location, **(Figure 8)** obliterating its usefulness as a civic space, a gathering spot for pedestrians. The plaza, though it remains unbuilt upon, is no longer an arrival point and has lost its function and serves principally as parking for the Ranger Operations Building. After the 1957 completion of the Visitor Center and other facilities to the east of the historic district, arriving automobile traffic was re-routed to an eastern approach. Park entrants arrived at the modern new Visitor Center before seeing the Grand Canyon Village, altering their perception of the place.

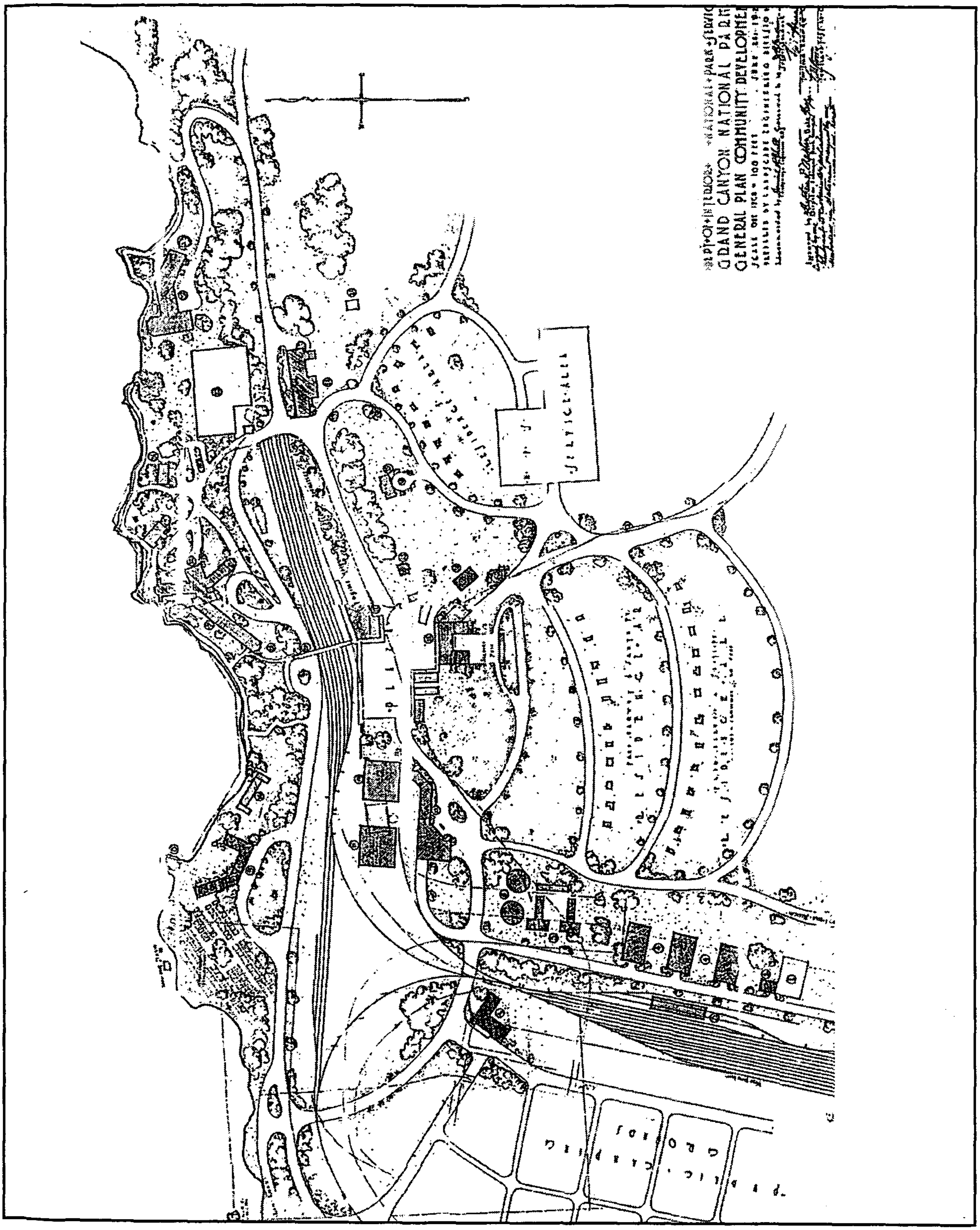


Figure 7: Master Plan for the Grand Canyon Village, 1924, by Daniel Hull.

Source: GCNPA files.

Park Headquarters Buildings at the Grand Canyon and the Log Cabin Building Type

By 1919, the Park Service had constructed several simple wood frame structures at the Grand Canyon for temporary use. During the 1920s, as automobiles and buses slowly replaced rail lines as the principal means of traveling to the South Rim of the Grand Canyon National Park, access became easier and the numbers of visitors increased. With more Americans visiting the park, it became clear that an expansion of services within the Canyon was needed.

Source: GCNPA Photograph Number 1542.

Figure 8: Line of cars outside Headquarters' Building, June 12, 1948.

In the summer of 1921, several permanent structures were erected, including the first Park Headquarters which also served as the Park Superintendent's residence. **(Figure 9)** Designed by Daniel Hull, the first Headquarters was one of the earliest rustic style buildings within the park. Eventually, the 1921 building which served the duel purpose of information center and residence, could no longer sufficiently serve all its requirements. To keep pace with the growing numbers of visitors in one of the nation's most popular western parks, the National Park Service undertook construction of a new Park Headquarters building, our subject building, within Grand Canyon National Park in 1929. **(Figure 10)**

In his 1938, three-volume edition of *Park & Recreation Structures,* Albert H. Good, an architectural consultant to the National Park Service noted:

> Few examples of administration buildings are known to exist as entities separate from other functions, except in national parks of vast extent. In these the need for space for the superintendent and a considerable staff engaged in the varied operations of dealing with the public and the park operator or concessionaire, keeping accounts, directing maintenance, planning the further development of the area, etc. is very considerable, and it results in a building of some size and of single purpose. . . Structures dignified by the designation "administration building" sometimes tend to a prominence of location. [13]

Source: Manns, T. A Guide to Grand Canyon Village.

Figure 9: First Park Headquarters, 1921.

GCNPA Photograph Number 12058.

Figure 10: Second Park Headquarters' Building looking southwest, 1929. Note grouping of casement windows at second story of west elevation before installation of awning.

Both Hull's first Park Headquarters and Vint's second Park Headquarters were built in an architectural style that fused the European chalet with the log cabin. The designs for both headquarters used the domestic log cabin, expanded it in size, scale, volume, massing and expression, and created a larger, utilitarian building type that served a variety of uses beyond residential. Exaggerated ornamentation that mimicked the surrounding landscape was incorporated to the basic building block of the cabin. **(Figure 11)** The log cabin building type was one of the basic elements of the park architecture vocabulary and aided the development of rustic NPS architecture as a singular style. Within the context of the development of the rustic style, the Ranger Operations Building best exemplifies the architectural refinement of the log cabin type.

Vint's Park Headquarters Building

Given the diverse staff and services needed to sustain the infrastructure of the expansive Grand Canyon National Park, plans for the new building went forward. Designed in 1928 under Vint's direction, the Ranger Operations Building at Grand Canyon National Park exemplifies the architect's design philosophy for park architecture, a unifying use of materials and siting to highlight the building's relationship to its natural surroundings.


ARG photo.

Figure 11: Oversized log detail above masonry courses.

Construction began on the "New Administration Building" on November 12, 1928. The building was substantially complete by March 25, 1929 and was formally opened on Saturday, April 6, 1929 in a documented ceremony. According to the opening ceremony program, the building cost $18,623.00 and was constructed by Olds Brothers Lumber Company, a general contractor from Winslow, Arizona. The brochure for the building opening states that the original materials included: exterior framing of native Kaibab limestone slabs and western yellow pine; a door and second story framing of Oregon pine; and first floor flooring of concrete. The building was referred to in this program as the Administration Building, the term used by Albert H. Good, as described above.

The second Park Headquarters, or Administration Building as it was sometimes called, housed the offices of the park superintendent and assistant superintendent (refer to original floor plans in Appendix A of this report). Other official functions of the structure included offices for the chief clerk and ranger, as well as the purchasing clerk. Additionally, there was an office for an engineer with an adjacent drafting room. The telephone exchange and storage facility were also housed within the new Headquarters Building. Most importantly, the first floor contained a welcoming, formal lobby and ranger information desk. **(Figure 12)** The rangers provided visitors with trail maps, campsite locations, weather information and general safety tips. Rangers were apt to warn of the harsh environment and steep trails in the Canyon. An immediate success with park visitors, the popular building served as an important stop during a stay in the park. The 1929 Headquarters' building retained its original use until the construction of the Canyon's third headquarters building (Visitor and Administration Center) in 1957.

GCNPA Photograph Number 2213.

Figure 12: Line of visitors at Ranger Information Desk at Headquarters' Building, August 1951. Note original information desk and lobby finishes.

Post War Changes within the Park System

After World War II, Americans increasingly took to the highways to explore the nation's points of interest and traveled domestically rather than internationally due to Post-War isolationism. With increased park usage and popularity, a rehabilitated infrastructure within the parks became necessary. Conrad L. Wirth, a landscape architect and planner who had led the Park Service's Civilian Conservation Corps (CCC) program, became director of the Park Service in December 1951. Facing a system with a deteriorating infrastructure overwhelmed by the postwar travel boom, Wirth responded with Mission 66, a ten-year financial program to upgrade facilities and park resources to coincide with the Service's fiftieth anniversary in 1966. A hallmark of the Mission 66 program was the park Visitor Center, a multiple-use facility with interpretive exhibits, audiovisual programs, and other public services. Fifty-six new visitor centers were open or under construction in National Parks by 1960, the earliest of which was Grand Canyon National Park Visitor Center designed by Cecil Doty, completed in 1957. **(Figure 13)** As a result, the 1929 Park Headquarters building became obsolete as a publicly functioning building when the new Visitor Center opened. Since then, the building has housed the administrative offices for park rangers and has become known as the Ranger Operations Building.

GCNPA photograph number 3244.

Figure 13: Visitor's Center, 1957.

The Architect, Thomas Chalmers Vint

Thomas Chalmers Vint (1894-1967) embodied the nature of the multi-disciplinary work he carried out for the National Park Service, assuming the role of draftsman, architect, landscape engineer, planner, and mentor. **(Figure 14)** Together with landscape architect Conrad L. Wirth, Thomas C. Vint was one of the two most influential landscape architects in the history of the National Park Service, espousing naturalistic principles of design and harmonization and an ethic of landscape preservation. As a versatile designer, Vint defined the idiom of park architecture, was instrumental in developing the park system's unique rustic architecture in the 1920s, and decades later, participated on the Mission 66 steering committee, promoting modern architecture in the parks. A skilled planner, Vint is credited with forging the concept of the Master Plan, the essential tool for all park planning, which plotted existing conditions and facilities and set forth a plan of proposed improvements, guiding development in all the National Parks for many years. His ideas about park architecture, planting, siting within a village center and enhancing the visitor's park experience are all evident in his Ranger Operations Building of 1929.

Thomas Chalmers Vint was born in Salt Lake City, Utah, on 15 August, 1894, and moved to Los Angeles, California, where he attended high school. Although primarily a landscape architect, Vint was also trained in architecture. He graduated from the University of California, Berkeley, with a Bachelor of Science degree in landscape architecture in December, 1920. After serving in Europe during World War I, he spent a semester studying at the Ecole des Beaux Arts at the University of Lyon, France; he later studied city planning at the University of California, Los Angeles.

Vint's early work experience and internships prepared him well for a forty-year career with the National Park Service. The skills he acquired as an intern included grading residential grounds, supervising construction and the large-scale planting of trees, and advising on planting designs. Vint worked in the offices of several Los Angeles architects and builders, including A.S. Falconer, W.J. Dodd and Lloyd Wright, who was designing the grounds of large residences, and working on landscape designs for Pasadena suburbs. This period was significant in Vint's development as he was immersed in residential and bungalow design, together within a landscaped environment–all early influences that appear in his Ranger Operations Building at the Grand Canyon.

In 1922 Vint became an architectural draftsman in the office of Daniel Ray Hull (1890-1964), the National Park Service's chief landscape engineer in Yosemite National Park. In 1923, the office moved to Los Angles, where Hull and Vint shared offices with architect Gilbert Stanley Underwood who was designing a number of park lodges for concessionaires. Perhaps the most well-known of these is Underwood's Awahnee Hotel at Yosemite. In a few short years, Vint moved from draftsman to assistant landscape engineer to associate landscape engineer. When the Western Field Office moved to San Francisco in 1927, Vint took charge of the landscape program and quickly became chief landscape architect with responsibility for the location, character, and quality of all park construction and planning. He led a small group of creative young landscape architects and sought to cultivate a philosophy in which new buildings were designed to be as unobtrusive and harmonious as possible in their park settings, instilling in his design team a sensitivity for the unique natural surroundings of each park, tailoring each master plan as well as each building project to a specific park site. The young designers were urged to carefully study the natural elements of the surrounding landscape including color, scale, massing, and texture, and then to integrate those elements into their designs.

Vint's tenure bridged two very distinct eras of Park Service design and paralleled the expansion within the National Park system. Thomas Vint dedicated a forty-year career to the National Park Service, but his influence has endured to the present. His legacy is not simply found in the tangible form of buildings and plans but in the way visitors experience the natural landscape as he strove to meet the Park Service's difficult mandate that parks be both accessible to the public and preserved unimpaired for future generations.

From *Building the National Parks.*

Figure 14: Thomas Vint, second from left, in the Western Field Office, 1934.

III. CHRONOLOGY OF DEVELOPMENT AND USE

This section summarizes the physical construction, modification, and use of the Ranger Operations Building. It also includes information on major maintenance and rehabilitation campaigns. The information presented is based on historical documentation with corroboration from first-hand observation and limited materials analysis. Changes to the building for which chronological documentation is not available are noted and explained at the end of the chronology.

Chronology of Users

From its construction the building operated as the main park administration, visitor contact point and ranger headquarters. In 1957, a new Visitor Center with administrative offices was inaugurated. Consequently, the 1929 structure became obsolete as a publicly-functioning building. In addition, some administrative offices and later, the Office of Park Communications, moved from the 1929 building to the Visitor Center. The 1929 Headquarters Building was retained as the command post for the Branch of Ranger Operations and continues as such to the present.

In addition to housing the Chief Ranger, the building, has accommodated the Chief of Maintenance and the U.S. Magistrate, both now housed in separate, dedicated buildings nearby. The U.S. Magistrate occupies the former Post Office across the plaza. Today, the 1929 building serves primarily as office space for the search and rescue teams and the public safety rangers who work in the field, returning to the building to write reports and complete administrative tasks. These rangers work a series of three shifts and many share office space as a result of this work environment.

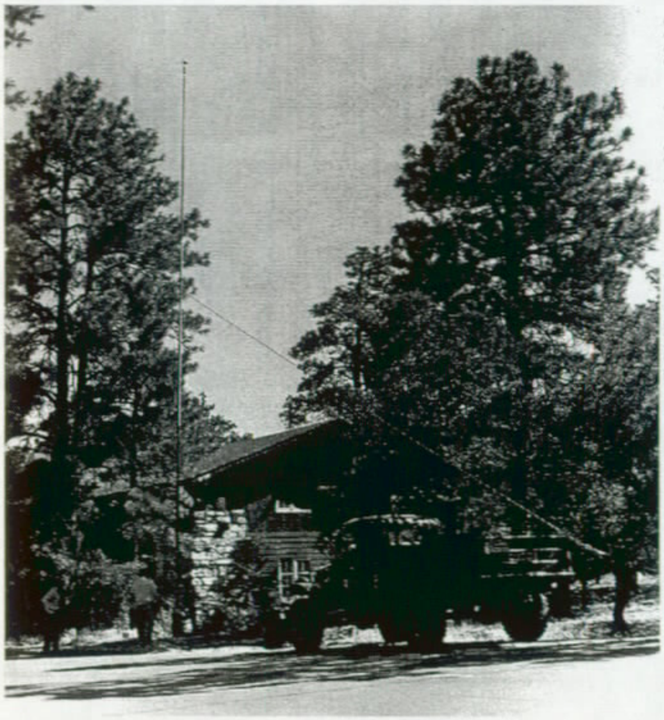
Chronology of Development / Alterations

1918	Site for future Administration Building noted on perimeter of the plaza on the proposed plan for the village.
1928	November 12, 1928 initial construction begins.
1929	March 25, 1929 construction completed. April 6, 1929 Formal Opening Ceremony.
1935	8' x 10' concrete vault added to east side of building. **(Figure 15)**
1938	Interior remodeled and a toilet room addition constructed at the north side of the building. The two utility tunnels (3-feet wide and 3-feet deep) underneath the concrete floor slab were probably installed during this remodel (construction documents for this work are not available).

GCNPA Photograph Number 9250.

Figure 15: Completed vault at east elevation of Headquarters' Building, February 1936. Note stone foundation and emergency exit ladder.

1946	70 foot tall flag pole erected at southeast corner of building, removed at an unknown date.
1949	Ceiling insulated at attic.
1951	Asbestos shingle roofing, originally laid in a diaper pattern, replaced with green asphalt shingles, exterior wood stained, and openings painted. Original hall partition removed at first floor clerical department (adding 90 square feet to chief clerk's office).
1952	New flagpole installed. **(Figure 16)**
1957	New Visitor Center completed. Park Headquarters relocated to the new structure.
Post 1957	Lobby interior partitioned for additional office, carpet installed over scored concrete lobby floor. New partition walls given same log treatment as original walls.



GCNPA Photograph Number 2310.

Figure 16: Erecting flagpole after repairs, June 1952.

1957-1974	Reconfiguration of the original superintendent's office as a conference room. The entrance to this room was moved further north along the east wall of the lobby.
Post-1974	Exterior door at the east elevation (exiting from the original superintendent's office) removed.
1974-1978	Addition made to vault at east facade.
1976	Boiler pipes break and ruin interior finishes at the first and second floors. As a result, most of the original interior celotex and batten wall finishes are replaced with 1/4" plywood paneling.
1982	Deteriorated shingles and sheathing replaced, log end rafters patched and consolidated, and deteriorated flagstones at the front porch replaced.
Pre-1984	Original eight-lite wood door at west elevation replaced.
1983-84	Green asphalt shingle roof replaced with wood shingles.

1984	Extensive exterior repair campaign, classified as preservation maintenance, during the summer months under the direction of the Williamsport Preservation Training Center. Work included: replacement and repair of log rafter ends, replacement and repair of decorative log work, replacement of roof sheathing at overhangs, replacement and repair of millwork at the second floor windows and siding, and selective masonry repair. An exterior phone booth was also installed and the south sidewalk altered during this period.
Late 1980s	All window mounted A/C units removed.
1987	Exterior wood siding re-painted an oil-based brown. Window frames and green trim were not painted in this project.
1989	South door replaced in kind.
1992	Rodent and bat proofing of exterior cracks.
1998	Hot water lines added to restrooms. (Hot water was previously supplied directly from the boiler – an illegal configuration). Flagpole re-installed (non-compliant) in a location different from the historic.
2000	Boiler flue replaced. This new flue was not replaced per park compliance requirements and is placed directly in front of, and blocks the view from, a second story window.

Roofing Chronology

As the chronology and documentation of the building's various roofing treatments have been difficult to outline, the following chronology, stating all known facts with regards to roofing, is provided:

- Original Construction Documents call for wood shakes
- Historic photo evidence shown diaper dutch pattern roofing was in place by 1929. This is so early in the building's life that it suggests that wood shakes were never installed.
- 1935 drawing for the east vault has a note "composition shingles to match main roof". A 1936 photo shows the east vault with the diaper dutch pattern shingle roof.
- 1951 Composition shingles with horizontal coursing installed.
- 1983 Sawn wood shingles installed.

Undated Alterations:

Addition of a metal awning at the second floor of the south facade

The original casement windows on the second floor level of the front elevation, as seen in historic drawings and photographs, **(See Figures 5, 10)** were replaced with double-hung wood sash windows. **(Figure 17)** It is likely that this occurred when the new awning was installed as the original casements would not have been operable with the awning in place. Due to the condition and construction of the double-hung sash, it is assumed that both the awning and double-hung windows were added soon after the building's initial construction date, perhaps when the 1935 alterations occurred to the structure.


Photo ARG.

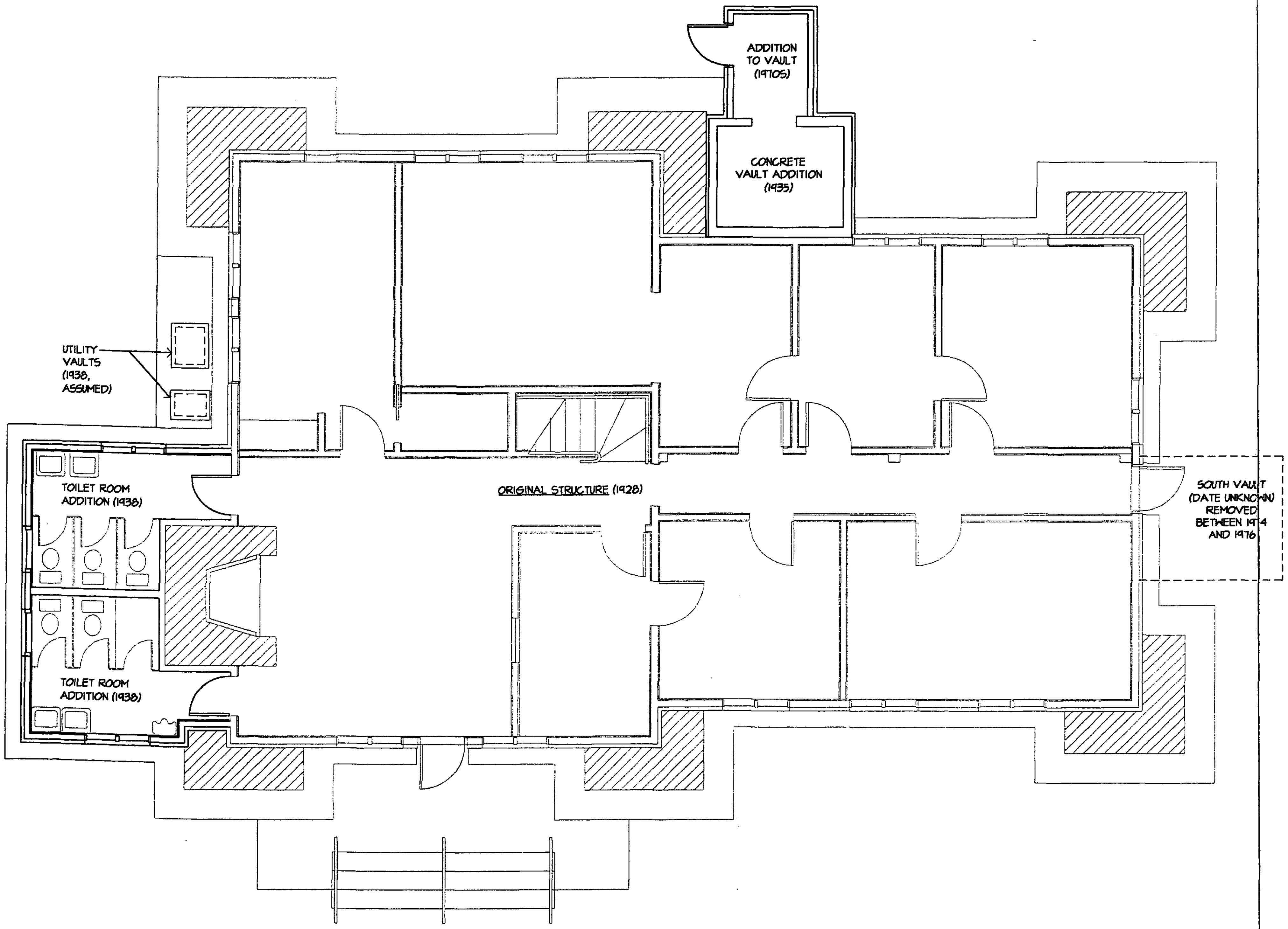
Figure 17: Metal awning at west elevation.

Addition of double-hung window at second floor north elevation

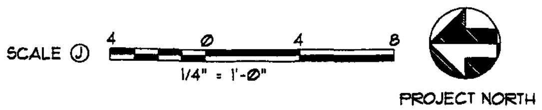
This window does not appear in the 1929 construction documents. However, there are no historic photographs of this building elevation, so it is not known if this window was an undocumented portion of the original construction or was a later alteration. As all of the other windows on the north facade are wood six-lite casements, it is suspected that this one double-hung window is not original to the building. Further, it exists on the north wall of the same room in which similar double-hung windows were introduced (screened by a metal awning) sometime after the original construction. As this window is similar to those double-hung sash, it is possible that this window was added at the same time.

Addition of a vault to south facade (removed between 1974 and 1976)

This greatly changed the appearance of the south facade by eliminating a first floor window and adding a one-story vault addition at the building's exterior (photographs of the addition were not found, though it does appear in descriptions and plans of the building from 1974). It is assumed that entry to the vault was via a door centered within the south elevation (to the immediate east of the original window). Now that the vault is removed, this door serves as a secondary entrance to the building.



A A1 FIRST FLOOR PLAN
SCALE Ⓙ



DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.
A1

TITLE OF SHEET
CONSTRUCTION CHRONOLOGY
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO. ——
PKG. NO.
SHEET —
OF —

ARCHITECTURAL RESOURCES GROUP

IV. SIGNIFICANCE AND INTEGRITY EVALUATION

Statement of Significance

Originally constructed as the second Park Headquarters for Grand Canyon National Park, this building is significant as an embodiment of the parallel expansion of American use and appreciation of the National Park system over time. It is an excellent example of rustic park architecture as developed by the National Park Service in the 1920s. The building is a representative example of the Park Service's desire for a singular and aesthetically appropriate architecture for the National Park system. Thomas Vint's Ranger Operations Building reflects his philosophy of incorporating elements of the natural landscape into building design. Vint purposely chose oversized stones and logs (compared to those used in typical building construction) which reflected the large scale boulders and mature trees found throughout the surrounding landscape. The big chunks of rubble masonry laid in courses mimicked the geologic strata found in the Canyon, and the log detailing was scaled to match the trunks of the surrounding forest. The building features are distinctly rustic in feeling.

The Ranger Operations Building was nominated to the National Register of Historic Places in 1975, and obtained National Historic Landmark status in 1986. The building is a contributing structure within the Grand Canyon Village Historic District, listed as a National Register District and a National Historic Landmark District.

The primary, secondary and tertiary spaces of significance with the building are identified on analytical drawings. An area of primary significance is defined as one of the most historically important spaces in the building. Major character-defining features are found in these locations and the building plan is primarily intact. An area of secondary significance is of lesser importance, however it contributes to the understanding of the building chronology. An area of tertiary significance is generally without character-defining elements. These drawings are included in Appendix C.

Period of Significance

The years 1928 through 1957 mark the period of significance for the Ranger Operations Building, when it served as one of the Grand Canyon Village's most important public buildings. Designed in 1928 by the Park Service landscape architecture division, construction was completed in 1929. The building served its intended original use as Park Headquarters until 1957, when it was replaced in function by an efficient, modernist visitor center, the prototype for a new Park Service building type developed under the Mission 66 program. By the late 1950s, the construction of the new eastern approach road and the reorientation of arriving vehicular traffic to enter the Village at the east, detracted somewhat from the prominence of the Ranger Operations Building, as it was no longer one of the principal introductory elements to the Grand Canyon Village. The National Historic Landmark status of this building indicates a level of exceptional significance. Alterations made to the building after the period of significance have not tampered with its character-defining features.

National Historic Landmark Boundary

As defined in the National Historic Landmark nomination form, the boundary runs along the south edge of the road on the building's north side, along the east edge of the road on the building's west side, and then 15 feet out from and parallel to the building walls on the south and east sides, with the eastern side of the boundary continuing north to the south edge of the road back to the starting point.

Evaluation Of Integrity / Condition

Eligibility for the National Register hinges on both significance and historic and architectural integrity. . Integrity is the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Integrity involves several aspects including location, design, setting, materials, workmanship, feeling, and association. These aspects closely relate to the resource's significance and must be primarily intact for eligibility. Integrity must also be judged with reference to the particular criteria under which a resource is eligible for continued inclusion in the National Register.

Overall, the exterior of the Ranger Operations Building retains a high degree of integrity. The reorientation of vehicular traffic via the eastern approach road has had a minimal negative impact on the setting of the building, as such the building retains an important visible location on its small corner lot.


Photo ARG.

Figure 18: Flue at east elevation, added Spring, 2000.

While the exterior has been altered, these changes, such as the installation of the metal awning, have been generally sympathetic. The exceptions are the recently installed flue at the rear **(Figure 18)**, the vault added to east side of building, the removal of the exterior door at the east elevation, the electrical service at the south elevation, the replacement front door, and the reconfiguration of the south facade by eliminating a first floor window and inserting a door. The interior design has been compromised by the addition of interior walls, removal of historic finishes, relocation of doors, and the addition of an office into the lobby space. While some materials, such as the log rafter ends and decorative log work, have been repaired or replaced, they retain a high degree of integrity. The quality of workmanship has remained high during subsequent works. The feeling of the building reflects the same rustic character as the original design intended. Lastly, the structure retains its association with important historic contexts, particularly with the development of rustic style architecture within the National Park Service.

Character-Defining Features

Exterior

Elements from the surrounding landscape have influenced the design of the building. The rough texture of the stonework courses mirrors the local geography, contributing to the singular character of the structure. The low-pitched roofs mask the size of the building so that it sits harmoniously among the trees. Following is a list of features that contribute to the rustic character of the Ranger Operations Building, capitalizing upon natural forms and indigenous materials to fashion a distinct character that links the building to its site. These are typical elements that came to define the rustic park architecture of the Park Service. These features are not listed in any order of importance⊇each in its own way is an equally important component of the building's design.

- Two-story stone and wood-frame chalet/log cabin building type
- Classic rustic design
- Coursed rubble masonry of native Kaibab limestone **(Figure 19)**
- Classically-inspired formal symmetrical entrance
- Sill-height stonework used to wrap the base of the building
- Exterior wood plank siding, laid horizontally at the first floor and vertically at the second
- Battered monumental piers; corner stone piers supporting three peeled logs
- Projecting symmetrical main pavilion with gable
- Two side wings
- Gabled roofs, finished with wood shingles
- Exaggerated eaves and sheltering roofs
- Axe-cut brackets and outlookers
- Coursed rubble masonry chimney
- Principal staircase of flagstone
- Use of rough-hewn boulders of Kaibab limestone piled two-high on front stair
- Wood-framed, six-lite casement windows
- Craftsman-style metal lanterns at entrance

GCNPA Photograph Number 62.

Figure 19: R. Redburn, Bill Downey, Carol Cox, C. Tyler, and Sammy (a local native-American) in front of Headquarters' Building, September 1931 or 1932. Note the use of large-scale boulders at the pier and steps.

Interior

Many of the original interior finishes and features have not survived previous building upgrades. However, there are several interior character-defining features of note including:

- Log siding and ceiling, stone fireplace and hearth in main lobby
- Lobby scored concrete floor (now covered by carpet)
- Staircase
- Remaining original interior office doors
- Window surrounds
- Celotex and batten wall and ceiling finish (at some rooms)

V. PHYSICAL DESCRIPTION AND ANALYSIS

Site

Situated at the southeast corner of Center Road and Village Loop Drive, the Ranger Operations Building faces southwest toward Center Road. **(See Figure 6.)** The building sits at the forested Y-junction of the two roads with no other buildings encroaching upon the site. Enhanced by a number of mature evergreen trees and stone curbing along the street, the site is generally flat and is bordered by a number of paved paths. An unpaved trail leads from the back of the building to Desert View Drive. The site is centrally located within the South Rim Village and, when constructed, was easily accessible to park visitors arriving at the train depot or by the principal southern entrance road that passed in front of this building, terminating at the plaza. At the south side of the structure there is a telephone booth, picnic table, horse corral, stone wall, and a manhole.

General Exterior

The Grand Canyon Ranger Operations Building most closely resembles a rustic chalet, a residential building type. Like a chalet, it is a two-story stone and wood-frame structure of classic rustic park design. The first floor of the building, up to sill height, and the structure's corner piers, are of coursed rubble masonry with a cement mortar. The remainder of the superstructure is of wood-frame construction with 1' x 10" horizontal siding with a 2" overlap at the first floor and vertical 1' x 12" dog-eared siding, with 1" x 4" battens at the second floor. **(Figure 20)** The stone piers at the building's corners each support three peeled logs that define the corner. The monumental piers are stepped in a battered fashion. The main pavilion of the building is symmetrical and sits slightly forward; the two side wings

Photo ARG.

Figure 20: Principal facade, May, 2000. Dark patch above the main door and window on right indicates the previous position of non-historic building sign.

are asymmetrical: the north wing is one story; the southern two-story wing extends away from the building approximately 32 feet.

The roof of the building is gabled, finished with wood shingles and has no gutter system. The gable roof of the central portion runs east-west and intersects the gable of the southern wing that runs north-south. Exaggerated eaves extend several feet from the building's walls and have axe-cut brackets and outlookers projecting beyond the sheltering roofs. A chimney, also of coursed rubble masonry, punctures the north side of the roof.

Exterior West (Front) Elevation

The principal elevation of the structure is marked by the building's formal entry accessed via a flagstone stair; each of the wide treads terminates with rough boulders piled two high, suggesting a low balustrade. **(Figure 21)** Giant stone piers flank the symmetrical entrance. The principal entrance is a single door, a replacement, with a large four lite inset window, framed by paired, wood-frame, six-lite casements on both sides. Squared, Craftsman-style roofed metal lanterns are mounted on either side of the main door. The sill-height stonework terminates in paired rough-hewn blocks alongside the front door and meets the flagstone of the principal staircase, giving the impression of a sturdy building well-anchored to its site. An aluminum awning, painted brown, shelters the second-story double-hung windows from the late afternoon sun; the aluminum awning supports are anchored to each window frame. A wide, deep-eaved gable completes the symmetry of the building's central element.

GCNPA Photograph Number 19.

Figure 21: Perry E. Brown and Constance Whitney former employees at Grand Canyon, and a second unidentified woman who visited the park with Miss Whitney, in front of Headquarters' Building, March 1932. Note original front door and extant Craftsman Style light fixtures flanking door.

A one-story wing is present at the north end of the west elevation and is marked by two hopper- style windows. The west elevation of the south wing is symmetrical with three sets of paired, wood-frame, six-lite casement windows. The south wing is roofed in a gable configuration that runs perpendicular to the central two-story element. The south end of the west elevation is anchored with a third giant stone pier.

West Elevation Alterations

A central utilitarian spotlight and conduit, both painted brown to match the horizontal plank siding, have been added above the door. A flagpole, erected in 1998, is located in front of the southern pier of the main facade. Historical photographs indicate a large metal sign, not a part of the original construction, denoting "Ranger Office" that once hung above the main entrance, but has now been removed. The original six-lite front door has been removed and replaced.

Original drawings of the building show a series of wood-frame, six-lite casement windows at the central second story element. These were likely replaced with the existing double-hung windows at an early date when a metal awning was installed to alleviate the heat created at interior spaces by the intense afternoon sun. The casement windows would not have opened easily or fully once the awning was installed. Several casement windows at the west elevation have been repaired or replaced in-kind. The one-story wing at the south end was constructed in 1938 to house restrooms.

West Elevation Condition

Exterior conditions are generally the same for each elevation. These include:

- some mortar deterioration at the masonry joints;
- stone is generally in good condition with some salt efflorescence present, likely from the typical condition of standing snow and related moisture;
- approximately 20% of the lower level wood siding is split or otherwise deteriorated, including curled ends;
- dog-eared upper story vertical siding is generally in good condition due to its proximity to the overhang;
- deteriorated log outlookers (some outlookers have dutchman plugs);
- deteriorated extended log roof brackets;
- vertical logs are in good condition;
- wood windows are generally in fair to good repairable condition; however, they are in need of scraping, sanding, new putty and paint, and several need new hardware.

Deviation from the standard conditions at the west elevation include: a fungus on the wood at the junction of the central element and south wing; a missing portion of the facia at the south portion of the main gable; and the replacement of one sash at the first floor, room 107.

The project team took one paint sample from a lower story window at the west elevation. While early photographs indicate that the building had light-colored windows, the paint sample indicates a dark green paint color at the substrate. Further paint analysis would be necessary to fully determine the original color of the wood windows.

Exterior East (Rear) Elevation

The structure retains its two-story chalet form, style, and massing at the rear. The rear elevation is asymmetrical. Paired giant piers, of coursed rubble masonry support three logs that define the corner and the facade, as on the west elevation. A low rusticated base at ground level connects the two corner piers. As throughout, the planks of the wood siding are horizontal at the first floor and vertical dog-eared above. The wood shingle roof over the central element is gabled. Exaggerated eaves over brackets extend out from the building's walls. Ten pairs of wood-frame, six-lite casement windows mark this elevation. Two pairs of hopper-style windows are present at the north end one-story wing. A single, wood-frame, six-lite casement window is present at the south end of the first story central element.

Two small additions adorn the east elevation at the north end of the south wing. A shed-roofed, single-story, concrete vault was added in 1935 and a smaller concrete extension was subsequently added to the vault in 1974-78. Access into these spaces is via a door at the south side of the later addition. Both of these concrete additions are sheathed in horizontal wood siding.

East Elevation Alterations

The shed-roofed, concrete vault addition was constructed in 1935 at the rear of the building and currently houses the boiler. **(See Figure 15)** The purpose of the vault addition is unclear. This addition was designed by William G. Carnes who had been placed in charge of Landscape Architecture in the Western Division of the Park Service when Vint became head of the Branch of Plans and Design.[14] A concrete extension to the 1935 vault was constructed in 1974-78. This second extension has a 5-panel door; the 1935 door opening that accessed the vault from the building interior was infilled with concrete block. Original drawings show a door at the south end of the first story that serviced the superintendent's office. This door has been removed and in-filled with horizontal wood siding; however, portions of the stone landing remain at this location. (See Original Drawings in Section VI of this document). The one-story wing at the north end was constructed in 1938 to house restrooms. A new flue was recently installed at the east elevation and blocks the window at room 209.

East Elevation Condition

General exterior conditions are the same as at the west elevation. Deviation from the standard conditions at this elevation include a damaged sash and a window with replacement mullions, both at room 106.

Exterior North (Side) Elevation

The treatment of the north elevation is consistent with the rest of the building. **(Figure 22)** A stone base wraps around the lower portion of the building. The exterior walls are clad with a wood-plank siding, horizontally laid below and vertically, dog-eared above. The gables and brackets receive similar treatment as at the other elevations. A one-story restroom addition projects northward from the original north wall. A single, giant masonry pier figures prominently in the character of the elevation, marking the northeast corner of the building. The second pier at the northwest corner is partially obscured by the one-story restroom addition. Two sets of paired, wood-frame, six-lite casements are present at the first story and three single, wood-frame, six-lite casement windows mark the east end second story. A double-hung window is present at the west corner of the second story. Two hopper-style windows are symmetrically placed under the gabled roof of the one-story wing. A stone chimney rises symmetrically above the one-story addition along the original north exterior wall.

ARG photo.

Figure 22: North elevation.

North Elevation Alterations

A one-story addition, sympathetic to the architecture of the original structure, was constructed in 1938 to house restrooms. This addition has hopper-style windows rather than the typical casement windows present throughout the building.

The original drawings show three casement windows at the second-story of the north elevation, east of the chimney. Presently, there is a fourth window at the second story to west of the chimney. This window was added at an unknown date and is double-hung.

The north elevation crawl spaces (vault) are accessed via two openings in the concrete pad at the foundation. The western-most space houses plumbing and utility chases (most likely added during the 1938 restroom addition) for the restrooms above, while the eastern-most space accesses the foundation under both the restroom and main portion of the structure. These spaces are used to route piping under the building.

North Elevation Condition

General exterior conditions are the same as at the west elevation. Deviation from the standard conditions at this elevation include new hardware at the three second-story windows. The western window at room 104 is damaged and needs to be reattached to the frame. Additionally, the western-most crawl space (vault), at the time of our site May 2000 site visit, contained approximately two feet of standing water.

Exterior South (Side) Elevation

The south elevation is a compact and tidy facade. All treatments are the same as at the principal elevation: use of giant stone piers and masonry, corner treatment, wood siding, and gabled roof. Two paired, wood-framed, six-lite casement windows punctuate the second story of the facade and are symmetrically placed. At ground level, there is one set of paired six-lite casement windows to the east of the south entry door.

South Elevation Alterations

The first floor of the south elevation has been reconfigured to accommodate a fireproof security door. Original drawings indicated that the lower story had two paired six-lite casement windows placed directly below the upper-story windows at the lower story (refer to the original drawings in Appendix A of this report). The western window has been removed and a door placed asymmetrically below the upper windows. Additionally, there are a number of electrical conduits and boxes that have been added to this elevation.

South Elevation Condition

General exterior conditions are similar to the west elevation. Deviation from the standard conditions at this elevation include a damaged window at room 111, and exterior electrical conduits and boxes which impair the visual quality of the elevation.

Roof

The main gabled roof is covered in wood shingles, as are the other roofed surfaces of the structure. This material was installed in 1983-84. The roof has seven vents, no gutters and brown-painted flashing.

Roof Condition

The roof surfaces appear to be in fair condition with some shingles that are split, cupped or missing. The shingles are in especially poor condition at the restroom addition. Patches of green organic growth are visible around joints of shingles.

Interior First Floor

The front (west) entry door opens to a reception area (room 103) with distinctive wall and ceiling surfaces covered with log slab siding, giving the building a particularly rustic feeling. The log slabs run vertically, creating a 3-foot wainscot, and run horizontally above. The floor is covered with wall-to-wall carpeting. Fluorescent ceiling lights illuminate the room. A stone fireplace at the north is articulated by stone piers of coursed rubble masonry that are topped by peeled logs supporting a log ceiling beam. Upon careful inspection, several of the prominently placed stones are actually petrified wood. **(Figure 23)** The hearth is stone.

ARG photo.

Figure 23: Stone mantel.

ARG photo.

Figure 24: First floor women's toilet room.

Doors on either side of the lobby fireplace lead to restrooms (rooms 101 and 102). **(Figure 24)** Each restroom has a vertical board wainscot, with celotex and battens above, two small washbasins, three toilet fixtures enclosed with wood stalls and a small radiator.

Directly off the lobby is a wood staircase also finished with log slab siding. To the east of the lobby is a conference room (room 104) with an adjacent file closet under the stair. Rooms 106, 108, 110, and 111 are offices and occupy the east portion of the structure off the central hallway. To the west of the central hallway are offices 109, 107, and 105. Aside from the main lobby there are few interior first floor finishes of note; other finishes include vertical, 1/4" plywood, non-historic wall finish, carpeting, fluorescent lighting, bathroom finishes, and acoustical tile ceiling. **(Figure 25)**

First Floor Alterations

As originally built, the first floor consisted of a lobby with the superintendent and assistant superintendent offices located directly to the east (presently the conference room and room 106). The lobby featured a fireplace at the north wall (extant) and a public counter along the south wall which has been infilled and reconfigured to accommodate an office (room 105). A door at the base of the stairway was removed. A ranger office, chief ranger office, and purchasing agent office occupied three rooms along the west front of the building. These offices have been reconfigured into present-day rooms 107 and 109. A hall separated the east and west spaces. A large general clerical department was located at the east end of the south wing. This space has been subdivided into rooms 108, 110 and 111.

The interior was remodeled in 1938 when the restroom addition was completed at the north elevation. The lobby, the 1938 restrooms, and the areas directly adjacent to the lobby are the only remaining interior areas retaining significant historic fabric. The original doors to all first floor offices were single lite over single panel. The original 1938 doors to the restrooms flank the fireplace. All other office doors at the first floor have been replaced.

ARG photo.

Figure 25: Typical first floor office interior.

First Floor Condition

The first floor spaces are in fair to good condition. The boiler pipes broke in 1976 and all of the interior finishes (celotex and batten), except in the toilet rooms and lobby, were replaced. The newer finishes in the structure are in good condition though not appropriate for the historic character of the structure.

Interior Second Floor

The second floor includes two small storage closets and a restroom directly north of the stair landing. The west side of the structure consists of four offices (rooms 205, 207, 209, and 221). The east side of the structure contains four offices (rooms 201, 206, 208, and 210). A centrally-placed corridor runs the length of the second floor from the stair landing to the south end. Interior finishes at the second floor include: historic celotex and battens; vertical, 1/4" plywood, non-historic wall finish; carpeting; florescent lighting; and acoustical tile ceiling.

Second Floor Alterations

Originally, the second floor consisted of a men's and women's restroom at the top of the stair. A small bedroom with a private restroom occupied the building's northeast corner. The telephone operator's office and terminal room were centrally located off the stair. The engineering office with a drafting and blue print room occupied the west front of the second floor. A large storage room was located at the south end, stretching from the east to west elevation, causing a termination in the central hall. The original janitor's closet adjacent to the stair has been reconfigured and is now accessed via room 209.

Most of the office doors have been replaced at the second floor; however, rooms 201, 202, 206, and 210 retain original single panel over single panel wood doors. Other changes include the removal of one bathroom, and installation of fluorescent lighting and new partitions in the office spaces. Rooms 201, 202, and 206 are the only second floor spaces that retain the original celotex and batten finishes. The original band of casement windows at the west elevation have been replaced with double-hung windows to accommodate the addition of an exterior awning. This change appears to have occurred early in the building chronology.

Second Floor Condition

The second floor spaces are in fair to good condition. When the boiler pipes broke in 1976, many interior finishes (celotex and batten) were replaced. However, several rooms still contain these finishes at the second floor. The newer finishes in the structure are in good condition, though not appropriate for the historic character of the structure.

Interior Attic

The unfinished attic of the building can be accessed from several openings at the second floor: one at the stair landing, one in room 210 and the other across the hall in room 211. The attic space contains various electrical wiring, conduit, ductwork, fan coils, insulation and the wood structural system. As it was not possible to walk through the attic, it was inspected from ladders at each opening. No signs of water infiltration, major roof leaks or structural problems were noted.

VI. TREATMENT AND USE

Ultimate Treatment and Use

This narrative discusses and analyzes the ultimate treatment and use of the structure as defined by the Grand Canyon National Park. Recommended treatment in general is to preserve the extant historic materials and features, but not to arbitrarily restore missing features unless they are highly characteristic and in need of treatment for other reasons, such as severe deterioration. Any proposed rehabilitation associated with new use will be carefully considered so that existing character-defining features of the site and buildings are maintained.

The Ranger Operations building has served various office functions since the Park Headquarters was relocated from this structure in 1957. It is no longer a public building (its original intended use), but houses the Ranger Operations for the park. It will retain this use in the future. Two issues arise from the current use: 1) The building retains a public appearance, yet there has been much discussion as to whether or not is should remain open to the public, and 2) The building is in need of added security as the rangers' firearms are stored within it and many of the office areas should not be accessible to the public.

In the recent past, the building has not been open to the public; the front door (at the west facade) has been locked and the south entrance has become the primary entrance for the rangers who occupy the building. However, as of June 2000, the front door has been re-opened and a staff person has been assigned to the lobby area to answer the questions of any visitors. **(Figure 26)** The public use of the


ARG photo.

Figure 26: Principal entrance, 10 July 2000.

primary lobby space is in keeping with the building's design. It would be awkward to insert desks and workspaces into this area, which should continue to serve a public function. The re-instatement of public access to the lobby does, however, raise issues for handicapped accessibility, as this primary entrance is accessed by exterior stairs. This issue is discussed in the "requirements for treatment" section of this document.

Public access further compounds the issue of security. Park security experts recommend the addition of security cameras and keyless entry systems at both exterior doors. Given the configuration of the lobby and stairway, it would be difficult to block public access to the second floor from the lobby. It may be possible to establish a completely secured area in the south wing of the building by adding doors to the south hallways at both the first and second floors.

Exterior Rehabilitation

Exterior rehabilitation should be undertaken to restore all of the damaged exterior surfaces that contribute to and define the building's historic character. Exterior elements that detract from the historic character, such as non-historic exterior doors, should be removed and replaced with elements more in keeping with the original design, as evidenced by historic drawings and photographs. Possible exceptions to this statement follow:

The metal awning at the second floor of the west facade is a non-contributing feature. **(Figure 27)**

ARG photo.

Figure 27: Double-hung wood sash window at Room 201. Note underside of awning outside window.

While it was added within the period of significance, its presence greatly alters the front facade appearance from the original design. It does provide much needed shade for the second floor during the summer months. From a purely historical view point, it should be removed, and the double-hung windows that it masks should be replaced with six-lite casements that match the originals. This decision, however, does not account for the comfort of the users who will continue to inhabit the building. Depending on the method of climate control chosen for the building rehabilitation (refer to the "alternatives for treatment" section of this document), it may be necessary to retain an awning at this location. The existing awning could be replaced with a retractable awning, to be extended only during the summer months. This solution would still preclude the restoration of the casement windows at this location, as casement windows would not be able to open to provide adequate ventilation when the awning was extended.

The south facade has been significantly altered since the building's original construction. While the lower level door is not original, is does provide a frequently used and necessary entrance to the building and should remain. This entrance could also be used as a proposed means of handicapped access to the building (see the "alternatives for treatment" section of this document). The exterior conduit and electrical boxes prevalent at the south elevation should be removed.

Other exterior work should be limited to maintenance and replacement, in kind, of deteriorated historic fabric. This work includes:

- Cleaning of exterior stonework with a restoration cleaner to remove biological growth and efflorescence.

- Minor stone repointing, taking care not to overpack the joints. Records from the 1984 repairs indicate that the following mortar mixture was used:
  7 parts no. 1 road sand or concrete sand, dark brown in color (pass through 1/4" mesh)
  1 part hydrated lime
  1 part gray portland masonry cement, type II
  These proportions should be verified with a sample of existing mortar prior to any repointing work.

- Renailing and caulking of exterior wood siding. Approximately 20% of the horizontal siding (at the first floor) and 10% of the vertical siding (at the second floor) will need complete replacement.

- Log elements such as outriggers, rafter tails, and decorative brackets are showing severe deterioration. As much as 50% of these elements should be replaced, in kind, with Ponderosa pine. As much as possible, deteriorated log ends should receive dutchman repair instead of complete replacement. All log elements, both old and new, should be treated with a boratic preservative prior to painting to deter future biological growth.

- All exterior wood elements should be repainted. Historic drawings and photographs do not clearly convey the original finish of the exterior siding and log elements. A paint analysis should be completed as part of the pre-design work to determine the original finishes. Regardless of the original finish, the current painted finish provided much needed moisture and sun protection for the exterior wood. The need for such protection should be weighed in deciding how to finish the exterior wood elements in the future.

- Windows should have all of their delaminating and flaking paint surfaces sanded and scraped. All sash and frames should be repainted to match the original color and repaired to operable condition. Additional rehabilitation work includes the installation of double-glazing and weatherstripping (refer to "alternatives for treatment"), the removal of interior storm sash and the installation of interior bug screens to match the original design. All hardware should be rehabilitated and replaced, in kind, where broken or missing.

- The original drawings indicate the roof was to be sheathed in wood shakes. However, early photographs of the structure show asphalt shingles laid in a diaper pattern. According to maintenance records, the roof was not re-surfaced with the extant wood shingles until 1983 or 1984. Given that this roofing material is over 15 years old and is exposed to severe winters, it is likely that it will need to be replaced soon. The roofing material over the toilet room addition, in particular, is showing significant biological growth and delamination from the sheathing beneath. **(Figure 28)** It is recommended that asphalt shingles, laid in a dutch diaper pattern, be used when the building is reroofed. Though this is not the material specified in the original construction documents, and its


ARG photo.

Figure 28: Roofing over toilet room addition. Some wood shingles are slipping at ridge line.

installation will change the current appearance of the structure, it is representative of the original material used on the building. Further, this material offers greater fire resistance, durability, and ease of maintenance than wood shingles or shakes. After replacement, debris should be removed from the roof on a regular maintenance schedule to reduce the potential for biological growth.

Interior Rehabilitation

Historic drawings and photographs convey the primary importance of the building's lobby, with its rough-hewn log walls and scored concrete floors. This area retains many of its original finishes, but its integrity has been diminished with the addition of an office partition, carpeting, a soda vending machine and water fountain. These elements should be removed and the room restored to its original configuration and finishes, including the scored concrete floor.

With the exception of rooms 101-103, 201-203, and 206, the configuration and interior office finishes are not original. As a result, there is the potential to reconfigure office spaces to meet the needs of the current program. All of the non-historic wall and ceiling finishes should be removed and new finishes, in keeping with the original celotex and batten system, should be installed. Unfinished gypsum board can replicate the appearance of the celotex without sacrificing any fire protective qualities. Historic paneled wood doors at rooms 201, 203, 206, and 210 should be retained and refinished and replications of the original doors should be re-installed at all other locations.

The first floor flooring: concrete slab on grade, should remain carpeted, with the exception of the lobby, where the original scored concrete surface should be exposed. The condition of the lobby floor is unknown, as the extant carpet is laid over several layers of carpet glue. Some refinishing of the slab may be required. At the stair and the second floor, however, the original Douglas fir flooring is extant under the carpeting and should be refinished and exposed (several layers of carpet glue will need to be stripped from all wood floors). Area rugs or runners, placed over the hardwood floors, could be used in the offices or hallways if a carpeted finish is desired. Baseboards to match the original 1x6 Douglas fir boards with 1/4" round cedar trim should be reinstalled at all rooms.

Lastly, the utility tunnels underneath the north end of the building are subject to seeping groundwater. **(Figure 29)** At times, water in the tunnels has risen to a depth of 24 inches. A drain should be installed at the low end of the tunnels to allow the water that enters between the surrounding rock strata and top soil to drain back out to the surrounding soil.

Additional measures needed to make the structure comply with current building codes are described under "requirements for treatment" below.

ARG photo.

Figure 29: Utility tunnel. Standing ground water was measured to a depth of 24" in May, 2000.

Requirements for Treatment

In concise terms, this text outlines applicable laws, regulations, and functional requirements. Specific attention is given to issues of handicapped accessibility, human safety, fire protection, energy conservation, and abatement of hazardous materials.

The rehabilitation design shall conform to NPS cultural resources policies and guidelines and will be reviewed for compliance with the GMP, NEPA, Section 106 of the NHPA, and all applicable codes and standards required by law and NPS policy. The building codes used for analysis include the 1997 Uniform Building Code (UBC), 1997 Uniform Code for Building Conservation (UCBC), and Uniform Federal Accessibility Standards.

The treatments recommended in this report will have effects on the cultural resource; however, it is intended that the treatments will result in benefits providing for a higher level of resource preservation than is now provided. Some proposed work will include actions that could be considered to have negative effects. For example, installation of additional means of emergency egress will require some removal of building fabric and reorganization of spaces. One of the most important design criteria, however, is that the modifications be designed to minimize these effects, both physically and visually. Those negative effects will be mitigated by providing an improved environment for the building preservation and the safety of its users. Further evaluation will be necessary when the recommendations are developed to a level of design detail specific enough to definitively identify particular building fabric impacts.

Accessibility

To meet code requirements, an accessible path of travel needs to be provided to an accessible exterior entry. As the west entry is accessed by steps, the south entry most readily lends itself to this upgrade. A paved, accessible path of travel would need to be established from adjacent parking areas to the south entry door and the door re-fitted with lever-type hardware. If this entry is secured with an alarm and keyless entry system, a doorbell will need to be provided. The west (front) entry could be made accessible by adding an exterior ramp; the stone steps would have to be demolished and re-built to accommodate clearance for the ramp landing. This would be a highly visible and intrusive change to the historically-significant front elevation. However, as the west entry is the historic public entry and historic circulation pattern, there are benefits to modifying it for continued, accessible public use. Both solutions are viable and should be further evaluated during the design phase.

The building does not have any accessible toilet rooms and the second floor of the building is inaccessible to anyone with mobile disabilities. Because of the small area of the upper floor, it is not possible to provide elevator access to the second floor without substantially altering the historic floor plan and, as the second floor of the building does not have any public spaces, it is proposed to provide access to the first floor of the building only. Toilet rooms, public meeting spaces, and offices will all be provided at the first floor. There will not be any functions at the second floor that are not also accommodated at the first.

Both men's and women's toilet rooms at the first floor should be upgraded to meet ADA standards. This will include widening the restroom doorways, thereby removing two existing historic doors. These doors should be relocated elsewhere in the building, where historic doors are missing. Widening the restrooms will also involve installing new doors with lever hardware and converting the existing three-person toilet rooms into single-person accessible toilet rooms. The toilet rooms at the second floor will not be ADA accessible. At present, there is only one toilet room at the second floor (there were originally two). A restroom will need to be reinstalled at room 202 due to the reduced number of fixtures provided at the first floor after ADA upgrade.

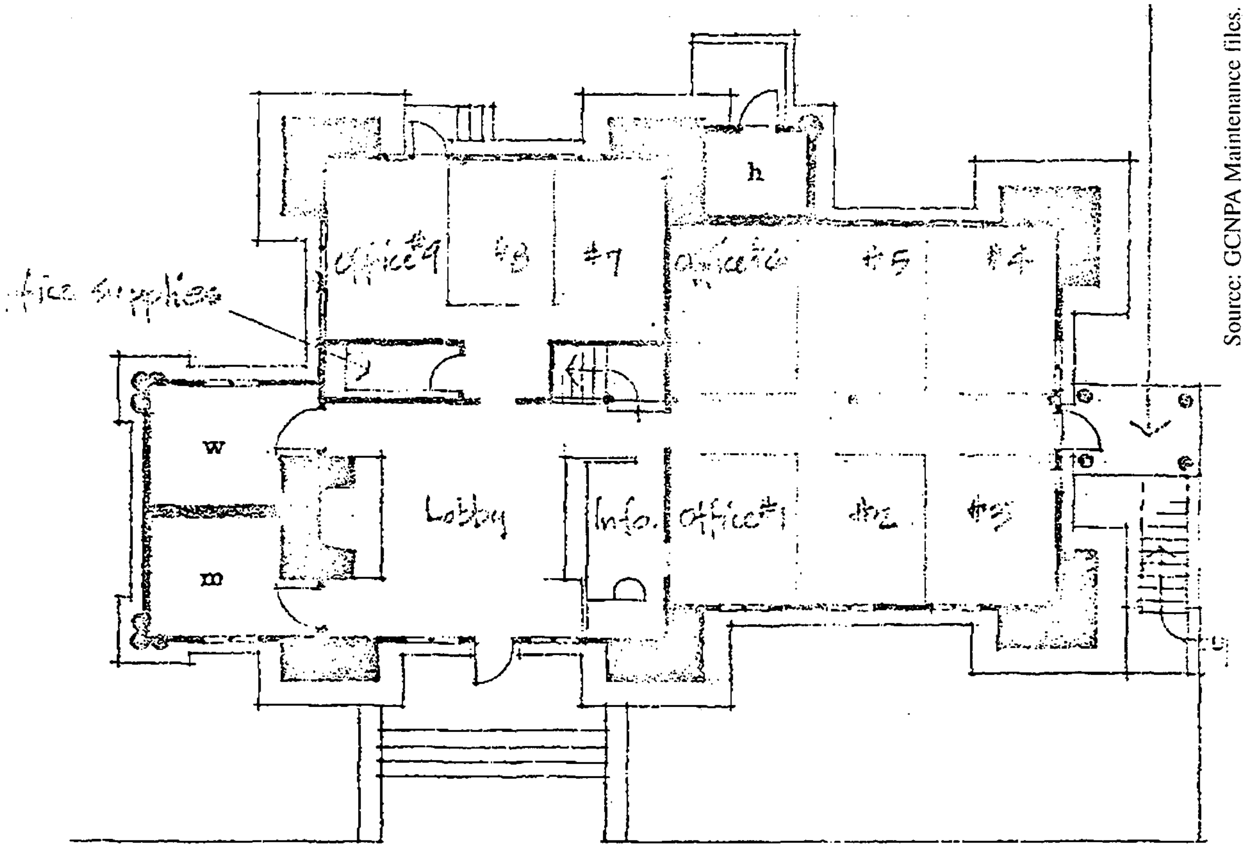
Egress (Human Safety)

The Uniform Building Code (UBC) mandates that dead-end corridors not exceed 20 feet in length. The corridor at the south end of the second floor exceeds this requirement. Further, a secondary means of egress is not provided from the second floor. Providing an exit at the south end of this corridor would solve both issues.

Providing a secondary means of egress from the second floor was an issue addressed early in the building's history. A 1935 photograph of the vault addition at the east side of the building shows a metal fire escape exiting out of the second floor window above the vault with a metal ladder from the vault roof to grade. **(Figure 30)** This secondary means of egress has since been removed. A 1974 study suggested creating a secondary means of egress from the south end of the second floor by creating a third opening between the two windows at the second floor. This opening would exit out onto the roof of a proposed porch addition at this side. A stair at the west side of the porch would provide access to grade.

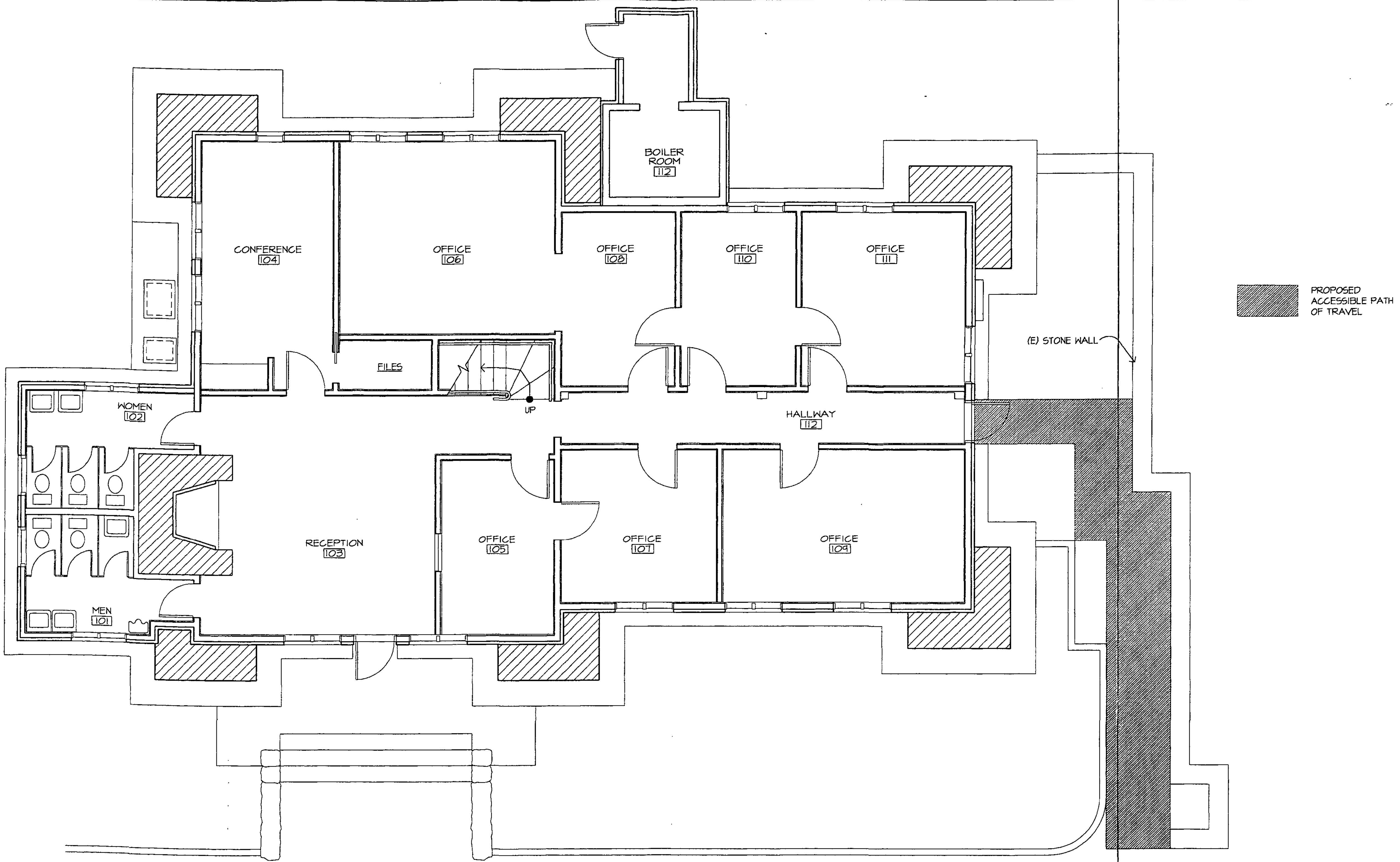
The existing interior stair is configured as a winder and the tread width does not meet minimum code requirements. As the Uniform Code for Building Conservation (UCBC) allows existing stairways to have risers and treads at variance with general code requirements, these aspects of the stair can remain unchanged. Code-mandated 6'-8" clear headroom is not provided at the winder landing. This issue can be easily addressed by raising the floor height of the closet directly above the landing. The existing handrails should be replaced with code-complaint ones, in keeping with the aesthetic of the originals.

Per code requirements, handrails need to be added at the exterior steps, at the west facade.



Source: GCNPA Maintenance files.

Figure 30: Sketch for secondary means of egress from south end of structure, 1974.

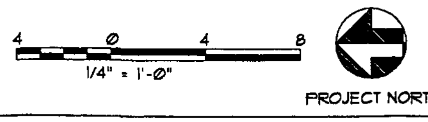


FIRST FLOOR PLAN

SCALE Ⓙ

ARCHITECTURAL RESOURCES GROUP

SCALE Ⓙ



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TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.

TITLE OF SHEET

ACCESSIBLE ENTRY SCHEME 1

RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

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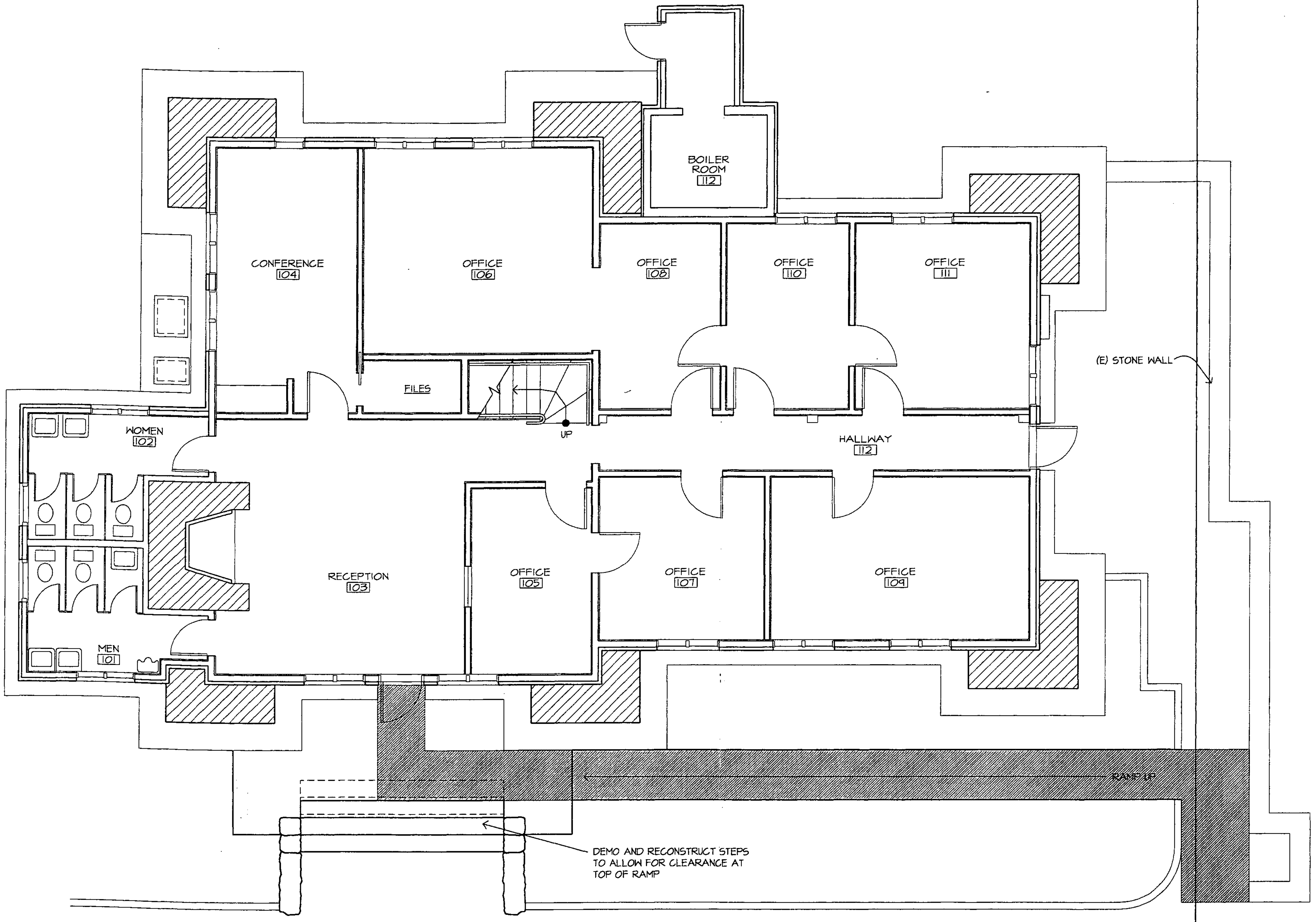

▨ PROPOSED ACCESSIBLE PATH OF TRAVEL

FIRST FLOOR PLAN
A-A-
SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

DESIGNED: WH DRAWN: WH TECH. REVIEW: WH DATE: 10/24/2000	SUB SHEET NO.	TITLE OF SHEET ACCESSIBLE ENTRY SCHEME 2 RANGER OPERATIONS GRAND CANYON NATIONAL PARK	DRAWING NO. —— PKG. NO.	SHEET – OF —

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Fire Protection

The building is equipped with a new fire detection system, but is unsprinklered. The installation of a sprinkler system is not required by code, but is NPS policy to sprinkle historic buildings when they are rehabilitated. According to NPS Director's Order 50B, section 12, article 12.2.A.6, "...buildings undergoing renovation ... will have automatic sprinkler system protection and automatic fire detection.". A dry-pipe system is recommended due to the potential for pipe freezing in the attic. Because the majority of the extant ceiling finishes are not original, flush-type sprinkler heads should be acceptable at most locations. Sidewall sprinklers should be considered in the few rooms that retain original finishes. The building is in an area prone to lightning strikes, increasing the risk of fire. The addition of a lightning rod is recommended for the safety of both the inhabitants and building.

Energy Conservation

Currently, heating the building is highly energy consumptive and interior temperatures cannot be maintained at a comfortable level. There is no existing cooling system for the hot summer months. In particular, the offices at the west side of the building receive the brunt of summer heat. Interior temperatures can be addressed in part by installing insulation at the exterior walls and attic as well as venting the attic space. It is recommended that the hydronic heating system be rehabilitated to meet winter heating needs. As none of the original radiators are extant, new radiators will need to be installed throughout. The addition of a forced air conditioning system to the building would be highly intrusive; many of the cooling issues could be addressed with operable windows and double glazing (which would prevent both summer heat gain and winter heat loss). The addition of weather-stripping at the exterior windows would also solve some of the air infiltration and indoor temperature issues. Abandoned fan coil units and ducting in the attic space should be removed.

Shading at the west facade will continue to be an issue, especially if a forced air system is not installed. The awning at this location currently provides the needed shade, but greatly alters the appearance of the building. Historic photographs show more vegetation at the west facade than currently exists. Increased, tall vegetation at this location may provide the necessary shade without the presence of the awning. This, however, is a long-term solution, as it would be many years before new vegetation would be large enough to provide necessary shade. Both of these options should be investigated in the design phase of any rehabilitation project.

In general, all of the utilities are aged and in need of upgrade. The electrical service should be upgraded to 120/208V three phase with underground service to meet current NPS standards. A single-main disconnect should be installed to replace the existing two-fused disconnect. Isolated ground receptacles should be installed for computer use. Refer to Appendix H, Pre-Design Report, for a more complete description of the existing conditions of the electrical, mechanical and plumbing systems.

Abatement of Hazardous Materials

Remnants of pipe insulation in the attic and in the chase above the first floor suspended ceiling may contain asbestos, and lead based paints are most likely found throughout the interior and exterior of the building. A Level I HAZMAT testing program is recommended for the entire building.

Other

The wood and celotex finishes in the toilet rooms are original, character defining features. Unfortunately, these finishes do not meet current code requirements for non-pourous finishes. It may be possible for these finishes to remain if coated with a durable, washable paint coating, and well sealed where they meet the ground.

A building security system must be installed due to the storage of ammunition within the building. The extent of this system shall be determined during the programming phase of the proposed design work.

Alternatives for Treatment

This section presents and evaluates alternative approaches to realization of the ultimate treatment. Alternatives are presented in both text and graphic form. Analysis addresses the adequacy of each solution in terms of impact on historic materials, effect on historic character, compliance with NPS policy, and other management objectives.

Egress (Human Safety)

Because the second floor is currently occupied by park rangers, who by job description must be physically fit and agile, the 1999 pre-design study for this building proposed to merely add a folding metal exit ladder from one of the second floor windows at the south end for emergency egress. The ladder, housed on the side of the building, would not greatly alter the exterior appearance of the building. This approach does not provide compliance with UBC requirements but would be allowable under the UCBC if approved by a building official. This solution would, however, require some reconfiguring of the interior spaces at the south end of the second floor. Both windows at this end of the building are currently located within office spaces. Exiting a building via an office, which has the potential to be locked in the event of an emergency, is not code compliant. In order to provide emergency egress through a window, the window must open into a hallway. The existing hallway would need to be reconfigured at the south end to incorporate one of the windows into it. This solution would remove one window and its related light from one of the offices and create an odd configuration at the end of the hallway.

While the proposed 1974 option, with the central exit and exterior porch would greatly alter the appearance of the south facade, it would create a much more pleasing interior arrangement and a code-compliant exit condition. Depending on the park's goals, such a solution may also improve the appearance of the already altered south facade. As this is a highly visible facade, such an addition would have a great impact (see egress scheme #2). In contrast, the addition of a secondary egress at the east side of the building would be hidden from general view. An interior hallway would need to be extended to this exit, removing some of the second floor office space (see egress scheme #3). All are viable solutions. The addition of a metal drop ladder would be the least expensive and render the smallest impact on the building's historic fabric, but provides a considerably lower level of public safety.

Energy Conservation

The building is currently served by an outdated, unreliable hydronic heating system that does not provide adequate heat in the winter months. There is no mechanical cooling system and minimal attic insulation. The building was constructed with operable windows, with screens, to allow for maximum air flow and natural cooling. The addition of interior storm sash, to further regulate interior temperatures during the winter months, has reduced the amount of available air flow through open windows and results in higher interior summer temperatures.

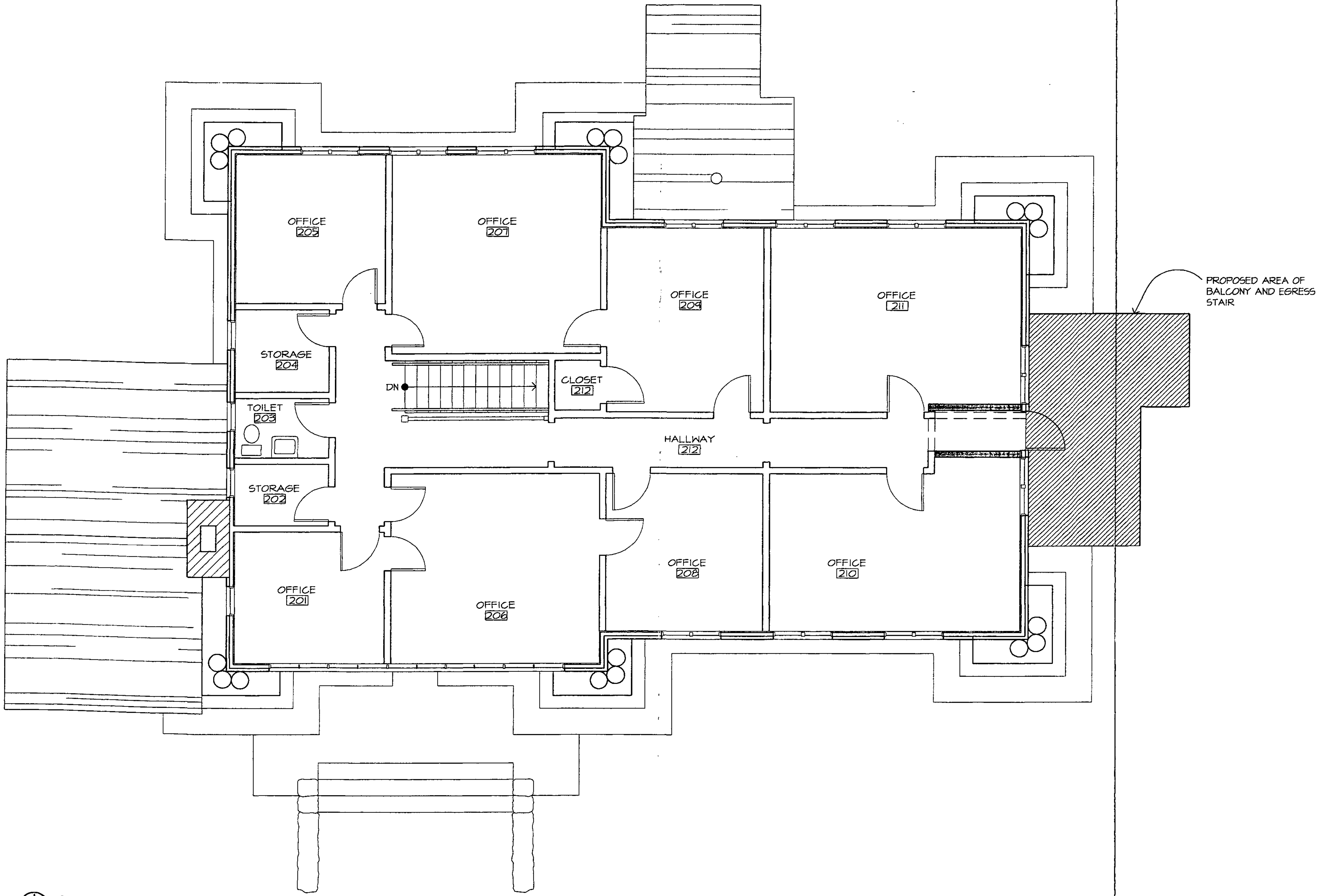
The 1999 pre-design study **(Appendix G)** proposes re-glazing the existing wood sash with double glazing and installing weather-stripping as a means to eliminate the need for interior storm sash. With this retrofit, the windows could again be fit with screens and remain operable for maximum summer airflow. The addition of relief fans and vents in the attic would also help to naturally cool the building.

The pre-design report also recommends rehabilitating the hydronic heating system. It is believed that such a system, along with double-glazed and weather-stripped windows and insulated exterior walls and ceilings, would enable the building to maintain a comfortable environment during cold weather.

Preliminary investigations indicate that the historic wood sash are thick enough to accommodate new thermal double glazing. The addition of such glazing would minimally affect the exterior appearance of the building by removing the historic glazing. Window hardware, specifically hinges, may also have to be replaced due to the increased weight of the glazing units.

Installing double glazing will require the removal of the historic glazing in the sash. While it may be desirable to retain this historic material, it would be impossible to establish a vacuum seal between the historic glazing and new glazing within the window sash. Without a vacuum seal between the two panes, dirt and moisture could become trapped between the glazing panels, resulting in maintenance and aesthetic issues.

With the exception of the window glazing and hardware, and addition of gable-end attic relief vents, the proposed solutions minimally impact the historic fabric of the building. The alternative of providing a building-wide, forced-air heating and cooling system would be much more expensive and detrimental to the remaining, intact historic interior spaces.



SECOND FLOOR PLAN
A-A- SCALE Ⓙ

NOTE:
FOR EGRESS SCHEME #1, REFER TO APPENDIX H,
PRE-DESIGN REPORT

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.

TITLE OF SHEET
EGRESS SCHEME 2
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

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OF

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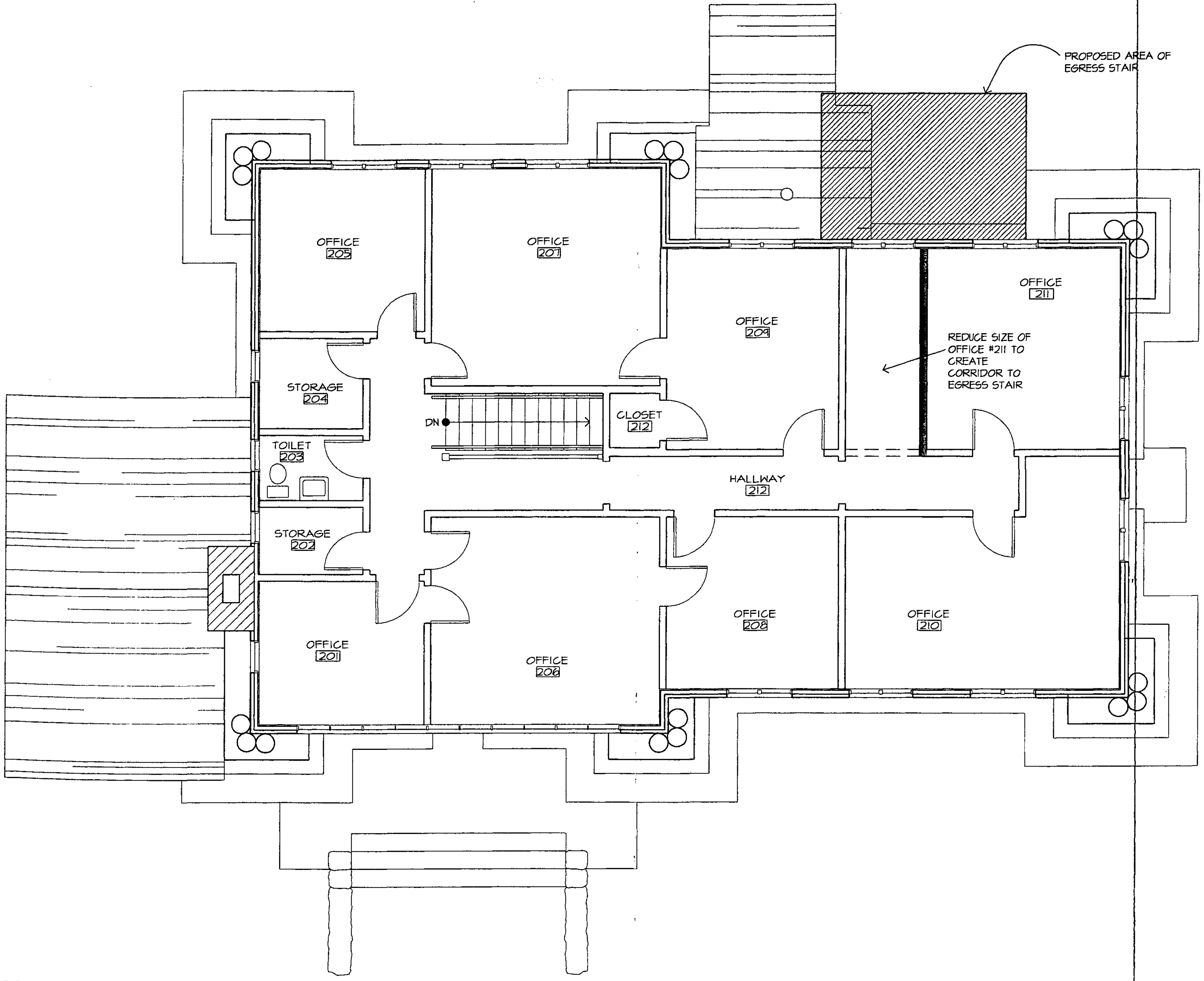

SECOND FLOOR PLAN

A-A- SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.

TITLE OF SHEET
EGRESS SCHEME 3
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

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VII. BIBLIOGRAPHY

Advisory Council on Historic Preservation. *Introduction to Federal Projects and Historic Preservation Law: Participants Desk Reference*. January, 1993.

Albright, Horace M., and Robert Cahn. *The Birth of the National Park Service: The Founding Years, 1913–33*. Salt Lake City: Howe Brothers, 1985.

Albright, Horace M., and Marian Albright Schenck. *Creating the National Park Service: The Missing Years*. Norman: University of Oklahoma Press, 1999.

Chappell, Gordon. "Railroad at the Rim." *Journal of Arizona History*. Spring 1976.

Chappell, Gordon. *National Register Nomination*. Grand Canyon Village Historic District. May 10, 1975.

Chappell, Gordon; Michael P. Scott; Robbyn Jackson; Jamie Donahoe; Susan Begley; and Ethan Carr. *National Historic Landmark Nomination*. Grand Canyon Village. September 13, 1996.

Dana, William S. B. *The Swiss Chalet Book*. New York. W. T. Comstock Co., 1913.

Darling, F. Fraser, and Noel D. Eichhorn. *Man and Nature in the National Parks: Reflections on Policy*. 2nd ed. Washington, DC: Conservation Foundation, 1969.

Dilsaver, Larry M., ed. *America's National Park System: The Critical Documents*. Lanham, MD: Rowman & Littlefield, 1994.

Everhardt, William C. *The National Park Service*. Boulder, Colo.: Westview Press, 1983.

Foresta, Ronald A. *America's National Parks and Their Keepers*. Washington: Resources for the Future, 1985.

Good, Albert H. *Park and Recreation Structures*. Boulder: Graybooks 1991 (reprint of 1938 NPS version).

Grand Canyon National Park Archives and Maintenance Records.

Grattan, Virginia L. *Mary Colter: Builder Upon the Red Earth*. Flagstaff: Northland Press, 1980.

Handlin, David P. *American Architecture*. New York: Thames and Hudson, 1985.

Harrison, Laura Soulliere. Architectural Historian, NPS Southwest Office. *National Historic Landmark - Architecture in the Parks*. Introduction and Grand Canyon Park Operations Building (Building 103), 1986.

Hughes, J. Donald. *In the House of Stone and Light: Introduction to the Human History of the Grand Canyon*. Denver: University of Denver and Grand Canyon National Park Association, 1997.

Ise, John. *Our National Park Policy: A Critical History*. Baltimore: Johns Hopkins University Press, 1961.

James, George Wharton. *Grand Canyon and How to See It.* Boston: Little Brown & Company, 1910.

Manns, Timothy and Elizabeth Dillon Smith. *A Guide to the Grand Canyon Village Historic District.* Grand Canyon Natural History Association, no date.

Mather, Stephen T. *Progress in the Development of the National Parks.* Washington, D.C.: GPO, 1916.

McClelland, Linda Flint. *Building the National Parks: Historic Landscape Design and Construction.* Baltimore: Johns Hopkins, 1998.

McClelland, Linda Flint. "Thomas Chalmers Vint." in *Pioneers of American Landscape Design: An Annotated Bibliography.* edited by Charles A. Birnbaum. Washington, D.C.: National Park Service, 1995.

Madrid, Christine L. *The Mission 66 Visitor Centers 1956-1966: Early Modern Architecture in the National Park Service.* Master's Thesis University of Virginia, School of Architecture, May 1998.

Merk, Frederick. *History of Westward Movement,* 1978.

Nash, Roderick. *Wilderness and the American Mind.* New Haven: Yale University Press, 1973.

Newton, Norman T. *Design on the Land: The Development of Landscape Architecture.* Cambridge: Harvard University Press, 1971.

Olmsted, Frederick Law, Sr. "The Distinction between National Parks and National Forests." *Landscape Architecture* 6, no. 3 (1916): 115-16.

Pray, James Sturgis with Robert B. Marshall. "The American Society of Landscape Architects and Our National Parks." *Landscape Architecture* 6, no. 3 (1916).

Rifkind, Carole. *A Field Guide to American Architecture.* New York: The New American Library, 1980.

Swain, Donald C. *Wilderness Defender: Horace M. Albright and Conservation.* Chicago: University of Chicago Press, 1970.

Tishler, William, ed. *American Landscape Architecture: Designers and Places.* Washington, D.C.: Preservation Press, 1989.

Tweed, William C., Laura Soulliere, Henry G. Law. *National Park Service Rustic Architecture: 1916-1942.* National Park Service, Western Regional Office, February, 1977.

Whiffen, Marcus. *American Architecture Since 1780: A Guide to the Styles.* Cambridge: The MIT Press, 1969.

Wirth, Conrad L. *Parks, Politics, and the People.* Norman: University of Oklahoma Press, 1980.

United States Department of the Interior. National Register of Historic Places. *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation.* Revised 1995.

United States Department of the Interior. National Register of Historic Places. *National Register Bulletin 39: Researching a Historic Property.* 1991.

VIII. ENDNOTES

[1] Director's Order 28.

[2] National Park Service, *National Historic Landmarks.*

[3] Chappell, Gordon; et al. *National Historic Landmark Nomination.* Grand Canyon Village. September 13, 1996. p. 57-58.

[4] Information on the native inhabitants of the Canyon is summarized from J. Donald Hughes' *In the House of Stone and Light.*

[5] Information on Spanish exploration of the Canyon is summarized from J. Donald Hughes' *In the House of Stone and Light.*

[6] Tweed, Wm. C., Laura E. Soulliere, and Henry G. Law, *National Park Service Rustic Architecture: 1916-1942*, NPS Western Regional Office, 1977. p. 23.

[7] Tweed, et al. p. 24.

[8] McClelland, Linda Flint. *Building the National Parks: Historic Landscape Design and Construction.* Baltimore: Johns Hopkins, 1998. p. 11.

[9] McClelland, p. 291.

[10] McClelland, p. 81.

[11] McClelland, p. 165.

[12] Chappell, Gordon; et al. *National Historic Landmark Nomination.* Grand Canyon Village. September 13, 1996. p.6.

[13] Good, Albert H. *Park and Recreation Structures.* Boulder: Graybooks 1991 (reprint of 1938 NPS version). p. 57.

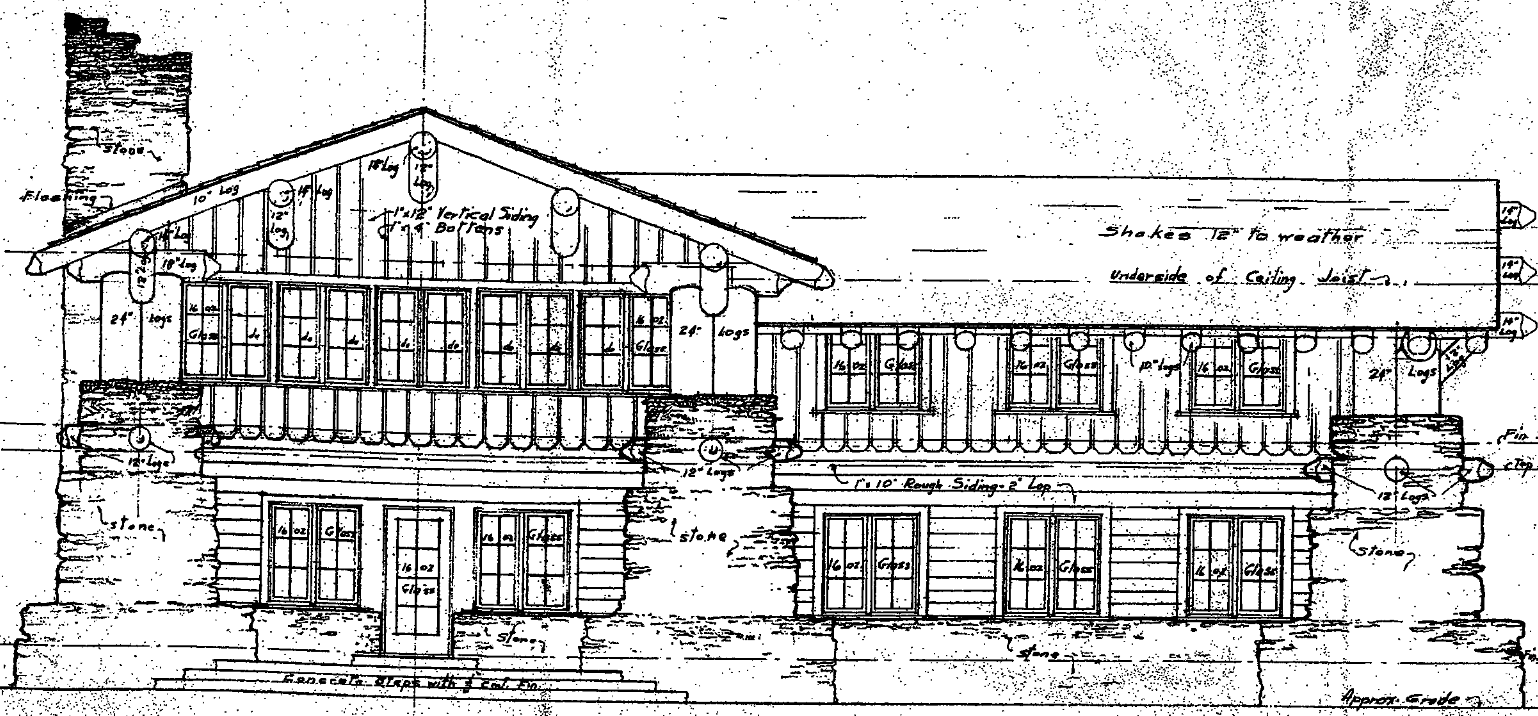
[14] McClelland, p. 330.

IX. APPENDICES

Appendix A.	Eight Original Drawings of Elevations, Plans, Sections, and Details, by Thomas C. Vint, all dated April 4, 1928. Original Drawing of Vault Addition, by William G. Carnes, Deputy Chief Architect, dated April 22, 1935.
Appendix B.	Existing Conditions Drawings of Plans, Elevations, and Section, by Architectural Resources Group, dated July 28, 2000.
Appendix C.	Plans illustrating Areas of Significance, specifically primary, secondary and tertiary spaces, by Architectural Resources Group, dated July 28, 2000.
Appendix D.	Drawings illustrating locations of original walls retaining historic fabric within the Ranger Operations Building, dated July 28, 2000.
Appendix E.	Historic Photographs of the Ranger Operations Building in Chronological Order
Appendix F.	Potential Seismic Hazard Assessment by Sato and Associates, dated October 1998.
Appendix G.	National Historic Landmark Nomination for the Grand Canyon Village, dated September 13, 1996. (Due to document length, only the Statement of Significance is included.)
Appendix H.	Pre-Design Report by Architectural Resources Group, December 20, 1999.

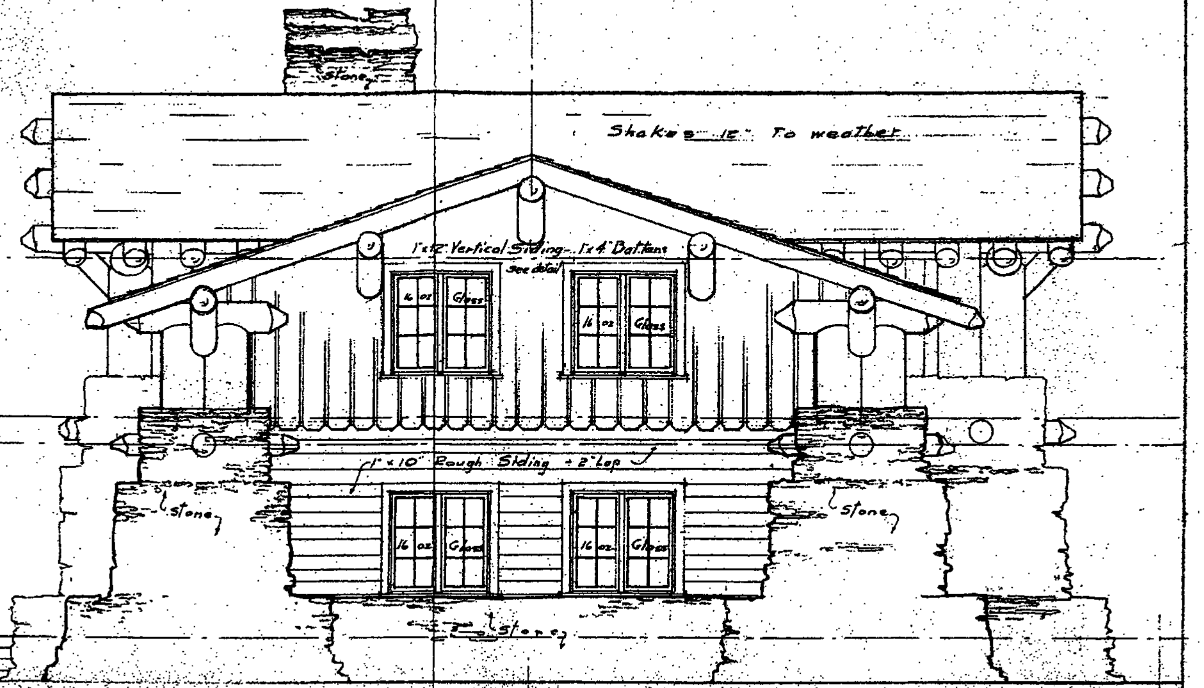
Appendix A. Eight Original Drawings of Elevations, Plans, Sections, and Details, by Thomas C. Vint, all dated April 4, 1928.

Original Drawing of Vault Addition, by William G. Carnes, Deputy Chief Architect, dated April 22, 1935.

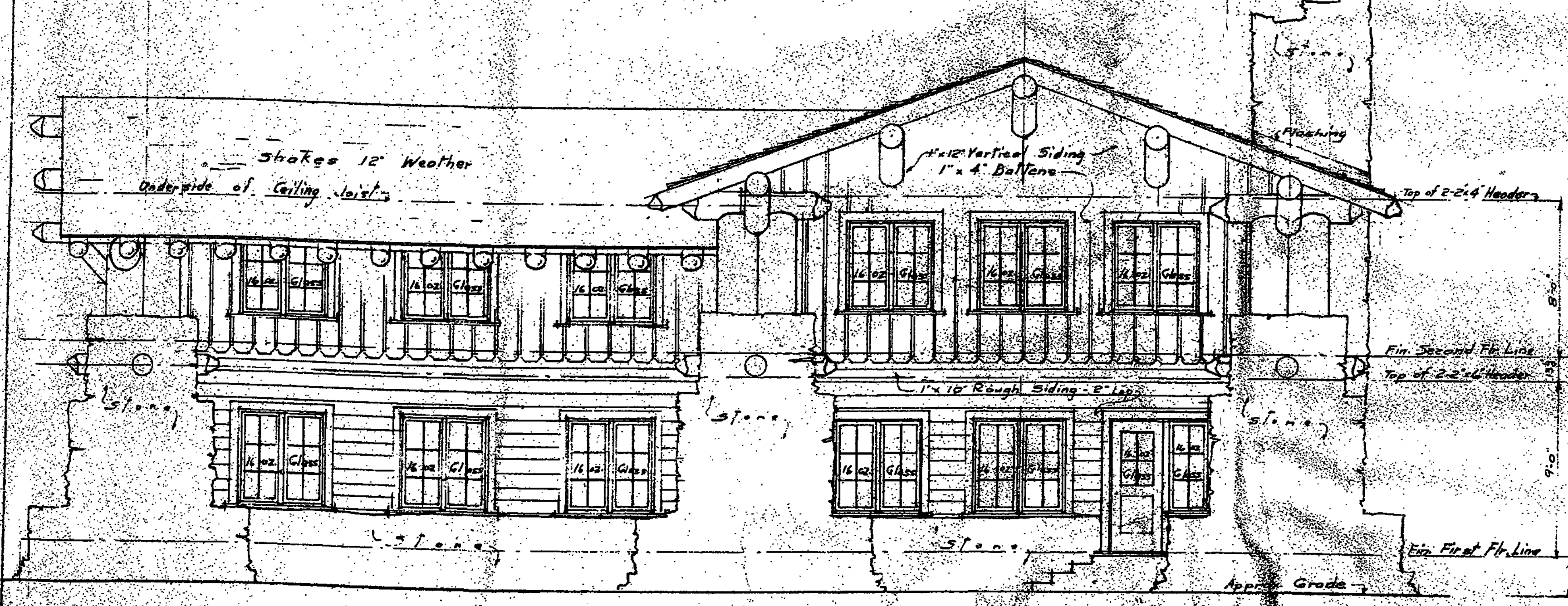


NORTH SIDE ELEVATION
Scale: ¼"=1'-0"

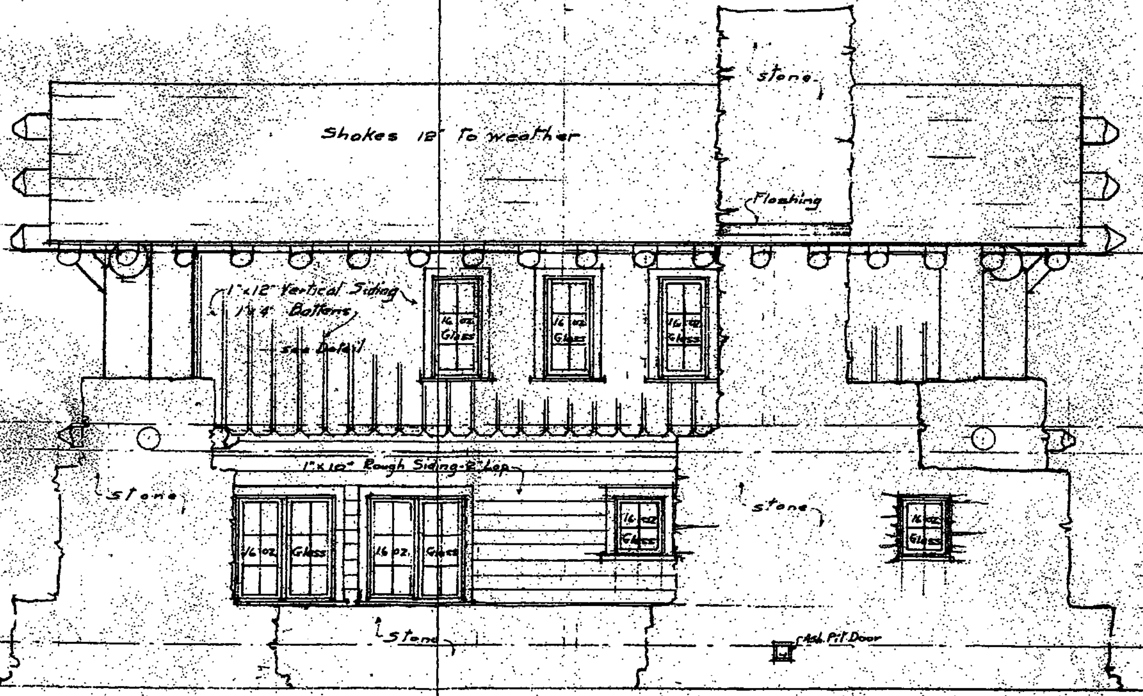
NOTE: REFER TO DETAILS SHOWN ON OTHER SHEETS



WEST END ELEVATION
Scale ¼" = 1'-0"



SOUTH SIDE ELEVATION
Scale ¼" = 1'-0"



EAST END ELEVATION
Scale ¼" = 1'-0"

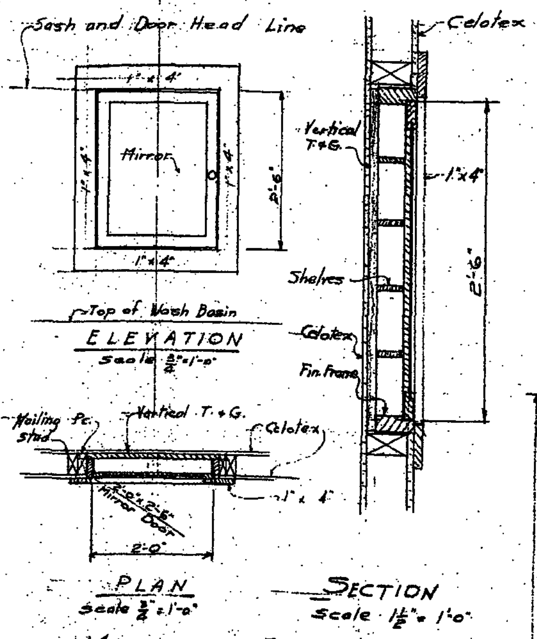
1
GC89

Dr. By-H.D.K.
Tr. By-H.D.K.
Ck. By-E.A.D.

Recommended Thos. C. Vint
Landscape Engineer
Concurred
Superintendent
Approved
Asst. Director N.P.S.

Dat

DEPT. OF INTERIOR NAT'L PARK SERVICE
GRAND CANYON NAT'L PARK
ADMINISTRATION BUILDING
DRAWN BY LANDSCAPE ENG. DIVISION

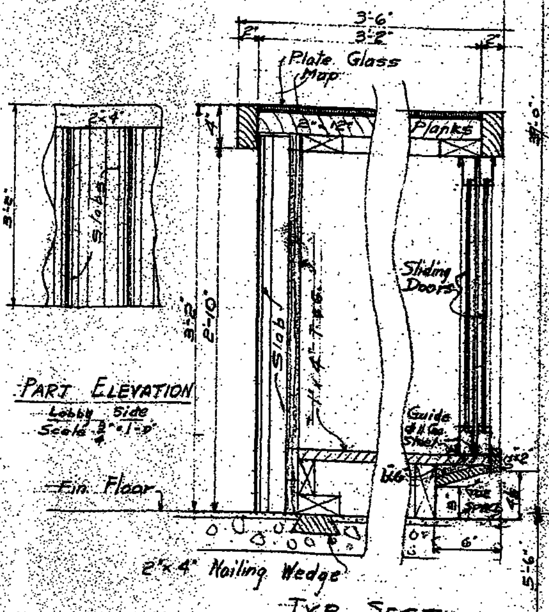


ELEVATION
Scale 3/4"=1'-0"

PLAN
Scale 3/4"=1'-0"

SECTION
Scale 1½"=1'-0"

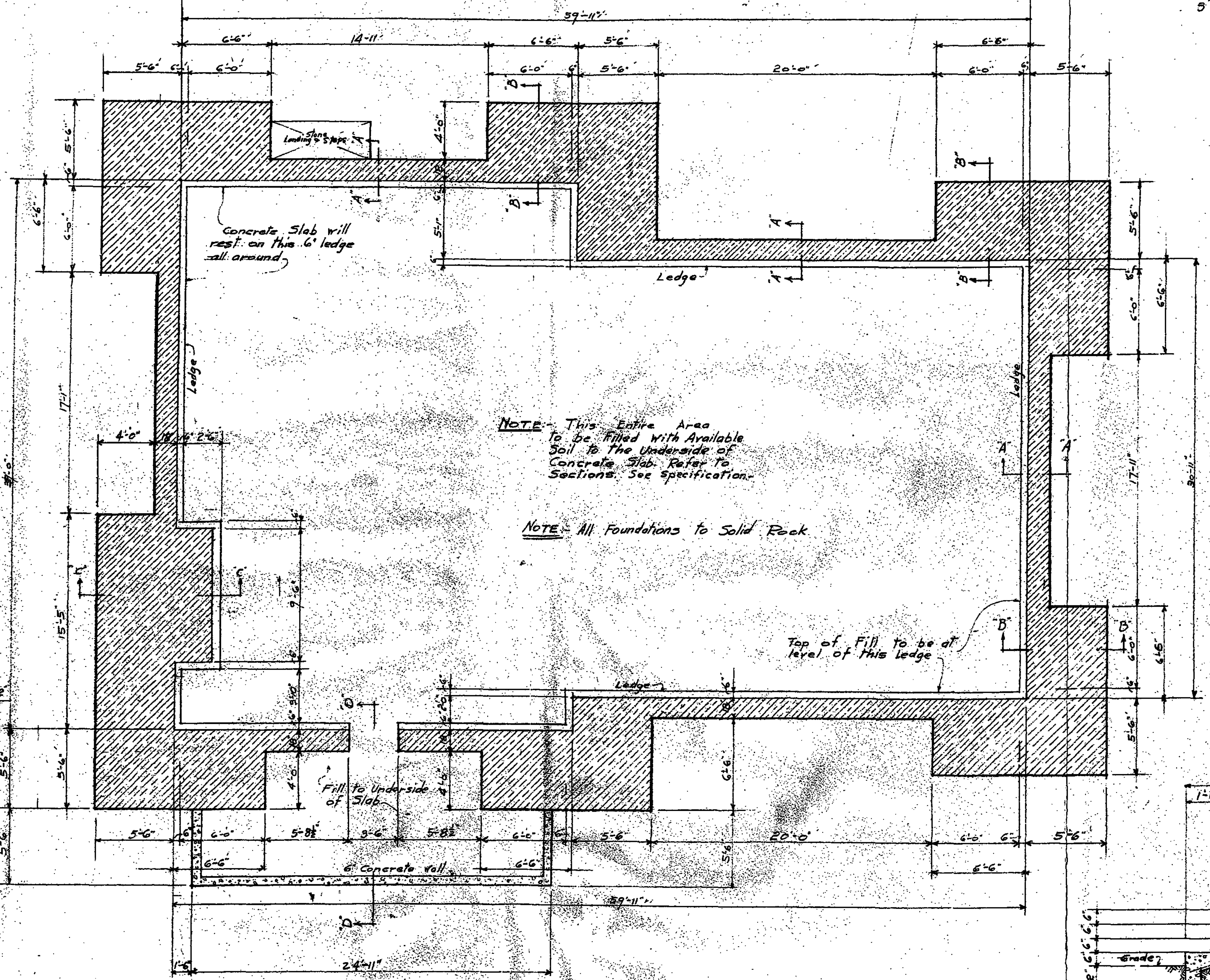
MEDICINE CABINET



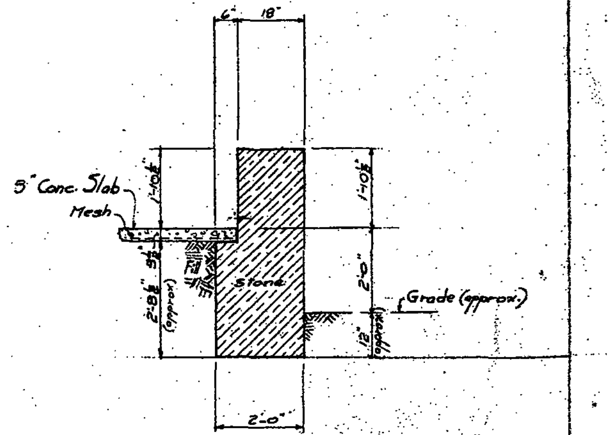
PART ELEVATION
Lobby Side
Scale 3/4"=1'-0"

TYP. SECT.
Scale 1½"=1'-0"

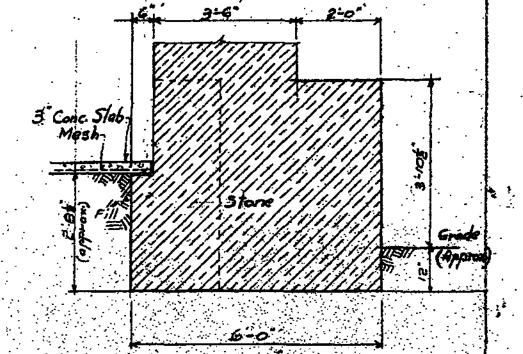
MAP COUNTER DET.



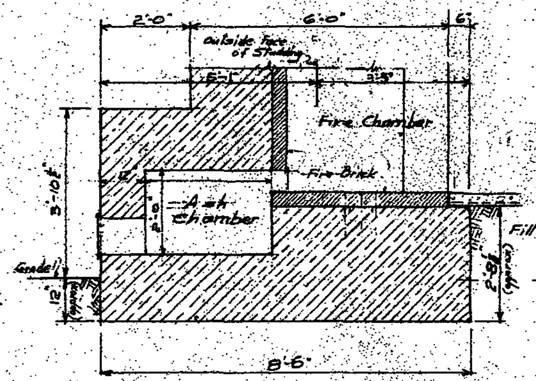
FOUNDATION PLAN
Scale 1/4"=1'-0"



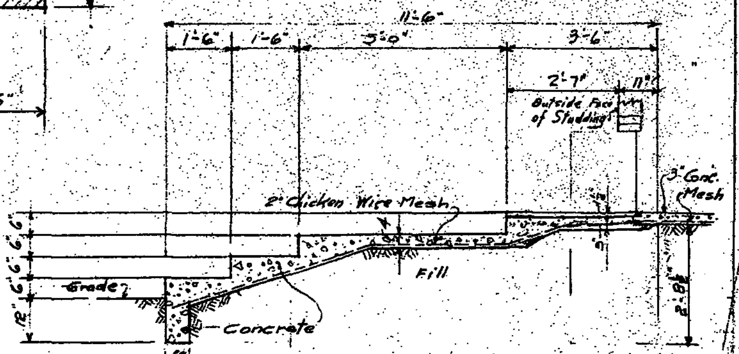
SECT. "A-A"



SECT. "B-B"



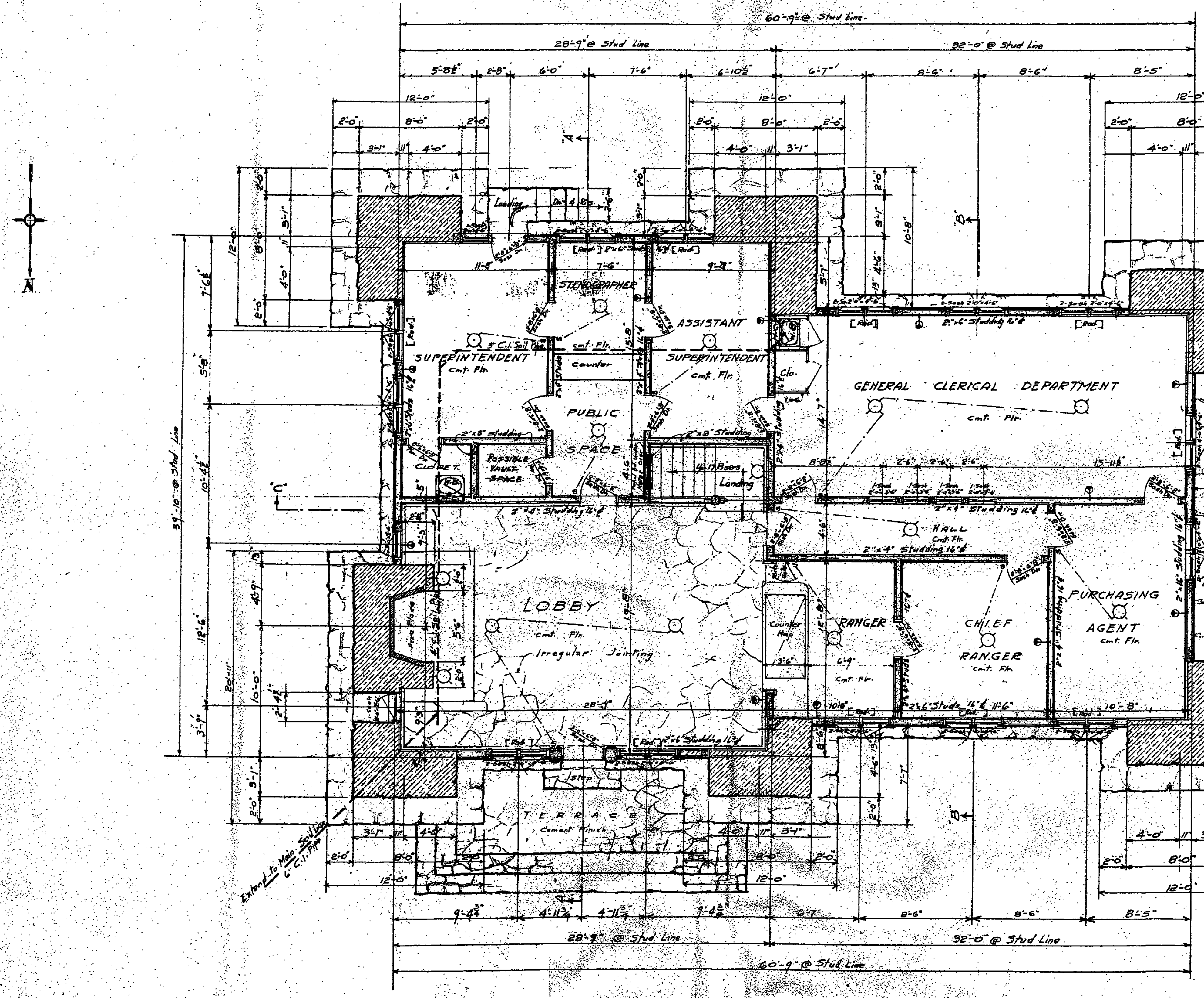
SECT. "C-C"



SECT. "D-D"
Scale ½"=1'-0"

②
G.C. 89

Dr. By - H.D.K. Tr. By - H.D.K. Ch. By - E.A.D.	Recommended Thos. C. Vint Landscape Engineer Date 4/5/28 Concurred Superintendent Date 4/9/28 Approved Director N.P.S. Date 4/14/28	DEPT. OF INTERIOR NATL. PARK SERVICE GRAND CANYON NATL. PARK ADMINISTRATION BUILDING DRAWN BY LANDSCAPE ENG. DIVISION



FIRST FLOOR PLAN

Scale 1/4"=1'-0"

Note: At 1st Story only
Studding in exterior walls are 2"x6"
" " interior " " 2"x4"
T+G. Partitions as marked on plan
2"x3" Studding " " " "

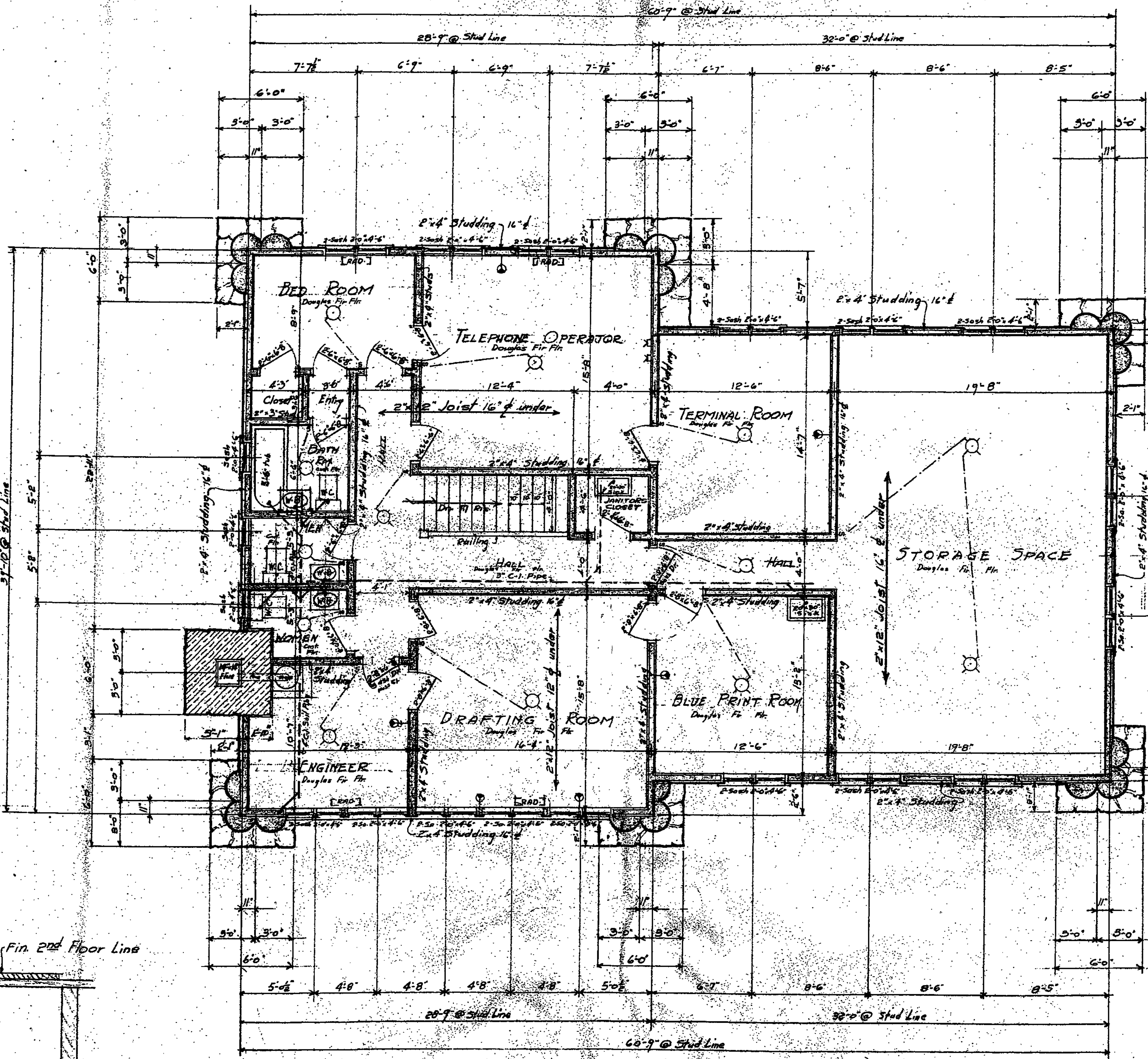
GENERAL LEGEND

- ⊗ Ceiling Outlet (Electrical)
- Bracket Outlet (")
- Convenience Outlet (")
- Steam Radiators

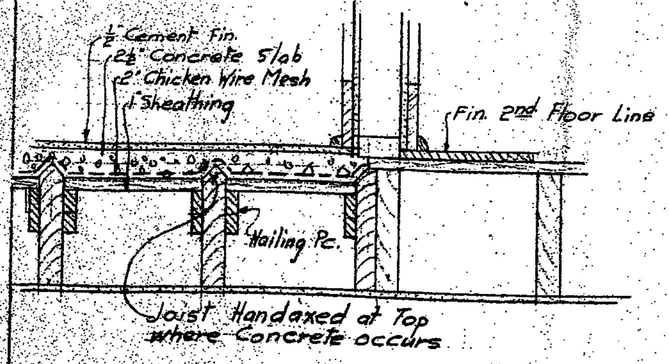
NOTE: In all cases
Follow dimensions
Refer to large scale details

③
G.C.89

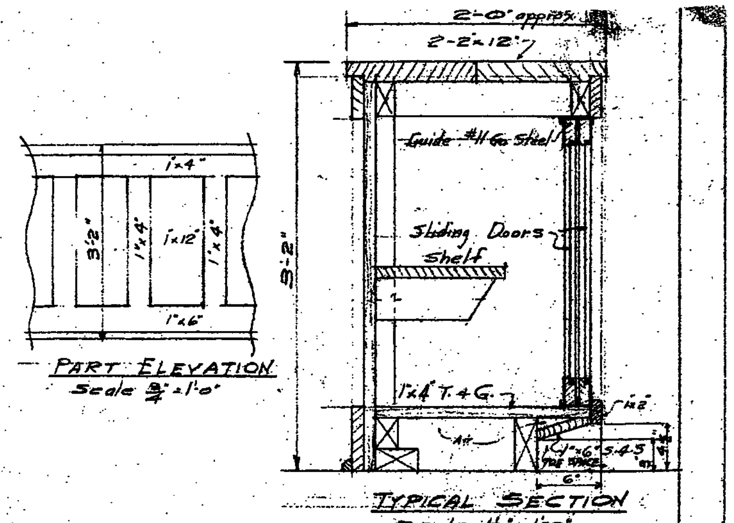
Dr.By-H.D.K.	Recommended Thos. C. Vint Landscape Engineer	Date 4/5/28	DEPT. OF INTERIOR NATL. PARK SERVICE GRAND CANYON NATL. PARK ADMINISTRATION BUILDING DRAWN BY LANDSCAPE ENG. DIVISION
Tr.By-H.D.K.	Concurred Superintendent	Date 4/9/28	
Ck.By-E.A.D.	Approved Asst. Director N.P.S.	Date 4/17/28	



SECOND FLOOR PLAN
Scale ¼"=1'-0"



TOILET & BATH RM. FLOOR DET.
scale 1½" = 1'-0"



STENOGRAPHER'S COUNTER
Refer to Sheet No 3.

Note: At 2nd Story only
Studding in exterior walls are 2"x4"
" " interior " " 2"x4"
T.+G. Partitions as marked on plan.
2"x3" Studding " " " "

GENERAL LEGEND

- Ceiling Outlet (Electrical)
- Bracket Outlet (")
- Convenience Outlet (")
- Steam Radiators
- Telephone

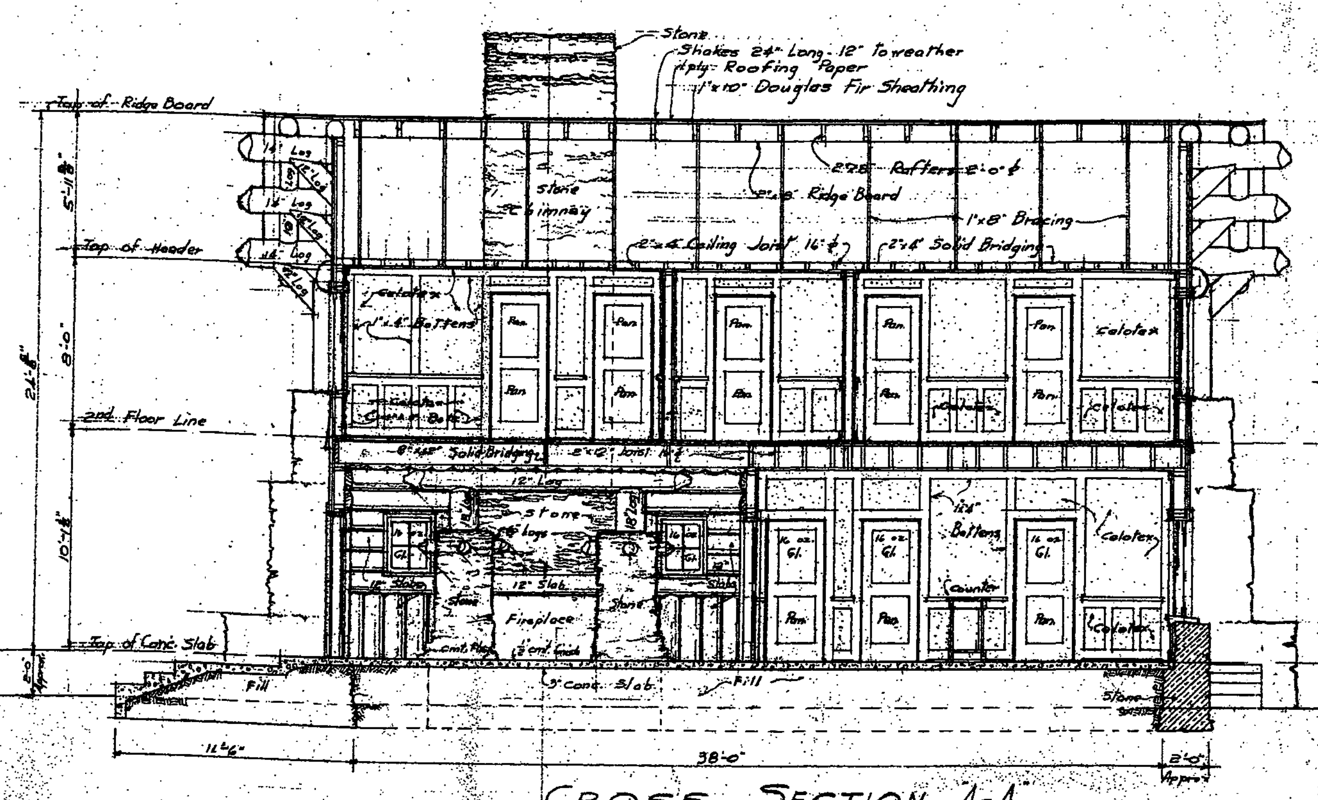
NOTE: In all cases
Follow dimensions
Refer to large scale details

④
G.C.89

Dr. By-H.D.K.
Tr. By-H.D.K.
Ck. By-E.A.D.

Recommended Thos. C. Vint Landscape Engineer Date 4/5/28
Concurred M. R. Tillotson Superintendent Date 4/9/28
Approved Arno B. Cammerer Asst. Director N.P.S. Date 4/17/28

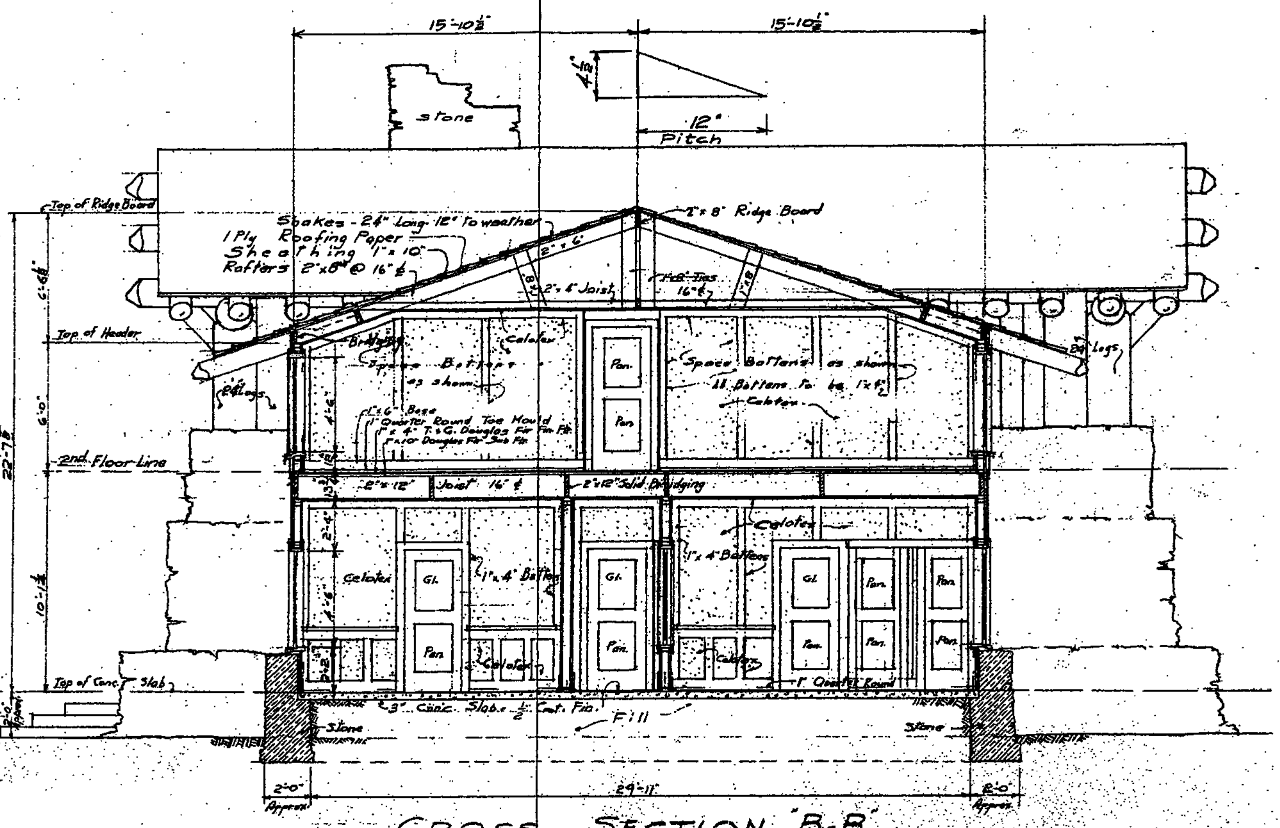
DEPT. OF INTERIOR NATL. PARK SERVICE
GRAND CANYON NATL. PARK
ADMINISTRATION BUILDING
DRAWN BY LANDSCAPE ENG. DIVISION



CROSS SECTION A-A

scale ¼" = 1'-0"

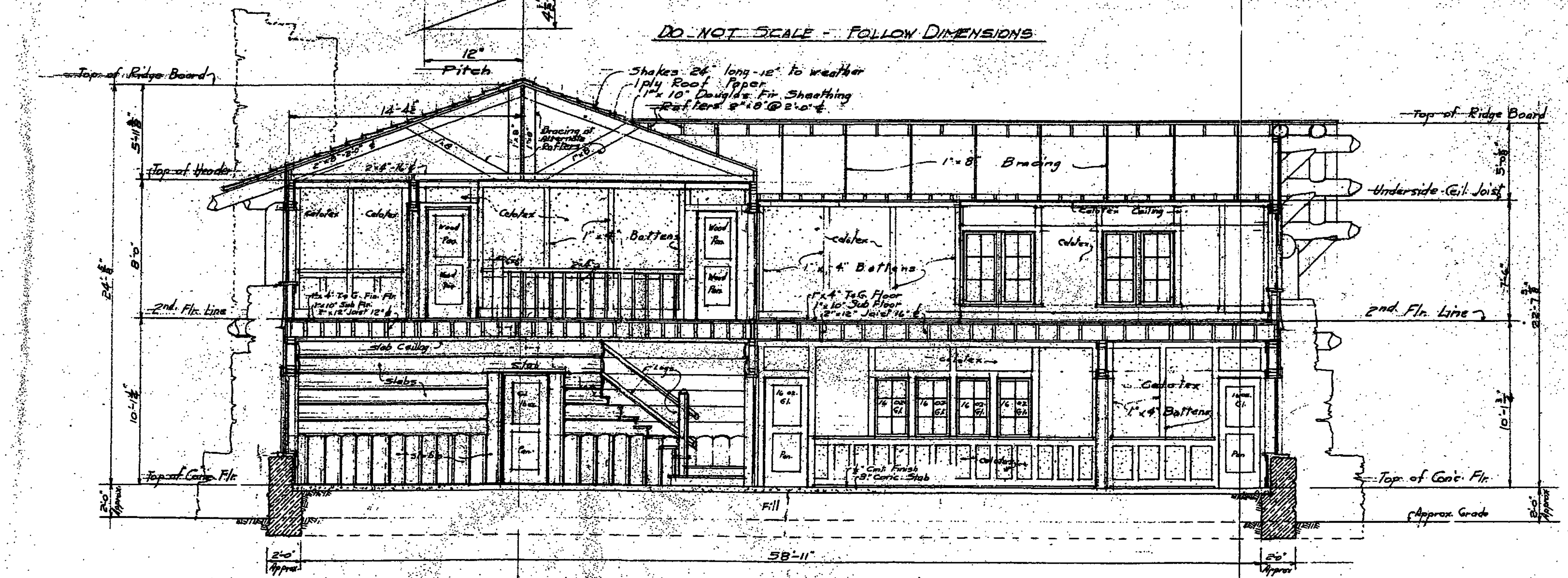
Note: In All Cases follow Dimensions. Refer to Large Scale Details.



CROSS SECTION "B-B"

Scale ¼" = 1'-0"

DO NOT SCALE - FOLLOW DIMENSIONS



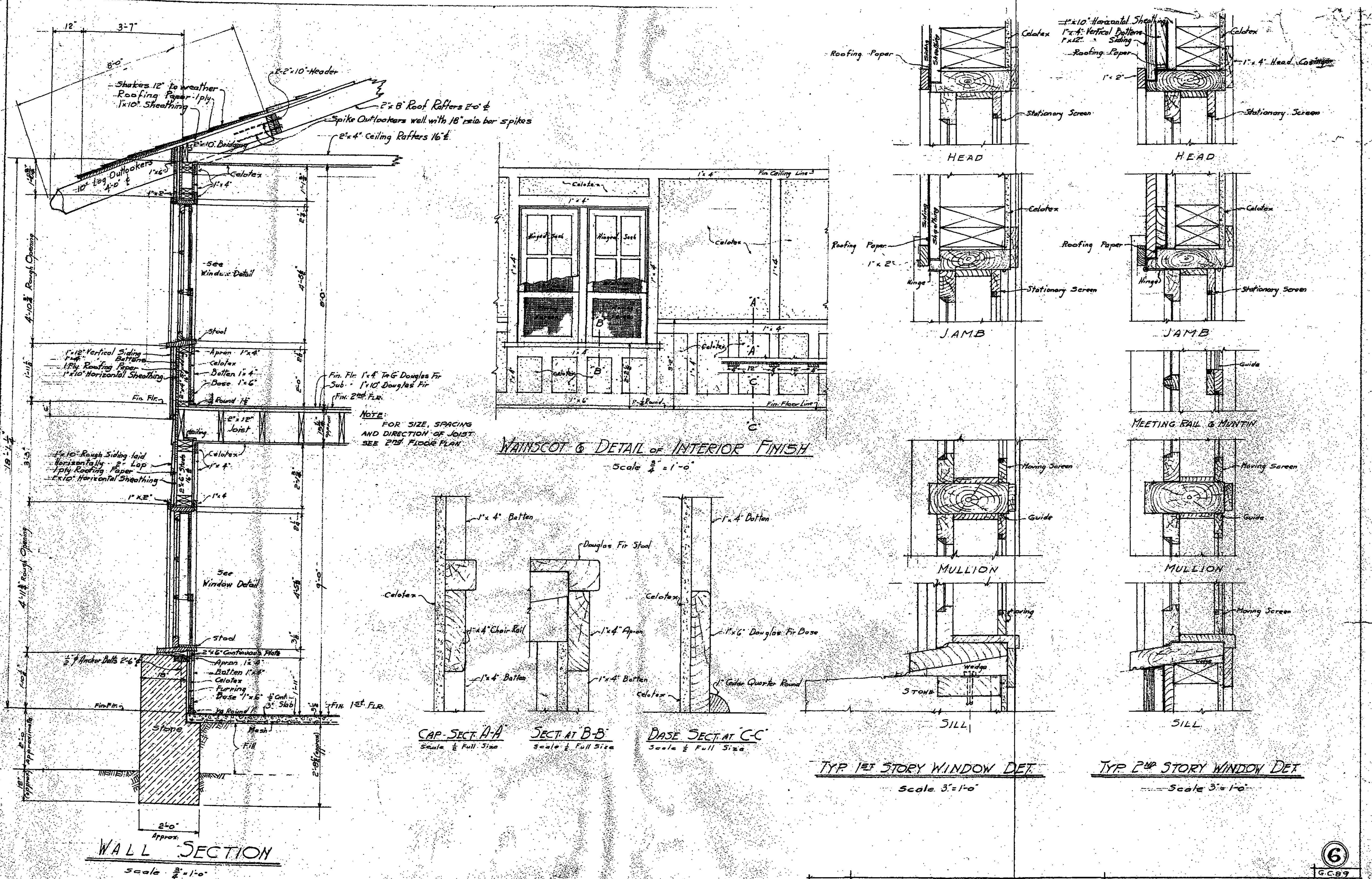
LONGITUDINAL SECTION "C-C"

scale ¼" = 1'-0"

5

GC 89

Dr. By - H.D.K. Tr. By - H.D.K. Ck. By - E.A.D.	Recommended Thos. C. Vint Landscape Engineer Concurred Tillotson Superintendent Approved Asst. Director N.P.S.	Date 4/5/25 Date 4/9/25 Date 7/14/25	DEPT. OF INTERIOR NATL. PARK SERVICE GRAND CANYON NATL. PARK ADMINISTRATION BUILDING DRAWN BY LANDSCAPE ENG. DIVISION



WALL SECTION
Scale ¾"=1'-0"

WAINSCOT & DETAIL OF INTERIOR FINISH
Scale ¾"=1'-0"

CAP-SECT. "A-A"
Scale ½ Full Size

SECT. AT "B-B"
Scale ½ Full Size

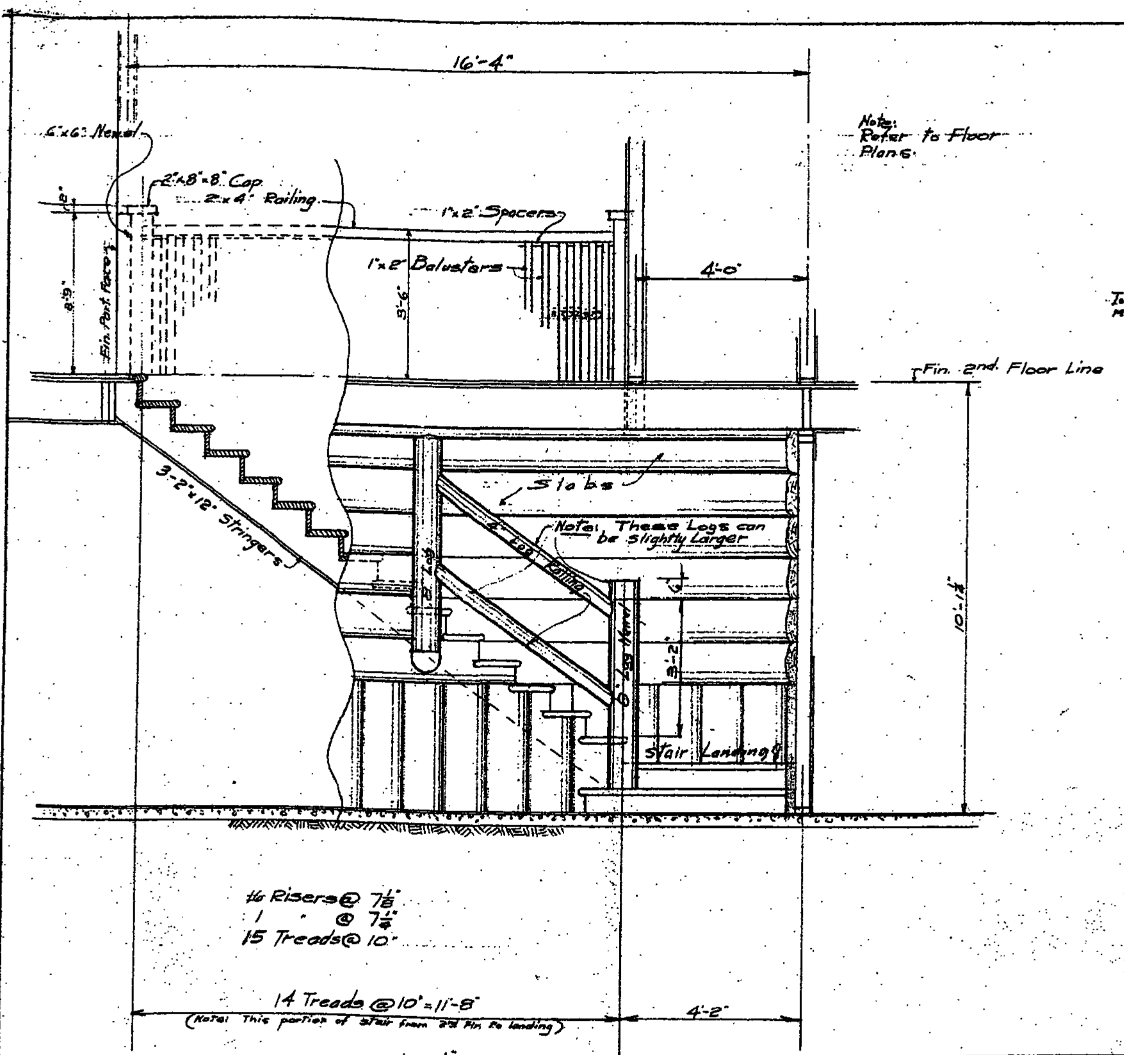
BASE SECT. AT "C-C"
Scale ½ Full Size

TYP. 1ST STORY WINDOW DET.
Scale 3"=1'-0"

TYP. 2ND STORY WINDOW DET.
Scale 3"=1'-0"

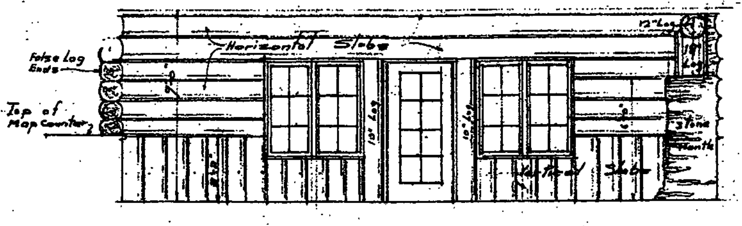
⑥
G.C.89

Dr. By. H.D.K.	Recommended Thos. C. Vint Landscape Engineer	Date 4/5/28	DEPT. OF INTERIOR NATL. PARK SERVICE
Tr. By. H.D.K.	Concurred Superintendent	Date 4/9/28	GRAND CANYON NATL. PARK
Ck. By. E.A.D.	Approved Arno B. Cammerer Asst. Director N.P.S.	Date 4/14/28	ADMINISTRATION BUILDING
			DRAWN BY LANDSCAPE ENG. DIVISION

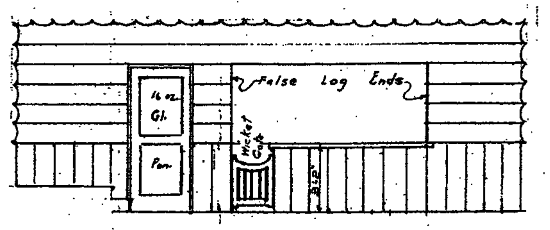


Scale 1/2" = 1'-0"

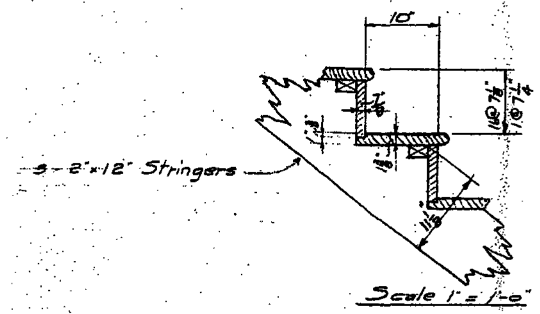
Note: Refer to Floor Plans.



NORTH ELEVATION OF LOBBY
Scale 1/4" = 1'-0"

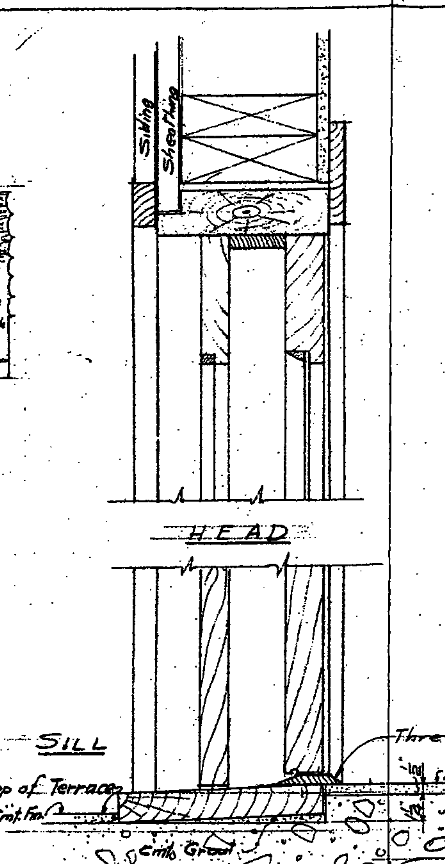


WEST ELEVATION OF LOBBY
scale 1/4" = 1'-0"



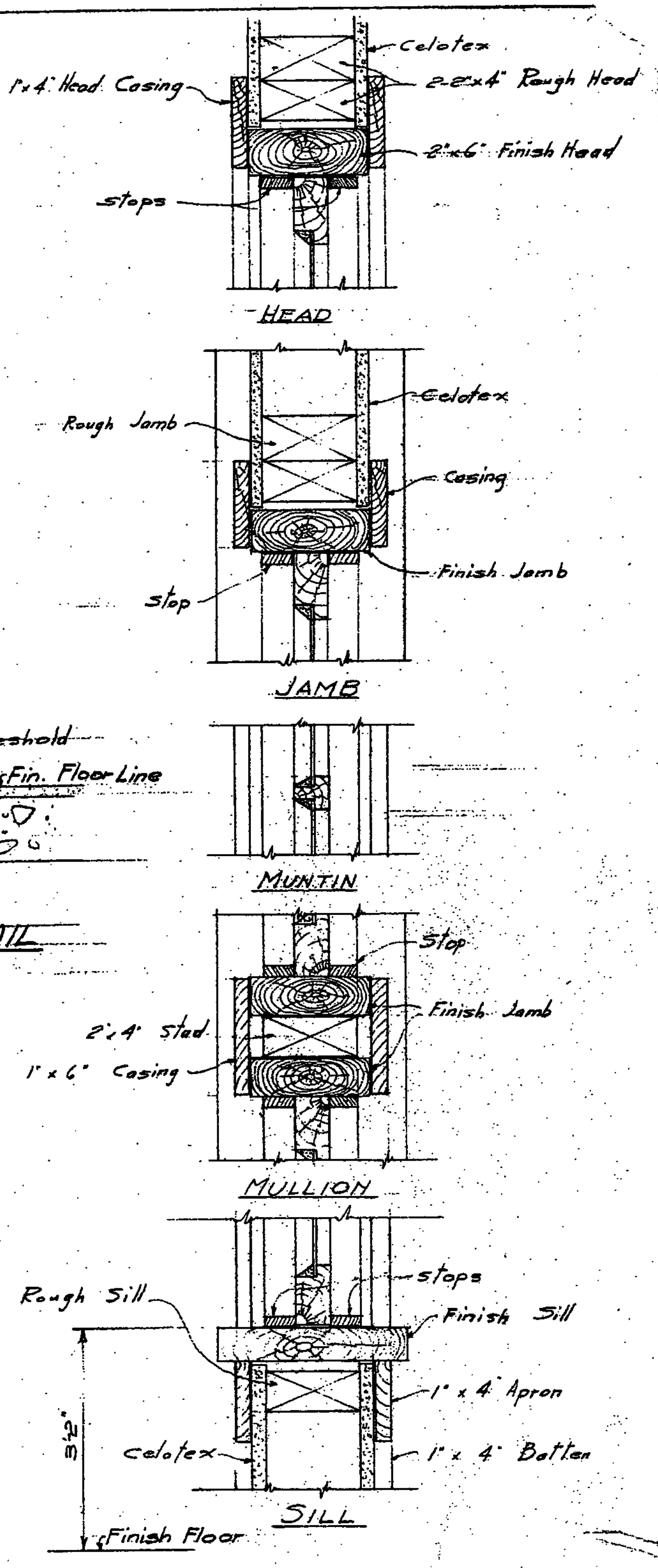
Scale 1" = 1'-0"

STAIR DETAIL



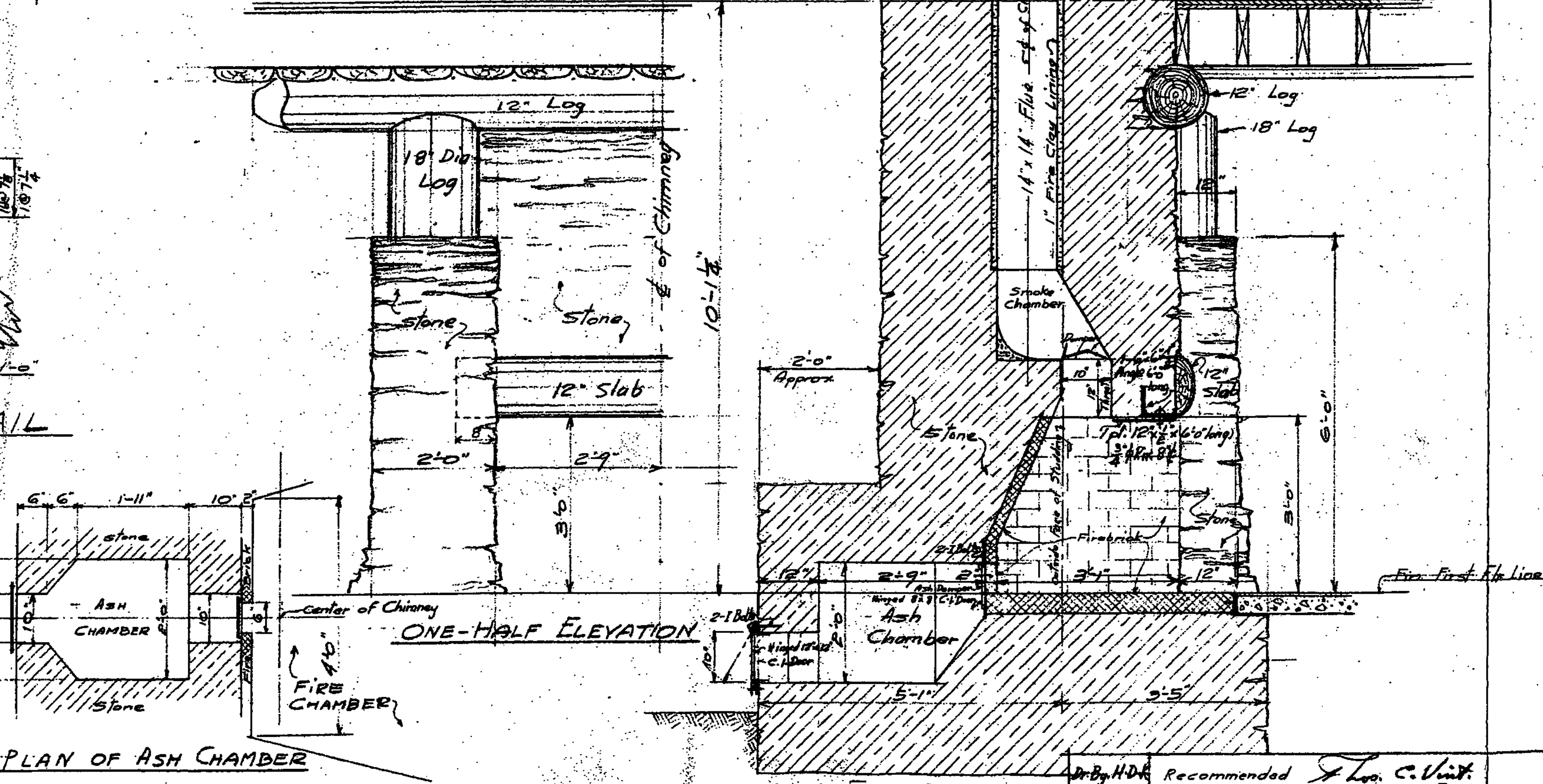
DOOR DETAIL

Scale 3" = 1'-0"



TYP. PARTITION SASH DET.

Scale 3" = 1'-0"



PLAN OF ASH CHAMBER

ONE-HALF ELEVATION

SECTION

FIREPLACE DETAIL

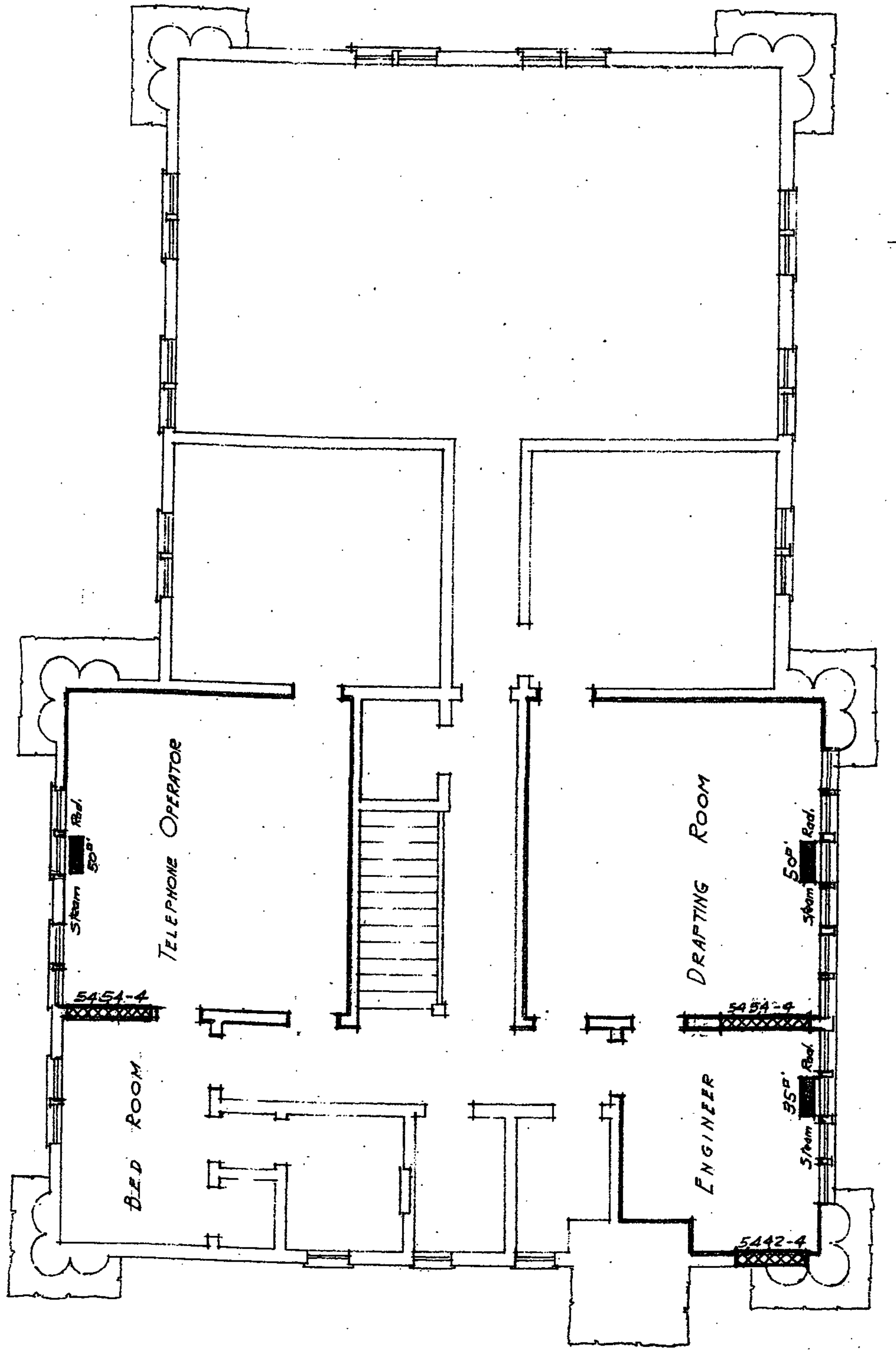
Scale 3/4" = 1'-0"

Dr. By H.D.K.	Recommended Thos. C. Vint. Landscape Engineer	Date 4/5/25
Tr. By H.D.K.	Concurred M R Tillotson Superintendent	Date 4/9/25
Ck. By E.A.D.	Approved Arno B Cammerer Asst. Director N.P.S.	Date 4/14/25

DEPT. OF INTERIOR NAT'L. PARK SERVICE
GRAND CANYON NAT'L. PARK
ADMINISTRATION BLDG.
DRAWN BY LANDSCAPE ENGINEERING DIV.

7

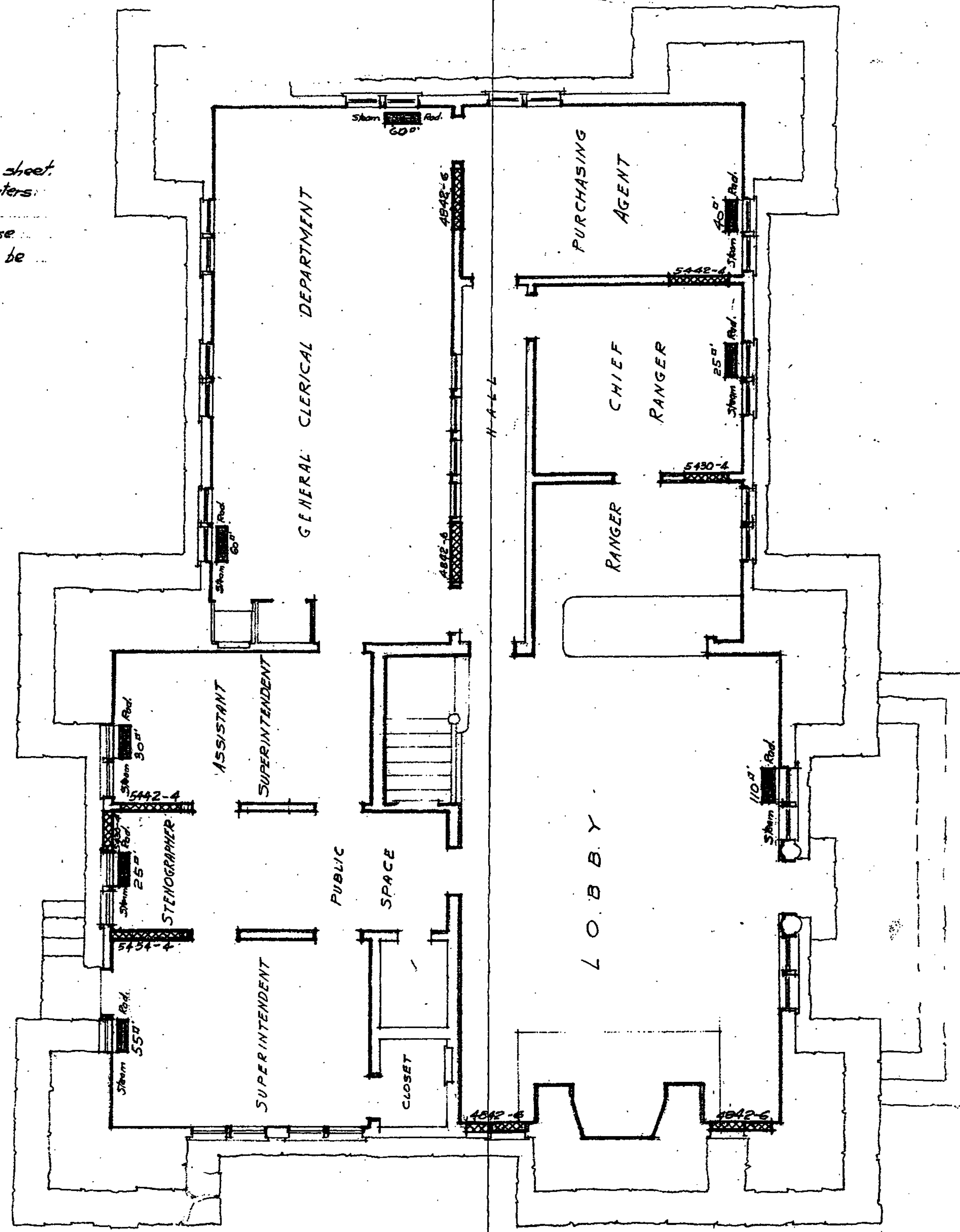
GC89



SECOND FLOOR

GENERAL NOTES:

2 Methods of Heating are shown on this sheet.
1st there is the system of concealed heaters.
2nd the ordinary " " radiators.
Radiation areas provided for by these methods are marked in each room to be heated.



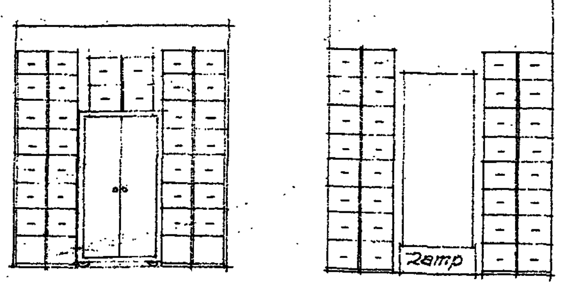
FIRST FLOOR

HEATING PLANS

8
G.C.8c

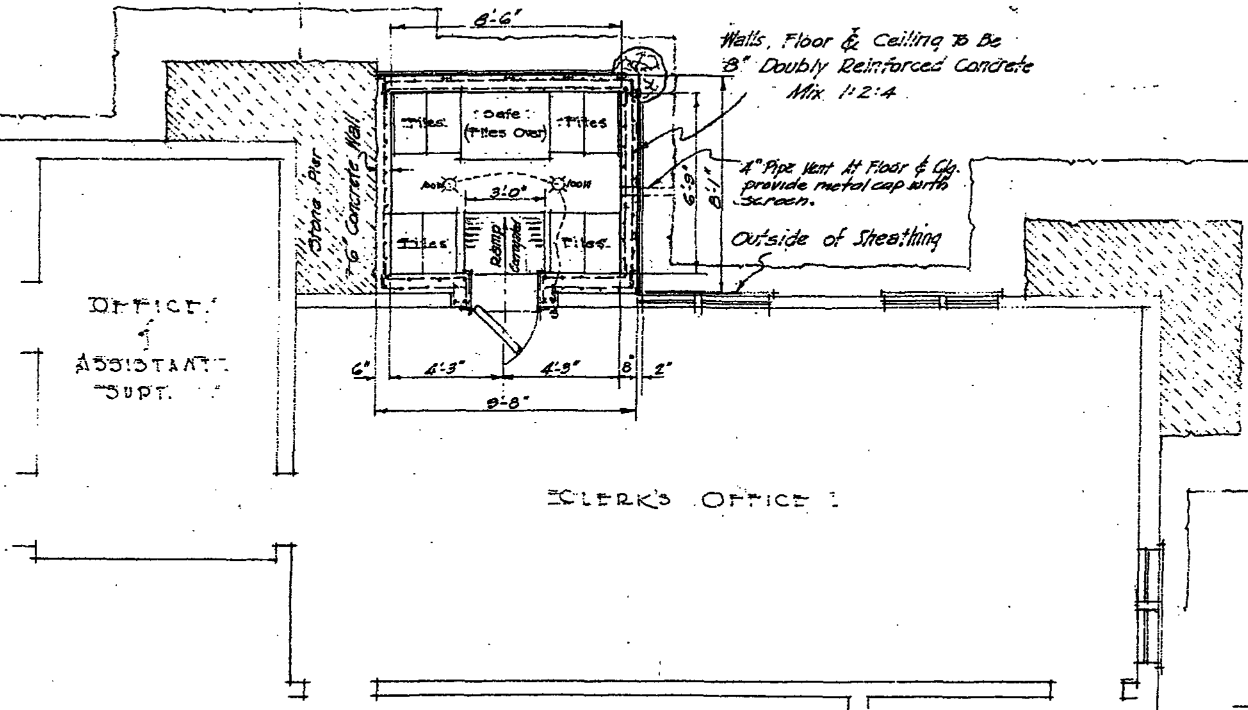
Dr. By. H.D.K.	Recommended	Chief: Landscape Architect	Date
Tr. By. H.D.K.	Concurred	Superintendent	Date
Ch. By. R.L.	Approved	Director National Park Service	Date

DEPT. OF INTERIOR NAT'L. PARK SERVICE
GRAND CANYON NAT'L. PARK.
ADMINISTRATION BUILDING
Designed By Division of Landscape Architecture

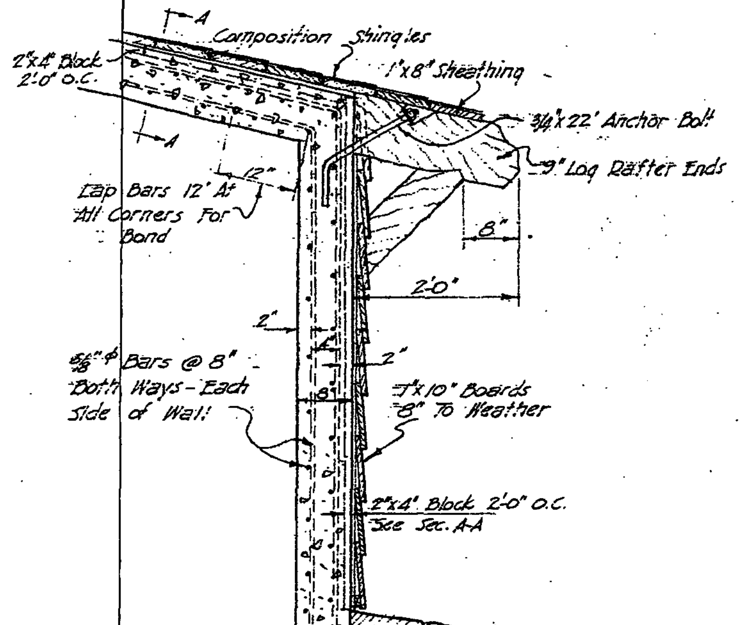


EAST WALL WEST WALL

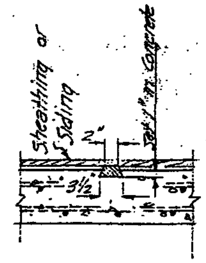
VAULT INTERIOR ELEVATIONS
1/4"=1'-0"



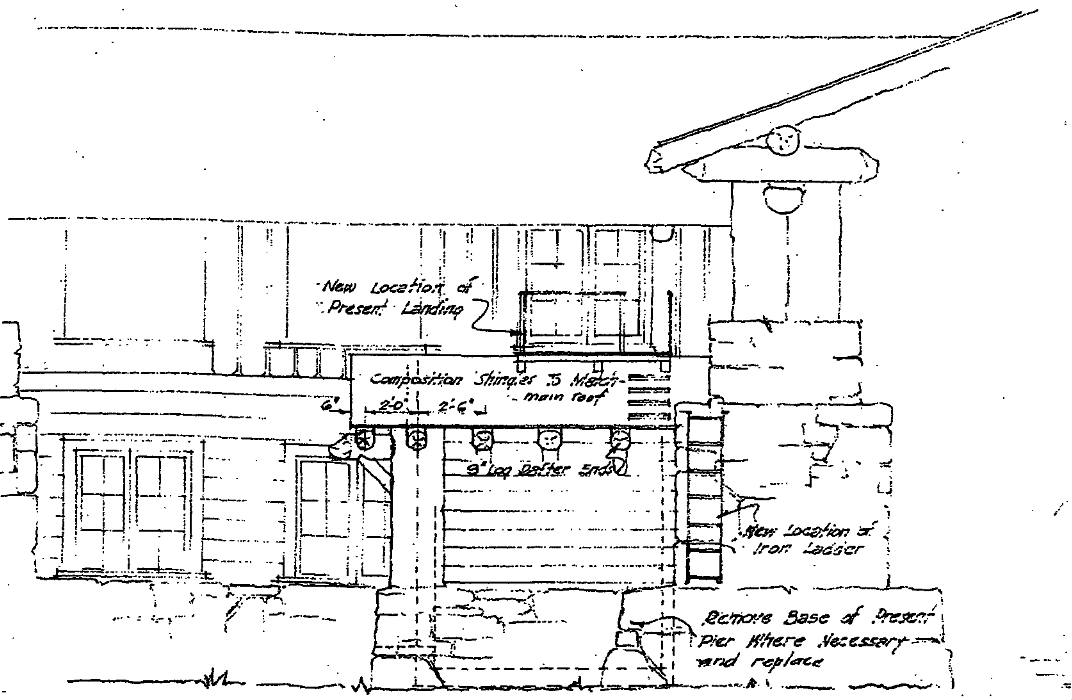
PLAN
1/4"=1'-0"



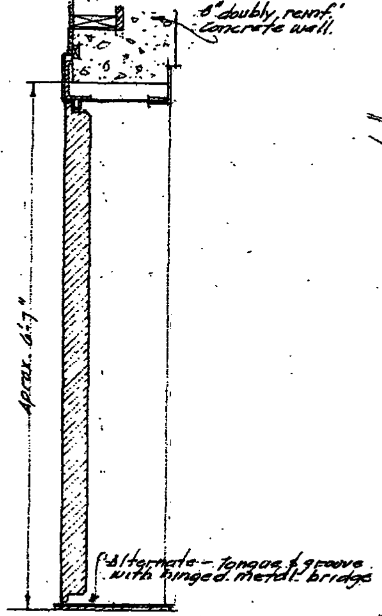
SECTION THRU RAFTER END
3/4"=1'-0"



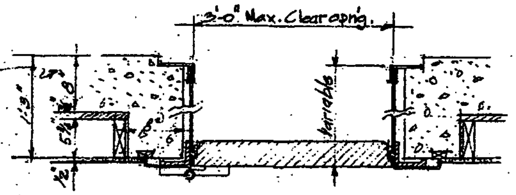
SECTION A-A
3/4"=1'-0"



EAST ELEVATION
1/4"=1'-0"

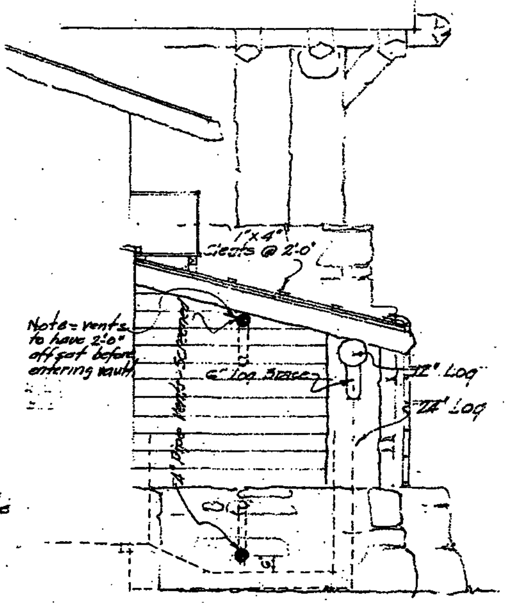


SECTION THRU VAULT DOOR



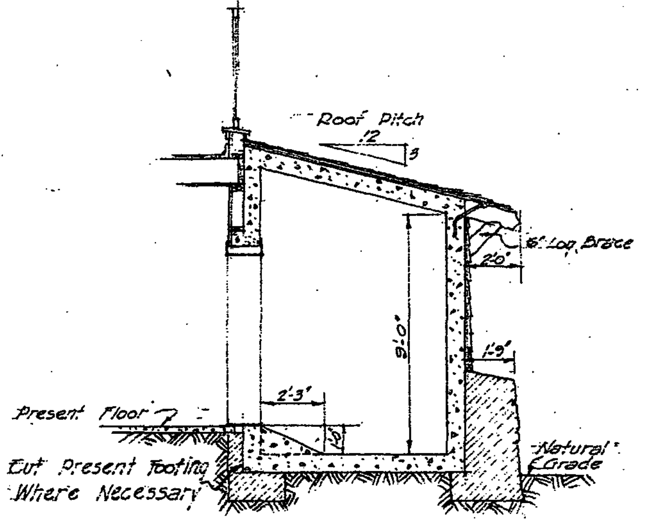
PLAN THRU VAULT DOOR
3/4"=1'-0"

Note!
Dimensions of rough opening for vault door to be determined from manufacturers detail.
Vault door to have two-hour fire resistance recognized by National Fire Protection Assn.
All electric wiring to be in conduit.



SOUTH ELEVATION
1/4"=1'-0"

ALTERATIONS
July 5, 1935 BY: Riggs



SECTION
1/4"=1'-0"

E.C.W. Proj. 22 - Class. 157 - Camp Nº - 2

Recommended	W. G. Carnes Deputy Chief Architect	Date	4-22-35
Cleared For Eng.	A. W. Burney Actg. Chief Engineer	Date	4-23-35
Concurred	Coffman Chief Forester	Date	7-19-35
Concurred	Superintendent	Date	7/1/35
Approved	Fred Hammer Director	Date	8-1-35

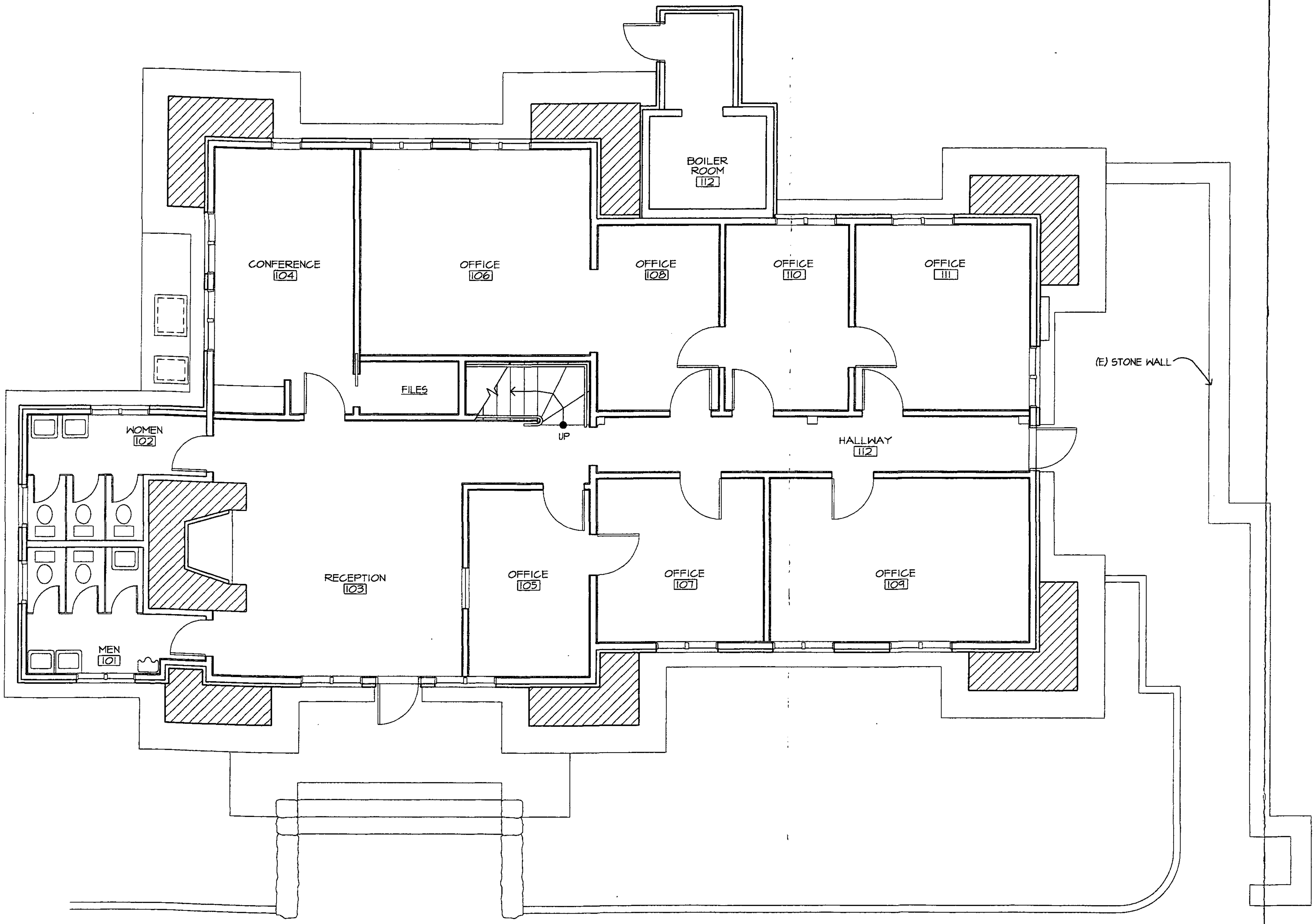
U.S. DEPARTMENT of the INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
VAULT FOR ADMINISTRATION BLDG
DRAWN BY BRANCH OF PLANS & DESIGN

Date 4-11-35
SHT. 4A
Drwg. Nº N.P. GC. 89

FIELD Nº 8166

G.S.H.

Appendix B. Existing Conditions Drawings of Plans, Elevations, and Section, by Architectural Resources Group, all dated July 28, 2000.



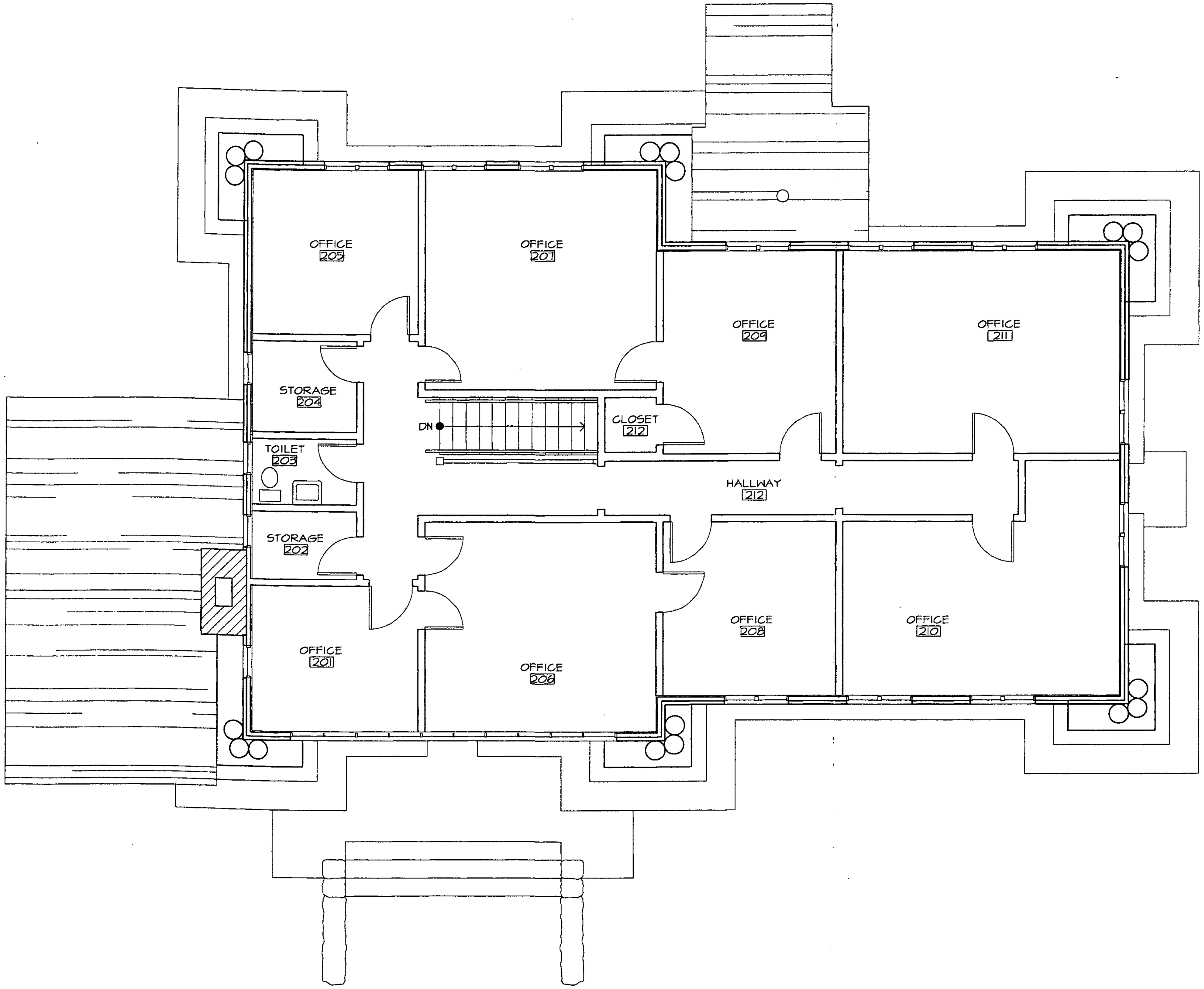
FIRST FLOOR PLAN
A-A- SCALE ⓙ

SCALE ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

DESIGNED: WH DRAWN: WH TECH. REVIEW: WH DATE: 7/28/2000	SUB SHEET NO. A1	TITLE OF SHEET EXISTING CONDITIONS FIRST FLOOR PLAN RANGER OPERATIONS GRAND CANYON NATIONAL PARK	DRAWING NO. PKG. NO. SHEET – OF –

ARCHITECTURAL RESOURCES GROUP



1 / A-A- SECOND FLOOR PLAN
SCALE Ⓙ

ARCHITECTURAL RESOURCES GROUP

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

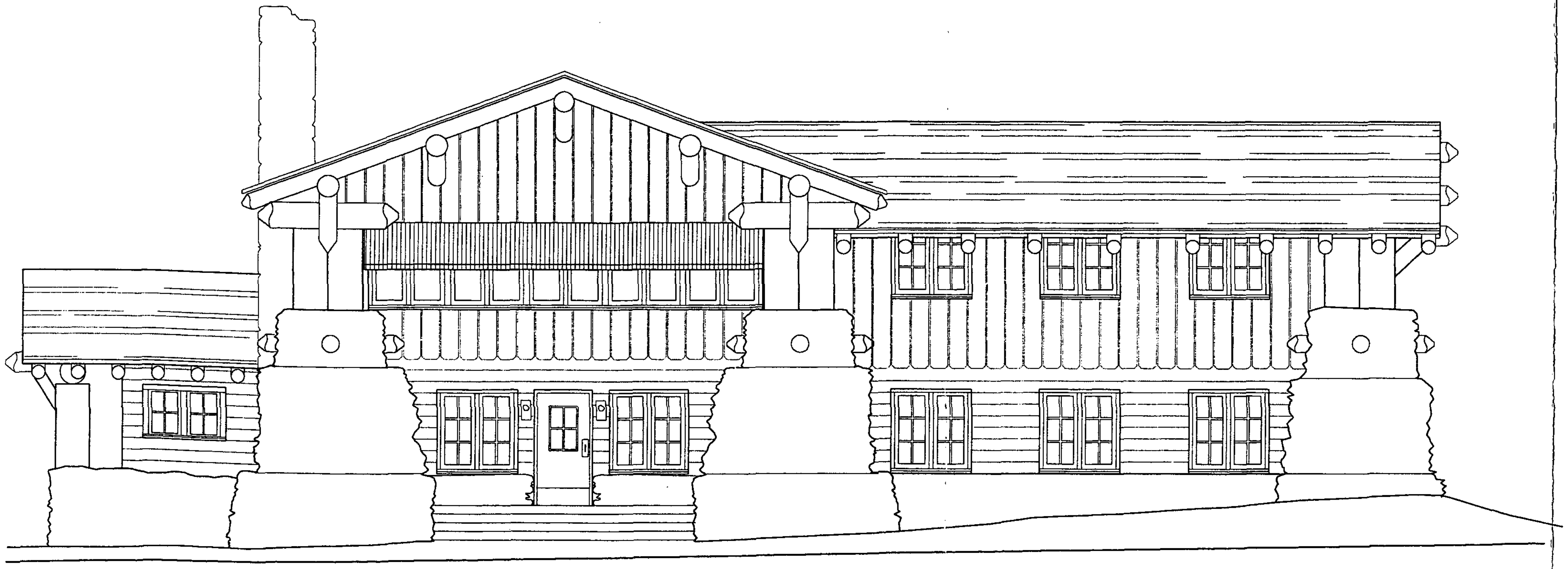
PROJECT NORTH

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A2

TITLE OF SHEET
EXISTING CONDITIONS
SECOND FLOOR PLAN
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET
OF



A-A- WEST ELEVATION
SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

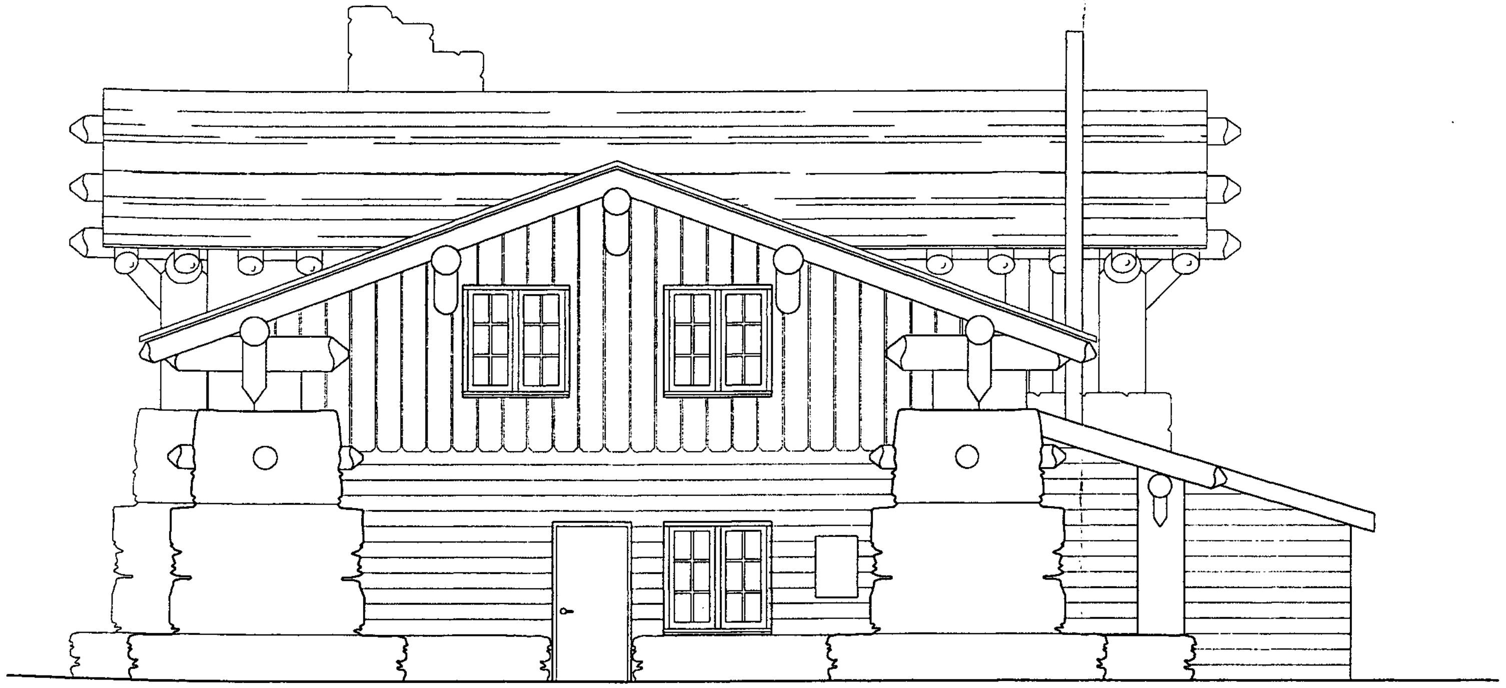
SUB SHEET NO.
A3

TITLE OF SHEET
EXISTING CONDITIONS
WEST ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

ARCHITECTURAL RESOURCES GROUP



A4 SOUTH ELEVATION
SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

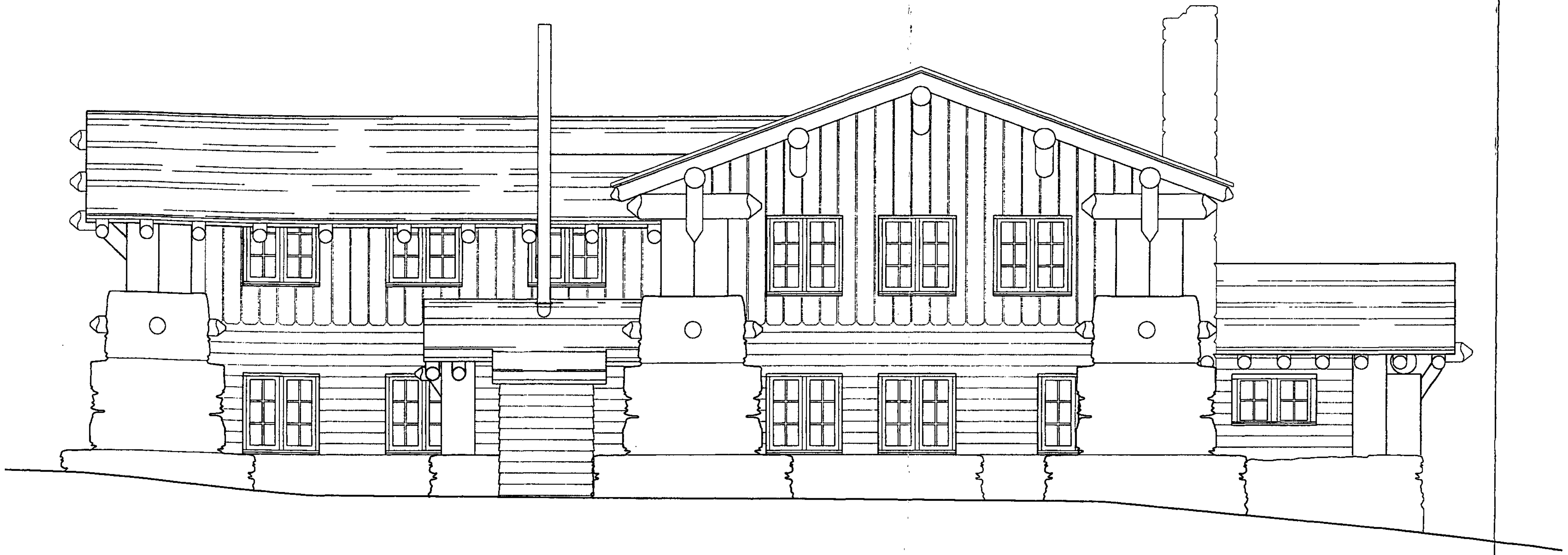
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A4

TITLE OF SHEET
EXISTING CONDITIONS
SOUTH ELEVATION
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET
OF

ARCHITECTURAL RESOURCES GROUP



EAST ELEVATION

1 / A-A-

SCALE (J)

SCALE (J) 4 0 4 8

1/4" = 1'-0"

DESIGNED: WH

DRAWN: WH

TECH. REVIEW: WH

DATE: 7/28/2000

SUB SHEET NO.

A5

TITLE OF SHEET

EXISTING CONDITIONS
EAST ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.

PKG. NO.

SHEET –

OF –

ARCHITECTURAL RESOURCES GROUP

NORTH ELEVATION

1
A-A-
SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

DESIGNED:
WH
DRAWN:
WH
TECH. REVIEW:
WH
DATE:
7/28/2000

SUB SHEET NO.
A6

TITLE OF SHEET
EXISTING CONDITIONS
NORTH ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET
–
OF –

ARCHITECTURAL RESOURCES GROUP

1 A-A- LONGITUDINAL SECTION

SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

ARCHITECTURAL RESOURCES GROUP

DESIGNED:
WH
DRAWN:
WH
TECH. REVIEW
WH
DATE:
7/28/2000

SUB SHEET NO.
A7

TITLE OF SHEET
EXISTING CONDITIONS
SECTION
RANGER OPERATIONS

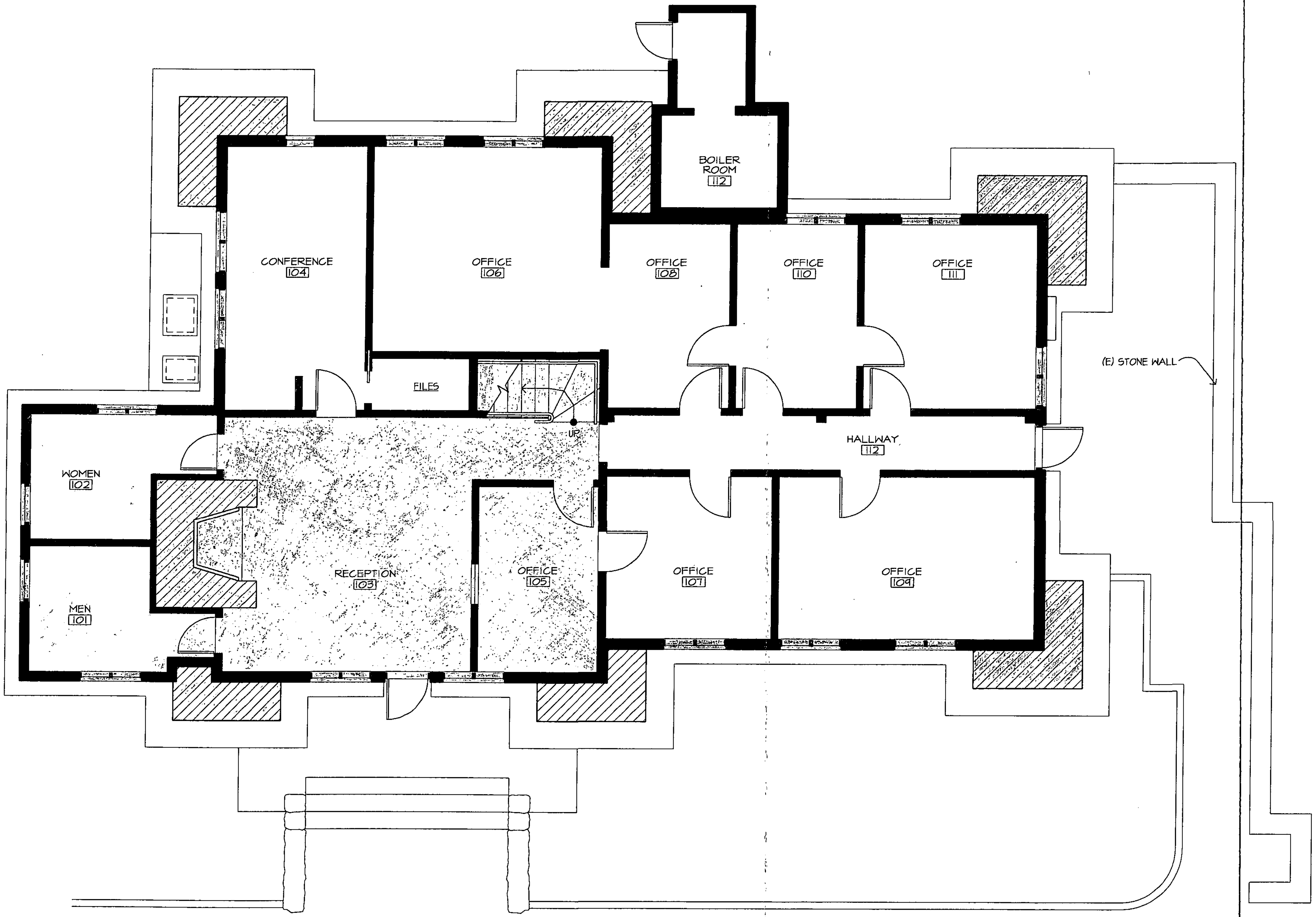
GRAND CANYON NATIONAL PARK

DRAWING NO.

PKG. NO.

SHEET
–
OF –

Appendix C. Plans illustrating Areas of Significance, specifically primary, secondary and tertiary spaces, by Architectural Resources Group, dated July 28, 2000.



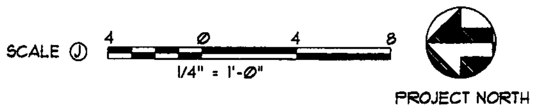
AREAS OF SIGNIFICANCE

▨ PRIMARY

▨ SECONDARY

☐ TERTIARY

FIRST FLOOR PLAN
SCALE Ⓙ



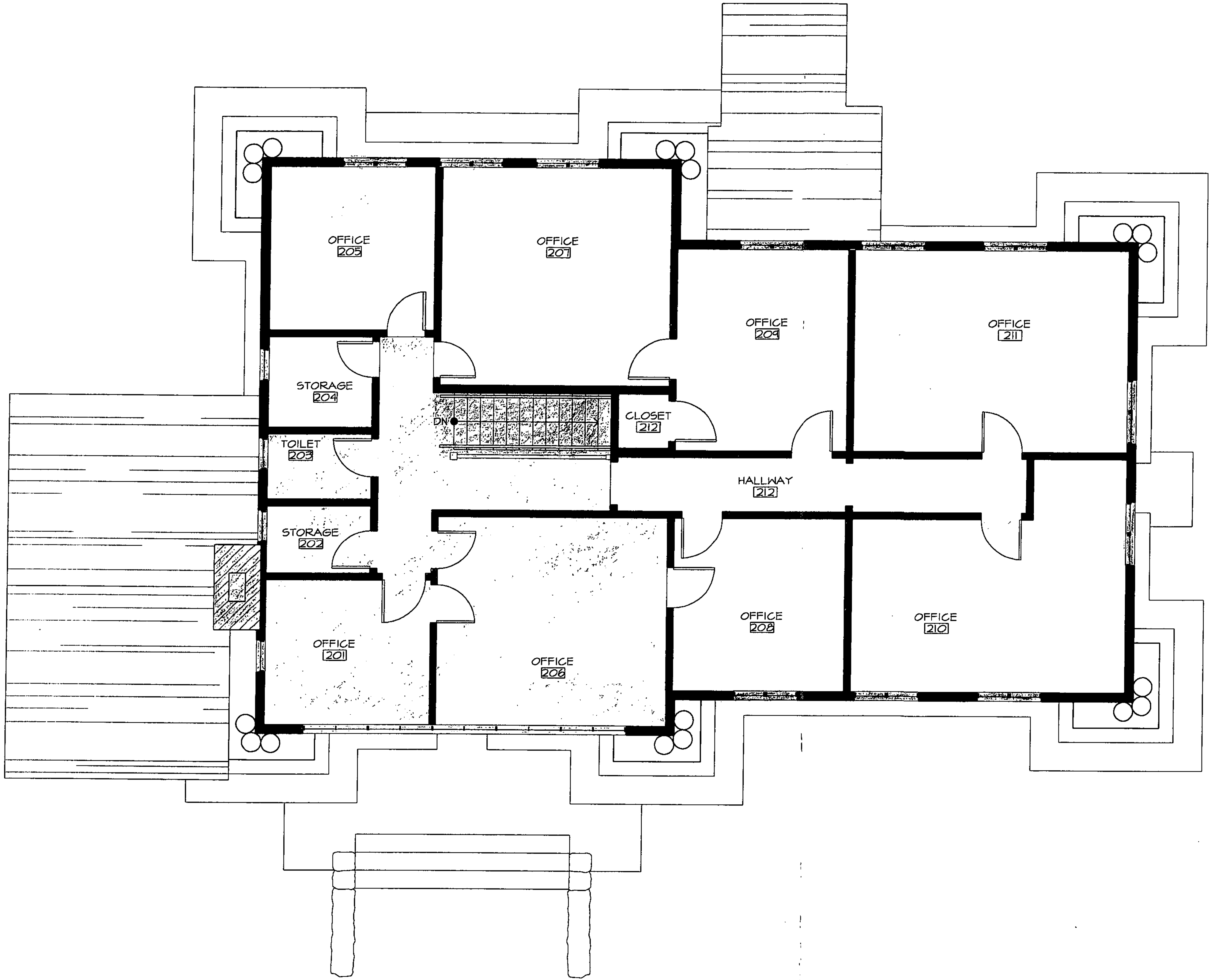
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A2

TITLE OF SHEET
AREAS OF SIGNIFICANCE
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

ARCHITECTURAL RESOURCES GROUP



A-A- SECOND FLOOR PLAN
SCALE J

SCALE J 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

AREAS OF SIGNIFICANCE

▨ PRIMARY
░ SECONDARY
☐ TERTIARY

ARCHITECTURAL RESOURCES GROUP

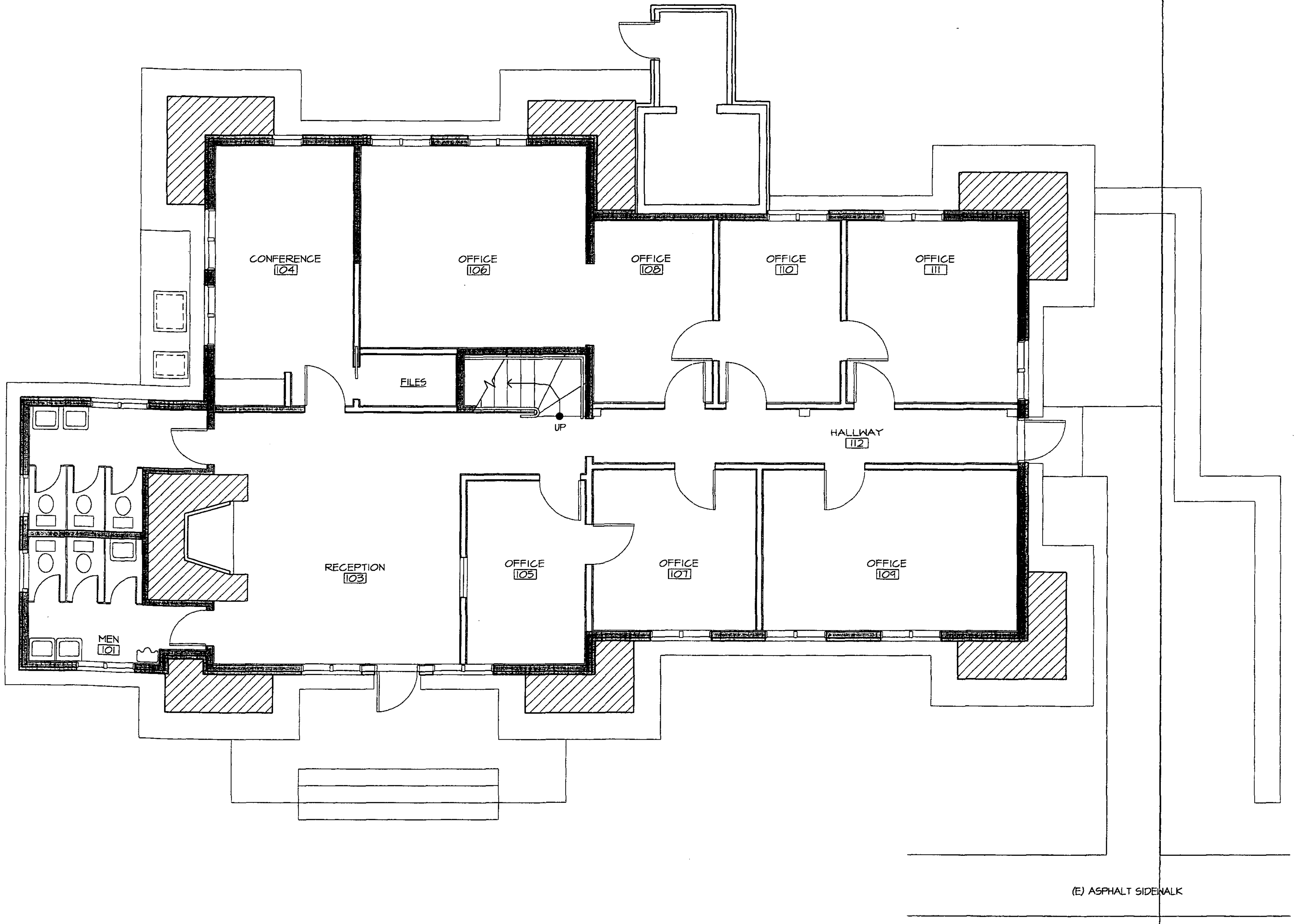
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A3

TITLE OF SHEET
AREAS OF SIGNIFICANCE
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

Appendix D. Drawings illustrating locations of original walls retaining historic fabric within the Ranger Operations Building, dated July 28, 2000.



KEY NOTES

▨ HISTORIC WALL

FIRST FLOOR PLAN
SCALE ⓙ

SCALE ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

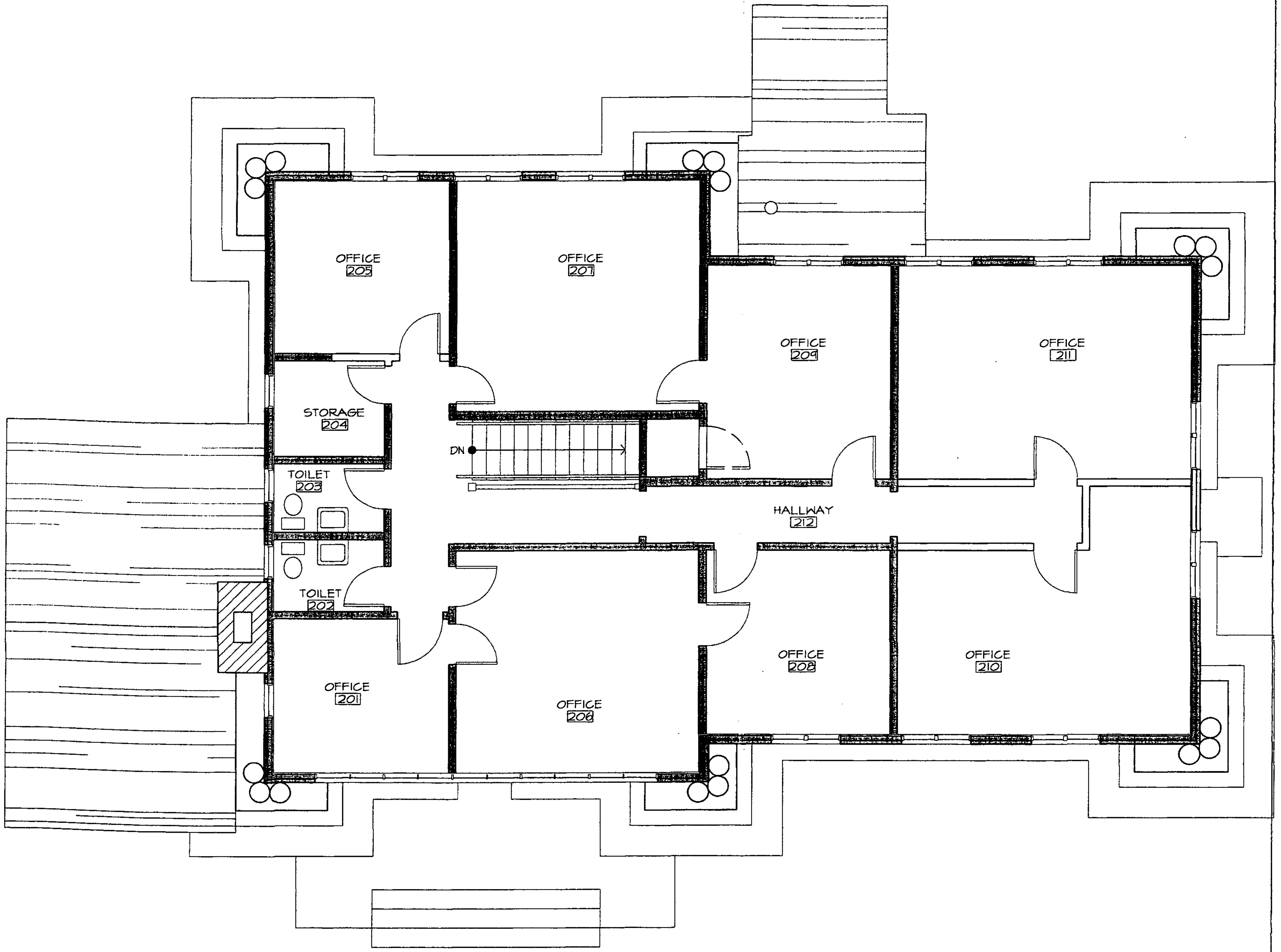
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A4

TITLE OF SHEET
HISTORIC WALLS
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET
—
OF —

ARCHITECTURAL RESOURCES GROUP



KEY NOTES

▨ HISTORIC WALL

SECOND FLOOR PLAN
1 / A-A-
SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

DESIGNED: WH
DRAWN: WH
TECH. REVIEW WH
DATE: 7/28/2000

SUB SHEET NO.
A5

TITLE OF SHEET
HISTORIC WALLS
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

ARCHITECTURAL RESOURCES GROUP

Appendix E. Historic Photographs of the Ranger Operations Building in Chronological Order.

View of Park Headquarters' Building looking northeast, shortly after completion in 1929. Note two casement windows at lower story of south elevation, original casements on the principal facade before installation of awning, and information sign indicating the building's public function. GCNPA Photograph Number 17735.

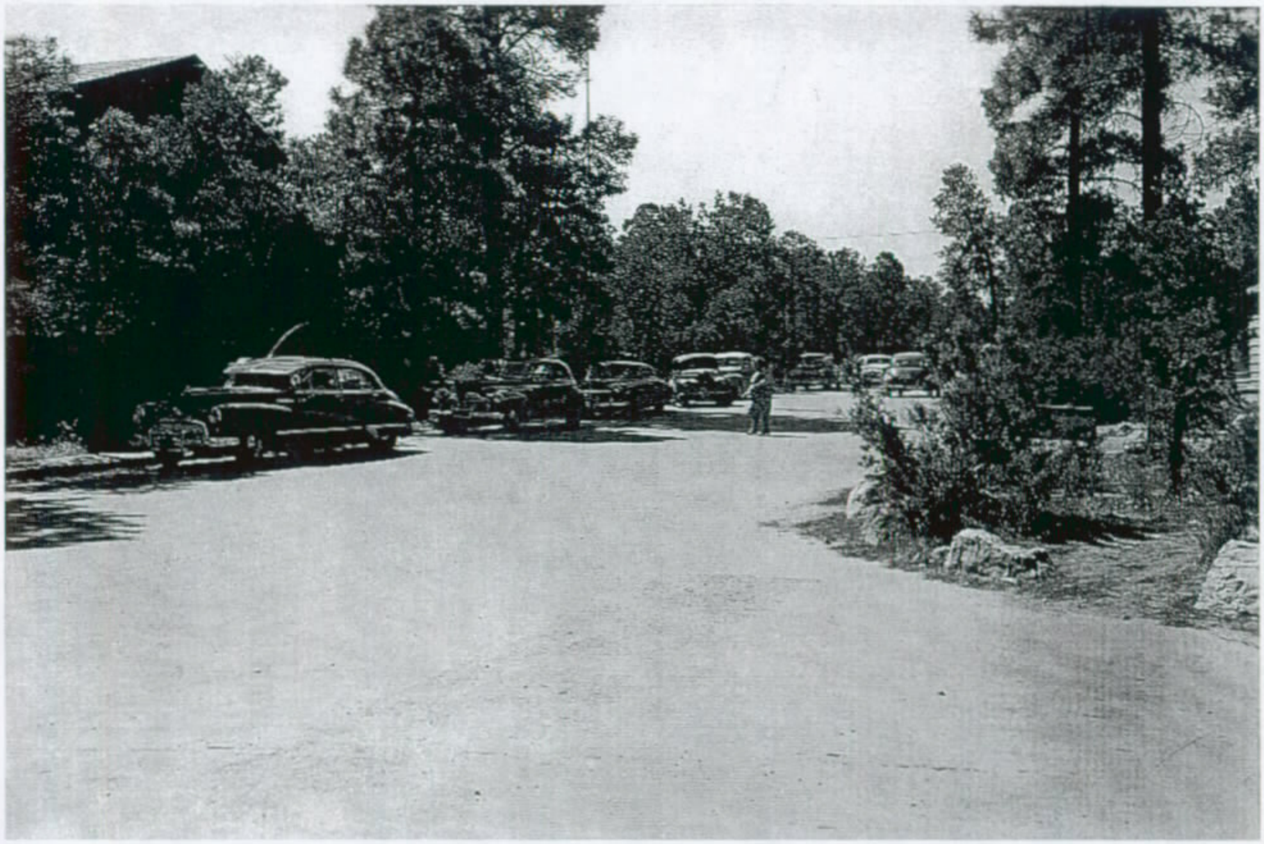
Park Headquarters' Building looking southwest, 1929. Note band of casement windows at second story of west elevation before installment of awning. GCNPA Photograph Number 12058.

Perry E. Brown and Constance Whitney, former employees at Grand Canyon, and a second unidentified woman who visited the park with Miss Whitney in front of Headquarters' Building, March 1932. GCNPA Photograph Number 19.

R. Redburn, Bill Downey, Carol Cox, C. Tyler, and Sammy (a local Indian) in front of Park Headquarters' Building, September 1931 or 1932. GCNPA Photograph Number 62.

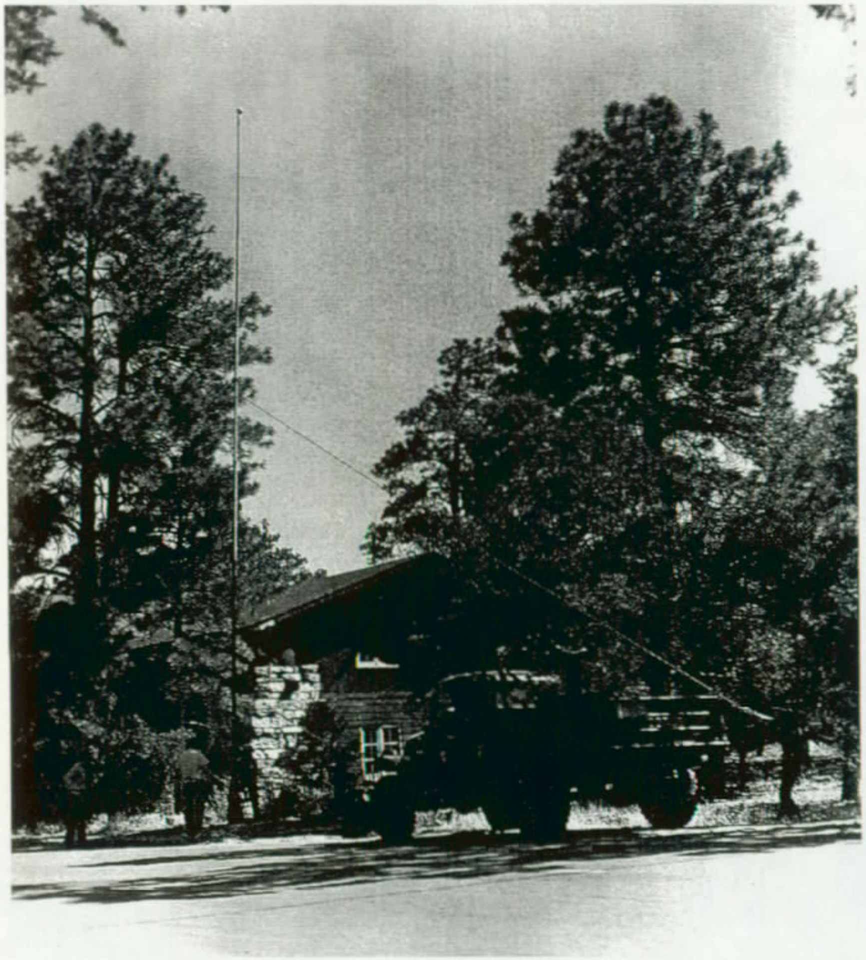
Construction of stone walkway outside Park Headquarters' Building, looking north, April 24, 1936. GCNPA Photograph Number 318.

Completed vault at east elevation of Park Headquarters' Building, February, 1936. Note stone foundation and emergency exit ladder. GCNPA Photograph Number 9250.



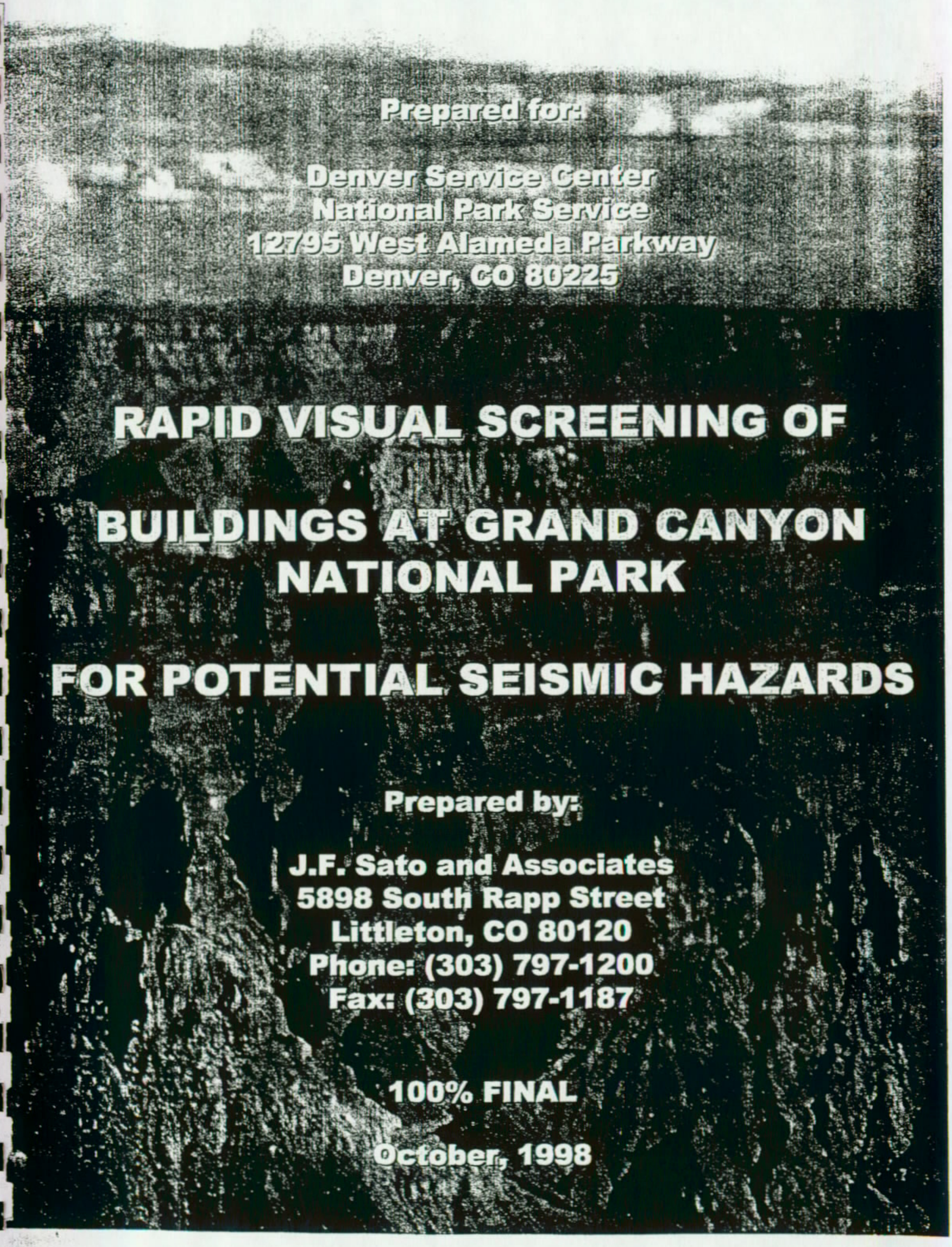
Line of automobiles outside Park Headquarters' Building, June 12, 1948. The photo indicates the building's importance as a first stop for visitors entering the park. GCNPA Photograph Number 1542.

Line of visitors at Ranger Information Desk at Headquarters' Building, August, 1951. Note original information desk and lobby finishes. GCNPA Photograph Number 2213.



Flag pole raised in front of Park Headquarters' Building, June, 1952 after repairs to building. GCNPA Photograph Number 2310.

Appendix F. Potential Seismic Hazard Assessment by Sato and Associates, dated October, 1998.



Prepared for:

Denver Service Center
National Park Service
12795 West Alameda Parkway
Denver, CO 80225

RAPID VISUAL SCREENING OF BUILDINGS AT GRAND CANYON NATIONAL PARK FOR POTENTIAL SEISMIC HAZARDS

Prepared by:

J.F. Sato and Associates
5898 South Rapp Street
Littleton, CO 80120
Phone: (303) 797-1200
Fax: (303) 797-1187

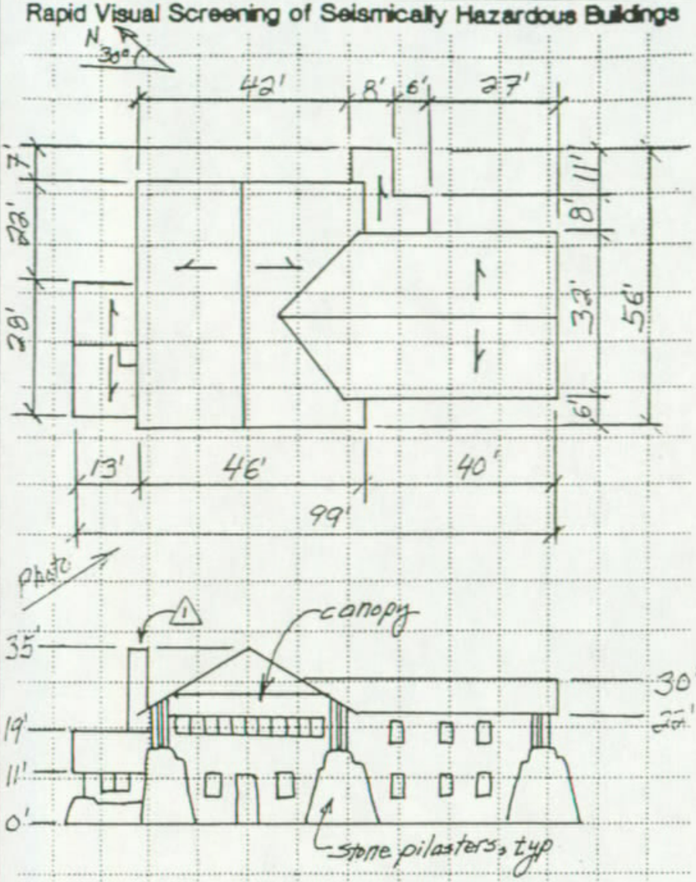
100% FINAL

October, 1998

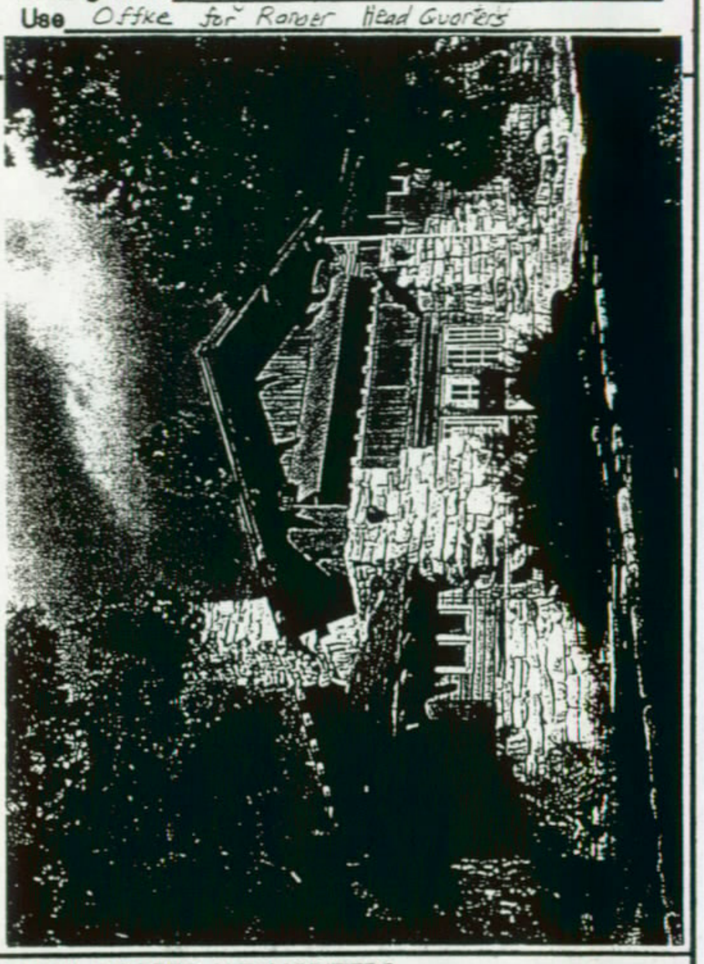
ATC-21/ (NEHRP Map Areas 1,2 Low)

Rapid Visual Screening of Seismically Hazardous Buildings

Address Center Street
Grand Canyon, South Rim, AZ Zip 86023
Other Identifiers South of train depot
No. Stories 2 Year Built 1929
Inspector Mark Wasinger Date 8-17-98
Total Floor Area (sq. ft) 7724 overall, 4144 first, 3580 second
Building Name Ranger Operations - Bldg #103
Use Office for Ranger Head Quarters



Scale: 1" = 40'



OCCUPANCY

	No. Persons
Residential	0–10
Commercial	[✓ 11–100]
[✓ Office]	100+
Industrial	
Pub. Assem.	
School	
[✓ Govt. Bldg.]	
[✓ Emer. Serv]	
Historic Bldg.	

Non Structural Falling Hazard ☑ △

DATA CONFIDENCE

* = Estimated, Subjective, or Unreliable Data

DNK = Do Not Know

STRUCTURAL SCORES AND MODIFIERS

BUILDING TYPE	W	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	C1 (MRF)	C2 (SW)	C3/S5 (URM INF)	PC1 (TU)	PC2	RM	[✓ URM]
Basic Score	**8.5**	**3.5**	**2.5**	**6.5**	**4.5**	**4.0**	**4.0**	**3.0**	**3.5**	**2.5**	**4.0**	**[✓ 2.5]**
High Rise	N/A	0	0	N/A	–0.5	–0.5	–0.5	–0.5	N/A	–1.0	–1.5	–0.5
Poor Condition	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5
Vert. Irregularity	–0.5	–0.5	–0.5	–0.5	–1.0	–1.0	–0.5	–1.0	–1.0	–1.0	–0.5	[✓ –1.0]
Soft Story	–1.0	–2.0	–2.0	–1.0	–2.0	–2.0	–2.0	–1.0	–1.0	–1.0	–2.0	–1.0
Torsion	–1.0	–2.0	–1.0	–1.0	–1.0	–1.0	–1.0	–1.0	–1.0	–1.0	–1.0	–1.0
Plan Irregularity	–1.0	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–0.5	–1.0	–1.0	–1.0	[✓ –1.0]
Pounding	N/A	–0.5	–0.5	N/A	–0.5	–0.5	N/A	N/A	N/A	–0.5	N/A	N/A
Large Heavy Cladding	N/A	–2.0	N/A	N/A	N/A	–1.0	N/A	N/A	N/A	–1.0	N/A	N/A
Short Columns	N/A	N/A	N/A	N/A	N/A	–1.0	–1.0	–1.0	N/A	–1.0	N/A	N/A
Post Benchmark Year	+2.0	+2.0	+2.0	+2.0	+2.0	+2.0	+2.0	N/A	+2.0	+2.0	+2.0	N/A
SL2	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3
SL3	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6
SL3 & 8 to 20 stories	N/A	–0.8	–0.8	N/A	–0.8	–0.8	–0.8	–0.8	N/A	–0.8	–0.8	–0.8

FINAL SCORE 0.5

COMMENTS △ Unreinforced stone chimney may fall & damage roof below during earthquake

Detailed Evaluation Required? [✓ YES] NO

ATC 15LOW
SCORE.91

Appendix G. National Historic Landmark Nomination for the Grand Canyon Village, dated September 13, 1996. (Due to document length, only the Statement of Significance is included.)

8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties: Nationally: X Statewide:___ Locally:___

Applicable National Register Criteria: A X B__ C X D__

Criteria Considerations (Exceptions): A___ B___ C___ D___ E___ F___ G___

NHL Criteria: 1, 4

NHL Theme(s): III. Expressing Cultural Values
    5. Architecture, Landscape Architecture, and Urban Design

VII. Transforming the Environment
    3. Protecting/Preserving the Environment

Areas of Significance: Landscape Architecture
Community Planning and Development
Politics/Government

Period(s) of Significance: 1897-1942

Significant Dates: 1897, 1901, 1905, 1915, 1919, 1924, 1933, 1942

Significant Person(s): N/A

Cultural Affiliation: N/A

Architect/Builder: Hull, Daniel; Vint, Thomas; Colter, Mary E. J.; Whittlesey, Charles F.; National Park Service; Bureau of Public Roads; A.T. & S.F. Railway

NHL Comparative Categories:
- XVII. Landscape Architecture
- XXXII. Conservation of Natural Resources
    - C. The Conservation Movement Matures, 1908-1941
        - 6. The Origin and Development of the National Park Service
- XXXIV. Recreation

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.

Summary

The Grand Canyon Village NHL District meets National Historic Landmark Criterion 1 for its association with the American park movement. The initiation of advanced town planning techniques in the design of national park villages and other developed areas was an essential step in the progress of planning and developing large scenic reservations for public use, without unduly marring the scenery being made accessible. The development of National Park Service town planning techniques also influenced and was integrated into later "master planning" procedures, another milestone in the history of American park planning. The district also meets National Historic Landmark Criterion 4 as an exceptionally valuable example of American landscape architecture, specifically as the most significant example with the greatest integrity of National Park Service town planning.

The Grand Canyon Village NHL District is significant under National Register Criterion A for its association with the American park movement. The district is also significant under National Register Criterion C as an example of American landscape architecture, specifically as a unique and outstanding example of community planning and development.

One of the most pressing issues addressed by early Park Service landscape architects was the need for well planned, centralized "developed areas" that would provide basic services for visitors, housing and office space for administrators, and sites for concessioners to develop their facilities. From 1914, when landscape architect Mark Daniels first articulated the idea, the "park village" was put forward as an appropriate model for this type of town planning in the context of national parks.

The concept of the park village was as old as the landscape park itself, but in the early 20th century Park Service landscape architect Daniel Hull developed specific policies and procedures (drawn from contemporary British and American town planning) for planning park villages that would provide needed services, while remaining consonant with surrounding landscape scenery. Yosemite Village was the first major Park Service town plan drawn up by Hull (and the architect Myron Hunt, ca. 1923); but it was at the south rim of the Grand Canyon for which the largest and most ambitious town plan was created. Hull finalized the major features of the plan in 1924, and today, Grand Canyon Village represents the most historically significant park village plan, with the greatest degree of integrity, ever designed by the Park Service. It was at Yosemite Village and Grand Canyon Village that the basic priorities for Park Service town planning were established. The higher degree of integrity at Grand Canyon, however, in addition to its great artistic and historical significance, make it a unique example of Park Service town planning in the 1920s.

Park Service town plans, like later Park Service master plans, were idealized models of contemporary professional planning principles. Because of federal ownership in parks, park villages could be "zoned," and exacting architectural standards could be maintained. The town plan for Grand Canyon divided the village into discrete residential, commercial, and civic areas; a consistent architectural idiom (Park Service Rustic) was employed throughout; a hierarchy of street sections, from pedestrian paths to through roads, was developed; a central "plaza" had the villages major public buildings sited around it. These and other features of the plan make it not only an exceptional example of Park Service town planning, but a highly significant example of American town planning in the 1920s in general. The innovative use of pedestrian paths, for example, predates the 1929 Radburn, New Jersey plan (Clarence Stein and Henry Wright) by several years. Although there are other interesting examples of Park Service town planning of this period, no other example combines the historic associations, the size, the artistic significance, and the excellent state of preservation of the Grand Canyon Village NHL District.

The period of significance of the district begins in the 1890s, specifically with the construction of the Buckey O'Neil Lodge in 1897, the oldest standing structure built on the rim. The period of significance ends in 1942, when the CCC was discontinued, by which time the village was largely complete. Significant dates include 1901, the date the railroad spur was extended to the location of Grand Canyon Village; 1905, the date Mary E.J. Colter completed Hopi House, the first sections of the stone wall along the rim were completed, and El Tovar opened; 1915, the world's fair year when visitation to the canyon soared; 1919, when national park legislation for the canyon was signed; 1924, the date of Daniel Hull's approved plan for Grand Canyon Village; and 1933, the date the Public Works Administration and the Civilian Conservation Corps began pouring in capital and labor to complete the village.

Historic Context

The legislative drive to reform the management of national parks shared certain inspirations and motivations with the civic movement to reform the planning and management of American cities. In the activities of key figures such as Frederick Law Olmsted, Jr., and J. Horace McFarland (the former a famous landscape architect, the latter the director of the American Civic Association), the nexus was clear. At the same time Olmsted was developing scientific planning techniques and organizing city planning as a new profession, for example, he was also working with McFarland in Washington to draft the 1916 legislation authorizing the National Park Service.

Other figures lobbying for the new park bureau also saw it as a potential agency for implementing scientific, systematic planning. As early as 1910, Secretary Ballinger had called for "complete and comprehensive plans for roads, trails, telegraph and telephone lines, sewer and water systems, hotel accommodations, transportation, and other conveniences" to be drawn up for every park before substantial amounts of money were invested in them.[1] Four years later, the landscape architect Mark Daniels had reiterated the desire for "comprehensive plan[s] . . . for all the national parks."[2] It was Daniels as well who pointed out that once a community reached a population of thousands, as Yosemite Valley did by then on a regular basis, "it ceases to be a camp; it becomes a village." And what was more, "it has municipal problems . . . it must have a sanitary system, a water-supply system, a telephone system, an

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[1] Department of the Interior, 1910 Annual Reports, 57.

[2] Department of the Interior, 1915 Annual Reports, 849.

electric light system, and a system of patrolling." What was needed, according to Daniels, was "some sort of civic plan."[3]

True comprehensive, or master plans, however, were not undertaken at the Park Service until substantial and consistent funding made them both possible and necessary in the late 1920s. In the meantime, various problems associated with vastly increased populations of visitors demanded that some kind of plans be made to address the problems associated with increased visitation. In Yosemite Valley, the impact of visitors was particularly evident. By 1913, the acting military superintendent had called for a "plan for development" by "competent landscape, architectural, sanitary, and engineering specialists for the development of this park." Of particular concern were the dangerous sanitary conditions and the lack of basic utilities and accommodations for both visitors and the growing number of permanent residents in the valley.[4] Secretary Lane's appointment of Mark Daniels as "landscape engineer and general superintendent" of the national parks in 1914 in large part responded to the growing problems at Yosemite.[5] Lane had initially asked the San Francisco landscape architect that March to "prepare a comprehensive general plan for the development and improvement" of the valley "so as to bring into view the full scenic beauty of the surroundings." Daniels's plans included locations for roads, trails, and bridges, as well as suggestions for pruning and removing trees in some areas in order to maintain the scenic views that had become obscured since seasonal burns of the valley meadows had been suppressed.[6]

Daniels's most ambitious plans for the park, however, involved the "proper location and arrangement of a village in Yosemite Valley." Several alternative studies for such a park village were drawn up, and at least one was published as the "Plan of Yosemite Village."[7] The village plan (which was not implemented) featured a central lodge on the north side of the Merced River flanked by separate residential and service districts. Daniels's statement, quoted earlier, that the location and character of every building was determined "in the light of a careful study of the best arrangement of the buildings and for picturesqueness,"[8] is borne out by the placement of new buildings along gracefully curving roads that met in large wye intersections. Daniels apparently also proposed substantial excavation and impounding of the

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[3] Department of the Interior, Proceedings of the National Park Conference Held at Berkeley, California, 1915 (Washington, DC: Government Printing Office, 1915), 18-19.

[4] Department of the Interior, 1913 Annual Reports, 723-24, 731.

[5] Stephen Mather's initial impulse to involve himself directly in national park affairs resulted from his dismay--as a mountaineer, a Sierra Club member, and a native Californian--with conditions at Yosemite and Sequoia as he found them in 1914. Shankland, Steve Mather, v-vi; Horace M. Albright, "How the National Park Service Came into Being--A Reminiscence,"in American Civic Annual (Washington, DC: The American Civic Association, 1929), 9-12.

[6] Department of the Interior, 1914 Annual Reports, 88.

[7] Mark Daniels, "Preliminary Plans and Tentative Studies of Architectural Character for the New Village, Yosemite National Park," n.d., Yosemite National Park Research Library.

[8] Department of the Interior, Proceedings of the Berkeley Conference, 1915, 20.

Merced River to create pools and lagoons along the edge of the new town. Lane was impressed enough with Daniels's work at Yosemite in 1914 to expand the scope of his appointment to include all the national parks.

Whether or not the village plan for Yosemite was advisable in all its features, its basic purpose was "to do away with unsightly buildings that now mar the scenery . . . and establish a village properly planned, comprising buildings of carefully studied architecture."[9] The "old village" at Yosemite was a disparate amalgamation of hotels, residences, and barns that had been deposited along the Merced over the previous 50 years of sporadic resort development. Whatever the aesthetic shortcomings of the old village, there were practical inadequacies involving sewage disposal, adequate drinking water, and traffic circulation.[10] These were problems not that different from those faced by towns and municipalities all over the country. But Daniels's response in the spring of 1914--a proposed new town plan--reflected the unique circumstances of working within the setting of a national park. In such a context, Daniels was free to advise the total demolition of the offending town and its replacement with a unified, comprehensively planned new town on the other side of the Merced River.

Park village planning of this type was as old as the landscape park itself; the controlled setting of the landscape park had always offered planners the opportunity to express ideal civic arrangements. In 18th-century British landscape parks, old villages were sometimes demolished to make way for a new lake or expansive greensward. The people so displaced might be rehoused in architecturally unified villages of arranged, pseudo-vernacular cottages, like the ones designed by Lancelot Brown for Milton Abbey in the 1760s. In the later context of American national parks, the device of a new "park village" continued to imply that groups of pseudo-vernacular buildings would be arranged and sited as visual elements of the larger landscape composition (in other words as parts of picturesque scenes) and therefore would not dominate or detract from the scenery that visitors came to appreciate.

In the early 20th century there were, of course, far more direct precedents for the design of such new towns than the park villages of Lancelot Brown. Landscape architect/planners such as F.L. Olmsted, Jr., and John Nolen had brought American "town planning" to a high degree of sophistication by the time Mark Daniels made his proposals for Yosemite. In 1911, working with the architect Grosvenor Atterbury, Olmsted had developed Forest Hills Gardens in New York for the Russell Sage Foundation. This "garden suburb" employed a consistent vocabulary of tree lined streets, rusticated construction finishes, pitched tile roofs, and carefully articulated public spaces to create a unified visual effect and "village" atmosphere. Nolen, in particular, became the most prolific "town planner" of the era. An early graduate of the Harvard landscape program and initially a close associate of the younger Olmsted, Nolen opened an office in Cambridge in 1904. As municipalities began to search for planning consultants, Nolen received commissions for the design of new towns, such as Kingsport,

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[9] Department of the Interior, <u>1915 Annual Reports</u>, 849-850.

[10] Linda Wedel Greene, <u>Yosemite: The Park and Its Resources</u>, Historic Resource Study, 3 vols. (Denver: Department of the Interior, National Park Service, 1987), vol. 1, 446-450.

Tennessee (1915), as well as city plans for more established cities such as Little Rock (1913) and Bridgeport (1916). His firm was soon the most active planning office in the country.[11]

The distinction between "town planning" and "city planning" was an important one to Nolen. In one of the earliest of his many publications, he pointed out the very different requirements of providing services for "cities and towns planned in advance of settlement" (town planning) and for "existing cities replanned or remodeled to meet new requirements" (city planning).[12] But the term town planning was also an Anglicism (city planning being the more common term in the United States) and revealed the extent of the influence of British planners in this branch of American landscape architecture. The backers of projects like Forest Hills Gardens attempted to create American "garden cities" modeled on the new model towns and suburbs that had been developed in Britain since the turn of the century. The most influential of the new British town planners was Raymond Unwin, whose 1909 book Town Planning in Practice immediately became an important source for planners on both sides of the Atlantic.[13] Unwin in turn had been influenced by 19th-century German city planners (who had greatly impressed Nolen and Olmsted, as well) and Unwin reproduced city plans for Nuremburg, Rothenburg, and Cologne in his textbook. The primary examples Unwin used in 1909, however, were the "garden city" developments he and the architect Barry Parker had undertaken since 1904. Letchworth, the prototypical garden city designed by Unwin and Parker, employed a broken grid of streets that partially conformed to topography, a hierarchy of street types from "Broadway" to narrow cul-de-sacs, and a segregation of industrial and residential areas. Civic buildings were to be sited along a centrally located town square, and the residences of the new community typically were intended to be "workingman's cottages" and other housing types of Arts and Crafts inspiration. The architectural office of Unwin and Parker had already done much to popularize simple and affordable cottages that emphasized traditional construction materials and unpretentious craftsmanship. In the arrangement of such houses in cul-de-sacs, closes, and other alternatives to traditional grid schemes, the architects also incorporated generous setbacks, garden spaces, and communal open spaces in their town plans.

At first disseminated by example and through Unwin's textbook, British town planning along these lines increased in popularity in the United States partly as a result of World War I. At the outset of war, the British government recognized that a national dearth of decent housing for workers impeded vital defense production. Private capital, under the pressure of wartime prices, could not meet demand, and a major public housing effort began immediately in 1914. New towns for war workers were hastily laid out, many by Britain's foremost town planner, Raymond Unwin. In 1917, the United States faced a similar, if less desperate, situation in industrial centers around shipyards and munitions factories. Although the government did not react with alacrity, the Department of Commerce eventually organized the U.S. Housing

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[11] John Hancock, "John Nolen: The Background of a Pioneer Planner," in Donald A. Krueckeberg, ed., The American Planner: Biographies and Recollections (New York: Methuen, 1983), 37-57.

[12] John Nolen, Replanning Small Cities (New York: B.W. Huebsch, 1912), 3.

[13] Raymond Unwin, Town Planning in Practice: An Introduction to the Art of Designing Cities and Suburbs (London: T. Fisher Unwin, 1909).

Corporation to spend millions of dollars building accommodations for wartime industrial workers. An unprecedented mobilization of American landscape architects, architects, and engineers provided plans for the new communities. Olmsted headed the Town Planning Division of the corporation, and Nolen, Hubbard, Kessler, Arthur A. Shurtleff, James Sturgis Pray, Charles Downing Lay, James S. Greenleaf, Albert D. Taylor, Ferrucio Vitale, and William H. Punchard (Charles Punchard's uncle) were among the many landscape architects who acted as town planners for the over 60 projects that were initiated.[14]

Perhaps because the effort was modeled on its British counterpart, principles of British (or "garden city") town planning were emphasized, and judging by the results, to some degree the experience proved a crash course in Unwin and Parker's techniques, as interpreted by Olmsted and others. John Nolen, for example, had already demonstrated his preference for arrangements of radiating street grids, central town squares, and zoned land uses in the design of new towns, and he subsequently produced one of the finest subdivisions of the war effort in Camden, New Jersey. All of the landscape architects and architects working for the Housing Corporation received "standard" or "type" plans from Olmsted at the outset, as well as detailed "suggestions for town planners."[15] Olmsted's advice for the group summarized his town planning methods at a critical and opportune moment. Planning, he insisted, should be initiated through a consultation of topography and other natural features. Detailed topographic surveys were repeatedly emphasized as the sine qua non of town planning; other environmental factors were to be considered as well. "Whatever the present condition of the site," he advised, the town planner "must see what it offers as a developed site; how its exposure will suit its occupancy; whether the topography is such as to afford convenient . . . disposition of communication and subdivisions, [and] what natural features . . . may be retained or improved as recreational and breathing spaces." The practical components of the plan ("lay-out, grading, and planting") were "the best possible foundation for the good appearance which comes from the artist's touch . . . . The curving street that minimizes the cost of grading and gives picturesque interest to the buildings along it must be a convenient means of circulation and make for the most advantageous subdivision of the lots on which those buildings are set."[16]

For many landscape architects and planners, their war experience would prove a strong influence on their subsequent professional practice. One of the American landscape architects drawn into World War I planning efforts was Daniel Ray Hull. A native of Kansas, Hull had studied at the University of Illinois under Charles Mulford Robinson, who had just joined the faculty there as professor of "civic design." Robinson, a journalist and municipal reformer from Rochester, New York, had become a leading proponent of "civic art" and town planning

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[14] Department of Labor, Bureau of Industrial Housing and Transportation, Report of the United States Housing Corporation 2 vols. (Washington DC: Government Printing Office, 1919), vol. 1, 185-187, vol. 2, 15-18. Plans of the projects are reproduced in the second volume of the report.

[15] Department of Labor, Bureau of Industrial Housing and Transportation, Report of the United States Housing Corporation, vol. 2, 497-504.

[16] Department of Labor, Bureau of Industrial Housing and Transportation, Report of the United States Housing Corporation, December 3, 1918 (Washington, DC: Government Printing Office, 1919), 74.

through numerous publications, beginning in 1901 with The Improvement of Towns and Cities. In 1913, Hull was one of four students who worked closely with Robinson on a city planning study (which was later published) that suggested planning strategies for the communities of Champaign and Urbana.[17] Hull then went on to receive his Master's degree in landscape architecture from Harvard in 1914. At that time Harvard professors Henry Hubbard and James Sturgis Pray would have been the principal influences on his education. After traveling in Europe, Hull began his professional career in California, where he planned the Montecito Country Estates subdivision in Santa Barbara with Francis T. Underhill.[18] He also worked for a San Francisco firm, Daniels, Osmont and Wilhelm, and his probable association with Mark Daniels at that point might explain how he later came to be chosen as Charles Punchard's assistant at the Park Service.[19]

From 1918 to 1919, Hull planned cantonments and hospital camps as an officer in the U.S. Army. Planning camps for the Army differed substantially from designing new subdivisions for civilian factory workers; but basic town planning procedures were applied systematically in this aspect of war planning as well, again in large part because of Olmsted's influence. Olmsted, with E.P. Goodrich and George B. Ford, had offered the services of American planners to the Cantonment Division of the U.S. Army immediately in 1917, and the landscape architect subsequently played a central role organizing wartime cantonment planning. George Kessler, Warren Manning, and James Sturgis Pray were among the civilian planners employed by the Cantonment Division.[20]

Hull's early experience qualified him as one of the growing number of landscape architects who specialized in town planning. His education in "civic art" and "city planning" at Illinois and Harvard would have been reinforced by his professional work in California and by his military experience as a cantonment planner. After leaving the Army, Hull went to work at the National Park Service in August of 1920 as assistant to the ailing Charles Punchard. Since 1918, Punchard had picked up where Mark Daniels had left off as chief Park Service landscape architect: reviewing concessioners' plans, advising superintendents, and acting as a one-man art commission to assure that buildings and other proposed facilities were "harmonious with their surroundings" and "disturbed the natural conditions of the parks" as little as possible. Yosemite was a particular concern, and Punchard had continued work on a

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[17] University of Illinois, Notes for a Study in City Planning in Champaign-Urbana by the 1913 and 1914 Classes in Civic Design (Chicago: R.R. Donnelly and Sons, 1915).

[18] "Daniel Ray Hull," Mather Collection, Entry 135, RG 79, National Archives, Washington, DC.

[19] McClelland, Presenting Nature, 113. According to Park Service reports, Hull was living in Milwaukee at the time he was hired in July 1920. He probably had relocated earlier that year. Department of the Interior, National Park Service, 1920 Annual Report, 93. See also: Carol Roland, "Hull, Daniel Ray," in Charles A. Birnbaum and Julie K. Fix, eds., Pioneers of American Landscape Design II: An Annotated Bibliography (Washington, DC: Government Printing Office, 1995), 79-83.

[20] James Sturgis Pray, "Planning the Cantonments," Landscape Architecture 8, no. 1 (October 1917), 1-17. In recognition of Olmsted's contributions to planning the war effort, the American Society of Landscape Architects struck a bronze medal, the Olmsted Medal, and presented it to him at the end of 1918. Landscape Architecture 10, no. 2 (January 1920), 96.

village plan for the valley while being stationed there for over seven months between 1918 and 1919.[21] He advised that the new village north of the Merced River, which had been "for many years . . . the subject of much discussion," be divided into commercial, industrial, and residential "zones."[22] That summer he oversaw the construction of the new rangers' club (1920) in the proposed village area. Designed by Charles K. Sumner with steeply pitched roofs pierced by dormers, the facility recalled (at a reduced scale) concessioner architecture at Yellowstone and Glacier.[23]

Punchard died that fall, and Daniel Hull found himself, at the age of 30, the chief landscape architect of the Park Service. Park Service director, Stephen Mather, by that time had secured some of his most important early victories in Washington, including the amendment to the Federal Water Power Act that exempted the parks from becoming the sites of new power and irrigation dams. The "principle of complete conservation," Mather reported in 1920, "has been upheld." In not unrelated developments, Mather also dedicated the new Park-to-Park Highway route that year, "a truly national highway system" which provided "well-built feeders to the entrances of the various parks and monuments" and encouraged the "tremendous increase in motor travel to the parks" that had been underway for years. Appropriations for the Park Service exceeded $1,000,000 for the first time in 1921; but an ambitious Mather estimated that well over twice that amount would be necessary to meet just the "essential needs" outlined by his superintendents.[24] Hull had arrived at a turning point in the administrative history of the Park Service. The crusades and campaigns of the past were giving way to secure annual appropriations and bureaucratic growth. Hull would soon have opportunities to see plans and designs realized in ways that Daniels and Punchard had not.

Hull's first step was to establish headquarters at Yosemite Valley, a logical center for his Park Service activities where he could also remain in touch with associates and clients in Santa Barbara and Los Angeles. In February, he was joined by an assistant landscape architect, an old friend from University of Illinois days, Paul P. Kiessig. Kiessig traveled extensively that summer reporting on conditions in other parks.[25] Hull immediately made it known that he was not satisfied simply offering advice and reviewing concessioner proposals on an ad hoc basis. Immediate needs, however, demanded his attention: "The construction of parapets along dangerous roads, removal of poles and wires from conspicuous locations, improvement of springs to make them more attractive and at the same time more sanitary, screening objectional

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[21] Greene, Yosemite, vol. 2, 580-581.

[22] Department of the Interior, National Park Service, 1919 Annual Report, 26-27, 331-332.

[23] Mather himself financed the rangers' club, an indication of still inadequate Congressional appropriations. The building was made a National Historic Landmark for its architectural significance in 1987. Harrison, Architecture in the Parks, 199-210.

[24] Department of the Interior, National Park Service, 1921 Annual Report, 14-16, 22-23.

[25] Department of the Interior, National Park Service, 1921 Annual Report, 274-275. The Landscape Engineering branch of the Park Service apparently remained headquartered in Yosemite Valley until 1923. Olsen, Organizational Structures of the National Park Service, 34-35.

views by planting native materials," and other tasks occupied much of his and Kiessig's time. With only one assistant, Hull felt that "it has been difficult to give proper study to many of our most pressing landscape problems," such as planning "civic groups, or village plans" to centralize administrative and utility areas. Still, by 1922 Hull and Kiessig had begun "tentative general plans" for Yellowstone, Yosemite, Sequoia, Grand Canyon, and Mesa Verde.[26]

At Yosemite, where the most pressing need for a new park village plan continued to be felt, the Los Angeles architect, Myron Hunt, was hired as a consultant. The annual meeting of park superintendents, held at Yosemite in 1922, had pushed the issue of planning future improvements for the valley to the forefront. "For years," Hull reported that year, "the building of [the new village] and the elimination of the present dilapidated shacks . . . has been considered essential both from the standpoint of practical operation and landscape effect."[27] Hunt and Hull collaborated on the village plan, which in 1923 finally set the shape of the new village on the north side of the Merced. The nature of Hunt and Hull's collaboration on the plan remains uncertain. Hull clearly credits Hunt with the plan, which was selected from among several alternatives by James Greenleaf and the other members of the Commission of Fine Arts. The plan, however, was entirely unlike Myron Hunt's orthogonal campus plans of the previous decade. Devoid of grand axes and monumentalism, the plan for Yosemite Village epitomized the priorities for park planning that had been articulated by Mark Daniels and others since 1914; the plan also embodied the principles of town planning that Olmsted had described for his World War I planners, and which had been inculcated in the young Hull through his education and professional experience.

Even while Yosemite received this attention, Hull was actively planning other national park villages. At Sequoia, where automotive tourists had also begun to swarm, Hull worked on a new village plan for the edge of the Giant Forest, where visitors would be less likely to compact root zones and damage the trunks of the great trees as they did when camping in the forest itself. A new administrative village was also planned on the park's western, Ash Mountain entrance.[28] At Mesa Verde, a park village was also being constructed in the early 1920s, beginning with the construction of a unique superintendent's residence in 1921. The buildings of the administrative core of the Mesa Verde village, designed primarily by superintendent Jesse Nussbaum and his wife Aileen, were constructed of sandstone blocks and had flat roofs supported by viga poles. The village again exemplified how a unified architectural ensemble could be conceived as a contextual element of the larger landscape scene. In this case, the ethological study of "early modern Pueblo Indian" architecture provided an appropriate inspiration for a group of buildings that complemented and preserved

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[26] Department of the Interior, National Park Service, 1922 Annual Report, 157.

[27] Department of the Interior, National Park Service, 1923 Annual Report, 52-53; 184.

[28] Department of the Interior, National Park Service, 1922 Annual Report, 157; Tweed, et al., Rustic Architecture, 37.

the aesthetic qualities of the surrounding park scenery and archeological sites. Mather felt the architecture perfectly "fit in with the atmosphere of the park."[29]

The largest and most significant Park Service town plan being pursued in the early 1920s, however, was that for the south rim of the Grand Canyon. Park Service planning for the Grand Canyon began officially only in 1919, when long anticipated federal legislation finally transformed the national monument into a national park, and so transferred jurisdiction from the Forest Service to the Park Service.[30] Interest in the region as a tourist destination, however, had developed in the 1880s when the Atlantic and Pacific Railroad first reached Flagstaff. Although numerous attempts to finance a spur line to the rim of the canyon failed, stage services were soon initiated. By 1892, three regularly scheduled stages were making the difficult 60-mile journey to the very edge of the precipice, at a point christened Grandview. That year, the Santa Fe and Grand Canyon Railroad also began rail service to Anita, only 20 miles from the canyon. From that point a stage carried passengers to a hotel near the Bright Angel trailhead, nine miles west of Grandview. In 1901, the railroad extended its track all the way to this location on the rim, which had become the site of a growing settlement called simply Grand Canyon. Ever since, this area has been the principal point of arrival for visitors to the region.[31]

Proposed national park status for the Grand Canyon had always inspired influential support. No scenery in North America more obviously deserved such designation. Benjamin Harrison, while still an Indiana senator, had first proposed national park legislation in 1882. In 1893, he had the opportunity as president to declare the region a forest reserve, and he did so. Theodore Roosevelt, as well, had a personal determination to preserve the canyon from inappropriate development. In 1903 he visited the canyon, and in 1908 he enhanced its status as a public reservation by creating the 800,000-acre Grand Canyon National Monument.[32] In the meantime, the south rim railhead had grown into a small town; when Roosevelt visited in 1903, there was a post office, two voting precincts, a population of miners and, increasingly, of tourists. That year the Santa Fe Railway (through its subsidiary the Fred Harvey Company)

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[29] Jesse Nussbaum also personally carved and constructed the Mission Revival furniture for the administration building. Department of the Interior, National Park Service, 1923 Annual Report, 71; The six buildings at the core of the Mesa Verde administrative village, built mostly between 1921 and 1928, were made a National Historic Landmark District for their architectural significance. Harrison, Architecture in the Parks, 211-228.

[30] The Forest Service retained jurisdiction over national monuments created out of existing national forests until 1933, when Roosevelt transferred management of all the national monuments to the Park Service. The Forest Service had managed the Grand Canyon as a national forest since 1893, and as a national monument since 1908. Mackintosh, The National Parks, 24.

[31] Margaret M. Verkamp, History of Grand Canyon National Park [1940] (Flagstaff: Grand Canyon Pioneers Society, 1993), 22-23.

[32] Hal Rothman, America's National Monuments: The Politics of Preservation (University Press of Kansas by arrangement with the University of Illinois, 1989), 64-68.

began construction of its second hotel, the luxurious El Tovar. Several other tourist establishments continued to operate in the vicinity.[33]

Efforts to pass park legislation in Congress did not end with the declaration of national monument status; Secretary Ballinger advocated national park status for the region beginning in 1909. Park legislation met difficulties, however, due to complex local politics and conflicting interests among those who hoped to operate businesses on the south rim. Local entrepreneurs had used mineral claims (allowed even after the forest reserve designation) to assert sometimes dubious rights to develop tourist accommodations and guide services. For Fred Harvey and the Santa Fe Railway, national park status would be a welcome step not only to assure the more complete preservation of the area, but also to eliminate competitors: as a national park concessioner the railroad could hope to be granted a limited monopoly. The Forest Service, for its part, would have welcomed national park status. In 1914, Chief Forester Henry S. Graves held several meetings with Mark Daniels, and he subsequently described "an informal cooperation arrangement" with Daniels that allowed the national monument to "be administered along national park lines as far as possible." But Graves felt there was little the Forest Service could do to improve the situation until the General Land Office cancelled the "fraudulent" mineral claims that had been placed with the sole intention, he felt, of controlling public access to key points along the south rim.[34]

The Forest Service exacerbated the situation in 1915, year of the San Francisco World's Fair, when visitation to the canyon skyrocketed. As expected, thousands of California-bound tourists made side trips to national parks; but at the Grand Canyon, over 100,000 tourists arrived, a total greater than that for Yosemite and Yellowstone combined that year. In order to augment totally inadequate visitor services, the Forest Service had made an open invitation to local entrepreneurs to operate livery services. Enough cowboys and ranchers responded to the potential windfall that the scene on the south rim soon degenerated into what park historian Margaret Verkamp describes as "considerable unpleasantness." The noisy competition made support for creating a national park that much stronger.[35]

The Forest Service had attempted to plan the growth of the town of Grand Canyon, Arizona; with little expertise or funding for such work, however, their efforts had foundered. In 1909, forest examiner (later forest supervisor) W.R. Matoon produced a detailed "Working Plan for Grand Canyon National Monument." In it he described some of the problems of the young town, including the critical lack of water, inadequate sanitation, and few roads or trails from which tourists might view the scenery from surrounding points on the rim. Matoon felt a

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[33] Verkamp, History of Grand Canyon, 23-26, 39.

[34] Henry Graves, "Memorandum on Conditions at the Grand Canyon National Monument and Suggestions for Improving Them," November 23, 1914, Grand Canyon, General Files, Entry 749A, RG 48, National Archives, Washington, DC.

[35] Verkamp, History of Grand Canyon, 40; Rothman, America's National Monuments, 97. George Horace Lorimer, in particular, published a series of articles in the Saturday Evening Post in 1916 (with titles such as "Ballyhooing in the Temple") in support of legislation to make the Grand Canyon a national park. The number of visitors to the canyon quickly returned to about one third of the 1915 total in the following years.

scenic rim drive was particularly warranted. It was clear that some sort of conveyance along the rim would soon be built one way or another, and "all development along the rim," the forester urged, should be made "for the benefit of the public at large rather than in the interest of any individual or commercial enterprise." Matoon also recommended "thinning for scenic effect" along the rim, and the construction of seats and "rustic shelters" at the most popular points for viewing the canyon. Shelters consisting of "a roof, stained green, and resting on natural juniper posts," he pointed out, would be "in good harmony with the surroundings."[36]

In his general desire for "rustic" design details that would "harmonize" with the landscape, Matoon simply expressed the widely prevailing sensibility for construction details appropriate in the setting of a landscape reservation. In a separate report the next year, however, he proposed a more ambitious scheme for the planned extension of the town of Grand Canyon; and here the forester showed how useless "rustic" architectural inspiration could be when unaccompanied by correspondingly appropriate site planning techniques. Matoon's proposed "townsite plan" was no more than an even grid of four square blocks, subdivided into eight lots apiece; the new blocks were surveyed parallel to the train tracks, just south of the point at which the rails ended.[37] The plan, like countless railroad towns laid out in the 19th century, drew its geometry and orientation from its relationship to the railroad, not surrounding natural features. Far from a response to topography, the grid was laid out without the benefit even of a topographic survey.

In the meantime, the town of Grand Canyon had grown larger, with 300 to 400 permanent residents and a transient population that exceeded that number. Over 50 temporary and permanent buildings (including a school) had been erected by 1914, most of them since railroad service began in 1901.[38] After 1915, the Forest Service reactivated its planning efforts for Grand Canyon, in part due to the negative publicity generated by the events of that year's travel season. In 1916, Matoon's successor as forest supervisor, Don P. Johnston, teamed up with a new forest examiner named Aldo Leopold to author a "Grand Canyon Uses Working Plan." They began their report by acknowledging that visitors to the canyon were subjected to "offensive sights and sounds . . . unsanitary conditions . . . [and] inconvenient facilities," to name just some of the municipality's problems. Noting that federal ownership and administration of the monument allowed for the legal enforcement of "regulations" over both permitees and, importantly, over those entrepreneurs operating by right of mineral claims, Johnston and Leopold urged a far-reaching plan of land-use "zones" to restrict specific

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[36] W.R. Matoon, "A Working Plan for Grand Canyon National Monument," 1909, manuscript #17460, pp. 61, 85-87, 105. Grand Canyon Museum Collection, Grand Canyon National Park.

[37] W.R. Matoon, "A Townsite Plan for Grand Canyon National Monument," 1910, manuscript #17460. Grand Canyon Museum Collection, Grand Canyon National Park.

[38] Many of the railroad's facilities were constructed within the acreage granted as part of its right-of-way. Michael P. Scott, National Register of Historic Places Nomination for the Grand Canyon Village Historic District, typed manuscript (1995), p. 24. National Register nominations are available at the National Register of Historic Places, National Park Service, 800 North Capitol Street, Washington, DC.

land uses to specific parts of the town.[39] Johnston and Leopold implied (as did many city planners of the day) that land-use zoning could be a regulatory solution to the kinds of conditions plaguing the town of Grand Canyon. The "division of the ground into zones" and the "segregation of various classes of services," they insisted, could "reduce the offensiveness of material service as far as possible" and make it possible for visitors to avoid the sights and sounds of the mules, steam engines, trash, and offal that were the inevitable result of tourism to the canyon.

Municipal zoning plans and ordinances of this type, although widely discussed and occasionally employed in the United States by 1916, would only be fully validated by the Supreme Court in a series of decisions in the early 1920s. But Johnston and Leopold pointed out that the unusual situation of a city within a national monument made the implementation and enforcement of a zoning plan far more feasible than it would be among private property owners at that time. Their revised 1917 plan described seven zones, each with prescribed land uses and regulations: the "Rim Zone," the "Accommodation Zone," the "Residence Zone," the "Commercial Zone," the "Seasonal Camp Zone," the "Public Camp Grounds," and the "Stables Zone." As refined as these categories were, the authors did not neglect to specify a range of variances and grandfather arrangements that allowed "inferior use of a superior zone," such as the intrusion of Verkamp's Curio Shop in what was otherwise the most restrictive area, the rim zone. The foresters also determined the relative aesthetic merits of structures that might be considered "objectionable" or not, depending on the standards that applied for each zone.[40] Although Johnston and Leopold did consider the location of future development for the town, they offered little insight on what physical form expansion might take. Included as an appendix to their 1917 revision were Mary E.J. Colter's plans for Fred Harvey's proposed cabin group at Indian Gardens; but this was no more than an endorsement of the concessioner's proposals on the part of the planners.[41] The Grand Canyon Working Plan mainly sought to eliminate existing nuisances and stabilize future land uses for specific areas. The residential zone, for example, (located in approximately the same area Matoon had suggested) precluded hotels, stables, and stores; the rim zone allowed only trails, "rustic shelters," and inconspicuous signs. Seasonal and temporary camping were assigned each to specific areas, and each activity was limited to its proper location.

Johnston and Leopold's analysis would prove valuable for future park managers, and their 1917 plan revision did include a feature that Olmsted had called the first prerequisite of town planning: a detailed topographic survey. The planners did not, however, plat land for anticipated residential developments, nor did they delineate future streets or public spaces. In 1918, the Forest Service took the next step and engaged Frank Waugh to devise a more detailed, physical plan for the expansion of the town. Waugh's plan for the "Village of Grand

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[39] Don P. Johnston, Aldo Leopold, "Grand Canyon Uses Working Plan," 1916, manuscript #18555, Grand Canyon Museum Collection, Grand Canyon National Park, no page numbers.

[40] Don P. Johnston, Aldo Leopold, "Grand Canyon Working Plan," 1917, typed manuscript #28343, Grand Canyon Museum Collection, Grand Canyon National Park, no page numbers.

[41] The cabin group was never built at Indian Gardens, although Colter's Phantom Ranch, a similar cabin group on the floor of the canyon, was built in 1922.

Canyon," which took Johnston and Leopold's land-use zones as a starting point, was published separately that year. In the residential zone south of the railhead, Waugh proposed to subdivide lots along new streets that curved to conform to the gentle slope of the site. A "civic center" was proposed directly in front of the new Fred Harvey garage (1914), between the railroad tracks and the proposed subdivision to the south. This center, Waugh suggested, could be a "grassy parklike . . . public square," around which he proposed siting new stores, a federal building, a community club, and a church. Near the main automotive entry to the town (still via Grandview Road from the east) and across the tracks from the Grand Canyon Depot (1910), the proposed plaza would have provided a prominent civic space and a central arrival and gathering point for the village.[42]

Frank Waugh was more experienced as an educator and a garden designer, however, and at this point his plan descended into idiosyncracy. Suggesting that the canyon landscape required "some sort of introduction," Waugh proposed "a broad straight walk . . . rising by rustic stone steps" from Grandview Road directly up to the canyon rim, at a point just east of Verkamp's Curio Store. Extending in an equally straight alignment in the opposite direction, the new avenue, named "Tusayan Mall," cut through the proposed residential district and terminated in a proposed "aviation field" located, remarkably, on the high ground in the middle of the residential subdivision. The proposed mall also bisected the property of the new school (1917) "in an objectionable manner," Waugh admitted; but Fred Harvey's compound to the west left little alternative for siting a dramatic "introduction" to the canyon near the center of town. Other unusual features of the plan included an "automobile outlook" on the rim, and "Tusayan Garden," a botanic garden also located on the rim. The botanic garden, of course, was to feature only native plants.[43]

Even as Waugh made these proposals, however, the shift to Park Service administration had been widely anticipated for some time. In 1916, Mather had gone so far as to include the Grand Canyon in his National Park Portfolio. Charles Punchard, in his capacity of Park Service landscape architect, visited the canyon in January 1919, a month before the park legislation had even been signed.[44] Although the Forest Service continued to administer the new park for several months (while the Park Service awaited an appropriation) Mather's chief engineer, George Goodwin, and the new acting superintendent, William H. Peters, immediately assessed conditions at the park. Goodwin and Peters advised that as a first priority the road to Hermit's Rest be improved and opened to automobiles. They predicted that private automobiles, a growing presence in the park already, were about to increase in

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[42] Frank A. Waugh, A Plan for the Development of the Village of Grand Canyon (Washington, DC: Government Printing Office, 1918), 8-11. The Grand Canyon Depot was made a National Historic Landmark for its architectural significance in 1987. Harrison, Architecture in the Parks, 123-133.

[43] Such development on the rim of the canyon did not accord with the "Rim Zone" restrictions suggested by Johnston and Leopold. Waugh, Grand Canyon Plan, 14-16.

[44] Stephen Mather to Charles Punchard, September 3, 1919, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

number exponentially.[45] Annual park visitation had doubled since 1916 (to over 67,000 in 1919) and many of the new tourists were arriving in their own motor vehicles, making the arduous journey from Flagstaff to Grand Canyon via Grandview. That year Mather reported that the Grand Canyon was in need of "broad development" in a number of areas; but the widening and resurfacing of scenic rim drives to the east and west of Grand Canyon Village was "the most urgent work."[46]

After the construction of roads and trails, Mather described a second major category of concern as "administrative village betterments." He outlined a construction program, including new administrative buildings, residential quarters, campgrounds, utilities, and other facilities, which amounted to nothing less than a project to build a small city.[47] That winter, Charles Punchard returned to the canyon and met with Peters to consider issues such as the siting of the new Park Service administration building. In considering new construction at Grand Canyon, Punchard asserted in a letter to Mather that "too great a variety in architecture . . . is going to make the place look like a jumble." He felt that it would be best to "adhere to the free rough [sic] which has been done by the rail road company in its small rest houses and curio stores, or else to the adobe architecture which is indigenous."[48] For his part, Mather had made it policy that no permanent buildings were to be erected in any park without the prior approval of the Park Service landscape engineer.[49] Inexperience, however, took its toll. Despite Goodwin's assistance estimating the cost of road improvements, Peters drastically overspent his first year's budget and bankrupted the park even before its official dedication, which had been delayed until April 1920. Mather was forced to personally plead with the Fred Harvey Company to assist with routine maintenance for the remainder of the fiscal year.[50]

Congress soon increased appropriations, however, and visitor numbers continued to climb. As Daniel Hull took charge of landscape engineering in the fall of 1920, Grand Canyon National Park, like Yosemite, was poised to undergo a major development program. Hull remained headquartered at Yosemite, but he visited Grand Canyon that winter. He sent Kiessig to the park at least twice, the second time for the entire summer of 1921 while the new

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[45] George Goodwin to Stephen Mather, August 17, 1919, Grand Canyon, General Files, Entry 749A, RG 48, National Archives, Washington, DC.

[46] Department of the Interior, National Park Service, 1919 Annual Report, 96.

[47] Department of the Interior, National Park Service, 1919 Annual Report, 96-98. Mather makes no mention of Waugh's village plan, which was not implemented. Punchard dismissed Waugh's plan lightly, and wrote to Goodwin that he was "sure that the Forest Service plan [could be] improved upon." Charles Punchard to George Goodwin, September 3, 1919, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[48] Charles Punchard to Stephen Mather, July 28, 1920, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[49] Department of the Interior, National Park Service, 1921 Annual Report, 57.

[50] Stephen Mather to Ford Harvey, March 15, 1920, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

administration building was being built.[51] The opportunity to design the Grand Canyon administration building, and soon other buildings at Grand Canyon, gave Hull a unique chance to affect the course of Park Service architectural style and planning procedures. He noted that the situation at Grand Canyon, where the park was being administered out of a few temporary shacks and the superintendent was housed in an old log cabin, presented an opportunity for a "practically new field in administrative development." And it is significant that his design of new administrative buildings in the early 1920s proceeded in tandem with the delineation of a new town plan for the village. In 1920, Hull and Kiessig undertook a "careful study of the landscape," which resulted in "the adoption of a layout for future development."[52] Using the 1917 topographic survey as a base, Hull sketched initial suggestions for the town plan and distributed them for review early in 1921.[53]

Hull's training as a landscape architect/town planner was evident in his sensitivity to existing natural features. Circulation at the site had already been determined to a large degree by topography: both the railroad approach (from the west) and the Grandview Road (from the east) followed the natural right-of-way of the Bright Angel drainage, a long swale parallel to the canyon, typically at an elevation about 50 feet below that of the south rim itself. Hull proposed a large "village square" (as Waugh had) at the point where the railroad and motor road came together below El Tovar in the usually dry bed of the drainage. The new administration building was sited on the north side of the proposed square, slightly elevated on the slope leading up to the rim. The elevated site made the administration building, which also served as a visitor center and contact station, a prominent feature for visitors arriving by train or car. Like most of Hull's proposals for Grand Canyon, however, it was well away from the rim itself, which remained unencumbered by botanic gardens or other "introductions."

The rest of the proposed administrative development of the new town was even farther from the rim, on the south side of the natural divide offered by the Bright Angel drainage. The land to the south of the drainage was, itself, naturally divided into two small hills, divided by a central, north-south swale perpendicular to the larger swale of the Bright Angel drainage. Hull proposed a central road down this smaller swale, with residential subdivisions on either side.[54] The effect was to create two neighborhoods which were subsequently assigned to Fred

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[51] Arno Cammerer to DeWitt Reaburn, October 12, 1921, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[52] Department of the Interior, National Park Service, <u>1921 Annual Report</u>, 102.

[53] Assistant Director Cammerer (acting for Director Mather) approved sketches for the "tentative layout" of the village in 1921. Arno Cammerer to Daniel Hull, March 17, 1921, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC. Only one print of Hull's early sketches for Grand Canyon Village has so far been recovered; signed by Hull and dated July 18, 1922, it is drawn (like the 1917 survey) at one inch to 100 feet with five-foot contour intervals. "Grand Canyon National Park, Tentative General Plan," Central File, Entry 6, RG 79, National Archives, Washington, DC. Official correspondence contains numerous references to earlier sketch plans, however, which were distributed to Mather and others for approval in 1921, and which must have shown more or less the same arrangement as this 1922 sketch.

[54] A portion of this road already existed at the time of the 1917 survey, and was used to access horse and mule pastures that covered the sites of the proposed subdivisions.

Harvey staff (to the west) and Park Service personnel (to the east). Already evident, as well, was some indication that Hull intended each subdivision to have its own character. To the west, three parallel streets all curved to suit the slope and each connected to the perpendicular center road, forming a gently curved grid. On the other side of the road, only one main entry to this considerably smaller development implied an extended cul-de-sac arrangement. A new Park Service utility area also on the east side (where it was convenient to the Park Service residences) was arranged orthogonally; the arrangement of utility buildings created central work yards that were well screened from the nearby residential area.

Hull also exploited the character of the existing vegetation. While the subdivisions were proposed on lightly wooded, well drained slopes, almost no new building was proposed in the Bright Angel drainage. This preserved a fine stand of Ponderosa and Pinyon pines, typical vegetation found in the moister soils of ~~a~~ such a drainage. These trees reinforced the division between the accommodation zone near the rim and the new residential and utility zones to the south. The older resort development (already long established on the rim of the canyon) was also accommodated in the new village plan. The hotels along the rim established their own land-use zone, as the Forest Service planners had observed, which was respected in the new village plans. The Fred Harvey utility area, which had been developed along the railroad right-of-way on the west side of the town, also created its own zone, in this case characterized by livery barns and mule corrals. These existing uses helped determine Hull's overall layout; the new Fred Harvey residential area, for example, was on the west side of the new village, in order to be more convenient to the existing Fred Harvey utility area.

The basic spatial organization and zoning implied in Hull's early sketch were suggested by topography, vegetation, existing development, and circulation needs in the village area. Hull's village plan, which was already taking shape in 1920, would become (with some important alterations) the essential blueprint for construction in the village over the next 20 years. The town planning methods he employed established a basic procedure for planning new "park villages" that protected the visual character of the surrounding scenery, and responded both to natural features and to the demands of maintaining and ameliorating earlier tourist developments.

This was not, however, Hull's only contribution to Grand Canyon Village at this time. While at Yosemite and elsewhere Hull often collaborated with architectural consultants in the design of new administrative facilities; beginning in 1920 he had the chance to design his own buildings at Grand Canyon. Hull's Grand Canyon administration building, which was serving visitors as well as park managers by the end of 1921, helped define what would later be described as Park Service Rustic architecture two years before Myron Hunt and Gilbert Stanley Underwood undertook their Yosemite commissions.[55] At the lower level of the two-story structure, Hull employed Kaibab limestone, heavily rusticated and laid in a random

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[55] Numerous items of correspondence make it clear that Hull designed buildings as well as landscape plans as part of his work. A letter from Cammerer in 1921, for example, specifically states that Hull designed the administration building and other buildings at the Grand Canyon. Arno Cammerer to Daniel Hull, March 17, 1921, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC. In 1921 Hull also designed a more modest administration building for Sequoia and a log cabin entrance station for Rocky Mountain. Tweed, et al., Rustic Architecture, 31-32.

ashlar pattern. The upper level, sheathed in darkly stained board and batten, was dominated by the intersecting gables of the broad, wood-shingled roofs.[56] As was Myron Hunt two years later, Hull clearly was familiar with contemporary California Arts and Crafts architecture. He also had the example of earlier "rustic" park buildings built by concessioners. The buildings Mary E.J. Colter had designed for the Fred Harvey Company must have made a particularly strong impression; she had already completed Hopi House (1905), Hermit's Rest (1914), and the Lookout Studio (1914), which together had determined the fanciful character and high quality of the resort architecture along the rim itself.[57] The first administration building at Grand Canyon, however, remains today as clear evidence that Park Service Rustic architecture did not develop independently from park planning, but as a consistent formal articulation of the same principles that guided the overall landscape development effort that was underway at the Park Service.

The designers of landscape parks, really from the 18th century on, had vigorously reiterated that buildings were appropriate in the landscape park setting only to the degree that they contributed as visual elements in perceived landscape scenes. Perceptions of scenery therefore ultimately determined the appropriateness of any architectural additions to the landscape; and perceptions of scenery had been shaped through a long history of the artistic genres of landscape, not the history of architecture. Painting (and later photography), descriptive poetry (and later travel guides and other literature), and landscape design (in the United States the design of large public parks in particular) had established over many years sensibilities of what defined an appropriate architectural image in landscape scenery. Whether the cottage vernacular of Lancelot Brown's landscapes, the Shingle style of Franklin Park, the Mesa Verde Pueblo style, or Park Service Rustic, "appropriate" park buildings shared an initial inception as visual elements of another, previsualized artistic composition--the landscape scene--which to some degree predetermined the desired visual character of new construction. Since the 18th century, park designers had attempted to evoke some variation of local vernacular construction technique and craftsmanship in the design of park buildings. In the same vein, the construction materials employed often were (or appeared to be) drawn from surrounding forests and quarries. Such construction conformed to expectations derived from artistic genres of landscape, and therefore resulted in buildings that did not conflict with the desired appreciation of land as landscape, and places as scenery. As Mather would say, such architecture "fit the atmosphere of the park."

Since at least the 1880s, some form of "rustic" architecture had been deemed appropriate in larger scenic reservations of all types, including national parks. Virtually everyone involved

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[56] A new wing was added to the first administration building when it was converted into the superintendent's residence in 1931. In the early 1980s the interior was remodeled to serve as an office annex for the Fred Harvey Company. Billy Garret, "Adaptive Reuse: The Superintendent's Residence at Grand Canyon National Park," Cultural Resource Management 7, no. 4 (December 1984), 6-7.

[57] Colter's architecture, however, emphasized anthropological allusions and elaborate masonry effects that were more suited to resort architecture than to official Government buildings. Hull would have also been familiar with Colter's plans for tourist cabins at Indian Gardens that had been inserted in the 1918 Forest Service Working Plan. Four of Colter's south rim buildings (including her 1931 Desert Watchtower) were made National Historic Landmarks for their architectural significance in 1987. Harrison, Architecture in the Parks, 99-121.

in early national park management, including Army engineers, railroad executives, and Forest Service supervisors, agreed that proposed architectural development should "blend" and "harmonize" with its surroundings. The physical characteristics of such architecture included dark wood siding, prominent wood shingled roofs, heavily rusticated or boulder masonry, and peeled log walls, columns, and trusses; the success of Robert Reamer's Old Faithful Inn in 1903 had cemented this association in the popular imagination. What Daniel Hull brought to the Grand Canyon Village in 1921, however, was landscape architectural design that used such "rustic," or naturalistic, architectural construction as a logical extension and consistent expression of an overall strategy for park development. The precedent of municipal and regional landscape park design of the Fairsted School therefore provided the essential model. Since the days of the elder Olmsted and Charles Eliot, naturalistic design details had been applied in municipal and regional landscape parks not only in the design of individual buildings, but in coordinated schemes of park development that included roads, bridges, guardwalls, and drainage structures, as well as in shelters, comfort stations, and other buildings necessary for the convenience of park visitors.

Working within this tradition of landscape park development (which ultimately referred back to the design techniques and formal vocabulary of the Fairsted School) Hull designed buildings at the Grand Canyon that were conceived as formal expressions of an overall landscape development plan. The construction details employed in his administration building, for example, were consistent with the materials and workmanship eventually employed in the needed roads, guardwalls, trails, signs, and other built features of Grand Canyon Village. In the setting of the 20th-century landscape park, "rustic" architecture did not imply the splendid, if isolated, presence of an Old Faithful Inn or an El Tovar; such architecture formed one element of a coordinated, understated landscape development scheme, governed above all by the "comprehensive plan" that assured all parts were expressions of a unified artistic purpose. Hull's Park Service Rustic architecture, unlike earlier park architecture sponsored by concessioners, emanated from the overall landscape plan; the scale, location, and character of individual buildings depended on their place as elements of that plan. Each structure, large or small, was calculated as a contribution to the larger work of art, the unified artistic expression that the elder Olmsted would have called the "single work of art . . . framed on a single, noble motive": the landscape park.

For Mather, Hull, and others that shared these cultural assumptions regarding the development of landscape reservations in the early 20th century, architecture considered suitable to form part of a landscape scene--architecture that Mather would have felt "harmonized" with the landscape--depended above all on the visual qualities of that landscape. The architecture itself might vary significantly from park to park; what made buildings appropriate for the landscape park setting did not depend on specific construction or materials as much as stylistic consistency and contextuality. Hull's early Park Service Rustic buildings became the basis of architectural uniformity in Grand Canyon Village (and in other park villages) and therefore averted the potential "jumble" that had so alarmed Punchard. The Nussbaums' design for the Pueblo style superintendent's residence at Mesa Verde in 1921 served a similar purpose. The subsequent construction of the park village at Mesa Verde in the 1920s extended the use of the same architectural idiom, again creating a stylistically unified village, which because of its unity more easily contributed as an element in the perceived landscape scene. In each case, the unified visual impression of the village was calculated to correspond--and to contribute--to a previsualized image of landscape scenery. National park architecture, whatever its visual characteristics, would be successful only if it contributed to the culturally determined aesthetic perception of landscape scenery considered appropriate to the specific region.

Seen in this light, Myron Hunt's 1923 administration building at Yosemite succeeded, as did his town plan for Yosemite Village that year, primarily because the architect wisely chose to meet the criteria for national park landscape development that Daniel Hull had already begun to establish at Grand Canyon Village. In both cases, the separation of different uses characterized the overall town plan. Utility areas, laid out orthogonally, were well separated but convenient to residential subdivisions. Visitors arrived at open "plazas," defined in part by the facades of the most important public buildings of the village, which together established the civic zone of the village. The buildings themselves expressed a unified, pseudo-vernacular architectural ensemble. These procedures and priorities represented standard town planning practice of the day, as described by Unwin, Olmsted, and Nolen; and it was Hull's training and experience as a landscape architect/town planner that assured the consistent application of these procedures in the national park system.

Hull, assisted by Kiessig, designed numerous other buildings for Grand Canyon at this time, some of which were built. By May of 1921, Hull's locations for the "cottages" for railroad employees had been determined, and the first bungalow in the Park Service residential area was completed in 1922.[58] A dormitory, community buildings, and other buildings were still on the drawing boards, however, when the entire planning effort at Grand Canyon was temporarily derailed in 1922. At that time, Mather was at the height of his disputes with Ralph H. Cameron, a well connected entrepreneur who was elected to the United States Senate in 1920. Cameron, who was a principal holder of the opportunistic mineral claims on the south rim, used his position in Congress to promote his interests in Arizona--and to vilify Mather on Capitol Hill. Animosities raged for years, but Cameron's mineral claims on the south rim remained embedded.[59] Partly as a result, early in 1922 Mather suffered his second nervous breakdown since assuming his work for the Park Service. Horace Albright, while visiting the Grand Canyon that spring, discovered that the Fred Harvey Company had engaged a prominent Chicago architect, Pierce Anderson, to redesign the entire Grand Canyon Village plan around a proposed multi-million dollar hotel complex. Although the timing may have been suspect, the offer by the concessioner to invest millions of dollars in new visitor facilities was received warmly. Albright and Cammerer (acting for Mather) instructed Hull to suspend

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[58] The cottage locations were approved by superintendent Reaburn and Director Mather. Daniel Hull to DeWitt Reaburn, May 28, 1921, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC. The Santa Fe cottages were designed by the railroad's architect, William H. Mohr. For the dates of construction and other details for all the buildings in the Grand Canyon Village Historic District, see Scott, "Grand Canyon National Register Nomination."

[59] Cameron had a long history on the south rim. He had built and operated a hotel at the site of the Bright Angel Lodge, and for many years he charged a toll for the use of the Bright Angel Trail. See: Douglas Hillman Strong, "The Man Who `Owned' Grand Canyon," The American West 6, no. 5 (September 1969): 33-54; Albright and Cahn, Birth of the National Park Service, 169-186.

all planning efforts until Pierce Anderson had presented his plans; the famous architect's proposals were to take precedence.[60]

A new community building designed by Hull, a new store planned by the Babbitt Brothers, and several other projects were immediately "put on hold" until their final locations in the new plan could be determined. Hull continued, nevertheless, to consider his plans for the village. Cammerer, responding to some restlessness on Hull's part, wrote to him that summer telling him again to "stop all work on the Grand Canyon plans . . . with the idea of cooperating with the general development scheme . . . entrusted to Pierce Anderson."[61] By December, Hull had still not met with Anderson. In response to Hull's inquiries, the new superintendent at the Grand Canyon, Walter W. Crosby, confessed that he "knew nothing of Mr. Anderson's plans," nor could he "get any definite line on them." Anxious to spend the appropriated money for the new community building, Crosby took the unusual step of encouraging Hull to make his case directly to Mather (who by then had resumed his duties) in order to get access to Anderson's plans.[62] Mather, however, had not seen the plans himself; he was as distraught as Crosby at the necessity of delaying the Babbitt Brothers' store and other needed buildings. Cammerer wrote to Ford Harvey (president of the Fred Harvey Company) stating roundly that "we are shortly going to be up against it with the location of some new buildings at the Grand Canyon." They were waiting, he added, to know what Anderson's plans would look like.[63]

They continued to wait. But Pierce Anderson had fallen gravely ill soon after receiving the Fred Harvey commission. Although that January the plans had already been delayed "somewhat longer than we expected," according to Cammerer, it was not until the following October that he and Mather finally reviewed several alternative "general layouts" in Anderson's Chicago offices. Shortly after the meeting, however, Anderson returned to the hospital, critically ill. In the meantime, Mather explained apologetically to Hull that he "fully realized the perplexities you and Colonel Crosby have been in . . . [but] the fact is we have not yet got an approved plan."[64] Superintendent Crosby, for his part, was exasperated;

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[60] Arno Cammerer to Daniel Hull, April 7, 1922, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC. Anderson, a principal of the Chicago firm of Graham, Anderson, Probst & White, had trained in Paris and was an accomplished master of early 20th-century neoclassism: he is best known as the architect of Union Station (1902) in Washington, DC, and as Daniel Burnham's assistant in planning the Philippine summer capital of Baguio (1903). It would be difficult to suggest two projects, however, more antithetical to the design and planning efforts underway within the Park Service in the 1920s.

[61] Arno Cammerer to Daniel Hull, July 26, 1922, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[62] William Crosby to Daniel Hull, December 10, 1922, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[63] Arno Cammerer to Ford Harvey, January 4, 1923, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[64] Stephen Mather to Daniel Hull, December 18, 1923, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC. Hull had finally met that August with "the architect employed by the operator" at Grand Canyon. He reported that "various schemes" were being considered. Department of the Interior, National Park Service,

virtually all permanent construction in the park had been stalled for 18 months. The new community building was a particular sore point; but the superintendent had a long list of buildings, especially utility buildings and employee residences, which had been delayed.[65] In January 1924, after another visit to Chicago, Mather communicated to the new superintendent at Grand Canyon, J. Ross Eakin, that "on account of Pierce Anderson's illness, things are more or less at a standstill as regards the landscape plans at Grand Canyon."[66]

The standstill had continued long enough. Anderson's long illness may or may not have affected the Fred Harvey Company's plans, but at about the time the architect died in February 1924, the concessioner decided to delay the construction of a new hotel. That spring, Hull (who in the meantime had completed the village plan for Yosemite with Myron Hunt) drafted a new plan for the "community development" at Grand Canyon. The new plan essentially improved and elaborated the village scheme he had been developing all along. Hull signed the plan, dated June 1924, and Mather, Superintendent Eakin, and Ford Harvey subsequently approved it.[67] Mather attributed the plan to "Park Service landscape engineers, the Santa Fe System engineers, and Fred Harvey officials." Myron Hunt was also thanked for his "advice and assistance."[68]

The new plan did differ in several regards from Hull's earlier sketches. Most importantly, a new automotive approach from Williams allowed a main entrance from the south, rather than the east. This plan transformed Hull's earlier center road between the residential subdivisions, making it the new South Entrance Road. Because the entrance road followed a natural valley, the residential neighborhoods remained relatively undisturbed on either side of the through road. The new automotive entrance also brought visitors to the center of Grand Canyon Village, rather than to its east side. As early as 1922, Hull had probably already decided to relocate the town's principal civic space, the "plaza," to this central arrival point. This plaza, which was originally intended as a large open square, figures prominently in its new location in the center of the 1924 plan. The new Babbitt Brothers' store, the post office, and a second park administration building were all sited around the plaza (as was a proposed museum that was never built). Like the plaza in the 1923 Yosemite plan, the Grand Canyon plaza also terminated the automotive entrance into the village. In both cases, these plazas became prime parking locations, eventually detracting from their usefulness as gathering places. Overall,

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1923 Annual Report, 57, 189.

[65] William Crosby to Daniel Hull, November 13, 1923, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[66] Cammerer quoted Mather directly in his own letter to the Grand Canyon superintendent. Arno Cammerer to J. Ross Eakin, January 8, 1924, Grand Canyon, Central Files, Entry 6, RG 79, National Archives, Washington, DC.

[67] Drawing NP.GC/46, Technical Information Center, Denver Service Center, National Park Service, Denver. The plan was drawn at one inch to 100 feet without the contour lines of earlier sketches. Tree masses were rendered in this presentation drawing.

[68] Department of the Interior, National Park Service, 1924 Annual Report, 39-40.

however, the redesigned entry and plaza combination vastly simplified and centralized the Grand Canyon Village plan.

Another major change from Hull's earlier plans involved the expansion of future hotel accommodations on the rim. Ford Harvey had made it clear that, sooner or later, his company would like to expand its operations significantly. Mather welcomed such cooperation from the concessioner, who was widely reputed to run the finest hotels in the Southwest. On the 1924 plan, Hull indicated that El Tovar would be expanded with a new western annex, and that the Bright Angel Camp would be completely rebuilt. Two sites east of El Tovar were also set aside: one for a "new first-class hotel for future consideration" and a second for a "proposed casino." Both presumably represented the remnants of Pierce Anderson's proposals for the Fred Harvey Company. Near the site of the existing Fred Harvey mule barns and utility buildings along the railroad tracks Hull proposed a consolidated complex of power house, laundry, and public garage. The mule barns and other buildings were to be relocated to an area along the southern arm of the railroad wye at the western edge of the village.

Over the next decades, the approved 1924 plan guided the development of Grand Canyon Village, although numerous alterations were made. The new hotel and casino complex was never built, nor was the annex to El Tovar. The Fred Harvey mule barns remained in their original locations, and the new power house and laundry (1926) were built next to them.[69] Perhaps most significantly, the plaza was reduced in size, and apparently from an early date it was used for parking. The first administration building, located near the original site of the proposed "town square," ended up fronting on the busy intersection between Grandview Road, the access to El Tovar, and the new main route to the town center.

With the approved plan finally in place, however, construction in the village proceeded rapidly. Between 1924 and 1933, 16 new bungalows, duplexes, and assorted garages were built in the Park Service residential subdivision. Several buildings were added to the nearby Park Service utility area, and a new park hospital (1930) was completed. During the same period, on the concessioner's side of town, the Santa Fe Railway completed over 50 new residences, garages, and other structures along the three parallel curving streets that Hull had designated.[70] This building campaign was directed primarily by Hull and, after 1922, by a new assistant landscape architect, Thomas C. Vint. When Hull left the Park Service in 1927, Vint continued as chief landscape architect. Also in 1927, Minor R. Tillotson replaced Eakin as superintendent, and for the next 11 years "Tilly" Tillotson oversaw and managed the most intensive period of development in the park's history.

The new residential areas at Grand Canyon Village continued to be built along distinctive lines. On the Park Service side, the cul-de-sac arrangement allowed automobile access to the back (kitchen) sides of residences; the front doors therefore opened onto communal public space and connected to informal pedestrian routes leading to school and work. In the 1930's

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[69] The powerhouse was made a National Historic Landmark for its architectural significance in 1987. Harrison, Architecture in the Parks, 257-267.

[70] Scott, "Grand Canyon National Register Nomination," 7-18.

(under Vint's direction) these implied routes were paved in asphalt and lined with rounded pieces of limestone set as curbs. Pedestrian and automotive circulation remained fully separated in this arrangement, and the network of pedestrian paths became fully integrated into the pedestrian paths elsewhere in the village. The arrangement established a hierarchy of semi-public and public spaces and enabled a convenient pattern of daily pedestrian circulation for residents. This type of arrangement would later be called "the Radburn idea," after the New Jersey subdivision designed by architects Clarence S. Stein and Henry Wright in 1929; its application at Grand Canyon Village, however, appears to have been underway at least several years earlier.

The Santa Fe Railway (Fred Harvey) residences on the other side of the South Entrance Road demanded a different treatment. This larger subdivision had been designed as a grid of connected streets, and the standard cottage designed by the concessioner's architect was slightly larger and more elaborate than the simple Park Service bungalows. Generously set back, the front doors of the cottages faced the streets, lending the neighborhood an entirely different character. Access to garages set at the rear of building lots required long alleys, parallel to the streets, down the center of the blocks. This arrangement introduced yet another street type to the hierarchy of street sections being developed by Hull and Vint. Within the residential areas alone at Grand Canyon Village, there were five distinct street types: . pedestrian paths lined with front entrances; a narrow main street lined with back entrances and garages; a slightly wider main street lined with the fronts of houses; service alleys; and the South Entrance Road itself, carrying through traffic. On the Park Service side, houses were organized along a (modified) cul-de-sac; on the concessioner's side, all the alleys and streets connected in a grid. The new Park Service utility area, with its very wide, rectilinear streets, featured a sixth typical street section. This refinement in the hierarchy of street types typified the contemporary town plans of, for example, John Nolen. The sophistication of circulation patterns, the varied modes of residential entrances, and the emphasis on the development of public and semi-public outdoor spaces were all lessons of British "garden city" planners, disseminated in particular through Unwin's 1909 textbook. The studied response to topography, vegetation, and natural systems that made this kind of town planning so particularly appropriate in a national park setting had been promulgated by F.L. Olmsted, Jr., in his various capacities as the leading planning professional in the United States. Grand Canyon Village epitomized the most skillful town planning techniques of the day.

One of the most important features of any successful town plan of this type was the central civic space. The town square typically served as a hub of circulation, an arrival point, and the site of the community's most important public buildings. At Grand Canyon, the Babbit Brothers' store finally opened in 1926 on the southern edge of the plaza, where Hull had sited it in 1924. In 1929, Thomas Vint contributed one of the most important buildings in the entire village, a second administration building, also located on the new plaza (where it had been sited in the 1924 plan). Vint's two-story building, now considered one of the finest existing examples of Park Service Rustic style, again featured a lower level of rusticated limestone and an upper level of dark wood siding surmounted by intersecting roofs covered in wood shingles. In this case the stone foundation extended up into the second story in massive rectangular piers reaching almost to the roofline. Peeled log columns set on the piers carry the roof beams and frame walls of dark wood siding pierced by windows.[71] As in many classic Park Service Rustic structures, neither the rough courses of stone nor the peeled logs serve their apparent structural purposes; the building does, however, project a powerful image representing the civic administration of the park. The presence of the second administration building dominated the Grand Canyon town plaza, and the peeled log trusses and rough stone or boulder masonry came to be completely identified with the scenic wonders of the Grand Canyon--and of national parks in general. For many park visitors, the decorative facades of the Park Service Rustic style also came to visually embody another aspect of the increasingly convenient national park system: the efficient and ethical management of national parks by a modern government bureau.

Other parts of Grand Canyon Village were developed before 1933 as well, including the Fred Harvey tourist cabin complex west of the railroad wye. After 1933, however, when the copious funds and abundant manpower of Franklin Roosevelt's New Deal suddenly were available to the Park Service, construction in the village received new impetus. By 1941, when the Civilian Conservation Corps and other New Deal programs effectively came to an end, over 70 new buildings had been built, including residences, utility buildings, tourist cabins, dormitories, a new school, a firehouse, and a new post office (the last located next to the Babbit Brothers' store on the town plaza). During the same period, the Fred Harvey Company redeveloped the Bright Angel Camp area and built the Bright Angel Lodge (1935), a motor lodge and cabin complex. Mary E.J. Colter, who designed the new lodge with Robert L. Nussbaum, had already done more than anyone to determine the character of commercial development along the rim. The Bright Angel Lodge was her last and most ambitious contribution to the development along the rim of the Grand Canyon. Less imposing and more decentralized than El Tovar, the new facility was geared to the more middle-class clientele that typically arrived by automobile. The low, sprawling complex incorporated several historic cabins in the area, and as a whole it maintained a low profile along the canyon rim. The interiors, as in all Colter's buildings, featured fantastic stone fireplaces, Hopi rugs and other crafts, and handcrafted furniture and details.

The presence of up to four Civilian Conservation Corps (CCC) camps in Grand Canyon National Park between 1933 and 1941 was especially significant for the Grand Canyon Village itself, since large numbers of youths could be employed there in labor intensive tasks such as digging utility lines and sewers, paving roads and trails, and smoothing and regrading roadsides. Two CCC camps ultimately were located in Grand Canyon Village itself: the first near the Park Service utility area and the second south of the residential area. The initial camp at Grand Canyon Village was made up almost entirely of Texas boys, who like other CCC recruits, were from families that had been receiving some sort of public relief.[72] The recruits, working under the supervision of locally experienced men as well as the (now more numerous)

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[71] The second administration building was made a National Historic Landmark for its architectural significance in 1986. Harrison, Architecture in the Parks, 301-309.

[72] Arizona, New Mexico, and Wyoming were subsequently represented as well. Each camp consisted of 100-200 recruits. "Narrative Reports Concerning ECW (CCC) Projects in National Park Service Areas, 1933-35," Arizona, Entry 42, RG 79, National Archives, Washington, DC.

Park Service landscape architects, built many of the most significant landscape structures in the village during the 1930s. The stone guardwall along the canyon, although portions of it dated back to 1905, eventually was completed and regularized along its length. It was complemented by the treatment of the rim trail, which like other heavily used footpaths in the village was paved in "oil bound macadam" to a width of five feet and lined on either side with pieces of limestone set as curbs. "Log seats" were set at advantageous points along the trail.[73] The last traces of wooden boardwalks and fences along the rim were removed during this period, and the flagstone esplanade in front of the Bright Angel Lodge was completed in 1939. Stone walkways, stairs, and retaining walls were built all around the village, including the wall around the mule corral at the head of the Bright Angel Trail. CCC recruits also completed numerous headwalls, culverts, and catch basin structures throughout the village.[74]

In general, the Park Service landscape architects and CCC foremen made a point of preserving existing vegetation, even relocating trenches for sewers and utility lines, for example, to minimize the damage to the roots of trees. In one of the most successful road projects in the village, the main road between the Fred Harvey garage and the town plaza (along the south edge of the railroad tracks) was replaced by two new roadways, which were separated by a straight, 30-foot wide mall. This type of mall was a favorite device of Thomas Vint's; he used it at Yellowstone, Glacier, and other parks during the 1930s. In this case, the two roadways, each carrying one-way traffic, were laid out on either edge of the mature grove of Pinyon and Ponderosa pines that remained in the Bright Angel drainage. The effect fully exploited the beauty of the trees, and probably also preserved more of them than a single two-way road would have.

Perhaps most significantly for the appearance of the village, scores of CCC boys were also employed in the difficult and time consuming tasks of improving soils and transplanting native trees and shrubs from surrounding areas. Few plans exist for landscape work of this type, and apparently much of it was directed in the field by the crew supervisors and by the Park Service landscape architects who oversaw all the work being done by CCC recruits.[75] The work is described in some detail, however, in reports submitted by CCC project superintendents to Superintendent Tillotson. Assistant and resident Park Service landscape architects also made regular and detailed reports to Vint, and both types of reports included photographs of construction progress and activities.[76] The work typically involved transplanting native plants in areas damaged by visitors or by new construction. This so-called "landscape naturalization"

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[73] Harry Langley, "Report to Chief Landscape Architect," September 8, 1932, Grand Canyon, Entry 7, RG 79, National Archives, Washington, DC.

[74] Scott, "Grand Canyon National Register Nomination," 19-21.

[75] Among the assistant and resident Park Service landscape architects making reports to chief landscape architect (through Superintendent Tillotson) during this period were: Harry Langley, Thomas E. Carpenter, and Alfred C. Kuehl. "Reports to the Chief Landscape Architect Through Superintendent," Grand Canyon, Central Files, Entry 7, RG 79, National Archives, Washington, DC.

[76] "Narrative Reports Concerning ECW (CCC) Projects in National Park Service Areas, 1933-35," Arizona, Entry 42, RG 79, National Archives, Washington, DC.

of disturbed areas attempted to recreate not so much the original conditions at an individual site, as a "beautified" condition featuring composed displays of native flora. At Grand Canyon, the planting designs emphasized the native plants of the pinyon-juniper belt that characterizes the 4,500 to 6,500-foot elevations in the park. Yuccas, Fernbush, Squawbush, and Bush mint were all used effectively to establish shrub borders and woodland understories. Pinyon pines and junipers, some of them large enough to require hoists and trucks to move the boxed roots, also were transplanted in the village area wherever ornamental plantings were desired. Areas around new construction received special attention, a fact which contributed immeasurably to the successful "harmonization" of new buildings. Such planting never hid the architecture behind a screen of vegetation, however, but enhanced and augmented the effect of the facade elevation. Local trees and shrubs planted strategically at the corners of buildings or as foundation plantings contributed as much to the building's total effect as did the choice of building materials. In other heavily used areas, such as along the rim walk, small islands of junipers, yuccas, and Fernbush were arranged as ornamental compositions that also contributed to the aesthetic appreciation of the park's flora generally.

Planting design and "landscape naturalization" of this sort clearly were influenced by the "natural gardens" described by Frank Waugh and others in the early 20th century. By the late 1920s, assistant Park Service landscape architects, working under Vint, had developed refined approaches to "naturalizing" disturbed areas by transplanting native trees and shrubs. In addition, by 1930 park scientists and interpreters such as Harold C. Bryant had put forward compelling environmental reasons for precluding the use of exotic species as ornamentals in national parks.[77] The term "landscape naturalization," in this case, implied the establishment of only native species, although William Robinson had originally coined the term to indicate the importation of suitable exotics. In any case, the use of nursery exotics in remote areas under harsh conditions would not have been cost effective (or even feasible) compared to making use of the hardened plant stock so readily available in nearby forests and meadows. The great success of assistant Park Service landscape architects, such as Ernest Davidson and Merel Sager, was in developing artistically compelling ornamental compositions while making use of local plants transplanted from nearby woods. Such planting design reinforced the general goals of landscape architectural development by strengthening spatial compositions or augmenting architectural facades; but by using local plants grouped by correct ecological associations, work of this type also "naturalized" areas that had been disturbed by construction or overuse, fulfilling the mandate to minimize the impact of physical development.[78]

In planting design, certainly, Park Service landscape architects successfully drew on the contemporary theory and examples of "natural style" gardeners such as Jensen or Waugh in order to create strategies for ornamental planting design appropriate for national parks. The

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[77] McClelland, Presenting Nature, 149-161, 221. McClelland discusses important, if ephemeral, examples of "natural gardens" cultivated as interpretative displays in national parks in the 1920s and 1930s, including the Yosemite Nature Garden.

[78] Ernest Davidson and Merel Sager were particularly active in the Pacific Northwest, and the administrative village and rim village areas of Crater Lake National Park retain original ornamental planting designs of particular significance from this era. Cathy A. Gilbert, Gretchen A. Luxenberg, The Rustic Landscape of Rim Village, 1927-1941 (Seattle: Department of the Interior, National Park Service, 1990).

use of native plants in "natural" arrangements had also been established as an appropriate complement to Arts and Crafts domestic architecture in California and elsewhere, and so it was a logical strategy for site work around new Park Service Rustic construction. Such horticulturally intensive work, however, made up only one component of the landscape architectural planning and design underway on the rim of the Grand Canyon in the 1920s and 1930s.

By the time the United States entered World War II, Grand Canyon Village had been essentially completed. It remains, remarkably, largely unaltered. Today there are 302 buildings and structures in the Grand Canyon Village NHL District, which was first placed on the National Register of Historic Places in 1975. Only 35 of these were built after 1941 or have been modified enough to significantly alter their appearance.[79] There are numerous other examples of Park Service village planning of this era, including Yosemite Village, the Mesa Verde administrative district, Yellowstone's Mammoth Hot Springs and Fishing Bridge Museum areas, Longmire and Yakima Park villages at Mount Rainier, the Munson Valley and Rim Village areas of Crater Lake, the Giant Forest and Ash Mountain areas of Sequoia, and others. In some cases, such as Mammoth Hot Springs, the Park Service planners merely reorganized circulation and visitor services in what was already an established administrative center. In others, such as Yakima Park (now called Sunrise), planners designed an entirely new developed area. The situation was usually somewhere in between, as it was at Grand Canyon. With the exception of Yosemite Village, however, none of these examples of park village planning compare to Grand Canyon Village in terms of size, historical significance, and artistic distinction.

Yosemite Village, because conditions there kindled the first attempts at national park village planning in 1914, can claim to be the first site at which visitor and administrative services were consolidated in a picturesque village landscape. But like many park villages in the national park system, Yosemite Village was extensively altered after World War II, diminishing its historical integrity. The rapid increase in visitor numbers that boded so well for the future of national parks in the early 1920s completely overwhelmed many visitor facilities by the 1950s. As postwar automotive tourism soared, many parks reverted to the overcrowded, potentially unsanitary situations that had inspired officials to undertake planned park development in the first place. Beginning in 1956, the Park Service began a major park redevelopment campaign, called "Mission 66," to accommodate far greater numbers of tourists in developed areas. One of the park villages most affected, in the end, was Yosemite. The construction of a new Degnan's concession building (1959) and a large Park Service visitor center (1967) began a transformation of the central village civic zone. In 1972, much of the village circulation system was "pedestrianized"; since then motor vehicles have either bypassed the village center or have been parked in nearby lots. The central plaza, no longer an arrival point, became part of an extended pedestrian mall, with new paths, lighting, and construction details dating to the early 1970s. The plaza itself was partially filled with raised, planted islands, surrounded by seating walls.[80]

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[79] Scott, "Grand Canyon National Register Nomination," 7-18.

[80] Land and Community Associates, Yosemite Valley, vol. 1, 2*114-2*116.

The "revegetation" of areas previously used for parking or other vehicular purposes led to the establishment of dense foliage in front of buildings and in open areas. This attempt to recreate oak woodland communities of native trees and shrubs may or may not have been successful ecologically. It is hard to imagine that a woodland ecosystem has been viably reestablished in an area which, even in 1914, was already a small city. What the reestablished vegetation definitely has done, however, is obscure the carefully crafted Park Service Rustic building facades behind screens of vegetation. This effect also diminishes the relationships of the buildings to one another, eroding the perception of the public spaces that the buildings once helped define. The central plaza, now largely "revegetated," is no longer perceptible as an important public space. Visitors no longer arrive at Yosemite Village at a well defined public plaza; and that plaza is no longer imbued with the sense of civic responsibility that Park Service Rustic architecture once embodied. As Daniel Hull knew so well, outside the context of an appropriate site plan, "rustic" architecture loses a great deal of its expressive and symbolic power. No longer "harmonized" with the landscape, the original buildings at Yosemite Village are now simply buried behind it. Perhaps most sadly, the maturing vegetation planted in the early 1970s now obscures many of the views from the village of the cliffs and other geologic formations of the surrounding valley. This geographic detachment greatly contributes to the generic, placeless quality of the village today--an ironic fate for a settlement privileged by such an extraordinary location.

At Grand Canyon Village, however, postwar development averted major alterations to the original village area. Planners sited a new southern approach road to the rim at Mather and Yavapai points. The road then extended west, where a new visitor center, campground, and shopping mall were developed, before arriving at the entrance to the historic village area. Hull's South Entrance Road no longer served as a main public entrance to the village, and therefore reverted back to Center Road (as it is known today). Motor vehicles again began arriving at Grand Canyon from the east, via what was once Grandview Road. This alteration to the overall circulation plan has reduced Hull's town plaza to a less significant location in the village. The new traffic pattern also further complicated the already busy intersection at what became (again) the main arrival point to the village: the area where the railroad tracks end, between the first administration building and the Fred Harvey Garage. Two new motels were also developed in the village, on the rim near the location that had been proposed in 1924 for the El Tovar annex. Assembled from modular, precast slabs of darkened concrete, and massed with extremely low silhouettes, the Kachina (1968) and Thunderbird (1971) Lodges are successfully understated presences on the rim.

Besides these changes, Grand Canyon Village remains little changed. Even rail service, suspended in the 1960s, was resumed in 1989, making the Grand Canyon once again the only national park with direct rail access into a central area of the park. Under the special circumstances offered by its legal and physical context, the village became, and has remained, an idealized vision of how new towns can be developed in ways that would enhance civic life, minimize environmental damage, and remain visually consistent with established conventions for the visual appreciation of land as landscape.

The Park Service policies for village planning that Hull established at Grand Canyon would remain largely unaltered through the 1920s and 1930s. Unity in architectural inspiration, for example, continued to be an essential feature for park village development, as it always had been. Park Service planners would also continue to devise village plans that separated uses, mainly between residential, civic, and utility areas. Another type of use, first suggested by Johnston and Leopold's "rim zone" and later reaffirmed by Hull, attempted to eliminate all development from the immediate vicinity of visually or environmentally sensitive areas, such as the rim of the Grand Canyon. A central civic space remained a feature of national park village plans of the era, as did the refined hierarchy of street types, such as those that Hull and Vint devised. New village streets typically conformed to topography, but in legible patterns that prevented overly circuitous circulation systems. Ornamental planting was intended to reaffirm the general goals of spatial organization and circulation and also to provide well composed displays; but since plants were usually transplanted from somewhere nearby and grouped by appropriate ecological associations, ornamental plantations could also serve to "naturalize" areas that had been disturbed by construction or visitor traffic. And in general, the response to topography and the preservation of natural features that F. L. Olmsted, Jr., emphatically recommended to his World War I town planners continued to be hallmarks of all aspects of National Park Service planning.

The Grand Canyon Village NHL District survives, like other great landscape parks in American history, to express the particular ideals of civic form originally articulated by the park's managers, advocates, and constituents. If New York's Central Park preserves the "new urban vision" put forward for 19th-century American cities, Grand Canyon Village embodies the highest standards of American "town planning" of the early 20th century. The precedents established at Grand Canyon for the development of national park villages were, at least for some, ideal prescriptions for urban development generally. In this sense, Hull advanced the role of national parks as 20th-century landscape parks: he initiated planning and development that would make the national park system a showcase of American planning ideals in the 20th century, just as municipal landscape parks had been in the 19th century.

The plan for Grand Canyon Village expounded the civic ideals of a certain generation of American planners and helped put National Park Service planning on the course it would follow at least until World War II. The challenges that face Grand Canyon Village today continue to be those that face American cities in general. As Grand Canyon Village has grown, it has sprawled--not unlike many American cities--in ways that early planners would not have anticipated. Increased traffic congestion and historic preservation are concerns that demand far greater attention than they did earlier in the century. Millions of tourists now arrive annually from all over the world, making the Grand Canyon one of the most visited places on earth. With luck, Park Service planners will continue to create design solutions that illustrate the best of what landscape architectural planning can achieve under such circumstances: development that alleviates the pressure put on delicate environments, while assuring that an ever larger and more diverse public continues to be able to fully appreciate "unimpaired" scenery, both as individuals and as a community. The Grand Canyon Village NHL District survives as evidence that this can be done.

Appendix G. Pre-design Report

Pre-Design by Architectural Resources Group, December, 1999.

Appendix H Pre-Design Report by Architectural Resources Group, December 20, 1999.

Pre-Design Report
for
Rehabilitation of the
South Rim Ranger Station
Grand Canyon National Park

prepared for the
National Park Service
Denver Service Center
prepared by
Architectural Resources Group
Architects, Planners & Conservators, Inc.
San Francisco, California

December 20, 1999

Table Of Contents

Executive Summary

Historical Background:

The Ranger Operations Building (Grand Canyon National Park Building No. 103) was constructed in 1929 to serve as the headquarters for Grand Canyon National Park. A prime example of early park rustic architecture, it was nominated to the National Register of Historic Places in 1975, and obtained National Historic Landmark Status in 1986. Designed under the direction of park landscape architect Thomas Vint, this two-story building features massive stone piers at its corners, topped by peeled locks forming brackets supporting the ends of the roof eaves. It is sheathed in horizontal wood siding at the first floor and vertical wood siding at the second. A small concrete vault addition was added to the east side of the building in 1935. A wood-framed extension to this vault is of an undetermined date. A north wing, of similar style to the original building, was constructed in 1938 to house ground floor restrooms. The building's interior was first remodeled in 1938. The last interior remodeling took place in the early 1980s.

Scope of Proposed Work:

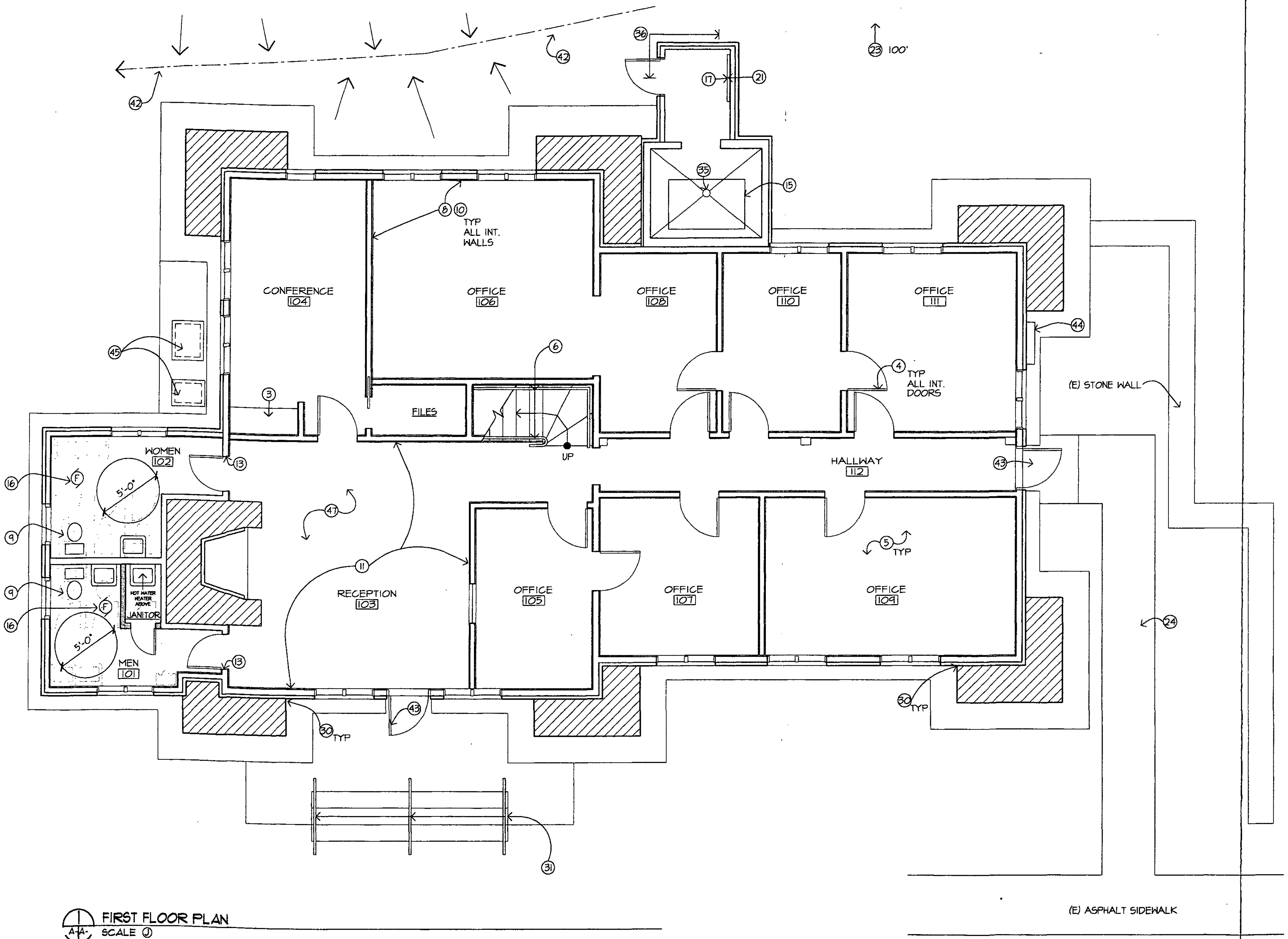
The building currently needs rehabilitation. Exterior rustic lap siding and exposed log elements are severely deteriorated and need stabilization to prevent the further loss of historic fabric. The aging plumbing and mechanical systems are badly outdated and inefficient. Heating the building is highly energy-consumptive and interior temperatures cannot be maintained at a comfortable level.

Items for rehabilitation include: re-pointing major joints in the historic stone foundations, repairing and replacing wood siding, repairing deteriorated exposed log ends, replacing roofing, rehabilitating existing wood windows to accept double glazing and weatherstripping, and installing insulation in the exterior walls and attic. At the interior, plywood wall paneling will be replaced with gypsum board sheathing and wood battens, hollow core doors will be replaced with two-panel wood doors and dropped ceilings will be removed and the original ceiling heights restored with a gypsum board finish. The intent of the interior work is install historically-sensitive finishes wherever possible. Electrical and mechanical systems will be replaced and upgraded, and new fire suppression and security systems will be installed. Code and accessibility-mandated upgrades are also included in the scope of work.

Pre-Design Package:

Included in this package are pre-design drawings which describe the scope of work, noting proposed building changes and upgrades; code and accessibility analyses with recommendations; and a Class C cost estimate for the proposed work. Also included are investigations and recommendations for improvements to the mechanical and electrical systems, prepared by Flack and Kurtz Consulting Engineers. Value analysis and life-cycle costing for the mechanical alternatives as well as the initial inspection report and project recommendations from the Denver Service Center staff are provided in appendices to this report.

Note: Portions of this report were updated in July, 2000 to reflect current information for the Historic Structures Report.



FIRST FLOOR PLAN

A-A SCALE ⓙ

GENERAL NOTES

REMOVE INTERIOR STORM SASH AT ALL WINDOWS. INSTALL INTERIOR BUG SCREENS TO MATCH ORIGINAL.

INSTALL HYDRONIC RADIATORS THROUGHOUT

KEY NOTES

③ REMOVE AND REPLACE UNIT KITCHEN

④ REMOVE (E) HOLLOW CORE DOORS AND INSTALL TWO-PANEL WOOD DOORS THROUGHOUT TO MATCH ORIGINAL (INCLUDES LEVER HARDWARE). TYP, U.O.N.

⑤ REMOVE (E) CARPET AND INSTALL CARPET AT FIRST FLOOR, U.O.N.

⑥ REMOVE (E) HANDRAIL AND INSTALL HANDRAILS AT BOTH SIDES OF STAIR

⑦ SEE SECOND FLOOR PLAN

⑧ REMOVE (E) PLYWOOD WALL PANELING. STRIP TO STUDS. INSTALL INSULATION AND GYPSUM BOARD WITH WOOD BATTEN TRIM TO MATCH ORIGINAL

⑨ REMOVE TOILET FIXTURES AS SHOWN AND PATCH FINISHES. REMODEL BATHROOMS AS SHOWN. RETAIN ORIGINAL FINISHES, IF POSSIBLE.

⑩ (N) PAINT THROUGHOUT

⑪ REPAIR/REFINISH (E) LOG SIDING

⑫ SEE SECOND FLOOR PLAN

⑬ WIDEN DOOR FRAME AND INSTALL DOORS WITH LEVER HARDWARE FOR ADA ACCESSIBILITY. RELOCATE (E) DOOR TO SECOND FLOOR

⑭ SEE SECOND FLOOR PLAN

⑮ REMOVE (E) MECHANICAL SYSTEM AND INSTALL BOILER (FUEL TO BE DETERMINED) AND HYDRONIC RADIATORS THROUGHOUT

⑯ INSTALL EXHAUST FAN

⑰ INSTALL ELECTRICAL UNDERGROUND SERVICE (200 AMP THREE PHASE) AND INSTALL BRANCH WIRING CIRCUITS THROUGHOUT WITH ISOLATED GROUND RECEPTACLES

㉑ RELOCATE ENTRANCE FOR UNDERGROUND COMMUNICATIONS AND ELECTRICAL SERVICE

㉓ REMOVE AND REPLACE UNDERGROUND FUEL TANK

㉔ RE-WORK SITE FOR DISABLED ACCESS: INSTALL ASPHALT WALK TO (E) ASPHALT SIDEWALK

㊿ CAULK EXTERIOR CRACKS BETWEEN MASONRY AND STUD WALLS: INSTALL BACKER ROD AND CAULKING, COVER WITH MASONRY MORTAR

㉛ INSTALL HANDRAILS AT FRONT STEPS

㉟ INSTALL FLOOR DRAIN

㊱ UNDERPIN FOUNDATION

㊷ RE-GRADE TO CREATE DRAINAGE SWALE

㊸ REMOVE AND REPLACE (E) ENTRANCE DOORS

㊹ REMOVE EXTERIOR COMMUNICATIONS AND ELECTRICAL CONDUIT

㊺ REMOVE (E) SHEET METAL COVERS AND INSTALL CONCRETE COVERS AT VAULTS

㊻ SEE SECOND FLOOR PLAN

㊼ RESTORE SCORED CONCRETE FLOOR AT LOBBY

SCALE ⓙ 4 0 4 8
1/4" = 1'-0"

PROJECT NORTH

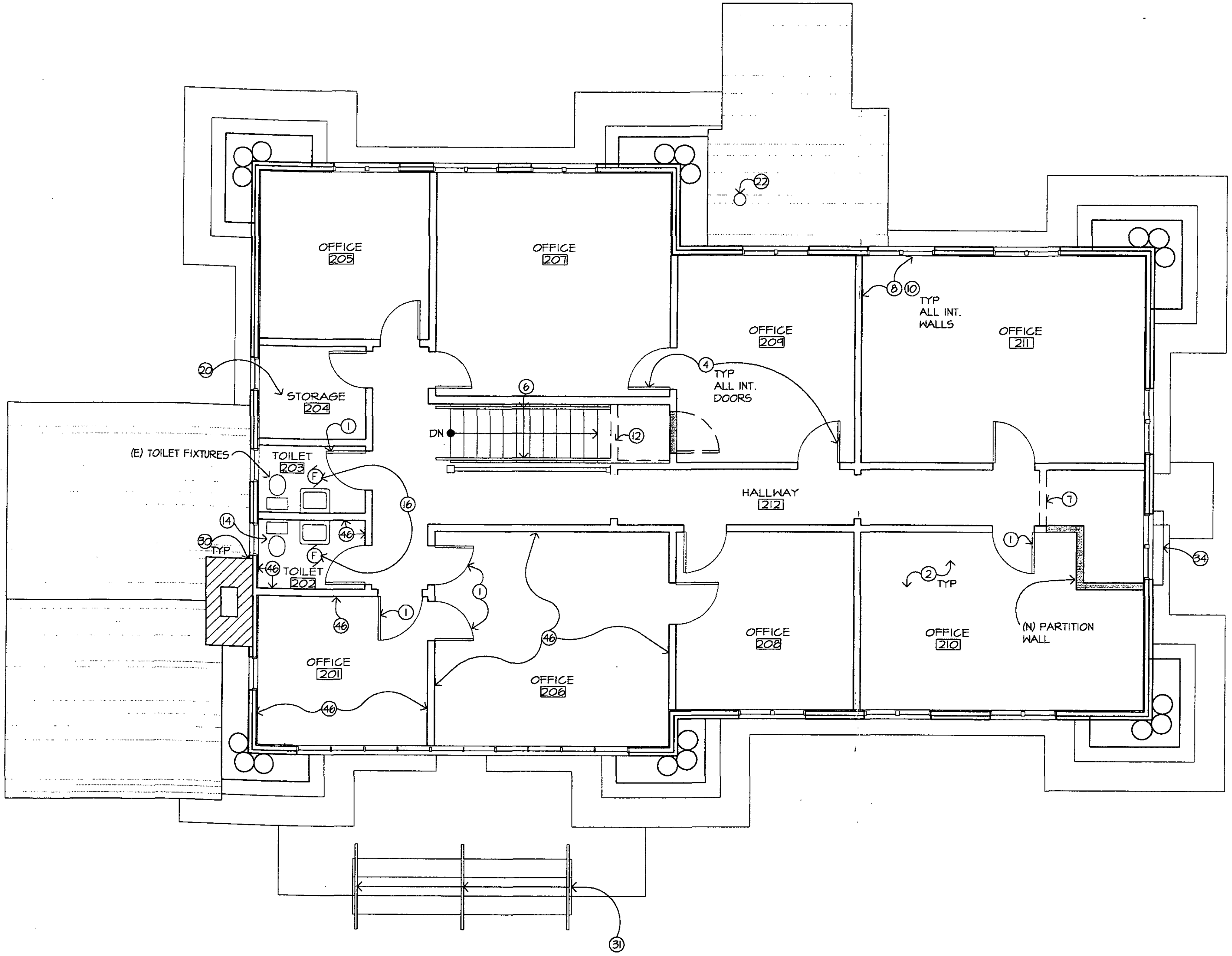
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A1

TITLE OF SHEET
PRE-DESIGN
FIRST FLOOR PLAN
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET
OF

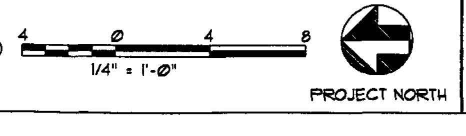
ARCHITECTURAL RESOURCES GROUP



SECOND FLOOR PLAN

A-A- SCALE ⓙ

SCALE ⓙ



GENERAL NOTES

REMOVE INTERIOR STORM SASH AT ALL WINDOWS. INSTALL INTERIOR BUG SCREENS TO MATCH ORIGINAL.

INSTALL HYDRONIC RADIATORS THROUGHOUT

KEY NOTES

① RETAIN (E) HISTORIC DOOR

② REMOVE (E) CARPET AND REFINISH WOOD FLOORS. TYP. AT SECOND FLOOR, U.O.N.

④ REMOVE (E) HOLLOW CORE DOORS AND INSTALL TWO-PANEL WOOD DOORS THROUGHOUT TO MATCH ORIGINAL (INCLUDES LEVER HARDWARE). TYP, U.O.N.

⑤ SEE FIRST FLOOR PLAN.

⑥ REMOVE (E) HANDRAIL AND INSTALL HANDRAILS AT BOTH SIDES OF STAIR

⑦ REMOVE (E) PARTITION

⑧ REMOVE (E) PLYWOOD WALL PANELING. STRIP TO STUDS. INSTALL INSULATION AND GYPSUM BOARD WITH WOOD BATTEN TRIM TO MATCH ORIGINAL

⑨ SEE FIRST FLOOR PLAN

⑩ (N) PAINT THROUGHOUT

⑪ SEE FIRST FLOOR PLAN

⑫ REDUCE SIZE OF CLOSET (RE-FRAME) TO ALLOW HEADROOM AT STAIRS

⑬ SEE FIRST FLOOR PLAN

⑭ INSTALL TOILET AND SINK

⑮ SEE FIRST FLOOR PLAN

⑯ INSTALL EXHAUST FAN

⑳ INSTALL SECURITY SYSTEM

㉒ REMOVE AND REPLACE FURNACE FLUE

㉚ CAULK EXTERIOR CRACKS BETWEEN MASONRY AND STUD WALLS: INSTALL BACKER ROD AND CAULKING, COVER WITH MASONRY MORTAR

㉛ INSTALL HANDRAILS AT FRONT STEPS

㉞ INSTALL METAL DROP LADDER

㊻ RETAIN HISTORIC WALL FINISHES

DESIGNED: WH DRAWN: WH TECH. REVIEW: WH DATE: 7/28/2000	SUB SHEET NO. A2	TITLE OF SHEET PRE-DESIGN SECOND FLOOR PLAN RANGER OPERATIONS GRAND CANYON NATIONAL PARK	DRAWING NO. PKG. NO.	SHEET — OF

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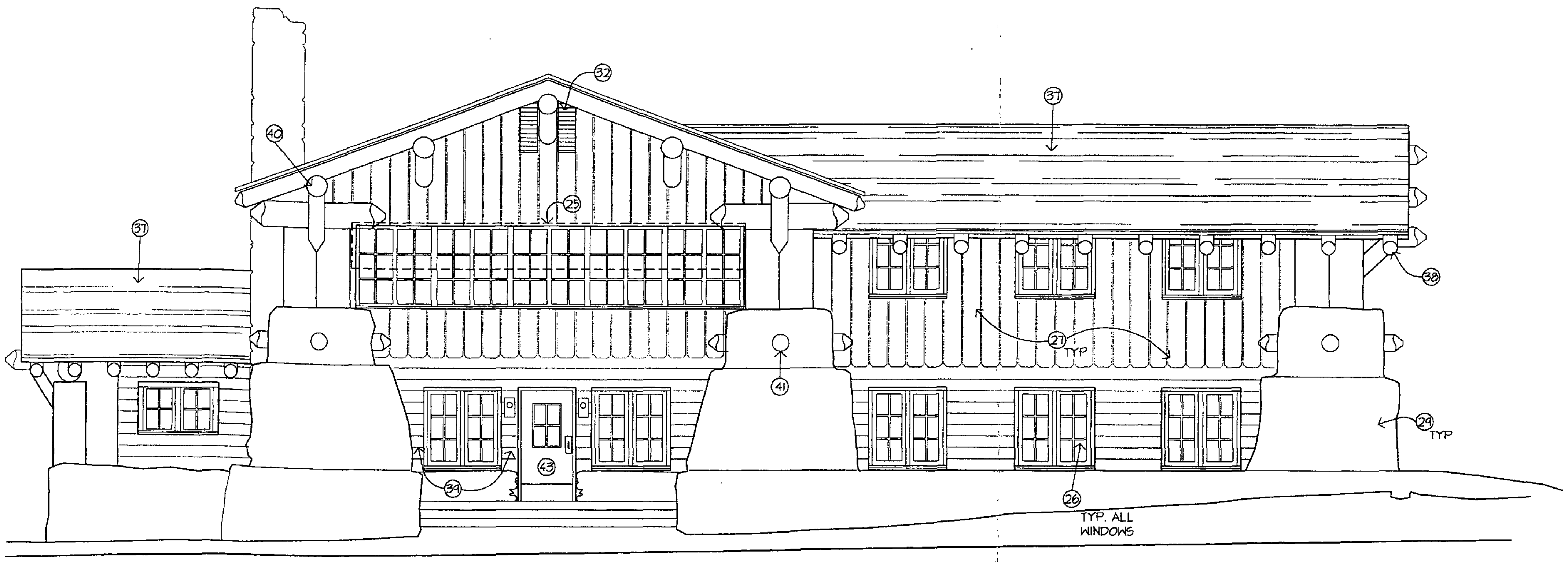


1 A-A- **WEST ELEVATION**
SCALE Ⓙ

KEY NOTES

㉕ REMOVE METAL AWNING. REMOVE (E) DOUBLE HUNG SASH AND REPLACE WITH CASEMENT SASH TO MATCH ORIGINAL.

㉖ REMOVE (E) GLAZING AND INTERIOR STORM SASH. ROUT OUT (E) SASH TO INSTALL INSULATING GLASS AND WEATHERSTRIPPING. INSTALL SCREENS AND BLINDS AT WINDOW INTERIOR

㉗ PAINT ALL EXTERIOR WOOD ELEMENTS

㉘ SEE EAST ELEVATION

㉙ SPOT REPOINT (E) MASONRY MORTAR

㉚ SEE FIRST FLOOR PLAN

㉛ SEE FIRST FLOOR PLAN

㉜ INSTALL ATTIC VENTS AT GABLE ENDS

㉝ NOT USED

㉞ SEE SOUTH ELEVATION

㉟ SEE FIRST FLOOR PLAN

㊱ SEE FIRST FLOOR PLAN

㊲ REMOVE (E) SHINGLE ROOF AND INSTALL COMPOSITION SHINGLE ROOF TO MATCH ORIGINAL, REPAIR SUBSTRATE

㊳ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG RAFTERS (APPROX. 50%)

㊴ SELECTIVELY REMOVE AND REPLACE AREAS OF DETERIORATED SIDING (APPROX. 20% HORIZONTAL & 10% VERTICAL)

㊵ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG ROOF BRACKETS

㊶ REPAIR AND REPLACE (E) DETERIORATED LOG OUTRIGGERS

㊷ SEE FIRST FLOOR PLAN

㊸ REMOVE AND REPLACE (E) ENTRANCE DOORS

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

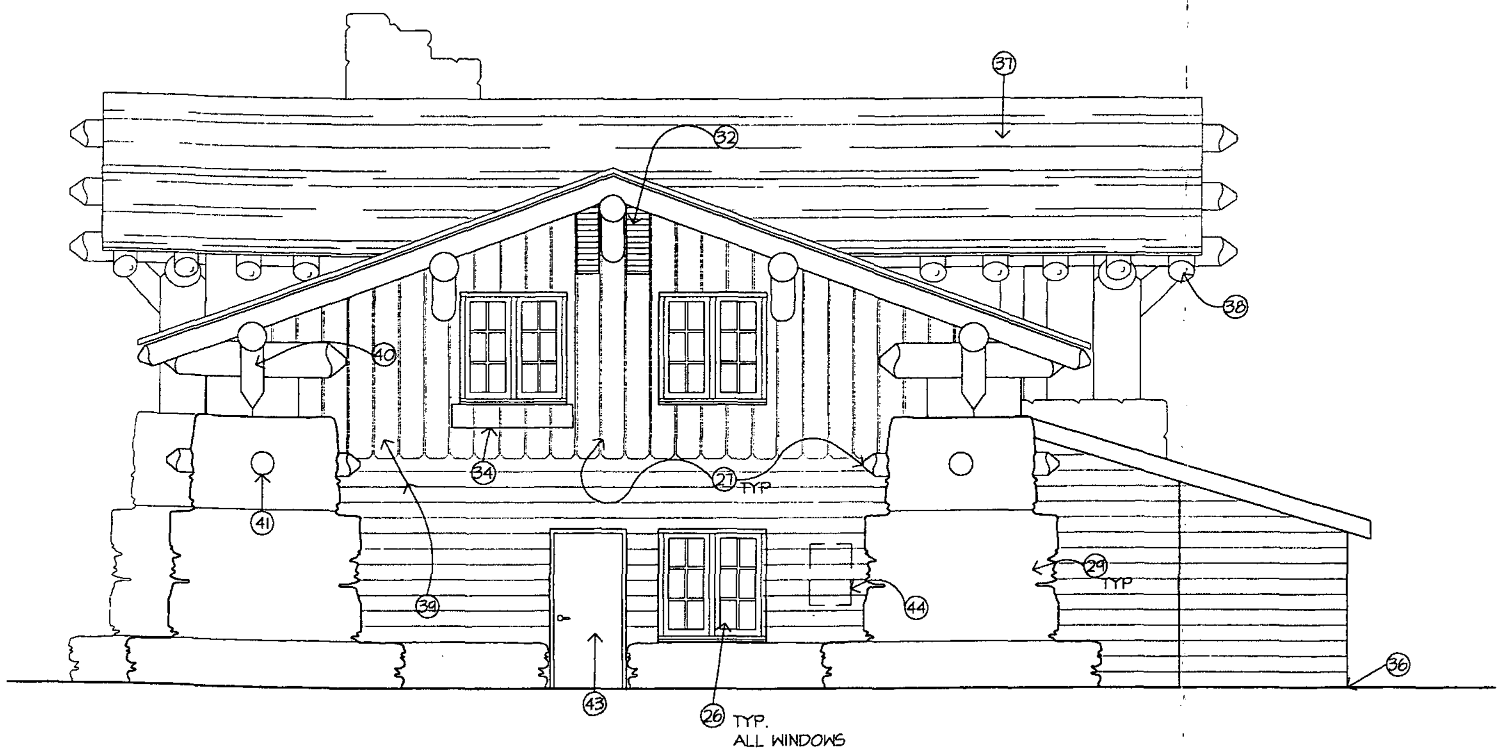
SUB SHEET NO.
A3

TITLE OF SHEET
PRE-DESIGN
WEST ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

ARCHITECTURAL RESOURCES GROUP



1/A-4 SOUTH ELEVATION
SCALE ⓙ

SCALE ⓙ 4 0 4 8
1/4" = 1'-0"

KEY NOTES

㉖ REMOVE (E) GLAZING AND INTERIOR STORM SASH. ROUT OUT (E) SASH TO INSTALL INSULATING GLASS AND WEATHERSTRIPPING. INSTALL SCREENS AND BLINDS AT WINDOW INTERIOR

㉗ PAINT ALL EXTERIOR WOOD ELEMENTS

㉘ SEE EAST ELEVATION

㉙ SPOT REPOINT (E) MASONRY MORTAR

㉚ SEE FIRST FLOOR PLAN

㉛ SEE FIRST FLOOR PLAN

㉜ INSTALL ATTIC VENTS AT GABLE ENDS

㉝ SEE WEST ELEVATION

㉞ INSTALL (N) METAL DROP LADDER

㉟ SEE FIRST FLOOR PLAN

㊱ UNDERPIN FOUNDATION

㊲ REMOVE (E) SHINGLE ROOF AND INSTALL COMPOSITION SHINGLE ROOF TO MATCH ORIGINAL, REPAIR SUBSTRATE

㊳ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG RAFTERS (APPROX. 50%)

㊴ SELECTIVELY REMOVE AND REPLACE AREAS OF DETERIORATED SIDING (APPROX. 20% HORIZONTAL & 10% VERTICAL)

㊵ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG ROOF BRACKETS

㊶ REPAIR AND REPLACE (E) DETERIORATED LOG OUTRIGGERS

㊷ SEE FIRST FLOOR PLAN

㊸ REMOVE AND REPLACE (E) ENTRANCE DOORS

㊹ REMOVE EXTERIOR COMMUNICATIONS AND ELECTRIC CONDUIT

ARCHITECTURAL RESOURCES GROUP

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DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.
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TITLE OF SHEET
PRE-DESIGN
SOUTH ELEVATION
RANGER OPERATIONS
GRAND CANYON NATIONAL PARK

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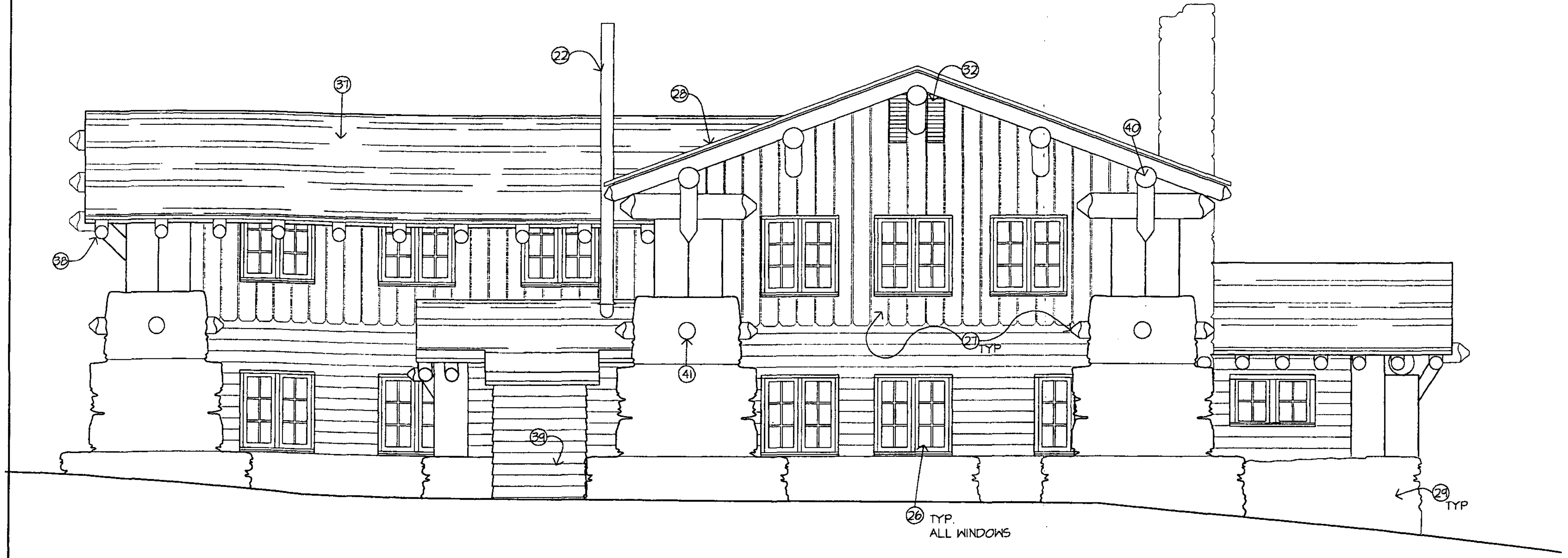

1 / A-A- EAST ELEVATION
SCALE Ⓙ

KEY NOTES

㉒ REMOVE AND REPLACE FURNACE FLUE

㉓ SEE FIRST FLOOR PLAN

㉔ SEE FIRST FLOOR PLAN

㉕ SEE WEST ELEVATION

㉖ REMOVE (E) GLAZING AND INTERIOR STORM SASH. ROUT OUT (E) SASH TO INSTALL INSULATING GLASS AND WEATHERSTRIPPING. INSTALL SCREENS AND BLINDS AT WINDOW INTERIOR

㉗ PAINT ALL EXTERIOR WOOD ELEMENTS

㉘ INSTALL LIGHTNING PROTECTION

㉙ SPOT REPOINT (E) MASONRY MORTAR

㉚ SEE FIRST FLOOR PLAN

㉛ SEE FIRST FLOOR PLAN

㉜ INSTALL ATTIC VENTS AT GABLE ENDS

㉝ SEE WEST ELEVATION

㉞ SEE SOUTH ELEVATION

㉟ SEE FIRST FLOOR PLAN

㊱ SEE FIRST FLOOR PLAN

㊲ REMOVE (E) SHINGLE ROOF AND INSTALL COMPOSITION SHINGLE ROOF TO MATCH EXISTING, REPAIR SUBSTRATE

㊳ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG RAFTERS (APPROX. 50%)

㊴ SELECTIVELY REMOVE AND REPLACE AREAS OF DETERIORATED SIDING (APPROX. 20% HORIZONTAL & 10% VERTICAL)

㊵ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG ROOF BRACKETS

㊶ REPAIR AND REPLACE (E) DETERIORATED LOG OUTRIGGERS

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

ARCHITECTURAL RESOURCES GROUP

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.
A5

TITLE OF SHEET
PRE-DESIGN
EAST ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

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PKG. NO.
SHEET
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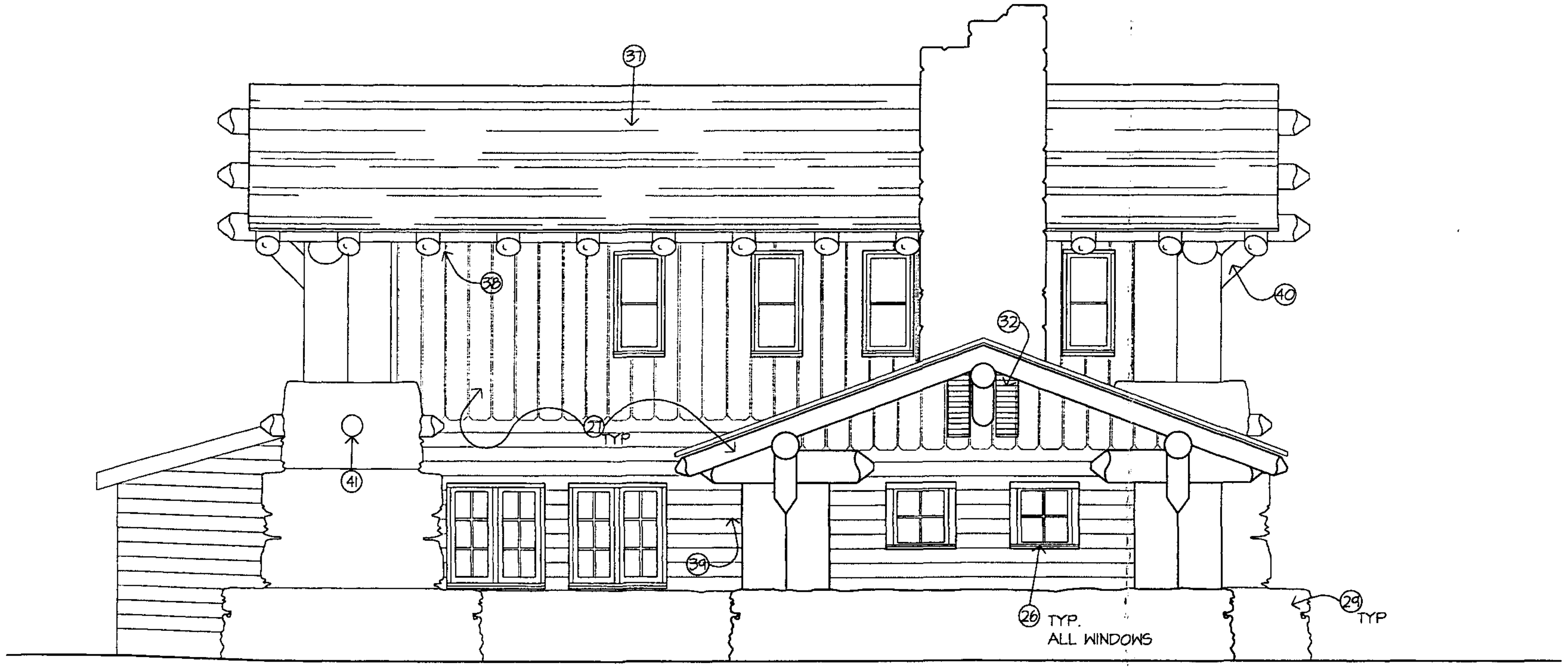
OF –



NORTH ELEVATION

A-A-

SCALE Ⓙ

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

KEY NOTES

- ㉖ REMOVE (E) GLAZING AND INTERIOR STORM SASH. ROUT OUT (E) SASH TO INSTALL INSULATING GLASS AND WEATHERSTRIPPING. INSTALL SCREENS AND BLINDS AT WINDOW INTERIOR
- ㉗ PAINT ALL EXTERIOR WOOD ELEMENTS
- ㉘ SEE EAST ELEVATION
- ㉙ SPOT REPOINT (E) MASONRY MORTAR
- ㉚ SEE FIRST FLOOR PLAN
- ㉛ SEE FIRST FLOOR PLAN
- ㉜ INSTALL ATTIC VENTS AT GABLE ENDS
- ㉝ SEE WEST ELEVATION
- ㉞ SEE SOUTH ELEVATION
- ㉟ SEE FIRST FLOOR PLAN
- ㊱ SEE FIRST FLOOR PLAN
- ㊲ REMOVE (E) SHINGLE ROOF AND INSTALL COMPOSITION SHINGLE ROOF TO MATCH ORIGINAL, REPAIR SUBSTRATE
- ㊳ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG RAFTERS (APPROX. 50%)
- ㊴ SELECTIVELY REMOVE AND REPLACE AREAS OF DETERIORATED SIDING (APPROX. 20% HORIZONTAL & 10% VERTICAL)
- ㊵ SELECTIVELY REMOVE, REPAIR AND REPLACE (E) DETERIORATED LOG ROOF BRACKETS
- ㊶ REPAIR AND REPLACE (E) DETERIORATED LOG OUTRIGGERS

ARCHITECTURAL RESOURCES GROUP

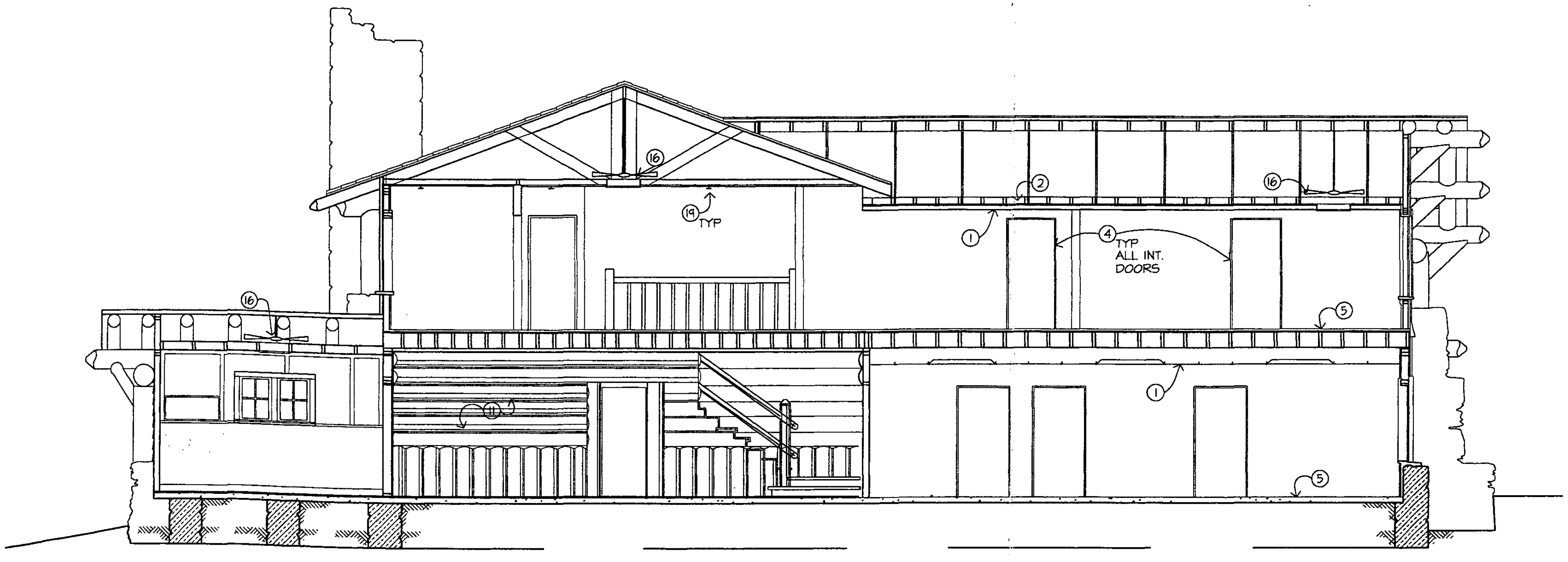
DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 10/24/2000

SUB SHEET NO.
A6

TITLE OF SHEET
PRE-DESIGN
NORTH ELEVATION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –



1 A-A LONGITUDINAL SECTION
SCALE Ⓙ

KEY NOTES

① REMOVE (E) DROPPED CEILINGS, CEILING LIGHTING AND WIRING. INSTALL NEW LIGHTING AND CEILING FINISH

② REMOVE (E) BLOWN-IN CEILING INSULATION AND INSTALL R-31 INSULATION AT ATTIC

③ SEE FIRST FLOOR PLAN

④ REMOVE (E) HOLLOW CORE DOORS AND INSTALL TWO-PANEL WOOD DOORS THROUGHOUT TO MATCH ORIGINAL (INCLUDES LEVER HARDWARE)

⑤ REMOVE (E) CARPET AND INSTALL CARPET AT FIRST FLOOR. REFINISH WOOD FLOORS AT SECOND FLOOR, U.O.N.

⑥ SEE PLANS

⑦ SEE SECOND FLOOR PLAN

⑧ SEE PLANS

⑨ SEE FIRST FLOOR PLAN

⑩ SEE PLANS

⑪ REPAIR/REFINISH (E) LOG SIDING

⑫ SEE SECOND FLOOR PLAN

⑬ SEE FIRST FLOOR PLAN

⑭ SEE SECOND FLOOR PLAN

⑮ SEE FIRST FLOOR PLAN

⑯ INSTALL BUILDING EXHAUST FAN

⑰ SEE FIRST FLOOR PLAN

⑲ INSTALL SPRINKLER SYSTEM

SCALE Ⓙ 4 0 4 8
1/4" = 1'-0"

DESIGNED: WH
DRAWN: WH
TECH. REVIEW: WH
DATE: 7/28/2000

SUB SHEET NO.
A7

TITLE OF SHEET
PRE-DESIGN
SECTION
RANGER OPERATIONS

GRAND CANYON NATIONAL PARK

DRAWING NO.
PKG. NO.
SHEET –
OF –

ARCHITECTURAL RESOURCES GROUP

Preliminary Code Analysis and Accessibility Evaluation

The following codes have been referenced for this analysis: the 1997 edition of the Uniform Building Code; the 1997 Uniform Mechanical Code; the 1996 Uniform Electrical Code; the 1994 Uniform Plumbing Code; and the 1997 Uniform Fire Code. The 1997 Uniform Code for Building Conservation (UCBC) has also been referenced to determine alternative code compliant solutions for historic buildings.

Although not a building code, the Americans with Disabilities Act (ADA) is a federal civil rights law that governs accessibility to buildings for the disabled. Because the intent of the ADA is not necessarily addressed in the building code, a review of a project pursuant to ADA requirements is included in the following preliminary code analyses.

The classification of historic buildings as qualified historic buildings is typically an important step in the long-term preservation of historic character. Building codes, such as the UBC, prescribe solutions to conditions based on new construction models. When conformance with prevailing codes - such as the UBC - would adversely affect the historic character of a qualified historic building, the UCBC may be invoked as a means to preserve historic fabric and explore solutions that meet the intent, but not necessarily the letter, of the UBC.

As indicated above, the following code analysis is preliminary. To facilitate future design work, this code analysis attempts to cite all major ways in which the building does not comply with prevailing codes. If the UBC and UCBC suggest that a condition may remain subject to verification with the building official, the non-compliant condition is typically noted and qualified.

The classification of program elements (uses) are as follows:

1st Floor:	Offices, reception area, conference room, toilet rooms (B occupancy under the UBC)
2nd Floor:	Offices, storage, toilet rooms (B occupancy under the UBC)

1) Occupancy Classification: Chapter 10 of the UBC establishes the available number of occupants in the building, (a ratio referred to as occupant load) and Chapter 3 outlines occupancy requirements. The following matrix excludes square footages for service areas occupied or used by the occupants of the major rooms; these spaces include circulation (corridors and staircases), toilet rooms, and closets. The rooms discussed below are shown on the building plans. Based on the table below, the total occupancy load for the first floor is 30 occupants. The total occupancy load for the second floor is 17 occupants.

Area and Occupancy Matrix

ROOM(S)	AREA (SQ. FT)	USE	OCC. LOAD (SQ. FT / OCC.)	NO. OF OCCS.	OCCU-PANCY
First Floor Offices	1600	office	1600/100	16	B
First Floor Conference Room	217	conference room	217/15	14	B
Second Floor Offices	1719	office	1719/100	17	B

Allowable Area / Height Matrix

BUILDING	OCCUPANCY	ACTUAL AREA	ALLOWED AREA (Type V-N Const.)	ALLOWED HEIGHT / (Type V-N Const.)	PERMITTED OR NOT IN BUILDING
Ranger Station	B	5575	8000	2	Permitted

2) Type of Construction: The existing construction is type V, non-rated, as defined in Chapter 6 of the UBC.

The following is a preliminary code analysis of the Ranger Operations Building, addressing only major code issues that have a bearing on facility planning issues and including suggested resolutions to broad code issues:

UBC INCLUDING LIFE SAFETY/DISABLED ACCESS REQUIREMENTS	**RESOLUTION OF CODE ISSUES**
1-hour fire-rated occupancy separation required between building heating equipment and other spaces (302.5).	Existing concrete walls are equal to one-hour construction.
When alterations exceed $1000, smoke detectors shall be hard-wired with battery back-up (310.9.1.3) and horns and strobes.	Existing system meets requirements.
Heating system must be able to supply 70 degrees F temperature at 3 feet above floor in habitable rooms (310.11)	Provide new hydronic radiator system to meet requirements

2 means of egress are required from B occupancies (Table 10-A) when the occupancy load exceeds 30 persons. Second floors with occupant loads of 10 or more shall have two exits (1004.2.3.2)	Two means of egress are provided at the first floor level (note: front door, if locked, must have interior panic hardware). Install a new metal drop ladder at a second floor window to provide secondary egress from the second floor.[1]
Stair configuration (winder) (1003.3.3.8.2) and tread depth (1003.3.3.3.3). do not meet code requirements	According to UCBC Section 402.6, "existing winding or spiral stairways may be accepted as one exit from a building, provided that a complying handrail is located at the stair's outside perimeter.". The stair will remain unchanged, with the addition of compliant handrails (see below).[2]
Stair head room does not meet code-required 6'-8" clearance (1003.3.4) at bottom of stairs	Remove second floor closet to allow increased head room at bottom portion of stair.
Stair handrails do not meet code requirements (1003.3.3.6)	Provide new handrails at both sides of interior stair. Provide three new handrails (one on each side plus intermediate handrail) at front exterior steps.
Dead end corridors longer than 20' prohibited (1004.2.6).	Reconfigure offices at south end of second floor to eliminate dead end corridor and provide access to window exit.
Assuming 20 men and 17 women in building, Table 29-A requires 2 toilets, 1 sink for men and 2 toilets and 1 sink for women. At least one toilet stall and lavatory (per sex) shall be accessible (1105.2.2)	Provide required number of fixtures. One toilet room will be added on the second floor. First floor toilet rooms to be accessible.

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[1] The installation of an additional stairway from the second floor of the building would remove a significant portion of needed and usable office space. As the rangers who occupy the second floor of this building perform jobs that require them to be fit and agile, the installation of a metal drop ladder from a second story window (to allow occupants to descent 12 feet to grade below) is proposed as an acceptable solution. According to UCBC Section 402.3, when approved by the building official, one of the means of egress may be a fire escape complying with section 402.5. Section 402.5 describes only fire escapes, not emergency drop ladders. As the drop ladder we are proposing is not addressed in the code, allowance for the proposed configuration will be at the discretion of the building official. UCBC Section 402.5 also states that such fire escapes shall not be accessed through an intervening room. To meet this requirement, the corridor on the second floor will need to be extended to the southern wall of the building to provide access to the window in question. This modification to UBC compliance will be made in conjunction with the installation of a fully automatic building-wide sprinkler system.

[2] Also according to UCBC section 402.6, "A winding or spiral stairway may not be the principal exit when used in conjunction with a fire escape as a second exit". As this is the condition that we are proposing, allowance/exception will be at the discretion of the building official.

An accessible path of travel is required to the structure and to all major functions housed in the structure, including the offices and toilet rooms.(1103.2.2)	Doors, hardware and controls, such as thermostats, may need to be replaced or modified to comply with disabled access requirements.
An accessible entry is required (1103.2.3)	Provide accessible entrance at south facade[3]
Accessibility to all portions of a building is required (1103.1.1)	Access will not be provided to the second floor[4]
Braille signage will be required at toilet rooms (1103.2.4.2)	Provide signage in Braille.

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[3] According to UCBC Section A305.2.2, "At least one accessible entrance that is used by the public shall be provided". The access that we are propsing at the south facade is not used by the public. This use is covered by the exception in A305.2.2: "When it is determined by the building official that no entrance used by the public can comply, access at any entrance that is unlocked during business hours may be used provided directional signs are located at the main entry. The route of travel for the accessible entry shall not pass through hazardous areas, storage rooms, closets, kitchens, or spaces used for similar purposes."

It is proposed to provide an accessible entrance at the south, side entry, though this is not the historic front entrance to the building. It is located along a path of travel 110 feet from the front door. The historic front door at the west facade is accessed by stairs and, as a result, is much more difficult to modify. Disabled access is more easily accomplished at the south entrance due to a relatively flat grade that leads to the building from the existing paved sidewalk, with no loss of historic features.

[4] According to UBC Section 1103.1.1, "Subject to the approval of the building official, areas where work cannot reasonably be performed by persons having a severe impairment (mobility, sight, or hearing) need not have specific features which provide accessibility to such persons." As all of the rangers that occupy this building must be mobile to execute their jobs, the second floor of the building will not be made accessible to such impaired persons. If a ranger is temporarily disabled (i.e. due to a broken leg) accommodations for temporary offices will be made at the accessible ground floor level. All potential public functions and uses for the building including office areas, conference room, and toilet rooms will be accommodated on the accessible ground level.

Mechanical Electrical and Plumbing
Schematic Report

for

Rehabilitation of the
South Rim Ranger Station
Grand Canyon National Park

prepared by

Flack & Kurtz Consulting Engineers
San Francisco, CA

National Park Service
South Rim Ranger Operations Building
Grand Canyon National Park

Mechanical, Electrical and Plumbing/Fire Protection Schematic Report

Prepared for:
Architectural Resources Group
Pier 9
The Embarcadero
San Francisco, CA 94111

Prepared by
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343 Sansome Street
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San Francisco, CA 94104

July 28, 2000

TABLE OF CONTENTS

I. STANDARDS

A. All work shall be installed in accordance with the following:

1. Uniform Building Code.
2. Uniform Mechanical Code.
3. Uniform Plumbing Code.
4. National Electrical Code.
5. Fire Code.
6. NPS Fire Marshal Requirements.
7. American National Standards Institute (ANSI).
8. National Fire Protection Association (NFPA) - all applicable standards.
9. Americans with Disabilities Act (ADA).
10. Other applicable codes, as necessary.

B. Materials and equipment shall be listed and labeled by Underwriters Laboratories or as required by authorities having jurisdiction.

II. HEATING, VENTILATING AND AIR CONDITIONING

A. OUTDOOR DESIGN CONDITIONS

1. Summer: 83°F dry bulb, 55°F wet bulb (ASHRAE 1.0%)
2. Winter: 8°F dry bulb (ASHRAE 1.0%)

B. INDOOR DESIGN CONDITIONS

1. Office Areas: No air conditioning or mechanical ventilation (Air conditioning may be considered as an option for the entire building). Outside air ventilation shall be provided through new operable windows. Hydronic heating to maintain minimum of 70°F in all areas as required.

2. Toilet Rooms, Janitor Rooms: Exhaust ventilation to provide 6 air changes per hour.

C. DEMOLITION AND REHABILITATION

1. The existing steam boiler, distribution piping, flue (flue was installed in the fall of 1999 and is not in compliance with 1997 UMC section 505.9.2), equipment, and radiators shall be carefully removed in their entirety from the buildings including insulation, hangers and steam traps. Any resulting damage to the fabric of the buildings shall be patched and repaired.

2. Remove existing underground fuel tank and fuel lines.

3. Pipe and duct insulation shall be tested for asbestos and removed according to State and Federal guidelines.

4. The contractor shall recycle as much removed steam and condensate piping and insulation as possible.

5. Remove all existing finned tube base board heating elements and any other radiant heating devices.

6. The existing fan coil units, sheet metal ductwork and fans shall be carefully removed from the building. The contractor shall recycle as much removed material as possible.

7. Existing attic gravity ventilation systems, if any, including roof vents shall be cleaned, dampers repaired and restored to serviceable operation.

8. Re-use existing floor and wall penetrations where practical. Seal and patch unused floor penetrations.

D. NEW HEATING SYSTEM

1. A complete new hydronic heating pipe distribution system shall be provided. This includes, but is not limited to, hot water propane fired atmospheric boiler, circulation pump, piping, insulation, radiators, thermostatic valves, flue and new fuel tank. A high efficiency condensing boiler with a side wall flue could be another option. However, it is significantly more expensive than a conventional boiler. Piping shall be concealed in attic spaces or walls wherever possible. Exposed piping shall be minimized. For exposed piping insulation provide white PVC jacketing and escutcheon plates. Provide expansion loops as required.

2. The piping distribution shall be a two-pipe supply and return with reverse/return arrangement. Pipe material shall be black steel or copper. Provide firestopping at floor and ceiling penetrations.

3. New convector/radiators shall be compatible with the historic character of the building, but shall be complimentary and contemporary such as the panel radiators manufactured by Runtal. All Runtal radiators shall be three rows high with rear-mounted heat transfer fins.

4. Each convector/radiator zone shall be provided with a thermostatic control valve. Provide 3-way valves located at the end of each run to allow variable volume pumping by riding the pump curve within acceptable limits. Each private office shall be one zone. Each large open area office shall be divided into two zones.

E. COOLING SYSTEM

Cooling may be required for the entire building. The following options will be considered (all three options would utilize operable windows).

1. Option 1:

   Remove exterior metal awning and install a central air conditioning system with the evaporator located in the attic and the condenser located remotely outside the building.

2. Option 2:

   Remove and replace the existing awning. Add interior blinds and a transfer fan to increase air circulation within the spaces.

3. Option 3:

Remove awning and install high performance insulating windows with interior blinds and a transfer fan to increase air circulation within the spaces.

F. SPECIAL APPLICATION AIR CONDITIONING

1. If required, temperature control in special application areas such as data processing or telecommunication rooms shall be met with dedicated split system DX cooling. Condensers will be discretely integrated into the landscaping surrounding the buildings. Provide an allowance for one 1.5 ton unit.

G. TOILET EXHAUST

1. Provide an allowance for one toilet exhaust system consisting of a cabinet fan, ductwork, volume dampers and two exhaust grilles.

2. Connect toilet exhaust fan to new architectural exhaust louver.

H. CONTROLS

1. Provide a central multi-channel electronic time clock to control building heating and exhaust system.

2. Boilers shall be provided with a dedicated boiler control package including all safety controls, hot water reset, lead/lag function and remote start function from tenant override/after hours control switches. Outside air sensor shall be used to enable boiler operation.

III. PLUMBING/FIRE PROTECTION

A. DEMOLITION

1. The existing ground floor plumbing fixtures are in poor condition, are not low flow, and will not be reused. The toilet fixtures on the ground floor will be removed and second floor fixtures will remain.

2. The lavatories, sinks and faucets on the ground floor are also in poor condition. They shall be removed and recycled if possible. The sink and faucets on the second floor will remain. If the faucets are to be re-used they will need to be tested, cleaned and retrofitted with reduced flow restrictors. Faucets deemed to be of historical status should be restored and retrofitted with flow restrictors. Other faucets should be replaced with new water saving types.

B. EXISTING CONDITIONS

1. Domestic Water Service:

The demand on the existing domestic water service is not being increased therefore it is expected the existing supply line will be reused. A new reduced pressure backflow preventor may be required. Confirmation of the new quantity of plumbing fixtures and additional miscellaneous new loads will be required to confirm that the existing building supply is adequate and will not have to be upsized. Assume all toilets and sinks are new low flow fixtures.

2. Domestic Hot Water:

The existing hot water system could not be verified. However the piping is old and will likely be replaced with a new hot water system. New water heaters shall be instantaneous point of use electric type due to the small number of fixtures.

3. Sanitary Sewer:

The building appears to have an adequate sanitary sewer, which could be re-used.

4. Fire Sprinklers:

There is no dedicated fire service.

6. Gas Service:

There is no natural gas service to the building. A new propane tank will be added to serve the new boiler.

C. FIRE PROTECTION SYSTEM

1. The building will be protected by a new hydraulically calculated dry sprinkler system based on light and ordinary hazard occupancy. Each floor will be considered as a separate sprinkler zone with its own sprinkler control valve assembly.

2. Sprinkler heads in finished areas will be quick response type, chrome finish with white escutcheon. Sprinkler heads shall be flush type. Side wall sprinklers will be considered in some circumstances in order to minimize impact on historical fabrics.

3. Monitoring of all system valves and water flow switches is required. A dedicated water supply will be provided to the building and will be valved. The building shall be fully sprinklered per NFPA – 13.

4. If there is inadequate water pressure, a in-line Fire Pump will be installed per NFPA-14.

5. The new fire protection system shall be addressable with a tie in to the central control station in an adjacent building. Flow switches shall have a minimum 10 second delay.

IV. ELECTRICAL

A. GENERAL

1. Demolition:

All existing conduit, wire, panels, equipment connections, lights, wiring devices, telecommunications wiring, outlets, etc. shall be removed in their entirety except as follows:

a. Existing concealed conduit and boxes used for light fixtures and wall switches shall remain.

b. Existing concealed conduit and boxes used for recessed receptacles and other wiring devices mounted in walls shall remain.

c. Existing fire alarm system (Radionics 9124) installed in 1997 shall remain. Fire alarm devices shall be added or relocated as required to suit new partition layout.

2. Power and Lighting:

New electrical service and distribution equipment will be required including new main utility company metering cabinet, main disconnect, branch circuit panelboard, conduit, wire, lighting fixtures, wiring devices, lighting controls, grounding, etc.

A new 200 amp, 120/208 volt, 3 phase underground electric service shall be provided. Electric service shall originate from a new APS power pole located approximately 200 feet from the building with three single-phase transformers with underground service conduits to the building. Assume a single 2" conduit for the under ground electric service. The actual service arrangement shall comply with APS utility company standards.

Dedicated areas for main electrical service equipment and electrical panelboard will be required to facilitate this installation as follows:

a. Space for a new electrical meter and main disconnect switch associated with a new electrical service to the building located in the utility/mechanical equipment room.

b. A new 200 amp, 120/208 volt, 3 phase rated main electrical panel will be located either in the utility room, or recessed in a wall on the first floor of the building, near the area where the existing panel is currently located.

The existing overhead electric service and electric service cabinet and conduits located on the outside of the building shall be demolished. All branch circuit conduit homeruns shall be re-routed to the new panel location.

3. Telecommunication Service:

A new main telecommunications service entrance cabinet will be located within the utility/mechanical room located behind the building. The existing over-head service will be removed and a new underground telecommunications service conduit shall be installed from the new service entrance cabinet to the existing power/telephone pole. Assume a 2" conduit for the new telecommunications service conduit.

New telecommunications service shall comply with the local telephone service provider requirements.

4. Security System:

A new security system will be provided consisting of keyless entry, security cameras at each of (2) exterior doors, door monitors and alarms on the two exterior entry doors, the door to the arms supply room, and the windows to the arms supply room.

B. BASIC MATERIALS

1. Wiring for all systems covered by this Division shall be in conduit.

2. Conduit in or below slab on grade shall be concrete encased PVC or PVC coated RSC. RSC shall be used in exterior locations, stub-ups to equipment connections, and exposed locations subject to damage.

3. Steel EMT or flexible MC type cable shall be used throughout except where another material is specified. Steel set-screw fittings for branch circuits. Steel compression fittings for feeders.

4. Conductors shall be copper, THHN, or THWN. Aluminum or copper bus in all equipment.

5. Branch circuit panelboards shall be bolt-on circuit breaker type with 10,000 AIC rating for 120/208V service or as appropriate for the service available short circuit current. Copper ground bus along with an isolated ground bus shall be provided.

C. POWER DISTRIBUTION

1. Electrical Distribution:

a. Conduit and copper cable, branch circuit panelboard and other power distribution equipment will be provided as required to distribute power throughout the building.

b. Anticipated utilization voltages will be:

(1) Lighting: 120 VAC, 1-phase.
(2) Receptacles: 120/208 VAC.
(3) Mechanical Equipment: 208 VAC, 3-phase.

c. Branch circuits shall utilize steel EMT or flexible metal conduit (MC type.) All conduit shall be at 1/2" minimum inside diameter or larger. Every effort should be made to conceal all conduits. Where conduits cannot be concealed, surface mounted Wiremold shall be provided with the actual routing and finish as approved by the Architect.

d. General purpose duplex receptacles will be provided as follows:

(1) For cleaning and maintenance purposes in corridors and in each room or office.
(2) Restrooms (GFI type).
(3) Within 25 feet of mechanical equipment.
(4) At exterior locations adjacent to the building access points (weather-proof type).

e. Receptacles will be provided in tenant areas and support areas per programming requirements. Tenant/user duplex receptacles will be provided as follows:

(1) In addition to the general purpose receptacle listed above, provide at least two duplex receptacles and two isolated ground (IG) type receptacles in each room for tenant/user office equipment. Outlets shall be located on opposite walls.
(2) Provide additional receptacles to specialized equipment such as copiers, kitchen equipment, main file server, etc.

f. Connect equipment to the panelboard. Maximum load per circuit shall be 1200VA. Maximum 6 general purpose receptacles per circuit. Maximum 4 IG type receptacles per circuit. Provide dedicated circuits to specialized tenant equipment such as copiers, kitchen equipment, main file servers, etc.

g. Provide equipment connections and coordination in accordance with manufacturer's recommendations and product submittals.

h. Branch circuits shall be provided with an insulated grounding conductor run with the circuit conductors. This grounding conductor shall be in addition to the ground path provided by the continuously grounded metallic raceway system that encloses the phase and neutral conductors.

i. Branch circuits serving IG type outlets shall be provided with an insulated, isolated grounding conductor. Isolated grounding conductors shall be isolated from other grounding systems back to the system point of origin.

j. Provide equipment connections and disconnect switches as required for the following equipment:

   (1) Mechanical equipment.
   (2) Food service equipment.
   (3) Owner furnished equipment.
   (4) Security equipment
   (5) Fire alarm equipment.

D. EMERGENCY POWER

1. Emergency power for lighting and exit signs will be provided by localized integral battery packs.

2. The fire alarm system will have integral battery backup for support of system per Code requirements.

E. LIGHTING FIXTURES, LAMPS AND CONTROLS

1. Illumination will be in accordance with the recommendations of the Illuminating Engineering Society, and CAC Title 24 Energy Conservation code.

2. New lighting and lighting controls shall be provided throughout. Refer to Lighting and Lighting Controls System Description by Architect.

3. Local occupancy sensors will be utilized in areas such as private offices, conference rooms, restrooms, and other applicable areas.

4. Exit signage shall be provided as required. Exit signs shall utilize either electroluminescent or LED sources for long life and energy efficiency.

F. TELECOMMUNICATION RACEWAYS

1. Empty conduits will be provided to allow the installation of cabling systems for tenant telephone, data, and other low voltage systems.

2. Telecommunications outlets will be provided in tenant areas and support areas per programming requirements. Tenant/user outlets will be provided as follows:

   a. Provide at least two duplex receptacles in each room for tenant/user office equipment. Outlets shall be located on opposite walls adjacent to the power outlets.

   b. Provide additional outlets to specialized equipment such as copiers, fax machines, main file server, etc.

3. Tenant telephone, data, and other low voltage outlets shall consist of a 4 inch square x 2 1/8 inch deep outlet box with single gang plaster ring and dedicated ¾" empty conduit to the main telecommunications cabinet.

G. GROUNDING

Provide the following grounding electrodes, bonded together to form the grounding electrode system:

1. Metal underground water pipe in direct contact with the earth for 3 meters or more and electrically continuous to the points of connection of the grounding electrode conductor and the bonding conductors.

2. Ground rod of copper clad steel, minimum ¾ inch diameter, minimum 10 feet long, driven full length into the earth. If a maximum resistance to ground of 25 ohms cannot be obtained with a single ground rod, provide additional ground rods installed not closer than 6 feet apart until a maximum resistance to ground of 25 ohms is obtained.

H. SECURITY SYSTEM

Provide a new security system to meet the program requirements. Security system shall secure the room with locked cabinet for fire arms as follows:

1. Door monitor and alarm on door to room housing the fire arms. Provide cardkey access

2. Break glass alarms on windows to room housing fire arms.

3. Door monitor and alarm to locked cabinet for fire arms.

5. Door monitor and alarm on main doors to building. Provide card key access.

6. Security cameras at both exterior entrances.

Security system shall consist of automatic dial up for remote alarm notification, as well as local audible alarms.

Conceptual Cost Plan
for
Rehabilitation of the South Rim Ranger Station Grand Canyon National Park

prepared by

Davis Langdon Adamson

INCLUSIONS

The project consists of renovating the South Rim Ranger Operations Building. Building shell work includes; minor repairs to the foundation, rehabilitation of vertical wood posts, removal and replacement of rafters, insulation of exterior walls with renovation of stonework as well, repair damaged wood siding, new entry doors, rehabilitation of existing wood windows to accept new storm sash and weather-stripping, removal of existing metal awning, insulation in the attic area and removal of existing wood shake roof and replacement with new fire retardant treated shakes.

Building interior includes; removal of existing fiberboard and replacement with gypsum board, some partitions will remodeled at the stairs and second floor offices, new doors and hardware, new ceramic tile at restrooms, carpeting throughout the remainder, new wood batten trim will be installed, painting throughout, new cabinets at kitchen area, window blinds removed and replaced, emergency egress ladder from second floor.

Mechanical systems include; new plumbing fixtures in all restrooms, new water heater, removal of existing steam heat system, installation of new hydronic heating system, supplemental cooling system and ventilation, new primary feed and panel, all new wiring to outlets and lighting, fire and security alarm system, new automatic fire sprinklers.

Site development includes; a new pedestrian access ramp, drainage swale, CMU block screen for propane tank, re-vegetation of disturbed areas with native species.

The project includes reasonable adjustment factors for remote location ($12.00/ SF included within general conditions) and cost escalation ($8.40/ SF).

INCLUSIONS

BIDDING PROCESS - MARKET CONDITIONS

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area. All unit rates relevant to subcontractor work include the subcontractors overhead and profit unless otherwise stated. The mark-ups cover the costs of field overhead, home office overhead and profit and range from 15% to 25% of the cost for a particular item of work.

Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors and general contractors, with a minimum of 4 bidders for all items of subcontracted work and 6-7 general contractor bids. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Davis Langdon Adamson has no control over the cost of labor, material, equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions at the time of bid, the statement of probable construction cost is based on industry practice, professional experience and qualifications, and represents Davis Langdon Adamson's best judgment as professional construction consultant familiar with the construction industry. However, Davis Langdon Adamson cannot and does not guarantee that the proposals, bids, or the construction cost will not vary from opinions of probable cost prepared by them.

BUILDING RENOVATIONS AREAS & CONTROL QUANTITIES

Areas

	SF	SF	SF
Enclosed Areas			
First Floor	2,825		
Second Floor	2,206		
SUBTOTAL, Enclosed Area		5,031	
Covered area	1,087		
SUBTOTAL, Covered Area @ ½ Value		544	
TOTAL GROSS FLOOR AREA			5,575

Control Quantities

				Ratio to Gross Area
Gross Area		5,575	SF	1.000
Enclosed Area		5,031	SF	0.903
Covered Area		1,087	SF	0.195
Volume		57,547	CF	10.323
Basement Volume		0	CF	0.000
Gross Wall Area		4,920	SF	0.883
Retaining Wall Area		0	SF	0.000
Finished Wall Area		4,920	SF	0.883
Windows or Glazing Area	10.57%	520	SF	0.093
Roof Area - Flat		0	SF	0.000
Roof Area - Sloping		3,894	SF	0.699
Roof Glazing Area		0	SF	0.000
Interior Partition Length		499	LF	0.090
Finished Area		4,511	SF	0.809
Elevators (x10,000)		0	EA	0.000
Plumbing Fixtures (x1,000)		10	EA	1.794

BUILDING RENOVATIONS COMPONENT SUMMARY

Gross Area: 5,575 SF

		$/SF	$x1,000
1. Foundations		0.13	1
2. Vertical Structure		1.61	9
3. Floor & Roof Structures		4.04	23
4. Exterior Cladding		23.44	131
5. Roofing & Waterproofing		10.30	57
Shell (1-5)		39.53	220
6. Interior Partitions, Doors & Glazing		7.54	42
7. Floor, Wall & Ceiling Finishes		17.76	99
Interiors (6-7)		25.30	141
8. Function Equipment & Specialties		2.65	15
9. Stairs & Vertical Transportation		0.46	3
Equipment & Vertical Transportation (8-9)		3.11	17
10. Plumbing Systems		4.12	23
11. Heating, Ventilating & Air Conditioning		10.13	56
12. Electric Lighting, Power & Communications		23.49	131
13. Fire Protection Systems		4.51	25
Mechanical & Electrical (10-13)		42.25	236
Total Building Construction (1-13)		**110.19**	**614**
14. Site Preparation & Demolition		5.87	33
15. Site Paving, Structures & Landscaping		2.90	16
16. Utilities on Site		1.63	9
Total Site Construction (14-16)		**10.39**	**58**
TOTAL BUILDING & SITE (1-16)		**120.59**	**672**
General Conditions	18.00%	21.71	121
Contractor's Overhead & Profit or Fee	6.00%	8.61	48
PLANNED CONSTRUCTION COST	***November 1999***	**150.90**	**841**
Contingency for Design Development	15.00%	22.60	126
Allowance for Rising Costs	5.00%	8.61	48
RECOMMENDED BUDGET	***July 2000***	**182.12**	**1,015**

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
1. Foundations				
Underpin existing foundation at boiler room				
Minor repairs to existing concrete footing	1	LS	750.00	750
				750
2. Vertical Structure				
Rehabilitate wood posts				
Remove damaged wood areas, patch with new wood, or epoxy fill, allow 5%	20	SF	450.00	9,000
				9,000
3. Floor and Roof Structure				
Rehabilitate wood roof brackets & rafters				
Remove damaged brackets, Install new, allow for 5 new wood brackets	5	EA	750.00	3,750
Remove damaged rafters, Install new, allow 50%	30	EA	625.00	18,750
				22,500
4. Exterior Cladding				
Insulation				
Install new batt insulation to exterior walls	4,920	SF	1.00	4,920
Stonework	*2,343*	*SF*		
Rake out areas of defective mortar, replace with new to match existing, allow 5%	120	SF	75.00	9,000
Install new caulking at joints with wood siding	180	LF	40.00	7,200

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
4. Exterior Cladding (continued)				
Wood Siding	*2,577*	*SF*		
Remove & replace areas of damaged wood siding, stain to match existing. allow 20% of lower siding, 10% of upper siding	300	SF	25.00	7,500
Renail, clean & refinish existing siding to remain	2,277	SF	7.00	15,939
Refinish fascias & trim	1	LS	5,000.00	5,000
Interior Finish				
Replace existing fiberboard with new gypsum board, taped & sanded	4,920	SF	1.85	9,102
Doors, Frames & Hardware				
Replace entry doors with new glazed wood doors & frames	2	EA	3,500.00	7,000
Windows & Glazing				
Rehabilitate all existing wood sashes to accept new glazing; sashes to match existing, include new custom hardware, screens & weather-stripping	65	EA	850.00	55,250
Refinish frames	35	EA	225.00	7,875
Install new attic vents	4	EA	350.00	1,400
Remove existing metal awning				
Remove existing awning, patch/repair siding	1	EA	500.00	500
				130,686
5. Roofing, Waterproofing & Skylights				
Insulation				
Install new batt insulation to attic	2,900	SF	1.00	2,900
Roofing				
Remove & replace existing wood shake roof, with new fire retardant treated shakes	3,894	SF	12.00	46,728
Minor repair of roof framing & sheathing	3,894	SF	2.00	7,788
				57,416

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
6. Interior Partitions, Doors & Glazing				
Partitions				
Replace existing fiberboard with new gypsum board, taped & sanded	4,491	SF	1.85	8,308
Cost to frame with internal security mesh at storage closet	312	SF	14.00	4,368
Allowance for reframing at second floor offices and egress	1	LS	1,500.00	1,500
Allowance for reframing at stairs	1	LS	2,000.00	2,000
Doors, Frames & Hardware				
Replace existing doors with new 2 panel wood doors. Install new hardware, reuse existing frames	25	EA	950.00	23,750
Security door at storage room	1	EA	2,100.00	2,100
				42,026
7. Floor, Wall & Ceiling Finishes				
Floor				
New ceramic tile in restrooms	230	SF	10.00	2,300
New carpet to remainder	4,281	SF	3.00	12,843
Wall				
Paint new gypsum board	9,411	SF	0.90	8,470
Wood 1" x 4" battens every 4' to match original layout on walls	3,493	LF	2.50	8,733
Wood 1" x 6" base, chair rails, ceiling moldings and wainscot	5,575	SF	4.50	25,085
Allowance for refinishing existing wood to remain	1	LS	10,000.00	10,000
Ceilings				
Replace existing fiberboard with new gypsum board, taped & sanded & painted	4,511	SF	7.00	31,577
				99,008

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
8. Function Equipment & Specialties				
Toilet Partitions & Accessories				
Install new toilet accessories at renovated restrooms	4	EA	450.00	1,800
Cabinets and countertops				
Lower cabinet with plastic laminate top	12	LF	225.00	2,700
Upper cabinet with shelving	12	LF	175.00	2,100
Light control and vision equipment				
Window blinds	520	SF	12.00	6,240
Special use equipment				
New two burner stove	1	EA	700.00	700
Refrigerator	1	EA	800.00	800
Microwave	1	EA	450.00	450
				14,790
9. Stairs & Vertical Transportation				
Stairs				
Install new handrails on interior stairs	1	EA	750.00	750
Install new metal drop ladder at west façade	1	EA	1,800.00	1,800
				2,550

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
10. Plumbing Systems				
Remove existing plumbing fixtures				
Ground floor restroom	11	EA	150.00	1,650
Second floor restroom	2	EA	150.00	300
Kitchen	2	EA	150.00	300
Modify plumbing in ground floor restroom, remove & cap abandoned piping	1	LS	4,000.00	4,000
Domestic Hot Water				
Replace existing hot water heater with new electric heater	1	EA	3,500.00	3,500
Replace supply piping & insulation	200	LF	18.00	3,600
Install new fixtures, including rough-in				
Ground floor restroom	4	EA	1,250.00	5,000
Second floor restroom	2	EA	850.00	1,700
Kitchen	2	EA	850.00	1,700
New floor drain at boiler room	1	EA	1,200.00	1,200
				22,950
11. Heating, Ventilation & Air Conditioning				
Replace Existing Heating System				
Remove existing steam boiler, piping & radiators	1	LS	8,000.00	8,000
Install new hydronic heating system, including new oil fired boiler & flue	5,031	SF	7.00	35,217

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
11. Heating, Ventilation & Air Conditioning (continued)				
Supplemental Cooling				
Add new 2 TN split system air conditioning unit for west facing offices	1	LS	4,000.00	4,000
Add new 1.5 TN split system air conditioning unit for data loads	1	LS	7,000.00	7,000
Exhausts				
Add new exhaust fans & ductwork to restrooms	3	EA	750.00	2,250
				56,467
12. Electrical Lighting, Power & Communication				
Primary Service				
Install new underground primary feeder from existing service pole	200	LF	75.00	15,000
Install new main circuit panel, 200A	1	EA	2,500.00	2,500
Power specialties				
Lightning protection	1	LS	4,500.00	4,500
Interior Wiring				
Replace all interior wiring with new conduit & wire, fully grounded	5,031	SF	4.00	20,124
Install new voice/data conduit & wire throughout	5,031	SF	4.00	20,124
Lighting				
Replace all interior and exterior light fixtures, including new exit lights and emergency battery packs	5,031	SF	6.00	30,186
Lighting controls, including occupancy sensors	5,031	SF	1.00	5,031
Receptacles & devices				
Replace all interior and exterior receptacles and devices	5,031	SF	2.00	10,062

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
12. Electrical Lighting, Power & Communication (continued)				
Alarm & Security				
Install new security buzzer with electronic lock at main entry door	1	EA	800.00	800
Install new fire alarm system	5,031	SF	3.00	15,093
Install new perimeter security system	5,031	SF	1.50	7,547
				130,967
13. Fire Protection Systems				
Automatic Sprinkler System				
Install new automatic sprinkler system	5,031	SF	5.00	25,155
				25,155
14. Site Preparation & Building Demolition				
Selective demolition of interior work	5,031	SF	6.50	32,702
				32,702

COMPONENT BUDGET	*Quantity*	*Unit*	*Rate*	*Total*
15. Site Paving, Structures & Landscaping				
Pedestrian paving				
Install new pedestrian access ramp	200	SF	3.50	700
Install new handrails at entry	18	LF	250.00	4,500
Site structures				
New CMU block screen, 6' high, surrounding propane tank with gate	336	SF	14.00	4,704
Site Drainage				
Install new drainage swale	80	LF	14.00	1,120
Landscaping				
Re-vegetate disturbed soil from new drainage swale with native plants	640	SF	8.00	5,120
				16,144
16. Utilities on Site				
New concrete Christy box lids for steam line access	2	EA	800	1,600
Replace existing underground fuel storage tank and replace with propane tank pad	1	EA	7,500	7,500
				9,100

November 12, 1999

Wendy Hillis
Architectural Resources Group
Pier 9, The Embarcadero
San Francisco, California
94111

South Rim Ranger Operations Building Grand Canyon National Park
Building Renovation Comparison

Dear Wendy:

Here is the steam heat and interior renovation comparison that you have requested. We analyzed several different projects and found that the Berkeley Unified School District Administration Building had undergone a similar renovation in 1993. The comparable costs are as follows:

Berkeley USD Administration Building in Berkeley, California. The building is 28,030 SF and was originally Berkeley City Hall. The work done included exterior restoration, some structural improvements, removal and replacement of steam heating system with a hot water heating system, removal and replacement of interior finishes and some partitions. We have taken the final construction cost of the mechanical systems replacement and interior finishes renovations. A general contractor won the open bid contract.

Total Cost per square foot for the steam heating replacement for the Berkeley Administration Building= $5.75/ SF without demolition. Reasonable adjustment factors include adds for cost escalation ($1.00/ SF) and smaller quantity factor ($0.50/ SF). The adjusted comparable square foot cost = $7.25/ SF. We have allocated $7.00/ SF for the Ranger Operations Building. Site complexity and remoteness factors are accounted for in our General Conditions and Profit Section of our Cost Plan.

Total Cost per square foot for the interior renovations for the Berkeley Administration Building = $17.50/ SF. Reasonable adjustment factors include adds for cost escalation ($3.50/ SF) and smaller quantity factor ($1.50/ SF), and the additional wood trim and paneling factor ($4.75/ SF).

The adjusted comparable square foot cost = $27.25/ SF. We have allocated $28.03/ SF for the Ranger Operations Building. Site complexity and remoteness factors are accounted for in our General Conditions and Profit Section of our Cost Plan.

If you have any questions, please contact us.

Sincerely,

Scott Ransdell
for Peter Morris

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April 11, 2000

Wendy Hillis
Architectural Resources Group
Pier 9, The Embarcadero
San Francisco, California
94111

South Rim Ranger Operations Building Grand Canyon National Park
Building Renovation Comparisons

Dear Wendy:

In response to your e-mail of March 20, 2000, we have examined the examples that you have provided and indexed them appropriately. We have provided additional examples for you to consider.

COMPARISON ROOF: Remove existing shingles and repair substrate

ARG Pasadena House, 6/96: Budgeted cost for demo, clean-up and roof replacement-$7.75/SF

> DLA adjustment factors: Time factor, add $1.31/SF, location factor add $2.72/SF, fire retardant add $1.50/SF for a total of $13.28/SF.
>
> We have budgeted $14.00/SF on our 11/1/99 estimate.
>
> A condominium project that DLA worked on in San Francisco on Russian Hill worked out to 12.70/SF for similarly adjusted construction components.

COMPARISON SIDING: Selective replacement of wood siding

ARG Seabreeze, City of Hayward, 1/99: Budgeted cost, wall finish replacement-$8.00/SF and rehab existing surface with sand and paint-$2.50/SF.

> DLA adjustment factors: Time factor, add $0.32/SF for wall finish replacement and $0.10/SF for sand and paint; location factor add $0.95 for wall finish replacement and $0.25 for sand and paint. Adjusted totals, $9.27 for new siding and $2.85 for painting.
>
> We have budgeted $9.09/SF for wall finish replacement and $1.95 for painting.
>
> The Presidio Fire station in San Francisco has an adjusted rate of $10.12/SF for new siding and painting.

A MEMBER OF DAVIS LANGDON & SEAH INTERNATIONAL

US Offices:
Los Angeles
San Francisco
Seattle
Sacramento

COMPARISON REPOINTING: Repointing stone foundations

ARG San Francisco Theological Seminary, repointing of rubble stone walls at $6.50/LF for a large quantitiy

> DLA adjustments, increase the rate per foot to $12.25/LF due to the small amount of repointing; we have budgeted $9,000 for repointing which will allow for 700 LF of mortar joints to be cleaned and repointed.

ARG Fort Point, San Francisco, 2/00: Budgeted cost for selective brick repoint-$21.02/SF

ARG University of Redlands Memorial Chapel Project, 12/99: Budgeted cost for repointing of stonework-$15.00/SF

> DLA adjustments are not as comparable. We have budgeted $6.90/SF for a small percentage of the wall area to be re-pointed, not the total wall area. If we are to re-point the entire stone wall surface, we would increase the cost plan to $18.50/SF.

COMPARISON WINDOW REHABILITATION: Renovation of existing windows

ARG San Francisco Theological Seminary refurbish existing wood windows-$1,000 each or if totally replaced-$2,500 each.

> DLA has priced the work based on labor per frame. In our estimate, we have allowed approximately $970.00 each, which represents 4.5 hours refinishing per window, an additional 4 hours for weather-stripping and hardware installation, 2 hours for glazing and pointing for a total of $577.50 in labor costs and $392.50 for material costs. Since the "science" of historic window refurbishment has some subjectivity, cost comparisons are not possible due to the numerous variables of modernizing a historic window.

If you have any questions, please contact us.

Sincerely,

Scott Ransdell
for Peter Morris

Appendix 1

Mechanical Systems Value Analysis and Life-Cycle Costing

VALUE ANALYSIS - Mini VA

Park: Grand Canyon
Project: South Rim Ranger Station
Package:
Date: 26 October 1999

Component Evaluated: Mechanical Systems

Phase I - Information:

Background Information/Special Concerns/Constraints/Previous Decisions/Description of Present Proposal/Design Assumptions

The building is currently ventilated solely by operable windows. This system does not allow for adequate ventilation, especially during the winter months when occupants are reticent to open their windows. The existing steam radiator system is old and insufficient. Added fan coil units are no longer operable. Offices on the west side of the building are hot during the summer months. Existing interior storm sash limit the amount of ventilation available through the operable windows.

Functional Analysis/Description of the Present Proposal:

	Active Verb	Noun
1.	provide	ventilation
2.	provide	heating
3.	provide	cooling
4.	provide	user comfort
5.		

For all of the systems evaluations, values were assigned assuming the following order of factor importance:

Most Important: Factor 5 - Improve Operational Efficiency and Sustainability
Factor 1 - Prevent Loss of Resources
Factor 6 - Protect Employee Health, Safety and Welfare
Least Important: Factor 2 - Maintain and Improve Condition of Resources

Phase II - Creativity (Alternatives): Fuel Systems

#	Alternative (Brainstormed)	Disposition of Alternative
1	Oil fuel	currently used
2	Propane	available
3	Electric power	too expensive
4	Natural Gas	not available

Phase III - Evaluation

Evaluation Sub-Factors or Variables :

#	Evaluation Variables or Sub-factors	Definition of Variable or Sub-factors
1	energy efficiency	

GRAND CANYON NATIONAL PARK - SOUTH RIM RANGER STATION
Choosing by Advantages

COMPONENT; Fuel System					FUNCTION: Fuel mechanical systems			
FACTOR	ALTERNATIVES							
	Alternative 1 • oil		Alternative 2 • propane		Alternative ___ •		Alternative ___ •	
PROTECT CULTURAL AND NATURAL RESOURCES								
FACTOR 1 - Prevent Loss of Resources								
Attributes	• oil spill detrimental to natural resources		• Propane spill not as detrimental to natural resources		•		•	
Advantages	*Least preferred set of attributes*	0	Greatest advantage*	90				
FACTOR 2 - Maintain and Improve Condition of Resources								
Attributes	• supply fuel for building heating system		• supply fuel for building heating system		•		•	
Advantages	equal advantage*	0	equal advantage*	0				
PROVIDE FOR VISITOR ENJOYMENT								
FACTOR 3 - Provide Visitor Services and Educational and Recreational Opportunities	N/A		N/A					
Attributes	•		•		•		•	
Advantages								
FACTOR 4 - Protect Public Health, Safety and Welfare	N/A		N/A					
Attributes	•		•		•		•	
Advantages								
IMPROVE EFFICIENCY OF PARK OPERATIONS								
FACTOR 5 - Improve Operational Efficiency and Sustainability	Energy efficiency		Energy efficiency					
Factor 5a -								

COMPONENT; Fuel System					FUNCTION: Fuel mechanical systems			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative ___		Alternative ___	
Attributes	• Dirty burn		• Cleaner burn		•		•	
Advantages	*Least preferred set of attributes*	**0**	Greatest advantage*	**50**				
FACTOR 6 - Protect Employee Health, Safety and Welfare	N/A		N/A					
Factor 6a -								
Attributes	•		•		•		•	
Advantages								
PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPKENT FOR THE NPS								
FACTOR 7 - Provide Other Advantages to the National Park System	N/A		N/A					
Factor 7a - Compliance Effort								
Attributes	•		•		•		•	
Advantages								
TOTAL IMPORTANCES OF ADVANTAGES		**0**		**140**				
Initial Cost (Net)	**$16,000**		**$8,000**					
Importance/Initial Cost Ratios	**0**		**.0175**					
Re-design Cost								
Compliance								
Life Cycle Cost (Net)	**$6,374**		**$6,374**					
Importance/ LCC Ratio	**0**		**.022**					
TOTAL	**0**		**.0395**					

Phase II - Creativity (Alternatives): Heating Systems

#	Alternative (Brainstormed)	Disposition of Alternative
1	Steam radiators	currently used
2	Hydronic radiators	possible
3	Forced Air	possible

Phase III - Evaluation

Evaluation Sub-Factors or Variables :

#	Evaluation Variables or Sub-factors	Definition of Variable or Sub-factors
1	aesthetics	
2	energy efficiency	
3	impact on historic fabric	
4	employee comfort	
5	ease of maintainability	

GRAND CANYON NATIONAL PARK - SOUTH RIM RANGER STATION
Choosing by Advantages

COMPONENT; Heating System

FUNCTION: Provide Heat

FACTOR	ALTERNATIVES							
	Alternative 1 • steam radiator		Alternative 2 • hydronic radiator		Alternative 3 • forced air		Alternative ____ •	
PROTECT CULTURAL AND NATURAL RESOURCES								
FACTOR 1 - Prevent Loss of Resources	impact on historic fabric aesthetics		impact on historic fabric aesthetics		impact on historic fabric aesthetics			
Attributes	• current system - any new piping in location of existing piping		• Use existing steam pipe location for water pies. No change in building fabric		• Ducts introduced to building. Limited spaces available for hidden ducts.		•	
Advantages	Greatest advantage*	90	Greatest advantage*	90	*Least preferred set of attributes*	0		
FACTOR 2 - Maintain and Improve Condition of Resources								
Attributes	• maintains heating in building		• maintains heating in building		• maintains heating in building		•	
Advantages	equal advantage*	0	equal advantage*	0	equal advantage*	0		
PROVIDE FOR VISITOR ENJOYMENT								
FACTOR 3 - Provide Visitor Services and Educational and Recreational Opportunities	N/A		N/A		N/A			
Attributes	•		•		•		•	
Advantages								
FACTOR 4 - Protect Public Health, Safety and Welfare	N/A		N/A		N/A			
Attributes	•		•		•		•	
Advantages								
IMPROVE EFFICIENCY OF PARK OPERATIONS								
FACTOR 5 - Improve Operational Efficiency and Sustainability	energy efficiency		energy efficiency		energy efficiency			

COMPONENT; Heating System					FUNCTION: Provide Heat			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative 3		Alternative	
Factor 5a -	ease of maintenance		ease of maintenance		ease of maintenance			
Attributes	• Energy efficient-radiant effect of heating units allows air temperature to be lower than in other systems • Not many people currently know how to maintain a steam radiator system.		• Energy efficient-radiant effect of heating units allows air temperature to be lower than in other systems • Maintenance of hydronic radiator system more widely known.		• Must heat building air to higher temperature for comfort • Maintenance of system well known. • Ducts could be used for future cooling system		•	
Advantages	*Least preferred set of attributes*	0	Greatest advantage*	100	Moderate Advantage	75		
FACTOR 6 - Protect Employee Health, Safety and Welfare	employee comfort		employee comfort		employee comfort			
Factor 6a -								
Attributes	• Heats space to comfortable level		• Heats space to comfortable level		• Heats space to comfortable level		•	
Advantages	equal advantage*	0	equal advantage*	0	equal advantage*	0		
PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPMENT FOR THE NPS								
FACTOR 7 - Provide Other Advantages to the National Park System	N/A		N/A		N/A			
Factor 7a - Compliance Effort								
Attributes	•		•		•		•	
Advantages								
TOTAL IMPORTANCES OF ADVANTAGES		90		190		75		
Initial Cost (Net)	$38,000		$27,000		$45,000			
Importance/Initial Cost Ratios	.002		.007		.002			

COMPONENT; Heating System					FUNCTION: Provide Heat			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative 3		Alternative ____	
Re-design Cost								
Compliance								
Life Cycle Cost (Net)	**$16,922**		**$11,948**		**$5,337**			
Importance/ LCC Ratio	**.005**		**.016**		**.014**			
TOTAL	**.007**		**.023**		**.016**			

Phase II - Creativity (Alternatives): Ventilation/Cooling Systems

#	Alternative (Brainstormed)	Disposition of Alternative
1	Through-attic venting with fans	possible
2	Ducted system (forced air)	possible
3	No change to current system (windows only)	Current system is not adequate

Phase III - Evaluation

Evaluation Sub-Factors or Variables :

#	Evaluation Variables or Sub-factors	Definition of Variable or Sub-factors
1	aesthetics	
2	energy efficiency	
3	impact on historic fabric	
4	ease of maintenance	
5	employee comfort	

GRAND CANYON NATIONAL PARK - SOUTH RIM RANGER STATION
Choosing by Advantages

COMPONENT; Ventilation and Cooling System					FUNCTION: Cool and Ventilate Interior Spaces			
FACTOR	ALTERNATIVES							
	Alternative 1 • through-attic ventilation (passive cooling)		Alternative 2 • Forced air (ducted) system		Alternative ___ •		Alternative ____ •	
PROTECT CULTURAL AND NATURAL RESOURCES								
FACTOR 1 - Prevent Loss of Resources	impact on historic fabric aesthetics		impact on historic fabric aesthetics					
Attributes	• Vents introduced at gable ends of building exterior. Fans placed in attic		• Ducts introduced to building. Limited spaces available for hidden ducts. Still must add vents at exterior gable ends to vent attic.		•		•	
Advantages	Greatest advantage*	**90**	*Least preferred set of attributes*	**0**				
FACTOR 2 - Maintain and Improve Condition of Resources								
Attributes	• Improves building ventilation and allows for passive cooling		• Improves building ventilation and allows for controlled cooling when desired		•		•	
Advantages	*Least preferred set of attributes*	**0**	Greatest advantage*	**70**				
PROVIDE FOR VISITOR ENJOYMENT								
FACTOR 3 - Provide Visitor Services and Educational and Recreational Opportunities	N/A		N/A					
Attributes	•		•		•		•	
Advantages								

COMPONENT; Ventilation and Cooling System

FUNCTION: Cool and Ventilate Interior Spaces

FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative		Alternative	
FACTOR 4 - Protect Public Health, Safety and Welfare	N/A		N/A					
Attributes	•		•		•		•	
Advantages								
IMPROVE EFFICIENCY OF PARK OPERATIONS								
FACTOR 5 - Improve Operational Efficiency and Sustainability	Energy efficiency		Energy efficiency					
Factor 5a -	ease of maintenance		ease of maintenance					
Attributes	• minimal energy cost (cost of running fan when needed) • Few components to maintain		• Large energy cost • Larger number of components to maintain		•		•	
Advantages	Greatest advantage*	**100**	*Least preferred set of attributes*	**0**				
FACTOR 6 - Protect Employee Health, Safety and Welfare	Employee comfort		Employee comfort					
Factor 6a -								
Attributes	• Possible uncomfortable temperatures for a couple of weeks during the year.		• Employees at comfortable temperatures at all times		•		•	
Advantages	*Least preferred set of attributes*	**0**	Greatest advantage*	**80**				
PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPMENT FOR THE NPS								
FACTOR 7 - Provide Other Advantages to the National Park System	N/A		N/A					
Factor 7a - Compliance Effort								
Attributes	•		•		•		•	

COMPONENT; Ventilation and Cooling System					FUNCTION: Cool and Ventilate Interior Spaces			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative		Alternative	
Advantages								
TOTAL IMPORTANCES OF ADVANTAGES		190		150				
Initial Cost (Net)	$2,300		$89,000					
Importance/Initial Cost Ratios	.083		.002					
Re-design Cost								
Compliance								
Life Cycle Cost (Net)	$750		$6.945					
Importance/ LCC Ratio	.025		.022					
TOTAL	.108		.024					

Phase II - Creativity (Alternatives): Windows

#	Alternative (Brainstormed)	Disposition of Alternative
1	Rehabilitate (e) window sash and install (n) storm sash.	possible
2	Rehabilitate (e) window sash to accept double glazing and weatherstripping. Install interior screens	possible
3	Replace (e) sash in kind with new sash that has double glazing and weatherstripping. Install interior screens	possible

Phase III - Evaluation

Evaluation Sub-Factors or Variables :

#	Evaluation Variables or Sub-factors	Definition of Variable or Sub-factors
1	aesthetics	

2	energy efficiency	
3	impact on historic fabric	
4	ease of maintenance	
5	ease of use	
6	employee comfort	

GRAND CANYON NATIONAL PARK - SOUTH RIM RANGER STATION

Choosing by Advantages

COMPONENT; Windows

FUNCTION: Provide views, ventilation, light

FACTOR	ALTERNATIVES							
	Alternative 1 • retain (e) sash		Alternative 2 • rehab. (e) sash		Alternative 3 • replace (e) sash		Alternative ____ •	
PROTECT CULTURAL AND NATURAL RESOURCES								
FACTOR 1 - Prevent Loss of Resources	impact on historic fabric		impact on historic fabric		impact on historic fabric			
Attributes	• No impact on historic fabric		• Minimal impact on historic fabric: new glazing		• Greatest impact on historic fabric: removal of entire sash		•	
Advantages	Greatest advantage*	90	Moderate advantage	70	*Least preferred set of attributes*	0		
FACTOR 2 - Maintain and Improve Condition of Resources	aesthetics		aesthetics		aesthetics			
Attributes	• no change in appearance		• minimal change in appearance of glazing		• minimal change in appearance of glazing		•	
Advantages	greatest advantage*	60	moderate advantage	10	moderate advantage	10		
PROVIDE FOR VISITOR ENJOYMENT								
FACTOR 3 - Provide Visitor Services and Educational and Recreational Opportunities	N/A		N/A		N/A			
Attributes	•		•		•		•	
Advantages								
FACTOR 4 - Protect Public Health, Safety and Welfare	N/A		N/A		N/A			
Attributes	•		•		•		•	
Advantages								
IMPROVE EFFICIENCY OF PARK OPERATIONS								

COMPONENT; Windows					FUNCTION: Provide views, ventilation, light			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative 3		Alternative ____	
FACTOR 5 - Improve Operational Efficiency and Sustainability	energy efficiency ease of maintenance ease of use		energy efficiency ease of maintenance ease of use		energy efficiency ease of maintenance ease of use			
Factor 5a -								
Attributes	• Storm sash limit amount of available ventilation through windows - energy inefficient • Two components of window sash (existing and storm) to maintain		• Double glazing - good energy efficiency • One component to maintain		• Double glazing - good energy efficiency • One component to maintain		•	
Advantages	*Least desirable set of attributes*	**0**	Greatest advantage*	**100**	Greatest advantage*	**100**		
FACTOR 6 - Protect Employee Health, Safety and Welfare	Employee comfort Ease of use		Employee comfort Ease of use		Employee comfort Ease of use			
Factor 6a -								
Attributes	• Difficult to open windows with storm sash at interior		• Easy to use • Interior screens allow for full opening of windows for cooling and ventilation		• Easy to use • Interior screens allow for full opening of windows for cooling and ventilation		•	
Advantages	*Least desirable set of attributes*	**0**	Greatest advantage*	**50**	Greatest advantage*	**50**		
PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPMENT FOR THE NPS								
FACTOR 7 - Provide Other Advantages to the National Park System	N/A		N/A		N/A			
Factor 7a - Compliance Effort								
Attributes	•		•		•		•	

COMPONENT; Windows					FUNCTION: Provide views, ventilation, light			
FACTOR	ALTERNATIVES							
	Alternative 1		Alternative 2		Alternative 3		Alternative	
Advantages								
TOTAL IMPORTANCES OF ADVANTAGES		150		230		160		
Initial Cost (Net)	$52,000*		$55,500		$47,125			
Importance/Initial Cost Ratios	.0028		.0041		.0034			
Re-design Cost								
Compliance								
Life Cycle Cost (Net)	$52,000		$52,000		$52,000			
Importance/ LCC Ratio	.0028		.0044		.0031			
TOTAL	.0056		.0085		.0065			

* Cost includes: Rehabilitate (e) sash + $29,250 + new storm sash at all windows $22,750 = $52,000

Phase IV - Development (Summary of Preferred Alternatives Advantages):

Based on the calculations in Phase III, the preferred alternatives are:

- **propane fuel**
- **hydronic radiator system**
- **passive ventilation through the attic and operable windows**
- **rehabilitation of the (e) window sash with double glazed and weatherstripped sash. Reinstall screens at the window interiors**

These alternatives provide the greatest energy efficiency, employee comfort and ease of use and maintenance, while limiting the impact on the historic fabric of the building and making minimal aesthetic changes to the historic appearance of the building.

Phase V & VI - Presentation & Implementation (Recommendations and Options for Implementation):

The above systems should be included in the rehabilitation work for the Grand Canyon South Rim Ranger Station. The building should be unoccupied during the course of this work. Work should be undertaken at one time (not phased).

November 2, 1999

Wendy Hillis
Architectural Resources Group
Pier 9, The Embarcadero
San Francisco, California 94111

Grand Canyon National Park
South Rim Ranger Station

Dear Wendy:

Further to your facsimile dated October 28, 1999, we have separated out the net costs for individual building components that you have requested. In addition, we have included the expected life cycle costs over a twenty-year period for each component. The life cycle costs do not include replacement costs. A 3.0% escalation factor has been included as well.

- An oil fired or a gas fired boiler are fairly close in cost to one another. However, with a propane unit, the storage tank is provided with the monthly service. We have allowed $8,000 for the boiler unit. A combination gas/ oil fired unit would nearly double the cost.

  Life cycle costs include a yearly service call and a burner replacement at year ten. $6,374.

- A steam radiator system proves to be problematic in a retrofit application. All the lines must drain to remove condensate and weekly system monitoring is required to maintain the efficiency of the system. A steam system would be approximately $38,000.

  Life cycle costs include two service calls per year, one system flush per year and steam-valve replacement at year ten. $16,922.

- The hydronic heating system we have allowed for includes pumps, water treatment, valves and pipes, insulation, headers and manifolds. Cost is $27,000.

  Life cycle costs include one service call per year, header replacement at year fifteen. $11,948.

☐ A forced air heating system including new ductwork typically runs $8.00/ SF or would total approximately $45,000.

Life cycle costs include a service call every two years, duct cleaning every five years, fan replacement at year fifteen. $5,337.

☐ Forced air ventilation system not including ductwork would be $3.00/ SF or $17,000.

Life cycle costs include a service call every ten years, new fan motor at year fifteen. $2,687.

☐ A new forced air heating, cooling and ventilation with ductwork is $16.00/ SF or approximately $89,000.

Life cycle costs include a service call every two years, duct cleaning every five years, fan replacement at year fifteen, new condenser at year fifteen and cooling recharging at years five, ten, fifteen and twenty. $6,945.

☐ We have included in our estimate $2,300 for attic fans and vents.

Life cycle costs include fan replacement at year fifteen. $750.

☐ To rehabilitate existing window sashes by stripping, puttying and refinishing, we would allow $450.00 per sash for a total of $29,250. To install a new storm sash at each window with frame and hardware we would allow $22,750.

Life cycle costs include refinish sash at years six, twelve and eighteen, replace weather-strip at year fifteen. $52,000.

☐ To rehabilitate existing window sashes by stripping, puttying, refinishing and altering sash to accept double-glazing the panes with associated weather-stripping and screens, we would allow $55,250.

Life cycle costs include refinish sash at years six, twelve and eighteen, replace weather-strip at year fifteen. $52,000.

☐ To replace existing sash in kind with new sash that has double-glazing, weather-stripping and screens, we have allowed $47,000.

Life cycle costs include refinish sash at years six, twelve and eighteen, replace weather-strip at year fifteen. $52,000.

The estimated costs above are net and do not include contractor mark-ups, profit, design contingency and escalation factors.

If you have any questions, please contact us.

Sincerely,

Scott Ransdell
for Peter Morris

SR/sr

Appendix 2

Initial Inspection Report and Project Recommendations

United States Department of the Interior
NATIONAL PARK SERVICE
Denver Service Center
12795 W. Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

IN REPLY REFER TO:
D5215 (DSC-CAP)
GRCA-017-10

Memorandum May 27, 1999

To: Shelley Mettlach, Denver Service Center Project Manager

From: David Ballard, Denver Service Center Historical Architect

Reference: Grand Canyon National Park Pkg. 017, Rehabilitate Historic Ranger Operations Building, PT – 10.

Subject: Site Visit for Building Inspection April 14, 1999

INTRODUCTION:

The purpose of the visit was to inspect the building to identify deferred maintenance, deteriorating architectural and structural elements and evaluate the mechanical and electrical systems. The team consisted of David Ballard, Job Captain, Emma Méndez Quiñones, Electrical Engineer, and Frank Lyons, Mechanical Engineer. A site visit was made on April 14 1999. Park Historical Architect Joanne Wilkins provided an introduction to the building, and park maintenance provided ladders and transportation. This report will document our findings and recommendations for rehabilitation according to the project description, and provide a preliminary cost estimate.

Building Background:

The Historic Ranger Operations Building, a prime example of early park rustic style architecture, was nominated to the National Register of Historic Places in 1975, and obtained National Historic Landmark Status in 1986. Designed under the direction of park landscape architect Thomas Vint, it was constructed in 1929 to serve as the park headquarters. The building features massive stone piers topped by peeled logs at the corners, horizontal siding on the first floor, vertical siding on the second. The low sloped roof is covered with wood shingles, and log outlookers support the extended eaves. A small east side addition constructed in 1935 to serve as the vault, and a north wing designed in a similar style was constructed in 1938 to house restrooms. There is also a wood framed extension to the 1935 vault, date of construction unknown. The interior was remodeled in 1938, and several times since then, the last time being in the early eighties.

Documentation:

A cursory review of the park and DSC files concerning this building revealed the following:

- Microfilmed original construction drawings from 1928.
- Construction drawings for the 1935 east addition.
- Construction documentation from the 1980 exterior work.
- Numerous notes about recent actions and decision regarding the building.

While there is much information in the National Register nomination Form, there is no completed HSR for the Ranger Operations Building.

FINDINGS:

Exterior

The exterior still retains its historic appearance and a significant amount of integrity.

The exterior walls are coursed rubble to the sill level of the first floor windows, with stepped, battered corner piers, (quoins) extending to the second floor level. While the site shows a minor amount of erosion, it appears to be primarily from foot travel, shortcutting across the site. The foundation doesn't appear to be failing or undermined, and the masonry shows no cracking that might be evidence of footing failure. There is a minor amount of stone repointing that could be done, but care must be taken to not overfill the joints and detract from the rustic stone appearance.

The walls between the piers are covered with rough cut 1"x10" siding. Short lengths of siding, such as between the windows and doors, and perhaps as much as 20% of the siding in other areas, have split and should be replaced. In general, the bottom edge of the siding has curled, but the 2" lap still provides sufficient cover to protect the sheathing.

The second floor is reverse board and batten, covered with 1"x12" vertical siding with 1"x4" battens. The bottom edge of the siding is dog-eared. The second floor is generally in better condition that the first due to the protection of the overhanging eaves, however it should be re-nailed as some of the connections have worked loose.

12" log ** OUTRIGGERS project from the quoins at the second floor level. These log projections are purely decorative and serve no structural purpose. They are somewhat loose in their sockets, and in early stages of decay, being both exposed and in direct contact with masonry. Their life could be extended if treated with preservative and painted.

The stone corner piers stop shortly above the second floor line, and support large vertical log columns that rise to the eaves. These vertical logs are in good condition. Horizontally above these columns is a 48" length of log that forms a visual support for the log brackets at the corners of the gabled elevations. There are five decorative log brackets on each of the four gabled elevations. The horizontal portions of the logs are perhaps 48" long and 12" extend beyond the edge of the roof. These brackets serve to support the gable rake log. All of the exposed bracket ends are in at least early stages of decay, with 50% advanced beyond that. There are log rafter tails at 4' on center along the all eaves of the building that have 12" of exposure beyond the protective edge of the roof. The tails are 8 feet long, and cantilever out from the wall over 4' to support the eaves. The file record and visual assessment indicate that many of these tails have had a 2' section replaced during the last major rehabilitation work on the building in the early 1980s. Similarly, all of the exposed bracket ends are in at least early stages of decay, with 50% advanced beyond that.

The windows are painted wood with single pane glazing. They are all casements on the first floor, and on most of the second as well. There are 10 double hung windows on the second floor above the main entrance on the west elevation. These are shown in the 1928 construction drawings as being casements; hence they either have been replaced at some point or are an original deviation to the plans. Those on the first floor, like the siding, are in somewhat worse shape than the second floor due to exposure. One or two sash have been replaced, many are missing hardware, or have replacement hardware that is inappropriate, have stripped screws attaching the hinges, and are generally ill fitting. One or two have frames that are loose within the wall. All seem to be operable to some degree. Most of the windows are in fair, repairable condition. The original interior screens have been replaced with double track, interior aluminum storm windows with screens.

The roof is covered with wood shingles. In general, the roof is in fair condition, with a few split, cupped, and missing shingles. The eaves are somewhat out of line, due to the failing of the log outlookers. The original drawings specified wood shakes, which would project a more rustic appearance. The roof is littered with tree debris that should be cleaned to promote drainage and drying to extend the life of the shingles. There are no gutters or downspouts.

On the north side of the building are two adjacent concrete vaults. The vault openings are secured by sheet metal covers. One vault provides access to a utility chase under the building, which is used to route steam and other plumbing utility lines. This appears to be the low point in the steam system and a small condensation return pump is located here. The other vault appears to provide access from the utility chase to the bath addition. It is filled with standing hot water one foot deep, apparently steam condensate.

The locations of main line underground utilities are unknown.

Interior

As previously stated, the building has had three additions, and has undergone at least three interior remodelings to reconfigure room layout.

The original construction drawings show the first floor was to be a slab on grade, or, as an alternative, a combination of slab on grade under the lobby, with the remainder of the first floor being framed with wood joist covered with subfloor and T & G finish floor. All floors are covered with carpet, but it feels as though it is a continuous slab on grade. A visual inspection of the small utility chase that runs under the lobby reveals that it is in fact a slab.

The existing structural system is adequate for the current loads. The exterior walls are framed with 2x6 studs, with 1"x sheathing covered by the rough cut 1"x10" siding. The second floor framing is 2x12 at 16"oc with 1x10 subfloor and T & G finish floor. The roof structure is supported by site built trusses. There is no evidence of any serious structural deficiencies or deterioration.

The lobby has retained it historic fabric, and has walls and ceiling of log slabs. The fireplace is stone with wood timbers similar to the exterior stone quoins. There is a cracked stone lintel spanning the firebox, an apparent replacement to the original slab timber. (There is some evidence that a steel lintel supports this span and the stone is decorative.) On either side of the fireplace are the original doors to the 1938 restroom addition. The floor is covered with glue-down carpet. The space is lighted by surface mounted ceiling fluorescent light fixtures.

The restrooms still retain almost all of their original finishes and fixtures, and seem in relatively good repair. The walls and ceilings are of beaded T & G boards, the floor is concrete, and the stalls are constructed of materials similar to the walls. The drawback is that neither the men's or women's rooms are ADA accessible.

The remainder of the finishes on the first floor date from the 1970's park remodeling. The walls are covered with wood paneling and the floors are carpeted. The ceiling is 2x4 suspended acoustical tile with surface mounted 2x4 fluorescent lighting fixtures. There is a small unit kitchen in the conference room.

Adjacent to the lobby is the stairway that leads to the second floor. The log handrail and second floor balusters seem to be original. The stair configuration is a winder, which is at variance with the original drawings that show an ell. The wide of the tread is 1" narrower that ADA requires, and the added pipe railing is not ADA compliant.

While the second floor has similarly undergone some room layout changes, several rooms retain their original finishes. The former Engineer's Office, Drafting Room and Men's Room still have painted homosote (Celotex) covered walls, with a chair rail 3'-2" above the floor. Above the chair rail vertical 1"x4" battens are spaced 4' oc, below the rail the

battens are spaced at 12" oc. There is a 6" wood base, and a 4" horizontal trim at the ceiling. The ceiling is also covered with homosote with battens at 4' oc in each direction. All these original finishes are in good condition.
The Men's Room, now unisex still has it original fixtures, determined by checking the date of manufacture stamped on the underside of the toilet tank top. The floor covering in this room has been replaced, but the original linoleum is still in place in the adjacent Women's' Room (now without fixtures and converted into a closet.) The bathroom that served the (former) Bed Room has also been converted to storage, and has had a new doorway installed.

The remainder of the second floor has been subdivided into modern office space. The walls are covered with wood paneling and the floors are carpeted. The ceiling is drywall with surface mounted 2x4 fluorescent lighting fixtures. Doors are painted flush wood hollow core, with simple painted trim. A portion of the second floor has the ceiling height reduced from 7'-6" to 6'-0" at the perimeter by the drywall ceiling following the sloping roof rafters.

The attic is accessed through a trap door located at the top of the stairs. As discussed below, the attic space is littered by several installations of electrical wiring, conduit, steam pipes, ductwork and fan coil units. There is a thin layer of loose fill insulation covering the second floor ceiling. An area where batt insulation was installed between the rafters has largely fallen, providing little if any value. The original structural system seemed in tact and there was no sign of any present or previous roof leaks.

While the park was in the process of installing an updated fire detection and annunciation system, some consideration should be given to installing a sprinkler system. Given that this building is listed on the National Register, it seems appropriate to provide this extra level of protection.

Mechanical Systems:

The existing mechanical system consists of a steam boiler located in a boiler room attached to the rear of the building. The piping enters the building thru holes in the wall – the interior routing was not traced throughout the building.

The existing system uses fuel oil from a tank located across the sidewalk about 100 feet from the boiler room. The tank is contained inside a cinderblock wall about three feet high; the tank is buried within this structure. This tank arrangement may not meet the current standards for underground storage tanks.

The building interior has both coil units and wall radiators. The two fan coil units located in the attic postdate the radiators, but apparently have not worked (or at least been used) in the past several years. The ductwork above the ceilings is of questionable tightness; two separate areas on the second floor appear to be served from two separate attic mounted systems. The attic areas are rather dirty from insulation and dust; both the ceiling insulation and pipe insulation to the fan units needs to be tested for fiber content to positively confirm the absence (or presence) of Asbestos Containing Materials (ACM's).

Some of the radiators on the second floor have large sheet metal covers, and probably date from the original installation. Other units in use are fin-tube dating from the 1970's. Few are ideally located due to the numerous changes in building layout over the years. The controls for the radiators are inefficient making comfortable temperatures hard to maintain, and there was ample evidence of temperature moderation by opening the windows.

Electrical System

The electric power is fed from an Arizona Public Service (APS) pole located near the Ranger Station. The pole-mounted transformer is single phase, 120/240 volt.

The service entrance equipment consists of a meter and two-fused main disconnects. One of the disconnects feeds two distribution panelboards and the other disconnect feeds a third distribution panelboard. At least one of the panelboards does not have access clearance required by code.

The branch circuit wiring in the facility consists of several types, is old and mainly unprotected.

Code Study:

While there was insufficient time for an exhaustive code study, several conditions should be investigated further.

- There is presently only one egress from the second floor.
- The egress stairway is combustible and is unprotected.
- The stair configuration is a winder.
- The handrails are not in compliance with code.
- The second floor is ADA inaccessible.
- The toilets are ADA inaccessible.
- The present heating system does not provide ventilation.

Hazardous Materials:

There are remnants of pipe insulation in the attic, and in the chase above the first floor suspended ceiling that may be asbestos containing materials (ACM). The pipe insulation in the attic has been disturbed, and if it is ACM, the whole attic space may be considered to have been contaminated. There may be other sources of ACM that were not observed, such as floor coverings, electrical wire insulation, and window glazing putty. Further, there may be lead-based paint (LBP) present, which would complicate the process of surface preparation for repainting. The entire building should have a Level 1 HAZMAT testing program performed.

RECOMMENDATIONS:

The following items for building rehabilitation are recommended:

General

- Complete Historic Structures Report to document the building, including code study.
- Complete Level 1 HAZMAT survey.
- Repair/ replace deteriorated log rafter outlookers.
- Repair/ replace deteriorated log roof brackets.
- Replace 20% of horizontal siding, re-nail, caulk remainder.
- Replace 10% of vertical board and batten siding, re-nail, caulk remainder.
- Rehabilitate existing wood windows, including new appropriate hardware. The sash appears to be thick enough to consider re-routing to allow installation of insulated glass panes. This would eliminate the need for interior storms, allowing recreation of the interior screens. It would also improve the thermal performance and physical comfort level of the occupants.
- Replace wood exterior doors with appropriate historical replications.
- While the roof is not in need of replacement immediately, it should be considered when the log outlookers are repaired.
- Perform minor re-pointing of the masonry.
- Re-caulk all exterior cracks and re-paint exterior. Consider use of borate preservative treatment on wood members prior to repainting.
- The historic interior finish materials remain appropriate today, and the interior COULD be restored to it historic appearance and configuration if desired. Regardless of that decision, the interior finishes should be updated.
- If there is no mechanical equipment in attic, insulation should be installed at the ceiling level and the attic space ventilated.

Mechanical

- The current mechanical equipment should be replaced with modern, high efficiency units. There should be sufficient space within the current building envelope for the new systems.
- The replacement and upgrade of the heating system will be based on new heat load calculations using the thermal characteristics of the rehabilitation design.
- The preferred fuel source for the heating system will be discussed with the park.
- Although not specifically investigated, the rest room facilities will also need renovation. Due to the age of the facility, new piping may be required to bring all plumbing up to code compliance.
- Consider installation of fire sprinklers.

Electrical

- Upgraded electrical system to 120/208 volts, three phase.

- The upgrade can be accomplished by (1) either locating a new pole with three single phase transformers with overhead service to the facility, or (2) by locating a new pole with three single phase transformers with underground service to the facility, or (3) by locating a new pole with switching at the pole and a pad mounted transformer with underground service to the facility. Either of the first two options is recommended: For historical reasons, it is possible the electric service shall remain overhead, conversely, for aesthetics reasons, undergrounding the electric service might be preferable.
- A single main disconnect with breakers should replace the two fused disconnects.
- Three-phase, 120/208 volts distribution panelboards should replace the existing panelboards, located at places where they meet code. The existing actually do not meet code, as there is no working clearance around them.
- New wire in conduit should replace the existing branch circuit wiring.
- Isolated ground receptacles should be added to accommodate the use of computers.
- Increased energy efficient lighting alternatives, both interior and exterior, should be evaluated which also compliments the historic nature of the building.

The above list of work is based on the investigation team's findings and evaluation of the existing conditions and relate to rehabilitation as requested by the park and described in the Project Data Sheet. While we were on site, the possibility of building restoration was raised by the park. While restoration of the building is entirely possible, the focus of this report remains rehabilitation. The question of restoration will be better answered with the completion of an Historic Structure Report.

An estimated cost for the above work is attached to this report. Any questions about this report should be addressed to David Ballard at (303) 969-2467.

Agreed Shelley Mettlatch, PM

cc: Harold Gibbs, GRCA NP Flagstaff
Joanne Wilkins, GRCA NP Architect
Sayre Hutchison, IMDE CNR

Appendix 3

Review Comments

DENVER SERVICE CENTER
REVIEW COMMENTS

DATE: **Monday, November 22, 1999**
PARK AND PKG NO: GRCA 017-10
PROJECT: South Rim Ranger Operations Building
PARK AREA: South Rim
% REVIEW: 100% Draft

NO.	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS
•	Reviewer: David Ballard	
1.	There are 10 double hung windows on the second floor above the main entrance on the west elevation. These are shown in the 1928 construction drawings as being casements; hence they either have been replaced at some point or are an original deviation to the plans. Most of the windows are in fair, repairable condition, and appear to have sash thick enough to allow for retrofitting with insulated glass. The existing glass is historic, however, and exhibits characteristics peculiar to old glass. A method of routing out the sash on the interior to install insulating glass, while leaving the old glass in place should be explored.	
2.	12" log outriggers (Note 41) project from the quoins at the second floor level. These log projections are purely decorative and serve no structural purpose. They are somewhat loose in their sockets, and in early stages of decay, being both exposed and in direct contact with masonry. Their life could be extended if treated with preservative and painted.	
3.	While the second floor has similarly undergone some room layout changes, several rooms retain their original finishes. The former Engineer's Office, Drafting Room and Men's Room still have painted homosote (Celotex) covered walls, with a chair rail 3'-2" above the floor. Above the chair rail vertical 1"x4" battens are spaced 4' oc, below the rail the battens are spaced at 12" oc. There is a 6" wood base, and a 4" horizontal trim at the ceiling. The ceiling is also covered with homosote with battens at 4' oc in each direction. All these original finishes are in good condition, and consideration should be given to preserving these finishes.	
4.	There are remnants of pipe insulation in the attic, and in the chase above the first floor suspended ceiling that may be asbestos containing materials (ACM). The pipe insulation in the attic has	

DENVER SERVICE CENTER
REVIEW COMMENTS

DATE: **Monday, November 22, 1999**
PARK AND PKG NO: GRCA 017-10
PROJECT: South Rim Ranger Operations Building
PARK AREA: South Rim
% REVIEW: 100% Draft

NO.	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS
	been disturbed, and if it is ACM, the whole attic space may be considered to have been contaminated. There may be other sources of ACM that were not observed, such as floor coverings, electrical wire insulation, and window glazing putty. Further, there may be lead-based paint (LBP) present, which would complicate the process of surface preparation for repainting. The entire building should have a Level 1 HAZMAT testing program performed.	
5.	The Ranger Operations Building is a Landmark Building. High consideration should be given to completion of an HSR for the building prior to any further work..	
•	Reviewer: Joanne Wilkins	
6.	Change two of title sheets from Death Valley to Grand Canyon! (Mech/Elec. & Plumbing Schematic Report & Conceptual Cost Plan	
7.	Replacing underground fuel oil tanks is not an option here in the park. We are replacing all fuel oil with propane.	
8.	Restrooms - please consider other options for the layout of the 1st floor restrooms in order to preserve as much of the historic fabric as possible. Mirrors, sinks, bead-board wainscot, and wooden partitions all add to the character of the space. Floors are concrete as originally constructed and retaining this is desirable if possible.	
9.	Consider removing office in lobby to restore that space to its original configuration. Floor in lobby was originally scored concrete. If it is possible to restore, this would be the preferred option.	
10.	Second story floors were originally Oregon pine. If this fabric is still intact we might consider restoring the wood floors.	
11.	Light fixtures over the 1st floor restroom doors in the lobby appear to be original....can we restore rather than replace?	
12.	Wood shingles rather than wood shakes were the original roofing material according to the Landmark Nomination form. Are wood	

DATE: **Monday, November 22, 1999**
PARK AND PKG NO: GRCA 017-10
PROJECT: South Rim Ranger Operations Building

PARK AREA: South Rim
% REVIEW: 100% Draft

NO.	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS
	shingles available in fire-resistant? This would be preferred.	
13.	After taking a closer look at the windows, it seems that insulated glass could easily be routed into the individual panes (on the inside) in order to retain the original glass yet provide energy efficiency. This is my first choice to rehab the windows.	
14.	The celotex is considered a fire hazard and we are removing it as we rehab buildings here in the park. However we are replacing it with gyp board and creating a finish which looks like celotex with battens 4' o.c. so the character of the space is retained. This way the new wiring, plumbing and insulation are easily installed also. I would like to see all the interior walls restored to this look	
15.	Completion of a HSR evaluating the various elements of the building for their historic significance and priorities would be most helpful in the rehabilitation.	

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